

Increasing Play Skills of Children With Autism Using Activity Schedules and Correspondence Training

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Play is a critical component of preschool children's development. For children with autism, restricted play skills eliminate common tools needed to build independent performance and peer relationships. The purpose of this study was to investigate a strategy to improve the independent performance of preschoolers with autism during playtime in an inclusive setting. A multiple-baseline design across subjects was employed to determine the effectiveness of correspondence training and activity schedules on the on-task and play correspondence behavior of 4 preschoolers with autism. Partial-interval recording was used to measure on-task behavior and experimenter prompts, whereas a frequency count was used for on-schedule behavior. Procedural integrity and social validity were also measured. Results of the study indicated that all 4 participants' on-task and play correspondence behavior increased, while experimenter prompts gradually decreased.

For most young children, play is a naturally occurring phenomena that promotes their engagement and learning, independent performance, and social inclusion (Brewer & Kieff, 1996; Lowenthal, 1996; Perlmutter & Burrell, 1995). The reinforcing value of play maintains its presence in the child's repertoire, serving as a precursor for successful participation in educational environments that expose children to important concepts in math, literacy, science, and language. Children who are unable to participate in play experiences are at risk for future deficits and have greater difficulty adjusting to preschool environments where individual instruction is limited (Buisse, Wesley, Keyes, & Bailey, 1996; Gallagher, 1997). For preschoolers with autism, absent or restricted play skills might prevent opportunities for learning and successful participation in inclusive classrooms. The impending isolation might serve to perpetuate the child's deficits in socialization and communication.

Independent performance is valued in edu-

cation and becomes a critical issue when children move into situations where child-teacher ratios are high (Bryan & Gast, 2000). The benefits resulting from children's independent performance in early childhood education settings might be increased instructional time, efficient and effective learning, increased opportunities for peer interaction, and decreased teacher supervision (Dunlap, Dunlap, Koegel, & Koegel, 1991; Mills, Cole, Jenkins, & Dale, 1998; Schmit, Alper, Raschke, & Ryndak, 2000). Some degree of independent performance is essential for expediting the successful inclusion of preschoolers with autism (Massey & Wheeler, 2000; Sainato, Goldstein, & Strain, 1992). Research in this area suggests that as children's engagement increases, their communication and social skills improve, while stereotypic behavior decreases (Green-span & Wieder, 1992; Libby, Powell, Messer, & Jordan, 1997; Thorp, Stahmer, & Schreibman, 1995).

With an emphasis on the benefits of inclu-

sion, parents of preschoolers with autism are seeking effective ways for their children to continue skill acquisition and enhancement, while also exposing their children to typically developing peers. Without systematic intervention strategies promoting appropriate play and independent performance, children placed in these types of settings might encounter many barriers (Massey & Wheeler, 2000). The ability to select and engage in, and eventually learn to perform a sequence of play activities, is a step towards facilitating independent play skills of preschoolers with autism (Bryan & Gast, 2000; Sainato et al., 1992; Schwartz, Billingsly, & McBride, 1998).

One effective strategy for promoting desirable behavior changes in children with disabilities is correspondence training. Risley and Hart's (1968) early correspondence training research indicated that a correspondence between what the child says and does, begins to develop when the child's behavior is reinforced for desired verbal behavior accurately reflecting previous play behavior. Existing correspondence literature suggests that there is a connection between what an individual indicates she will do and what she actually does (Baer, 1990; Odom & Watts, 1991). The objective becomes the explicit matching of word to deed, with the delivery of reinforcement for accurate matches. This strategy has been used to promote such behaviors as toy play, peer-directed talk, and clean up (Odom & Watts, 1991; Osnes, Guevremont, & Stokes, 1986).

Another procedure useful in promoting independent performance and positive behavior changes is the use of activity schedules or picture schedules. Many interventions rely solely on verbal instructions (Lazarus, 1996) that are sometimes inadequate for children with severe language deficits (Grodin & LeVasseur, 1995). Bryan and Gast (2000) found that picture activity schedules increased the on-task and on-schedule performance of 4 students with autism in an elementary resource room. In Massey & Wheeler's (2000) study, a preschooler with autism exhibited increased task engagement and decreased challenging behavior with the implementation of a photographic activity schedule. Photographic activity sched-

ules have been used to help children develop play skills, make play choices, access more play areas in the classroom, and ultimately increase their independent performance during playtime (MacDuff, Krantz, & McClannahan, 1993; Pierce & Schreibman, 1994; Valk & Schwartz, 1997).

This study sought to extend previous research by combining the use of correspondence training and photographic activity schedules, exploring the generalization of behavior change and assessing the social validity of the strategy among relevant consumers. Although other studies looked at the effectiveness of the individual strategies (Odom & Watts, 1991; Pierce & Schreibman, 1994), few research studies have been conducted using a combination of the two strategies (Bevill, Gast, MaGuire, & Vail, 2001; Frazier, 1997). Furthermore, researchers have not examined the effectiveness of the combined strategy on the acquisition and sequencing of play behavior of preschoolers with autism during playtime within an inclusive environment.

