Pyramidal Staff Training: Teaching Play and Manding to Children with Autism and Developmental Disabilities

Koji Takeshima

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PYRAMIDAL STAFF TRAINING: TEACHING PLAY AND MANDING TO CHILDREN WITH AUTISM AND DEVELOPMENTAL DISABILITIES

by

Koji Takeshima

A Dissertation
Submitted to the
Faculty of The Graduate College
in partial fulfillment of the
requirements for the
Degree of Doctor of Philosophy
Department of Psychology
Dr. Richard Malott, Advisor

Western Michigan University
Kalamazoo, Michigan
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This study involved pyramidal staff training and the teaching of play and manding to children with autism and developmental disabilities in an early intervention program. The following training components were sequentially introduced to each technician: (a) a written procedure; (b) video modeling; (c) a slide show and checklist, combined with video modeling; and (c) feedback. The trainees improved their skills in teaching play as these training components were introduced, and the children’s performance in play and manding subsequently improved. For the skills of teaching play, the core component of the training that resulted in the largest improvement varied across technicians. For the skills of teaching manding, most of the technicians improved only with the written procedure.
ACKNOWLEDGEMENTS

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Koji Takeshima
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CHAPTER I

INTRODUCTION

Teaching Play

Play is a primary activity of young children and is an occasion for them to learn various skills, such as language and social skills. Unfortunately, children with developmental disabilities typically do not play, and when they do play, their play is often inappropriate. Therefore much research involves play skills, especially for children with autism, because their language and social skills deficits and limited reinforcers are their core symptoms (DSM-IV-TR, American Psychiatric Association, 2000). Several authors have reviewed the literature of descriptive and theoretical analysis of play displayed by children with autism (Jarrold, Boucher, & Smith, 1993, Roeyers & Berckelaer-Onnes, 1994, and Wulff, 1985). Briefly, the play of children with autism is often limited to simple manipulation of objects. The quality of their play is lower than that of non-autistic children of comparable mental age, and spontaneous, symbolic play is usually absent or impaired (Roeyers & Berckelaer-Onnes, 1994).

Therefore, improving play-skill deficits of these children has several implications: First, the ability to play directly affects their quality of life. In addition, play enhances children's functional repertoires (e.g., imitation, social skills, and language). Furthermore, inappropriate or irregular play, which often is displayed by children with autism and other developmental disabilities, may create a negative impression with other children and may prevent their involvement in a regular learning environment. Enhancing
play skills can improve children's lives by increasing their participation in educational environments.

In the area of interventions to enhance play, Lane and Mistrett (1996) reviewed the studies of assistive technologies for individuals with severe physical impairments. For adults with autism and mental retardation, another set of authors (Nietupski, Ayres, & Hamre-Nietupski, 1983) reviewed the studies of recreation/leisure skills, such as physical exercise and purchasing items from a vending machine. Specifically for children with autism, Rettig (1994) reviewed interventions to enhance play and categorized the play interventions in five categories: (a) direct instruction; (b) use of peers; (c) manipulation of the physical settings; (d) manipulation of toys and playthings; and (e) comprehensive intervention in play setting. Since the review by Rettig (1994), a significant number of studies have been conducted in this area. And thus, play interventions were re-organized using the following categories: (a) antecedent manipulation strategies (e.g., toy preference, environmental redesign); (b) prompt strategies (e.g., modeling, verbal or physical prompts, activity schedule); (c) direct reinforcement of play; (d) parent and peer training; (e) self-management; and (f) stereotypy reduction.

Antecedent Manipulation Strategies

Three studies have evaluated the effects of antecedent manipulation on the play of children with autism and developmental disabilities. These interventions included manipulating the environment with respect to play materials, room arrangement, and scheduling of play times (Nordquist, Twardosz, & McEvoy, 1991), type of toys (Murphy, Carr, & Callias, 1986), and choice of toys (DiCarlo, Reid, & Stricklin, 2003). For example, Murphy et al. (1986) studied the effect of toys that included auditory and visual...
stimuli on the play behavior of twenty, nonverbal children (mean chronological age was 14.5 years old). They found that children generally showed more contact with and active manipulation of toys that produced sensory stimulation compared to toys that did not, although there was great variability in the rate of play across the participants. DiCarlo et al. (2003) also found that, although choice of toys resulted in increased toy play for one child, the other 2 children in the study showed no behavior change when given a choice. In summary, the antecedent manipulation strategies were effective for some children, however, the effects were variable.

Prompt Strategies

Using modeling and other prompts are common strategies used to increase a variety of functional behaviors. Typical implementation includes the trainers (adults or peers) providing verbal instruction, visual demonstration, or physical guidance in order to increase the target response. The use of prompts without reinforcement to increase the toy play of children with developmental disabilities has been evaluated in two studies (Singh & Millichamp, 1987; Spangler & Marshall, 1983). Spangler and Marshall (1983) demonstrated an example of a prompting intervention. The study evaluated the effects of institution for developmentally disabled children to increase their leisure-time activity. The participants included 14 boys, ages 8 to 18-year-old, all essentially nonverbal with IQs below 20. The teachers walked around the area, and manually prompted appropriate toy play when an individual was not engaging in any functional activities. The activity levels of the children increased during the intervention, decreased during the reversal phase, and increased again during the second intervention phase, demonstrating the effectiveness of prompting on the children’s activity levels. In addition, two studies
evaluated the effects of modeling with prompts on play (pretend play by Hadwin, Baron-Cohen, Howlin, & Hill, 1996 and symbolic play by Kim, Lombardino, Rothman, & Vinson, 1989), and one study examined the effects of modeling alone on toy play (Tryon & Keane, 1986). These prompts strategies primarily involved visual or verbal cues that may have functioned as discriminative stimuli or a motivational operation to increase appropriate play. The prompts were given without external reinforcement, such as social praise and candy, and still successfully increased the frequency of play. However, in order for these prompts-in-isolation strategies to have sufficient effects, it is crucial that the children have appropriate prerequisite skills, such as generalized imitation skills and instruction following skills.

A new strategy in teaching play is video modeling where videotaped models were shown to learners instead of live models (Charlop-Christy, Le, & Freeman, 2000, D’Ateno, Mangiapanello, & Taylor, 2003, Nikopoulos & Keenan, 2003, and Taylor, Levin, & Jasper, 1999). For example, Nikopoulos and Keenan (2003) provided an extensive report of successful video modeling for teaching play skills (i.e., engaging in dyadic play with the experimenter and a toy) to children with autism. They exposed the participant to a 35 s video of a model initiating and engaging in a toy play activity with the experimenter. After watching the video, the experimenter led the child to the room depicted in the video and engaged in the same behavior the experimenter had done in the video; but the experimenter gave no instructions to the child. Clinically significant reductions in time spent in inappropriate play and increases in appropriate play were demonstrated in 4 of the 7 participants. It has been observed that books and videos are often strong reinforcers for children with autism (Buggy, Toombs, Gardener, & Cervetti,
In addition, these visual prompts allow the children to avoid social interactions, which are aversive for many children with autism (LeBlanc et al., 2003). Using a prompt medium that is already a reinforcer would ensure that the learner attends to that prompt, and thus may increase the likelihood of the successful learning of the target response.

Another prompt strategy to increase appropriate play is the use of a picture activity schedule (Bevill, Gast, Maguire, & Vail, 2001; MacDuff, Krantz, & McClannahan, 1993; Morrison, Sainato, Benchaaban, & Endo, 2002). It refers to a procedure in which the participants typically learn to select a few pictures, each of which represents an appropriate play activity. And then, they learn to place them on a strip in a sequence and to follow the sequence of the appropriate play activities that they had selected. For example, MacDuff, et al. (1993) examined the effects of picture activity schedules on the on-task and on-schedule play behaviors of 4 boys with autism. Prior to this study, all participants displayed picture-object correspondence and had some experience using photographic activity schedules. After using verbal, gestural, and manual prompts to teach children to follow the picture activity schedules for play (e.g., games, blocks, and puzzles), the children became more on-task and on-schedule. This intervention also showed both maintenance and generalization to photographs of novel play activities.

Reinforcement Strategies

Reinforcement was the most common strategy for increasing appropriate play. In fact, nearly twenty studies investigated these effects of reinforcement. Typically, reinforcement was used as a part of an intervention package including modeling and prompts. Several studies used prompts combined with reinforcement (Eason, White, &
Newsom, 1982; Flavell, 1973; Fox & Hanline, 1993; Haring, 1985; Lifter, Sulzer-Azaroff, Anderson, & Cowdery, 1993; Santacangelo, Dyer, & Luce, 1987; Woods, 1987). For example, Lifter et al. (1993) demonstrated the use of prompts and reinforcement combined to increase developmentally appropriate or age appropriate toy play. Three participants were 4-years-old boys with pervasive developmental disorder and/or autistic behaviors; they spoke only single words. During the baseline, a teacher placed toys, two at a time, before the child without giving directions to probe for any unprompted occurrences of target actions (e.g., brushing a doll’s hair). During the intervention, 5-min teaching sessions were conducted, consisting of five teaching trials. Trials began with a few seconds for the child to respond, and then the trainer brought the toy in the child’s view and physically guided playing with it. The reinforcers for the correct response were smiles, hugs, and animated verbal acknowledgement. All 3 children learned developmentally appropriate play and displayed the appropriate play with other toys, which had not been used in teaching sessions. No follow-up or maintenance information was provided.

Some studies used modeling, prompts, and reinforcement (DiCarlo et al., 2003, Greer, Becker, Saxe, & Mirabella, 1985, Nuzzolo-Gomez, Leonard, Ortiz, Rivera, & Greer, 2002, Peck, Apolloni, Cooke, & Raver, 1978, Stahmer, 1995, Thorp, Stahmer, & Schreibman, 1995, Wehman, Karan, & Rettie, 1976, Wehman, & Marchant, 1978). For example, Stahmer (1995) demonstrated the use of modeling, prompts, and reinforcement to teach symbolic play. The participants were seven, 4 to 7-year-old children with autism. During baseline, the experimenter administered the free play assessment, in which play behavior was recorded in 14-min segments over several days. The child’s parent, a peer,
or the experimenter entered one of the experimental settings with the child. During the first 7 min, the child played alone while the parent, the peer, or the experimenter watched. During the last 7 min, the experimenter, the parent, or the peer played together. The parent and the peer were told to play together but were not directed to increase symbolic play. During the intervention, the therapist conducted treatment sessions three times weekly for 1 hour per session. Prompts and modeling were given when the child showed interest in one of the toys, and reinforcement was the access to these toys and social praise. Overall, training sessions increased the symbolic play of all 7 children. The results were generalized to the sessions with the parent and the peer. The effects were also maintained in the 3-month follow up sessions.

An advantage of adding reinforcement to prompts and modeling is that such treatment packages can be effective for those who do not have the prerequisite skills of generalized imitation and instructional following. As introduced above, the intervention package by Stahmer (1995) utilized the occasions where the child showed interest in a toy as opportunities to teach functional repertoires. This process may increase the probability that the reinforcer that maintains the target play response transfers from adult social praise to the play. Some disadvantages of these training packages are the cost of staff implementation and staff training. As the number of components increase, the complexity of implementation increases. The treatment integrity does not tend to be as high as video-modeling strategies, in which videos present identical modeling prompts over and over. The effort required of trainers is typically high compared to picture activity schedules, in which adults prompt the child only at the beginning of the sessions.
As described above, reinforcement is typically combined with other components, such as prompts and modeling. This is probably because it is difficult to reinforce a behavior which has a very low operant level. Romanczyk, Diament, Goren, Trunell, and Harris (1975) attempted to evaluate the effects of reinforcement in isolation on group play for 4 children with diagnoses of autism and other disabilities. The children displayed little or no verbal social interaction with adults or peers, high rates of self-stimulatory behavior, and minimal self-help skills; they functioned at a severely impaired level. During baseline, the children were placed in the playroom with the announcement that it was “play time” and without further instructions or intervention. In the group play sessions, undergraduate volunteers dispensed social and food reinforcement contingent on the occurrence of appropriate play, which were toy manipulation with other children (social play) and toy manipulation without other children (isolated play). During the isolated play sessions, isolated play of all children increased play with no verbal prompt. During social play sessions, due to the low operant level, additional physical prompts were used. The result indicated the clear behavioral change due to the interventions for all 4 children. In addition, it indicated that providing reinforcers were not always sufficient to increase the playing.

**Parent Training and Peer Training**

Sometimes the parent or siblings at home and peers at school train children with developmental disabilities. The typical procedure includes prompts, modeling, and reinforcement. The virtues of using these nonprofessionals are the generalization of the target response to people in the natural context and the use of resources available in the
natural contexts. Play behaviors are usually valuable only when they occur in the natural environment, such as the home or school.

Three studies (Lowry & Whitman, 1989; Moran & Whitman, 1991; Moran & Whitman, 1985) trained mothers to use behavioral techniques (e.g., prompts, prompt-fading, reinforcement, etc.) to enhance play behaviors of their children. For example, Lowry and Whitman (1989) evaluated the effects of a multi-component parent-training program. The participants were 5 mother-toddler dyads, enrolled in a community home-start program for children with or at risk for developmental delay. In the skills-training phase, mothers were taught appropriate use of prompts and reinforcement to increase their child’s toy play. The generalization-training phase included the trainers’ explaining the importance of utilizing the appropriate use of prompts and reinforcement in any situation, modeling specific situations, and having mothers describe how they might use the skills without giving them further opportunity to practice. The skill training and generalization training were implemented sequentially after the baseline sessions. The results indicated that, in general, the mothers improved in the appropriate use of prompts and reinforcement both during the target toy play situation and during generalization-testing situations, where they had a novel toy. The children’s appropriate responses to the maternal prompts also improved. The maintenance probe sessions indicated these results were maintained.

One of the demonstrations of sibling training was conducted by Celiberti and Harris (1993). They worked with three families, to evaluate the effectiveness of teaching older siblings (7 to 10-year-old sisters) to use behavioral skills (play related commands, praise, and prompts) while playing with their 4-year-old brother or sister with autism. All
3 children with autism displayed gross deficits in their play skills. The target responses for the siblings were play-related commands, praise, and prompts. The target skills for the children with autism were toy play and play-related comments. The siblings successfully acquired all their training skills and maintained those skills in all of the follow-up probe sessions. The desired play response of the children with autism also improved after the training session and were maintained at the 16-week, follow-up sessions. Coe, Matson, Craigie, and Gossen (1991) also trained siblings in order to teach play skills of the children with autism. The sibling training resulted in the increased delivery of prompts and reinforcers by the siblings and also resulted in increased play (i.e., toy manipulation and play-related verbalization) of the children with autism. The results were maintained in the one-month follow-up session.

Four studies (Kok, Kong, & Bernard-Opiz, 2002, Robertson, Green, Alper, Schloss, & Kohler, 2003, Wolfberg & Schuler, 1993, Zercher, Hunt, Schuler, & Webster, 2001) trained peers at school in order to increase the frequency of the target child’s play behavior. Most of these studies trained peers to model or to prompt play, but not necessarily to reinforce play. For example, Robertson et al. (2003) demonstrated an effective peer training intervention. They trained 3 and 5-year-old peers at school to increase the play (i.e., appropriate toy manipulation during free play, cooperative play with peers during free play, and participation in the circle/story time) of two, 3 and 4-year-old children with developmental delay. The peers modeled appropriate play next to the developmentally delayed children and verbally prompted appropriate play. No external reinforcement was involved. The 2 peer trainers appropriately modeled the play most of the time, and the 2 target children improved the amount of appropriate play.
Self-Management

Self-management strategies refer to a training package, in which the learners are taught to state instructions to themselves or to monitor their own performance and obtain tangible reinforcers contingent on the target response. The purposes of incorporating the self-management strategy are the maintenance of the target play after the training is withdrawn and the transfer of the play when the adult trainers are absent. Keogh, Faw, Whiteman, and Reid (1984) investigated self-instructional training, where children stated instructions out loud in order to complete a complex sequence of playing a game. The 2 participants were severely mentally retarded adolescents, who lived in a state facility. Training sessions lasted approximately 20 min and involved verbal instructions, modeling, prompting, and contingent praise of appropriate game playing. Also, appropriate self-instruction and verbalization of game steps were trained through a forward chaining procedure. And although both adolescents successfully learned complex game playing, additional intervention and social support, such as prompts, were needed to maintain and generalize the game playing. One of the 2 participants maintained appropriate game playing in all games he had been trained on, though he did not maintain overt self-instruction in all of the games. The other participant required additional review sessions in order to maintain both self-instruction and appropriate game playing.

Stahmer and Schreibman (1992) evaluated the training of self-monitoring combined with self-reinforcement, where children monitored their own behavior and dispensed a reinforcer for their own appropriate toy manipulation. Participants were three, 7 to 13-year-old children with autism. Self-management training involved discrimination training, where the participants learned how to discriminate between
appropriate and inappropriate play. It also involved the participants learning to use an alarm wristwatch to cue the time interval after which reinforcement was available if the interval consisted entirely of appropriate play. Appropriate play increased with the introduction of the self-management treatment package for all 3 children. And the play generalized across settings and toys. One month after the last training session, 2 of the 3 children maintained high levels of appropriate play, and the other child needed one booster training session.

Although the self-instruction study resulted in limited results in the maintenance phase, the combination of self-monitoring and self-reinforcement resulted in fairly high maintenance. The further research is necessary to evaluate the participants' prerequisite skills for this treatment package to work.

Reducing Stereotypy

Koegel, Firestone, Kramme, and Dunlap (1974) increased appropriate play by reducing stereotypy. The participants were 2 children with autism. In the baseline, the participants were allowed to engage in self-stimulation, which included gazing, eye crossing, finger manipulations, rhythmic manipulation of objects, hand flapping in the air, etc. During the suppression sessions, the experimenters punished self-stimulatory behaviors by sharply saying "No" and briskly slapping or briefly holding the part of the child's body with which the response was being performed. This suppression resulted in the increase of the both children's appropriate play, which were drawing with a crayon, placing a tile in the pegboard, manipulating the appropriate mechanism to make one of five animal heads pop up, etc. Unfortunately, no other researcher has yet replicated this strategy. Although the results were promising, further investigations are necessary.
Summary

Six different categories of solitary-play interventions were reviewed in this section: (a) antecedent manipulation strategies; (b) prompt strategies; (c) direct reinforcement of play; (d) parent and peer training; (e) self-management; and (f) stereotypy reduction.

Antecedent manipulation strategies appear to produce rather variable effects. Prompt strategies, especially video-modeling and the use of picture activity schedules, are relatively new, emerging technologies. It is crucial to test whether the participants have the prerequisite skills, such as generalized imitation and instruction following. It may be very effective when these prompt media, which are often visual, are actually reinforcers for the children. The most common strategy of teaching play is a training package using reinforcement. This strategy may work even when the learners do not have generalized imitation or instruction following skills, however, the disadvantages are the relative difficulty of getting high treatment integrity, implementation cost, and staff training cost. Parents/peer training and self-management strategies may be very effective strategies to enhance generalization and maintenance. Reducing stereotypy could work effectively, however, further investigation is needed.

Mand Training

Skinner’s analysis of verbal behavior (1957) is becoming a major force in language training for individuals with developmental disabilities. For example, Sundberg and Partington published a book (1998) on teaching language based on Skinner’s analysis of verbal behavior, and it has been used by many practitioners to teach language to children with autism and other developmental disabilities. In Skinner’s analysis of verbal
behavior (1957), he analyzed language in the same way that he analyzed other behaviors; he focused on the motivating conditions, antecedents, and consequences that explain verbal behavior. Using such analysis, he divided language into several categories and called them “verbal operants”. A mand is a verbal operant maintained by a reinforcer and is evoked by the relevant establishing operation for that reinforcer, for example saying “juice” when the speaker is deprived of liquid for hours (i.e., establishing operation). In order for this behavior to be considered a mand, it must have been reinforced by juice in the speaker’s past.

