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INCREASING SPONTANEOUS LANGUAGE IN THREE AUTISTIC CHILDREN

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A time delay procedure was used to increase spontaneous verbalizations of 3 autistic children. Multiple baseline across behaviors designs were used with target responses, selected via a social validation procedure, of two spontaneous responses ("please" and "thank you") and one verbally prompted response ("you're welcome"). The results indicate gains across target behaviors for all children, with occurrence across other stimuli and settings. These gains were validated socially with 10 adults. Furthermore, increases in appropriate language had no effect on levels of inappropriate speech.

DESCRIPTORS: spontaneous language, time delay, social validation

Language programs for autistic children have most frequently focused on increasing verbally prompted responses cued by the speech of the therapist. Only two studies have attempted to increase rates of spontaneous language in autistic children (Charlop, Schreibman, & Thibodeau, 1985; Charlop & Walsh, 1986). As defined by Charlop et al. (1985), a spontaneous response is a verbal response to a nonverbal discriminative stimulus in the absence of a verbal discriminative stimulus. Overreliance on verbal cueing, as opposed to nonverbal referents, may result in a very restricted use of speech in response to a limited set of stimuli (Halle, Baer, & Spradlin, 1981). Also, spontaneous verbalizations are less likely to occur when the child is trained to respond only to others. Thus, the person's efforts to make his or her desires known and the development of normal conversational patterns are limited.

The present study was designed to replicate those of Charlop et al. (1985) and Charlop and Walsh (1986) on spontaneous communication training for autistic persons by using a time delay, modeling, and food reinforcement procedure to teach three previously untrained verbal responses. These consisted of two spontaneous responses and one verbally cued response. Second, several additional untrained stimuli were examined, once again as a replication and extension of previous work. Social validation was used to assess treatment efficacy, given the importance of demonstrating the practicality of the training with autistic children. Third, unlike previous studies, maintainence of learned behaviors was assessed at follow-up. Fourth, the relationship between rates of appropriate and inappropriate verbalizations was examined.

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METHOD

Subjects and Setting

Three autistic children with moderate mental retardation, all of whom met DSM-III-R and ASA criteria for autism, participated in this study. All 3 children displayed little or no spontaneous speech and were from self-contained classrooms. Child 1 was an 11-year-old female whose speech consisted of echolalia and repetition of cartoon scenarios. She was also diagnosed as hyperactive according to DSM-III-R criteria and was being treated with a stable dosage (25 mg) of fenfluramine while this study was in progress. The 2nd child was an 11-year-old male whose verbal repertoire consisted entirely of echolalia and the inappropriate repetition of a few food words. Child 3 was a 9-year-old male whose entire verbal repertoire consisted of labeling approximately a dozen common words in response to being asked, "What is this?" Child 3 often refused to remain in his seat, frequently struck or

kicked the therapist, and also made attempts to destroy furniture and pictures in the room. Communication levels were 1 year, 9 months for Child 1; 1 year, 8 months for Child 2; and 1 year, 5 months for Child 3 as measured by the Vineland Adaptive Behavior Scale.

Baseline and treatment sessions took place two afternoons per week in an experimental room. During baseline and treatment sessions, the experimenter and child were seated facing each other, separated by a small table. Training periods generally lasted 1 hr and consisted of 15 to 25 trials. The number of trials per day varied within and between children. A tape recorder was placed on a window sill behind the child during all sessions.

Target Behaviors

Social validation. To select target behaviors used frequently in the natural environment, a social validation procedure using 30 college students was employed (Kazdin & Matson, 1981). The students were each given an open-ended questionnaire and were asked to think about specific normal social interactions between themselves and significant others. They were then asked to generate a list of words, interjections, and social responses that were commonly used during the imagined interactions. From this list, two spontaneous responses, "please" and "thank you," and one verbally cued response, "you're welcome," were selected as target behaviors for treatment. All of the children in the present study failed to use these words prior to treatment, as reported by parents and teachers.

Verbal responses. The child was required to spontaneously emit the verbal response within 10 s after presentation of the stimulus. Responses were considered correct only if spoken before the model. The words trained were "please," "thank you," and "you're welcome."

For "please," the child was required to say, "(Item), please," within 10 s of being shown the item and before the response was modeled. For "thank you," the child was required to say "thank you" within 10 s of receiving the desired object and before the response was modeled. For "you're welcome," the child was required to say "you're welcome" within 10 s of the experimenter saying "thank you" and before the response was modeled.

