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The Use of Play Expansions to Increase the Diversity and Complexity of Object Play in Young Children With Disabilities

Jennifer R. Frey[1] and Ann P. Kaiser[1]

Abstract

The purpose of this study was to determine if an intervention consisting of contingently imitating play, modeling expansions of play actions, and describing play actions increased the diversity of object play in young children with disabilities. The multicomponent intervention was introduced in a multiple-probe design across three young children in their classrooms. Generalization probe sessions, using an untrained toy set, were conducted throughout baseline and intervention. Follow-up sessions were conducted approximately 1 month after completion of the intervention. All participants increased their performance of different actions and the complexity of their play with toys; however, the magnitude of effects varied across participants. In addition, all participants spoke more and used more different words at the end of intervention when compared to the end of baseline. Performance during generalization and maintenance assessments was variable. Implications for future research and practice are discussed.

Keywords

early childhood, expansions, intervention, modeling, play

Play is influenced by and contributes to children's cognitive, language, and social growth. As children develop, a predictable sequence of play skills emerges concurrent with advancing cognitive and social development. A number of developmental play taxonomies, describing the categories and the sequence of the types of play that emerge during the toddler and preschool years, have been created (e.g., Hill & McCune-Nicolich, 1981; Libby, Powell, Messer, & Jordan, 1998; Piaget, 1954; Smilansky, 1968). Although these broad-based taxonomies include both object and social play, object play—children's play with toys—is of particular interest.

Object play generally emerges before social play and includes both functional and symbolic actions with toys. In functional play, a child uses a toy based on the intended function of that toy (e.g., Kasari, Freeman, & Paparella, 2006; Libby et al., 1998; Ungerer & Sigman, 1981). For example, a child could pretend to drink using a toy cup or roll a toy car on a toy track. Symbolic object play generally develops after functional play and incorporates representational uses of objects. In symbolic object play, a child could substitute a toy for an object he or she does not have (i.e., use a marker as a hairbrush or use a block as a car), a child could give abilities to an object (i.e., have a doll feed herself or brush her own hair), or a child could create multischeme sequences of play (Kasari et al., 2006; Lifter, Sulzer-Azaroff, Anderson, & Cowdery, 1993). The sequence of functional, presymbolic, and symbolic play closely mirrors children's emergent cognitive abilities to represent actions, objects, and events.

Object Play in Young Children With Disabilities

Young children with disabilities differ in the frequency, diversity, and complexity of their play with objects compared to their typical peers. Usually their play actions are simpler, less diverse, and more repetitive than the play of same-aged peers. Therefore, without systematic intervention to develop their object play skills, young children with disabilities may not acquire or may have delays in acquiring sophisticated play. Having a limited repertoire of play actions and less complex play may decrease the time and quality of children's interactions with peers and adults, which could reduce opportunities for learning communication and social skills during play-based activities.

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Interventions to Promote the Development of Object Play

Introducing a variety of toys does not ensure children with disabilities will acquire, maintain, or generalize new complex play skills (Malone & Langone, 1999). In general, systematic intervention is needed (Lifter, Ellis, Cannon, & Anderson, 2005). Several studies have examined the effects of strategies to teach play skills to children with disabilities. Intervention techniques have ranged from nondirective or facilitative play strategies, such as environmental arrangement and selection and presentation of materials (e.g., Kohler, Anthony, Steighner, & Hoyson, 2001; Kok, Kong, & Bernard-Opitz, 2002; Malone & Langone, 1998; McCabe, Jenkins, Mills, Dale, & Cole, 1999) to more directive strategies, such as prompting and explicit instruction (e.g., Kohl, Beckman, & Swenson-Pierce, 1984; Kok et al., 2002; Lifter et al., 1993; Stahmer, 1999). Other interventions have used a combination of techniques and included both direct and naturalistic teaching in their intervention procedures (e.g., Kasari et al., 2006). Although the results of individual studies have been promising, no study has been exceptionally effective in teaching generalized complex play skills without relying on a form of prompting to increase the rate or level of play.

Play Expansions: Models of New Play Actions Contingent on Child's Play

Malone and Langone (1999) suggested that interventions to promote play skills are likely to be successful when they are based on an understanding of a child's current play abilities, are supportive of the child's continuing attempts to play, and are interesting to the child. Play expansions (contingent modeling of more advanced play forms) are a potential example of an interactive intervention strategy that includes these ideal strategies.

Play expansions, as conceptualized in this study, are similar to verbal expansions. Verbal expansions (i.e., modeling more complex forms of language following a child-generated form) frequently are used by parents during interactions with their language-learning children (Paul, 2001). Parents naturally respond to child communication with models of slightly more complex or more grammatically complete forms. For example, when the child says "bottle," the parent may reply, "You want your bottle," which both acknowledges the child's comment (or request) and embeds the child's word into a more complete sentence expressing the same function. The use of verbal expansions increases the chance a child will spontaneously imitate all or part of the expanded utterance (Scherer & Olswang, 1984). Expansions model more complex language for children at times when they are most able to process linguistic information. That is, expansions model new language similar to the child's own utterance based on the child's form and meaning and are presented immediately following the child's utterance. Verbal expansions are a key component of naturalistic language interventions, which have been effective in teaching new language to young children with developmental delays (Kaiser, Hancock, & Nietfeld, 2000; Kaiser & Trent, 2007).