Many researchers have investigated teaching manding to individuals with developmental disabilities (Bourret, Vollmer, & Rapp, 2004, Chambers & Rehfeldt, 2003, Duker, Dortmans, & Lodder, 1993, Sigafoos, Doss, & Reichle, 1989, Stafford, Sundberg, & Braam, 1988, Sundberg, Loeb, Hale, & Eigenheer, 2002), usually because acquiring mand skill directly benefits the learners by providing a method to obtain what they want. For example, Sigafoos et al. (1989) taught manding to 3 individuals with severe developmental disabilities. Preferred foods and utensils to eat the foods were selected prior to the training. Touching symbols was used as a method of manding because participants’ vocalization lacked recognizable speech sounds. During baseline, the experimenter placed the food item on the table, but no cues or prompts were given to the learners. Failure to respond within 10 s led to the next trial of presenting another food item. During the intervention, when the learner failed to mand the item placed on the table within 10 s, a prompt was provided. The prompter held up the item, pointed to it, and asked, “What is this?” An appropriate response of touching the symbol was reinforced as a mand (i.e., the learner was given the item corresponding to the symbol
touched as opposed to a descriptive praise, “That is right, it is spoon.”). Failure of a verbal prompt resulted in a modeling or physical guidance prompt. Appropriate responses after these prompts were also reinforced as manding. Over successive trials, prompts were faded by progressively delaying each prompt component. This procedure resulted in the acquisition of pointing to a food picture when the food was presented.

Researchers who conducted the successive studies made improvements in their research methods. For example, preference assessments have been used prior to teaching manding rather than relying on the verbal reports by staff. For example, Chambers and Rehfeldt (2003) used a multiple-stimulus preference assessment without replacement (DeLeon & Iwata, 1996). Bourret, et al. (2004) used a free-operant preference assessment (Roane, Vollmer, Ringdahl, & Marcus, 1998). These assessments increase the likelihood that the items being used as “reinforcers” are actually reinforcing.

Furthermore, Duker et al. (1993) pointed out that, many studies assumed that a request was manding if a learner accepted the requested item, however, a request is not manding if the participants accepted a non-requested item. In other words, if a behavior is not maintained by a reinforcer that corresponds to the relevant establishing operation, it is not called a mand. In their study, adults with developmental disabilities were trained to mand with gestures. In order to teach manding that is controlled by the correct establishing operation, they used a correction procedure; when the trainee accepted an offered object the trainee had not manded, the trainee was told, “No,____. You want (label for the gesture made by the trainee),” and was guided to repeat the gesture of the items that they accepted 10 times. This procedure resulted in the increase of the correct rejection of unmanded objects.
In addition, Sundberg et al. (2002) investigated manding for information that was not controlled by the presence of the item (i.e., a discriminative stimulus). The experimenters initially gave children with autism a container that included their preferred item. After the brief contact with the item, the experimenter distracted the learner by giving the child a book or another toy, and removed the container and the item. During the distraction activity, the preferred item was placed in one of two containers and positioned about 2 m away from each side of the participants. The learners were presented an empty container and told “Get your ____”. If the child vocally manded, “Where ____?,” he was told which of the other two containers held the item (e.g., “The ____ is in the bag”) and was allowed approximately 30 s to play with the item after he retrieved it from the container. This procedure successfully contrived the situation in which the information regarding the location became reinforcing for the learners. It was a successful approach to teach manding for information for the 2 children in this study.

Sundberg (1993) discussed the pros and cons of using a picture-based system vs. sign language manding techniques. And Chambers and Rehfeldt (2003) studied the acquisition and generalization of manding and compared the picture exchange communication system (PECS, Frost & Bondy, 1994) with sign language. The researchers used an alternating treatment design to teach the same four mands using PECS and sign language. Sessions typically lasted for 30-40 min and were conducted three times a week. A half of each session was assigned to teach manding using PECS and the other half to teaching using sign language, and the order of the training was randomized. For PECS training, they used the standard procedures for teaching PECS: (a) Phase 1 included teaching the participant to pick up a picture of a reinforcing item and
place it in the experimenter's hand, in exchange for the reinforcing item (the trial began when the child reached toward the item); (b) phase 2 included teaching the participant to remove an attached picture from the outside cover of the binder, approach the experimenter, and place the picture in the experimenter's hands before receiving the item; (c) phase 3 included teaching the participants to select the picture of a desired item from an array of pictures. During this PECS training, the participants' attempts to use sign language were physically blocked by the experimenter. During the sign language training, there were also three similar phases: (a) Phase 1 was to teach the participant to emit the correct sign, within 5 s, for the reinforcing item present; (b) phase 2 was to teach the participant to approach the experimenter and make the correct sign; and (c) phase 3 was to teach the participant to emit the correct sign in the presence of corresponding item. The dependent variables were the percentage of correct trials for PECS and sign language. In addition, over the course of training, four interspersed trials were used to assess manding objects not in view. PECS resulted in faster acquisition of manding than did sign language. And all 3 participants showed generalization across settings using PECS, while only 2 showed generalization across settings using sign language. In addition, all participants were more likely to mand reinforcing items not present when using PECS than using sign language. However, when testing for manding and all of the mandable objects are reinforcers, it is not clear that the mand is really manding, because it is not clear that the children were manding the specific reinforcer they really “wanted” even though they got what they “asked for,” regardless of whether PECS or sign language is used.
Bourret et al. (2004) evaluated a sequential prompting procedure for training vocalization of complete mands. They used a sequence of prompts with a 10 s pause between each prompt: (a) The trainer waited for 10 s without prompting; (b) the trainer gave a non-specific prompt (e.g., saying, “if you want, ask me for it.”); (c) the trainer gave a prompt including a model of the complete targeted utterance (e.g., “say, chip”); and (d) the trainer lowered the response criterion and gave a prompt—just the first phoneme of the targeted response (e.g., “say, ch”) with “ch” then being accepted as the correct response. Furthermore, if the person said, “chip,” before getting to the next prompt, less time had elapsed between the beginning of the sequence of prompts and the reinforcer. In addition, the participants received access to the reinforcer for a longer duration when the participants responded earlier in the prompt phase. If the participant said the full utterance 5 s after the start of the trial he would be allowed access to the reinforcer for the remaining 55 s of the trial; and if he said the full utterance after 25 s, he would gain 35 s access to the reinforcer. This was done to increase the amount of the reinforcer for the full utterance, “chip,” rather than the partial “ch,” with the hope of getting a higher frequency of full utterances rather than partial ones. During this assessment (or sequential-prompting training), one participant, who initially made only partial utterances with non-specific prompts, increased unprompted full utterances within 11 sessions. Another participant made partial utterances with phoneme prompts and did not increase to full utterances within eight sessions. The last participant made full utterances with non-specific prompts but did not increase unprompted responses during six sessions. In their subsequent training of two other words, the first participant, who learned to made unprompted full utterances of “chips”, was trained to say “music” and
“video”, using the same treatment procedure because the sequential prompting procedure was effective for this participant. Approximately 30-50 sessions were needed to increase unprompted manding for each word. For the second participant, who said only the “T” of “TUNES” in the initial sequential prompting procedure, shaping was used as an alternative treatment. Approximately 80 sessions were needed to shape the full utterances. For the last participant, who made full utterances with non-specific prompts, prompt fading was selected along with the sequential prompting procedure. Initial prompts included, “____ (his name), if you want this say;” and it was gradually faded to include only his name and the first phoneme of his name. Approximately 30 sessions were needed to increase unprompted full utterances for each of the two words.

Although mand training appears beneficial for various populations, many aspects of mand training have yet to be investigated, for example, different types of reinforcers for manding (information, actions, etc.), methods of contriving establishing operations, methods of assessing mand skills, outcome studies of comprehensive programs of mand training, and methods of training staff to teach and maintain manding.

Staff Training in Human Service Settings

Many human service facilities utilize behavioral interventions to increase the clients’ appropriate behavior and decrease their inappropriate behavior. The behavioral interventions include the staff’s arranging antecedents (e.g., environments, instructions, and prompts) and consequences (e.g., praise, corrective feedback, and ignoring). It is important that the staff correctly and consistently implement these behavioral interventions; therefore, much research has been conducted on staff training in human service settings. In addition, direct-care staff turnover rate is high (Mitchell & Braddock,
1994); so it is important to investigate not only effective but also efficient staff training and managing systems.

The most commonly investigated participants and settings are direct-care staff in residential facilities for individuals with disabilities (Burg, Reid, & Lattimore, 1979, Burgio, Whitman, & Reid, 1983, Embregts, 2002, etc.). Other common participants and settings are teachers and their aids in schools (Lavie & Sturmey, 2002, Noell, et al., 2000, Schepis, Reid, Ownbey, & Persons, 2001, etc.) and staff in educational programs for adults and adolescents with handicaps or developmental disabilities (Cooper & Browder, 2001, Jensen, Parsons, & Reid, 1998). Rarely studied participants and settings are direct-care staff in a psychiatric inpatient clinic (Delamater, Conners, & Wells, 1984), geriatric nursing homes (Burgio et al., 1990), infant care facilities (Kunz et al., 1982), and analog settings (i.e., undergraduate students in a university) (Iwata et al., 2000). Besides the study that used undergraduate students in a university setting (Iwata et al., 2000), Cooper and Browder (2001) used graduate students working full time, and Kunz et al. (1982) reported some of the staff were undergraduate students and graduate students. However, I found no published studies dealing with the training of practicum students as staff in human services settings.

Although these settings share common environmental features, the staff responsibilities (or the target skills for the training) vary across studies. So, for this review, the interventions are categorized by client behaviors, as follows: (a) increasing client engagement in leisure and work activities; (b) decreasing client inappropriate behaviors; (c) teaching functional behaviors to the clients; and (d) other miscellaneous client behaviors.
Increasing Client Engagement in Activities

The largest number of studies involves the training of direct-care staff in residential facilities to maintain client engagement in functional activities (Burgio et al., 1983, Harchik, Sherman, Sheldon, & Strouse, 1992, Hrydowy & Martin, 1994, Parsons, Cash, & Reid, 1989, Smith, 1995). For example, Parsons et al. (1989) observed that for institutionalized clients, two thirds of their time was spent in activity that appeared to have no habilitative value. So, the experimenters introduced an intervention package to train staff to prompt and reinforce leisure activities of the clients. The training included the following: (a) Highly specific information was provided in the residents’ daily schedules; (b) staff members were assigned to specific responsibilities; (c) staff members received in-service training including rationale about the importance of leisure activities, written examples of leisure activities, target skills for the staff, and the modeling of those target skills; and (d) staff members received on-site monitoring and supervisory feedback by the site supervisors. This staff-training package resulted in increased active treatment provided by the staff and increased engagement in leisure activities by the residents; furthermore, those increases maintained during the 9-month follow-up session.

Another staff-training study is by Hrydowy and Martin (1994). The responsibilities for the direct-care staff included rotating task presentation among the clients, presenting appropriate activities to those clients who worked independently, recording client performance, and summarizing client data at the end of each week. The training for the staff included (a) the use of performance checklists, (b) direct observation and feedback from the supervisor, and (c) goal setting for the area of improvement. The
training package increased staff performance and client on-task behaviors; and those increases maintained during the 16-week follow-up session.

Decreasing Inappropriate Behaviors of Clients

Correctly dealing with the client’s inappropriate behaviors is also an important task for direct-care residential staff. A few researchers investigated staff-training packages to improve treatment of inappropriate client behavior (Embregts, 2002, Methot, Williams, Cummings, & Bradshaw, 1996, Shore, Iwata, Vollmer, Lerman, & Zarcone, 1995). For example, Embregts (2002) investigated the performance of the direct-care staff in a residential facility for mild mental retardation and attention-deficit hyperactivity disorder. The clients’ inappropriate behaviors included interrupting others, shouting, hitting, and making provocative gestures. The target staff behaviors were a verbal comment to stop the inappropriate behavior (e.g., “Sam, I will listen to you when I have finished my conversation with Edward”) or ignoring the behaviors. First, prior to the staff training, the trainer tried instructing the clients individually for 30 min. This instruction included discussing appropriate and inappropriate social responses, role-playing, and showing videotaped examples of appropriate and inappropriate social behaviors exhibited by unknown individuals. But this client instruction improved the performance of only one of the 4 clients; so, staff training was introduced. The training began with an in-service meeting that provided the staff with the descriptions of clients’ behaviors, the description of appropriate staff responses to the clients’ behaviors and the importance of correct staff-client interactions. The meeting was followed by once-a-week video feedback that included the following: (a) positive feedback for demonstrating appropriate staff responses contingent on resident social behavior; (b) corrective feedback for an
inappropriate response or failure to respond to the resident's appropriate social behavior at each occasion; (c) positive feedback for demonstrating an appropriate response contingent upon the resident's appropriate social behavior; (d) the percentage of inappropriate behaviors of the clients; and (e) suggestions on how to increase appropriate client behavior; and (f) a concluding positive comment on correct staff performance. As a result, all of the staff members showed an increase in the frequency of correct responding to inappropriate client behavior. However, there was a large decrease in the frequency of inappropriate behavior for only one client.

Similar results were obtained by Methot et al. (1996). Their supervisory-training package resulted in behavioral changes in the desired direction for 6 of the 7 staff participants (about 86%) but only 9 of 15 clients (60%). The lesser improvement of client behavior may be because the intervention did not incorporate functional-assessment strategies. Shore et al. (1995) used functional analysis prior to introducing the training intervention, and they obtained an improvement for 7 of the 8 clients (87.5%).

Teaching Skills to Clients

A few researchers have investigated the training of teachers to implement behavioral teaching procedures, typically the teaching of academic skills, both in schools for children with developmental disabilities and in schools for children without (Noell et al., 2000, Schepis et al., 2001, Witt, Noell, LaFleur, & Mortenson, 1997, Wolery, Athony, Snyder, Werts, & Katzenmeyer, 1997). For example, Witt et al. (1997) taught teachers to implement an intervention to improve the academic performance of elementary school students in regular-education. This involved giving reward slips to the children for good performance, with an exchange of the slips for backup reinforcers. The
consultant met with the teachers daily to provide data on the students' academic performance and feedback on the teachers' implementation of the intervention. Teachers' performance improved and that improvement maintained after the feedback frequency was decreased to weekly.

A few researchers investigated the training of staff in educational programs for adults and adolescents with disabilities (Cooper & Browder, 2001, Jensen et al., 1998). For example, Cooper and Browder (2001) taught staff to offer a choice, to prompt, and to delay the prompts in order to increase the clients' independent responses during a community-purchasing activity. The multi-component staff-training package included in-service training, performance feedback in the community-purchasing context, and self-monitoring procedures. The in-service training included a written manual with an oral description of the manual, videotaped examples of the target skills, and role-playing. The teachers used a checklist to self-monitor their performance as videotaped during community-instruction sessions. Both staff and client behavior improved during staff training and that improvement maintained during the 4-month follow-up session.

Teaching functional activities is also one of the important responsibilities for direct-care staff in residential facilities, and a few researchers have investigated this (Kissel, Whitman, & Reid, 1983, Page, Iwata, & Reid, 1982, Parsons & Reid, 1995, Parsons, Reid, & Green, 1996). For example, Parsons et al. (1996) trained staff to teach basic self-help skills, such as drinking from a cup, and simple vocational skills, such as putting paper in a paper shredder. The teaching process included presenting instructions based on a task analysis, using least-to-most prompts, providing reinforcement, and providing error correction. The training for the staff included (a) rationale for the staff
training, (b) videotaped examples of staff performance with discussion, (c) role-playing rehearsal of the skills, (d) assignment of the teaching tasks, and (e) on-the-job monitoring and feedback. This training package improved staff’s performance and the client’s acquisition of the target skills.

Staff Training of Other Responsibilities

Many studies improved staff performance, without necessarily aiming to change specific client behavior but instead directly or indirectly improved the client’s quality of life, for example increasing the frequency of staff interactions with clients in a residential facility (Burg et al., 1979), improving the provision of nutritional food to the clients (Kneringer & Page, 1999), assembling adaptive switches to be used by clients (Green & Reid, 1994), increasing the frequency of diaper changing in an infant care facility (Kunz et al., 1982), increasing the frequency of asking geriatric nursing-home residents to go to the bathroom (Burgio et al., 1990), increasing the frequency of data recording (Burgio et al., 1983, Morris & Ellis, 1997), increasing the frequency of staff on-task behaviors and adherence to the scheduled activities (Richman, Riordan, Reiss, Pyles, & Bailey, 1988) in residential facilities, and conducting preference assessment in a school for children with autism (Lavie & Sturmey, 2002). All of the above studies resulted in positive changes in the staff performance.

Training Components

All of these training interventions involved training packages with several similar components, such as goal specification, modeling, and feedback. It is desirable to investigate the core component(s) responsible for the behavioral change. The typical
training began with one or a few sessions of in-service training by the experimenter. All of the preceding studies, started with similar in-service training, with the possible exception of Witt et al. (1997). The common components were: (a) the rationale of the training, (b) the specification of client and staff target behavior and examples of them, along with a checklist of those behaviors, (c) demonstration of the target behaviors using live or videotaped models, and (d) role play of the target behaviors with immediate feedback from the trainer. The in-service training was followed by on-site training, involving performance observation and feedback. The feedback sessions were given by the experimenter or by the staff supervisor. Almost all of the studies used performance observation and feedback in the training, except those using self-monitoring (Burg et al., 1979, Burgio et al., 1983).

Feedback sessions were much more effective than in-service training in increasing low frequencies of appropriate staff behaviors and in maintaining newly acquired staff behaviors (Delamater et al., 1984, Jensen et al., 1998, Noell et al., 2000, Quiltich, 1975, Richman et al., 1988, Smith, 1995, Witt et al., 1997). However, because of the need for a skilled provider of feedback, feedback is one of the most costly intervention components. Methods to reduce the cost of the feedback and cost-effective alternatives are identified and discussed in a later section.

*Parent Training*

Although not precisely staff training, many training studies focused on training the parents of children with developmental disabilities and autism, and those parent-training studies used almost identical training procedures as other staff-training studies (Harris, Peterson, Filliben, & Glassberg, 1998, Kaiser, Hancock, & Nietfeld, 2000,

Examples of teaching parents how to increase play skills for children with disabilities are provided in the earlier section of teaching play. The training of parents to teach other behaviors (e.g., language skills) was studied by Harris et al. (1998) and Kaiser et al. (2000).

In addition, a few researchers trained parents to reduce their child’s inappropriate behaviors (Lerman et al., 2000, Marcus et al., 2001). For example, Marcus et al. (2001) used a training package that included (a) intervention overview, (b) role-play, (c) modeling, (d) immediate and delayed feedback, and finally (e) fading the feedback (mere observation without feedback). Both parent and child behavior improved and maintained in a one-month follow-up session.

Summary of Basic Staff Training

In summary, staff training has been investigated extensively in regular and special educational programs and in residential facilities for individuals with disabilities. Frequently targeted staff behaviors involved: (a) increasing client engagement in work and leisure activities, (b) correctly responding (or not responding) to the clients’ inappropriate responses, and (c) teaching functional repertoires to clients. The staff-training studies demonstrated that successfully changing staff behavior also successfully changed client behaviors. However, many staff-training studies have used highly skilled and potentially expensive trainers, such as the researchers themselves. Therefore, there is
a need for the demonstration of the effectiveness of less-expensive trainers or less-expensive training procedures.

*Train-The-Trainer Model (Pyramidal Staff Training)*

One cost-effective staff-training strategy is the use of pyramidal staff training (Green & Reed, 1994, Neef, 1995, Page et al., 1982, Shore et al., 1995). Supervisors are trained in the target skills so that they can, in turn, train their supervisees. The benefits of using this model are: (a) the number of staff directly trained by more expensive professionals can be reduced, (b) the supervisors can train new staff as they enter the program, and (c) the supervisors can maintain the behaviors of the staff because feedback is typically one of the components of the supervisor training (Page et al., 1982). For example, Shore et al. (1995) used pyramidal staff training for direct-care staff working with individuals who exhibited self-injurious behavior, aggression, and disruption. They trained unit supervisors to implement treatment, to collect and interpret data, and to provide similar training and feedback to the direct-care staff members. As a result, all of the supervisors and staff members correctly implemented the procedures and the behavior of 7 of the 8 clients improved.

Other researchers also conducted similar studies of pyramidal staff training. Page et al. (1982) trained supervisors to improve teaching behaviors used by the direct-care staff in a residential facility for individuals with disabilities, with a resulting increase in correct teaching by the staff and small but noticeable improvements in the client behavior. Neef (1995) used pyramidal training to train parents to teach their children with developmental disabilities so that those parents, in turn, could train other parents to teach.
their own children. The results of the training by the parents were comparable to the training by professionals.

_Supervisory Skills Training_

In this category, the supervisors were trained in supervisory skills, consisting of behavioral observation and the provision of feedback to maintain supervisee target skills (Burgio et al., 1990, Harris et al., 1998, Hrydowy & Martin, 1994, Jensen et al., 1998, Methot et al., 1996, Parsons et al., 1989, Parsons and Reid, 1995, Richman et al., 1988). In these studies, either the skills were already in the supervisees' repertoires or the experimenter(s) conducted training sessions to make sure that the supervisees had the target skills prior to the supervisory training.