Inappropriate speech. Any verbalizations unrelated to the task at hand or the immediate environment were considered irrelevant. Comments about the stimuli (e.g., "Crayon is blue"), the experimenter or rater (e.g., "Shirt is pretty" by Child 1), or reinforcers (e.g., "Candy, please" by Child 2 at follow-up) were not considered irrelevant even if they were wrong ("Crayon is orange"). Echolalia, perseverations, and nonsensical utterances were considered inappropriate for all of the children.

Stimulus Materials

A variety of toys and play objects were selected by the experimenter and then placed in the children's presence to informally assess desirability. Five stimuli were then chosen for each child to be used during treatment. Stimuli included blocks, crayons, stuffed animals, and other toys.

Experimental Conditions and Procedures

Experimental design consisted of pretest, baseline, treatment, assessment of novel stimuli, and follow-up sessions. Three single subject designs were carried out in multiple baseline fashion across target behaviors. For each child, target behaviors were trained in the following order: (a) "please," (b) "thank you," and (c) "you're welcome."

Pretest. A pretest was administered to each child to determine whether he or she was able to label each of the preferred stimuli. Each object was held before the child while the experimenter asked, "What is this?" When the child responded correctly three consecutive times, it was determined that he or she could label the object. If a child failed to meet this criterion, the correct label of that object was modeled for the child until he or she independently labeled the object three consecutive times.

Baseline. Prior to each session, the five stimuli were arranged in random sequence for presentation. The first of the five objects was held up by the experimenter for 10 s, and the child was rated on

whether he or she requested the item by saying, "(Item), please" within 10 s. If the child did not emit the correct response, the response was modeled by the experimenter. The next four objects were then presented one after the other, but correct responses were not modeled by the experimenter during baseline. Correct responses were reinforced with verbal praise. If the child reached or grabbed for an object, it was withheld until the end of the 10-s period. This procedure was continued until all five objects had been presented.

For the "thank you" response, the five objects were presented again in random order. This time the objects were immediately handed one at a time to the child, who was allowed to hold each object for 10 s. The child was required to say, "thank you," within this 10-s period. If no response occurred during this time, "thank you" was modeled by the experimenter (for the initial stimulus only) and the next stimulus was presented.

For the "you're welcome" response, the child started with the five preferred stimuli. The experimenter requested the items one at a time by saying, "May I have the (item), please?" When the child handed over the correct object, the experimenter took it and said, "Thank you." The child was given 10 s to respond, "You're welcome," before the response was modeled (for the initial trial only) and the next object requested. If the child handed over an object that had not been requested, the experimenter again asked for the object until it was given to him by the subject. These procedures were continued until all five stimuli had been received by the experimenter.

During each session, Child 1 and Child 2 were also rated for the presence or absence of inappropriate speech during the 10-s interval following stimulus presentation (partial interval sampling). All sessions were recorded on audiotape to calculate reliability.

Treatment. Random order of the five stimuli was predetermined. A 2-s graduated time delay plus modeling, food reinforcement, and praise procedure was used with all five stimuli.

For the "(Item), please" response, the first stimulus was presented. After a 2-s interval, the response "(Item), please" was modeled by the experimenter. A correct imitation of the modeled response or a spontaneous response was immediately reinforced with (a) the stimulus just requested (e.g., crayon), (b) an edible reinforcer (M&M®s, grapes, popcorn, etc.), and (c) verbal praise. In addition, at the conclusion of each session, children were allowed to play with the objects they had appropriately requested. An additional reinforcer (a picture book) was used if a child failed to show improvement of at least 10% after several trials.

Both correct imitations of the modeled response and unmodeled responses were reinforced. However, only when the response was emitted spontaneously and completely was it rated as correct. Inappropriate words were recorded by the raters and ignored by the therapist.

When the child had correctly imitated four of five responses appropriately for two consecutive sessions, the time delay between presentation of the stimulus and the model was increased to 4 s. The delay was gradually increased by 2-s intervals in this manner until the time delay before modeled responses reached 10 s or until spontaneous responses were successfully mastered by the child.

When the first target response had been mastered, treatment began with the "thank you" response in accordance with the multiple baseline design across behaviors. Treatment was continued until all three target responses improved. Food reinforcement was continuous at first but was faded to a variable-ratio schedule after the child correctly used that response 80% of the time for three consecutive sessions.

Assessment of novel stimuli. Following training, additional sessions were conducted to assess responding to five untrained stimuli. Procedures were identical to those used in treatment sessions. Novel stimuli consisted of various toy items.