The purpose of this study was to investigate the effectiveness of correspondence training and photographic activity schedules on the on-task and play correspondence behavior of children with autism in an inclusive preschool classroom. It was anticipated that through developing independent play skills the children would be more likely to repeat and expand meaningful play interactions within a typical classroom setting.

METHOD

Participants and Setting

This study was conducted in an inclusive preschool classroom each day during the regularly scheduled playtime. Four preschool children with autism participated in the study, along with 8 typically developing preschoolers who were also enrolled in the class. Three parents of children participating in the study volunteered to assist in the classroom one day per week. A licensed social worker and a special education assistant teacher volunteered in the classroom once per week. The parents and volunteers were asked to assist with activities

and the general classroom routine. Prior to the onset of the study, they received general instructions on managing the classroom environment and peer model interaction, but they were instructed not to interact with the target children during the observation period of the study.

The classroom contained four defined play areas referred to as Blocks, Kitchen, Dollhouse, and Art. Toys and play materials located in the play areas were selected based on the following criteria: items that were developmentally and age appropriate, items commonly found in typical peer group settings, items providing access to more than one child at a time, and items promoting interactive play skills. Play materials with multiple pieces were stored in plastic shoeboxes in child-accessible areas.

To recruit children for this study, letters describing the study were mailed to 29 families of preschool children with autism who were known to live in the community. Of the 10 families who responded to the letter, 4 children met the criteria to participate in the study. Eligibility criteria consisted of an existing documented diagnoses of autism as defined by the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 1994), a moderate to severe rating on *The Childhood Autism Rating Scale* (Schopler, Reichler, & Renner, 1988) and significant deficits in the social and language domains as identified using *The Battelle Developmental Inventory* (Newborg, Stock, Wnek, Guidubaldi, & Svinicki, 1984). Children were not selected if they exhibited self-injurious behavior or were participating in an intensive discrete trial training program. Typically developing children were enrolled via community announcements that a preschool classroom was being created. The children constituted this new class and were enrolled for 4 months before the study.

Ned, a 58-month-old male, diagnosed with autism when he was 31-months old attended a center-based, self-contained early childhood special education classroom for 2 years prior to his involvement in this study. Ned's symptoms of autism rated in the moderate range on

The Childhood Autism Rating Scale (Schopler et al., 1988) and he received the following age equivalent scores on *The Battelle Developmental Inventory* (Newborg et al., 1984): cognition, 32 months; receptive language, 36 months; expressive language, 28 months; and personal-social, 31 months.

Diagnosed with autism when she was 50-months old, Kelly was a 63-month-old female who also attended a center-based early childhood self-contained classroom for 2 years. Kelly's age equivalent scores on *The Battelle Developmental Inventory* (Newborg et al., 1984) were as follows: cognition, 36 months; receptive language, 20 months; expressive language, 27 months; and personal-social, 22 months.

Michael was a 42-month-old male with a typically developing twin sister. He was diagnosed with autism when he was 36-months old and had not attended early childhood special education classes. Michael's scores on *The Battelle Developmental Inventory* (Newborg et al., 1984) were: cognition, 26 months; receptive language, 20 months; expressive language, 24 months; and personal-social, 12 months.

Janet was a 70-month-old female attended an inclusive early childhood special education classroom for 2 years prior to participating in this study. She was diagnosed with autism when she was 55-months old. Janet received the following age equivalent scores on *The Battelle Developmental Inventory* (Newborg et al., 1984): cognition, 40 months; receptive language, 20 months; expressive language, 28 months; and personal-social, 20 months.

Photographic Activity Schedules

Color photographs were taken of the four play areas in the classroom. One set of photographs was developed and enlarged to 12.70 cm × 17.78 cm. Each of these photographs was posted on a yellow container placed on a shelf or table in the corresponding play area. This container allowed the children to store their activity schedule in the play area where they were playing. Four sets of 5.08 cm × 7.62 cm color photographs were used to make an activity schedule for each of the children partic-

icipating in the study. These photographs were used to teach the children which photographs corresponded with a specific play area, how to select a play area, and to review their play behavior at the conclusion of playtime.

Each child received a 12.7 cm × 20.32 cm clipboard with his or her name on it. Attached to the front side of the clipboard were pieces of Velcro, spaced 2.54 cm apart. The children placed their play selections from left to right across the first row of Velcro. On the back of the clipboard, an attached envelope held photographs of all the play areas. Velcro was attached to the back of each picture allowing the children to place their selections on the front of the clipboard.

Dependent Variables

This study focused on increasing the independent play skills of preschoolers with autism. Two dependent variables were measured: the percentage of intervals the child exhibited on-task behavior and the total number of occurrences of correspondence between children's play selections and their actual play behavior.

