Hammill Institute on Disabilities

Journal of Positive Behavior Interventions
2018, Vol. 20(3) 138–148

DOI: 10.1177/1098300717753833
jpbi.sagepub.com
SAGE

An Empirical Examination of Effective Practices for Teaching Board Game Play to Young Children

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Abstract

We examined an intervention package using peer modeling, systematic prompting, and contingent reinforcement to increase the frequency and complexity of board game play and social behaviors in young children with disabilities. Four children with or at risk for disabilities participated with their typically developing peers. Results indicated a strong functional relation given the magnitude of change across conditions and participants and robust study rigor. Minor individual adaptations were used for two of the four participants. Overall, the study extends the research on board game play interventions with young children by demonstrating the effectiveness of an intervention that was successful for a diverse sample of preschool children with or at risk for disabilities and their peers.

Keywords

preschool, disabilities, peer-mediated procedures

Play is a critical milestone and a primary form of engagement for young children (Brown & Conroy, 2011; Brown, Odom, & McConnell, 2008; Lifter, Mason, & Barton, 2011). Play is related to improved social and communication skills (Lifter et al., 2011; Mills, Beecher, Dale, Cole, & Jenkins, 2014; Toth, Munson, Meltzoff, & Dawson, 2006), promotes improved physical and mental health (Hirsh-Pasek, Golinkoff, Berk, & Singer, 2009), and serves as an instructional context for embedding evidence-based practices (Barton & Ledford, 2017; Lifter et al., 2011). Play also provides a critical context for fostering relationships with caregivers (Cohn, 1990; Henry, 1990) and peers (Coolahan, Fantuzzo, Mendez, & McDermott, 2000; Ladd, 1990). Children with or at risk of disabilities, however, often demonstrate delays in play skills, which deleteriously affect their engagement in classroom activities including social interactions with peers (Barton, 2010). The effects can be cumulative because playful interactions with caregivers, peers, and teachers are a primary context for learning new skills (Barton, 2014; Dunst, Hamby, Trivette, Raab, & Bruder, 2000), including social skills that can be used across typical classroom activities, materials, and settings (Schneider & Goldstein, 2008).

The relation between social skills acquired through play and school readiness highlights a critical need to address play and social competence as early as possible (Lee & Bierman, 2015; Stormont, Herman, Reinke, King, & Owens, 2015). Social competence in children predicts important outcomes such as academic achievement, job retention, and relationship success (Christakis & Fowler, 2011; Jones, Greenberg, & Crowley, 2015). Effective interventions for addressing child social competence exist (Hemmeter, Snyder, Fox, & Algina, 2016) and primarily involve adult systematic prompting (Joseph, Strain, Olszewski, & Goldstein, 2016). The best outcomes have been associated with interventions in which adults intentionally plan and facilitate social interactions between typically developing children and children with disabilities (Odom & Strain, 1986). In fact, this type of peer-mediated instruction—when intentional and systematic—has been effective for teaching the broad range of discrete skills needed to positively affect the frequency and quality of peer-related social interactions (Odom et al., 1999; Strain & Bovey, 2015).

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Action Editor: Todd Haydon

Although typical preschool curricula include a variety of social activities, the research on play and peer-mediated interventions has focused primarily on dramatic or toy play activities (Barton & Wolery, 2008; Goldstein, Lackey, & Schneider, 2014; Joseph et al., 2016; Jung & Sainato, 2013). For example, studies have examined practices related to improving the frequency of play, complexity and pretend play with toys, and sociodramatic play with scripts (Barton & Wolery, 2008). A dearth of research exists on teaching young children to play specific, developmentally appropriate games with their peers (Baker, 2000), which might provide multiple opportunities for social interactions. Play with board games, in particular, has the potential to be beneficial for teaching children with disabilities to interact with their peers due to the structured format (Davis-Temple, Jung, & Sainato, 2014). Board games are ubiquitous to early childhood settings and, as such, provide a normative context for structured social interactions between children with and without disabilities. Board games also might be a preferred activity for teaching other skills such as social communication, early academic concepts, or fine motor skills. Furthermore, teaching board game play to children with and without disabilities has practical benefits, in that play with board games provides a context for children to engage with one another independently in a meaningful activity, which permits teachers or caregivers to attend to other instructional needs.

The research on teaching children with disabilities to play board games with their peers is limited, but burgeoning. Deming (1999) taught five children with autism spectrum disorder (ASD; age = 4–6) to play board games with an adult and peers using a least to most prompting procedure. Specific games were chosen based on the child's preexisting functional repertoire (e.g., Candy Land®, Clue Jr.®). However, methodological limitations including variability during baseline and significant overlap across adjacent conditions preclude identification of a functional relation and restrict additional interpretations. Baker (2000) taught three young children with ASD to play a BINGO game with their typically developing siblings. The BINGO game was not traditional, however, and included a focus on idiosyncratic ritualistic themes (i.e., number lines, crashing cars, movie clips). Although all children demonstrated increased social interactions after intervention and generalized across settings and games, methodological issues (e.g., procedural fidelity, accuracy with game play was not reported) limit interpretations and external validity of their results. Davis-Temple et al. (2014) taught three boys with disabilities to play board games with their peers following a brief didactic training and a least to most prompting hierarchy, which began with the typically occurring antecedent (e.g., the presentation of the games) followed by the adult delivery of increasingly intrusive prompts. Although their study supports previous research using least to most prompting hierarchies to support child play and social skills (Barton & Wolery, 2008), the baseline level of appropriate board game was variable and in a slightly therapeutic direction for one of three participants, which limits the identification of a functional relation. Two of the three participants with disabilities in their study maintained board game play with the removal of teacher prompts, which suggests the intervention package (i.e., didactic training and least to most prompting) was effective for teaching the children a play repertoire with their peers in the context of a structured, developmentally appropriate, and normative activity. Oppenheim-Leaf, Leaf, and Call (2012) taught two boys with ASD (5 and 7 years old) to play three different games using systematic adult prompting and a token reinforcement system. Although the exact teaching procedures are not readily discernable, their study extended this line of research by teaching children with ASD to play three different social games with distinct materials and skills: (a) UNO®, which uses cards, numbers, and colors; (b) Go Fish, which involves labeling pictures and matching; and (c) Yahtzee® Jr., which involves rolling and counting multiple dice. However, they did not measure the child's game play with peers, only with adult play partners.