For example, Parsons et al. (1989) evaluated a system designed to improve a procedure used in residential living units for the individuals with developmental disabilities (prompting clients to engage in functional activities). One of the experimenters (who was also the director) provided standard in-service training to the direct-care staff and then trained assistant supervisors to observe and provide feedback to the direct-care staff at least weekly. As a result direct-care staff increased their prompting and the off-task behavior of the clients decreased. Parsons and Reid (1995) trained supervisors to teach mentally handicapped residential clients. The supervisors' teaching performance improved but the quality of feedback they provided to direct-care staff did not. Classroom-based instruction and on-the-job observation and feedback that targeted supervisors' feedback skills resulted in improving the supervisors' feedback skills; and the direct-care staff's maintenance of the teaching skills was higher than those whose supervisors had not received this training.
Self-Management

As an alternative to frequent supervisory feedback to maintain staff performance, some researchers investigated self-management training packages. This strategy needs less supervisory time and should be less expensive, if successful. For example, Burgio et al. (1983) used self-monitoring and self-praise by direct-care staff to increase their interaction with clients with developmental disabilities when the clients played properly with toys. In the self-management training, self-monitoring instruments (i.e., a wrist, response counter and graph paper) were distributed to the staff along with their rationale and instructions for their use. Then the experimenter modeled the correct use of the instruments and asked the staff to demonstrate those behaviors. After this in-service training, when the staff returned the self-recording instrument to the supervisor at the end of each day, they received praise from the supervisor for using the instruments, but not for the interactions with clients. After handing in the instrument, the staff then entered their daily frequency of interactions on the graph in the supervisor’s office. Finally, it was suggested to the staff that they covertly praise themselves for meeting their frequency goals for the interactions, which were selected in the in-service training. The frequency of staff interactions with the clients increased and had maintained for 6 of 10 participants, with some decrease for the other 4 participants in the 6-month follow-up session.

Richman et al. (1988) used self-monitoring to maintain adherence to schedules and on-task behaviors of the staff in residential care facilities for individuals with developmental disabilities. Initially, the experimenters provided standard in-service training, which did not increase the staff’s on-schedule and on-task behaviors; so the self-monitoring component was introduced. Each staff member was given and asked to use a
copy of the staff schedule and an individual schedule card that had the shift divided into half-hour blocks on one side of the card along with a copy of the definitions of appropriate on-task behavior on the reverse side. As a result, staff on-task and on-schedule behaviors increased. However, some staff members did not maintain consistently high levels of performance; so the experimenters added twice-a-day supervisor feedback. This feedback resulted in consistently high on-task and on-schedule behavior for all the staff. These two studies indicate that self-management is not always sufficient to maintain all staff members' performance.

Other researchers also investigated self-management strategies. Burg et al. (1979) used self-recording to increase staff interaction with clients in a residential facility. Cooper and Browder (2001) used a self-monitoring checklist for offering choice and prompting during purchasing activities. Kissel et al. (1983) used self-recording to maintain staff’s correctly teaching activities of daily living to clients in a residential facility for developmental disabilities. In these studies, self-management procedures resulted in all of the staff members’ improved performances, and the improvement had maintained in the follow-up sessions.

*Permanent Products*

Witt et al. (1997) used permanent products to provide feedback, thus eliminating the time-consuming process of the supervisor’s directly observing the on-site teacher performance. They trained teachers to use a token economy that produced permanent products in a general education setting. For example, the score at the top of a graded paper indicated that the grading had been accomplished. Furthermore, reward slips were used to reinforce the students’ correct performance. When slips were redeemed for
backup reinforcers, the occurrence of the exchange was written on the reward slips' backs. During the feedback sessions with the consultant/supervisor/experimenter, the consultant used graphs to indicate missed treatment steps as well as the students’ percentage correct on daily assignments. The performances improved for all 4 teachers and had maintained in the 8-week follow-up session, though one teacher needed booster training. Although permanent products are not always available, if they are, this procedure could reduce the cost of staff training and management.

In summary of cost-effective staff training procedures, four strategies were identified: (a) train-the-trainer model (pyramidal staff training); (b) supervisory skills training; (c) self-management; and (d) permanent products.

Summary

There are different types of strategies for teaching children with autism and other developmental disabilities to play, strategies such as antecedent manipulations, prompts, reinforcement, parent training, self-management, and the reduction of inappropriate behavior. And the most common, the reinforcement-based training strategies usually involve multi-component training packages that use prompts and modeling, as well as reinforcement. The advantage of using such multi-component training packages is that it makes more likely the learning of the children who do not have basic repertoires, such as instruction following and generalized imitation. However, as the number of components in the training packages increase, accurate and consistent implementation becomes difficult; so, effective staff training is important to ensure the accurate and consistent implementation.
Many researchers have begun to investigate the teaching of manding to individuals with developmental disabilities. However, many aspects of mand training are still yet to be investigated. The combination of mand training and staff training is one area yet to be investigated.

In the area of staff-training studies in human services, the most commonly studied participants and settings are direct care staff in residential facilities and teachers in educational settings; none seem to have addressed the training of university practicum students. The participants' responsibilities may vary from teaching behaviors to clients to reducing the inappropriate behaviors of the clients. Although the target responses may vary, most of these studies used similar training components. The first component is usually in-service training, which includes a written manual that specifies the staff responsibilities, modeling of the target skill(s), and a rehearsal session with feedback. The second component is usually on-site training, which includes behavioral observation and feedback. The core components responsible for the staff behavioral changes are yet to be investigated. In addition, it is important to make staff training strategies not only effective, but also efficient and realistic in human service settings. The train-the-trainers model (pyramidal model) is a strategy to make staff training cost effective and realistic. Further studies in this area are warranted.

The current study evaluated a training package using the pyramidal model of staff training for teaching low-functioning children with disabilities to mand and play actively with adults.
CHAPTER II

METHODS

Settings

This study was conducted in an early intervention program for children with autism and/or other developmental disabilities in a public school. In this program, children received one-on-one, discrete-trial sessions throughout the day in their own individual booths that were designed to minimize any distractions. The discrete-trial sessions followed the procedures specified in the text developed by Lovaas (1981). The technicians were practicum students from a local university, and they stayed in the program for about 15 weeks. The school days were divided in three, 2-hour shifts, which allowed children to interact with 3 different technicians a day. The playtime was scheduled for 15-20 min per shift. In this playtime, the children came to a playroom that was specifically designed for play. At the beginning of the intervention, no specific guidelines were provided to the technicians regarding play, although technicians were generally encouraged to play with their child, prompt their child to play appropriately, and generalize the skills that they taught during discrete-trial training.

Participants

Three sets of participants were used in this study. The first set of participants was 2 children with autism. The children were selected for the study because staff members reported, at the beginning of the study, that they did not play appropriately at all during playtime, and technicians typically failed to increase play.
Children

*Ian.* Ian was a 4 year-old boy with a diagnosis of autism. He had been in the program for a year and 9 months. He acquired sitting nicely in the chair, matching of several objects and pictures, and imitating simple actions and manipulations of objects, but he had yet to acquire oral instruction-following skill. The rate of his skill acquisition was low compared with other children in the program. Informal observation during the playtime showed that he typically manipulated a toy that played music or made other sounds. He often pressed the buttons of these toys repeatedly and ran back and forth in between them. When technicians prompted to use the toys in a more appropriate manner or to play different activities, he typically pushed the technicians’ hands and walked away or picked up another, similar toy. Ian sang a song occasionally but did not make sounds upon being prompted. He primarily used PECS to mand food items throughout the program. His verbal imitation emerged during the experiment, though it did not reliably occur upon modeling prompts. For this study, both sign language and verbal sound were used as acceptable forms of a mand.

*Mimi.* Mimi was a 5-year-old girl with developmental disabilities. She had been in the program for 2 years and 8 months. She had deficits in her gross and fine motor skills. She could match simple objects and pictures and imitated several simple manipulations of objects, but she had yet to acquire oral instruction-following skill. The rate of her skill acquisition was low compared with other children in the classroom. Informal observation during playtime showed that Mimi typically walked around the playroom with a toy in her hand. When she manipulated toys, it was often in a non-functional manner, such as shaking a doll and putting a pop-up toy close to her mouth, but she occasionally used
them in a functional manner, such as pressing buttons of toys that made sounds and
shaking a drum with beads inside. When technicians approached to play with Mimi, she
often walked away, thus appropriate toy play or any other activities typically continued
for no longer than several seconds. She could make a few sounds, “Bah”, “Elmo”, and
“Wo”, and she could produce these sounds when given verbal prompt (i.e., “Say, bah”).
She used Picture Exchange Communication System (PECS) to mand toys and food items
throughout the program, however, for this intervention in the playroom, sign language
was used as the primary forms of manding, and a verbal sound “Bah” was used for
manding bouncing on the ball. PECS was not used in this play setting because it was
difficult for Mimi to manipulate the PECS book and icons, especially in the middle of
play activities.

**Introductory-Level Technicians**

The second set of participants was 6, introductory-level technicians. All of them
were female university students who registered for the practicum. Three of them worked
with Mimi and the other 3 worked with Ian, and each of them worked in one of the three
shifts. At the beginning of the semester, the classroom teacher assigned them to work
with Mimi or Ian before commencement of this study. They were selected for the study
because they were assigned to work with either Mimi or Ian. These technicians had no
more than a few weeks of experience teaching functional behaviors to the children and
interacting with the children in this context. Prior to this practicum, none of the
technicians had experience working in any other training programs for children with
autism or other developmental disabilities. All of them had no experience in interacting
with children of this spectrum, except the third-shift technician for Ian, who had a sibling with Asperger syndrome.

**Senior Technicians (Trainers)**

The third set of participants was 3, senior technicians who trained the introductory-level technicians. The senior technician for Ian and the 1st senior technician for Mimi were female university students, who registered for the practicum. They had a semester of experience conducting discrete-trial training for Ian or Mimi. The senior technicians attended some days of the week in the first shift, some days in the second shift, and some days in the third shift for total of 10 hours a week. They trained the introductory-level technicians to conduct discrete-trials at the beginning of the semester. And they took turns with the introductory-level technicians conducting discrete-trials. This responsibility was given to them at the beginning of the semester, regardless of the study. They were selected for the study because they were assigned to work with Ian or Mimi. The 1st senior technician for Mimi was excused from the study during the training because of an arm injury. The 2nd senior technician for Mimi was also a female university student, but her responsibility was primarily to observe the performance and provide feedback to introductory-level technicians working with other children. She also had a semester of experience conducting discrete-trial training for a child, but not for Mimi. She was selected for the study because she was the only available technician with experience almost equivalent to the first senior technician. The assignment of the children, introductory-level technicians, and the senior technicians are specified in the Figure 1.
Figure 1. Children-Technicians Assignment Diagram

Play Sessions

At the beginning of the study, a 15-min, daily play session was scheduled for each of the three shifts for each child. For the rest of the time, the children received discrete-trial sessions or training in activities of daily living. The study began when all introductory-level technicians had received at least 2 weeks of training in discrete-trial training and teaching activities of daily living. During the experiment, the experimenter trained the senior technicians to increase the children's play and mand skills. Then the senior technicians, in turn, trained the introductory-level technicians to increase the children's play and mand skills. During their training and evaluation, when the senior technicians played with their child, the introductory-level technicians were asked to observe other technicians doing discrete trial training in another part of the school room in order to avoid the confounding variable of observational learning.
Dependent Variables

Children's Play

The general categories of play were overall play and active engagement in play. Overall play referred to the child being involved in any play-activities specified in Table 1. It included any involvements in the play activities and being on the play instruments (i.e., slide, trampoline, rocking chair, and exercising ball). Refer to Appendix A for the detailed examples of overall play for each play activity.

The definition of overall play was not sensitive in differentiating actively engaging in the activities or passively being involved in the activities. Thus another category of play, active engagement, was added. Active engagement was a part of overall play. Active engagement refers to the child actively participating in one of the play activities specified in Table 1, though the level of active engagement was different for the 2 children. Refer to Appendix A for the detailed examples of active engagement.
Table 1

**Summary of Definitions of Play**

<table>
<thead>
<tr>
<th>Activities</th>
<th>Overall Play</th>
<th>Active Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Slide</td>
<td>Being on the slide. It excludes just stepping on the first step of the slide.</td>
<td>Climbing the slide, sliding, and crawling through the arches on the slide</td>
</tr>
<tr>
<td>2. Trampoline</td>
<td>Being on the trampoline. It excludes stepping on the trampoline on the way to going somewhere else.</td>
<td>Jumping on the trampoline</td>
</tr>
<tr>
<td>3. Sing a song</td>
<td>Attending to a technician while she sings, (i.e., “itchy-bitsy-spider”, “wheels-on-the-bus”, etc.)</td>
<td>Singing or doing the motion involved in the songs</td>
</tr>
<tr>
<td>4. Ring-around-the-rosies</td>
<td>Following the physical prompts to play ring-around-the-rosies</td>
<td>Walking around or jumping with a technician while the technician sings the song. It is not active when the children stop moving their feet.</td>
</tr>
<tr>
<td>5. Bouncing</td>
<td>Staying on the exercise ball, while the technician</td>
<td>Bouncing on the ball with a little support from a technician</td>
</tr>
<tr>
<td>6. Peek-a-boo</td>
<td>Attending to a technician while the technician plays peek-a-boo</td>
<td>Child M. Grabbing a technician’s arms or hands while the technician plays peek-a-boo Child I. Imitating a technician’s movement</td>
</tr>
<tr>
<td>7. Tickle</td>
<td>Being tickled but excludes during receiving social praise, which was given contingent on other appropriate behaviors</td>
<td>Child M. Grabbing a technician’s arms or hands while the technician tickles Child I. When technician counts number before tickling, count the number together or imitates the motion.</td>
</tr>
<tr>
<td>8. Rocking</td>
<td>Staying on the rocking chair, while a technician rocks or the child rocks</td>
<td>Pushing the chair to rock using arms or legs</td>
</tr>
<tr>
<td>9. Wagon</td>
<td>Staying on the wagon while a technician pulls the wagon</td>
<td>The child imitates the technician’s behavior or follows any instructions. (e.g., when technician counts number, the child also counts. This play was omitted from the list)</td>
</tr>
</tbody>
</table>
Children's Manding

For manding the above-specified play activities, sign language and vocal sounds were used. Signs for the preferred activities were as follows: (a) Sliding: moving two fingers back and forth on the open palm of the other hand; (b) Jumping on the trampoline: signing “jump”, which was moving two fingers up and down on the open palm of the other hand; (c) Playing ring-around-the-rosies: signing “roses”, which was moving a pinched hand around the nose as if sniffing a flower; (d) Bouncing on the ball: signing “ball”, which was making a circle shape with the thumbs and index fingers of both hands; (e) Playing peek-a-boo: moving (the child’s or the technicians) hands in the way of playing peek-a-boo (hiding either the child’s face or the technician’s face); (f) Tickling: moving the hands under the arms; and (g) rocking in a rocking chair: signing “rock”, which was moving arms back and forth besides the face. Mimi could make a sound, “Bah”, and thus saying, “Bah” was also the appropriate way to mand bouncing on an exercising ball. Ian started to imitate words during the study, and thus verbally saying, “Ball”, “Jump”, “Peek-a-boo”, “Slide”, and “Rosies” were also appropriate ways to mand the related activity.

Mands were categorized as prompted when a technician modeled or prompted verbally or physically prior to the child’s manding; otherwise they were categorized as spontaneous.

Technician’s Behavior

The technicians’ behavior was categorized as follows: (a) Correct play and prompts to play; (b) Incorrect play and prompts to play; (c) Correct prompts to mand and
responses to child’s manding; and (d) Incorrect prompts to mand and responses to child’s manding.

Correct play and prompts to play. This category included the technicians’ correctly playing with the child and correctly prompting the child to play. Correct playing was helping the child to do an activity faster, higher, or better (e.g., helping the child jump higher, rock faster, and bounce safely), while giving the child a chance to play actively (refer to Table 1), and praising or making play-related comments (e.g., clapping and jumping together with the child, while saying, “You jump so high,” or “Good job jumping.”). Correct prompts to play included the technicians’ giving a clear verbal instruction (e.g., “Let’s jump on the trampoline”, “Do you want to slide?”) when the child was attending to the technician, looking at a play instrument (e.g., slide, trampoline), or being near a play instrument. Correct prompts to play also included more intrusive prompts (i.e., gestural and physical prompts) given when the child was not following the verbal prompts but not resisting or moving away. Refer to Appendix B for the detailed examples of correct play and prompts to play.

Incorrect play and prompts to play. Incorrect play was blocking the child’s active engagement (e.g., a technician held Ian on her lap and bounced on the exercise ball, or rocked the rocking chair in a way that the child could not rock on his or her own), praising unsafe behaviors (e.g., praising Ian jumping off of the slide), and ignoring a child’s correct play behaviors. Incorrect prompts to play included technicians’ giving verbal prompts when the child was neither attending to the technician, looking at the play instrument, nor near the play instrument. Incorrect prompts also included prompting the child forcefully when the child was resisting or attempting to move away, and giving full
physical prompts prior to less intrusive prompts. For example, it was incorrect prompt if the technician physically guided the child to sit down at the slide before giving the child verbal prompts and a chance to sit down on his own. Incorrect prompts also included picking up and placing the child on the slide, trampoline, or rocking chair, except placing the child on the exercising ball because neither of the children could safely climb up the exercising ball. Refer to Appendix B for the detailed examples of incorrect play and prompts to play.

Correct prompts to mand and responses to child’s manding. The correct prompts to mand included prompting the child to use correct forms of manding specified above when the child initiated or continued the play activities (e.g., the child stepping on the trampoline, slide, and rocking chair, sitting down in front of the slide, staying on the trampoline and attempting to continue jumping, or pulling technician’s hands in the way that they would help the child to do a play activity). Correct responses to children’s manding were to help with the play activity that the child manded (prompted or spontaneous) immediately (within approximately 3 s) after the child’s mand.

Incorrect prompts to mand and responses to child’s manding. Incorrect prompts to child’s manding included prompting to mand when the child did not show any initiations (e.g., a technician prompting the child to sign “Ball” when the child steps on the trampoline) or using the forms of manding that were not specified for the child (e.g., a technician prompting the child to say, “trampoline” instead of “jump”). Incorrect responds to children’s manding were ignoring the child’s manding or not immediately (within approximately 3 s) helping with the play activity that the child manded.
Intervention Procedure for Teaching Play

Preference Assessment

A preference assessment was conducted prior to the training for the technicians in order to identify preferred activities for the children. Nine interactive play-activities were selected by the experimenter through an informal interview with the classroom teacher. The play activities were (a) sliding, (b) jumping on the trampoline, (c) singing a song, (d) playing “ring-around-the-rosies”, (e) bouncing on an exercise ball, (f) playing peek-a-boo, (g) tickling, (h) rocking in a rocking chair, and (i) riding in a wagon. All of the activities included some interaction with a technician. Although the children were able to do some of these activities independently (e.g., jumping on the trampoline), they could do it faster, higher, or better with a technician’s support (e.g., the children could jump higher when they held a technician’s hands).

The assessment procedure followed the study by Koegel, Dyer, and Bell (1987). The experimenter offered each activity, one at a time. For example, the experimenter held the child’s hand and said, “Let’s slide,” and guided the child to step on to the slide. When the child followed the prompt, the experimenter made a play-related comment, such as, “Wow, you are on top of the slide. Look, it is so high.” Besides social attention, no tangible items were given to the child. The activities were continued until the child moved away and resisted the guidance for a maximum of 3 min. Each play activity was offered to the child one by one until all of the activities were offered. The experimenter repeated the process three times in the same manner, except the order of the activities was altered for each round. Refer to the procedure in Appendix C. The six play activities that the child participated in for the longest duration were selected as preferred activities. The

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preferred activities for Ian were the wagon ride, “ring-around-the-rosies”, peek-a-boo, bouncing, slide, and trampoline. And the preferred activities for Mimi were wagon ride, tickling, “ring-around-the-rosies”, rocking, bouncing, and peek-a-boo. When measuring the duration, the definitions of overall play were used. Riding on a wagon was eliminated from the list soon after the intervention started because other children, who shared the playroom, also frequently requested the wagon ride; and thus it was difficult to keep the wagon only for Mimi and Ian. During the intervention, it was observed that Mimi engaged in jumping on the trampoline occasionally, thus the technicians were informed that jumping on the trampoline was also one of the good activities to prompt, though no further instruction and training was provided to the technicians.

