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ABSTRACT

The study compared the effectiveness of peer and adult models in teaching an expressive language task to four autistic boys (9-11 years old). Ss had well developed imitative repertoires and some spontaneous language. Using a BCBC design, counterbalanced across modeling conditions and replicated across Ss, autistic Ss were taught to respond to questions involving common objects and actions. The effectiveness of teaching methods was assessed through rate of learning, generalization, and maintenance of correct responding. Results indicated that all four Ss learned through observing peer and adult models and that few, consistent differences occurred across the two modeling conditions. Also, the degree of generalization of responding was consistently high in both conditions. (CL)

Observational Learning: Peer versus Adult Models and Autistic Children's Learning

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RUNNING HEAD: Peer versus Adult Models

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Observational Learning: Peer versus Adult Models and Autistic Children's Learning

Although the discrete trial method of teaching has been demonstrated to be effective in teaching a wide variety of behaviors to autistic children, this method is very time consuming and often the behaviors taught with this approach do not generalize to extra-treatment settings or personnel (Charlop, Schreibman & Tryon, 1983; Harris, 1975; Koegel, Rincover & Egel, 1982; Rincover & Koegel, 1975). In addition, behaviors taught with the discrete trial method are infrequently maintained over time (Lovaas, Keogel, Simmons & Long, 1973).

Recently, investigators have examined the efficacy of observational learning as an alternative teaching method with autistic children. Modeling has been demonstrated to be effective in teaching skills such as play behavior and discrimination tasks. Two studies have employed adult models (Riguet, Tayler, Benaroyn & Klein, 1981; Varni, Lovaas, Koegel & Everett, 1979) and three used peer models (Coleman & Stedman, 1974; Charlop et al., 1982; Egel, Richman & Koegel, 1981). Although a large amount of research has documented the effect of model characteristics on learning in normal children (e.g., Bandura, 1977), the efficacy of different kinds of models has not been examined with autistic children.

The aim of the present study was to address this issue by comparing the effectiveness of peer and adult models in teaching an expressive language task to four autistic children. More specifically, rate of acquisition, generalization of responding to extra-therapy examiners and settings and behavior maintenance were compared across peer and adult modeling conditions.

Method

Subjects

Four autistic boys participated in this study. These children were

diagnosed as autistic, multiplically handicapped, by outside agencies and were enrolled in a language-behavior disorder program at a private school. The chronological ages of Child 1 through Child 4 were 10.8 years, 7.11 years, 10.4 years and 9.1 years respectively (Mean CA = 9.4 years). The children's intellectual functioning, as derived from standardized tests, was at the mentally retarded level. They were functioning academically at the second or third grade level, but were deficient in age-appropriate social behavior, play and language. All the children exhibited such language deficits as echolalia, pronoun reversal and perseveration. All of the children engaged in mild to moderate amounts of self-stimulatory behavior.

Models

A 9.2 year old, non-autistic boy served as the peer model; a 27 year old male, unfamiliar with the subjects, served as the adult model in this study.

Design and materials

A BCBC design, counterbalanced across modeling conditions and replicated across subjects was used to teach the autistic children to respond to questions involving common objects and actions. Questions were chosen by the children's failure to answer them correctly during a pretest administered both at the beginning of the experiment and before each condition. Subjects were randomly assigned to modeling condition sequences.

Dependent variables

The effectiveness of teaching methods was assessed through a) rate of learning, b) generalization of responding to an extra-therapy school examiner and setting and to the mother in the home, and c) maintenance of correct responding.

Training

Subjects were pretested in the training setting to make sure they were

unable to answer the training questions correctly. Training sessions were conducted in an empty classroom. The model sat next to the experimenter, facing the subject across a table. The autistic children observed the peer or adult model correctly answer a question and be contingently reinforced with verbal praise and food by the examiner. The subject was then asked the same question. Correct responding (answering the question properly within five seconds) was contingently reinforced with verbal praise and food; incorrect responding (answering the question incorrectly or not responding) was consequated by a "no" from the examiner. The procedure was repeated for a total of 20 trials. If the subject's attention wandered, he was cued to "pay attention". Severe off-task behavior (e.g., tantrums) was consequated by removal from the training area. The session was continued when the subject was calm and quiet. Each modeling condition consisted of a set of five questions, asked in a random order. Criterion for successful learning in a condition was 80% correct for each of the five questions. Training was conducted three days per week.

Generalization probes

After criterion was reached in a training condition, the subject was asked the same set of questions, in a randomly determined order, by an unfamiliar adult female in an extra therapy school setting. The subject was also asked the training questions by his mother at home. Responding was not consequated, but in order to maintain attention, the subject was reinforced for "good work" with verbal praise and food after approximately every fourth trial.