When using play expansions, the adult imitates the child's play action and adds one or more new actions to it. Specifically, the adult follows the child's lead in play, contingently imitates (or mirrors) the child's play action, and then adds another play action that is closely related to the child's preceding action. Unlike directive play interventions, play expansions do not prompt the child to perform new actions but instead provide examples of new actions to children at times when they are likely to learn and imitate new behaviors. In principle, the use of play expansions should promote learning of new play actions because the model of new play actions is based on the child's immediate interest, delivered at a time when the child is more likely to be able to process the information, and includes the child's own action. No study has examined the use of expansions alone in play interventions designed to increase the diversity of object play.

Purpose of This Study

The purpose of this study was to examine the effects of an intervention based on the principle of play expansions. The goal of the intervention was to increase children's independent performance of new actions with objects. The components of the intervention included (a) contingently imitating (mirroring) and describing the child's play actions (mapping) to connect and engage with the child and to let the child know the adult is interested in what the child is doing; (b) modeling an expanded form of the child's play actions (child action plus new related action) to increase the likelihood of the child's observationally learning new play actions; and (c) verbally mapping expansions of the child's play actions to increase child attention to the expanded form of play and to provide meaningful descriptive language. These intervention procedures were embedded into child interactions with an engaged and responsive adult, who played with the same materials used by the child. The adult assumed the role of coparticipant in play rather than the role of prompting teacher.

Research Questions

This study addressed the following research questions: First, do expansions of play actions increase the diversity and complexity of object play performed by young children

Table 1. Participant Characteristics

Child	Age (months)	Classroom	Gender	Ethnicity	Diagnosis	MIS[a] score	Baseline MLU	Baseline no. of different words
Child 1	32	A	Female	Caucasian	Language delay	87.5	1.00	4
Child 2	25	B	Male	African American	Down syndrome Language delay	87.5	1.00	4
Child 3	28	B	Male	Caucasian	Language delay	81.3	1.33	8

Abbreviations: MIS, Motor Imitation Scale; MLU, mean length of utterance.
[a]Percentage of items performed correctly on the MIS.

with disabilities? More specifically, does the use of play expansions (a) increase the number of different actions performed by children within an intervention session, (b) increase the number of novel actions performed across sessions, and (c) increase the complexity of play skills? Second, do increases in performance of different actions generalize to an untrained toy set? Third, do increases in performance of different actions during training maintain 1 month after the conclusion of the intervention? Fourth, are there changes in children's spoken language during intervention? Specifically, does the use of play expansions that includes a verbal description of the action increase (a) mean length of utterance (MLU), (b) the number of words used, and (c) the number of different words used by children during play?

Method

Participants

Three children participated in this study. The participants were between the ages of 25 and 32 months at the start of the study and were enrolled in inclusive classrooms for 2-year-olds in a university child care facility. This university child care facility served toddlers and preschoolers with developmental disabilities, toddlers and preschoolers classified as "at risk," and typically developing toddlers and preschoolers from different ethnic and socioeconomic backgrounds. Child 1 (C1) was internationally adopted and was diagnosed with a language delay, Child 2 (C2) had Down syndrome and delayed language, and Child 3 (C3) was diagnosed with language delay and was considered to be "at risk" because he had a sibling with autism. Participant information is displayed in Table 1.

The participants were recommended by their teachers based on observations indicating the children demonstrated limited functional play skills with classroom toys. All participants met the following prespecified criteria for inclusion in the study. The participants (a) were at least 18 months of age, (b) used at least single words to communicate, (c) did not have physical disabilities that impaired their motor imitation or manipulation of objects, (d) were able to engage in play with typical classroom materials, (e) could pass motor imitation screening, (f) could stay engaged with an adult for at least 5 min, and (g) did not have an autism spectrum disorder diagnosis. Parents of each participant provided written consent for their child's participation in the study.

Prior to the start of the study, the participants were screened and observed. The *Motor Imitation Scale* (MIS; Stone, Ousley, & Littleford, 1997) was administered to evaluate each child's motor imitation skills. The MIS is made up of 16 items—8 object imitation items (such as banging a spoon on the table) and 8 body imitation items (such as pulling on an earlobe). After the examiner demonstrated the action, the examiner told the child: "You do it; your turn." More information about the assessment and the psychometric properties of the scale can be found in the article by Stone et al. (1997). To be included in the study, children completely imitated at least 80% of the items administered in the MIS (see Table 1).

To evaluate each child's play, an adapted version of the *Play Assessment Scale* (Fewell, 1986) was used to observe children's spontaneous play with presented toy sets and to determine if any of the participants used thematic combinations of play actions or play schemes with the materials. Each child was observed for 20 min in the classroom during free play prior to the start of the study. The first author wrote narrative notes to record anecdotal observations of language use and toy play. During the free play observation, C1 played with a Barney bus by pressing the buttons on the bus, closed the lids on a Disney pop-up toy, put beads in a track, rolled a car on a shelf, and held a baby doll. C1 used single-word utterances in play, such as "baby." C1 did not play near peers and did not initiate to peers or adults. C2 pressed play on a piano music toy, shook and rolled a toy plane, rolled a car on a cube chair, and mouthed toys. C2 used single words to label toys and simple two-word utterances, such as "my turn." C2 initiated to adults but not to peers. C3 rolled a truck and a plane, stacked blocks, shook rattles, and put a cow in a barn. C3's classroom language also consisted of single words and two word utterances, such as "wash

hands," "throw away," and "my turn." C3 responded to adults but rarely initiated communication with them.