Follow-up. Sessions were conducted 2 months, 6 months, and 1 month after final treatment sessions for Children 1, 2, and 3, respectively. They were conducted in the same manner as treatment sessions, using a 10-s delay interval with stimulus

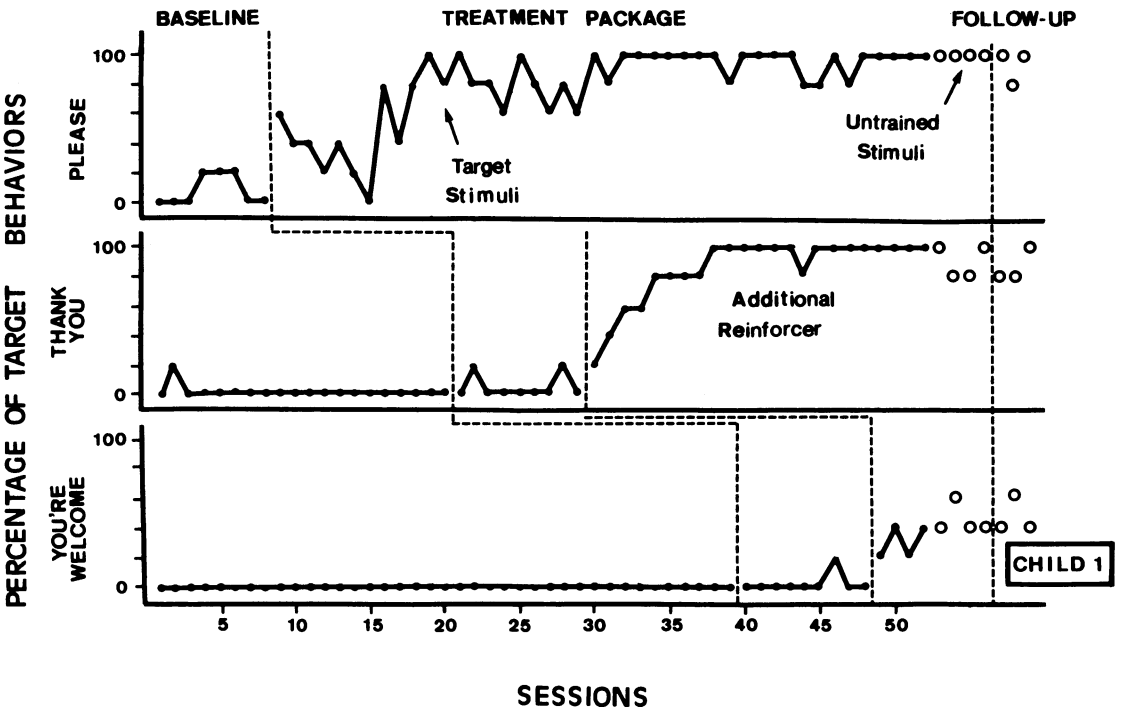

Figure 1. Percentage of target behaviors across baseline, treatment, and 2-month follow-up sessions for Child 1.

objects randomly chosen from original and novel stimuli.

Social Validation of Treatment

A group of 10 adult community members were shown two video recordings of sessions with each child. These included a recording of the first baseline and last treatment sessions for each child. Tapes were presented in random order; after viewing each video recording, community members were asked to rate the children using a five-point Likert-type scale on overall social appearance and appropriate use of the specific target behaviors.

Raters and Reliability

An undergraduate senior psychology major served as the primary rater. Interrater reliability was calculated for 20% of sessions by having a second assistant (also a senior psychology major) rate behaviors from the tape-recorded sessions. Both raters were blind to experimental conditions, and the second rater was blind to the order in which sessions occurred.

Each trial in a session was rated as to whether the child correctly verbalized the appropriate target response for that trial. Agreement occurred when both raters scored a behavior as having occurred or not occurred within a particular trial. Interrater reliability was calculated by dividing the total number of agreements by the total number of agreements plus disagreements and multiplying by 100.

For Child 1, reliability for target behaviors ranged from 92.3% ("you're welcome") to 98.5% ("please") and averaged 96.7%. Reliability for the correlative behavior (inappropriate speech) averaged 91.8%. For Child 2, reliability ranged from 92.0% ("thank you") to 96.5% ("please") and averaged 94.7%. For inappropriate speech, the average agreement between raters was 94.2%. For Child 3, agreement on target behaviors ranged from 91.8% ("thank you" and "you're welcome") to