No-Procedure Baseline

At the beginning of the no-procedure sessions, the experimenter told the technicians that they should play with the child as much as they could and that they would be videotaped during every play session from this time on. The experimenter also explained to the technicians that they would soon receive systematic training in increasing the child’s play. The technicians did not receive any additional training in this no-procedure condition. Mimi’s 2nd senior technician was not exposed to the pre-baseline session because all of the other technicians did poorly in the no-procedure baseline.

Procedure Baseline

At the beginning of the procedure (written instructions) baseline, the technicians received a written procedure for playing with the children (Appendix D for Ian and E for Mimi). The procedure specified how to play the five, preferred play activities with the
child. It was written in the format used for discrete-trial training in the classroom. It specified each step for playing each activity. For example, the procedure for jumping on the trampoline specified: “The technician says, ‘Ian, jump on the trampoline,’ and guides him to step on the trampoline by holding his hand(s). The technician holds his hand(s) and pulls him up slightly so he can jump higher than when he is jumping on his own. The technician makes positive comments about his jumping, such as ‘You are a good jumper’ or ‘You jump so high!’.” The experimenter instructed the technicians to read the procedure carefully before the first play session. In addition to the procedure, the technician received non-specific positive comments from the experimenter on the performance three times a week after the session in order to evaluate the effects of specific feedback in a subsequent phase. The experimenter continued giving positive comments throughout the intervention.

**Video Modeling**

At the beginning of this condition, the technicians watched a video of the experimenter playing with the child. This was the video of the experimenter and each child during the preference assessment session. The video was edited in order to show only the preferred activities that were specified in the procedure. Each activity lasted for about 2-3 min, starting from the end of the previous play activity to the point that the child moved away or 3 min elapsed. No further training was given in this phase.

The experimenter or the senior technicians showed the videotape to the trainees. When the experimenter showed the video to the trainees (senior or introductory-level technicians), he encouraged the trainees to ask any questions but did not give any information unless the trainees asked. When the senior technicians showed the video, the
experimenter told them to encourage the trainees (introductory-level technicians) to ask any questions and to answer those questions.

*Slide Show, Checklist, and Video Modeling*

At the beginning of this condition, the technicians watched a slide show that described the following: (a) rationale for increasing the child’s play; (b) steps for each play activity; and (c) guidelines to do those steps. For example, to play “ring-around-the-rosies”, the technicians should follow these steps: (a) giving a verbal prompt; (b) giving a physical prompt (i.e., holding the hands and guiding toward the position) if necessary; (c) singing the song; (d) allowing the child to fall down; (e) giving praise, comments, and affection; and (f) offering another prompt to play again. Each step had guidelines to do it correctly: (a) verbal prompt: giving a clear statement, while the child is attending to the technician or located near an open space in the play room (attending to the play instrument was acceptable for other play activities); (b) physical prompt: giving it an activity quickly but not forcefully, the prompt should be given in a way that does not disrupt the natural flow of the play; (c) singing the song: singing a song in an enthusiastic manner with a smile, the technician may help the child to jump during the singing; (d) fall down: exaggerate the motion and make it exciting; and (e) offer it again: offer the hands and give a chance to do it again. The slide contents are shown in Appendix F for Ian and Appendix G for Mimi. After watching the slide show, the technicians watched the video again while filling out the checklist that summarized the steps and the guidelines (Appendix H for Ian and Appendix I for Mimi). During the slideshow and the video presentation, the technicians were encouraged to ask questions of the trainer.
Training for trainer. Before the senior technicians gave the combination of the slide show, checklist, and additional video modeling to the introductory-level technicians, the senior technicians were provided with two copies of a checklist (Appendix H for Ian and Appendix I for Mimi), one for themselves and the other for the introductory-level technicians. The checklist did not only specify the steps for the introductory-level technicians to implement the play intervention, but also specified the steps for the senior technicians how to implement the training. The steps were: (a) showing the slide show, (b) encouraging the technicians to use the checklist while watching the videos, and (c) answering any questions that the technicians might ask. The experimenter told the senior technicians to read the checklist with the steps, to follow these steps, and to ask any questions regarding the training. Ian’s senior technician did not receive the slide show component when she was learning how to teach play, thus, before the training that she gave, she was told to watch the slide show and to ask questions to the experimenter regarding the slide show. After the senior technicians gave the training to the introductory-level technicians, the experimenter gave the senior technicians (i.e., the trainer) non-specific positive comments. Data were not collected on the senior technicians’ implementation of the training.

Concurrent Feedback and Modeling

During this condition, the trainer observed the technicians’ performance using the checklist (Appendix H for Ian and Appendix I for Mimi), and gave concurrent feedback during play sessions. When necessary, the trainer modeled the appropriate performance. The frequency of the feedback varied across technicians due to their performances and the schedule of the senior technicians. Feedback was given to Ian’s 3rd-shift technician
before she was exposed to the slideshow and the checklist. This was an experimenter’s implementation error. For Mimi’s 1st senior technician, the feedback was introduced along with the slide show, checklist, and the video modeling. This was also an experimenter’s implementation error.

*Training for trainer.* Before the senior technicians gave feedback to the introductory-level technicians, the experimenter provided the senior technicians with a feedback guideline for the trainers (Appendix J) and the checklist (Appendix H for Ian and Appendix I for Mimi) for the performance observation. The feedback guideline included the following steps: (a) using the checklist to observe the introductory-level technicians’ performance; (b) stopping the play and provide feedback whenever appropriate; and (c) providing as many positive feedbacks as corrective feedbacks and ending the session with positive comments. The experimenter told the senior technicians to read the feedback guideline, to follow these directions, and to ask any questions to the experimenter regarding providing feedback. The experimenter also told the senior technicians that they could model an appropriate performance when the introductory-level technicians had trouble implementing the feedback. After the senior technicians gave a feedback session to introductory level technicians, the experimenter gave the senior technicians non-specific positive comments. Data were not collected on the senior technicians’ implementation of the feedback.

**Intervention Procedure for Teaching Manding**

The mand intervention was introduced to only those technicians who successfully acquired the skills to teach play. In other words, there is no opportunity for the technician to prompt manding until the child starts playing actively and initiating play activities.
(e.g., stepping on to the relevant play instrument and reaching hands toward the technician to have her help the play activity).

No-Procedure Baseline

Besides the technicians had received sequential training of how to teach play, they received no instruction to teach manding. The written procedure for the play (Appendix D and E) included the phase of teaching manding after completing the phase of teaching play, however, it was specified that the technicians should not move on to the teaching manding phase until instructed to do so.

Procedure for Mand Training

At the beginning of the procedure phase (written instructions), the technicians were instructed to read the written procedure for teaching manding to the children (Appendix D for Ian and E for Mimi) carefully before starting the first session of teaching manding. It specified that the technician should start prompting to say (or sign) a play activity when the child showed initiation of the play activity (e.g., reaching for the relevant toy, grabbing the technician’s arms to do something, moving toward the relevant toy, etc.). It also specified that the technician should reinforce the prompted manding as if it were manded spontaneously.

Slide Show

The slide show specified the steps to teach prompting manding more in detail than the written procedure did (Appendix K). The slide show included the rationale for teaching manding and described the importance of increasing the child’s initiation before introducing the steps to prompt manding. This training was given only to Ian’s senior
technician, and the experimenter showed the slide show to her.

Procedure for Time Delay

The next phase of the procedure (written instructions) was the use of time delay (Hughes, Fredrick, & Keel, 2002) in prompting manding. The procedure specified that, when the child’s initiated any of the preferred activities, the technicians should wait for 5 s before prompting the child to mand. When there is no spontaneous manding, the technician should prompt the child to mand and reinforce the manding as if the manding were spontaneous.

Research Design

A multiple-baseline design across technicians was utilized. The training was introduced to each technician one at a time, and the point of introduction of the training was staggered across technicians. All of the training components were completed within a semester because the technicians were only registered for one semester (15 weeks). Because of time constraints, the data were collected for only 25% of the videotaped sessions while the experiment was in progress. And because of the complexity of the dependent variables, the two-way interaction between the performance of the technician and the child, and the constraints of working within a semester system, it was considered better to decide when to move to each new experimental phase based on the experimenter’s subjective clinical judgment, rather than a more experimentally rigorous and more easily replicated objective criterion. So for the senior technicians, the next phase was introduced if the child’s performance had not reached a subjectively satisfactory level within two or three sessions in a given phase. The experimenter moved
to the next phase, before performance stability might have been reached for the child, because of the necessity of ensuring that the senior technicians had mastered the skills soon enough to have time left in the semester for them to train the introductory-level technicians. And, for the introductory-level technicians, the next phase was introduced if the child’s performance had not reached a subjectively satisfactory level within three to nine sessions, depending in part on the availability of the senior technicians to do the training of the introductory-level technicians. For these introductory-level technicians, the experimenter usually moved to the next phase, after the child’s performance appeared to stabilize or appeared to be worsening.

Order of Training

The training was first introduced to the senior technician. When the senior technicians made a clinically significant behavioral change (subjective judgment by the experimenter), they became a trainer of the introductory-level technicians. The training components given by the senior technicians were: (a) video modeling, (b) a combination of slideshow and checklist along with additional video modeling, and (c) feedback, with an exception that the experimenter introduced video modeling to Mimi’s 2nd and 3rd-shift technicians (the trainers’ effect is minimal because the training was simply presenting the video).

Data Collection

For the preference assessment sessions, the children’s play was videotaped during the entire session. The experimenter (primary data collector) and his assistants (secondary
data collectors) observed the videos and measured the duration of each play activity, using a stop watch. The data sheet is shown Appendix L.

For other play sessions, each child-technician pair's performance was videotaped for 15 min daily. The experimenter and his assistants collected the technicians' and children's performance data from the videotapes, using 10-s, partial-interval data-recording forms (Appendix M and N). During the observation, a computer program made a beeping tone and showed a visual display to indicate to the data collectors the beginning of each 10-s interval. For those videos that were observed after all of the intervention components were completed, the dates of the sessions were eliminated and coded in order to avoid the possible bias of the assistant data collectors.

Interobserver Agreement

As shown in Table 2, the interobserver agreement (IOA) data were collected on more than 30% of the videotaped sessions for each participant, ranged from 33.3% to 52.0%. The average IOA percentages varied across dependent variables from 91.2% (Mimi's active engagement) to 99.8% (technicians' incorrect prompts and responses to Ian's manding).

The experimenter (primary data collector) and his assistants (secondary data collectors) observed the videotaped performances simultaneously, but independently. The primary data collector trained the secondary data collectors with written definitions and examples of the dependent variables (Appendix A and B). During the data-collection training, the primary and secondary data collectors observed practice videos simultaneously while discussing the behaviors on the videos. The videos used for the
practice sessions were not used as IOA. The training was continued until the agreement between the primary and the secondary observers reached more than 80%.

Table 2

**IOA Data**

<table>
<thead>
<tr>
<th>Participants</th>
<th>Dependent Variables</th>
<th>% of IOA Sessions</th>
<th>% of IOA</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ian</td>
<td>*Pref. Assess.</td>
<td>Overall</td>
<td>33.3</td>
<td>91.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Active Engagement</td>
<td>33.3</td>
<td>95.4</td>
</tr>
<tr>
<td></td>
<td>Play</td>
<td>Overall</td>
<td>44.7</td>
<td>93.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Active Engagement</td>
<td>44.7</td>
<td>94.3</td>
</tr>
<tr>
<td></td>
<td>Mand</td>
<td>Prompted</td>
<td>39.0</td>
<td>98.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Spontaneous</td>
<td>39.0</td>
<td>98.6</td>
</tr>
<tr>
<td>Mimi</td>
<td>*Pref. Assess.</td>
<td>Overall</td>
<td>33.3</td>
<td>97.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Active Engagement</td>
<td>33.3</td>
<td>90.3</td>
</tr>
<tr>
<td></td>
<td>Play</td>
<td>Overall</td>
<td>33.3</td>
<td>93.6</td>
</tr>
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<td></td>
<td></td>
<td>Active Engagement</td>
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<tr>
<td></td>
<td>Mand</td>
<td>Prompted</td>
<td>36.0</td>
<td>98.3</td>
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<tr>
<td></td>
<td></td>
<td>Spontaneous</td>
<td>36.0</td>
<td>99.5</td>
</tr>
<tr>
<td>Ian’s</td>
<td>Play</td>
<td>Correct**</td>
<td>34.1</td>
<td>92.7</td>
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<tr>
<td>Technicians</td>
<td></td>
<td>Incorrect</td>
<td>34.1</td>
<td>97.7</td>
</tr>
<tr>
<td></td>
<td>Mand</td>
<td>Correct</td>
<td>34.1</td>
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<tr>
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<td></td>
<td></td>
<td>Incorrect</td>
<td>50.0</td>
<td>99.8</td>
</tr>
</tbody>
</table>

* Preference assessment
**For technicians’ behavior, in the play column, correct represents correct prompts and play, and incorrect represents incorrect prompts and play. In the mand column, correct represents correct prompts and responses to children’s manding, and incorrect represents incorrect prompts and responses to children’s manding.

The percentage of IOA was calculated differently for the preference assessment and for other play sessions. For preference assessment, the smaller number of the two observers was divided by the larger number of the two and multiplied by 100. The other sessions’ IOAs were calculated as point-by-point agreement: the number of agreements
was divided by the number of agreements plus the number of disagreements (i.e., the total number of the all intervals) and was multiplied by 100. The percentage of IOA sessions and the IOA data are summarized in Table 2.

Technicians’ Questionnaire

In order to measure the acceptability of the training that the technicians received and how helpful the training was for the technicians, an anonymous questionnaire was given to each technician (both senior and introductory-level technicians) at the end of their academic semester (see Appendix O). In addition, another anonymous questionnaire was given to the trainers (i.e., senior technicians) to measure the acceptability of the training that they gave (Appendix P). The technicians rated items in 1-5 scales. All of the technicians (N=8) answered the trainee questionnaire except the senior technician, who was excused from the study because of injury. The 2 trainers (i.e, senior technicians) answered the trainer questionnaire.

CHAPTER III

RESULTS

Preference Assessment

Each child received three opportunities to engage in each of nine play activities. Ian participated in eight of those activities and actively engaged in seven of those eight (Figure 2). The six activities that Ian participated in for the longest durations, wagon ride, ring-around-the-rosies, peek-a-boo, bouncing on an exercising ball, slide, and trampoline, were chosen as the target play activities, though, as mentioned earlier, the wagon ride
was eliminated soon after the intervention began because it was too distracting to the other children in the play room.

Figure 2. Ian's Preference Assessment

Mimi participated in all nine activities and actively engaged in seven (Figure 3). The six activates that Mimi participated in for the longest durations, wagon ride, tickling, ring-around-the-rosies, bouncing on an exercising ball, rocking in a rocking chair, and peek-a-boo, were chosen as the target play activities. The wagon ride was also eliminated soon after the intervention because of the above mentioned reason.
Technicians' Prompts and Play

Generally, as training components were added, the technicians’ performance and the children’s performance improved, as the following data will indicate.

During the pre-baseline (i.e., no-procedure) sessions, where the technicians had received no specific procedural instructions, none of Ian’s technicians used correct prompt or play techniques for a total of more than 30% of the intervals (Figure 4). But also, only one of the technicians used incorrect techniques for more than 20% of the intervals. In essence, the technicians were fairly inactive using neither correct nor incorrect prompting and play procedures.

However, during the baseline, where the technicians had received specific procedural instructions, correct prompts and play tended to increase for all 4 technicians;
and incorrect prompts and play remained low or decreased, with the exception of the 2nd-shift technician who showed some increase in incorrect techniques. On sessions 8 and 12, in an effort to increase the use of prompting and play techniques, the experimenter suggested that the 3rd-shift technician follow the written procedure, but in vain.

When the video-modeling component was introduced, the only strong benefit was for the 3rd-shift technician, who showed a marked increase in correct procedures and a marked decrease in incorrect procedures.

The slideshow, checklist, and additional video modeling were introduced to only 1st-shift and 2nd-shift technicians because the senior technician and the 3rd-shift technician had improved without them. When these components were introduced, only the 1st-shift technicians' correct prompts and play showed a marked, though variable, increase.

When feedback was introduced to the 1st, the 2nd, and the 3rd-shift technicians, correct prompts and play tended to increase for the 1st and 2nd, but not for the 3rd. In addition, incorrect prompts and play decreased markedly for the 2nd-shift technician. Refer to Table 3 for Ian's technicians' performance in each training phase.
Figure 4. Ian’s Technicians’ Prompts and Play
Table 3

**Correct and Incorrect Use of Prompts and Play Procedures by Ian's Technicians**

<table>
<thead>
<tr>
<th>Technicians</th>
<th>No-Procedure</th>
<th>Procedure</th>
<th>Video Modeling</th>
<th>Slide Show</th>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st-Shift</td>
<td>18.0</td>
<td>38.9</td>
<td>43.0</td>
<td>58.4</td>
<td>55.1</td>
</tr>
<tr>
<td>2nd-Shift</td>
<td>1.1</td>
<td>29.0</td>
<td>30.5</td>
<td>33.4</td>
<td>56.7</td>
</tr>
<tr>
<td>3rd-Shift</td>
<td>0</td>
<td>8.9</td>
<td>50.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior</td>
<td>8.9</td>
<td>64.6</td>
<td>80.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Incorrect Prompts and Play (Median)**

<table>
<thead>
<tr>
<th>Technicians</th>
<th>No-Procedure</th>
<th>Procedure</th>
<th>Video Modeling</th>
<th>Slide Show</th>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st-Shift</td>
<td>9.7</td>
<td>12.4</td>
<td>6.8</td>
<td>6.6</td>
<td>3.3</td>
</tr>
<tr>
<td>2nd-Shift</td>
<td>5.6</td>
<td>22.3</td>
<td>33.6</td>
<td>41.3</td>
<td>4.5</td>
</tr>
<tr>
<td>3rd-Shift</td>
<td>56.7</td>
<td>22.2</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior</td>
<td>13.3</td>
<td>4.9</td>
<td>1.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

During the pre-baseline (i.e., no-procedure) sessions, none of Mimi’s technicians used correct prompts and play techniques for a total of more than 15% of the intervals (Figure 5). But also, only the 1st-shift technician used incorrect techniques for more than 20% of the intervals.

When the written procedure was introduced, correct prompts and play tended to increase for all 4 technicians. However, incorrect prompts and play also tended to increase for all but the 1st-shift technician. In other words, the technicians tended to be more actively involved during this phase.

The video-modeling component was not introduced to the 1st-shift technician because of the high level of her performance without any other training components. When the video-modeling component was introduced, correct prompts and play showed a marked increase only for the 3rd-shift technician, and remained at the same level for the other 2 technicians.
Figure 5. Mimi’s Technicians’ Prompts and Play

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For the 1st senior technician, the slide show, checklist, additional video modeling, and feedback were implemented at the same time. Her correct prompts and play increased abruptly, while incorrect prompts and play decreased.

The slide show, checklist, and video modeling, without feedback, were introduced to the 2nd senior technician and the 2nd and the 3rd-shift technicians. Correct prompts and play tended to increase for the 2nd senior technician and the 2nd-shift technician; also incorrect prompts and play tended to decrease for them. However, the 3rd-shift technician’s correct and incorrect prompts and play stayed at the same level.

The feedback component was introduced for the 2nd senior technician and the 3rd-shift technician, with the result that correct prompts and play tended to increase for both. Refer to Table 4 for Mimi’s technicians’ performance in each training phase.