Setting and Materials

Baseline, intervention, generalization, and maintenance sessions were conducted in the participants' classrooms. Each session was recorded with a digital camera. A timer was used to indicate the beginning and end of a session. Sessions included the first author and the child participant seated and playing at a classroom table. Sessions lasted 5½ min. Three toy sets were used during these play sessions (one toy set per session); the toys sets were rotated across sessions, and the order of the toy sets was counterbalanced across participants. The selected toys were developmentally appropriate and similar to the types of toys found in the children's classrooms. The first toy set was made up of objects that fit a picnic or meal theme: dolls and stuffed animals, utensils, cups, plates, bowls, bottles, and pretend food. The second toy set was a farm set with a barn, animals, farm food, fence, and tractors. The third toy set was made up of cars, a racetrack, and a car wash and garage. A fourth toy set, a playground set with people, slide, swings, and school bus, was used for generalization probes. To allow the adult to mirror the child's play, each toy set contained two identical or similar toys (e.g., two dolls and two cups and two of each food item).

Experimental Design

A multiple-probe design across three participants with intermittent probe variation was used (Horner & Baer, 1978). Participants who had yet to receive the intervention participated in intermittent baseline sessions while the first participant was in the intervention phase. When effects of the intervention were observed for C1, the intervention was introduced to C2, then C3, as consistent with the requirements of the design. Generalization sessions lasting 5½ min were conducted with each participant after every sixth session across all phases of the study using the untrained toy set. Three maintenance sessions, one session using each experimental toy set, were conducted approximately 1 month after intervention.

Experimental Conditions

Baseline. Baseline sessions were conducted with all participants before the intervention phase began and were conducted intermittently during intervention phases for the participants who had not yet received instruction. The researcher brought the play materials, video camera, and a timer into the classroom. During baseline sessions, the researcher followed the child's lead in play and mirrored his or her play actions. The researcher verbally interacted with the participant; she commented on the child's play and praised the child for playing with the materials and with her. The researcher did not provide any play models, play suggestions, or physical or verbal play expansions. Verbal praise was delivered at least once per minute throughout the baseline session. After 5½ min, the session ended, and the child participant was praised and thanked for playing. The participant then returned to his or her classroom activities.

Intervention. Intervention sessions were conducted exactly like the baseline sessions with the addition of the independent variable: play expansions and verbal mapping of play expansions. During intervention sessions, the researcher followed the child participant's lead in play and mirrored his or her play with objects. Expansions were provided at the end of a participant's action or sequence of actions. That is, at the end of the researcher's imitation of the child's action or sequence of actions, the researcher added a new, related action to the sequence. For example, if the child was using a spoon to stir in a bowl, the researcher stirred her spoon in her own bowl and then used her spoon to pretend to feed her baby. Each expansion consisted of the child's action plus a single action related to the play scheme used by the child. The researcher mapped the expansion while she performed the new action. In the play expansion example above, the researcher stirred her spoon in her own bowl and said, "Stir the soup," and then used her spoon to pretend to feed her baby and said, "Feed baby." If the participant was not playing with the materials, the researcher waited 5 s for the child to initiate play. If the child did not initiate any action for 5 s, then the researcher provided a model of a play action. Based on guidelines established prior to the start of the study, the researcher provided a total 8 to 14 expansions ($M = 9.28$) and models ($M = 4.05$) per session. The number of expansions and models varied within sessions and across participants based on the number of opportunities to expand within that session but fell within the range of 8 to 14 expansions and models. After 5½ min, the session ended, and the participant was praised for playing, thanked for participating, and returned to his or her classroom activities.

Generalization. Generalization sessions were conducted with each participant after approximately every sixth session and used a fourth toy set that was not available during the baseline and intervention sessions. Generalization sessions were conducted in the child's classroom in the same location as baseline and intervention sessions. Materials from the toy set were set up on the table within the child's reach. The researcher sat next to the participant during generalization sessions, but she did not mirror the participant's play, expand the play, or model any new play actions. The researcher did, however, verbally interact with the child. The researcher commented about what the child did

("You put the boy in the bus") or what the child seemed to enjoy ("You like to push the swing") and responded to the child's verbalizations. The number of comments per session varied across sessions and participants because it was dependent on what the child was doing during the session. After 5½ min, the session ended, the participant was praised for playing, and the participant returned to his or her classroom activities.

Maintenance. Three follow-up sessions (one session per toy set) were conducted with each participant approximately 1 month after completion of the intervention sessions to determine whether changes achieved during intervention maintained after conclusion of the intervention. These sessions were identical to the baseline sessions in which the researcher mirrored and mapped the child's play but did not provide any play suggestions or ideas; no expansions or models were given during these sessions.

Play Measures

We measured play in three ways: (a) the number of different actions, both spontaneous and imitated, children performed with toys within a session (diversity of object play); (b) the cumulative number of novel spontaneous actions children performed with toys across sessions; and (c) the level of play complexity at the end of baseline and the end of intervention. Play complexity was measured using three categories: nonfunctional play, functional play, and symbolic play.

Diversity of play actions. Two classes of child behavior were measured using the Object Play Code (Frey & Reddinger, 2005): (a) actions and play sequences performed with materials and (b) imitation of play models and expansions. Observational data were collected on these behaviors by coding the first 5 min of the video recordings of baseline, intervention, generalization, and maintenance sessions. Because of the difficulty in segmenting play actions into discrete events, partial interval recording with 10-s intervals was used to measure play actions. Video recordings were viewed and scored using ProcoderDV (Tapp, 2003). Observers coded (a) whether the child was functionally playing with the materials, (b) whether the child's functional play action was a different action within the session, (c) when play models and expansions were provided by the researcher, and (d) when models and expansions were imitated by the child.

