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Setting Generality of Peer Modeling in Children with Autism[1]

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Behavior development in normal children is greatly facilitated by peer modeling. Unfortunately, autistic children do not typically imitate their normal peers. The present study was undertaken to identify variables that facilitate the acquisition of peer imitation and promote setting generality of imitative skills once they have been acquired. We selected a common preschool activity (Follow-the-Leader) as the vehicle for studying modeling effects. Four preschool children with autism took part in an intervention in which a normal peer demonstrated and, if necessary, physically prompted a variety of actions and object manipulations that defined the activity. Following training, all four children generalized their imitative skill to a new setting involving new actions and object manipulations. Results are discussed with respect to the potentially important role that the use of multiple training objects and/or responses play in enhancing attention to the model and facilitating setting generality as well as the role that intrinsically reinforcing activities may play in maintaining acquired peer imitation.

Peer modeling is an important process by which many behaviors in normal children are facilitated. These behaviors include play (Grusec & Abramovitch, 1982), sharing (Canale, 1977), sex-role development (Wolf, 1973), and problem solving (Geshuri, 1972). Research suggests that children experienc-

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ing retardation can also acquire a variety of behaviors by imitating normal peers (Kazdin, 1973; Lancioni, 1982).

Studies of children with autism have focused on the use of adult rather than peer models. Some research suggests that these children are poor at imitating adults (Varni, Lovaas, Koegel, & Everett, 1979). Other studies suggest that with structured intervention, adult models can be successfully used to develop social and self-help skills (Lovaas, Freitas, Nelson, & Whalen, 1967), speech (Lovaas, Berberich, Perloff, & Schaeffer, 1966), and sign language (Carr & Kologinsky, 1983). The encouraging results achieved in some adult modeling studies leave open the possibility that peer modeling may likewise be beneficial.

Only a handful of studies involving children with autism have thus far been conducted with peer models. These studies, which focus almost exclusively on the important area of language development, have demonstrated that a variety of skills including receptive labeling (Charlop, Schreibman, & Tryon, 1983), concept discrimination (Egel, Richman, & Koegel, 1981), and expressive language (Coleman & Stedman, 1974; Ihrig & Wolchik, 1988) can be facilitated via peer modeling. In each study, the critical feature of the intervention involved positioning a single peer model in close physical proximity to the observer in order to enhance the observer's attention to the model. Interestingly, this intervention was not successful when used to teach nonlanguage behavior, specifically, community living skills such as crossing a street or buying a snack (Blew, Schwartz, & Luce, 1985). Differences between the community study and the language studies highlight the need for continued development of peer modeling methodology.

One difference between the two sets of studies was that in the language studies, children were seated and thus physically restricted to a small area. In contrast, in the community study, children were free to move about a large area. The lack of physical constraints in the community study may have promoted distractibility and diminshed attention to the model. Interestingly, and consistent with the suggestion just made, the one instance in the literature where peer modeling was unsuccessful in promoting language involved training that took place in a free play situation (Charlop & Walsh, 1986). A second difference was that the language studies all involved brief, discrete responses, for example, the model was asked a question and answered; then, the observer was asked the same question and permitted to answer. In contrast, in the community study, the model demonstrated an extended chain of continuous behavior and the observer was then required to imitate the peer model following a period of protracted monitoring of the model. It may be that responses involving extended chains of behavior are less readily imitated than brief responses, an observation that has in fact been made in the case of normal children (McCall, Parke, & Kavanaugh, 1977). In light of

these issues, one focus of the present study was to address the need for developing peer modeling procedures in situations in which model and observer are free to move about and imitation of extended behavior chains is involved.

Given that a child with autism can be taught through peer modeling, there is still a question as to whether newly acquired imitative skills will transfer to a nontraining setting. It has been frequently found that desirable skills acquired in one setting are not performed in other settings (Wahler, 1969). Thus, there is an issue of setting generality. Charlop et al. (1983) found that a specific set of receptive labels acquired through peer modeling in one setting was also observed in a different setting. However, these investigators did not examine an interesting related question, namely, whether imitative skill itself having been mastered in one setting will generalize to a different setting. This aspect of setting generality was an important second focus of the present study.