On task. The following statements were described and coded as on-task behaviors. The child was engaged in (a) focused visual attention—the child's eyes were directed at the toy or play materials, at another child engaged in the same activity, or at the experimenter; (b) purposeful interaction or manipulation of the materials involved in the play activity; (c) nonverbal or verbal interaction with another student or the experimenter during a play activity; (d) retrieving, visually attending to, or replacing their photographic activity schedule. *Off task* (\emptyset) was coded when the child (a) was not engaged according to the definitions listed above; (b) engaged in self-stimulatory behavior such as mouthing, finger flicking, bouncing, or spinning; (c) manipulated toys or play materials in a prolonged repetitive pattern; (d) engaged in disruptive or aggressive behavior.

Play correspondence. The experimenter presented the child with photographs of play areas located within the classroom and asked to make three play selections by saying or pointing to photographs of play areas. The following rules were established for recording

correspondence of play selection to play behavior: (a) the child placed the indicated photographs on the front of the photographic activity schedule, (b) the experimenter recorded play selections, (c) the child was observed to see if he or she was on task and followed the same play behavior sequence as indicated by his or her photographic activity schedule, (d) the child received credit for correspondence when play behavior matched his or her play selections as indicated on the photographic activity schedule.

Measurement

The children were videotaped using a wide-angle lens during a 45-minute playtime. A 10-second interval tape was used with the videotape to code and record on-task behavior for each child. Using a partial-interval recording scheme the sequence in which the children were observed was rotated daily. During the play sessions, observations of the children were conducted in a rotating fashion with one child being observed for a 10-second interval and not observed for the next three 10-second intervals while the other 3 children were being observed. The percentage of intervals the child was on task was calculated by determining the total number of intervals the child was on task and dividing this number by the total number of intervals in a session.

Event recording was used to identify the number of one-to-one occurrences of play correspondence. Each target child had an opportunity to receive three play correspondence points for each session. Play correspondence was counted when correspondence was observed between the child's play selections and his or her actual play behavior during playtime.

Procedural Integrity

To ensure the integrity of the experimental procedures, data were collected using procedural integrity checklists, specifically designed to address each experimental and generality condition. These checklists detailed the steps of the intervention for each condition with regard to experimenter behavior and interactions with the participants. The criterion

Table 1.
The Mean (Range) of the Percent of Intervals of Experimenter Prompts

Children	Baseline	Activity Schedule Training	Say + Reinforce	Play Correspondence Package	Say + Reinforce
Ned					
Exp.	20 (16–23)	29 (24–40)	19 (18–19)	11 (5–18)	7 (1–17)
Gen.	16 (16)	20 (20)	14 (14)	11 (3–16)	9 (3–16)
Kelly					
Exp.	19 (14–25)	24 (17–29)	21 (19–24)	13 (3–20)	9 (4–19)
Gen.	14 (8–20)	16 (16)	15 (12–14)	6 (4–8)	4 (0–6)
Michael					
Exp.	18 (14–22)	27 (16–33)	13 (12–18)	12 (6–18)	—
Gen.	13 (12–14)	10 (10)	10 (10)	10 (3–16)	
Janet					
Exp.	21 (10–33)	25 (18–31)	14 (9–17)	13 (4–22)	—
Gen.	18 (14–20)	20 (16–23)	—	8 (3–11)	

Note. Exp. = Mean for experimental sessions; Gen. = Mean for generality sessions.

for each item was whether or not each step in the intervention condition was observed or not observed, which was indicated by a checkmark in either the “Yes” or “No” column on the checklist. Two second year doctoral students in special education acting as secondary observers completed the procedural integrity checklists as they observed the experimenter during 20% of the experimental sessions and 25% of the generality sessions. Interobserver agreement for procedural integrity checklists was 100% for participants during all conditions.

To further ensure procedural integrity, the percentage of intervals of experimenter prompts delivered to each participant was measured for all conditions. Experimenter prompts were measured as an independent variable to determine the influence of the experimenter’s behavior on the participants’ play behavior. Although experimenter prompts in-

creased during the activity schedule training condition because of the training aspect of the study, prompts decreased for all children during the play correspondence package and say + reinforcement conditions. The mean and range of experimenter prompts for all conditions can be found in Table 1.

Scored-interval interobserver agreement was conducted for 15 of the 59 (25%) experimental sessions for experimenter prompts and ranged from 93% to 100% for all children. Scored-interval interobserver agreement was conducted for 11 of the 13 (84%) generality sessions and ranged from 94% to 100% for all children.

Procedures to Ensure the Believability of Data

Interobserver Agreement. Scored-interval interobserver agreement was conducted for children’s on-task behavior for 15 of the 59 (25%)

experimental sessions and 11 of the 13 (85%) generality sessions. Interobserver agreement across all conditions ranged as follows: Ned, 96% to 100%; Kelly, 96% to 98%; Michael, 96% to 100%; and Janet, 95% to 99%.

Play correspondence behavior was recorded on a daily observation form. As the children made their play selections, the experimenter recorded the selections in the correct sequence on the play observation form. A second observer recorded the actual play behavior of the child. The videotaped session was viewed for any disagreements between the experimenter and the second observer. Percentage agreement was conducted for 57 of 59 (97%) experimental sessions and 12 of 13 (92%) generality sessions. Observer agreement was 99% for Ned, Kelly, and Michael, and 100% for Janet.