The purpose of the current study was to extend the research on board game play with young children using effective strategies (i.e., peer modeling, systematic prompting, and contingent reinforcement) to increase the frequency and complexity of board game play and social behaviors in young children with disabilities. The research questions guiding this study were as follows:

Research Question 1: Does an intervention package using a system of least prompts (SLP) procedure, visual activity schedules, peer models, and contingent reinforcement increase independent board game play in young children with or at risk of disabilities during intervention sessions?
Research Question 2: Does the intervention package increase duration of social communication between children with or at risk of disabilities and other individuals during intervention sessions?
Research Question 3: Do increases in appropriate board game play generalize to an untrained board game and maintain across time?

Method

Participants

Four target and six peer participants were recruited after obtaining institutional review board approval. Inclusion criteria for all children were that the child (a) was between 12 and 72 months old, (b) attended school at least 80% of scheduled school days in the past month, (c) demonstrated

the motor skills required to manipulate board game pieces (e.g., pincer grasp, isolation of index finger), (d) was able to sit or stand for 15 min, (e) had no aversion to board games or social interactions with peers, and (f) had the ability to follow one-step directions. Inclusion criteria were assessed via brief classroom observations and teacher report. In addition to the previously noted inclusion criteria, target participants were required to (a) have or be at risk of a developmental delay and (b) demonstrate social skills at levels lower than same age peers (per observation and teacher report).

Elizabeth was a White, 46-month-old female diagnosed with ASD; she displayed impulsive behavior, short attention to task, and minimal use of peer-directed social skills. Kamala was a White, 61-month-old female diagnosed with DiGeorge syndrome. She had significant difficulty articulating speech, which negatively affected her communication with peers; her social skills were delayed as compared with her same-aged peers based on teacher and parent report. Tammy was a Black, 52-month-old female diagnosed with a visual impairment and cognitive delay. Tammy did not appropriately initiate to peers and required adult support during social interactions. She was observed to primarily engage in solitary activities in the classroom and on the playground. Bernie was a Latino, 35-month-old male who was considered at risk of social delays and had frequent occurrences of challenging behavior across typical classroom activities, which severely limited his social interactions with peers. His teachers reported he often exhibited noncompliance and attention-seeking behaviors during structured or small group activities. Bernie often needed adult support to initiate social interactions with peers and occasionally engaged in physical or verbal aggression toward peers. Six peer participants also were recruited based on teacher nomination. Teachers were asked to identify peers who demonstrated age-appropriate social skills, high rates of compliance during structured activities, and participated without supports during small group activities. The peers included three boys and three girls, all between 43 and 53 months of age. Four peers were White, one was Latino, and one was Asian.

All sessions were implemented by four female early childhood special education graduate students, three of whom were White and one who was Asian. All implementers also were working toward board-certified behavior analyst certification.

Setting and Materials

The study was conducted at a private, inclusive preschool in the southeastern United States. Sessions were conducted in a small, separate classroom with two tables and child-size chairs. Each session included two children, one target and one peer participant, who sat across from one another with the board game in between them; the implementer sat at the head of the table within arm's reach of both children. The sessions occurred after lunch during the school's scheduled naptime. None of the participants in the study napped; all participated in a daily nap group—available for children in the school who did not nap—as part of their typical routine.

Four board games (and associated pieces) produced by Peaceable Kingdom™ were used: "Snug as a Bug in a Rug," "Stone Soup," "Sunny Day Pond," and "Count Your Chickens" (as the generalization game). All games were designed such that children worked together to achieve a common goal rather than competing against one another. Study implementers created a four-step visual activity schedule for each game using pictures of adults engaging in the game play behaviors. Although each schedule was game specific, steps were similar and of equal difficulty across games (e.g., spin the spinner, move a piece appropriately, pass schedule to peer). A digital timer and small edibles were also used for all sessions.

Target Behaviors and Data Collection

All sessions were video recorded and coded by graduate students in special education using ProCoderDV software (Tapp, 2003). Primary dependent variables from each session were coded and graphed daily to permit visual analysis. Data were analyzed within and across tiers and conditions for level, variability, trend, overlap between conditions, immediacy of change following the introduction of intervention, and consistency in data patterns across tiers (Gast & Spriggs, 2014). Game play behavior was the primary dependent variable upon which experimental decisions were made. Social communication data, the secondary dependent variable, were coded and analyzed post hoc.

Game play behavior was defined as correct completion of an individual step during board game play. Each turn included four steps, across all four games. Each step was coded as unprompted correct (UPC), prompted correct (PC), unprompted error (UPE), or prompted error (PE). Steps scored as UPC were completed correctly and independently or with peer assistance, but without prompting from implementer. Steps scored as PC were completed correctly with prompting from the implementer. Steps scored as UPE were completed independently, or with help from peers, but incorrectly. Steps scored as PE were prompted by an implementer, but ultimately performed incorrectly. For game play behavior, each of the four steps per turn was individually coded using timed event recording (e.g., Step 1 was time stamped and coded as UPC, PC, UPE, or PE, independent of Steps 2–4). During intervention, each new turn was indicated by the target child receiving the activity schedule from the implementer or the peer. During baseline, generalization, and maintenance sessions, a new turn

