

## **Training Nonverbal and Verbal Play Skills to Mentally Retarded and Autistic Children<sup>1</sup>**

**David Coe, Johnny Matson, Virginia Fee, Ramasamy Manikam, and Christine Linarello**

*Louisiana State University*

*Two mentally retarded boys with autism and one mentally retarded girl with Down syndrome were taught to initiate and play a ball game with an adult confederate. The program targeted both nonverbal responses related to the actual execution of the ball game as well as verbal responses for play initiation and providing compliments for the confederate's behavior. Training sessions provided ample practice in all aspects of the game from initiation to termination through use of brief play cycles. Instruction was provided using a combination of physical and verbal prompts as well as reinforcement and time-out. All three children learned the game and by the study's completion executed multiple play cycles each session. The implications of combining play and social skills training in programming for developmentally handicapped children are discussed.*

Play contributes significantly to child growth and development allowing children to learn about the environment and develop important problem-solving and social competencies (Bruner, Jolly, & Sylva, 1976; Piaget, 1962). Mentally retarded and autistic children typically exhibit limited play behavior. Mentally retarded children prefer structured materials and engage in brief toy contact with nonfunctional manipulation and pounding (Horne & Philleo, 1942; Tilton & Ottinger, 1964; Weiner, Ottinger, & Tilton, 1969). Autistic children demonstrate even greater deficits (Riguet, Taylor, Benaroya, & Klein, 1981; Wing, Gould, Yeates, & Brierley, 1977).

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Within the last 20 years, researchers have explained the application of behavior modification to systematically training play responses. In an early study, Whitman, Mercurio, and Caponigri (1970) taught two severely mentally retarded children to roll a ball and pass a block to each other for candy and social reinforcement and obtained increases in social interaction with generalization to classmates. Whitman, Burish, and Collins (1972) employed a similar design with two moderately mentally retarded children who received tokens for talking to each other and cooperating in basic game activity (drawing, picture naming, and bean bag throwing). Cone, Anderson, Harris, Goff, and Fox (1978) later shaped ball play among profoundly mentally retarded adolescents.

A parallel development in the behavior therapy literature has been social skills training of developmentally handicapped children and adults. This literature is notable for its emphasis on nonverbal and functional aspects of communication. In an early study, Matson, Kazdin, and Esveldt-Dawson (1980) provided social skills training to two mildly mentally retarded emotionally disturbed children for appropriate speech content and intonation, eye contact, and facial expression. Gaylord, Haring, Breen, and Pitts-Conway (1984) taught three autistic males, 17 to 20 years of age, to initiate social interactions with peers, to play appropriately with objects and provide social terminating responses. More recently, Matson et al. (1988) and Taras, Matson, and Leary (1988) treated social skills deficits of multiply handicapped mentally retarded children and autistic youngsters using a question-and-answer format.

The present study attempted to apply the social skills training methodology to a play context with younger children thus advancing work done in earlier studies on several accounts. First, training integrated both nonverbal (ball contact and cooperative play—tossing and catching) and verbal (play initiation and complimenting) play responses. Second, repeated and intensive practice of all responses was achieved by using brief play cycles to compress an entire play period into a minute or less. Third, the procedure used here initially taught responses essential for maintaining a game and investigated the effect of adding an ancillary verbal response—complimenting the game partner. Training was conducted in an analog setting with an undergraduate student acting as a confederate. Prior work comparing the efficacy of peer and adult play partners has suggested that training may in some cases be better achieved using an adult rather than a peer partner (Morris & Dolker, 1974). Given the limited social and compliance skills of our subjects, an adult confederate was viewed as most appropriate for initial training.

## METHOD

### *Subjects*

John, a 6-year-old male, met DSM-III-R (American Psychiatric Association, 1987) criteria for autism (2 of 5 impaired social interaction criteria, 4 of 6 impaired verbal and nonverbal communication criteria, and 2 of 5 restricted activities and interests criteria). His most recent performance on standardized intellectual and adaptive behavior measures fell in the mild mental retardation range. Among John's most salient deficits were poor articulation and eye contact, and low compliance with requests and commands.

Mary, a 5-year-old female, had Down syndrome and met DSM-III-R criteria for mild mental retardation. Although not exhibiting the severe impairments in language and overall social interaction the two boys did, Mary also had been referred due to problems in initiating and maintaining peer interactions.