We sought to study the issues just outlined by making use of an interactive activity not examined in earlier research, namely, Follow-the-Leader. There are several reasons for this selection. First, Follow-the-Leader is an activity that is commonplace in the early grades and is thus developmentally and educationally appropriate for the young children who participated in the present study. Second, the activity involves extended chains of behavior in which participants are free to move about, the precise situation that proved problematic in earlier research on peer modeling (Blew et al., 1985). Third, Follow-the-Leader is, by definition, inherently an exercise in peer modeling thereby making it an ideal vehicle for exploring issues related to imitation.

METHOD

Subjects

Teachers in a day school program for children with developmental disabilities were interviewed and the first four children who met the following criteria were selected for inclusion in the study. First, the children could follow simple requests (e.g., "Look at me," "Pick up your shoes," "Get your lunch box."). However, none of the children had explicit histories of direct compliance training. Second, they had expressive language consisting of 1- to 2-word statements. Third, they had basic play skills that they could demonstrate on request (e.g., riding a bike or bouncing a ball). Fourth, the teachers stated that the children did not appear to learn observationally (e.g., during morning circle time, they did not imitate other children). Finally, the teachers reported that the children could imitate simple, discrete motor acts when

directly rewarded for doing so (e.g., the teacher would clap his/her hands and tell the child "Do this" at which time the child would imitate and receive a tangible reinforcer for correct responding). However, none of the children would imitate a complex series of unreinforced motor acts nor would they spontaneously imitate others.

Based on these criteria, four children were chosen. Joe, Ben, and Sal were 4 years old, and Ed, 5. Joe and Ben were identical twins. The medical staff had diagnosed Joe, Ben, and Sal as having autism, and Ed, as having severe speech delay with autistic features. Joe and Ben had IQ's of 50 and 71, respectively, on the Wechsler Preschool and Primary Scale of Intelligence, and Ed, 58 on the Stanford-Binet. Sal had an adaptive developmental quotient of 50 on the Gesell Developmental Schedules. With respect to language development, all four children functioned at the 24-month level on the Gesell Receptive-Expressive Language Evaluation. None of the children displayed spontaneous communication except for 1- to 2 word requests for tangible items (e.g., foods, toys).

All the children displayed perseverative toy play and/or other forms of self-stimulation such as finger mannerisms. Joe, Ben, and Ed exhibited aggression, tantrums, and occasional self-injurious behaviors.

The peer model was a friendly and cooperative 5-year-old boy who was the son of a member of the school staff. He was chosen based on his availability for the study rather than on evidence of exceptional prosocial behavior per se. This child had a Stanford-Binet IQ of 114. At the time of the study, he was enrolled in a regular kindergarten school program. All sessions were scheduled at times other than the kindergarten class to ensure that no educational opportunities would be lost. The child was recruited as a "teacher's helper," a role that he sometimes played in his regular school and one that he relished in the present context. He expressed pride in his involvement in this study and responded positively to the high level of adult attention he received, so much so that no backup reinforcers were required to maintain his cooperation. As the study progressed, he frequently offered additional help to the participants and his mother commented favorably on what she described as his growing concern for others and his greater ability to interact cooperatively at home.

Setting

All sessions took place in either a training setting or a probe setting. The training setting was a hallway located adjacent to the classroom area and measured 35×3 m. The objects associated with the play activities involved in training were placed at 10 equidistant locations in the middle of the hallway. Each object or set of objects at a given location was separated

Table I. Objects Used in Training and Probe Sessions, Location and Order in Which the Objects Were Presented, and Activities Associated With the Obejects