Experimental Design

A multiple-baseline design across subjects was used to assess the effects of correspondence training using photographic activity schedules on children's on-task and play correspondence behavior during playtime. The five experimental conditions were as follows: baseline, activity schedule training, say + reinforcement, play correspondence package, and generality.

Experimental Conditions

General procedures. Parents brought the children to the classroom. After the children and the parent or volunteer assisting for the day arrived, the experimenter instructed the class that it was playtime. The experimenter arranged the materials for the activity schedules while the parent or volunteer monitored the children. The table was located on one side of the classroom, but outside of the play areas. While the other children were playing, the experimenter brought the target children individually to sit at the table. The clipboard, used for constructing the activity schedule, was within the child's reach on the table.

The experimenter presented the child with 5.08 cm × 7.62 cm photographs of the four play areas in the classroom by placing the photographs on the table directly in front of

the child. A larger set of the four play area photographs was posted in the corresponding play areas. This provided the child with a visual connection between the photographs on his or her activity schedule and the actual play areas the photographs represented within the classroom.

Baseline. The experimenter brought the target child to the table and asked the child, "Where do you want to play?" If the child selected a picture, the experimenter prompted the child to put the photograph on the clipboard and asked the child, "Where do you want to play next?" The same procedure was followed for the child's third selection. If the child secured the photographs on the clipboard, the experimenter prompted the child to "Follow your play schedule." The child was then observed to see if she engaged in the play areas indicated on her activity schedule. If the child did not make a play selection within 15 seconds, the experimenter prompted the child to "Go play with your toys." The experimenter gave general prompts to play only when the child was off task or engaged in stereotypic behavior for approximately 20 seconds. The experimenter gave immediate specific prompts if the child was engaged in disruptive behavior. Baseline continued until data points fell at or near a specific level indicating stable responding for a minimum of three consecutive data points.

Activity schedule training. The same general procedures were followed at the beginning of each session throughout this condition. In this condition the experimenter implemented a training protocol to teach the children to use the activity schedules. The experimenter asked the child, "Where do you want to play?" If the child selected a picture, the experimenter prompted the child to put the photograph on the clipboard and asked the child, "Where do you want to play next?" The same procedure was followed for the child's third selection. If the child secured the photographs on the clipboard, the experimenter verbally reviewed the child's play selections and prompted the child to "Follow your play schedule." The child was observed to see if he or she played in the play areas

indicated on his or her activity schedule. If the child did not make a play selection, the experimenter prompted the child. This procedure was repeated until the child had three photographs on his or her activity schedule. The experimenter prompted the child to "Follow your play schedule" and observed the child to see if he or she proceeded to the areas indicated on the activity schedule. The experimenter then prompted the child to place his or her activity schedule in a container marked with a corresponding photograph.

The experimenter used graduated guidance, providing the type and amount of prompting necessary to prompt the child to initiate and correctly perform the task (Bailey & Wolery, 1992; Bryan & Gast, 2000). Specifically, graduated guidance was used to prompt the child to interact with play materials in the indicated play area. The experimenter demonstrated appropriate interaction with play materials as well as prompts regarding the location of materials. The child was prompted to remain in each of the three play areas indicated on his or her activity schedule for a minimum of 5 minutes.

The second and third observers timed the children in each play area. If the child was observed to be off task after 5 minutes, the experimenter prompted the child to look at his or her activity schedule and proceed to the next indicated play area. Following the completion of 5 minutes in the third play area, the experimenter waited until the child was observed to be off task for two consecutive intervals and said to the child, "You are all done with your play schedule, take it to the brown table." The experimenter gave the child one stamp and said, "Good job following your play schedule."

Activity schedule training continued on subsequent days until the child independently selected and followed a sequence of play selections as indicated on his or her activity schedule for two consecutive sessions. Criteria were met when the child remained in at least two different play areas as indicated on his or her activity schedule, for a total of 5 minutes per play area, without experimenter prompts to remain in the play area.

Say + reinforcement. In this condition, the experimenter followed the general procedures previously described. The experimenter asked the child, "Where do you want to play?" If the child selected a picture the experimenter prompted the child to put the photograph on the clipboard and asked the child, "Where do you want to play next?" The same procedure was followed for the child's third selection. If the child secured the photographs on the clipboard the experimenter verbally reviewed the child's selections and said, "Good job telling me where you are going to play." The experimenter immediately gave the child a stamp on his or her hand and said, "Now follow your play schedule." The child was then observed to see if he or she played in the play areas indicated on his or her activity schedule.

This condition was included to provide information regarding the child's performance when reinforcement was provided immediately after the child said what he or she was going to do. The experimenter provided verbal prompts for the child to follow the activity schedule. The child remained in the say + reinforcement condition until the child's mean percentage of on-task behavior was 25% less than his or her mean percentage of on-task behavior in the activity schedule training condition.

Play correspondence package. Following the general procedures, the experimenter asked the child, "Where do you want to play?" If the child selected a picture, the experimenter prompted the child to put the photograph on the clipboard and asked the child, "Where do you want to play next?" The same procedure was followed for the child's third selection. If the child secured the photographs on the clipboard the experimenter verbally reviewed the child's play selections and prompted the child to "Follow your play schedule." If the child did not proceed to the indicated play area on his activity schedule the experimenter prompted the child, "Look at you play schedule."