Maintenance probes

After generalization probes were conducted, the training questions for that condition were asked by the experimenter at one-week intervals to assess maintenance of correct responding. The questions were asked in a randomly

determined order for a total of 20 trials per set. Responding was not consequated, but subjects were reinforced as above.

Recording and reliability

All training, generalization and maintenance sessions were audio tape recorded for purposes of reliability scoring. Reliability was conducted on ninety-three percent of both the training and maintenance sessions. Responses were scored as correct or incorrect, as defined above, by an independent rater who was blind as to the purpose of the study. For school generalization probes, reliability was assessed for all sessions. Home generalization probes were scored by a trained undergraduate research assistant and the reliability of home generalization data was conducted on all sessions.

Results

Reliability

Trial-by-trial reliability for occurrence and nonoccurrence of correct responding was calculated by dividing the total number of agreements (identical recording by both observers on a given trial) by the total number of agreements plus disagreements in each session and multiplying by 100.

Training. The average reliabilities for the two model conditions for Child 1 were 97.8% (range: 90-100%) for the adult model and 97.3% (range: 90-100%) for the peer model. The average reliabilities for the two model conditions for Child 2 were 86.8% (range: 85-100%) for the adult model and 99.1% (range: 85-100%) for the peer model. The average reliabilities for the two model conditions for Child 3 were 99% (range: 95-100%) for the adult model and 100% for the peer model. The average reliabilities for the two model conditions for Child 4 were 95% (range: 65-100%) for the adult model and 87.3% (range: 70-100%) for the peer model.

Generalization. For school generalization probes average reliabilities

were 98.8% (range: 95-100%), 100%, 91.3% (range: 80-100%), and 90% (range: 75-100%) for Children 1 through 4, respectively. For home generalization probes average reliabilities were 87.5% (range: 75-100%), 91.3% (range: 75-100%), 90% (range: 75-100%), and 88.3% (range: 75-95%) for Children 1 through 4, respectively.

Maintenance. The average reliabilities for Child 1 were 100% for the adult model and 98.2% (range: 85-100%) for the peer model. The average reliabilities for Child 2 were 100% for the adult model and 97.7% (range: 75-100%) for the peer model. The average reliabilities for Child 3 were 91.6% (range: 75-100%) for the adult model and 92.2% (range: 70-100%) for the peer model. The average reliabilities for Child 4 were 85.3% (range: 55-100%) for the adult model and 85% (range: 70-100%) for the peer model.

Response acquisition

Figure 1 shows the results of training using adult and peer models for Child 1 and Child 2. For both of these subjects, Set A and Set C questions were taught with the peer model, while Set B and Set D questions were taught with the adult model.

In the peer model condition Child 1 reached criterion in 4 and 9 sessions for Set A and Set C questions, respectively. In the adult model condition, Child 1 reached criterion in 3 and 6 sessions for Set B and Set D, respectively. With a peer model, Child 2 reached criterion in 10 and 7 sessions for Set A and Set C, respectively. Using an adult model, Child 2 reached criterion in 5 and 6 sessions for Set B and Set D, respectively.

Figure 2 shows the results of training using adult and peer models for Child 3 and Child 4. For both of these subjects Set A and Set C questions were taught with the adult model, while Set B and Set D questions were taught with the peer model.

In the adult model condition Child 3 reached criterion in 4 and 3 sessions for Set A and Set C, respectively. With a peer model, this child reached criterion in 5 and 3 sessions for Set B and Set D, respectively. In the adult model condition, Child 4 reached criterion in 11 and 9 sessions for Set A and Set C, respectively. In the peer model condition, Child 4 reached criterion within 14 and 5 sessions for Set B and Set D, respectively.

Generalization

Table 1 shows the percentage of correct responding during the school and home generalization probes. All children were able to generalize correct responding from the training setting to unfamiliar school settings and to the home. The average percentage of correct responding was 98.8% (range: 95-100%), 94.3% (range: 75-100%), 88.8% (range: 70-100%), and 87.4% (range: 50-100%) for Children 1 through 4, respectively. No discernable effects of type of model were noted with respect to response generalization.

Maintenance

Table 2 shows the percentage of correct responding during weekly maintenance probes. All children maintained high levels of correct responding, even up to 18 weeks after reaching criterion in training. The average percentage of correct responding was 98.8% (range: 90-100%), 95.2% (range: 65-100%), 88.1% (range: 45-100%), and 88.1% (range: 45-100%) for Children 1 through 4, respectively. No discernable effects of type of model were noted with respect to maintenance of correct responding.