Objects	Location no.	Activity
		Training sessions
Cup (2)	1	Place cup in can OR Place cup on top of can
Can (2)	2	Place can in box OR Place can on top of table
Box (2)	3	Place box under table OR Place box on top of table
Table	4	Crawl under table OR Walk by and touch table
Hat (2)/cone (2)	5	Place hat on plastic cone OR Put hat on head
Tunnel	6	Crawl through tunnel OR Walk beside tunnel
Chair	7	Climb on and off chair OR Sit on chair and move on
Sponge ball (2)	8	Kick ball OR Bounce ball
Bike (2)/horse	9	Ride bike OR Sit on toy horse and get off
Bobo doll	10	Punch Bobo doll OR Kick Bobo doll
		Probe sessions
Hurdle	1	Jump over hurdle OR Crawl under hurdle
Bowling pin (2)	2	Knock down pins OR Put pin on desk
Desk/mug (2)	3	Put mug in desk OR Put mug on desk
Rope	4	Jump over rope OR Crawl under rope
Steps/jungle gym	5	Climb up steps OR Climb over jungle gym
Slide/carriage (2)	6	Go down slide OR Push carriage
Balance beam	7	Walk on beam OR Walk beside beam
Scooter (2)/tire	8	Ride scooter OR Step in and out of tire
Hippity hop (2)/ball (2)	9	Jump on hippity hop OR Roll ball
Set of blocks (2)	10	Set up blocks OR Knock down blocks

from the next location by a distance of 3.5 m. Table I lists the objects used for both training and probe sessions, the location of the objects with respect to the order in which they were used by the children, and the activities associated with the objects at each location. Some locations had two identical objects associated with them (e.g., two cups), one to be used by the model and one, by the observer. This situation is noted in Table I by the number 2 in parentheses. Some locations had two different objects associated with them, for example, a bike and a toy horse. This situation is noted in Table I by a slash mark (e.g., bike/toy horse). In this case, the model would choose one of the objects, perform the activity, and move on, leaving the object free for the observer to respond to. Finally, some locations had only one object associated with them (e.g., a Bobo doll). In this case, the model would demonstrate an activity and move on, again leaving the object free for the observer to respond to.

The probe setting was a gym room that measured 25 × 10 m. Again, 10 locations were used. The objects were arranged in a circuit around the room and adjacent to the walls such that the 10 locations were equidistant from one another.

Follow-the-Leader, the target activity for the present study, is typically enacted in the preschool setting using a series of more or less arbitrary

objects and actions. Notwithstanding this fact, we intentionally included a number of functional behaviors in both the training and the probe sessions in order to enhance the naturalistic dimension of the study. Thus, behaviors such as riding a bike, bouncing a ball, climbing on a jungle gym, going down a slide, and stacking blocks were incorporated into the procedures to give the participants greater exposure to common preschool activities. From time to time throughout the school year, the children would encounter several of these activites. However, at no time, had there been an attempt to build in the targeted activity, namely, Follow-the-Leader.

Procedure

Experimental Design and Overview

The order of conditions was as follows: motor proficiency pretest, baseline probes, training, posttraining probes. The motor pretest was given to determine whether each child was physically capable of performing all the actions involved in the experiment. In baseline probes, each child was required to observe a normal peer model perform various actions with respect to 10 objects arranged in a sequence. The observer was given an opportunity to imitate the actions of the model as the model worked his way through the sequence. In the training sessions that followed, 10 new objects were introduced and the observer was prompted and reinforced for imitating the peer model as he worked his way through the new sequence. Training was introduced in a multiple baseline design across children. Once the observer reached a final mastery criterion, probe sessions were reintroduced using the original 10 objects to assess whether any gains in imitative skills had occurred since baseline.

Motor Proficiency Pretest

If the observer failed to imitate the model during the probe sessions, that could mean one of two things: either the observer was poor at imitation or he was physically incapable of performing the action. To rule out the latter possibility, we conducted a motor proficiency pretest involving the 20 actions that were to be used during the probes. In the pretest, we verbally instructed each observer to perform the action (e.g., "Roll the ball") and/or gestured to the child (e.g., by pointing first to the mug and then to the top of the desk in order to get the child to put the mug on the desk) and/or gave minimal physical prompts (e.g., positioned the child in front of the jungle gym steps and then nudged him to climb the steps). Each action was pretest-

ed once. All four children scored 100% correct indicating that they were physically capable of performing the 20 actions.

Training

All training sessions were 25–40 min long with the exceptions noted below. The adult began the initial training session by telling the model what action to perform with respect to the object at the first location (e.g., "Put the cup in the can."). The model was required to repeat the verbal instruction to verify that he knew what to do (e.g., "I put the cup in the can."). In addition, the adult told the model to begin a trial by turning to the observer and saying "Watch me." Finally, the model was instructed to tell the observer, "No, X [the observer's name], that's wrong" whenever the model saw the adult shake his head. The adult shook his head only at the end of a trial in which the observer failed to respond or made an incorrect response.