The diversity of play was the primary measure and was measured by counting the number of different actions or sequences of actions each child used within a single session. To code the participant's play, the coder observed and recorded the most sophisticated play action or sequence observed within each 10-s interval. Then, the observer recorded whether the action was different (i.e., not previously coded within that session). Finally, a description of the coded action for each interval was written in standard English transcription (i.e., the observer wrote out how the child manipulated the toy(s) in that interval). During intervention, child imitations of adult expansions or models of play were coded as both different actions and imitations.

Cumulative novel actions. On completion of each baseline and intervention session, the researcher reviewed the transcript of actions for each child and recorded each different and spontaneous action with a toy in a separate spreadsheet. Using this list as a reference, the researcher determined the total number of novel actions (i.e., actions not coded in any previous session) performed by each child in each session.

Functional and symbolic play skills. Videos of the last three baseline sessions and the last three intervention sessions were analyzed to determine if there were any observed differences in the complexity of play (i.e., changes in the frequency of functional and symbolic play actions at the end of intervention compared to the end of baseline). The researchers used adapted definitions of play actions described by Lifter et al. (1993) and Kasari et al. (2006) to label each play action as one of three categories: nonfunctional, functional, or symbolic play. Nonfunctional play included intervals in which the child did not manipulate the materials or performed indiscriminate play actions, such as mouthing or banging the toys. Functional play included (a) discriminate actions on objects—using the toy(s) in a way it was intended to be used (e.g., rolling the car; opening the barn doors), (b) general combinations of at least two objects in a play action (e.g., put horse in barn; put person in car), (c) pretend self-play (e.g., child pretended to drink from cup; child pretended to eat with a fork), and (d) child as agent play (e.g., child fed the baby with a bottle; child walked the cow into the barn). Symbolic play included (a) single-scheme sequences of actions in which the child extended the same action to two or more figures (e.g., child fed the doll and then fed dog); (b) specific combinations in which the child combined two objects in a functional way and then added an action after the combination (e.g., child put a person in the tractor and then rolled the tractor; child scooped the spoon in the bowl and then ate with the spoon); and (c) doll as agent—child used the toy in such a way that it appeared the figure was doing its own action (e.g., child walked the cow to the trough and made the cow drink the water; child put the bottle in the doll's hands and brought the bottle up to the doll's mouth). The average percentage of intervals in which the child performed nonfunctional, functional, and symbolic play actions across the last three baseline sessions and the last three intervention sessions was calculated.

Adult play models. In intervention sessions, if a child did not initiate any action for 5 s, the researcher provided a model of a play action and verbally described the modeled action. Models were always single-play actions. The

observer wrote a description of the model on the play transcript and recorded "M" in the ProcoderDV file in the interval in which the model was given.

Adult expansions. Expansions were recorded when the researcher mirrored and mapped the child's play action, added a play action to the child's play, and described the new action. Each expansion provided was recorded on the play transcript and recorded as "E" in the code file in the interval in which the expansion was provided.

Child imitation. For each expansion and model, coders recorded on the transcript whether the child immediately imitated the expansion or model (i.e., the child's next action was the model or expansion provided by the adult). If the child did not imitate the expansion or model, the coder recorded what the child did instead (i.e., no response or play action different from the researcher's action).

Adult praise. The researcher praised children for playing and for imitating expansions and models. Praise was delivered at least once per minute and was coded and recorded on the play transcript for purposes of measuring procedural fidelity. Participants also were praised at the end of each session for playing.

Language Measures

Child utterances from the last three baseline sessions and the last three intervention sessions were transcribed and analyzed using *Systematic Analysis of Language Transcripts* software (SALT; Miller & Chapman, 2008). Using these transcripts, child MLU, total number of words, and number of different words spoken before intervention and at the end of intervention were calculated. In addition, the content of child talk was analyzed by scoring each word spoken by the child as related or unrelated to toys available in the session.

Coder Training

The first author was the primary coder and coded all sessions for all participants. A second coder, a master's student, coded 25% of the sessions to assess interobserver agreement (IOA). The researcher and coder were trained on all measures prior to the start of the study. Practice sessions of adult use of the play expansion procedures were conducted and video recorded. These videos were used to practice the partial interval recording procedures for the specified measures and the written transcripts of the measures. The researcher and the coder reviewed all definitions and procedures and together practiced the recording systems. Then, the researcher and coder independently coded an additional practice session video and discussed their coding agreements and disagreements. They continued coding practice videos until they reached an agreement level of 80% on at least three consecutive sessions.

Interobserver Agreement

IOA data were collected on coding different play actions, child imitation of models and expansions, researcher demonstrations of play models and expansions, and researcher delivery of praise. IOA was assessed for approximately 25% of sessions across all conditions for each participant by having the trained coder independently code these sessions. Interval by interval interobserver agreement was calculated using the formula: number of agreements divided by the number of agreements plus disagreements and the quotient multiplied by 100. If overall session IOA dropped below 85% and/or if an individual code had IOA less than 80%, the researcher and the coder met to review the discrepancies and make any necessary adjustments. Average percentages of IOA across coding categories ranged from 86% to 100%. The average percentage of IOA for coding different play actions ranged from 86% for C2 to 91% for C3. The average percentage of IOA for participants' imitation of models and expansions ranged from 89.7% for C1 to 100% for C2 and C3. The average percentage of IOA for examiner-delivered models and expansions ranged from 88% for C1 to 93% for C3. Lower percentages of IOA corresponded with low frequencies of child behaviors or the first occurrence of a new play behavior not clearly defined by the code.