Fred, a 6-year-old male, met DSM-III-R criteria for autism (3 of 5 impaired social interaction criteria, 5 of 6 impaired verbal and nonverbal communication criteria, and 4 of 5 restricted activities and interests criteria). Fred also met DSM-III-R criteria for moderate mental retardation. His most salient clinical features included persistent echolalia, poor eye contact, absence of imaginative activity, and preoccupation with spinning objects.

All three children were students in noncategorical classes.

### **Setting for Assessment and Treatment**

The study was conducted in the psychology department building in a classroom from which all desks had been removed. The dimensions of the room were 8.7 meters (length)  $\times$  4.8 meters (width)  $\times$  5 meters (height). One wall contained a large one-way mirror that permitted unobtrusive observation and recording.

### *Target Behaviors*

The behaviors selected for treatment were ball contact, play initiation, cooperative play, and compliment delivery. Selection of these target behaviors was influenced by earlier ball play studies (e.g., Cone et al., 1978; Whit-

man et al., 1970, 1972) and finalized using a task analysis for a simple game of catch designed by the experimenters. Definitions of target behaviors were as follows:

*Ball Contact.* Ball contact was scored in any recording interval in which the child came in contact with the ball. This behavior class included handling, holding, bouncing, tossing as well as catching the ball.

*Play Initiation.* Play initiation was scored in any recording interval in which the child asked a second child (baseline) or an adult confederate (baseline and treatment) to play ball.

*Cooperative Play.* Cooperative play was scored in any recording interval in which the child tossed the ball to or caught the ball from a second child (baseline) or an adult confederate (baseline and treatment).

*Compliment.* Any example of the child praising the performance of a second child (baseline) or an adult confederate (baseline and treatment) during a recording interval constituted a compliment.

### *Raters and Rating System*

The primary rater was a second-year clinical psychology graduate student with extensive experience working with developmentally delayed children. This individual did not participate in training the children to insure that rater and trainer behaviors performed by the same person did not result in a confound. Reliability checks were provided by a second graduate student with similar credentials.

In this study partial interval recording was employed. Each child's behavior was observed for 10-second intervals every 40 seconds—a total of 15 intervals for each session of 10 minutes.

### *Procedure*

Sessions were conducted 3 to 4 days a week in either the morning or afternoon, depending on the child's daily schedule. Treatment was implemented according to a multiple baseline design with treatment staggered both across children and behaviors (Barlow & Hersen, 1984).

*Baseline.* To assess the frequency with which each child engaged in the target behaviors without training, each child was observed in a contrived play setting. The child was led by an adult (the trainer in subsequent treatment conditions) into the classroom in which there was a second adult (the confederate in subsequent treatment conditions) and a second developmentally delayed child of similar age. In this room were several toys including a ball later used in play training as well as a can of "Tinker Toy," 2 boxes of wooden blocks, 2 cloth dolls, and 1 toy truck. The child was told that the

adults wanted to watch the child play and that they would come and get him/her when it was time to go. After 10 minutes the trainer returned to take the child back to his/her mother. During the 10-minute period, the child received no prompts or instructions except to stop acts of aggression (e.g., throwing toys or hitting the second child).

*Treatment.* First, the trainer led the child into the classroom and prompted him/her to sit on the floor opposite the confederate at a distance of approximately 1 foot. The trainer sat perpendicularly to the child. Then the trainer informed the child that she/he would earn snacks by being good and doing as requested. For all four behaviors, a hierarchy of prompts was employed to cue behaviors. If the child failed to perform a target response within 1 to 2 seconds, this response was prompted with the next most intrusive prompt. In order from least to most intrusive, the prompts were (a) indirect nonverbal prompt (the trainer and confederate look expectantly at the child when a response is pending); (b) indirect verbal prompt (the trainer asks the child what the pending response is, e.g., "Well?," "What next?"); (c) partial direct verbal prompt (the trainer or the confederate state the first word in a verbal response, e.g., "Play . . ." for "Play ball, (name of confederate)" or "Good . . ." for "Good, (name of confederate)"); (d) complete direct verbal prompt [the trainer or confederate states the entire verbal response for the child or for nonverbal behaviors the trainer specifically instructs the child what to do, e.g., "Throw the ball to (name of confederate), John"]; and (e) physical prompt (the trainer uses his hands to prompt the appropriate response, e.g., holding his hands on the ball to prevent the child from throwing it prematurely, holding the child's head to direct eye contact or clasping the child's hands to initiate clapping).

*Shaping Ball Contact.* When the child was sitting quietly, the trainer placed the ball on the ground directly in front of the child and asked him/her to pick it up. When the child touched the ball, the session officially began. The child received snacks and verbal praise for this response. When the child could perform this response five times without a prompt, the second response was taught.