The child was then observed to see if he or she played in the play areas indicated on his activity schedule. If the child was playing in a non-indicated play area but was observed to

be on task, the experimenter gave the child no prompts. The child did not, however, receive play correspondence credit. If the child was playing in a non-indicated play area and was observed to be off task, the experimenter prompted the child by saying, "You need to follow your schedule." The experimenter provided specific prompts to the child to, "Remember to follow your play schedule" when the child was engaged in disruptive or stereotypic behavior.

At the conclusion of playtime, the experimenter directed the child to the table where the child initially made his or her play selections. Verbal feedback after play was used to review the correspondence between where the child said he or she was going to play and where the child actually played (focusing on a say-do sequence). The experimenter reviewed the child's play selections by asking him, "You chose Art Table. Did you play at the Art Table?" If the child did not respond, the experimenter reported to the child where he or she was observed playing. If the child was observed playing at the Art Table in the correct sequence, the experimenter placed a copy of the play area photograph underneath the corresponding photograph attached to the child's activity schedule. The experimenter told the child, "You picked Art Table and you played at the Art Table." The experimenter then placed a stamp on the child's hand. This procedure was followed for the other two play selections. The experimenter compared the child's verbal report or activity schedule to the child's nonverbal play behavior and delivered reinforcement for accurate correspondence.

If the child's activity schedule indicated a play area in which the child did not play within the correct sequence, the experimenter would ask, "Did you play in the Block Area?" If the child did not respond, the experimenter reported to the child where he or she was observed playing. The experimenter placed a copy of the play area photograph face down underneath the corresponding photograph attached to the child's activity schedule. The experimenter said to the child, "You did not play in the Block Area today" or "You forgot to go to the Block Area after you were

finished at the Art Table." The child did not receive a stamp for play selections indicated on the activity schedule that did not correspond to actual play behavior.

Criteria for this condition were met when the child made three play selections using the photographic activity schedule and exhibited on-task behavior in the corresponding play areas in the correct sequence for two consecutive sessions. Play correspondence package condition continued on subsequent days until on-task behavior was maintained with the mean percentage of experimenter prompts being at or below the mean percentage of experimenter prompts in the previous conditions.

Say + reinforcement. Two participants, Ned and Kelly, returned to this condition following the play correspondence package condition. The same procedures were implemented here as described in the first say + reinforcement condition.

Generality. Probes for generality were conducted for 20% of the experimental sessions. Observation of the children during a 15-minute play period prior to or at the conclusion of the scheduled playgroup served as the generality setting. Generality procedures were identical to baseline procedures. The experimenter instructed the class that it was playtime. Play area photographs and clipboards were placed on a table within the children's reach. Target children were individually given a prompt, "Where do you want to play?" Target children were not prompted to construct or follow an activity schedule.

Social validity. A basic tenant of applied behavior analysis is that science can be used to improve the human condition. Determining the social validity of intervention goals, procedures, and outcomes is an essential component of promoting practice that is based on research (Carnine, 1997). Information was collected from relevant consumers who were identified as parents of the children participating in the study, early childhood special education teachers, and early childhood education teachers.

Five parents of children participating in the study viewed one videotaped segment of their

child during baseline and one videotaped segment of their child during intervention, to determine the value of the intervention goals based on their child's observed behavior changes. The experimenter also gathered information from early childhood special education teachers to determine if this group of consumers found the intervention procedures socially acceptable and usable (Carnine, 1997). Based on what the teachers observed while viewing pre-intervention and post-intervention videotaped segments, they were asked to evaluate the intervention procedure as an effective behavior-change strategy for classroom use. Finally, information was collected from early childhood education teachers and evaluated to determine the social validity of the intervention outcomes. Twelve teachers completed the *Hawaii Preschool/Kindergarten Survival Skills Checklist* (McCormick & Kawate, 1982) while viewing pre-intervention and post-intervention videotaped segments of the target children. Based on what the teachers observed on the videotaped segments, they were asked to evaluate the intervention procedure in terms of the appropriateness of the participants' play skills. The teachers were asked to ascertain whether the child they observed on the videotape displayed play skills necessary for the child to benefit from placement in classrooms for typically developing children. Three teachers were randomly assigned to observe each of the participating children.