Procedural Fidelity

Procedural fidelity was assessed for 25% of sessions by the second coder using a procedural fidelity checklist listing the steps of the procedure. These steps included the following: the researcher used the designated toys and materials, the sessions were at least 5 min, the researcher contingently imitated the child's play, 8 to 14 expansions or models were provided during intervention sessions and no expansions or models were provided in baseline and generalization sessions, the researcher verbally labeled the expansions and models, play models were provided during intervention session if a child did not initiate play for 5 s, at least one praise statement was given per minute, and verbal praise was given to the child at the end of the session. The trained coder reviewed the video-recorded session and completed the procedural fidelity checklist by checking off each item that was implemented correctly. The percentage of correct implementation was calculated by dividing the number of items scored correct by the total number of items observed with the quotient multiplied by 100.

Procedural fidelity ranged between 88.9% and 100% (M = 97.3%) for all participants across baseline and intervention sessions. Procedural fidelity values less than 100% occurred when the researcher did not praise the child at least once per minute throughout the session.

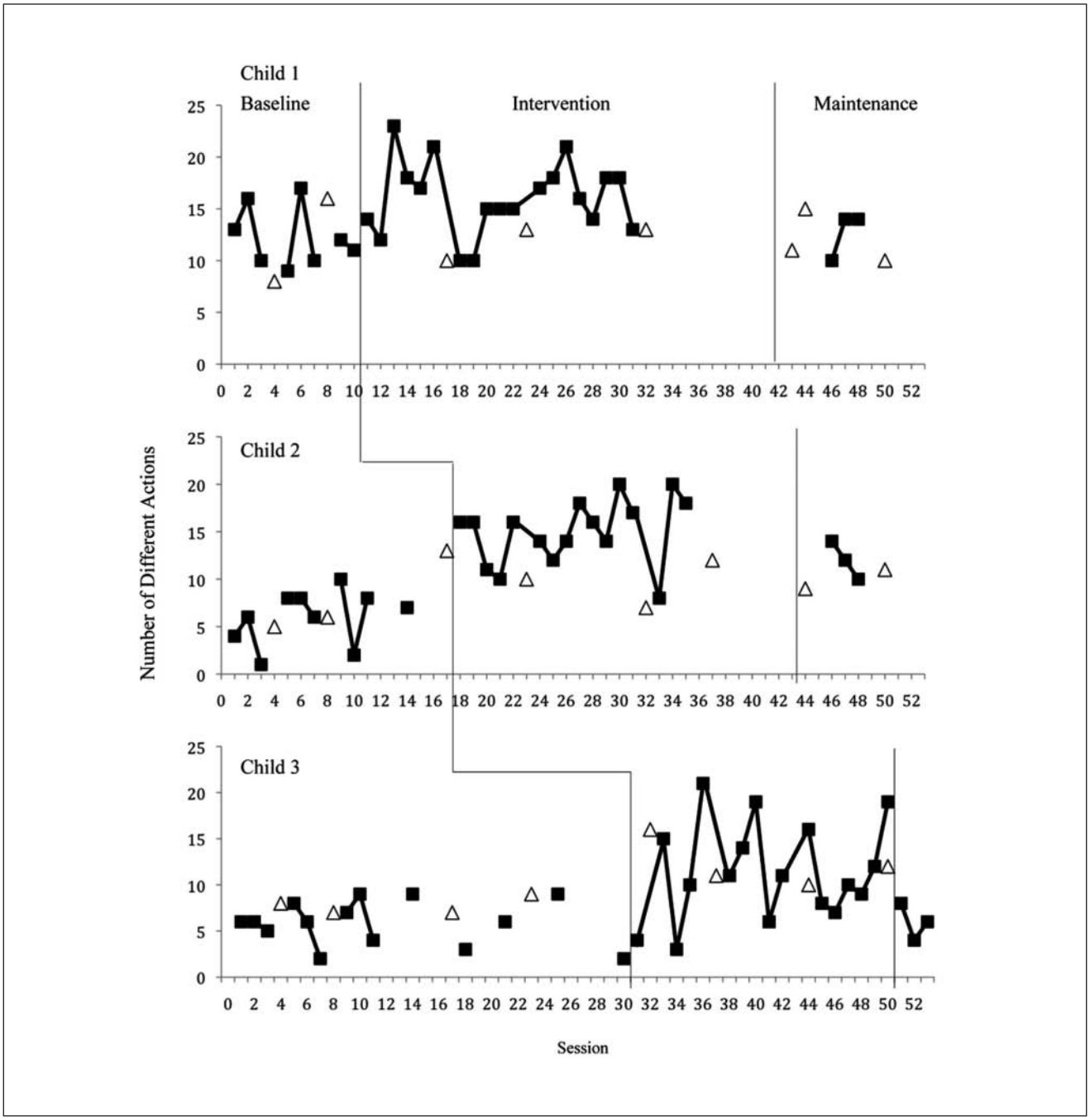

Figure 1. The number of different play actions in baseline, intervention, and maintenance conditions across participants
Note: Open triangles indicate generalization sessions.