*Initiate Play.* With the child holding the ball, she was prompted to ask the confederate to play ball. Given the relatively poor communication skills of all three children, the request trained was simply "Play ball, (name of confederate)." For this response the child made the request and then tossed the ball to the confederate when she consented to play. Food and verbal praise were delivered contingent on this response. When the child could pick the ball up, look at the confederate, ask her to play, and then toss the ball to her after her consent five times without a prompt, the third response was taught.

*Cooperative Ball Play.* For this response, the child was taught to toss the ball to the confederate and then catch the ball five times until the trainer

requested the ball. At the end of each cycle, the child received a snack, social reinforcement, and feedback on performance. After this, the play cycle began again.

*Compliment.* Training on this last response was implemented after the first three responses appeared to reach asymptote as judged by visual inspection of the data. For this response, the child was taught to say "Good, (name of confederate)" each time the confederate caught the ball. In turn, the confederate complimented the child each time she caught the ball. Food and verbal praise were still delivered at the end of each play cycle.

Acts of aggression or noncompliance by the child were punished with time-out. Time-out durations varied between 15 and 60 seconds. During this time the child was required to sit or stand in a corner of the room while the confederate was reinforced for playing ball with the trainer.

## RESULTS

Interrater reliability was computed on 51% of intervals rated. Proportion of agreement was computed by dividing the total number of agreements by the total number of ratings. The average proportion agreement obtained was .96, with .93 for ball contact, .96 for play initiation, .94 for cooperative play, and .97 for compliments.

John's data are presented in Figure 1. Here, as in Figures 2 and 3, the frequency of 10-second intervals during which each of the four targeted behaviors occurred is noted (a maximum of 15 per session). During baseline, John did not engage the ball nor attempt to initiate cooperative play at all. Informal reports by the raters indicated that John spent virtually the entire time hammering and shaking toys in a stereotypic manner. When treatment was implemented, John's initial performance was erratic, marred by frequent tantrums and noncompliance with instructions. Ball contact, for example, the first behavior targeted, took more than 15 sessions to reach asymptote. Variability of this response, however, decreased over time most notably after the introduction of the compliment response in the second lag. Play initiation also exhibited considerable fluctuation at first before settling down to between one and six intervals per session. Cooperative play took the longest time of the three initial behaviors to reach asymptote. As with ball contact, this behavior appeared to be more consistent after the compliment response was added to the play cycle. Finally, in marked contrast to the first three responses, complimenting was established easily and reached asymptote within 10 sessions. Time-out was implemented an average 1.5 times per session.

Mary's data are contained in Figure 2. In baseline, she actually engaged the ball on a handful of occasions but did not attempt to engage in

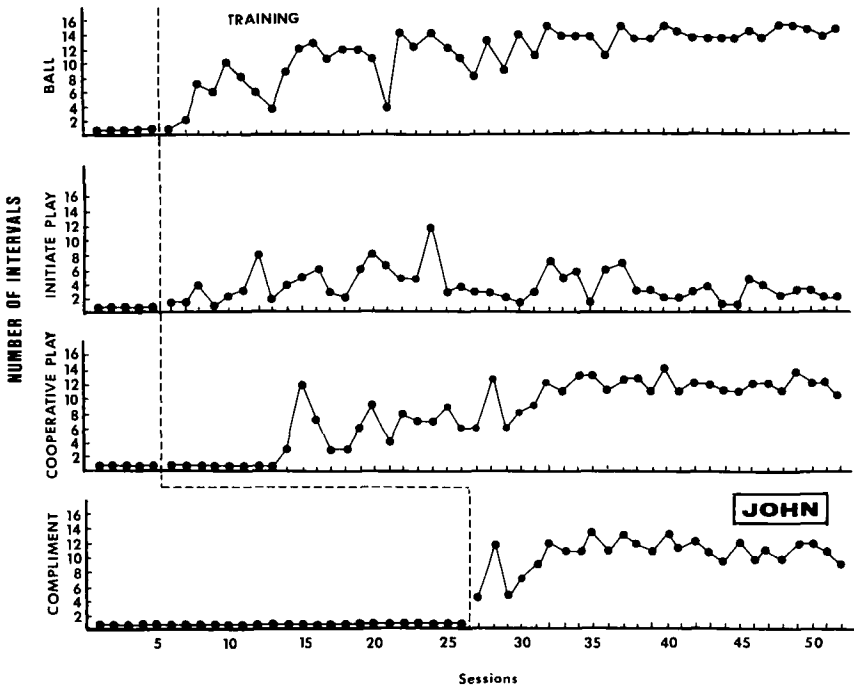


Fig. 1. John: Frequency of intervals containing ball contact, play initiation, cooperative play, and compliment responses.