Table 1. IOA and Procedural Fidelity Percentages

Measure	Variable	Condition	Elizabeth	Kamala	Tammy	Bernie
IOA	Board game behaviors	Baseline	95.0	88.7 (87.5–88.9)	93.6 (87.5–100)	90.0 (75.0–100)
		Intervention	91.7 (56.0–100)	96.5 (95.0–97.4)	91.9 (86.4–95.5)	94.3 (83.3–100)
		Maintenance	100	93.8	100	90.0
		Generalization	88.6 (82.1–95.0)	87.5	90.0	100
	Social communication	Baseline	92.5	95.4 (95.2–95.5)	96.4 (95.1–97.1)	92.3 (90.1–97.4)
		Intervention	93.6 (88.2–99.1)	95.9 (95.5–96.5)	94.2 (93.4–96.1)	92.2 (86.3–95.8)
		Maintenance	91.3	95.3 (92–97.6)	93.4 (90.4–95.6)	89.5
		Generalization	88.0 (87.3–88.6)	97.7	93.9	93.2 (91.9–94.5)
Procedural fidelity	Control variables	Baseline	92.6 (91.1–93.3)	97.2 (94.3–100)	93.6 (80.9–100)	98.6 (94.3–100)
		Intervention	94.9 (80.0–100)	85.2 (73.7–100)	98.4 (95.8–100)	98.8 (95.8–100)
		Maintenance	100	98.1 (94.3–100)	98.1 (94.3–100)	100
		Generalization	100	97.2 (94.3–100)	100	100
	Intervention	Baseline	99.1 (92.3–100)	100	98.9 (96.7–100)	98.6 (94.3–100)
		Intervention	94.2 (89.3–100)	90.6 (88.8–100)	98.8 (95.7–100)	95.1 (84.7–100)
		Maintenance	100	98.1 (97.2–100)	98.9 (97.2–100)	100
		Generalization	100	100	100	100

Note. IOA = interobserver agreement.

occurred each at 1-min interval. This decision was made given new turns required children to pass the schedule, which might occur less often during nonintervention conditions and could arbitrarily inflate appropriate game play.

Social communication was defined as any vocal behavior (e.g., commenting, responding, prompting, laughing) that was paired with a secondary indicator of social engagement. Secondary indicators included joint attention to the board game (e.g., touching or looking at the game materials), saying the peer or implementer's name, handing the peer or implementer items, shifting orientation toward peer or implementer (i.e., moving face or body in the direction of), making eye contact, or using a point or gesture (e.g., high five). Vocalizations paired with problem behavior (e.g., crying, hitting, kicking) were not coded. To capture estimated duration of social communication, momentary time sampling (MTS) was utilized with 5-s fixed intervals. At the end of each 5 s, the coder marked whether the target child was engaged in social communication.

Interobserver agreement (IOA). IOA was assessed for at least one third of randomly selected sessions across participants and conditions, for both dependent variables. Secondary coders were trained on the target behaviors through co-coding with primary coders; training was followed by coding practice until the criterion of 80% or greater agreement with the primary coder across target behaviors for three consecutive videos was reached. IOA was assessed using the point-by-point method (i.e., total number of agreements divided by the number of agreements plus disagreements, multiplied by 100; Ayres & Ledford, 2014). IOA for both dependent variables met research design standards for all participants and conditions (Kratochwill et al., 2013). IOA is provided in Table 1.

Experimental Design

A multiple probe across participants design was used to assess the relation between the intervention package and the dependent variables (Gast, Lloyd, & Ledford, 2014). This design allows for intermittent data collection across participants, which might be important for avoiding satiation with materials prior to instruction. Children began baseline concurrently; intervention commenced in a time-lagged manner when their baseline data patterns—and those of participants who entered intervention prior to them—were stable. Upon achieving three consecutive, stable sessions with greater than 80% UPC (i.e., the mastery criterion), children moved to maintenance. Generalization sessions, using an untrained board game, were conducted at least one time per participant, per condition. This study was designed and executed to meet contemporary single-case research standards as identified by Kratochwill and colleagues (2013).

Procedures

Peer training. Peer participants were trained (in pairs) to play each game and to assist target children. The implementer told peers she was showing them how to play the game so they could play it with friends who needed help playing. The implementer used verbal and model prompts and behavior-specific praise to teach the peers to (a) play each game and (b) use specific strategies to be a good friend during the game (e.g., help target children find the right piece, use the activity schedule, provide praise to the target children for their effort). The implementer and peers then played each game once, and the implementer provided prompts and praise for appropriate game play and for

helping their peers. All peers were trained on all games prior to commencing baseline. We made this decision to decrease the likelihood the peers would satiate or develop an aversion to playing the games without knowing the rules (Authors, 2017).

Baseline. Before coming to the table, the implementer asked one of the children which of two games he or she would like to play and that game was selected; the daily game choice was rotated regularly to ensure all children had regular exposure to each game. Choices were used across conditions to increase motivation to play the board game (Dunlap et al., 1994; Green, Mays, & Jolivette, 2011). Once children were seated appropriately at the table, the implementer presented a script explaining the cooperative nature of the game (e.g., they worked together and helped each other, when the game was over everyone won), followed by the statement, "Let's play," concurrent with starting the timer (set for 15 min). During the session, the implementer responded minimally and with neutral affect to all interactions, narrated game-specific behaviors 1 to 2 times per turn per child (e.g., "You found a green piece."), and provided praise for staying seated in the game play area and for helping one another. If a child asked for the implementer for help, she told the child to try it on his or her own. Challenging behaviors were interrupted and redirected with minimal attention. When 15 min passed, or when both children said they were finished, the implementer thanked the children for playing. Given we wanted to identify the target children's current board game play skills and whether training peers on the board games alone would result in board game play, we did not tell the target children the explicit game rules.