Discussion

The purpose of this study was to assess whether peer and adult models differentially affected autistic children's learning answers to questions. The present data suggest that the subjects learned equally well with either type of model. In addition, generalization of correct responding to extra-training

settings occurred with both kinds of modeling conditions. Similarly, maintenance of correct responding over periods as long as 18 weeks occurred for both conditions.

The present results are similar to those of Charlop et al. (1983) and Egel et al. (1981). In all three studies autistic children learned by observing peer models. However, the current data are contradictory to those of Varni et al. (1979), which demonstrated that observing adult models was not an effective teaching strategy for autistic children. This discrepancy might reflect differences in subject characteristics or tasks across the two studies. Although the present subjects demonstrated impairment in several areas of functioning, all had acquired the ability to initiate both verbal and nonverbal behaviors. In contrast, the subjects in the Varni et al. (1979) study had severely impoverished imitative repertoires. Egel et al. (1981) and Varni et al. (1979) have suggested that imitative ability is a prerequisite for observational learning. In the present study the model's and subject's responses were alternated for a total of 20 trials per subject each session, while in the Varni et al. (1979) study, the autistic children observed the model for 20 trials before being allowed to respond. Perhaps the procedure in the present study enhanced the subject's attention to the model.

The lack of differentiation between learning in peer and adult model conditions may have been due to the novelty of both models, as well as the entire training situation, for the subjects. Attentional skills may have been enhanced (e.g., Dunlap & Koegel, 1980; Egel, 1980; Egel et al., 1981) through being taught these tasks in a one-to-one setting involving reinforcement and attention from the experimenter and model. Alternatively, perhaps the subjects perceived both types of models to be equally prestigious, competent and/or rewarding (Bandura, 1977), and thus the modeling conditions were equally

effective.

In general, the present data suggest that both modeling conditions were effective teaching strategies for these autistic children. In addition, both types of models seem to have facilitated generalization of correct responding to two extra-training settings and examiners and to have maintained correct responding for over 18 weeks. Perhaps these high levels of generalization and maintenance are due to the looser structure of both modeling conditions (Charlop et al., 1983).

It appears that modeling is an effective strategy for teaching autistic children. It is also a cost-effective technique for use in the classroom. Several children can learn simultaneously in a more normal manner than in a highly structured one-on-one situation (Charlop et al., 1983). The results of the present study suggest that both peers and adults would be equally effective as teachers. Autistic children would seem to benefit from being at least partially integrated in classrooms with normal peers. Also, since the present subjects learned from observing adults models as well as peer models, utilizing adult aides, teachers or other personnel is an alternative in settings where normal peers are not available. Finally, the use of modeling may facilitate generalization and maintenance of correct responding after training.

It is difficult to generalize from the results of the present investigation to all autistic children in all learning situations. Thus, future research should compare peer and adult modeling conditions using autisitc children who demonstrate different levels of functioning. Also, the efficacy of peer versus adult models may vary across tasks. A third issue for further research is the differential effectiveness of modeling conditions versus discrete trial conditions. In the one study to date comparing these approaches, Charlop et al. (1983) demonstrated that low functioning autistic children learned

receptive labeling tasks in both traditional discrete trial and modeling conditions. In addition, generalization and maintenance of correct responding were superior when the children learned through observation than by discrete trial teaching. Research designed to replicate and extend these findings using different kinds of tasks and subjects at different levels of functioning is important because of the potential implications of such research for improving our current teaching strategies.