RESULTS

Child Behavior

On task. Our initial findings indicated that participants' on-task behavior during the 45-minute playtime was low during baseline, with means of 19%, 13%, 21% and 4% for Ned, Kelly, Michel and Janet respectively. The mean and range of on-task behavior for all participants across conditions can be found in Table 2. During baseline participants were engaged in stereotypic behavior, such as spinning and bouncing, requiring frequent experimenter prompts to remain in the observed general play area. Participant's on-task and

on-schedule behavior increased and gradually continued to improve during the activity schedule training condition, but experimenter prompts remained high during this condition because of the training aspect of the intervention (see Table 1). Participants' on-task and on-schedule behavior during the say + reinforcement condition decreased to similar baseline levels, although experimenter prompts remained similar to previous conditions. During the play correspondence package condition, participants' on-task and on-schedule behavior again increased and continued to improve for the duration of the study. Mean scores for on-task behavior during this condition were: Ned 77%, Kelly 73%, Michael 71%, and Janet 59%. Experimenter prompts during this condition gradually decreased for all participants. Higher levels of on-task and on-schedule behavior were observed during generality sessions. Although Ned and Kelly returned to a say + reinforcement condition, both children maintained increased levels of on-task and on-schedule behavior, with experimenter prompts continuing to decrease. The results of individual children's on-task behavior for all experimental conditions with generality sessions coterminous with experimental sessions are presented in Figure 1.

Play correspondence. The second dependent variable measured in this study was the play correspondence behavior of the participants. During baseline we found that although Ned would select three play areas and place them on his schedule, his play behavior corresponded to his selections only one time. Kelly, Michael, and Janet did not exhibit play correspondence behavior during baseline. The number of play correspondence behaviors for participants is displayed in Figure 2. The number of play correspondence behaviors for all participants increased during activity schedule training conditions, as did experimenter prompts. During say + reinforcement, the number of participants' play correspondence behaviors decreased, but stayed above baseline levels. Participants' play correspondence behavior increased during play correspondence package conditions to numbers higher than observed during activity schedule

Table 2.
The Mean (Range) of the Percent of Intervals of Participants' On-Task Behavior

Children	Baseline	Activity Schedule Training	Say + Reinforce	Play Correspondence Package	Say Reinforce
Ned					
Exp.	19 (16–26)	71 (66–76)	23 (22–25)	77 (52–86)	80 (68–91)
Gen.	16 (16)	41 (41)	0 (0)	83 (77–96)	73 (50–84)
Kelly					
Exp.	13 (1–29)	63 (37–77)	17 (7–31)	73 (55–88)	79 (64–92)
Gen.	8 (8)	21 (12–30)	20 (17–23)	86 (73–100)	92 (92–96)
Michael					
Exp.	21 (8–31)	71 (59–89)	24 (8–37)	71 (53–84)	—
Gen.	19 (19–20)	32 (22–40)	15 (15)	67 (62–81)	
Janet					
Exp.	4 (0–21)	57 (29–74)	21 (3–48)	59 (30–72)	
Gen.	1 (1)	33 (4–69)	—	43 (9–76)	

Note. Exp. = Mean for experimental sessions; Gen. = Mean for generality sessions.

training conditions, but experimenter prompts decreased during play correspondence package conditions. Returning to say + reinforcement, the number of Ned and Kelly's play correspondence behaviors remained similar to those during play correspondence package conditions.

Social Validity

We used the information gathered from the identified relevant consumers to determine social validity of intervention goals, procedures, and outcomes. Parents of the participants indicated that the goal of the study held significant value in preparing their child for future inclusive programs. They reported important observed behavior changes in their children's play behavior during baseline compared to intervention conditions. The three early childhood special education teachers questioned (100%), indicated that the intervention strat-

egy appeared to be an effective strategy to improve the play behavior of preschoolers with autism. They noted that the intervention procedures were socially valid for classroom use. Eleven of the 12 early childhood education teachers (91%) established social validity of intervention outcomes when they decided against placement in their classrooms for all participants based on observation of the children during play in the pre-intervention segment, but decided for placement of Ned, Kelly, and Michael in their classrooms following observation of post-intervention videotaped segments. The social validity checklist teachers used while viewing videotaped segments was adapted from the *Hawaii Preschool/Survival Skills Checklist* (McCormick & Kawate, 1982) and consisted of items asking teachers for example whether children spontaneously began play activities during play time, focused on tasks, and used materials.