Board game intervention. The intervention package was identical to baseline with the following exceptions. Following the game script, the implementer explained the specific rules of the game and modeled a turn, presenting each of the four steps while referring to the visual activity schedule. To start the game, the teacher handed a child the activity schedule and stated "Let's play!" Once a child had the schedule in front of him or her, if a UPC for the first step did not occur in 3 s, the implementer pointed to the appropriate picture on the activity schedule (gestural prompt) and said, "What's next?" If a UPC did not occur within 3 s of the gestural prompt, the implementer modeled the step while verbally describing her actions (controlling prompt). If the child did not imitate the model within 3 s, the implementer completed the step and allowed the child 3 s to begin the next step on the schedule; this prompting procedure was repeated for each of the four steps. If UPEs occurred during intervention sessions, responses were immediately blocked. In addition, praise for engaging in appropriate game play behavior was provided once per turn per child. Sessions were concluded when the game was over (e.g., all pieces were used or turned over) or after 15 min in duration.

Modifications. Instructional modifications were made for Elizabeth and Bernie due to low levels of responding immediately after starting the intervention condition. For Elizabeth, continuous verbal praise and intermittent edible reinforcement were provided (by a second implementer) to keep her seated. Beginning with the third intervention session, the primary implementer began providing a hand-over-hand prompt rather than a model prompt as the controlling prompt given the model prompt did not always result in her imitating the model. Continuous verbal and edible reinforcement was thinned to occur only following each UPC and PC. Starting with Session 22, praise and edible reinforcement was further thinned to follow UPCs only, and the second implementer was no longer present. Finally, to provide additional motivation, Elizabeth earned a short video clip following game completion, starting at Session 34.

For Bernie, hand-over-hand prompting became the controlling prompt and verbal and edible reinforcement followed each UPC or PC beginning with the fourth intervention session. Starting Session 19, edible reinforcement was thinned to follow UPCs only. And, as with Elizabeth, a short video clip was provided following game completion for the final six sessions.

Generalization and maintenance. Generalization and maintenance procedures were identical to baseline. Generalization sessions occurred intermittently, at least once per condition. During these sessions, children played the game "Count Your Chickens." Maintenance sessions were conducted for 1 to 8 weeks following the final intervention session.

Procedural Fidelity

Procedural fidelity was assessed via video recording by a graduate student in special education unassociated with the study for at least one third of randomly selected sessions across participants and conditions. The graduate student assessed the implementer's use of both control and intervention variables for all conditions to measure adherence to experimental procedures and differentiation across conditions. For variables that occurred only once per session, a checklist was used; for those that occurred multiple times per session, data were collected using direct observation by interval. For control variables, implementers were scored based on the appropriate demonstration of pre- and postsession behaviors (e.g., reading game script, starting the timer), their use of praise and edible reinforcement for staying at the table and for helping peers, and the production of one to two narrations per child per turn. For intervention variables, implementers were scored on their appropriate use of the SLP procedure and their consistent praise of correct game play

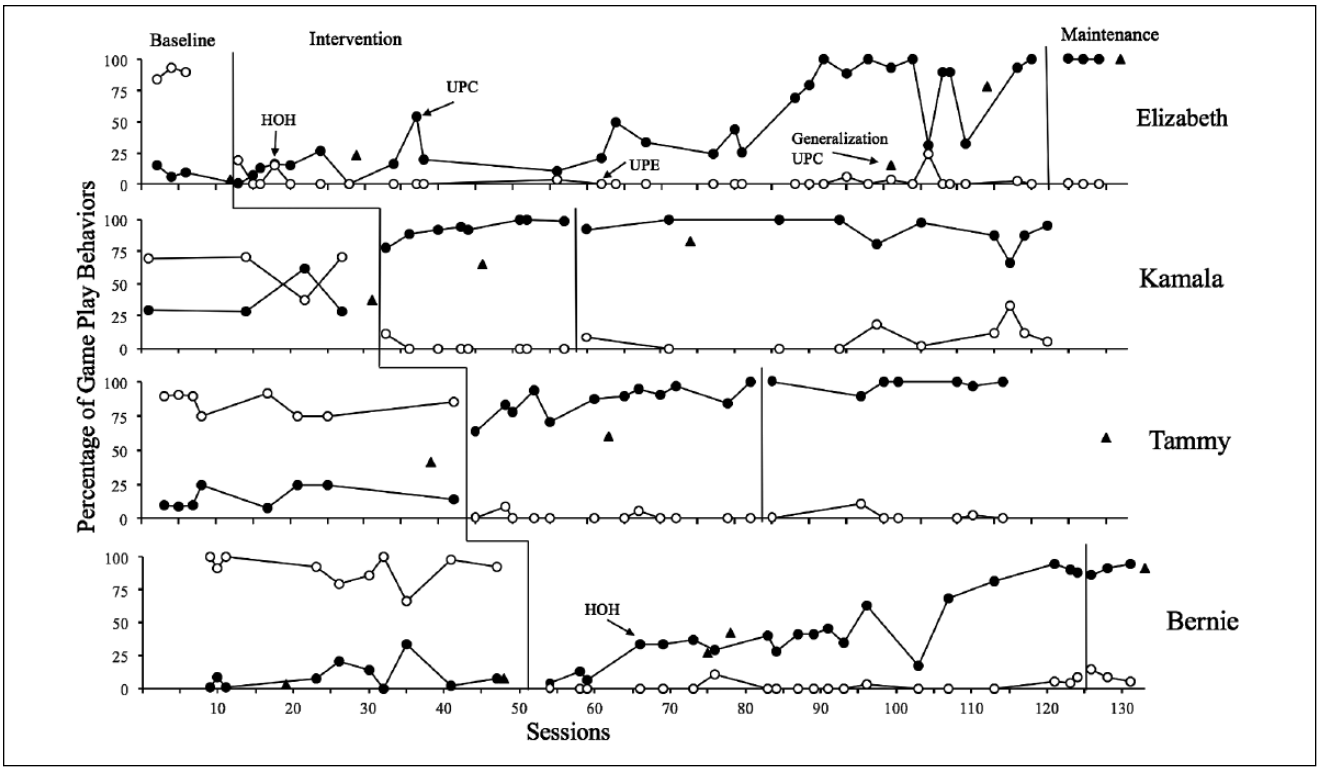

Figure 1. The open circles represent the target children's percentage of unprompted errors in board game play.
Note. Closed circles represent the target children's percentage correct of unprompted board game play. Closed triangles represent the target children's percentage correct of unprompted board game play for a generalization board game. UPC = unprompted correct; UPE = unprompted error; HOH = hand over hand prompting.