Results

Diversity of Play

Number of different actions. The number of different play actions within each session for each participant is shown in Figure 1. Different actions were defined as play actions the child had not previously performed within that session. These actions could either be performed spontaneously or be a spontaneous imitation of an expansion or a model. The average number of different actions performed within each session in each condition for all participants is shown in Table 2.

Table 2. Different Actions Performed per Session in Baseline and Intervention Conditions

	Baseline	Intervention
Child 1		
M	12.25	16.22
Range	9, 17	10, 23
SD	2.92	3.56
Percentage	40.8	54.1
Child 2		
M	6	15
Range	1, 10	8, 20
SD	2.87	3.44
Percentage	20	50
Child 3		
M	5.86	11.47
Range	2, 9	3, 21
SD	2.44	5.27
Percentage	19.5	38.2

During baseline, C1 had a moderate but variable number of different actions in each session (M = 12.25; range, 9–17). A slight change in level occurred between baseline and intervention conditions. The mean number of different actions performed in each session during intervention was 16.22 (range, 10–23), and 42% of the different actions performed during intervention were immediate imitations of models and expansions (see Table 3). In the intervention condition, C1 showed an initial increase in the number of different actions performed during the third through the sixth sessions of intervention. This initial increase was the basis for the decision to introduce the intervention to C2. However, during Sessions 7 and 8, C1's play actions decreased to baseline levels and remained somewhat variable across the last 10 intervention sessions. The percentage of nonoverlapping data points between baseline and intervention conditions was 39%.

C2 had a low number of different actions during baseline (M = 6, range, 1–10). C2 demonstrated an increase in the number of different actions performed when the intervention was introduced. During intervention, C2 performed between 8 and 20 different actions per session (M = 15). Visual inspection of C2's data indicated a change in level with a possible slight accelerating trend across the phase. Between baseline and intervention conditions, 87.5% of the data points were nonoverlapping. Forty-one percent of C2's different actions performed in intervention were immediate imitations of play models and expansions.

C3 also increased the number of different actions performed in each session when intervention was introduced. During baseline, C3's number of different actions per session ranged from 2 to 9 (M = 5.86). In intervention, the number of C3's different actions ranged from 3 to 21, with an average of 11.47. Only 19.5% of C3's different actions in intervention were immediate imitations of play models or expansions. Although C3's play actions were variable within baseline and intervention, there was a change in level during the intervention condition. C3's data in the intervention condition were more variable than in baseline and showed a larger range across sessions. The percentage of nonoverlapping data points between conditions was 65%.

Novel actions. Participants demonstrated spontaneous novel actions (i.e., play actions never spontaneously performed or coded before) throughout the intervention. C1, C2, and C3 performed 52, 36, and 38 novel actions during intervention, respectively. Participants demonstrated two to three novel actions in each intervention session.

Functional and Symbolic Play

The average percentage of play session intervals coded as nonfunctional, functional, and symbolic play during three sessions at the end of baseline and at the end of intervention is shown in Figure 2.

C1's symbolic play skills increased from about 11% at the end of baseline to about 25% at the end of intervention. Her functional play decreased from the end of baseline to the end of intervention, as she performed more complex play actions, and her nonfunctional play did not change.

C2 performed more complex play at the end of intervention. At the end of baseline, 37% of C2's play session intervals were categorized as nonfunctional. At the end of intervention, his nonfunctional play decreased to an average of about 9% of the play intervals. C2's average functional play performance increased from 61% to 74%, and his average symbolic play performance increased from 1% to about 14%.

C3 also demonstrated more complex play at the end of intervention. The average percentage of nonfunctional play intervals decreased from 39% at the end of baseline to about 24% at the end of intervention. C3's average functional play performance increased from 60% to 66%, and his average symbolic play performance increased from 1% to about 7%.

Play Models and Expansions

The number of models and expansions provided by the researcher varied based on the child's play and the resulting opportunities for models and expansions (see Table 3); however, the number of models and expansions provided in each session for each child was within procedural fidelity levels. C3 received more models than the other participants (average of about 5 models per intervention session), and C2 was provided with more expansions than the other participants (average of about 11 expansions per intervention session).

Table 3. Imitation of Models and Expansions Across All Intervention Sessions

	Total no. of models provided	Mean no. of models per session	Total no. of models imitated	Percentage of models imitated	Total no. of expansions provided	Mean no. of expansions per session	Total no. of expansions imitated	Percentage of expansions imitated	Percentage of different actions that were imitations
Child 1	74	3.89	28	38	161	8.47	107	66	42
Child 2	57	3.56	39	51	180	11.25	81	45	41
Child 3	80	4.71	10	12.5	128	8.12	33	24	19.5