Table 4

Correct and Incorrect Use of Prompts and Play Procedures by Mimi’s Technicians

<table>
<thead>
<tr>
<th>Technicians</th>
<th>No-Procedure</th>
<th>Procedure</th>
<th>Video Modeling</th>
<th>Slide Show</th>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st-Shift</td>
<td>9.5</td>
<td>58.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd-Shift</td>
<td>3.9</td>
<td>39.5</td>
<td>50.0</td>
<td>65.0</td>
<td></td>
</tr>
<tr>
<td>3rd-Shift</td>
<td>10</td>
<td>34.4</td>
<td>60.0</td>
<td>52.5</td>
<td>72.2</td>
</tr>
<tr>
<td>1st Senior</td>
<td>3.3</td>
<td>26.1</td>
<td>32.2</td>
<td>63.4</td>
<td></td>
</tr>
<tr>
<td>2nd Senior</td>
<td>32.2</td>
<td>38.8</td>
<td>58.4</td>
<td>75.6</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technicians</th>
<th>No-Procedure</th>
<th>Procedure</th>
<th>Video Modeling</th>
<th>Slide Show</th>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st-Shift</td>
<td>13.3</td>
<td>12.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd-Shift</td>
<td>4.4</td>
<td>21.1</td>
<td>16.9</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>3rd-Shift</td>
<td>3.3</td>
<td>33.3</td>
<td>15.6</td>
<td>7.1</td>
<td>1.1</td>
</tr>
<tr>
<td>1st Senior</td>
<td>6.7</td>
<td>40.6</td>
<td>32.3</td>
<td>10.2</td>
<td></td>
</tr>
<tr>
<td>2nd Senior</td>
<td>28.4</td>
<td>23.6</td>
<td>6.9</td>
<td>5.6</td>
<td></td>
</tr>
</tbody>
</table>

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Children’s Play

Overall, the children’s play behavior improved as the technicians’ performance improved as the following data will indicate.

During the pre-baseline (i.e., no-procedure) sessions, Ian’s overall play was low with all but the 3rd-shift technician (Figure 6). His active engagement was generally lower than 20% with all of the technicians.

When the written procedure was introduced to the technicians, Ian’s overall play increased with all of the technicians except with the 3rd-shift technician; active engagement stayed at a low level with all technicians, except that it showed a moderate increase with the senior technician.

When the video-modeling was introduced to the technicians, Ian’s overall play and active engagement showed clear improvement for only the senior technician and the 3rd-shift technician.

When the slide show, checklist, and additional video modeling were introduced to 1st-shift and 2nd-shift technicians, overall play tended to stay the same; and active engagement increased for the 1st-shift technician only.

When the feedback component was introduced to the 1st-shift, 2nd-shift, and the 3rd-shift technicians, Ian’s overall play and active engagement increased for all but the 3rd-shift technician. Refer to Table 5 for medians of Ian’s active and overall play in each training phase.
Figure 6. Ian’s Play
**Table 5**

*Ian’s Play*

<table>
<thead>
<tr>
<th>Technicians</th>
<th>No-Procedure</th>
<th>Procedure</th>
<th>Video Modeling</th>
<th>Slide Show</th>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st-Shift</td>
<td>15.2</td>
<td>64.0</td>
<td>47.2</td>
<td>54.7</td>
<td>62.2</td>
</tr>
<tr>
<td>2nd-Shift</td>
<td>13.3</td>
<td>39.5</td>
<td>56.7</td>
<td>56.7</td>
<td>66.0</td>
</tr>
<tr>
<td>3rd-Shift</td>
<td>62.2</td>
<td>34.4</td>
<td>69.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior</td>
<td>15.6</td>
<td>56.1</td>
<td>82.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technicians</th>
<th>No-Procedure</th>
<th>Procedure</th>
<th>Video Modeling</th>
<th>Slide Show</th>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st-Shift</td>
<td>7.9</td>
<td>10.1</td>
<td>22.5</td>
<td>31.5</td>
<td>33.3</td>
</tr>
<tr>
<td>2nd-Shift</td>
<td>5.6</td>
<td>7.8</td>
<td>13.6</td>
<td>18.9</td>
<td>37.5</td>
</tr>
<tr>
<td>3rd-Shift</td>
<td>1.1</td>
<td>2.2</td>
<td>40.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior</td>
<td>11.1</td>
<td>24.4</td>
<td>62.9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mimi’s overall play and active engagement were both generally below 20% during the pre-baseline (i.e., no-procedure baseline) (Figure 7).

When the written procedure was introduced to the technicians, Mimi’s overall play increased greatly with all of the technicians, while Mimi’s active engagement increased slightly with all but the 1st senior technician.

When the video-modeling component was introduced, Mimi’s overall play and active engagement stayed at the same level, except that they showed marked increase with the 3rd-shift technician.

When, due to a procedural error, feedback was introduced to the 1st senior technician along with the slide show, checklist, and video modeling, Mimi’s active engagement increased, but only briefly.
Figure 7. Mimi’s Play

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When the slide show, checklist, and video modeling were introduced to the 2nd senior technician and the 2nd and 3rd-shift technicians, Mimi's overall play stayed at the same. However, Mimi's active engagement increased markedly with the 2nd senior technician and the 2nd-shift technician, although it decreased with the 3rd-shift technician.

When the feedback component was introduced to the 2nd senior technician and the 3rd-shift technician, Mimi's overall play stayed at the same level with both technicians, while active engagement increased with both technicians. Refer to Table 6 for Mimi's play in each training phase.

Table 6

<table>
<thead>
<tr>
<th>Mimi's Play</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mimi's Overall Play (Median)</td>
</tr>
<tr>
<td>Technicians</td>
</tr>
<tr>
<td>1st-Shift</td>
</tr>
<tr>
<td>2nd-Shift</td>
</tr>
<tr>
<td>3rd-Shift</td>
</tr>
<tr>
<td>1st Senior</td>
</tr>
<tr>
<td>2nd Senior</td>
</tr>
</tbody>
</table>

Mimi's Active Engagement (Median)

| Technicians | No-Procedure | Procedure | Video Modeling | Slide Show | Feedback |
| 1st-Shift | 6.7 | 33.8 |
| 2nd-Shift | 6.1 | 20.0 | 17.7 | 23.8 |
| 3rd-Shift | 10 | 21.1 | 45.6 | 19.7 | 42.2 |
| 1st Senior | 15.6 | 25.6 | 27.8 | |
| 2nd Senior | 26.3 | 21.7 | 44.1 | 41.1 |

Correlation Between the Technicians' and Children's Performance

As the technicians' performance improved, so did the children's performance.

Figure 8 shows the percentage of intervals in which Ian played (either actively or
passively) and also the percentage of intervals in which he played actively correlated with the percentage of intervals in which the technicians used the play procedures correctly. Each data point is the median percentage of each training phase for each technician and the corresponding play data for Ian. For example, the open square on the far left represents Ian’s 2nd-shift technician’s no-procedure phase, in which the median score of the 2nd-shift technician’s correct prompts and play was 1.1% of the intervals, and the median score of Ian’s overall play with the 2nd-shift technician was 13.3% of the intervals. And the closed diamond shape on the far right represents Ian’s senior technician’s video modeling phase, in which the median percentage for that technician’s correct prompts and play was 80.5% of the intervals, and the median score of Ian’s active engagement while playing with the senior technician was 62.9% of the intervals. The correlation coefficient between Ian’s play and technicians’ correct prompts and play was 0.73 and 0.89 for Ian’s overall play and active engagement respectively. (Note that, for technical reasons, there is no differentiation between the four technicians in this graph; however, refer to Appendix Q for the same graphs with the data for each of the four technicians indicated with a different symbol.)
Figure 8. Correlation between Ian’s and His Technicians’ Performance

Figure 9 shows the comparable data for Mimi. The correlation between her play (active and passive) and her technicians’ correct prompts and play was 0.89; it was 0.80 for her active engagement.

Figure 9. Correlation between Mimi’s and Her Technicians’ Performance
Technicians’ Prompts and Responses to Children’s Manding

After the children had substantially increased their playing, intervention to increase manding could be implemented. These interventions showed similar results to those obtained from interventions to increase play: Generally, when staff-training components were added, the technicians’ performance and the children’s manding improved, as the following data will indicate.

During the no-procedure condition, all of Ian’s technicians’ correct and incorrect prompts to mand and responses to Ian’s manding were near zero; however, note that there were no opportunities for responding to Ian’s manding because he made none (Figure 10).

When the written procedure was introduced, correct prompts to mand and responses to Ian’s prompted manding increased to over 20% of the intervals for most of the sessions for all technicians. In addition, incorrect prompts for manding and incorrect responses to Ian’s manding stayed near zero percent for all but the senior technician; her incorrect percentage was approximately 10%; therefore the slide show was introduced for her. Then her incorrect prompts and incorrect responses to Ian’s manding decreased to nearly zero. (Note that, though the correct prompts and responses to Ian’s manding occurred during more than 20% of the intervals of the training sessions, the technicians responded properly on essentially 100% of the occasions when Ian actually did mand. Also note that it is possible for an interval to contain both a correct and an incorrect prompt or response.)
Figure 10. Ian’s Technicians’ Prompts and Responses to Ian’s Manding

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When the procedure for time delay was introduced to the senior technician and the 1st-shift technician, the senior technician’s performance improved considerably, though the 1st-shift technician’s performance remained essentially unchanged.

During the no-procedure condition, all of the technicians’ correct prompts and responses to Mimi’s manding were very low, though not always zero, while their incorrect prompts and responses to Mimi’s manding were at zero percent for almost all sessions (Figure 11).

When the written procedure was introduced, the 2nd senior technician and the first shift technician showed a considerable increase in correct prompts to mand and responses to Mimi’s manding, though the 3rd shift technician showed only a slight increase. Incorrect responses stayed at the same level. The written procedure was never introduced to the 2nd-shift technician because of the time limitation.
Figure 11. Mimi's Technicians' Prompts and Responses to Mimi's Manding
Children’s Manding

During the no-procedure baseline, Ian’s prompted manding were zero or near zero, and there was no instance of spontaneous manding (Figure 12). However, when the written procedure was introduced Ian’s prompted manding increased abruptly, while the spontaneous manding remained near zero. When the written procedure for time delay was introduced, Ian’s spontaneous manding increased and the prompted manding decreased with all of the technicians, including the technicians who were not introduced to the time delay procedure.

During the no-procedure baseline, Mimi’s prompted manding were zero or near zero for all technicians; and there was only one instance of spontaneous manding (Figure 13). When the written procedure was introduced, Mimi’s prompted manding increased, at least somewhat, with all the technicians; and instances of spontaneous manding increased to slightly above zero for all technicians.
Figure 12. Ian’s Manding

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Figure 13. Mimi’s Marding

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Technicians' Questionnaire

Overall, the technicians rated the training package very positively (Table 7 and 8). However, for some items, the validity of the rating is questionable: One technician positively rated one slide-show component, though she had not been exposed to it; and 4 technicians positively rated another slide-show component, though they had not been exposed to it, all suggesting a positive hallow effect. In addition, one technician failed to rate any of the three mand training components she had been exposed to.

Table 7

**Questionnaire Results (Technicians)**

<table>
<thead>
<tr>
<th>Questions (The technicians rated in 1-5 scales: 1=very positive; 3=neutral; and 5=very negative)</th>
<th>Average rating score</th>
<th>Number of technicians answered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training for prompts and play</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. How helpful was the procedure?</td>
<td>1.6</td>
<td>8</td>
</tr>
<tr>
<td>2. How helpful was the video (if you watched)?</td>
<td>1.6</td>
<td>8</td>
</tr>
<tr>
<td>3. How helpful was the slide show (if you watched)?</td>
<td>2.2</td>
<td>6</td>
</tr>
<tr>
<td>4. How helpful was the feedback (if you received)?</td>
<td>1.7</td>
<td>6</td>
</tr>
<tr>
<td>5. How did you like the training overall?</td>
<td>1.6</td>
<td>8</td>
</tr>
<tr>
<td>Training for prompts and responses to the child's manding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. How helpful was the procedure?</td>
<td>1.5</td>
<td>6</td>
</tr>
<tr>
<td>2. How helpful was the slide show (if you watched)?</td>
<td>1.6</td>
<td>5</td>
</tr>
<tr>
<td>3. How did you like the training overall?</td>
<td>1.7</td>
<td>6</td>
</tr>
</tbody>
</table>
Table 8

*Questionnaire Results (Trainers)*

<table>
<thead>
<tr>
<th>Questions (The trainers rated in 1-5 scales: 1=very positive; 3=neutral; and 5=very negative)</th>
<th>Average rating score</th>
<th>Number of technicians answered</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How prepared did you feel when providing training to other technicians?</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2. Did you like training other technicians?</td>
<td>1.5</td>
<td>2</td>
</tr>
<tr>
<td>3. Were your trainees willing to accept your training, including feedback?</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4. How appropriate, did you feel, was the training package for the trainee to acquire skills?</td>
<td>1.5</td>
<td>2</td>
</tr>
<tr>
<td>5. How appropriate, did you feel, was the training package for the child?</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

CHAPTER IV

DISCUSSION

General Discussion

Overall, the technicians’ performance improved as a result of the introduction of the training components, whether the training was conducted by the experimenter or by a senior technician who had been trained by the experimenter (pyramidal training). This extends cost-efficient pyramidal staff training to play and mand training for children with developmental disabilities. The most effective component(s) varied across technicians: some technicians improved with the video-modeling (in-session training), some with the combination of slide show, checklist, and video modeling (in-session training), and some with feedback (on-site training). None-the-less, the technicians evaluated all aspects of this training highly.
The effects of the training components have multiple implications. In order to obtain the largest impact on the technicians' performance, it would be desirable to give a complete training package that includes all of the components. However, in most human-service settings, it may not be possible to give all of the training components to all of the technicians because of the cost. The sequential introduction of each training component, as in this study, may be an efficient alternative to a complete training package, especially when the targeted technicians already have some experience in relevant areas.

During no-procedure baseline sessions, none of the technicians performed well in correct prompts and play, however, when the written procedure was given to the technicians, most started to improve. This suggests that merely specifying the procedure can improve staff performance to a large extent, though research on human-services staff training usually uses complete training packages, involving considerable extra cost. And, while experience providing discrete-trial and PECS training and experience with written behavioral procedures may have helped the technicians learn the play and play manding procedures, the senior technicians, with their additional semester of experience, generally did not master those procedures more quickly than the new technicians.

Although the written procedure improved the technicians' performance and usually increased the overall play of the children, the children's play usually involved only their passively accepting stimulation provided by the technician (e.g., rocking in a rocking chair or being supported while being bounced on the exercise ball). Therefore the training components were modified slightly to increase the children's active engagement.

The children passively or actively participated in five or six preferred play activities for 15 min, three times a day, five days a week, even though the play-activity
preference assessment was conducted only once at the beginning of the study; however Ian’s active and passive play did decrease slightly during the last month. Of course play activities based on more frequent preference assessments might have resulted in even more play.

Rule governance may have been the basis for the improvements in technician performance: The written instructions may have given the trainees a set of rules that facilitated appropriate rule-governed performance, which may eventually have become contingency-controlled performance. The video modeling may have supported this rule-governed behavior by facilitating formation of visual concepts that, in turn, set the occasion for the statement of the relevant rule (i.e., when a child-training situation matched the visual concept acquired during the video modeling, the trainer would then state the appropriate rule to govern his or her performance). The slide show and the checklist may have increased the salience of the stimulus features of the video that became part of the visual concepts.

Limitations and Future Directions

As mentioned earlier, it was considered better to decide when to move to each new experimental phase based on the experimenter’s subjective clinical judgment, rather than on a more experimentally rigorous, objective set of criteria. That makes this experimental procedure more difficult to replicate. In addition, not having the all of the past data analyzed and available to influence the decision to move to new experimential phases may have occasionally resulted in suboptimal decisions.

In addition to addressing the above mentioned concerns, future studies might make other methodological improvements or clarifications by (a) reducing the potential
for reactivity involved with the current obtrusive data recording system (i.e., conspicuous videotaping by the assistants or the experimenter) and (b) documenting the treatment integrity of the staff training. However, with the current children, there was no obvious indication that they were affected by the videotaping, and the current technicians said they soon stopped noticing the recording. Furthermore, the experimenter observed most of the training the senior technicians gave to the new technicians and found that training to be done according to the current protocol (i.e., with good treatment integrity).

The current experiment focused on the sequential introduction of the treatment components; therefore future studies might investigate the effects of each, individual training component on the staff performance.

As indicated in the General Discussion, the play-activity preference assessment was conducted only once, at the beginning of the intervention. Future studies might investigate the effects of frequent assessment on the performance of children and the staff, to see if the opportunity for novel play activities would affect the results play behavior.

The technicians in this study had previously received training in discrete-trial and PECS teaching procedures. It might be of value to see if this pyramidal training in the teaching of play and manding would be as effective for technicians who had not had that prior training.

It might also be desirable to investigate the effects of this pyramidal staff training on generalization and maintenance for both the technicians and the children. For the technicians’ performance, the relevant questions might be whether they can implement the same procedures with other children, whether they can implement the procedures
with different play activities, and whether they maintain their training skill over time. For the children's performance, the relevant questions might be whether they can mand the same play activities with other technicians, whether they maintain their play and manding skills over time, and whether they can increase their manding vocabulary using other play activities.

Conclusion

The package using the pyramidal staff-training model increased the technicians' correct implementation of procedures for teaching play and manding. The children's play and manding also increased as the technicians' performance improved. These results extended the literature of pyramidal staff training to the teaching of play and mand training procedures to staff working with children with developmental disabilities. The components of the staff training varied across technicians: some staff improved when provided written procedures, some with the addition of video modeling, and some with the further addition of on-site performance feedback.
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skills research with moderately, severely and profoundly mentally handicapped


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Appendix A

Definitions and Examples: Children's Behavior
Definitions and Examples: Children’s Behavior

1. Overall Play

Overall play refers to the child’s being involved in any play-activities specified in the procedure. It involves active engagement of play, which is specified below, and passive involvement in play, such as being held on the bouncing ball, laying on the ball, not resisting physical prompts, and simply standing on the slide. In general, it is overall play from the point when the child gets in the area of a suggested play activity to the point when the child refused to stay in the activity. When the play activity is using an instrument (e.g., slide, trampoline, and bouncing ball), it is overall play from the point when the child steps on a play instrument to the point when the child steps out of the play instrument. When the play activity does not use any instruments, it is overall play from the point when the child starts following prompts, attending, or engaging in the activity to the point when the child’s stops resisting prompts or stops attending.

Specific behaviors are listed below.

- Ring-around-the-rosies: Start counting when the child starts following the technician’s prompts (i.e., walks around with the tech) and finish counting when the child resists (e.g., pull arms) the prompts or when a technician stops touching (e.g., tickling) after the song.

- Tickling:
  Mimi: Start counting when she accepts (does not resists) a tech’s prompts to play (i.e., a tech starts tickling) and stop counting when she starts moving toward something else or a tech stops tickling (e.g., Counting, “1, 2, 3 is a part of tickling)

  Ian: (In order to differentiate tickling as a play activity and tickling as reinforcement for any sorts of good behaviors,) Start counting when Ian shows anticipation behavior (looks at the technician, smiles/giggles, or crumbles his body) while the technician starts to tickle (i.e., saying, “I am going to tickle you.” or showing the tickling motion)

- Peek-a-boo: Start counting when the child is looking at a technician for more than 2 seconds when the technician starts playing peek-a-boo

- Slide, trampoline, and ball: Start counting when a child starts stepping up the play instrument. It is overall interactive play as long as a child stays in the instrument.

- Singing songs: start counting when a technician starts singing and doing the motion of any songs, and the child should be looking at the technician, singing along with the technician, or imitating the technician while the technician is doing the motion.
2. Active Engagement

Active engagement refers to child’s active engagement (prompted or spontaneous) in any play-activities specified in the procedure. It involves following:

- **Ring-around-the-rosies**: Jumping when circling around, singing along with the tech, walking around on her/his own
  - For Ian, consider that he is walking on his own when he is looking at the tech while walking around together
  - For Mimi, consider that she is walking on her own when she is standing up (holding her own weight) while walking around together

- **Trampoline**: Jumping on his own

- **Bouncing**: Bouncing on his own (e.g., Bottom on the ball).
  - For Mimi, count as active when her feet are touching the tech’s legs and when her arms are moving along the bouncing movement. If these are not clear, use technician’s behavior, count as active when the technician is touching her minimally (i.e., holding waist rather than under arms in order to help her bounce little and avoid accidents but not to bounce for her).
  - When she is bouncing with her back side up, count as active when she is holding her upper body up to look up.
  - For Ian, start counting when Ian is moving his hands along bouncing and when his feet are touching the tech’s legs. If these are not clear, count as active when a technician is touching him minimally (i.e., holding waist rather than under arms in order to help her bounce little and avoid accidents). When Ian is lying on the ball, it is not bouncing on his own.

- **Slide**: Climbing, crawling through, and preparing to slide at the top of the slide, and sliding are active engagement. Jumping off of the top is not active engagement of play.