Table 2. Mean Percentage of Intervals With Social Communication (Range).

Condition	Elizabeth	Kamala	Tammy	Bernie
Baseline	28 (16–42)	22 (5–35)	38 (18–51)	34 (22–48)
Intervention	27 (0–49)	21 (14–29)	27 (14–43)	42 (23–66)
Maintenance	32 (24–43)	32 (18–48)	26 (15–31)	37 (36–38)
Generalization	37 (24–47)	29 (22–41)	34 (19–47)	40 (33–44)

behaviors. Average procedural fidelity by condition was above 85% for all participants (see Table 1). Rates of narration, praise, and reprimands were constant across all conditions. We also assessed the implementation fidelity of at least one third of randomly selected peer training sessions, including at least one training session per peer. Assessment criteria were identical to those of procedural fidelity, with the addition of a required explanation of the purpose of the sessions and specific ways in which peers could help target participants. Average implementation fidelity across peer participants was 91.7% (range = 81.8%–98.5%).

Results

The percentage of UPC game play behaviors and the percentage of intervals in which social communication occurred are presented in Figure 1 and Table 2, respectively.

Board Game Behaviors

A functional relation was established between the use of SLP and the level of UPC behaviors. Experimental control was demonstrated through an increased level of UPC behaviors following the introduction of the intervention for all four children, with no associated changes in subsequent tiers. Independent game play behaviors maintained for all children following the cessation of prompts, and generalized to an untrained board game for three participants.

Elizabeth. Elizabeth demonstrated a low and stable use of UPC game play during baseline (range = 7%–16%). Following the introduction of the intervention, Elizabeth's level of UPC immediately dropped to zero. Once modifications were introduced, she demonstrated a slow and variable increasing trend through the next 22 sessions. During

Sessions 25 and 28, Elizabeth's use of appropriate game behavior dropped significantly; however, after Session 28, data stabilized at or near 100% UPC for the remainder of intervention and maintenance sessions, with minimal overlap with baseline. Elizabeth's UPC behaviors during generalization followed the same pattern as the primary data path in all conditions. No changes in data patterns in subsequent tiers were associated with the introduction of intervention for Elizabeth.

Kamala. Kamala demonstrated a moderate and variable use of UPC game play during baseline (range = 29%–62%). Following the introduction of the intervention, an immediate increase in UPC behaviors with an accelerating trend was observed over the next five sessions. Data remained high and stable throughout the remainder of the intervention (range = 92%–100%), with no overlap with baseline; data in maintenance were consistent with intervention. Kamala's performance during generalization sessions was lower than in intervention, yet displayed a similar accelerating trend. The introduction of the intervention for Kamala did not result in changes in data patterns across remaining tiers.

Tammy. Tammy demonstrated a low and variable use of UPC behavior during baseline (range = 9%–25%). An immediate increase in level of UPC game play was observed following the start of intervention, with no associated changes in other tiers. Data in intervention and throughout maintenance remained high and stable (range = 64%–100%), with zero overlap with baseline. Tammy's appropriate game play behavior during the generalization condition also was relatively stable throughout the study, with little improvement when intervention commenced.

Bernie. Bernie demonstrated a low and variable use of UPC game play during baseline (range = 0%–33%). His independent use of game behaviors remained low for the first three intervention sessions, but increased during Session 14 when hand-over-hand prompting replaced the model prompt. He had an increasing trend for the remainder of intervention (range = 17%–95%) with considerable overlap with one baseline datum point. Maintenance data remained at a level consistent with the final intervention sessions (range = 86%–95%). Bernie's UPC behaviors during generalization followed the same pattern as the primary data path in all conditions.

Social Communication

No functional relation was identified between the intervention and social communication. The percentage of intervals with social communication for all children demonstrated minimal variation and no changes were associated with the intervention (see Table 2). The graphed data are available via email from the first author.

Discussion

This study demonstrated that an intervention package using SLP, visual supports, and individualized reinforcement was effective for increasing the appropriate, independent board game play of preschool children with or at risk and without disabilities. Children with or at risk of disabilities demonstrated appropriate game play with their peers, which maintained without the intervention. Anecdotally, target children continued to request the games after the study concluded and maintained their level of independent game play, supporting the social validity of board game play demonstrated by previous researchers (Davis-Temple et al., 2014).

In addition, the current study extends previous research by measuring stimulus and response generalization—across board games and behaviors, respectively. We programmed for and assessed stimulus generalization throughout the duration of the study. To program for generalization across play partners, we trained six different peers and rotated dyad assignment regularly such that all target children played games with all peers. No differences were noted in the level of board game play behavior across target children associated with specific peer partners; these results are similar to those demonstrated by Oppenheim-Leaf et al. (2012). To assess the ability for appropriate game play behavior to transfer to an untrained board game, we included a generalization condition and conducted at least one generalization session per participant per condition. Results indicated that generalization occurred for Elizabeth, Kamala, and Bernie, but not Tammy, although the limited number of data points preclude clear interpretations of these data. Given that Tammy often required explicit instruction for skill acquisition and generalization in the classroom, we hypothesized that she needed more explicit instruction across board games to facilitate generalization.

