

*INCREASING AUTISTIC CHILDREN'S SPONTANEOUS VERBALIZATIONS
OF AFFECTION: AN ASSESSMENT OF TIME DELAY AND
PEER MODELING PROCEDURES*

MARJORIE H. CHARLOP AND MICHELE E. WALSH

CLAREMONT MCKENNA COLLEGE

We assessed the efficacy of time delay and peer modeling procedures in increasing autistic children's spontaneous verbalizations of affection. Four autistic children were taught to spontaneously say "I like (love) you" in response to a hug from a familiar person and their mother. Generalization from a free play training setting to free play outdoors and at home was assessed. Ancillary social and affection behaviors were also observed. Results indicated that the time delay was a quick and effective procedure for all the children. Peer modeling was unsuccessful in teaching the target behavior.

DESCRIPTORS: autism, speech, time delay

One of the most severe and persistent characteristics of autistic children is their marked deficit in social and affection behaviors. Their unresponsivity is seen in extreme withdrawal, isolated self-stimulatory behavior, inappropriate affect, and absent or delayed social smile (Rutter, 1978). Parents report great despair over their child's failure to express any affection towards them. The children's apparent disinterest in others discourages parents, peers, and teachers from attempting to interact with them, further lessening opportunities for learning (Lovaas, Koegel, Simmons, & Long, 1973). Additionally, autistic children generally appear unresponsive to verbal expression of affection. The lack of spontaneity in speech (Charlop, Schreibman, & Thibodeau, 1985) makes it unlikely that a verbal autistic child would initiate any unprompted expressions of affection. Thus, it is probably due to such unresponsivity and lack of spontaneity that researchers to date have not addressed the acquisition of appropriate spontaneous expressions of affection by autistic children.

Our study was designed to assess the efficacy of two procedures in increasing autistic children's affection behavior. Specifically, a time delay procedure (Charlop et al., 1985; Halle, Marshall, & Spradlin, 1979) and a peer modeling procedure

(Charlop, Schreibman, & Tryon, 1983; Egel, Richman, & Koegel, 1981) were used in an attempt to teach the children to spontaneously vocalize "I like you" or "I love you" in response to a hug by a familiar person or their mother, respectively. We employed the definition of spontaneity used in Charlop et al. (1985): "a verbal response to a nonverbal discriminative stimulus in the absence of a verbal discriminative stimulus." In addition, we assessed generalization of the affection behavior across settings and people, and observed the procedures' effect on ancillary social behaviors.

METHOD

Subjects

Four autistic boys who were diagnosed according to the National Society for Autistic Children's criteria (Ritvo & Freeman, 1978) participated in this study. Child 1 was 6 years old with a mental age of 4 years, 4 months. Mental ages for all the children were derived from the Leiter Scale. Child 1 displayed appropriate receptive and expressive speech but also exhibited immediate and delayed echolalia and inappropriate intonation. He engaged in self-stimulatory behavior such as hand-flapping and toe-walking, rarely maintained eye contact with others, and did not initiate conversations. He was previously taught to give hugs

Reprints can be obtained from Marjorie H. Charlop, Department of Psychology, Claremont McKenna College, Claremont, California 91711.

upon request, but they were generally accompanied by self-stimulatory behaviors. He rarely exhibited a social smile.

Child 2 was 8 years 9 months old with a mental age of 3 years, 7 months. He displayed some appropriate receptive and expressive speech, but most of it was echolalic. He engaged in gazing and hand posturing, and numerous off-task behaviors including tantrums, leaving his seat, and reaching for objects. He exhibited irrational fears of certain objects and extreme attachment to others. He preferred to play alone and frequently stiffened upon contact. When asked to give a hug, he generally responded with a brief, weak effort. He would only occasionally exhibit social smiles, and would rarely make eye contact.

Child 3 was 7 years 11 months old, with a mental age of 6 years 2 months. He displayed extensive expressive, receptive, and spontaneous speech, which primarily consisted of asking questions (e.g., "What's this called? What's it for?"). He exhibited articulation problems. He also engaged in grimacing, inappropriate laughter, and preoccupation with objects. He rarely made eye contact, played with others, or initiated hugs.