- **Peek-a-boo**: imitating a tech’s behavior is active engagement
  - For Ian, imitating a tech’s hand-movement or saying “peek-a-boo” is active engagement
  - For Mimi, imitating a tech’s hand-movement or grabbing tech’s hands is active engagement

- **Singing a song**: Singing along with the technician or imitating the motion of the technician

- **Tickling**
  - For Ian: imitating any technician’s behavior (e.g., counting 1, 2, 3 before tickling)
  - For Mimi: grabbing tech’s hands and its attempts is active engagement (the grabbing attempts should be clear enough)
3. Prompted Manding

Any child's manding following the tech's verbal, gestural, or physical prompts, such as "Say ball", physical prompts to sign, and modeling a sign. Manding includes signing and vocal language.

- Jumping (saying jump or signing jump)
- Bouncing on the ball (saying ball, bounce, or signing ball) For Mimi, "ba" is used to ask for bouncing on a ball.
- Singing ring-around-the-rosies (saying "rosies" or signing rosies)
- Slide (saying "slide" or signing "slide")
- Peek-a-boo (saying "pick-a-boo" or "boo" or hiding own face or the tech's face)
- Tickle (saying "tickle" or touching own body or the tech's body)
- When a child is signing "More", put "M" in the sheet to differentiate.

4. Spontaneous Manding

Any child's manding before being prompted. The forms of responses are exactly the same as the prompted mands. The mands should not be following any of the technicians' prompts, such as "Jump", "Say, ball", "What do you want?", "You need to ask.", etc.

When the child mand is following technician's question, "What do you want?", put "W" mark instead in order to differentiate this prompted response from other prompted response.
Appendix B

Definitions and Examples: Technician’s Behavior
Definitions and Examples: Technicians’ Behavior

1. Correct play & prompts to play

Correct play includes following:

- Helping a child to do an activity faster, higher, or better
- Giving the child a chance to play actively (refer to the active engagement in the child’s behavior)
- Excited during the play (tone of voice, facial expression, or movement)
- Praising the child for playing

Examples)

Bouncing on the ball
- When Mimi or Ian sits on the ball, a technician supports their body in the way that Mimi or Ian can bounce on her/his own (i.e., supports their body on their waist or hands, but not under the arms, pushes down but not pushes up)
- When the technician plays in the way that Mimi can support her body when she lays on her stomach (this applies to only Mimi)

Rocking chair (only for Mimi)
- When Mimi faces backwards, a technician supports her body or rocks for her in the way that still allows her to rock on her own
- When Mimi faces forwards, a technician rocks for her in the way that Mimi can rock on her own (i.e., push with her legs/feet)

Peek-a-boo
- When Ian or Mimi faces toward the technician, a technician starts playing (the technician’s attempt of play is correct)

Jumping on the trampoline
- When Ian or Mimi climbs on the trampoline, a technician starts holding their hands and jump together or clapping her hands while praising them (not always necessary to make them jump higher)

Slide
- When Ian or Mimi starts climbing up the slide, a technician helps Mimi or Ian climb up the slide (supports their body lightly or hold their hands, but not picking them up)
- Pulling their legs to slide faster

Correct prompts to play include the following:

- Clear verbal prompts (short, loud enough, and a play activity specified)
- Verbal prompts given when the child is attending to the tech (or the technician gets in the child’s view, generally facing toward the tech’s direction is not good enough), the child is facing toward the relevant play instrument, or the child is located near the relevant play instrument (verbal prompt can be given with a signing prompt, but prompting the child to sign is not a correct prompt to play)
- When the child is not start playing (but not clearly moving away from the play instrument or pushing away the tech), physically prompts/guide toward the play activity approximately within 3-5 seconds after a verbal prompt (the verbal prompt can be repeated)
Examples:
- When the child is facing toward the slide, a technician says, “Let’s slide” while holding the hand. Then, the technician runs/walks toward the slide together.
- When the child is walking near the trampoline, a technician says, “Wanna jump?”, and then pushes the child’s back lightly toward the trampoline.
- When the child is walking at the center of the playroom, a technician gets into the child’s sight and says, “Let’s play ring-around-the-rosies” and start singing.

Non-examples:
- When a child has already started to step on a trampoline (or any of the play instruments), the technician says, “Do you want to jump (or whatever the play is)?” This is simply commenting on what the child is doing. It is NOT counted as correct nor incorrect prompt.
- Technicians’ any comments on child’s play should NOT be counted as correct nor incorrect prompts.
- Technicians’ saying, “What do you want?” should NOT be counted as correct nor incorrect prompts.

2. Incorrect play & prompts to play

Incorrect play includes the following:
- Blocking the child to play actively (refers to active engagement in the child’s behavior)
- Not verbally praising the child’s active engagement in the play, or not helping the child’s to play faster, higher, or better when child is actively engaging in a play.
- Any unsafe play

Examples:

Bouncing on the ball
- A technician holds the child under the arms and pushes the child up
- A technician sits on the ball, holds the child on her lap, and cuddles
- A technician holds the child from behind and shakes the child up and down on the ball (the technician has more control than the child)

Rocking chair (only for Mimi)
- A technician rocks the chair while Mimi sits in the chair facing forward with her legs crossed on the chair (no chance for Mimi to rock independently.)

Slide
- When Mimi or Ian is attempting to climb up the slide, a technician picks them up and places them on the top of the slide (both Ian and Mimi can climb the slide with a very little help from the tech. Not giving them a chance to do independently is incorrect).
- Allowing the child jump off of the slide

Ring-around-the-rosies
- When Mimi or Ian is attempting to move away, the technician forcefully make them circle around
• The technician circles around so fast that Ian cannot walk on his own
Non-examples (exception):
Bouncing on the ball
• A technician picks up Mimi or Ian and places them on the ball is NOT incorrect because they should not climb up independently (for safety reason).

Incorrect prompts include following:
• Verbal or physical prompts given when the child is not attending the tech (or the technician is not getting in the child’s view), the child is not facing toward the relevant play instrument, or the child is not close to the relevant play instrument
• Forceful - given even when the child is clearly attempting to move away or push the tech’s arms (It is not an incorrect prompt when the child attempt to move away after the technician prompted. It is an incorrect prompt when the technician persists to prompt after the child’s attempt to move away)
• Not using gestural or physical prompts when the child is not starting to play for 5 seconds (when the child is not clearly attempting to move away)

Examples:
• When the child is behind the slide and looking at a slide, and a technician is standing beside the trampoline, which is located 3-feet away from the child, the technician says, “Let’s jump.” (The child is not looking at the relevant play instrument and not nearby.)
• When the child is walking toward the trampoline, the technician says, “Let’s slide”. (The technician should have asked for jumping on a trampoline instead of sliding.)
• When the child is looking at a toy near the rocking chair, and the technician suggests, “Let’s rock.” (The technician should get child’s attention first.)
• A technician says, “Let's play ring-around-the-rosies.” The child looks at the technician but does not do anything. The technician just waits for 7 seconds and said, "You don’t want to play? How about trampoline?" The child just stands there, and the technician keeps talking to the child. (The technician should move on to the necessary, more intrusive prompts)
• When Mimi is moving toward rocking chair, a technician says, “Let’s jump on the trampoline,” and picks her up from behind and places her on top of the trampoline.

Exceptions and cautions:
• When the technician makes some unclear suggestions (“Let’s play”), or not specifying clearly (“Let’s do it again.”). Although these are technically incorrect, we do NOT counted these as incorrect prompts because they are often made when the child is going out of the playroom and it is difficult to distinguish from other types of comments.
• Repeating instructions are allowed as you move on the next level of prompt. When the technician does not move on to the next level of
prompt, it is incorrect. Simply repeating instructions are incorrect but we do NOT count as incorrect if it is difficult to distinguish from other types of comments.

3. Correct prompts to mand and responses to the manding

Correct prompts to mand include following:
- A verbal, gestural, or physical prompts, given when the child initiates (i.e., the child spontaneously starts stepping on the play instrument, or the child reaches his/her hands toward a technician and attempts to move the technician's hands in the way to help the child) or when the child stays in the relevant play area after the technician stops helping the child.
- A verbal, gestural, or physical prompts, given in a form of manding (sign or verbal) that is specified in the procedure
- A technician should get child's attention.

Examples:
- A technician asks, “Say, Ball” when Mimi holds a tech’s hand, and started to climb up the ball spontaneously.

Non-examples:
- A technician asks, “What is it?” “Yes, ball. Great!” This is not an example prompts to mand nor incorrect prompts to mand. (“What is it?” should be coded as W.)
- A technician is prompting Mimi to say, “more”. (“More” should be coded as M.)
- When Ian steps on the trampoline, a technician says, “Wanna jamp?” This is just commenting on what Ian does, thus not a correct nor incorrect prompts.
- When Ian walks closer to the bouncing ball, a technician says, “Ball” while signing, it. This is considered as a technician’s prompt to play, rather than a prompt to mand. If the technician is physically prompting the child to sign, this is an INCORRECT prompt because lasiah does not show initiation yet.
- When Ian is on the trampoline, a technician says, “What do you want?” Although this is technically incorrect prompt because it is not specifying anything, it is not counted as prompt to mand. The technician is perhaps prompting the child to play more or move on to do something rather than just standing or sitting on the trampoline.

Correct responses to the manding
- Doing the manded play-activity right after the child’s manding (prompted or spontaneous)
- Praising the manding in an enthusiastic tone of voice

4. Incorrect prompts to manding

Incorrect prompts to mand include following:
- A verbal, gestural, or physical prompts, given when a child is moving away from the relevant area of a play activity
- Given in a form that is not specified in the procedure (except more)
- Ignoring child's mands or initiation (specified in the correct prompts to mand and responds to the manding section)

Examples:
- A technician is prompting Ian, "trampoline" for manding (it should be "Jump")
- When Ian is walking near the trampoline, a technician says, "trampoline," and physically prompts him to sign. This is incorrect because there is not initiation to jump on the trampoline yet. (The technician should have prompted to play first or waited to see the initiation.)
- When Ian is initiating, a technician verbally prompts Ian to say, "Ball" but not moving on to the next level of the prompt even when Ian is still initiating.

Non-examples (exceptions):
- When Ian is walking near the trampoline, a technician says, "trampoline," and physically prompts him to step up the trampoline. This is NOT an example of incorrect prompt to manding. This is an example of correct prompt to play.

Incorrect responses to the child's manding include following:
- Not doing the manded play-activity right after the child's following the prompt
- Not praising the manding in an excited tone of voice

Examples:
- When the child signs, "jump", a technician prompts the child to say, "jump" and not playing within 5 seconds.
- When the child signs, "jump", a technician prompts the child to say more, and not helping the child to do the jump because the child did not say more.

Non-examples:
1. When the child signs and a technician prompts the child to say it, it should NOT be counted as incorrect as long as the technician help the play within 5 seconds.
Appendix C

Preference-Assessment Procedure
Preference Assessment

The practicum coordinator will conduct a preference assessment of play activities. During the assessment session, he will prompt the child to participate in one activity at a time until he completes all of the 9 activities. This process will be repeated three times and the order of the activities varied each round. The children are allowed to continue participating in the activity until he/she shows clear indications of disinterest, such as walking away, pushing the prompts, etc.

1\textsuperscript{st} Round
1. Jumping on the trampoline or jump with a tech wherever
2. Climbing the slide (the slide or the stairs), crawling through the halls on the walls, and sliding (any one of these can be counted as play)
3. Bouncing on the big bouncing ball
4. Rocking on the rocking chair
5. Tickling (the child sits in the bean bag and the tech tickles)
6. Singing a song (ring-around-the-rosies)
7. Listening a song (spider song)
8. Riding a truck or a wagon
9. Pick-a-boo

2\textsuperscript{nd} Round
1. Tickling (the child sits in the bean bag and the tech tickles)
2. Riding a truck or a wagon
3. Climbing the slide (the slide or the stairs), crawling through the halls on the walls, and sliding (any one of these can be counted as play)
4. Jumping on the trampoline or jump with a tech wherever
5. Pick-a-boo
6. Listening a song (spider song)
7. Rocking on the rocking chair
8. Singing a song (ring-around-the-rosies)
9. Bouncing on the big bouncing ball

3\textsuperscript{rd} Round
1. Singing a song (ring-around-the-rosies)
2. Pick-a-boo
3. Jumping on the trampoline or jump with a tech wherever
4. Rocking on the rocking chair
5. Bouncing on the big bouncing ball
6. Climbing the slide (the slide or the stairs), crawling through the halls on the walls, and sliding (any one of these can be counted as play)
7. Listening a song (spider song)
8. Tickling (the child sits in the bean bag and the tech tickles)
9. Riding a truck or a wagon
Appendix D

Procedure for Ian's Technicians
### Procedure for Ian's Technicians

#### Pupil: Ian

#### IEPC Goal:

#### Objective:
Functional and interactive play, initiation of appropriate social interaction

#### Materials:
Trampoline, slide, bouncing ball, rocking chair, wagon, beanbag, etc.

#### Reinforcer:
Play itself, praises, positive comments, and affection

#### Data collection:
No data collection

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#### Phase Tutor Presentation/Preparation

<table>
<thead>
<tr>
<th>Phase</th>
<th>Correct Response</th>
<th>Incorrect Response</th>
<th>Criteria for Phase Change</th>
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<td>1</td>
<td><strong>1) Sing “Ring around the rosies”</strong>&lt;br&gt;The technician gets Ian's attention (e.g., gets in the area where Ian can see, holds Ian's hands, points to the relevant toy). The technician suggests that Ian play any one of following 6 activities. The technician should guide Ian to play as suggested below.&lt;br&gt;&lt;br&gt;<strong>1) Sing “Ring around the rosies”</strong>&lt;br&gt;The technician says, “Let’s sing,” and holds both of his hands. The technician sings, “Ring around the rosies, pocketful of posies, ashes, ashes, we all fall down,” while circling around with him, gradually speeding up, and falling down together while getting excited and giving him affection (guide Ian to fall down on the beanbag so he won’t injure himself).&lt;br&gt;&lt;br&gt;<strong>2) Peek-a-boo</strong>&lt;br&gt;The technician obtains Ian's attention by calling his name and getting in the area where Ian can see. The technician may say, “Ian, sit,” and guide him to sit in the secured place (e.g., in the beanbag, on the slide, on the trampoline) by holding his hand(s). The technician covers his/her face with his/her both hands, and&lt;br&gt;&lt;br&gt;<strong>Ian’s correct response</strong>&lt;br&gt;Ian follows the technician's physical prompts, imitates the technician's movement, or initiates any of the 3 play activities.&lt;br&gt;&lt;br&gt;<strong>“Initiation” refers to Ian reaching for the relevant toy, grabbing the technician's arms to do something, moving toward the relevant toy, etc. (Just looking at a toy is NOT initiation.)</strong>&lt;br&gt;&lt;br&gt;<strong>Technician’s response</strong>&lt;br&gt;Jumping off of the slide is dangerous. Block this behavior and physically guide him to walk down the stairs or slide without making any comments about jumping.&lt;br&gt;&lt;br&gt;<strong>Ian’s incorrect response</strong>&lt;br&gt;Ian does any dangerous or inappropriate behaviors (e.g. stands on the edge of the slide, throws objects, cries).&lt;br&gt;&lt;br&gt;<strong>Indicating that he does not want to play</strong>&lt;br&gt;Your supervisor will announce when to move on.</td>
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<td>Phase</td>
<td>Tutor Presentation/Preparation</td>
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<td>then opens his/her hands while saying, “Peek-a-boo”. The technician jumps and gets close to him when he/she says, “Peek-a-boo” in order to make this game extra surprising, or the technician can cover Ian’s (or the technician’s) face using stuffed animals, etc. The technician may say, “Where is Ian? Where does he go (when covering his face)? Here he is (when uncovering)!” etc.</td>
<td>When Ian initiates, the technician continues to play excitedly, gives descriptive praise, makes positive comments, and give affection.</td>
<td>(pushing the technician’s arms, moving away from the relevant toy, etc.) is NOT an incorrect response.</td>
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<td>3) Bouncing on the big bouncing ball The technician says, “Ian, bounce on the ball,” and guides him to sit on the big bouncing ball by supporting his body around his waist. The tech should sit in front of Ian so that he may put his feet on the technician’s thighs. The technician bounces Ian on the ball while supporting his body (to assure that he does not fall off or hit his head) and making positive comments, such as, “You’re bouncing so well!”, etc.</td>
<td>When the tech suggests any play activities, he/she physically prompts (guide the Ian to play) Ian clearly and quickly to make it less aversive.</td>
<td>When Ian indicates that he does not want to play, suggest another play activity.</td>
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<td>4) Riding on the wagon The technician says, “Ian, ride on the wagon,” and guides him to sit on the wagon by holding his hand(s) so that he won’t fall off. The technician pulls the wagon around the playroom or outside the playroom, while making play-related comments, such as, “You are going on a world trip.” “The next station is slide. Let’s go!”, and “Oops, you are going too fast!”</td>
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<td>5) Jumping on the trampoline The technician says, “Ian, jump on the trampoline,” and guides him to step on the trampoline by holding his hand(s). The technician holds his hands and pulls his up slightly so that he can jump higher than when he is jumping on his own. The technician When Ian indicates that he does not want to play, suggest another play activity.</td>
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<td>makes positive comments about his jumping, such as &quot;You are a good jumper&quot;, &quot;You jump so high!&quot; etc.</td>
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|       | **6) Slide**  
The technician says, "Ian, let's slide," and guides him to climb up the slide by holding his hand(s). Ian may climb up the stairs or the slide. The technician says, "Crawl through," when he climbs up the stairs and guide him to craw through the hall on the wall. The technician says, "Sit" when Ian is close to the slide and physically guides him to be ready to slide. The technician may hold his feet and gently pulls them so that he slides faster than when he is sliding on his own. The technician makes comments, such as "It goes so fast!"  
Randomly rotate the play activities to maintain his motivation. (Ian can continue one activity repeatedly if he continues to do so.) NOTE: Stay in this phase until the trainer will inform you the phase change. |                  |                   |                          |
| 2     | "Initiation" refers to Ian reaching for the relevant toy, grabbing the technician's arms to do something, moving toward the relevant toy, etc. (Just looking at a toy is NOT initiation.)  
When Ian initiates any one of the activities in the phase 1 or 2, the tech quickly physically prompts Ian to sign the play activity. **The sign should be specified here.** When Ian initiates to do the play that Ian can do independently, the tech should allow Ian to do so.  
If Ian does not initiate any activities, the tech increases Ian's motivation by pointing to the relevant toy, by guiding him to get | Ian follow the tech's physical prompts, spontaneously signs, or verbally requests for the activity.  
The tech plays with Ian with the activity that Ian initiated.  
The tech gets especially excited when Ian verbally | Same as above. | Your supervisor will announce when to move on. |
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<tr>
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<td>close to the relevant toy, saying, &quot;What do you want?&quot;, doing a little bit of any of the play activities and watching for him to initiate for more, etc.</td>
<td>requests, signs spontaneously, or almost spontaneously.</td>
<td>Ian spontaneously verbally requests, signs, or follows the physical prompt.</td>
<td>Same as above. N/A</td>
</tr>
<tr>
<td>3</td>
<td>“Initiation” refers to Ian reaching for the relevant toy, grabbing the technician’s arms to do something, moving toward the relevant toy, etc. (Just looking at a toy is NOT initiation.) When Ian initiates any one of the activities, the tech looks at Ian’s face and wait for 5 seconds before physically prompting Ian to sign for the activity. When Ian signs, do the activity as soon as possible. If Ian do not sign, provide Ian with the physical prompt and play anyway. If Ian does not initiate any activities, the tech increases Ian's motivation by pointing to the relevant toy, by guiding him to get close to the relevant toy, saying, “What do you want?”, doing a little bit of any of the play activities and watching for him to initiate for more, etc.</td>
<td>The tech plays with Ian with the activity that Ian initiated. The tech gets especially excited when Ian verbally requests, signs spontaneously, or almost spontaneously.</td>
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Appendix E

Procedure for Mimi's Technicians
Procedure for Mimi's Technicians

**Pupil:** Mimi  
**IEPC Goal:**  
**Objective:** Functional and interactive play, initiation of appropriate social interaction  
**Materials:** Trampoline, slide, beanbag, wagon, bouncing ball, rocking chair, etc.  
**Reinforcer:** Play itself, praises, positive comments, and affection  
**Data collection:** No data collection