Our study also extends the research on board game play by including children representing a broad range of ages and abilities. Kamala and Tammy were similar in age and developmental level to the children in Davis-Temple and colleagues (2014). Likewise, our results were similar, with both children demonstrating a rapid acquisition of game play behavior following the introduction of the intervention. Elizabeth and Bernie, however, were notably younger than those in previous game play research (Baker, 2000; Davis-Temple et al., 2014; Deming, 1999; Oppenheim-Leaf et al., 2012) and engaged in noncompliance and challenging behaviors during initial sessions. Although modifications were required to acquire board game skills, the modifications were minor and typical of effective, individualized instructional programs for children with disabilities (e.g., changing a controlling prompt, individualized

reinforcement), and are recommended practices (Division for Early Childhood, 2014). Despite requiring more instructional sessions to reach mastery criterion than Kamala or Tammy, both Elizabeth and Bernie acquired and maintained independent board game play with relatively limited instructional time (i.e., approximately 15 min sessions once per day). Researchers should continue to examine effective and efficient strategies for teaching children with a range of characteristics representing the heterogeneity of needs typical of early childhood environments to play social board games with their peers.

We included a visual activity schedule to support game play acquisition and independence. Visuals are a well-established method to increase independence across a wide range of tasks and activities, particularly for students with autism (Knight, Sartini, & Spriggs, 2015). Specially, the use of activity schedules in conjunction with systematic prompting has been used to support interactive game play with peers (Betz, Higbee, & Reagon, 2008; Brodhead, Higbee, Pollard, Akers, & Gerencser, 2014). For this reason, we hypothesized that the addition of an activity schedule to the prompting procedure would produce more rapid acquisition of game play behavior than was demonstrated by Davis-Temple and colleagues (2014). Anecdotally, we observed that, with few exceptions, children did not refer to the schedule for assistance but rather relied on their peers to assist them if they forgot or incorrectly completed a step. This is both ecologically and socially valid in that it provided an opportunity for social interactions and, more specifically, social initiations by target children to their peers. Furthermore, it is possible that similar effects might occur without the addition of the visual activity schedule. These social interactions and the need for a visual prompt should be examined in future research.

Although the intervention was related to increased game play behavior, it was not related to changes in social communication. There were at least three possible reasons for this. First, although the quantity of communication did not change, implementers anecdotally reported that the quality of communication improved over the course of the study. However, because the measurement system captured social communication directed at the implementer or the peer and related or unrelated to game play, we were unable to discern whether (a) target children directed an increased number of communications to peers throughout the course of the study or (b) their communications were increasingly appropriate to a small group game setting. Second, social communication might not have increased because the effort required for game play was greater than the effort required during the baseline condition. Third, although complex statements related to game play might have increased during intervention, unrelated statements might have simultaneously decreased, resulting in an unchanged overall level of social communication. Anecdotally, we did in fact note these phenomena. That is, children increased their verbalizations related to the board game while decreasing nonsequiturs and nonword vocalizations. However, our measurement system did not capture these changes.

Limitations

Several limitations of the study should be noted. First, although average IOA remained high across participants and conditions, two sessions resulted in low agreement (i.e., one baseline session for Bernie and one intervention session for Elizabeth) due to a very short session and procedural infidelity. A second limitation is that the current study only examined changes in the duration of social communication and did not examine the complexities of social communication during game play. Third, sessions occurred in a separate classroom within the school and were implemented by non-indigenous implementers, which limits ecological validity. However, at least two of the implementers were completing practicum experiences in participant classrooms. Finally, the measurement of generalization or lack thereof precluded establishing experimental control. This limits the generality of the outcomes, which is a critical feature of evidence-based practices and should be examined in future research.

Implications and Future Research

This study provides evidence to support the use of systematic prompting, visuals, and reinforcement contingencies with diverse learners in a small group instructional context. Individual modifications were critical in the current study, demonstrating their importance for facilitating learning (Barton et al., 2016). In addition, programming for stimulus generalization—particularly related to diverse play partners—resulted in the acquisition of appropriate play behaviors across multiple same-aged peers, which is indicative of a high level of social validity. Consequently, generalization, especially as related to peer partners, should be programmed when planning interventions. Furthermore, structuring small group instruction such that observational learning occurs can be efficient and effective for teaching a range of skills (Ledford, Gast, Luscre, & Ayres, 2008; Ledford, Lane, Elam, & Wolery, 2012; Ledford & Wolery, 2013, 2015)

Through the successful replication of previous research (Davis-Temple et al., 2014), this study provides additional evidence demonstrating the success of an intervention package using SLP. High-quality replication of demonstrated practices is essential to confirm procedural effects and to identify evidence-based practices and improve outcomes for young children (Council for Exceptional Children, 2014; Travers, Cook, Therrien, & Coyne, 2016). Replication studies, particularly by unique research groups and implemented with high methodological rigor, should continue to be conducted and should receive equal consideration with original

research studies to develop a comprehensive understanding of intervention science (Cook, 2014; Makel et al., 2016)

All studies conducted thus far on the use of systematic prompting to teach board game play have been implemented by research staff; consequently, future research should examine whether similar results are obtained when procedures are implemented by indigenous implementers in natural settings. Also, because this study was not able to discern whether the visual activity schedule was a necessary component to its success, researchers should explore whether the inclusion of activity schedules has an effect on the rate of acquisition of game play behaviors. In addition, future research should continue to examine factors that facilitate generalization across games and other play materials. Finally, because previous research has supported the use of peers to train preschool children in multiple dimensions of play behavior (Authors, 2017; Barton & Ledford, 2017), additional research using peer partners as implementers is warranted. For example, researchers could investigate the success of a similar intervention in which peers are trained to be the primary implementers, or one in which peers teach target children to engage in social play behaviors, such as sports or social games (e.g., "Telephone," "Seven-Up").