Child 4 was 8 years 6 months old with a mental age of 4 years. He exhibited limited expressive and receptive language, poor intonation and articulation, and little spontaneous speech. He engaged in self-stimulatory behaviors such as hand-flapping, grimacing, and inappropriate laughter. He occasionally exhibited aggressive behaviors such as spitting and pinching. When requested to give a hug, he would briefly place one or both arms limply around the other person. He preferred to be alone, exhibited poor eye contact, and rarely smiled.

Setting and Materials

Observations were made in three conditions:

1. **Free Play Indoors (Training Setting):** The child was taken into a 2.9 m × 4.3 m play room containing furniture (e.g., large chairs, coffee table, telephone) and various toys. The experimenter attempted to engage the child in play by making requests and offering toys (e.g., "Would you throw me the ball?").

2. **Free Play Outdoors:** The child was taken to a grassy lawn area where a different set of toys was available. The experimenter again tried to involve the child in play. The experimenter was a familiar person to the child, someone who had provided behavior modification sessions as well as free play sessions for over a year. In addition, the experimenter had previously engaged the child in several social activities such as taking walks, requesting hugs, giving tickles, and participating in holiday parties for the children. Thus, it was deemed appropriate that the experimenter (the second author) be the recipient of the target response of "I like you."

3. **Free Play at Home:** This setting consisted of the typical play area for the child (e.g., the child's room, the den). Toys available for the child were chosen by his mother. The mother served as the experimenter and attempted to engage the child in play. If training was necessary in this setting, the mother was taught, through modeling and feedback, both how to implement the time delay procedure and how to record the data.

Design

A multiple baseline across subjects and settings was used. Pretests and probes were implemented in the training and generalization settings. Two children were randomly chosen to serve as models and two served as learners. Generalization probes were presented from 3 days to 2 weeks after the completion of training. If generalization was not demonstrated, the behavior was subsequently trained.

Up to three modeling sessions were provided for the learners. A probe was conducted after each session to ascertain whether observational learning had occurred. If learning had occurred, generalization probes were conducted. If learning was not demonstrated, the learner participated in time delay training sessions in the free play indoors condition.

Time Delay

Baseline. This condition was established to determine whether the child would spontaneously

emit the "I like (love) you" target vocalization before intervention. In each of the free play situations, the experimenter (or mother) would request "Give me a hug." If the child did not move within approximately 10 s to hug the experimenter, she would again request, "Give me a hug" and provide the necessary physical prompt of approaching the child and placing his arms around her neck. After the hug, the experimenter would smile and, maintaining eye contact and the child in her arms, prompt by saying "I like you." A correct response would have been for the child to say "I like (love) you" after the hug, but before the experimenter (mother) vocalized. Had this ever occurred, it would have been reinforced with the child's preferred food reinforcer and with social reinforcers of a smile and praise (e.g., "What a good boy," "I like you, too"). Imitations of the experimenter's vocalization would have also been reinforced but not considered a correct response. The "Give me a hug" request was presented five times per session, approximately once per minute. After the baseline sessions had been conducted and none of the children had spontaneously vocalized "I like (love) you," Child 1 and Child 3 were randomly chosen and presented with the time delay procedure.

Training. In the first time delay session, the therapist again requested "Give me a hug." As the hug was completed, the experimenter looked the child in the eye, still maintaining the child in her arms, delayed 2 s, and modeled the response "I like you." If the child responded during the 2-s delay, or if he imitated the response, that behavior was reinforced with his preferred food and social reinforcers ("I like you, too"). If the child did not respond, the child and experimenter merely resumed playing until the next trial (approximately 1 min later). The delay was increased by 2-s increments when the child made two consecutive correct responses or imitations at the current delay. Only five trials per play session were presented because it would seem unnatural to request more hugs. Training was completed when the child spontaneously vocalized "I like (love) you" within 10 s following a hug in two consecutive sessions

on at least four of the five trials in the session. Generalization probes were then conducted.