After the model had been instructed, the observer was brought into the training setting. Observer and model were positioned 0.6 m from the objects at the first location. The adult nudged the model in the arm as a cue to begin the sequence. At this point, the model turned to the observer and said "Watch me." Then, the model picked up one of the cups, walked to the second location, and placed the cup in the can. The model remained at the second location facing the adult and waited 5 sec for the observer to respond in like manner. If the observer correctly imitated the model's action, the model escorted the observer back to the first location. After 5 sec, the adult provided general praise contingent on effort rather than specific performance (i.e., the adult said to the observer, "You're trying really hard. Good for you!"). This procedure was carried out to help maintain the observer's motivation to perform without making the observer dependent on the adult for response-specific feedback. The model also received general praise.

If the observer failed to respond or gave an incorrect response (e.g., placed the cup beside the can rather than in the can), the model said "No, X, that's wrong." Then, the model took both cups and returned with the observer to the first location. A prompting procedure was now initiated.

Before a prompted trial, a second adult led the observer 6 m away from the model and out of earshot so that the first adult could instruct the model what to do. The observer was also turned so that he could not see the model. In a low voice, the first adult told the model, "I want you to take X by the arm and lead him right up to the cup. Then I want you to pick up your cup. If X doesn't pick up his cup, I want you to take his hand and put it on his cup. Then, I want you to take X by the arm and lead him to where the can is. You put your cup in the can. If X doesn't do this too, I want you to take his hand and help him put his cup in the can." The model was required to

repeat the instructions. If the model did not understand, the adult gave the instructions again and visually showed the model what to do. Next, the first adult positioned the two children to begin the trial. The model said "Watch me" and went through the prompt sequence. General praise was omitted on all prompted trials. If the observer responded correctly, the next trial was run without prompts. If the observer failed to respond to the model's prompts, the trial was repeated and an adult verbal prompt was used. Specifically, after the model said "Watch me" and picked up the cup, the adult pointed to the model while facing the observer and said to the latter child, "See what he (the model) is doing? You do it too." If necessary, this prompt was repeated at various points during the trial as the model went through the action sequence. Adult prompts were used on less than 1% of the trials during the entire experiment and were always effective. The mastery criterion for this phase of training was three correct responses in a row without prompts. At this point, the procedure was repeated for the second activity; that is, the model now placed the cup on top of the can. Again, the mastery criterion was three correct unprompted responses in a row. In the last phase, the model demonstrated the two activities in a random sequence with the constraint that the same activity was not modeled on more than two trials in a row. The mastery criterion was now six correct unprompted responses in a row on the randomized sequence.

Once the actions initiated at the first location had been mastered, the actions initiated at the second location were introduced using the procedures just described. On each trial, both model and observer began by carrying out one of the actions initiated at the first location as before but now they moved on to the second location where the next phase of training took place. The model stood at the second location, facing the adult, and waited for the adult to give a visual signal (i.e., a slight head nod) as to when to initiate the next action. At that point, the model either picked up the can from the second location and placed it in a box at the third location or placed it on top of a box at that location. The adult now provided general praise to the observer when that child correctly completed the action initiated at the second location. Once the observer reached the mastery criterion of six correct responses in a row, a procedural modification was introduced. Specifically, the model stopped saying "Watch me" prior to initiating the action at the second location. The new criterion was six correct responses in a row without use of the phrase "Watch me." That is, beginning at this stage of training, the model would say "Watch me" at the start of a trial (i.e., the first location) only. The activities associated with the third location were also taught using the procedures just described.

Next, training was introduced at the fourth location which differed from the first three in that there was only a single object involved, namely, a table. Nonetheless, the procedure was the same as before in that the model

demonstrated one of two actions (i.e., either crawling under the table or walking by the table and touching it). The fifth location differed from the preceding four in that there were two different objects involved, namely, a hat and a large plastic cone. The model performed a different action with respect to each object but, in all other respects, the procedure was the same. The remaining locations represented one or more of the same type of object situations already described.