Conclusion

This study demonstrates that the use of SLP, a visual activity schedule, peer models, and contingent reinforcement—with individualized modifications for two children—resulted in the acquisition of independent board game play behavior for four preschool children with or at risk for disabilities. Given that play has been identified as a behavioral cusp, the development of play skills is a functional and critical goal for young children, and one that often requires direct instruction for children with disabilities (Lifter et al., 2011). Our study extends the research and provides meaningful information by demonstrating the effectiveness of a board game play intervention, which has the potential to facilitate social interactions and positive relationships between children with disabilities and their peers. As children become more skilled in board game play, board games can be used to teach more complex social skills such as tolerance for losing, considering others perspectives, or providing compliments.

Authors' Note

The opinions expressed do not necessarily reflect the policy of the U.S. Department of Education and no official endorsement should be inferred.

Acknowledgment

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, Grant H325D140308.

References

Ayres, K., & Ledford, J. R. (2014). Dependent measures and measurement systems. In D. L. Gast & J. R. Ledford (Eds.), *Single case research: Applications in special education and behavioral sciences* (2nd ed., pp. 124–153). New York, NY: Routledge.

Baker, M. J. (2000). Incorporating the thematic ritualistic behaviors of children with autism into games: Increasing social play interactions with siblings. *Journal of Positive Behavior Interventions*, *2*, 66–84.

Barton, E. E. (2010). Development of a taxonomy of pretend play for children with disabilities. *Infants & Young Children*, *23*, 247–261.

Barton, E. E. (2014). Assessing social competence and play skills. In M. McLean, M. L. Hemmeter, & P. Synder (Eds.), *Essential elements for assessing infants and young children with special needs* (pp. 195–241). Boston, MA: Pearson.

Barton, E. E., & Ledford, J. R. (2017). The effects of reinforcement on peer imitation in a small group play context. *Journal of Early Intervention*. Advanced online publication. doi: 1053815117748409.

Barton, E. E., Ledford, J. R., Lane, J. D., Decker, J., Germansky, S. E., Hemmeter, M. L., & Kaiser, A. (2016). The iterative use of single case research to advance the science of EI/ECSE. *Topics in Early Childhood Special Education*, *36*, 4–14.

Barton, E. E., & Wolery, M. (2008). Teaching pretend play to children with disabilities. *Topics in Early Childhood Special Education*, *28*, 119–125.

Betz, A., Higbee, T. C., & Reagon, K. A. (2008). Using joint activity schedules to promote peer engagement in preschoolers with autism. *Journal of Applied Behavior Analysis*, *41*, 237–241.

Brodhead, M. T., Higbee, T. S., Pollard, J. S., Akers, J. S., & Gerencser, K. R. (2014). The use of linked activity schedules to teach children with autism to play hide-and-seek. *Journal of Applied Behavior Analysis*, *47*, 645–650.

Brown, W. H., & Conroy, M. A. (2011). Social-emotional competence in young children with developmental delays: Our reflection and vision for the future. *Journal of Early Intervention*, *33*, 310–320.

Brown, W. H., Odom, S. L., & McConnell, S. R. (2008). *Social competence of young children: Risk, disability, and intervention*. Baltimore, MD: Brookes.

Christakis, N. A., & Fowler, J. H. (2011). *Connected: The surprising power of our social networks*. Boston, MA: Little Brown.

Cohn, D. A. (1990). Child-Mother attachment of six-year-olds and social competence at school. *Child Development*, *61*, 152–162.

Cook, B. G. (2014). A call for examining replication and bias in special education research. *Remedial and Special Education*, *35*, 233–246.

Coolahan, K., Fantuzzo, J., Mendez, J., & McDermott, P. (2000). Preschool peer interactions and readiness to learn: Relationships between classroom peer play and learning behaviors and conduct. *Journal of Educational Psychology*, *92*, 458–465.

Council for Exceptional Children. (2014). *Standard for Evidenced-Based Practices in special education*. Retrieved from http://www.cec.sped.org/~/media/Files/Standards/Evidence%20based%20Practices%20and%20Practice/CECs%20Evidence%20Based%20Practice%20Standards.pdf

Davis-Temple, J., Jung, S., & Sainato, D. M. (2014). Teaching young children with special needs and their peers to play board games: Effects of a least to most prompting procedure to increase independent performance. *Behavior Analysis in Practice*, *7*, 21–30.

Deming, J. E. (1999). *Teaching game playing skills to increase peer conversation in children with autism and related disorders* (Unpublished doctoral dissertation). University of California, Los Angeles.

Division for Early Childhood. (2014). *DEC recommended practices in early intervention/early childhood special education 2014*. Retrieved from http://www.dec-sped.org/recommendedpractices

Dunlap, G., DePerczel, M., Clarke, S., Wilson, D., Wright, S., White, R., & Gomez, A. (1994). Choice making to promote adaptive behavior for students with emotional and behavioral challenges. *Journal of Applied Behavior Analysis*, *27*, 505–518.

Dunst, C. J., Hamby, D., Trivette, C. M., Raab, M., & Bruder, M. B. (2000). Everyday family and community life and children's naturally occurring learning opportunities. *Journal of Early Intervention*, *23*, 151–164.

Gast, D. L., Lloyd, B. P., & Ledford, J. R. (2014). Multiple baseline and multiple probe designs. In D. L. Gast & J. R. Ledford (Eds.), *Single case research methodology: Applications in special education and behavioral sciences* (2nd ed., pp. 251–296). New York, NY: Routledge.

Gast, D. L., & Spriggs, A. D. (2014). Visual analysis of graphic data. In D. L. Gast & J. R. Ledford (Eds.), *Single case research methodology: Applications in special education and behavioral sciences* (2nd ed., pp. 176–210). New York, NY: Routledge.

Goldstein, H., Lackey, K. C., & Schneider, N. (2014). A new framework for systematic reviews: Application to social skills interventions for preschoolers with autism. *Exceptional Children*, *80*, 262–286.