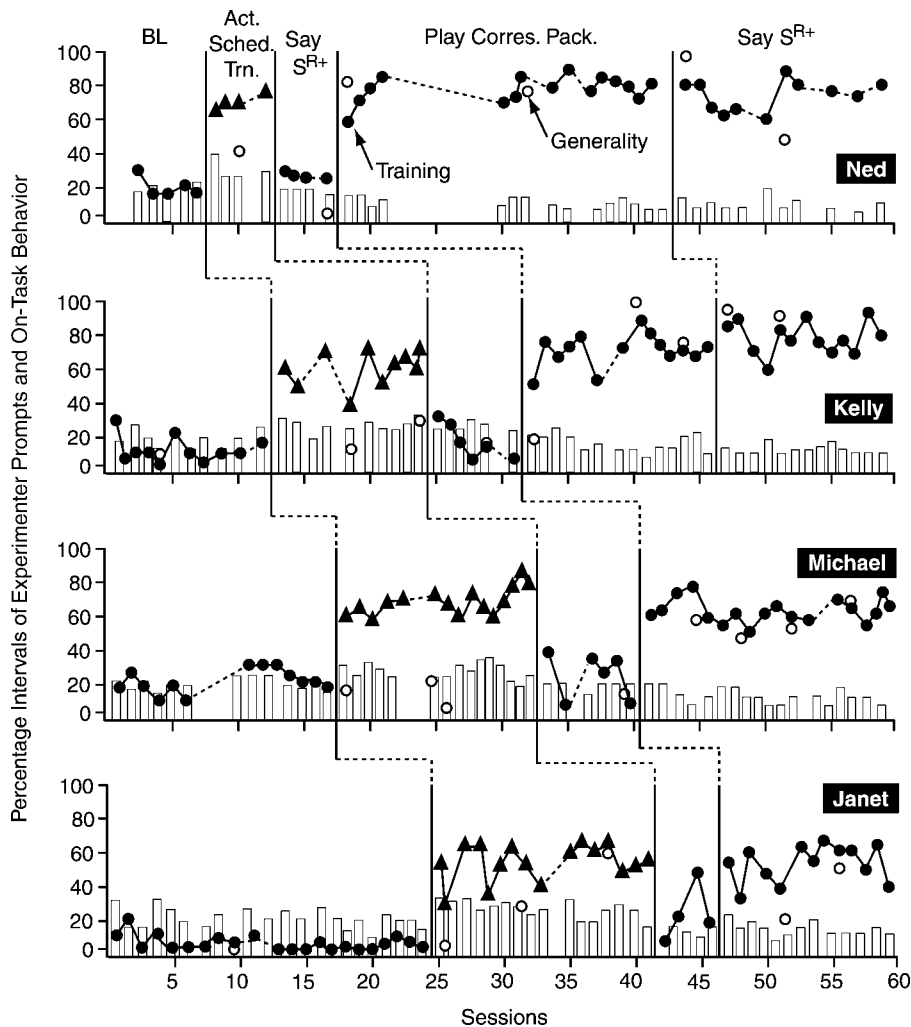


Figure 1. Percentage of observed intervals in which on-task behavior (data points) and experimenter prompts (bars) were recorded for each participant during conditions. Triangles (\blacktriangle) represent training conditions.

DISCUSSION

The results of the present study demonstrated the effectiveness of combining correspondence training and photographic activity schedules to increase the on-task and play correspondence behavior of 4 young children with autism in an inclusive preschool classroom. All participants exhibited generalization. Procedural integrity measures were used to report the level of experimenter prompts compared to participants' on-task and play

correspondence behavior, allowing children's independent performance to be reliably measured. Furthermore, social validity results indicated a high level of consumer acceptability and usability among relevant consumers.

As in previous research, our findings support the effectiveness of using photographic activity schedules to improve the independent performance of children with autism (Bryan & Gast, 2000). Activity schedules have been used to increase the on-task play and play cor-

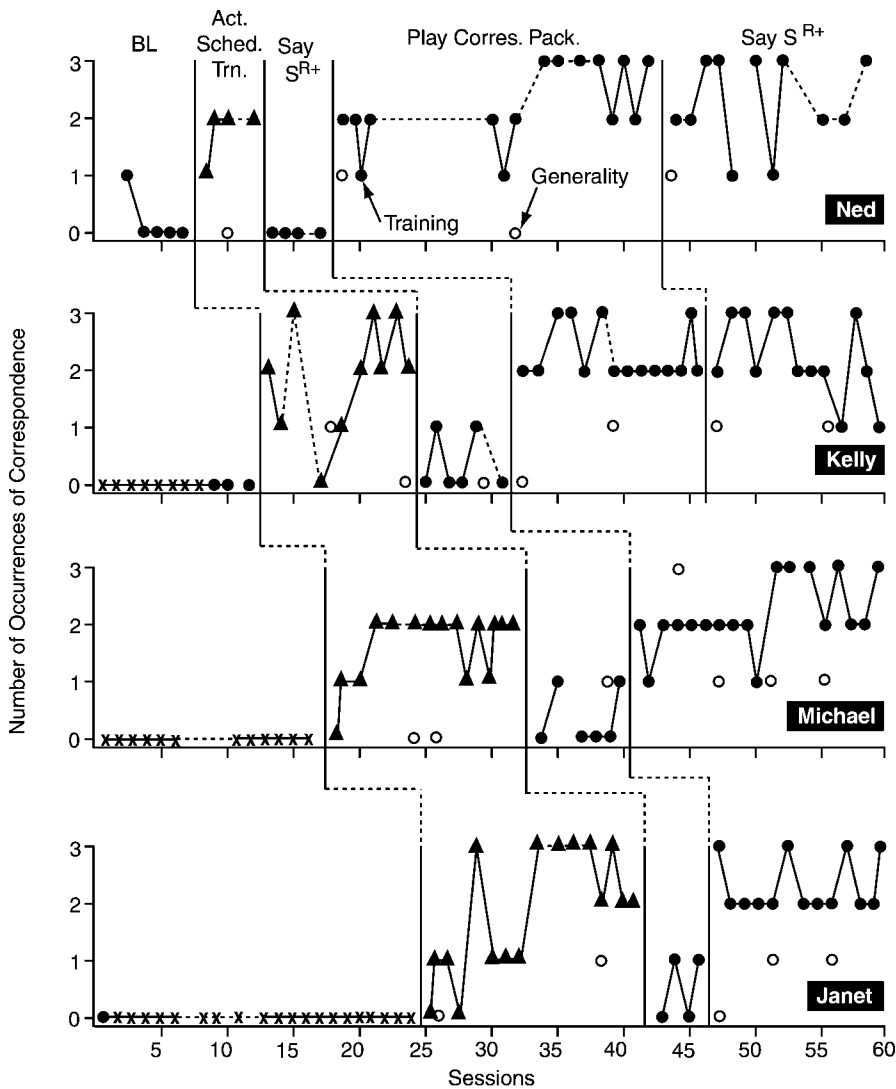


Figure 2.