After training was completed at the 10th location, additional sessions were run until the observer met a final criterion. This criterion consisted of 100% correct responding across all 10 locations for 5 consecutive sessions. The actions at each location were randomized from session to session. Sessions were no longer 25–40 min. Instead, they consisted of the 10-location sequence of actions repeated twice. That is, the model and observer went through the sequence once and then, after a 2-min pause, they went through the sequence again. Once criterion was reached, probe sessions were conducted.

Baseline and Posttraining Probes

The purpose of these sessions was to determine if the observer would display imitation skills in a new setting and in the presence of objects and activities that differed from those used in training. These sessions were run prior to training (thus constituting a baseline) and following training (thus constituting a test for setting generality of acquired imitation skills). The baseline (and later posttraining probe) procedure duplicated that used in earlier peer modeling studies. That is, the peer model was positioned in close physical proximity to the observer. In addition, the model began a trial by verbally instructing the observer to pay attention ("Watch me.").

On each trial, the model demonstrated one of two actions at each of the 10 probe locations delineated in Table I. The action demonstrated at each location was randomized both within and between sessions with the constraint that a specific action at a given location could occur on no more than three trials in a row at that location over days. The probe procedure was the same as that used in the final criterion sessions of training (i.e., the 10-location sequence of actions was repeated twice). Two procedural changes were made. Specificially, neither the model nor the adult provided any prompts or negative feedback. Thus, if the observer responded incorrectly or made no response, the model would simply move on to the next location (after receiving the adult's cue to do so) and omit any correction procedure. Irrespective of the nature of the observer's performance, the adult provided general praise for effort after the 10-location sequence was completed. We continued to run posttraining probes for each child until the school year ended or the child became unavailable because of competing school activities.

Response Definitions and Reliability

Because there were 20 response definitions for training and 20 more for probes, we define only the first 2 as examples. (The complete list can be obtained by writing to the authors.)

Consider the first location for the probes. The action "jumping over hurdle" was defined as the observer's jumping or stepping over the hurdle so that it was not knocked down. The action "crawl under hurdle" was defined as the observer's crawling on all fours under the hurdle so that it was not knocked down. The remaining response definitions were similarly concrete and easily defined.

All responses were recorded on precoded data sheets on which all 10 locations and actions were listed. The coder merely had to check "yes" (correct) or "no" (incorrect) next to each item on the sheet. Coders were positioned 3 m from the children and maintained that distance from them as the children moved through the sequence. Reliability coders were drawn two at a time from a pool of three coders who were supplied with a complete list of response definitions at the start of each session. During training, reliability was assessed across the four children in 65% of the sessions on the average (range: 40–100% of the sessions) and during probes, in 57% of the sessions on the average (range: 31–78% of the sessions). Coder records were compared item by item and the reliability index was the number of agreements divided by the number of agreements plus disagreements multiplied by 100 to yield a percentage. The mean reliability across the four children was 95% in training (range: 93–100%) and 99% for probes (range: 98–100%).

RESULTS

On the motor proficiency pretest, all four children scored 100% correct. This outcome demonstrated that the children were physically capable of performing the action associated with each object. Therefore, poor baseline scores reflected a lack of imitation skill rather than motor deficits.

The number of training sessions needed to reach criterion was 8 for Sal, 14 for Ed, 27 for Ben, and 25 for Joe. On trials in which the observer failed to imitate correctly, the observer showed either of two behavior patterns. One pattern involved self-stimulation (e.g., hand gazing). The child would stop attending to the model for a period of time while self-stimulating. During this period, performance on the next several trials would typically be incorrect. Ben and Joe commonly self-stimulated and they required the greatest number of training sessions. The second pattern was common for Sal and Ed. When they were incorrect, they would characteristically not wait