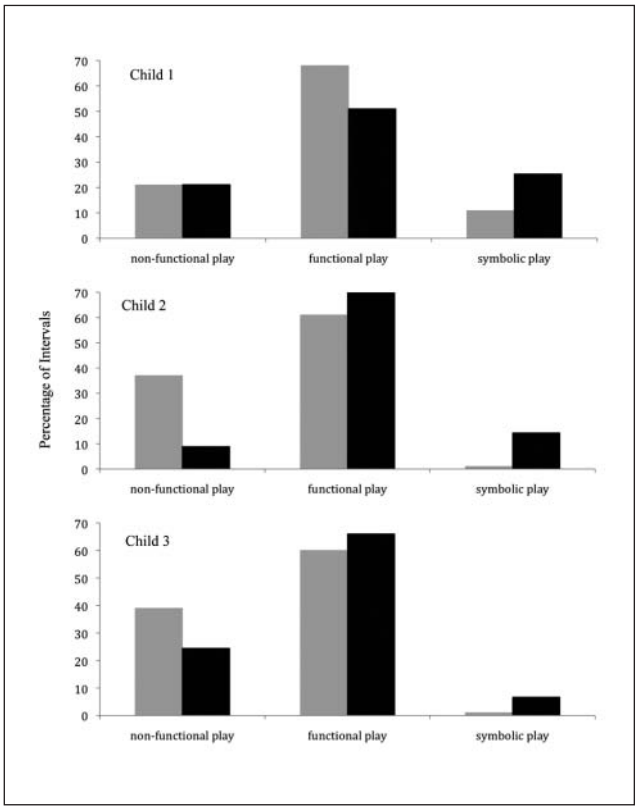

Figure 2. The average percentage of intervals coded as nonfunctional, functional, and symbolic play at the end of baseline and the end of intervention
Note: Grey bars indicate the average play of the last three baseline sessions. Black bars indicate the average play of the last three intervention sessions.

Participants also varied in the percentage of models and expansions immediately imitated (see Table 3). C1 imitated 38% of the play models and 66% of the play expansions. C2 imitated 51% of the play models and 45% of the play expansions. C3 imitated 12.5% of the play models and 24% of the play expansions. This information suggests the three participants used different strategies for learning new play actions. C1 replaced some spontaneous actions with imitations. C2 gradually increased the number of spontaneous actions over time, and C3 increased the number of spontaneous actions over time with low rates of imitation.

Generalization

Generalization data are shown in Figure 1. Only C3 demonstrated generalization to untrained toys as indicated by a change in level from baseline to intervention. The average number of different actions performed per generalization session in the baseline condition was 7.75 (SD = 0.96); 12.25 (SD = 2.62) different actions were performed in the intervention condition. C3 had no overlapping data points across generalization sessions in the baseline and intervention conditions. Visual inspection of the generalization data showed no change in performance for C1 and C2.

Maintenance

Maintenance data for number of different play actions are included in Figure 1. Data from the 1-month follow-up observation indicated that C2 maintained the increase in number of different actions achieved during the intervention condition. Maintenance data for C2 were at or above baseline levels, with an average of 12 (SD = 2) different actions performed per session. C1's and C3's data indicated a return to baseline levels.

Language

Transcript analyses revealed no changes in children's MLU; however, all three participants increased the number of verbalizations and different words used at the end of intervention when compared to the end of baseline. At the end of baseline, C1 used 4 different words in the transcribed sessions. At the end of intervention, C1 used 9 different words, and 8 of the 9 different words were related to the play or the toys used. C2 used 4 different words at the end of baseline and 17 different words at the end of intervention; all of the words before intervention and at the end of intervention were related to the play actions or the toys used. C3 used 8 different words before intervention and 20 different words at the end of intervention. Nineteen of the 20 different words spoken at the end of intervention were related to the play or the toys used.

Discussion

The results of this study extend the literature on effective strategies for teaching object play skills to children with

disabilities and demonstrate the effectiveness of a new strategy, play expansions, to increase the frequency, diversity, and complexity of object play. Play expansions were effective in increasing both the diversity of play actions and the level of play complexity. Responses to the expansions intervention, however, were different across participants, and the extent of generalization and maintenance varied.

Two types of changes in children's play actions were observed. First, children increased the overall number of different play actions performed within sessions and increased the number of spontaneous novel actions they performed with toys across sessions. Second, children increased the complexity of their play actions, as described by changes in functional and symbolic play categories. As C1 performed more symbolic play actions in intervention, her number of functional actions decreased. As C2 and C3 acquired more play skills, they increased the number of intervals in which they performed functional play actions and demonstrated more intervals of symbolic play actions.

The initial goal of the study simply was to increase the amount of different play actions. The use of the expansion strategy, however, resulted in modeling more sophisticated play. Although we did not measure the level of symbolic play that was included in the expansions and therefore cannot define the exact relationship between the play level included in the expansion and the child's use of more sophisticated play actions, the impact of the intervention on performing more sophisticated play suggests an important advantage of this responsive approach for moving children toward more symbolic use of toys. In the current intervention, new play actions were never prompted, and children's production of new symbolic play was spontaneous or a spontaneous imitation. This finding suggests that meaningful advances in children's play skills can be accomplished through contingent modeling and without the risk of prompt dependency. These findings, though promising, need to be replicated to investigate if modeling via play expansions dependably increases symbolic play actions. The current intervention was delivered as a package that included praise, adult contingent imitation, expansions and models, and verbal mapping of play actions. Although the only component that differed between baseline and intervention sessions was the provision of play expansions and models, it is unclear how each procedural component contributed to the results of this study.