Number of observed play correspondence behaviors recorded for each participant during all conditions, with x denoting the absence of play selections and therefore no opportunity for correspondence. Triangles (▲) represent training conditions.

response behavior of preschoolers with disabilities (Bryan & Gast, 2000; Frazier, 1997; Massey & Wheeler, 2000; Valk & Schwartz, 1997). Results of this study also support the existing literature on correspondence training, specifically its use for increasing desirable behaviors in preschool children (Odom & Watts, 1991; Weninger & Baer, 1990).

This study extended existing photographic

activity schedule and correspondence training literature by combining the two strategies and implementing the procedure during playtime in an inclusive classroom with 4 children exhibiting limited verbal repertoires. Photographic activity schedules were used as verbal mediators for correspondence training, allowing 3 nonverbal children to participate and use the activity schedules to indicate play area preferences for the correspondence training

component. The children in this study quickly learned the relationship between their forecast of what they were going to do and their nonverbal play behaviors. They did, however, need the activity schedules as visual cues to make play selections, remain on task, and follow the sequence of play activities indicated on their schedules. This suggests that participants were beginning to manage their play behavior to correspond with their activity schedules without experimenter prompts. An indicator of increasing independent performance was observed when participants did not check their activity schedules during playtime to follow their sequence of play selections. The results indicated that participants, in the absence of extensive verbal language, could use photographs to accurately represent play preferences and correspond their play behavior to their verbal behavior.

Another contribution of this study was the social validity information gathered from identified relevant consumers. Parents identified the play skills their children exhibited after the intervention as being “very important,” suggesting that the intervention goals were socially valid for the children participating in the study. Parent feedback in this study supported the findings in existing literature on parent perceptions of early intervention services and the importance of inclusive placements for their preschoolers with disabilities (Romer & Umbreit, 1998). Early childhood special education teachers indicated that the intervention increased the overall play skills of the participants and that the benefits of the intervention on the participants’ play skills were worth the cost, time, and effort to implement the intervention. In summary, all three teachers said they would use this intervention in their classrooms with children exhibiting similar behaviors to the participants they observed in the study, therefore addressing the trustworthiness and usability of this strategy for practitioners (Carnine, 1997). Eleven of the 12 early childhood teachers felt the participants’ play skills were sufficient for placement in inclusive classrooms following the intervention, determining social validity of

intervention outcomes (King-Sears & Cummings, 1996).

Implications for Practice

The success of implementing this strategy in an inclusive preschool classroom suggests that it could serve as a nonintrusive means of facilitating the inclusion of preschoolers with autism. The photographic activity schedules are an inexpensive, transportable strategy allowing mobility across settings and people that early childhood special and general educators considered socially valid. The activity schedule provided constant and available visual cues for participants to remain engaged and on schedule. Initially, none of the participants interacted with other children in the classroom. Ned began to interact nonverbally with peers during the play correspondence package condition. He took turns with some of the play materials such as the dollhouse, marble works, or pretend doctors kit. He began to verbally interact with peers during the second say + reinforcement condition. Kelly, Michael, and Janet quickly began to play in close physical proximity of their peers and gradually throughout the study began to nonverbally interact with peers in the classroom. The implementation of this strategy allowed the participants to increase their play skills and become active members in a community of their peers (Schwartz et al., 1998).

Children with autism have difficulty organizing and interacting with their environment. The use of this strategy appeared promising and revealed itself as a viable strategy for children with autism to enhance their organizational skills and promote active engagement during play. The photographs provided visual cues for participants to make play selections, transition from one activity to another, and remain engaged. Finally, the photographs were used as verbal mediators for nonverbal preschoolers with autism to communicate preference and nonpreference activities, therefore reducing disruptive and other inappropriate behaviors.

Directions for Future Research

With parent emphasis on inclusion, educators are challenged to find strategies for promoting

the success of children with disabilities in least restrictive environments (Sainato & Morrison, 2001). The findings of this study indicated that a nonintrusive strategy with a high level of social validity can be used to promote independent performance in inclusive settings. Research might explore whether the type of skills the participants demonstrated in this study can be generalized across other educational settings, and if the activity schedules can be eliminated when language skills become strong enough to support the verbalizations needed for correspondence training. Future research might explore the extent to which this strategy can be used to support preschooler's social interaction with peers. Finally, this line of research might examine the effectiveness of this strategy for use with older children with disabilities in inclusive environments.

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