Generalization Probes

Outdoor free play. The purpose of this probe was to assess generalization across settings. The experimenter requested "Give me a hug" five times, approximately once per minute, during the 5-min probe. A correct response was marked if the child said "I like you" within 10 s following the hug. Reinforcers were not provided contingent upon correct responses; rather, four or five reinforcers were provided for "nice playing" throughout the session so that the child did not cease to respond completely. Generalization was said to have occurred if the child made four correct responses during the five trials in the session. If generalization did not occur, the child was taught the response using the time delay procedure.

Home free play. This probe was designed to assess generalization across persons and settings and was conducted in the same manner as described above with the mother as the experimenter. If generalization did not occur, the mother used the time delay procedure to teach the behavior. If the child said "I like you," the behavior was said to have generalized. However, mothers were instructed to respond with "I love you, too" in order to encourage this response with them.

Peer Modeling

Child 1 and Child 3 served as peer models for Child 2 and Child 4, respectively, only after they reached criterion in the time delay procedure. In the modeling condition, both children (model and learner) entered the free play room with the experimenter. Approximately once per minute (five times in the 5-min probe), the learner was instructed to "Look, pay attention." He was physically prompted to face the model if necessary. The peer model was requested by the experimenter to "Give me a hug." His correct "I like you" response was reinforced with a snack and social reinforcers (e.g., "I like you, too" "What a nice boy"). The learner was then presented with the probe for observational learning. Acquisition of the behavior

was said to have occurred if the learner responded with the "I like you" vocalization within 10 s following a requested hug in four of the five probe trials. If the behavior was acquired, generalization probes were conducted. If the behavior was not acquired following the first presentation to the model, a second and third presentation condition and subsequent probes were conducted. If the behavior was not acquired following the third presentation, the learner was trained using the time delay procedure.

Ancillary Behaviors

For each session (including baseline) in the indoor and outdoor free play settings, observations were taken of other spontaneous affection and social behaviors to assess any positive side effects. The ancillary behaviors were: approach/touch (child initiated touch or child moved within 1 foot of experimenter or other child), social smile (within 1 foot and face-to-face with experimenter or child, or while engaged in a hug), eye contact (while within 5 feet of experimenter or child and for at least 1 s), spontaneous hug/kiss, spontaneous hello/goodbye verbalization, and spontaneous I like/love you verbalization. Observations were made by two trained staff who were naive to the purpose of the study. A continuous, 10-s, partial interval recording procedure was used. Observations were not made in the home.

Reliability

For correct and incorrect trials, interrater reliability was calculated by dividing the total number of agreements between the experimenter and the other observer by the number of agreements plus disagreements and multiplying by 100. Interrater reliability was calculated for 75% of sessions and was 100% for trial response. Interrater reliability for ancillary behaviors was calculated for occurrences and nonoccurrences in the same manner. Interrater reliability for ancillary behaviors was measured for 75% of sessions with overall reliability (occurrences and nonoccurrences) as follows: approach/touch, 95%; spontaneous hug/kiss,

100%; spontaneous "hello/goodbye," 100%; spontaneous "I like/love," 100%; social smile, 92%; and eye contact, 90%. Interrater reliability was not measured in the home to avoid obtrusiveness.

Social Validation

A questionnaire was distributed to six parents (four mothers and two fathers) and five siblings before and after the study to assess family members' perceptions. The questionnaire was modified from a social validation survey given to teachers by Schreibman, Runco, Mills, and Koegel (1982), and is available from the first author.

RESULTS

The results of the time delay and modeling procedures are presented in Figure 1. During baseline, no correct responses were made by any of the children, regardless of the number of trials or of the condition (i.e., free play indoors, free play outdoors, free play at home) presented.

With the introduction of the time delay condition, Child 1 and Child 3 quickly increased their responding to the criterion level of at least four spontaneous responses in two consecutive sessions of five trials each. Child 1 was presented with two additional treatment sessions due to a 4-week delay between the time that criterion was met and the time that he was available to serve as a peer model for Child 2. The additional sessions served to ensure that he had retained the behavior and would successfully model it. These sessions are plotted on Figure 1 as the last indoor data point in time delay and the first indoor data point after the outdoors probe.