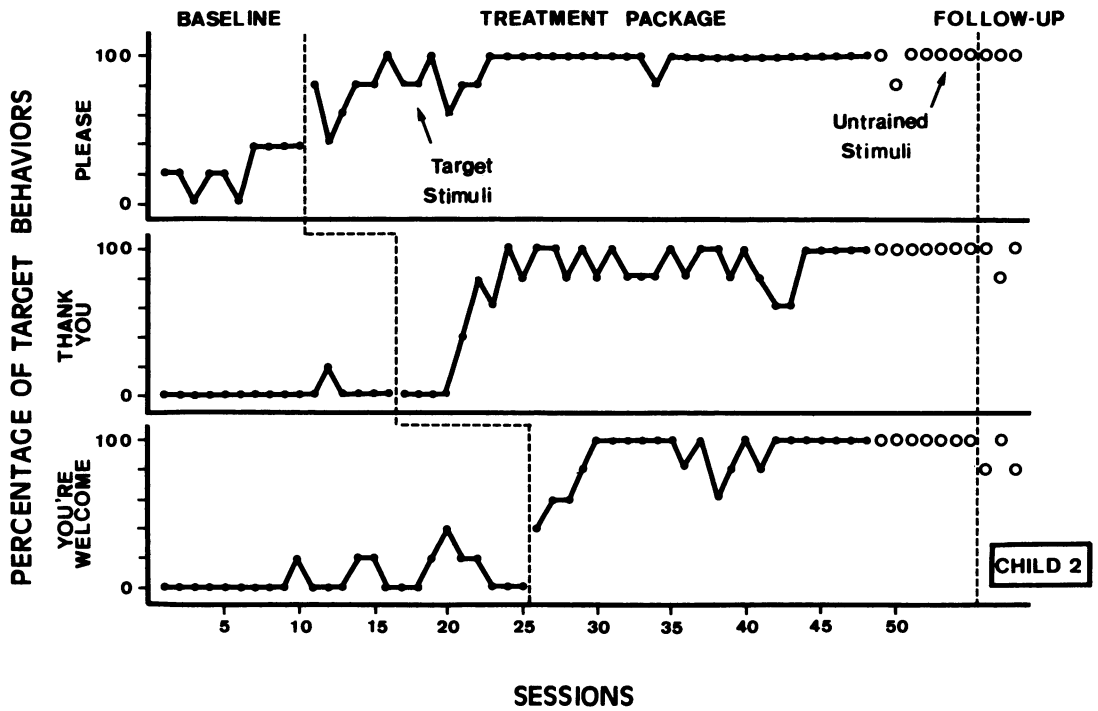

Figure 2. Percentage of target behaviors across baseline, treatment, and 6-month follow-up sessions for Child 2.

95.9% ("please") and averaged 93.2% for total behaviors rated.

RESULTS

Results are provided in Figures 1, 2, and 3. Child 1 responded at 100% during pretest, but Children 2 and 3 were unable to label three of their stimuli and therefore required two and three 30-min teaching sessions, respectively. As shown in Figure 1, spontaneous use of target words was near zero during baseline for Child 1. With the introduction of treatment, Child 1 rapidly improved in making spontaneous requests for objects. However, with initial treatment of the second target behavior, she failed to imitate the model's "thank you." A second reinforcer (picture book) was therefore included in treatment, and her use of "thank you" quickly improved. This second reinforcer was also introduced when Child 1 failed to respond during treatment for the third target behavior, with improved performance as a result. These responses continued with introduction of untrained stimuli. For Child 2, all three behaviors increased immediately with treatment (see Figure 2), and continued with novel stimuli. For Child 3, improvement in all three target responses occurred quickly and, as with other subjects, treatment effects continued with the five novel stimuli.

The significance of change was corroborated by the findings on the social validition data. For Child 1, analysis of pre- and posttreatment ratings using t tests indicated that community members reported a significant difference both in overall social appearance, $t(9) = 4.49, p < .01$, and in appropriate use of the three target responses, $t(9) = 10.53, p < .01$. Also, for Child 2, a significant difference occurred between pre- and posttreatment measures both in overall social appearance, $t(9) = 7.41, p < .01$, and in appropriate use of the three target responses, $t(9) = 10.36, p < .01$. For Child 3, however, rated improvement reached significance