Imitation is presumed to be the mechanism by which children learned new actions; however, participants varied on their immediate imitation of actions demonstrated to them through expansions and models. The current study only reports immediate imitations, and the presented imitation data do not reflect the spontaneous performance of models and/or expansions later in the session or in subsequent sessions. Individual differences in children's immediate and delayed imitation may reflect children's strategies for learning from their environments. For example, C1 and C2 showed higher percentages of imitation, as they more often responded to the expansions and models by immediately imitating them. C3 acquired novel and complex actions during the intervention, but he less frequently immediately imitated the researcher's models and expansions. C3 continued with his own play actions after a model or expansion and later in the session performed the demonstrated action. Thus, it appears that children could learn the action presented to them in an expansion or model without immediately imitating that action. This finding is consistent with the research that shows providing linguistic expansions increases the likelihood the child will later produce the utterance modeled expansion as an apparently spontaneous utterance (Paul, 2001).

Kasari et al. (2006) reported that a weakness across the results of various play interventions has been that the acquired skills do not always maintain over time or generalize to new contexts or people. Evidence of consistent maintenance and generalization also were weaknesses of this study. Although C2 was able to maintain the increase in the number of different actions performed per session, the maintenance data from C1 and C3 showed a return to baseline levels. Maintenance might have been facilitated by a longer intervention and systematic fading of the interventionist as a responsive play partner. It is possible the increase in play was related to the general support for play and engagement in the responsive interactions between the adult and child in the sessions. After the conclusion of intervention, the child no longer had the same 1:1 situation in which to practice newly acquired play skills. Visual inspection of the generalization data showed no change in generalization between baseline and intervention for C1 and C2. This finding may be due to the way generalization was assessed. The generalization procedures in this study were not a proximal enough measure of generalized advances in play actions given the age and abilities of the participants. Generalization sessions used a fourth toy set that was not used in baseline or intervention sessions, and the adult was not highly interactive with the child during generalization sessions. The researcher did not mirror the participant's play or model any new play actions. Furthermore, none of the toys from the baseline and intervention toy sets were included in the generalization toy set and children never saw any new actions modeled for that set. The lack of generalization effects suggests that the play actions demonstrated during the intervention sessions were associated with a specific toy rather than generalized actions to be used across toys.

Future play interventions using this expansion approach should measure and systematically program for generalization.

Generalization should first be measured on independent child play on trained toy sets (i.e., child play without the adult imitations, expansions, or comments). Once children demonstrate that they can perform the newly learned play skills without support, children's play with classroom materials similar to those in the trained toy sets should be examined. Future research could use the expansion procedure with classroom materials to increase the likelihood of children using new play actions in the classroom.

Although no changes were observed in children's length of utterances, all participants used more words at the end of intervention, when compared to the end of baseline. No systematic attempts to increase child verbalizations were included in this intervention. Thus, any changes in child language may have been the result of modeling only. Although changes in language resulting from development cannot be ruled out as a factor in increasing language, this is an area for future research. Combining play expansions, language models, and language expansions with intermittent prompts to comment on play action(s) would extend the features of this intervention to focus simultaneously on language and play. This combined intervention is a promising area for future investigations.

Additional Considerations

Toy sets. C3's data showed systematic variation possibly related to the toy sets. C3 had a strong preference for the car toy set. Toy preference may need to be considered when using this intervention. Lifter et al. (2005) discussed the importance of identifying target play activities. This study did not conduct any preference assessments to gather more information about each participant's preferred toys and did not make any individual accommodations to the toy sets.

Play expansion technique. Future research on this intervention should focus on developing "advancing" forms of play expansions, expansions made up of more than one action, for children at different play levels. Using single action expansions increased the number of different actions a child performed with toy sets but did not teach children to spontaneously perform extended play sequences or routines. The focus of this study was to increase the diversity of object play, but future research also should focus on variations of modeling and expanding procedures to increase the complexity of play without directly prompting these actions. In addition, the level of functional and symbolic play of each expansion should be measured to better understand the relationship between expansions provided and children's increases in performance of more complex play actions.

Play "targets" were not selected for individual children in this study. Therefore, there was no systematic plan for which exact expansions were provided contingent on child play. Selection of play targets (designated play levels intended to advance the current level of child play) and systematic implementation of play expansions at target levels are promising directions for future studies.

Implications for Practice

There are several implications of this research for practitioners. Using this approach to teach play skills to young children with disabilities may help them increase play with objects and use of play-related language. The procedures are relatively easy to use in natural interactions. The use of modeling and expanding without prompting avoids the potential for prompt dependence, which may be especially important for some children. Teachers, parents, and siblings could be trained to use the imitating, describing, and expanding techniques of this intervention. Training to use similar strategies to increase language has been accomplished in several studies of milieu teaching (Kaiser, Hancock, & Hester, 1998; Kaiser et al., 2000; Kaiser, Hancock, & Trent, 2007; Trent, Kaiser, & Frey, 2007). A play expansion intervention could be introduced in play contexts at school and at home using toys available in these environments. Finally, play expansions could be integrated with embedded instructional strategies to teach language and social skills. Although the social validity of this intervention was not measured in this initial study, future investigations using the play expansion technique should also investigate the social validity of the procedure when used at school or home with interventionists, teachers, and/or parents.

Conclusion

Young children with disabilities differ in their frequency of play and variety of play skills and activities as compared to their typical peers. Although these children may need direct interventions to learn how to play with toys in more complex and varied ways, they may be able to learn these skills without direct instruction or prompting. In the current study, an intervention package including mirroring, modeling of play expansions, and verbal mapping of expansions was shown to increase the diversity and complexity of play for engaged, imitative children with low rates of novel play actions with toys. This study was a demonstration of the expansion principle. The intervention procedures used in this study have potential for being developed into a comprehensive and systematic approach to modeling and expanding object play.

Authors' Note

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