cooperative play with another person. Once training was implemented, acquisition of all behaviors occurred more rapidly than with John. At the same time, however, Mary ultimately failed to achieve John's response levels. Ball contact developed slowly but steadily over the study's course. Play initiation reached asymptote within 10 sessions. Acquisition was especially abrupt for cooperative play and compliments. Mary exhibited stable performance in initiating play cycles but considerable day to day fluctuations in cooperative play. In Mary's case, time-out was implemented an average of 0.2 times per session.

Fred's results are presented in Figure 3. Similarly to John, Fred in baseline sessions made no attempt to play with the ball or initiate play with a second person. He too displayed a preference for stereotypic play, in his case spinning or waving toys about according to informal rater reports. With the introduction of treatment, ball contact was established on the first day. Shaping play initiation and cooperative play proved more difficult. By the end of the study Fred failed to achieve the response levels maintained by the other two children. With play initiation, peak responding occurred be-

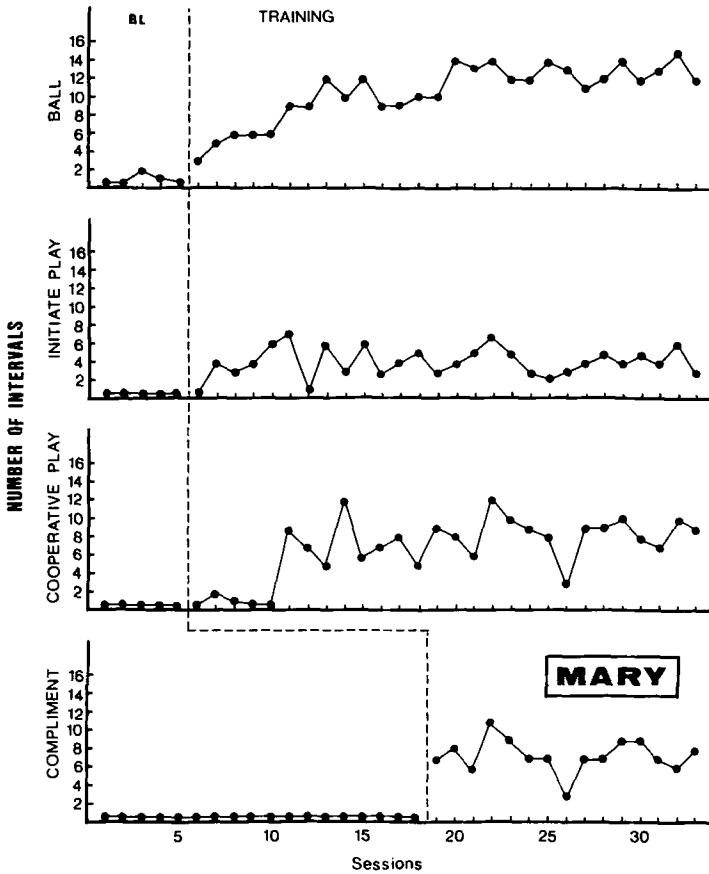


Fig. 2. Mary: Frequency of intervals containing ball contact, play initiation, cooperative play, and compliment responses.

tween sessions 12 to 15. Compliment and cooperative play responses were generally more erratic than for the other two children. In Fred's case time-out was employed an average of 0.8 times per session.

### DISCUSSION

The results are consistent with earlier reports on training play skills to handicapped children. All three children to varying degrees acquired both nonverbal and verbal play responses. Our results indicate that for at least two of the three children adding a compliment requirement did not adverse-