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Authors' Note

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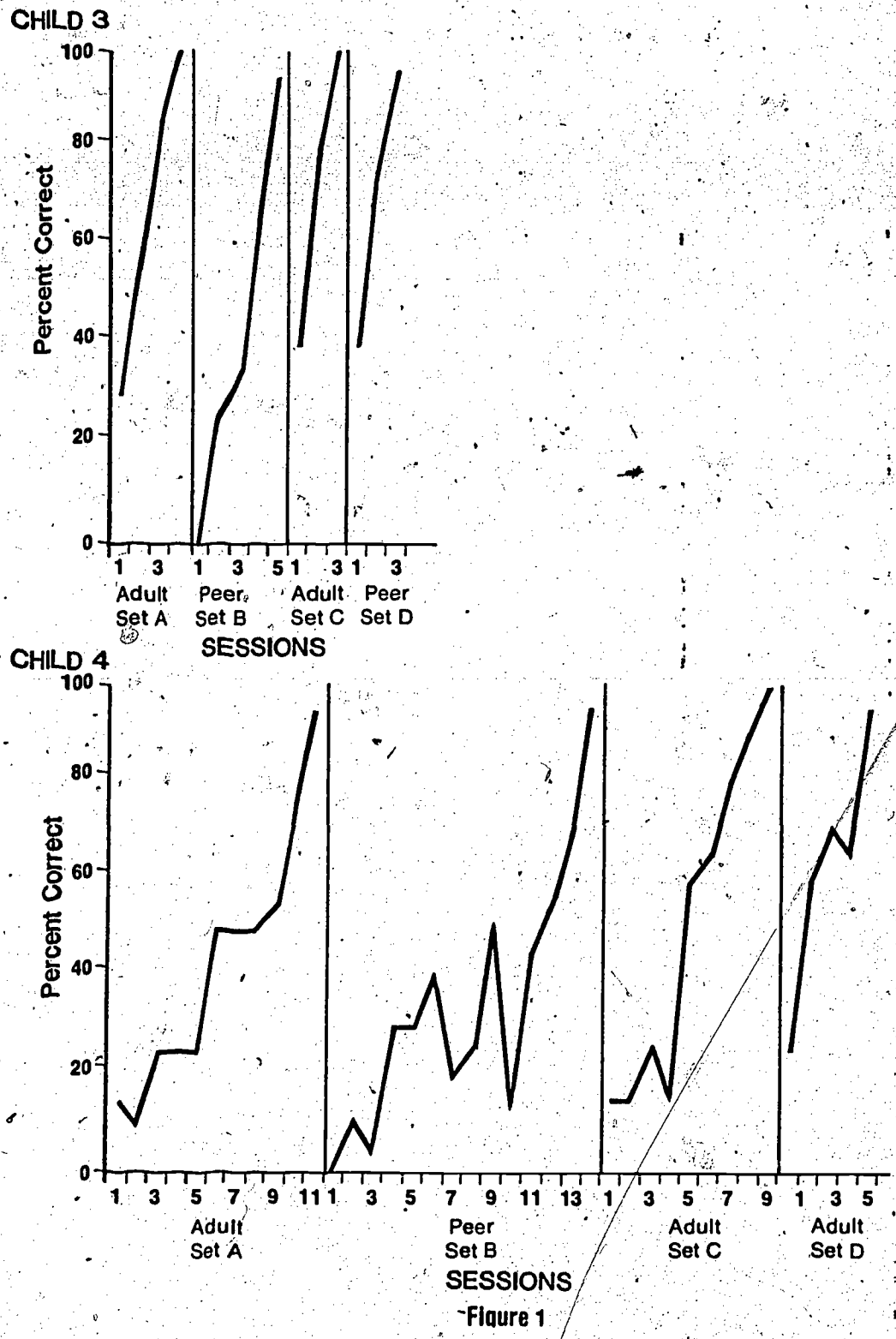
CHILD 3
Percent Correct
100
80
60
40
20
0
1 3 1 3 5 1 3 1 3
Adult Set A
Peer Set B
Adult Set C
Peer Set D
SESSIONS
CHILD 4
Percent Correct
100
80
60
40
20
0
1 3 5 7 9 11 1 3 5 7 9 11 13 1 3 5 7 9 1 3 5
Adult Set A
Peer Set B
Adult Set C
Adult Set D
SESSIONS