The behavior of Child 1 and Child 3 generalized across settings to the free play outdoors probe. Child 3 also generalized across settings and persons in the free play at home generalization probe. After his mother responded with "I love you, too" following his spontaneous verbalization of "I like you," Child 3 said "I love you" for the remaining trials. Child 1's performance, however, failed to

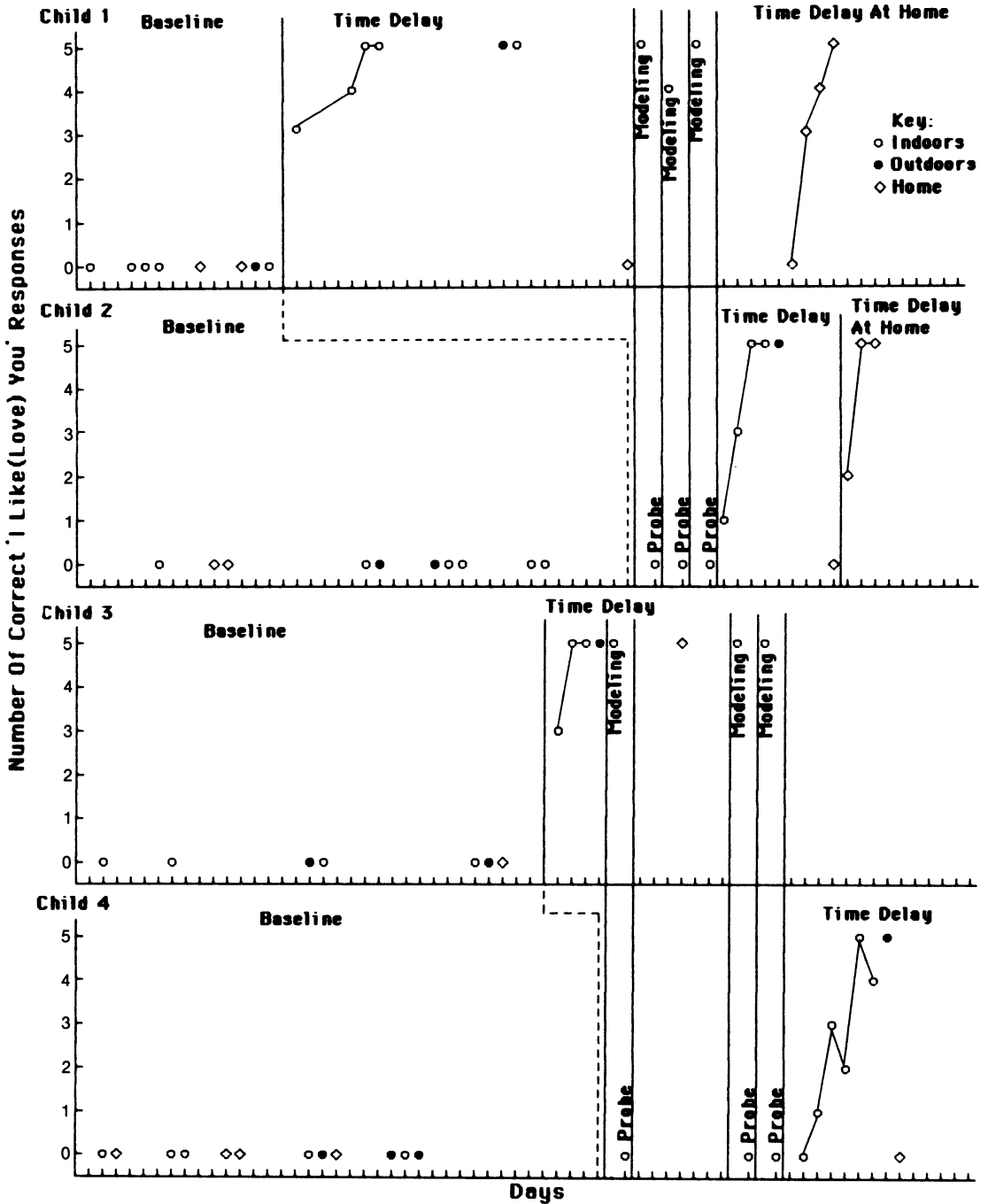


Figure 1. Performance during baseline, time delay, modeling, and probe sessions for all children.

generalize to the home setting. The time delay intervention was thus implemented in the free play at home setting and Child 1 subsequently met criterion.