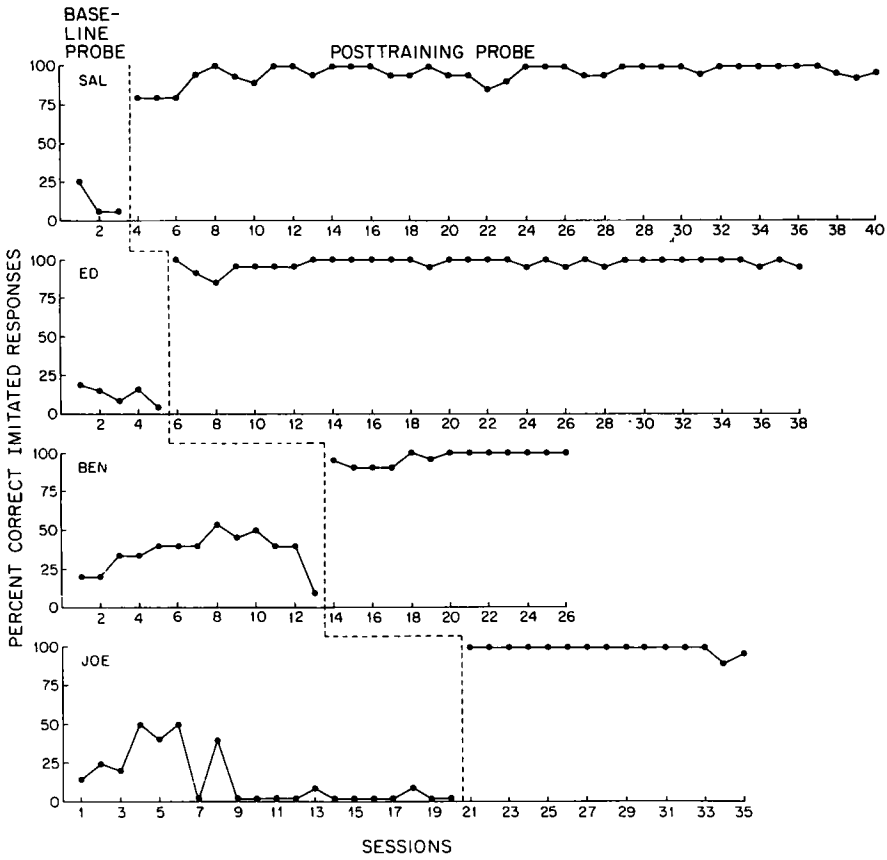

Fig. 1. Percentage of correct responses shown by four children with autism engaged in a Follow-the-Leader activity. Data show responding in a novel situation both prior to a modeling intervention mediated by a normal peer (baseline probe) and following such intervention (posttraining probe).

for the model to demonstrate the action but instead would run to the object and begin to play with it, ignoring the model.

Figure 1 shows the percentage correct imitated responses for each observer during the probe sessions. In baseline, the average level of correct responding was 11.7% for Sal, 13% for Ed, 36.2% for Ben, and 13% for Joe. Correct responding in baseline probes had a distinctive pattern. Since the observers were familiar with many of the objects prior to the study, they sometimes approached the objects and played with them in a perseverative manner. For example, to the extent that they manipulated the bowling pins at all, they would repeatedly knock them down. Since this action occasion-

ally matched that of the model, it would be scored as correct. However, when the model switched his behavior (e.g., put the bowling pin on a desk), the observer ignored the model and continued to knock down the pins. In sum, fortuitous matching did occur in baseline and produced levels of correct responding as high as 50% in isolated sessions for some children (Ben and Joe). When the observers were not engaging in fortuitous matching, they typically wandered off to a corner of the room or spent the entire session playing with a few specific objects. In either case, they did not attend to the model and therefore got many trials incorrect.

Following training, the average correct imitation score (posttraining probes) increased abruptly for all four children to 95.5% for Sal, 97.7% for Ed, 96.9% for Ben, and 99% for Joe. The high level of correct imitation was maintained during the entire posttraining period. Several anecdotes are worth noting. First, all observers showed many instances of positive affect throughout the posttraining probes. For example, they would laugh and smile while imitating the model. This type of behavior was absent in baseline. Second, in both baseline and posttraining, the model would frequently embellish an activity. For example, he might announce "I'm Superman" while climbing over the jungle gym. Interestingly, the observer would often imitate such behavior but only during posttraining, not baseline.

DISCUSSION

Children with autism can acquire a common preschool activity, namely, Follow-the-Leader, by observing the behavior of a normal peer model who systematically demonstrates the behavioral components making up the activity. The baseline procedure, which duplicated that used in previous studies of peer modeling, was unsuccessful. Specifically, close physical proximity of observer and model coupled with verbal prompts ("Watch me.") given by the model did not produce peer-modeling effects. Nonetheless, the results suggest that an activity, such as Follow-the-Leader, involving extended behavior chains in a free-field situation, can be acquired observationally if a period of training is provided in which the peer uses a combination of physical prompts and verbal feedback. Subsequent to this training, children with autism reliably transferred their newly acquired imitative skills to a nontraining (probe) setting involving new objects and actions. Thus, the procedures developed in the present study constitute one strategy for producing setting generality of peer modeling effects.