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</table>
| 1     | The technician gets Mimi's attention (e.g. gets in the area where Mimi can see, holds Mimi's hands, points to the relevant toy). The technician suggests that Mimi play any one of following 6 activities. The technician should guide Mimi to play as suggested below.  
1) Sing “Ring around the rosies”  
The technician says, “Let’s sing,” and guides holds both of her hands. The technician sings, “Ring around the rosies, pocketful of posies, ashes, ashes, we all fall down,” while circling around with her, gradually speeding up, and falling down together while getting excited and giving her affection (guide Mimi to fall down on the beanbag so she won’t injure herself).  
2) Rocking on the chair  
The technicians says, “Mimi, rock”, and guides her to sit on the rocking chair by holding her hand(s). Mimi can sit appropriately or kneel backwards while holding the seat if the tech is confident in keeping her safe. The tech helps her rock the chair while making | Mimi's correct response  
Mimi follows the technician's physical prompts or initiates any of the 3 play activities.  
“Initiation” refers to Mimi reaching for the relevant toy, grabbing the technician's arms to do something, moving toward the relevant toy, etc. (Just looking at a toy is NOT initiation.) | Mimi's incorrect response  
Mimi does any dangerous or inappropriate behaviors (e.g. stands on the edge of the slide, throws objects, cries).  
Indicating that she does not want to play (pushing the technician's arms, moving away from the relevant toy, etc.) is NOT an incorrect response. | Your supervisor will announce when to move on.  
Technician's response  
When Mimi initiates, the technician continues to  
Technician's response |
<table>
<thead>
<tr>
<th>Phase</th>
<th>Tutor Presentation/Preparation</th>
<th>Correct Response</th>
<th>Incorrect Response</th>
<th>Criteria for Phase Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>comments, such as “Good rocking.” and “It is so fast!”</td>
<td>play excitedly, gives descriptive praise, makes positive comments, and give affection.</td>
<td>If Mimi does an incorrect response, quickly block these behaviors and continue play.</td>
<td>When Mimi indicates that she does not want to play, suggest another play activity.</td>
</tr>
<tr>
<td>3) Bouncing on the big bouncing ball</td>
<td>The technician says, “Mimi, bounce on the ball,” and guides her to sit on the big bouncing ball by supporting her body under her arms. The tech should stand in front of Mimi so that she may put her feet on the technician’s thighs. The technician bounces Mimi on the ball while supporting her body (to assure that she does not fall off or hit her head) and making positive comments, such as, “You’re bouncing so well!”, etc.</td>
<td>When the tech suggests any play activities, he/she physically prompts (guide Mimi to play) Mimi clearly and quickly to make it less aversive.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) Riding on the wagon</td>
<td>The technician says, “Mimi, ride on the wagon,” and guides her to sit on the wagon by holding her hand(s) so that she won’t fall off. The technician pulls the wagon around the playroom or outside the playroom, while making play-related comments, such as, “You are going on a world trip.” “The next station is slide. Let’s go!”, and “Oops, you are going too fast!”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) Tickling</td>
<td>The technician says, “Mimi, I’m gonna tickle you,” and guides her to sit in the beanbag by holding her hand(s). The technician tickles her under her arms, feet, around the neck, etc. The technician may count, “1, 2, 3,” while showing his/her finger(s) to count the number and tickle when he/she reaches “3”. (Mimi may look at the technician count and wait to be tickled.) The technician makes comments like, “Ha ha ha, that tickles.”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6) Peek-a-boo</td>
<td>The technician says, “Mimi, sit,” and guide her to sit in the secured place (e.g., in the beanbag, on the slide, on the</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase</td>
<td>Tutor Presentation/Preparation</td>
<td>Correct Response</td>
<td>Incorrect Response</td>
<td>Criteria for Phase Change</td>
</tr>
<tr>
<td>-------</td>
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<td>--------------------------</td>
</tr>
<tr>
<td>1</td>
<td>Reproducing (e.g., a trampoline) by holding her hand(s). The technician covers his/her face with his/her both hands, and then opens his/her hands while saying, &quot;Peek-a-boo&quot;. The technician may use Mimi's feet to hide his/her face, or the technician can cover Mimi's face using stuffed animals, etc. The technician may say, &quot;Where is Mimi? Where does she go (when covering her face)? Here she is (when uncovering)!&quot;, etc. Randomly rotate the play activities to maintain her motivation.</td>
<td>Mimi's response</td>
<td>Same as above.</td>
<td>Your supervisor will announce when to move on.</td>
</tr>
<tr>
<td>2</td>
<td>&quot;Initiation&quot; refers to Mimi reaching for the relevant toy, grabbing the technician's arms to do something, moving toward the relevant toy, etc. (Just looking at a toy is NOT initiation.) When Mimi initiates any one of the activities in the phase 1 or 2, the tech quickly physically prompts Mimi to sign the play activity. <strong>The sign should be specified here.</strong> When Mimi initiates to do the play that Mimi can do independently, the tech should allow Mimi to do so. If Mimi does not initiate any activities, the tech increases Mimi's motivation by pointing to the relevant toy, by guiding her to get close to the relevant toy, saying, &quot;What do you want?&quot;, doing a little bit of any of the play activities and watching for her to initiate for more, etc.</td>
<td>Mimi's response Mimi follow the tech's physical prompts or spontaneously signs for the activity.</td>
<td>Same as above.</td>
<td>N/A</td>
</tr>
<tr>
<td>3</td>
<td>&quot;Initiation&quot; refers to Mimi reaching for the relevant toy, grabbing the technician's arms to do something, moving toward the</td>
<td>Mimi spontaneously signs or follow the physical</td>
<td>Same as above.</td>
<td>N/A</td>
</tr>
<tr>
<td>Phase</td>
<td>Tutor Presentation/Preparation</td>
<td>Correct Response</td>
<td>Incorrect Response</td>
<td>Criteria for Phase Change</td>
</tr>
<tr>
<td>-------</td>
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</tr>
<tr>
<td></td>
<td>relevant toy, etc. (Just looking at a toy is NOT initiation.) When Mimi initiates any one of the activities, the tech looks at Mimi's face and wait for 5 seconds before physically prompting Mimi to sign for the activity. When Mimi signs, do the activity as soon as possible. If Mimi does not sign, provide Mimi with the physical prompt and play anyway.  If Mimi does not initiate any activities, the tech increases Mimi's motivation by pointing to the relevant toy, by guiding her to get close to the relevant toy, saying, &quot;What do you want?&quot;, doing a little bit of any of the play activities and watching for her to initiate for more, etc.</td>
<td>prompt.  The tech plays with Mimi with the activity that Mimi initiated.  The tech gets especially excited when Mimi signs spontaneously or almost spontaneously.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix F

Slide Show Contents for Ian's Technicians
Slide Show Contents for Ian’s Technicians

In the playroom
- Children with autism often do not play appropriately or interactively
- During the playtime, Ian may run back and forth, listen to music, or use the same toy over and over
- These behaviors prevent him from playing with you interactively
- Research shows that mere availability of preferred toys does not increase appropriate play, but prompting and reinforcing does
- Ian needs your help! You can increase his interactive play activities by prompting and reinforcing them

Increasing Ian’s interactive play
- The procedure specifies his preferred interactive play activities
- So far, Ian has been engaging in these interactive play activities much longer than he used to do. This is a clear improvement!
- One concern is his “active engagement,” which involves eye contact, grabbing your hands, imitating you, climbing, sliding, jumping, and bouncing on his own
- This slideshow provides you with guidelines to make the play activities reinforcing for Ian to actively engage in these play activities

Ring-around-the-rosies
Step 1: “Instruction to play”
- The instruction should be clear
- The technician may remove distractions (e.g., toys) in order to obtain Ian’s attention

Step 2: “Physical prompts”
- Hold his hands confidently to come to the area where you can play
- Do NOT force him. If he resists (e.g., pulling arms), you can simply introduce another play activity (playing with toys is not an option)
- Start playing without disrupting the natural flow (observe Ian carefully)
  - Our goal in the playroom is to encourage him to sing, slide, jump, and bounce actively
  - Your task is to help him do these faster, higher, & better than he would have done on his own (Your help should be a reinforcer!)

Step 3: “Sing the song”
- Go with the natural flow
- When Ian jumps, you may pull Ian’s arm slightly so that Ian can jump higher than he would do on his own
- When Ian follows your lead to circle around, you sing enthusiastically and smile so that circling around is significantly more interesting than if he would have done it on his own
  - General rule: “Do more when he smiles, looks at you, or attempts to do it more.”

Step 4: “Allow the child to fall down on the bean bag”
- Help Ian fall down. Exaggerate it. Same with the previous step.

Step 5: “Give affection, comments, or praise”
- You may fall down together, clap hands, praise, tickles, or do whatever makes him smile, look at you, etc. Watch him carefully to decide what you do next

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Step 6: “Offer hands while instructing”
Give Ian a chance to do it again (e.g., grab your hand or reach your hands). He may run and come back. Do not chase him (or make it game).

Bouncing on the ball
Step 1: Instruction to play
Clear and given while Ian attends
Step 2: Physical prompts
Hold his hands to get closer to the ball
Guide him but Do Not force him (e.g., Ian climbs up while you help)
Start playing anyway that interests him (Observe Ian carefully)
E.g., He may lay on the ball and you bounce for him initially
E.g., He may start bouncing the ball using his hands
Step 3: Bouncing Ian on the ball while giving comments or praise
Help Ian to bounce faster, higher, or better.
Step 4: Prompt Ian to sit in the right position
Bring to the best position without disrupting the natural flow of play (Put the ball against the wall and sit in front of it).
Step 5: Fix the position (security)
Once in a while, take a breath and fix his position so that Ian won’t fall off or fix your position so that you have a better control

Peek-a-boo
Step 1: Instruction
Clear and given while Ian attends
Step 2: Physical prompts (optional)
You may start playing when he just accidentally looks at you (He may be doing something else)
Step 3: Play “peek-a-boo”
Be excited. It is your playing that gets his attention. E.g., Jump toward him to surprise him. Exaggerate your hand motion.
He is not required to do anything. You should try different ways. If he looks at you or imitates you, then this is the way that you play again

Jumping on the trampoline
Step 1: Instruction
Clear and given when Ian attends
Step 2: Physical prompts
Hold his hands to step on the trampoline but do not force
Step 3: Jump
Help him to jump slightly higher than he would jump on his own and jump together
You may clap hands if he put your hands together
Be excited
Step 4: Give comments or praise
Clap your hands, praise him, or do whatever makes him smile
Step 5: Pause
Take a breath and give him a chance to start over

Sliding
Step 1: Instruction
Clear and given while Ian attends
Step 2: Physical prompts
Hold his hands and approach the slide without forcing
Start this play by helping him step on the slide (he may climb up on the stairs, slide, or the rope net on the other side).
Help means that he climbs and you support so that he climbs a little faster or better than he would normally do
Block if he attempts to jump from the top without attending too much
Step 3: Prompts to crawl through or slide
Give instruction and physically prompt him to crawl through or sit down on the slide if necessary but do not force
Step 4: Slide (when he comes to the position)
Go to the end of the slide and help him slide faster by holding his legs
You may show hand motion of tickling to make sliding more exciting
Step 5: Give affection, comments, or praise
When he slides, give him lots of praise, affection, or comments

Summary
Step 1: Instruction
Clear and given when Ian attends
Step 2: Physical prompts
Guide him to the destination by holding his hands but do not force
You may start playing in the way that does not disrupt the natural flow
Step 3: Play
Help him to do it faster, higher, and better
Be excited
Step 4: Give him a chance to do it again
Take a breath once in a while and ensure the security
Appendix G

Slide Show Contents for Mimi’s Technicians
Slide Show Contents for Mimi’s Technicians

In the playroom

Children with autism often do not play appropriately or interactively
During the playtime, Mimi may walk back and forth while shaking a drum, Elmo, etc.
These behaviors prevent her from playing with you interactively
Research shows that mere availability of preferred toys does not increase appropriate
play, but prompting and reinforcing does
Mimi needs your help! You can increase her interactive play activities by prompting
and reinforcing them

Increasing Mimi’s interactive play

The procedure specifies her preferred interactive play activities
So far, Mimi has been engaging in these interactive play activities much longer than
she used to do. This is a clear improvement!
One concern is her “active engagement,” which involves eye contact, grabbing your
hands, rocking, jumping, and bouncing on her own
This presentation provides you with guidelines to make the play activities reinforcing
for Mimi to actively engage in these play activities

Ring-around-the-rosies

Step 1: “Instruction to play”

The instruction should be clear
The technician may remove distractions (e.g., toys) in order to obtain Mimi’s
attention

Step 2: “Physical prompts”

Hold her hands confidently to come to the area where you can play
Do NOT force her. If she resists (e.g., pulling arms), you can simply introduce another
play activity (playing with toys is not an option)
Start playing without disrupting the natural flow (observe Mimi carefully)
❖ Our goal in the playroom is to encourage her to sing, rock, jump, and bounce
actively
❖ Your task is to help her do these activities faster, higher, & better than she would
have done on her own (Your help should be a reinforcer!)

Step 3: “Sing the song”

Go with the natural flow
❖ When Mimi jumps, you may pull Mimi’s arm slightly so that Mimi can jump
higher than she would have done on her own
❖ When Mimi follows your lead to circle around, you sing enthusiastically and
smile so that circling around is significantly more interesting than if she would
have done it on her own
❖ She may dance (swing side to side) while she sings

Step 4: “Allow Mimi to fall down on the bean bag”

❖ Help Mimi fall down. Exaggerate it. Same with the previous step.

Step 5: “Give affection, comments, or praise”

You may fall down together, clap hands, praise, tickles, or do whatever makes her
smile, look at you, etc. Watch her carefully to decide what you do next

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Step 6: “Offer hands while instructing”
Give Mimi a chance to do it again (e.g., grab your hand or reach your hands).
When she starts walking away, take a breath and introduce another play activity. Do
NOT force or chase her (or make it a game).
Avoid picking her up when she does not get up. Over-prompting reinforces her
staying down behavior.

Rocking a chair
Step 1: Instruction to play
Clear and given while Mimi is attending
Step 2: Physical prompts
Hold her hands to get closer to the chair
Guide her but Do Not force her (e.g., Mimi steps on the chair while you help)
Observe her carefully and start playing in a way that interests her
E.g., if she starts rocking, let her rock in the way she initiated and help her rock faster
or push harder, while watching her security
Step 3: Allow her to be in a safe position
If she is not in a safe position, prompt her to be in the position that you have a good
control to ensure security
Do NOT disrupt the flow of play
Be excited if she follows your prompts
Step 4: Allow her to rock while giving comments and praise
Help her to rock faster and push harder so that she would do better than when she
would have done on her own

Bouncing on the ball
Step 1: Instruction to play
Clear and given while Mimi is attending
Step 2: Physical prompts
Hold her hands to get closer to the ball
Guide her but Do Not force her (e.g., Mimi climbs up while you help)
Observe Mimi carefully and start playing in a way that interests her
E.g., She may lay on the ball and you bounce for her initially (if she starts looking up
and smile, you are in the good direction.)
Step 3: Bouncing Mimi on the ball while giving comments or praise
Help Mimi to bounce faster, higher, or better
If you helps her jump really fast and high, Mimi will start trying on her own
Step 4: Prompt Mimi to sit in the right position
Bring to the best position without disrupting the natural flow of play (Put the ball
against the wall and sit in front of it)
Step 5: Fix the position (security)
Once in a while, take a breath and fix her position so that Mimi won’t fall off or fix
your position so that you have a better control

Tickling (or Peek-a-boo)
Step 1: Instruction

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Clear and given while Mimi is attending
Step 2: Physical prompts (optional)
   Hold her hands and bring her to the secured position. (e.g., beanbag, trampoline, chair, on the ball)
Step 3: Play tickle (or pick-a-boo)
   Be excited. It is your playing that gets her attention. E.g., Tickle under her arms, knees, neck, etc. Count one to three with your fingers.
   E.g., For peek-a-boo, use her feet, use stuffed animals, exaggerate hand motion, etc.
   She is not required to do anything. You should try different ways. If she giggles, grabs your hands, or stays where she is, then you are in a good direction

Jumping on the trampoline (optional)
Step 1: Instruction
   Clear and given when Mimi is attending
Step 2: Physical prompts
   Hold her hands to step on the trampoline but do not force
Step 3: Jump
   Help her to jump slightly higher than she would have jumped on her own and jump together
   Be excited
Step 4: Give comments or praise
   Clap your hands, praise her, or do whatever make her smile or jump more
Step 5: Pause
   Take a breath and give her a chance to start over

Summary
Step 1: Instruction
   Clear and given when Mimi is attending
Step 2: Physical prompts
   Guide her to the destination by holding her hands but do not force
   You may start playing in the way that does not disrupt the natural flow
Step 3: Play
   Help her to do it faster, higher, and better
   Be excited
Step 4: Give her a chance to do it again
   Take a breath once in a while and ensure her security
Appendix H

Checklist for Ian’s Technicians
Checklist for Ian’s Technicians

**Instruction for the trainer:** During the instructional session, the trainer completes the following components:

1. Show the slides
2. Encourage the technician to fill out the observation form (below) while observing the instructional video
3. Answer questions if the technician has (if the trainer cannot answer the question, he/she should ask the supervisor)
4. Completing the checklist (answer the questions located at the end of the checklist)

**Instruction for the trainee:** Fill out the checklist while watching the videos.

1. **Observation form for ring-around-the-rosies**

<table>
<thead>
<tr>
<th>Ring-around-the-rosies</th>
<th>Criteria</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1: Instruction to play</td>
<td>Is it clear and given while Ian is attending?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 2: Physical prompts</td>
<td>Does the tech hold hands without forcing?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 3: Sing the song</td>
<td>Does the tech help Ian to play faster, higher, and better?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 4: Allow the child to fall down on the bean bag</td>
<td>Is it given in an excited way?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 5: Give affection, comments, or praise</td>
<td>Is it given in an excited way?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 6: Offer hands while instructing</td>
<td>Does the tech give him a chance to do it again?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
</tbody>
</table>

2. **Observation form for bouncing on the ball**

<table>
<thead>
<tr>
<th>Bouncing on the ball</th>
<th>Criteria</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1: Instruction to play</td>
<td>Is it clear and given while Ian is attending?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 2: Physical prompts</td>
<td>Does the tech hold hands without forcing?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 3: Bounce Ian on the ball while giving comments or praise</td>
<td>Does the tech help Ian to play faster, higher, and better?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 4: Prompt Ian to sit in the right position</td>
<td>Does the tech prompt without disrupting the natural flow?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 5: Fix the position</td>
<td>Does the tech fix the position when Ian is in an unsafe position?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
</tbody>
</table>

3. **Observation form for pick-a-boo**

<table>
<thead>
<tr>
<th>Peek-a-boo</th>
<th>Criteria</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1: Instruction to play</td>
<td>Is it clear and given while Ian is attending?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 2: Physical prompts</td>
<td>Does the tech hold hands without forcing?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 3: Play peek-a-boo</td>
<td>Is it given in an excited way?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
</tbody>
</table>
4. Observation form for jumping on the trampoline

<table>
<thead>
<tr>
<th>Jumping on the trampoline</th>
<th>Criteria</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1: Instruction to play</td>
<td>Is it clear and given while Ian is attending?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 2: Physical prompts</td>
<td>Does the tech hold hands without forcing?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 3: Jump</td>
<td>Does the tech help Ian to play faster, higher, and better?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 4: Give comments or praise</td>
<td>Is it given in an excited way?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 5: Pause</td>
<td>Does the tech give Ian a chance to start over?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
</tbody>
</table>

5. Observation form for sliding

<table>
<thead>
<tr>
<th>Sliding</th>
<th>Criteria</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1: Instruction to play</td>
<td>Is it clear and given while Ian is attending?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 2: Physical prompts</td>
<td>Does the tech hold hands without forcing?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 3: Prompts to crawl through or slide</td>
<td>Does the tech prompt to crawl through or slide?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 4: Slide</td>
<td>Does the tech help Ian to play faster, higher, and better?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 5: Give affection, comments, or praise</td>
<td>Does the tech give Ian a chance to start over?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
</tbody>
</table>

Instruction for the trainer:
Please write down the questions that the trainee asked.

1.

2.

3.

After the session answer these questions.