Neither Child 2 nor Child 4 learned the behavior by observation, as indicated in the three modeling probes. With the implementation of the time delay procedure, both children met criterion. Ad-

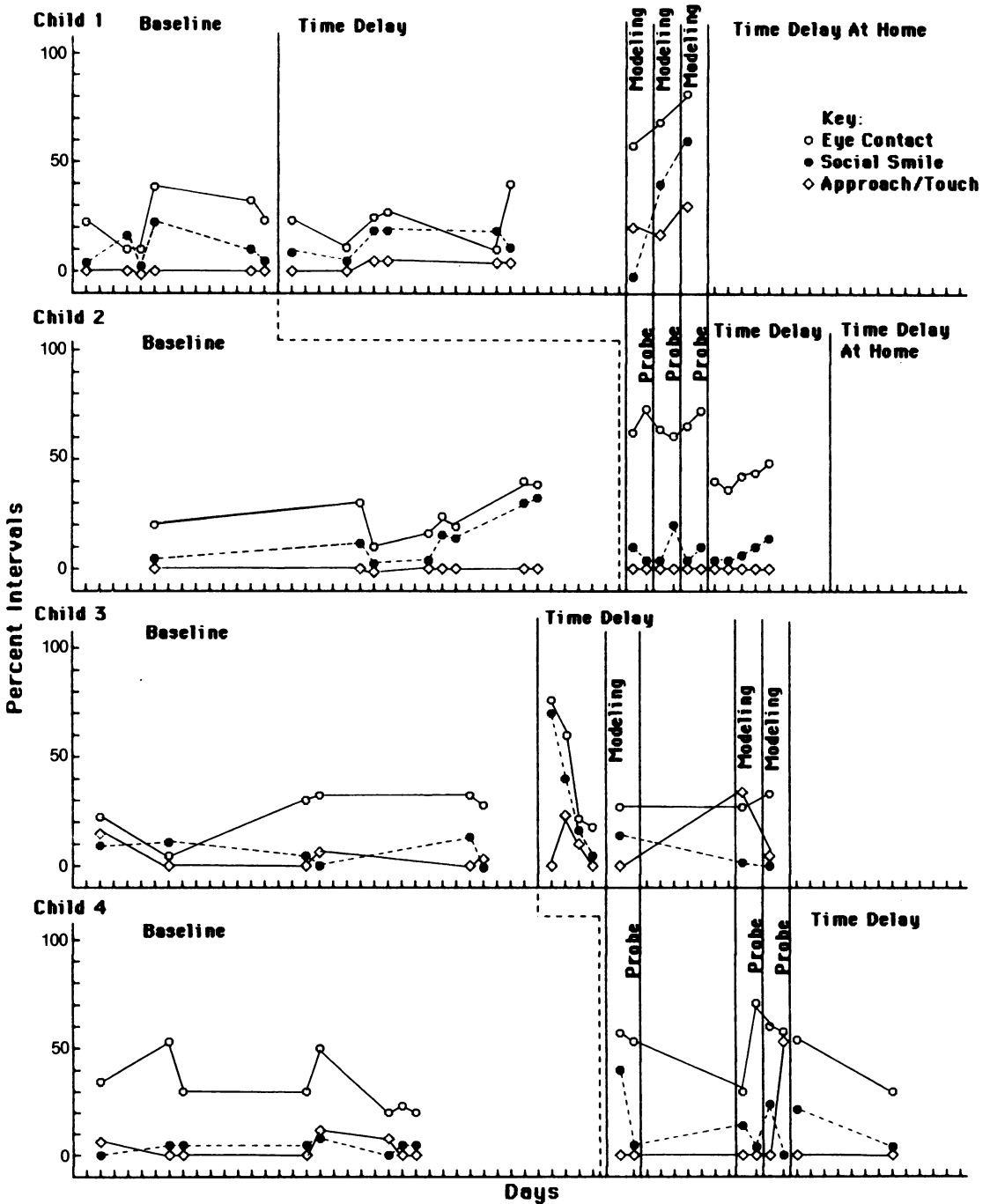


Figure 2. Ancillary behaviors of all children during baseline, time delay, modeling, and probe sessions.

ditionally, their performance generalized to the free play outdoors setting, but not to the free play at home setting. A time delay introduced at home increased the frequency of correct responding to

criterion for Child 2. Although Child 4's mother reported that he acquired the response, she lost the time delay training data and thus it does not appear on the graph.

Table 1
Mean Responses to Social Validation Questionnaire by
Parents and Siblings Before and After Intervention

Parents' questions	Mean response	
	Before	After
Initiate hugs?	2.33	4.60
Initiate hugs with sibs?	2.33	4.00
Repetitive behavior?	5.67	5.20
Comply?	5.83	6.20
Comply with sibs?	3.17	3.60
Stiffen on contact?	5.67	3.60
Initiate greeting?	3.33	4.40
Wandering attention?	3.36	3.00
Tantrum?	2.50	2.40
Touching?	2.50	4.20
Eye contact?	2.67	4.40
Social smile?	5.30	5.30
Smile at sibs?	4.50	4.60
Unaware of surroundings?	4.30	4.30
Conversation?	3.50	4.60
Interest in you?	3.50	5.50
Interest in sibs?	3.67	4.60
Loves you?*	5.67	6.75
Loves sibs?*	5.67	7.00
You love?*	7.00	7.00
Siblings' questions		
Hug you first?	2.00	4.25
Hug parents first?	2.60	4.75
Hug back?	2.80	4.75
Do what asked?	2.40	3.75
Say Hi first?	2.20	3.50
Tantrum?	3.80	2.50
Touch?	2.40	4.50
Eye contact?	3.00	4.00
Smile?	2.80	4.75