Figure 1

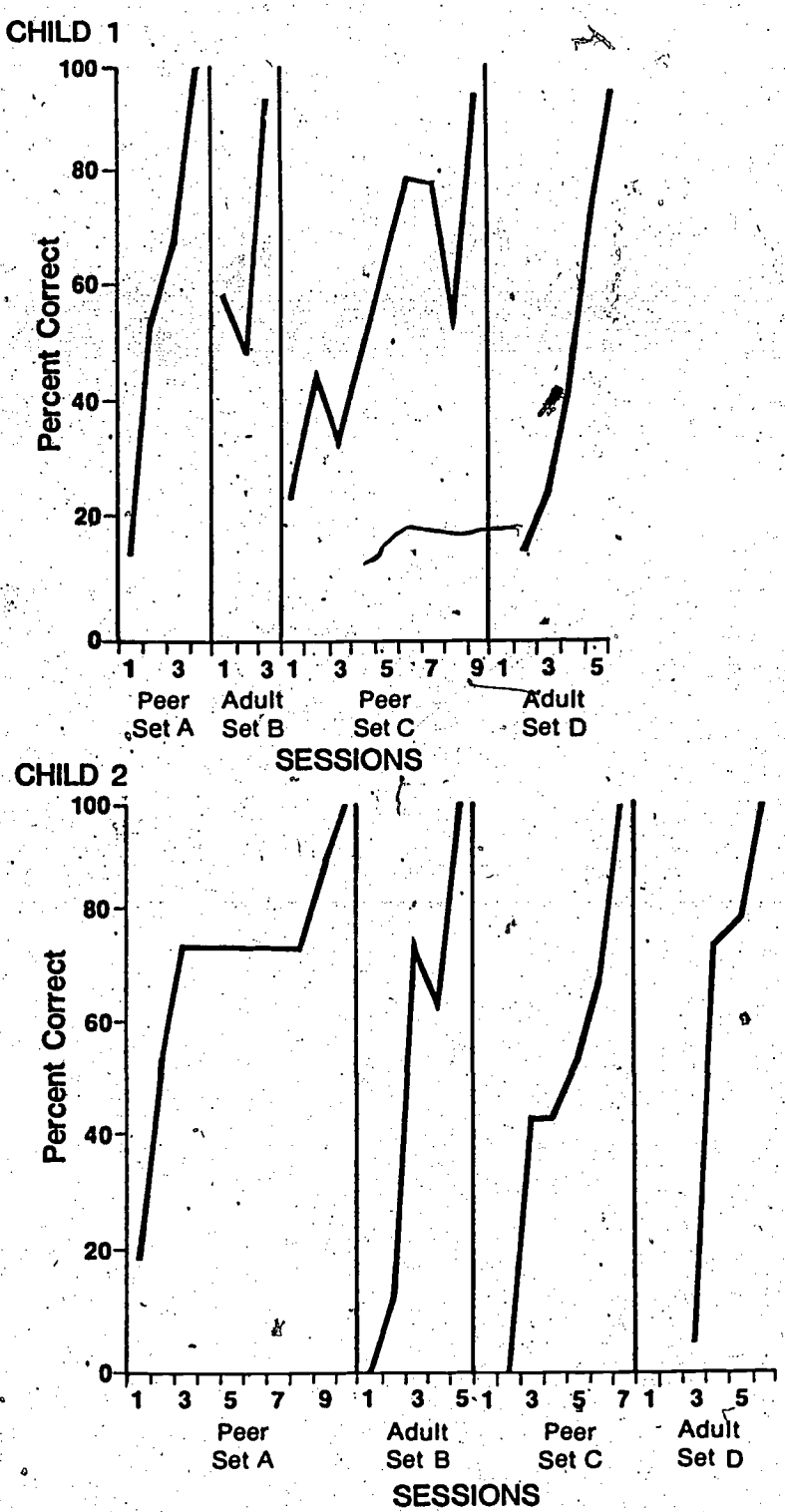

Figure 2.
Children's performance during acquisition for the peer and adult modeling conditions.

Table 1

Generalization Data

	Peer Model		Adult Probe	
	School Probe	Home Probe	School Probe	Home Probe
Child 1				
Set A	95	100	Set B 100	95
Set C	100	100	Set D 100	100
Child 2				
Set A	84	100	Set B 100	100
Set C	100	75	Set D 100	95
Child 3				
Set B	95	95	Set A 75	100
Set D	70	80	Set C 95	100
Child 4				
Set B	50	100	Set A 90	85
Set D	89	90	Set C 95	100

Note: Figures represent percentages of correct responding in school and home probe settings. The percentages are based on five presentations of each of the four questions per training set.

Table 2

Maintenance of Correct Responding

	Peer Model														
Child 1															
Set A	100	100	100	100	90	90	100	100	100	100		100	100	100	
Set C	95	100	95	100	100	95	100								
Child 2															
Set A	100	75	100	100	100	65	100	95		95	100	100	100		
Set C	95	100	100	95											
Child 3															
Set B	100	100	100	100	95	95	95	100	75	95	100				
Set D	70	75	75	90	90	90	90								
Child 4															
Set B	75	75	65	100	70	75									
Set D	90	70	75												
	1		3		5		7		9		11		13		15

Probe Sessions

Note: Figures represent percentages of correct responding during probes that were conducted after criterion had been reached. The percentages are based on five presentations of each of the four questions per training set.

Adult Model

Child 1

Set B 100 95 100 100 100 100 100 100 100 100 100

Set D 100 100 100 100 100

Child 2

Set B 90 100 100 95 100 100 100 100 100 100

Set D 90 90

Child 3

Set A 100 100 100 100 100 100 100 50 95 100 100 75 65

Set C 100 100 100 95 95 100 90 100 100

Child 4

Set A 95 90 90 95 90 100 100 100 100 100 100 100 100 100 95 95

Set C 100 75 95 90

1 3 5 7 9 11 13 15