1. Did you show the slide? Yes / No
2. Did you encourage the technician to fill out the monitoring form while observing the instructional videotape? Yes / No
3. Did you answer questions (if you cannot answer the questions, please ask your supervisor after the session)? Yes / No
4. Did you answer all the questions above? Yes / No
Appendix I

Checklist for Mimi’s Technicians
Checklist for Mimi’s Technicians

**Instruction for the trainer:** During the instructional session, the trainer completes the following components:
1. Show the slides
2. Encourage the technician to fill out the observation form while observing the instructional video
3. Answer questions if the technician has (if the trainer cannot answer the question, he/she should ask)
4. Completing the checklist (answer the questions after the steps)

**Instruction for the trainee:** Fill out the checklist while watching the videos.

### 1. Observation form for ring around the rosies

<table>
<thead>
<tr>
<th>Ring-around-the-rosies</th>
<th>Criteria</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1: Instruction to play</td>
<td>Is it clear and given while Mimi is attending?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 2: Physical prompts</td>
<td>Does the tech hold hands without forcing?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 3: Sing the song</td>
<td>Does the tech help Mimi to play faster, higher, and better?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 4: Allow the child to fall down on the bean bag</td>
<td>Is it given in an excited way?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 5: Give affection, comments, or praise</td>
<td>Is it given in an excited way?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 6: Offer hands while instructing</td>
<td>Does the tech give her a chance to do it again?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
</tbody>
</table>

### 2. Observation form for rocking a chair

<table>
<thead>
<tr>
<th>Rocking a chair</th>
<th>Criteria</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1: Instruction to play</td>
<td>Is it clear and given while Mimi is attending?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 2: Physical prompts</td>
<td>Does the tech hold hands without forcing?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 3: Allow her to be in a safe position</td>
<td>Does the tech prompt Mimi without disrupting the natural flow?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 4: Allow her to rock while giving comments and praise</td>
<td>Does the tech help Mimi to play faster, higher, and better?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
</tbody>
</table>

### 3. Observation form for bouncing on the ball

<table>
<thead>
<tr>
<th>Bouncing on the ball</th>
<th>Criteria</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1: Instruction to play</td>
<td>Is it clear and given while Mimi is attending?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 2: Physical prompts</td>
<td>Does the tech hold hands without forcing?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 3: Bounce Mimi on the ball while giving comments or praise</td>
<td>Does the tech help Mimi to play faster, higher, and better?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
<tr>
<td>Step 4: Prompt Mimi to sit in the right position</td>
<td>Does the tech physically prompt without disrupting the flow?</td>
<td>Y / N</td>
<td>Y / N</td>
</tr>
</tbody>
</table>
Step 5: Fix the position | Does the tech fix the position when Mimi is in an unsafe position? | Y / N  | Y / N

| **4. and 5. Observation form for tickling (or peek-a-boo)** |
|-----------------|---------------------------------------------------------------|------|------|
| **Peek-a-boo**  | **Criteria**                                                  | 1    | 2    |
| Step 1: Instruction to play | Is it clear and given while Mimi is attending? | Y / N | Y / N |
| Step 2: Physical prompts | Does the tech hold hands without forcing? | Y / N | Y / N |
| Step 3: Play peek-a-boo | Is it given in an excited way? | Y / N | Y / N |

| **6. Observation form for jumping on the trampoline (optional)** |
|-----------------|---------------------------------------------------------------|------|------|
| **Jumping on the trampoline** | **Criteria**                                                  | 1    | 2    |
| Step 1: Instruction to play | Is it clear and given while Mimi is attending? | Y / N | Y / N |
| Step 2: Physical prompts | Does the tech hold hands without forcing? | Y / N | Y / N |
| Step 3: Jump | Does the tech help Mimi to play faster, higher, and better? | Y / N | Y / N |
| Step 4: Give comments or praise | Is it given in an excited way? | Y / N | Y / N |
| Step 5: Pause | Does the tech give Mimi a chance to start over? | Y / N | Y / N |

**Instruction for the trainer:** Please write down the questions that the tech asked.

1.

2.

3.

**Instruction for the trainer:** After the session answer these questions.

1. Did you show the slides? Yes / No
2. Did you encourage the technician to fill out the monitoring form while observing the instructional videotape? Yes / No
3. Did you answer questions (if you cannot answer the questions, please ask your supervisor after the session)? Yes / No
4. Did you answer all the questions above? Yes / No

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Appendix J

Feedback Guideline for Trainers
Feedback Guideline for Trainers

Follow the steps below when you conduct the feedback session.

1. You will provide a concurrent feedback, which means that you stop trainee’s play activity whenever you see a problem and provide feedback.

2. Provide as many positive feedbacks as corrective feedback. End the session positively by thanking the trainee to follow your feedback.

3. Use the observation checklist to assess the trainee’s performance strengths and weaknesses. It is important for you to use the checklist to assess the trainee’s performance, but it is not crucial for you to fill them out because you may not have a time.

4. Whenever you see a problem(s) that is not specified in the observation form, and you think that it is important, please provide feedback and describe what was the problem and what feedback you provided below. Your original feedback may give us great information regarding what is the common problem and what is crucial thing that makes the play activity reinforcing for Ian (or other children in general).

5. Answer any questions asked (ask your supervisor later if you cannot answer).

Original feedback and question notes

1. 

2. 

3. 

4. 

5.

Instruction for the trainer: After the session answer these questions.

1. Did you use the monitoring form to provide feedback? Yes / No

2. Did you give as many positive feedbacks as corrective feedbacks? Yes / No

3. Did you answer the questions that you receive (if you do not know the answer, please ask your supervisor after the training)? Yes / No

4. Did you write down when you find a problem(s) and provide feedbacks that are not in the observation form above? Yes / No

5. Did you answer all the questions above? Yes / No
Appendix K

Slide Show Contents for Mand Training
Slide Show Contents for Mand Training

Your child’s motivation
- By the time you see this presentation, your child should be initiating to play with you at least occasionally
- (Initiation – e.g., reaching for or grabbing the relevant toy or your arms)
- It means that your playing increased the reinforcing value of the target play
- You will teach your child mand skill (manding to play) using the child’s motivation to play with you

Step 1: Capturing or contriving motivation
Capturing MOs (catch when your child is motivated to play)
- When your child initiates (e.g., reaches toward the relevant toy, grabs your hands)
Contriving MOs (create a situation for your child to be motivated to play)
- Show the relevant play instrument
- Look at the child’s face (You may ask what your child wants)
- Point to the instrument (You may talk about it, such as “Look, I found a trampoline.”)
- Do the target play briefly

Step 2: Prompt appropriate way to mand
When you see your child’s initiation to play
- Physically prompt your child to sign the play
- At the same time, say the name of the play
- Do them quickly so that you won’t make the physical prompt unnecessarily aversive
  - When there is no initiation (when you cannot contrive motivation), your instructor will re-train you in play

The instructor should show you the signs below.
- Jump on the trampoline (Sign, “Jump” while saying, “Jump”)
- Bounce on the ball (Sign, “Ball” while saying “Ball”)
- Ring-around-the-rosies (Sign, “Flower” while saying, “Rosies”)
- Slide (Sign, “Slide” while saying, “Slide”)
- Peek-a-boo (Hide your child’s face or your face with your child’s hands while saying, “Peek-a-boo”)
- Tickle (Touch your child’s body or your body with your child’s hands and say, “Tickle”)

Step 3: Reinforce your child’s following the prompts
- Play with your child excitedly and enthusiastically (of course, use the play that your child initiated)
- Do it immediately after your child follows your physical prompts
- If your child mands verbally, you should play immediately with extra excitement (verbal mand is better than signing)
- Give external reinforcement after or during the play (e.g., “Good asking”, high five, tickles)
When there are inappropriate behaviors
- Inappropriate behaviors are dropping on the floor, hitting, crying, etc.
- When these happen, block them and proceed to the physical prompts and play
- Your instructor will demonstrate how to block these behavior and prompt quickly after the session

Step 4: Time delay (next phase)
Once your child consistently follow your prompts, you can fade the prompts using time delay (Your instructor will announce when you should use time delay)
- Look at your child (make your child look at you) and wait for 5 seconds before physically prompts
- When your child signs spontaneously, play with extra enthusiasm and give extra reinforcers
- When your child does not sign spontaneously, physically prompts to sign and play anyway

Summary
Step 1: Capture or Contrive motivation
- Catch when your child initiates
- Create MO if he/she is not motivated yet
Step 2: Physically prompt to sign
- Do it quickly after your child’s initiation
- Say the name of the play simultaneously
Block your child’s inappropriate behavior
Step 3: Play and give external reinforcement
- Immediately
- With enthusiasm
(Step 4: Use time delay when instructed)
- Wait 5 seconds before you prompt
Appendix L

Preference-Assessment Data Recording Form
Preference Assessment Data Recording Form

1st Round
1. ________ Jumping on the trampoline or jump with a tech wherever
2. ________ Climbing the slide (the slide or the stairs), crawling through the halls on the walls, and sliding (any one of these can be counted as play)
3. ________ Bouncing on the big bouncing ball
4. ________ Rocking on the rocking chair
5. ________ Tickling (the child sits in the bean bag and the tech tickles)
6. ________ Singing a song (ring-around-the-rosies)
7. ________ Listening a song (spider song)
8. ________ Riding a truck or a wagon
9. ________ Pick-a-boo

2nd Round
1. ________ Tickling (the child sits in the bean bag and the tech tickles)
2. ________ Riding a truck or a wagon
3. ________ Climbing the slide (the slide or the stairs), crawling through the halls on the walls, and sliding (any one of these can be counted as play)
4. ________ Jumping on the trampoline or jump with a tech wherever
5. ________ Pick-a-boo
6. ________ Listening a song (spider song)
7. ________ Rocking on the rocking chair
8. ________ Singing a song (ring-around-the-rosies)
9. ________ Bouncing on the big bouncing ball

3rd Round
1. ________ Singing a song (ring-around-the-rosies)
2. ________ Pick-a-boo
3. ________ Jumping on the trampoline or jump with a tech wherever
4. ________ Rocking on the rocking chair
5. ________ Bouncing on the big bouncing ball
6. ________ Climbing the slide (the slide or the stairs), crawling through the halls on the walls, and sliding (any one of these can be counted as play)
7. ________ Listening a song (spider song)
8. ________ Tickling (the child sits in the bean bag and the tech tickles)
9. ________ Riding a truck or a wagon
Appendix M

Data Recording Form: Technician's Behavior
Data Recording Form: Technicians' Behavior

Date: _______________  Child's Name: _______________
Tech's Name: _______________  Observer: _______________

<table>
<thead>
<tr>
<th>Minute</th>
<th>Tech's play &amp; Prompts to play</th>
<th>Tech's prompts to mand &amp; Responses to manding</th>
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<tbody>
<tr>
<td></td>
<td>Correct</td>
<td>Incorrect</td>
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</table>

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Appendix N

Data Recording Form: Children's Behavior
Data Recording Form: Children's Behavior

Date: ______________ Child's Name: ______________
Tech's Name: ______________ Observer: ______________

<table>
<thead>
<tr>
<th>Minute</th>
<th>Interval</th>
<th>Overall</th>
<th>Active Engagement</th>
<th>Prompted</th>
<th>Spontaneous</th>
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Appendix O

Questionnaire for Technicians
## Questionnaire for Technicians

During this semester, you received training in order to teach play to your child. Regarding the training in how to teach play, please answer the following questions.

1. How helpful was the procedure?
   - Very helpful
   - Somewhat helpful
   - Not at all

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2. How helpful was the videotape (answer only if you watched the video)?
   - Very helpful
   - Somewhat helpful
   - Not at all

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3. How helpful was the slide show (answer only if you watched the slide show)?
   - Very helpful
   - Somewhat helpful
   - Not at all

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4. How helpful was the feedback from the trainer (answer only if you received feedback)?
   - Very helpful
   - Somewhat helpful
   - Not at all

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5. How did you like the training overall?
   - Very good
   - Somewhat good
   - Not at all

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Some of you also received training in order to teach manding play activities. Regarding the training in how to teach manding play activities, please answer the following questions.

6. How helpful was the procedure?
   - Very helpful
   - Somewhat helpful
   - Not at all

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7. How helpful was the slide show (answer only when you watched the slide show)?
   - Very helpful
   - Somewhat helpful
   - Not at all

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8. How did you like the training overall?
   - Very good
   - Somewhat good
   - Not at all

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Appendix P

Questionnaire for Trainers
Questionnaire for Trainers

1. How prepared did you feel when providing training to other practicum students?
   Very prepared Somewhat prepared Not at all
   1  2 3 4 5

2. Did you like training other practicum students?
   Very much To some extent Not at all
   1  2 3 4 5

3. Was your trainee willing to accept your training, including feedback?
   Very much To some extent Not at all
   1  2 3 4 5

4. How appropriate, did you feel, was the training package for the trainee to acquire skills related to play?
   Very appropriate Somewhat appropriate Not at all
   1  2 3 4 5

5. How appropriate, did you feel, was the training package for the child?
   Very appropriate Somewhat appropriate Not at all
   1  2 3 4 5
Appendix Q

Correlation Graphs
Correlation between Ian’s Overall Play and His Technician’s Performance

Correlation between Ian’s Active Engagement and His Technicians’ Performance

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Correlation between Mimi’s Overall Play and Her Technicians’ Performance

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Appendix R

HSIRB Approval Letter and Proposal (Project Description)
This letter will serve as confirmation that your research project entitled "Pyramidal Staff Training: Training Discrete-Trial Technicians to Play and Mand Skills to Children with Autism" has been approved under the exempt category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note that you may only conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: September 29, 2005
HSIRB Proposal

Project Description
Children spend most of their time in play, an important occasion for them to learn skills necessary for their life, skills such as imitating other people, interacting with other people, and using toys in developmentally-appropriate ways. However, children with autism often do not play; instead, they may stare at one object or a wall for an extended period of time; and they usually do not initiate interaction. This greatly interferes with their acquisition of a more functional repertoire and prevents them from entering less restrictive educational environments.

A classroom at Croyden Avenue Schools provides an early behavioral training program for children with autism. This program entails intensive, one-on-one training, called discrete-trial training. In this classroom, the trainers who implement discrete-trial training are practicum students at Western Michigan University (WMU). This practicum (Psychology 357. Practicum with Special Populations) helps the practicum students get experience using behavior analysis to teach children diagnosed with autism.

Discrete-trial training usually involves the planned presentation of the opportunity for one specific correct response and the reinforcement (rewarding) or correction of that response. This form of training is one of the most effective techniques used to enhance functional repertoires, such as paying attention to stimuli and imitating other people. In addition, it is also used to teach prerequisite play skills, such as following play-related directions and making play-related comments. Another technique to enhance play skills is natural-environment teaching. This training uses more naturally occurring learning opportunities in a less structured setting. It facilitates children’s generalizing to a natural play setting the prerequisite play skills that they acquired through discrete-trial training.

Although such natural-environment teaching is essential to increase the children’s play, it is more difficult for trainers to do than discrete-trial training because it is less structured. We have been developing, implementing, and collecting data in teaching practicum students how to increase children’s play and interactions with other people in the playroom. This involves first training second-semester practicum students in the proper procedures for teaching the children appropriate play skills, and then training those practicum students to, in turn train first semester practicum students in the proper use of those same procedures. Because each second semester practicum student will be working with more than one first semester practicum student, this allows us to arrange for more direct, one-on-one training of the first semester practicum students than would otherwise be possible with our limited staff. In addition, we collect social-validity data from the practicum students, that is anonymous student evaluations of our teaching procedures (see the attached sample evaluation sheet and sample data collection sheet). We have been collecting these data as a part of our standard teaching.

This project will evaluate these data to determine which component of our training is the most important in our teaching practicum students and in increasing children’s play and interactions. This project will only use data that has already been taken as part of the students’ normal curriculum at Croyden Avenue School. This project only desires to look at these data and compile it in an organized fashion. What we ask HSIRB permission for is to use these confidential performance and anonymous social-validity data in Koji Takeshima’s dissertation, in presentations at various professional conferences, and in
publications, if publication is warranted. Through this evaluation, the children and the practicum students engage in the regular school activities that are already required as part of their Croyden and WMU curricula, respectively (this evaluation requires no extra participation time for the participants, either the children or the practicum students).

**Methods of Analysis**
The evaluation of our most recent practicum and play training procedures involves three sets of participants: children with autism, first-semester practicum students, and second-semester practicum students. We will ask permission of the practicum students and the children’s parents to share these data we are currently collecting.

*Children’s performance.* The children’s data are frequency of engagement in appropriate play, initiation of play, inappropriate behavior, and prompted or unprompted mand to play.

*First-semester practicum-student performance.* The practicum students’ performance data are the frequency of correctly providing reinforcement and prompts to increase the child’s appropriate play and manding.

*Second-semester practicum-students performance.* The second-semester practicum-students’ performance data are the frequency of correct use of training materials and the frequency of providing positive feedback to the first-semester practicum students when those students are working with the children. In addition, we record the frequency of correctly providing reinforcement and prompts to increase the children’s appropriate play and manding when the second-semester students directly teach the children.

*Social validity data.* The social validity data come from the anonymous questionnaire given to all the practicum students.

This project hopes to first identify stages of our teaching procedures that are likely to increase technician’s appropriate use of prompts and reinforcement during the playtime, and the subsequent increase in the children’s appropriate play and the manding. The data will be graphed linearly to display the changes in the performance of each child and technician when each stage of our teaching procedure was introduced. The way of graphing these data is often used in studies using a single case design. In addition, the social validity data will be graphed in order to display the technician’s satisfaction. Again, these data are already being taken as part of the educational curriculum and this project only seeks to analyze and graph this data so that we can evaluate our teaching.

**Benefits of disseminating these data**
By presenting the results of this evaluation at conferences and in publications, valuable information will be disseminated on teaching practicum students, teaching discrete-trial trainers, and teaching play skills to children with autism. In addition, the use of these data in Koji Takeshima’s dissertation facilitates the addition of one more well-trained professional to the population of professionals helping children with autism lead more normal lives.
Participant Selection

One set of participants is those children with autism, enrolled in the Early Childhood Developmental Delay (ECDD) Classroom of Croyden Avenue School who are learning play and manding skills during playtime. There are no criteria for participant selection other than learning to play appropriately as a part of their curricula. We will ask the parents of these children for their informed consent to use their children's data in a publication, professional presentations, and a dissertation.

The other sets of participants are the first and second-semester practicum students, who are working with these children as a part of their standard curricula; we will ask these practicum students for their informed consent to use their data in the dissertation, publications, and professional presentations.

Risks to Participants

There are no foreseeable risks for any of the participants from our presenting their data, as they will not be identifiable in anyway (Children’s and practicum students’ name will not ever be used, but instead they will be referred to as Child #1, Technician #1, etc.).

Protection of Participants

The practicum students may withhold or withdraw their permission for the dissemination of their performance and social-validity data at any time without any negative consequences by contacting the numbers specified in the consent form or any of their supervisors. Similarly, at any time, the parents of the children with autism may also withhold or withdraw their permission for the dissemination of their children’s confidential performance data without any negative consequences by contacting the classroom teacher or the numbers specified in the consent form.

The practicum coordinator, Koji Takeshima, MA, BCBA, who will present these data, is a board certified behavior analyst (BCBA) and also supervised by a nationally certified school psychologist and a certified special education teacher. In addition, the practicum teacher, Richard Malott, Ph.D., BCBA of the WMU Psychology Department faculty supervises the practicum coordinator.

Confidentiality of Data

All identifying information will be removed from the participants’ data (both practicum students and children with autism) when presented in the dissertation, at professional conferences, or through publications. For both practicum students and children with autism, all data will be coded and stored on computer discs, with direct access given only to the practicum coordinator, the clinical supervisors, and the practicum teacher. These data will be archived and stored in a locked cabinet accessible to the primary investigator for at least three years.

Instrumentation

The current evaluation will not use any instruments. The standard performance-monitoring and social-validity forms used to collect the data (for our teaching purpose, not for this project) are attached.
Informed Consent

We request a waiver of the requirement to obtain informed consent for the participants for the following reasons. (1) The purpose of this project is to evaluate and disseminate the data that have been collected as our regular teaching process. The project does not require of the participants any additional activities, and the data to be used for the evaluation and dissemination will be coded when presented, thus presenting minimal risk to the subjects. (2) Waiving the requirement of informed consent will not adversely affect the participants' rights and welfare because the names of the participants will not be disclosed. (3) The consent will be difficult to obtain when the children with autism or the practicum students were already graduated from the programs. (4) We are giving appropriate feedback to the parents of children with autism and the practicum students regarding their progress throughout our regular teaching process.