A critical element in developing competence in imitation likely centers on the involvement of multiple responses and/or multiple objects during training. In pilot work, we had used a single object at each location (e.g., a ball)

associated with a single response (e.g., kicking the ball). Unfortunately, we discovered that following this procedure, the observer did not acquire true imitative skills. Specifically, on probe trials, when the peer model bounced the ball instead of kicking it, the observer ignored the model and continued to kick the ball. The autistic observer had come under control of the stimulus object (the ball) and not the behavior of the model. Interestingly, similar observations have been made on young normal children (McCall et al., 1977). In the present study, we solved this problem by having the model randomly perform either of two behaviors at each location (e.g., bouncing the ball vs. kicking the ball, or riding the bike vs. sitting on the toy horse). This procedural change made it necessary for the observer to attend to the behavior of the model as well as the presence of the stimulus object.

A second factor pertaining to the development of modeling competence may be the use of peer-prompting procedures. Traditionally, adult prompting had been successfully employed to develop basic skill repertoires (Lovaas et al., 1966, 1967). However, the use of adult prompting alone may cause the autistic child to focus exclusively on adults thereby failing to attend to and learn from peers. For this reason, peer prompting has been recommended as an important strategy for producing additional behavior development (Lovaas, 1981; Strain, Kerr, & Ragland, 1979). The results of the present study lend further empirical support to this recommendation.

Third, just as the inclusion of multiple behaviors and multiple objects may be critical in the initial acquisition of imitative competence, so too they may be critical in bringing about generalization of this skill. The fact that training involved 12 different objects and 20 different behaviors means that intervention was essentially an exercise in multiple examplar technology. This technology has proven efffective in promoting generalization across a variety of skills and clinical populations (Stokes & Baer, 1977). The consistent improvement in imitation skills observed during posttraining probes involving new objects and a new setting may be seen as a further example of the power of multiple examplar training in promoting stimulus generalization. It must be noted, however, that although the training and probe settings differed in terms of the objects and activites used, there were some common stimulus features. Specifically, the adult trainer, the observers, and the peer model were present in both settings and could therefore have been an additional factor promoting setting generality. It may be worthwhile in future research to manipulate such person variables in order to evaluate the extent to which they contribute to generalization effects and the manner in which they can best be organized to promote clinically useful setting generality.

Interestingly, during posttraining probe sessions, the observer continued to perform correctly in spite of any direct reinforcement from either adult or peer for specific imitative acts. One explanation for this maintenance ef-

fect is that a number of the activites involved were likely intrinsically reinforcing. Knocking down pins, climbing over a jungle gym, and riding a scooter, for example, may be reinforcing in and of themselves, irrespective of whether an adult or peer provides praise. The many expressions of positive affect on the part of the observers anecdotally noted during a number of the probe sessions support an intrinsic reinforcement explanation of maintenance effects. This notion implies that judicious selection of object/activity pairs could play an important role in facilitating or inhibiting long-term display of imitation skills once these skills have been induced through training. Specifically, selection of pairs lacking intrinsic reinforcement value mayresult in poor maintenance. Also, in the case of Ben and Joe, the intrinsic reinforcement associated with several of the activities may have successfully competed with the intrinsic reinforcemnt associated with self-stimulatory behavior (see Carr & Kologinsky, 1983). Anecdotal observations suggested that self-stimulation in these two children decreased as training progressed. A direct empirical analysis of this phenomenon seems warranted.

Finally, there is the anecdotal observation that following training, observers would often imitate the model when he embellished an activity. Since these embellishments were not part of the training protocol, their imitation suggests that observers who are exposed to intensive peer modeling may display unanticipated behavior change. This possibility needs to be empirically tested. Perhaps, by further expanding the intervention so that it includes an even greater number of settings and a still longer exposure to the peer, the broad modeling effects that are the hallmark of behavior development in normal children may also be seen in children with autism.

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