Talk to you?	4.00	5.00
Likes you?*	4.40	4.75
You like?*	4.20	5.00

Parents
scale: 1 = never 7 = very frequently
*scale: 1 = very little 7 = very much

Siblings
scale: 1 = never 5 = a whole bunch
*scale: 1 = a little bit 5 = all the time

Ancillary Behaviors

Occurrences of ancillary behaviors are shown in Figure 2. Spontaneous I like/love responses, hello/goodbye responses, and hug/kiss responses were not plotted because they did not occur. In general, the most striking finding was that for eye contact, which occurred more often during modeling conditions for Children 1, 2, and 4 (although data is

limited for Child 4) than during baseline or time delay conditions. Child 3 initially displayed more eye contact during time delay, but this frequency of occurrence dropped rapidly to a level similar to that of his modeling sessions.

Social Validation

The means of the parents' and siblings' responses to the social validation questionnaire are given in Table 1. Parents and siblings perceived the children to be more social and lovable following intervention. Additionally, they reported a decrease in inappropriate behaviors and an increase in appropriate behaviors.

DISCUSSION

This study demonstrated the efficacy of a time delay procedure in increasing four autistic children's spontaneous verbalizations of affection. The target behavior generalized across settings (free play outdoors) and for one child, across persons and settings (free play at home). When necessary, the children's mothers were successful in using the time delay procedure with their children to teach the target behavior in the home.