Green, K. B., Mays, N. M., & Jolivette, K. (2011). Making choices: A proactive way to improve behaviors for young children with challenging behaviors. *Beyond Behavior*, *20*, 25–31.

Hemmeter, M. L., Snyder, P. A., Fox, L., & Algina, J. (2016). Evaluating the implementation of the Pyramid Model for promoting social-emotional competence in early childhood classrooms. *Topics in Early Childhood Special Education*, *36*, 133–146.

Henry, M. (1990). More than just play: The significance of mutually directed adult-child activity. *Early Child Development and Care*, *60*, 35–51.

Hirsh-Pasek, K., Golinkoff, R. M., Berk, L. E., & Singer, D. G. (2009). *A mandate for playful learning in preschool: Presenting the evidence*. New York, NY: Oxford University Press.

Jones, D. E., Greenberg, M., & Crowley, M. (2015). Early social-emotional functioning and public health: The relationship between kindergarten social competence and future wellness. *American Journal of Public Health*, *105*, 2283–2290.

Joseph, J. D., Strain, P., Olszewski, A., & Goldstein, H. (2016). A consumer reports-like review of the empirical literature specific to preschool children's peer-related social skills. In B. Reichow, B. Boyd, E. E. Barton, & S. Odom (Eds.), *Handbook of early childhood special education* (pp. 179–197). London, England: Springer.

Jung, S., & Sainato, D. M. (2013). Teaching play skills to young children with autism. *Journal of Intellectual & Developmental Disability*, *38*, 74–90.

Knight, V., Sartini, E., & Spriggs, A. D. (2015). Evaluating visual activity schedules as evidence-based practice for individuals with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, *45*, 157–178.

Kratochwill, T. R., Hitchcock, J. H., Horner, R. H., Levin, J. R., Odom, S. L., Rindskopf, D. M., & Shadish, W. R. (2013). Single-case intervention research design standards. *Remedial and Special Education*, *34*, 26–38.

Ladd, G. W. (1990). Having friends, keeping friends, making friends, and being liked by peers in the classroom: Predictors of children's early school adjustment? *Child Development*, *61*, 1081–1100.

Ledford, J. R., Gast, D. L., Luscre, D., & Ayres, K. M. (2008). Observational and incidental learning by children with autism during small group instruction. *Journal of Autism and Developmental Disorders*, *38*, 86–103.

Ledford, J. R., Lane, J. D., Elam, K. L., & Wolery, M. (2012). Using response-prompting procedures during small-group direct instruction: Outcomes and procedural variations. *American Journal on Intellectual and Developmental Disabilities*, *117*, 413–434.

Ledford, J. R., & Wolery, M. (2013). Peer modeling of academic and social behaviors during small-group direct instruction. *Exceptional Children*, *79*, 439–458.

Ledford, J. R., & Wolery, M. (2015). Observational learning of academic and social behaviors during small-group direct instruction. *Exceptional Children*, *81*, 272–291.

Lee, P., & Bierman, K. L. (2015). Classroom and teacher support in kindergarten: Associations with the behavioral and academic adjustment of low-income students. *Merrill-Palmer Quarterly*, *61*, 383–411.

Lifter, K., Mason, E. J., & Barton, E. E. (2011). Children's play: Where we have been and where we could go. *Journal of Early Intervention*, *33*, 281–297.

Makel, M. C., Plucker, J. A., Freeman, J., Lombardi, A., Simonsen, B., & Coyne, M. (2016). Replication of special education

research: Necessary but far too rare. *Remedial and Special Education*, *37*, 205–212.

Mills, P. E., Beecher, C. C., Dale, P. S., Cole, K. N., & Jenkins, J. R. (2014). Language of children with disabilities to peers at play: Impact of ecology. *Journal of Early Intervention*, *36*, 111–130.

Odom, S. L., McConnell, S. R., McEvoy, M. A., Peterson, C., Ostrosky, M., Chandler, L. K., . . . Favazza, P. C. (1999). Relative effects of interventions supporting the social competence of young children with disabilities. *Topics in Early Childhood Special Education*, *19*, 75–91.

Odom, S. L., & Strain, P. S. (1986). A comparison of peer-initiation and teacher-antecedent interventions for promoting reciprocal social interaction of autistic preschoolers. *Journal of Applied Behavior Analysis*, *19*, 59–71.

Oppenheim-Leaf, M., Leaf, J. B., & Call, N. A. (2012). Teaching board games to two children with an autism spectrum disorder. *Journal of Developmental and Physical Disabilities*, *24*, 347–358.

Schneider, N., & Goldstein, H. (2008). Peer-related social competence interventions for young children with communication and language disorders. In W. H. Brown, S. L. Odom, & S. R. McConnell (Eds.), *Social competence of young children: Risk, disability, and intervention* (pp. 233–252). Baltimore, MD: Brookes.

Stormont, M., Herman, K. C., Reinke, W. M., King, K. R., & Owens, S. (2015). The Kindergarten Academic and Behavior Readiness Screener: The utility of single-item teacher ratings of kindergarten readiness. *School Psychology Quarterly*, *30*, 212–228.

Strain, P. S., & Bovey, E. H. (2015). The power of preschool peers to influence social outcomes for children with special needs. In K. R. Harris and L. Meltzer (Eds.), *The power of peers in the classroom: Enhancing learning and social skills* (pp. 288–316). New York, NY: Guilford Press.

Tapp, J. (2003). *ProcoderDV*. Nashville, TN: Vanderbilt Kennedy Center.

Toth, K., Munson, J., Meltzoff, A. N., & Dawson, G. (2006). Early predictors of communication development in young children with autism spectrum disorder: Joint attention, imitation, and toy play. *Journal of Autism and Developmental Disorders*, *36*, 993–1005.

Travers, J. C., Cook, B. G., Therrien, W. J., & Coyne, M. D. (2016). Replication research and special education. *Remedial and Special Education*, *37*, 195–204.