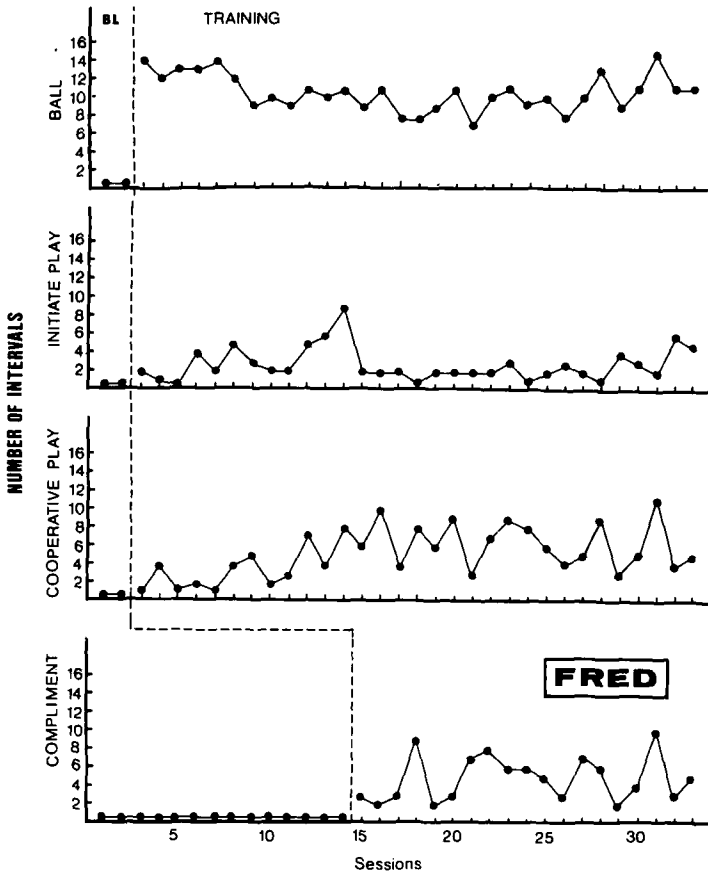


Fig. 3. Fred: Frequency of intervals containing ball contact, play initiation, cooperative play, and compliment responses.

ly affect performance. For John, performance in fact seemed to improve with the introduction of this response. In contrast, for Fred, introduction of the compliment response appeared to limit the development of the other three responses. Asymptotes for these three responses occurred at the time the compliment response was introduced. More research appears to be needed on how to best integrate new responses into ongoing behavior sequences—especially language. Ideally, verbal and nonverbal behaviors should compliment each other and sustain behavioral chains more effectively. Previous studies have generally focused on shaping responses specifically related to the game skill (Cone et al., 1978; Whitman et al., 1970, 1972). Gaylord et al. (1984) initially demonstrated the validity of combining verbal

and nonverbal, as well as play and social skills training but with older children and different play skills.

The children received training in cycles that were relatively brief in duration (rarely more than 1 minute) and repeated several times each session. The cycle format provided the children with frequent opportunity to practice all behaviors related to successful play in particular transitional responses (play initiation). The rationale behind this approach was that it was important for each child initially to have ample practice in executing all behaviors rather than to try to approximate natural play durations. Under standard conditions the child may have the opportunity to initiate play only once per play period. Given the intellectual levels of our children we thought this was insufficient. The children only achieved relatively low rates of play initiation given intensive and structured training. Even taking into account the fact that each play cycle included five compliment and catch-toss sequences for each initiation, play initiation only achieved low and variable rates. Evidently, this response is hard for the children to master and requires more intensive training. Our results suggest that standard play programming would be even less likely to establish initiation of interactions.

Time constraints prevented us from expanding play cycle lengths to approximate normal durations or to integrate our children into activities with children of their own mental and chronological ages. We also did not have the opportunity to eliminate external reinforcement and evaluate the effectiveness of the game itself in maintaining behavior. The outcome of the present project suggests that even when the individual the child interacts with is a well-trained and highly motivated college student, responses may take a relatively long time to establish. Whether children of similar ages or intellectual levels to our subjects would be so patient while responses are brought to criterion level is not clear. An alternative approach, and one pursued in this study, is to attempt to teach handicapped children basic skills in structured settings that might later be integrated into natural settings and thereby maximize benefits to the target child and the children she interacts with. What are needed at this time are additional controlled treatment studies to determine more effective ways to train play as well as social skills in general to handicapped children. Results from several recent studies have supported the use of peer models in training a variety of educational and social skills (Blew, Schwartz, & Luce, 1985; Charlop, Schreibman, & Tryon, 1983; Ihrig & Wolchik, 1988; Odom & Strain, 1986). At the same time, other findings suggest that peer modeling may have limitations (Charlop & Walsh, 1986; Odom & Strain, 1986). Optimal conditions for peer participation in general in the training of developmentally handicapped children need to be identified. Considerations include not only specific skill acquisition and maintenance on the part of developmentally handicapped children but effects on overall peer attitudes and responses towards handicapped children, especially when younger peers are involved.

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