Peer modeling was not effective in teaching the target response. The free play indoors condition, in which the modeling was conducted, was by design unstructured to provide an environment similar to that which the child is likely to encounter. It is possible that the children took advantage of the loosely structured environment and thus decreased their attention to the model. Frequently, the experimenter had to physically restrain the learner from self-stimulating. Our findings are consistent with the suggestion that the success of modeling may be dependent on a number of factors, including the amount of self-stimulation the child displays and the structure of the modeling environment (Charlop et al., 1983; Egel et al., 1981). Thus, it may not be modeling per se but the lack of stimulus control over the learner's behavior that may have interfered with learning through observation in our study. The ancillary data collected in this study support the idea that a modeling situ-

ation may be conducive to increasing social and affection behaviors. Thus, continued research with slightly more structured settings seems worthy of attention.

Although three of the four children's behavior did not initially generalize to the home environment, it is important to note that training implemented by their mothers was successful. Additionally, Child 3's mother reported several instances of the spontaneous "I love you" phrase in other appropriate situations such as when being tucked into bed or when hugged after returning from school. Child 2's mother reported that after training at home, his behavior also generalized across family members and settings (e.g., when hugged by his father and siblings at home, when hugged by his father in a market). Importantly, the children responded with "I like you" when hugged by the experimenter and with some other, but not all, familiar persons. But when hugged by less familiar persons (e.g., new staff members), they did not respond with the target response at all. Thus, the children appeared to have made the appropriate discrimination with whom to engage in the response. Postexperiment probes demonstrated this for Children 1, 2, and 3 (Child 4 was unavailable for these sessions). Probe data were recorded by two observers with 100% reliability. Probes consisted of having various persons request "Give me a hug" with the child's response recorded ("I like (love) you") in a variety of different settings (office, classroom, lounge). The results of this probe indicated that the children responded to certain persons with "I love you," others with "I like you," and others not at all. Child 1, who said "I love you" to a nonfamily member, had previously indicated a preference for this person (e.g., requested to work with this person, brought art projects from school to this person).

All of the parents expressed concern prior to the study about their child's lack of social and affection behaviors. The social validation data reflect a change in how the family members perceive the autistic

youngster as measured by their self-reports. Importantly, parents and siblings reported that they felt that the autistic child loved (liked) them more after the intervention than before. This is noteworthy because parents of autistic children continually report the hurt and frustration of their children's indifference towards them. The parents seemed encouraged by their children's social progress and mentioned spending more time interacting with them. It seems feasible that this attention may, in turn, lead the child to respond even more socially.

REFERENCES

- Charlop, M. H., Schreibman, L., & Thibodeau, M. G. (1985). Increasing spontaneous verbal responding in autistic children using a time delay procedure. *Journal of Applied Behavior Analysis*, *18*, 155-166.
- Charlop, M. H., Schreibman, L., & Tryon, A. S. (1983). Learning through observation: The effects of peer modeling on acquisition and generalization in autistic children. *Journal of Abnormal Child Psychology*, *11*, 355-366.
- Egel, A. L., Richman, G. S., & Koegel, R. L. (1981). Normal peer models and autistic children's learning. *Journal of Applied Behavior Analysis*, *14*, 3-12.
- Halle, J. W., Marshall, A. M., & Spradlin, J. E. (1979). Time delay: A technique to increase language use and facilitate generalization in retarded children. *Journal of Applied Behavior Analysis*, *12*, 431-439.
- Lovaas, O. I., Koegel, R., Simmons, J. Q., & Long, J. S. (1973). Some generalization and follow-up measures on autistic children in behavior therapy. *Journal of Applied Behavior Analysis*, *6*, 131-166.
- Ritvo, E. R., & Freeman, B. J. (1978). National Society for Autistic Children definition of the syndrome of autism. *Journal of Autism and Childhood Schizophrenia*, *8*, 162-167.
- Rutter, M. (1978). Diagnosis and definition of childhood autism. *Journal of Autism and Childhood Schizophrenia*, *8*, 139-161.
- Schreibman, L., Runco, M. A., Mills, J. I., & Koegel, R. L. (1982). Teachers' judgments of improvements in autistic children in behavior therapy: A social validation. In Koegel, R. L., Rincover, A., & Egel, A. L. (Eds.), *Educating and understanding autistic children* (pp. 78-87). San Diego: College Hill Press.

Received August 26, 1985

Final acceptance May 13, 1986