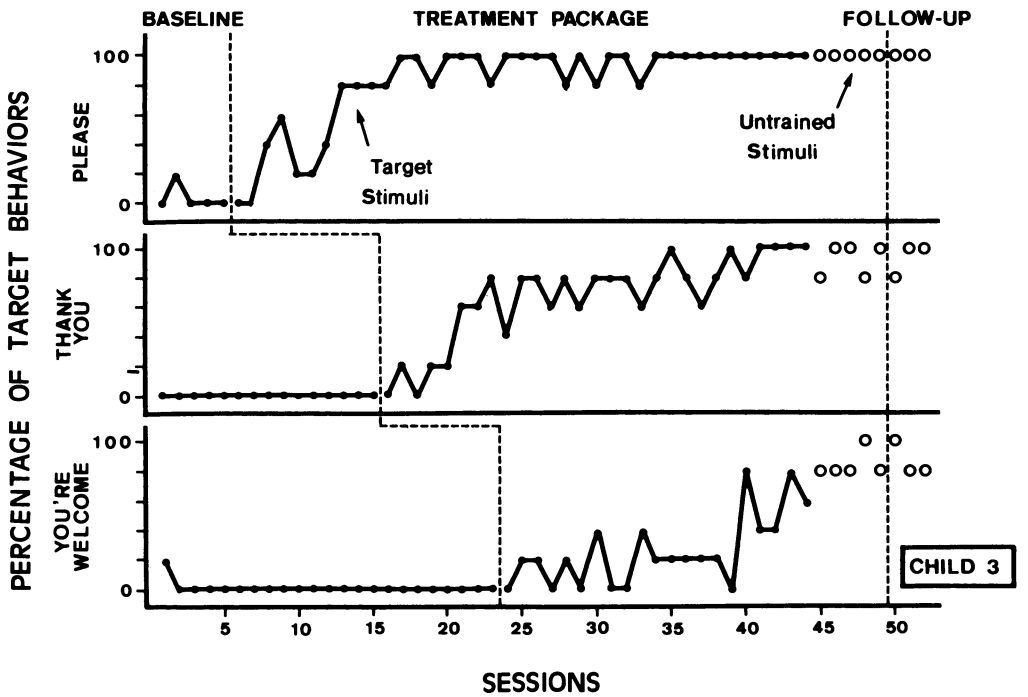

Figure 3. Percentage of target behaviors across baseline, treatment, and 1-month follow-up sessions for Child 3.

only in the child's use of target responses, $t(9) = 7.27, p < .01$, perhaps because aggressive behavior persisted throughout treatment. Percentages of inappropriate speech during each session were correlated with session number for each child using the Pearson Product-Moment coefficient. For both Child 1 and Child 2, the measures were uncorrelated, indicating no decreases in inappropriate language over time.

Two-month follow-up for Child 1, 6-month follow-up for Child 2, and 1-month follow-up for Child 3 indicated that treatment gains were maintained by all 3 children.

DISCUSSION

Prior to treatment, the children grabbed for desired objects, often displaying temper tantrums when desires were thwarted. Our participants were successfully taught to self-initiate several requests, to appropriately thank the experimenter, and to use the "you're welcome" response. Furthermore, these responses occurred in the presence of several untrained stimuli and were maintained at follow-up. The experimenters and raters also anecdotally observed that the children used "please" and "thank you" with other stimuli and acquired other requests ("Work, please," "Water, please," etc.).

At the completion of treatment, parents were asked to rate the use of target responses, other spontaneous responses, and general behavior for improvement in the home setting. A five-point Likert-type scale ("no" to "noticeable improvement") was used. Parents of Child 1 and Child 2 rated high improvement in use of target responses, in use of spontaneous speech, and in general behavior observed at home. Parents of Child 3 rated noticeable improvement in the use of target responses, slight improvement in spontaneous speech, and no improvement in general behavior, corroborating the social validity data from the 10 adults. These data are clearly anecdotal and biased (parents were aware of treatment and no pretreatment measures were obtained) and are included only as general impressions of social validity.

One important finding was that increases in ap-

propriate responding had no observable effect on the inappropriate speech of Children 1 and 2, who still exhibited echolalia, perseverations, and nonsense sounds and phrases between trials at rates comparable to those prior to treatment. Because abnormal speech patterns are frequently severe and develop over many years, many autistic children may require treatment specifically focused on the alleviation of these particular problems. However, any program to decrease inappropriate speech should be accompanied by an equally rigorous program to increase appropriate language skills.

The present findings should be viewed in light of several limitations of the study. First, assessment of performance with untrained stimuli should not be construed as generalization data because baseline probes were not obtained. However, given that neither the parents nor teachers of the target children had ever heard the children use the target responses prior to treatment, generalization appears to have occurred.

A second limitation is that the target responses were trained in the same order for all 3 children, resulting in possible order effects. Third, two of the three target responses improved for Child 1 only after the inclusion of an additional reinforcer, making it impossible to isolate the effects of the time delay procedure. Although the treatment package as a whole was effective, the concurrent use of the time delay and reinforcement components prevents conclusions about either component of treatment.

Future studies might focus more thoroughly on generalization, treatment acceptability, conducting treatment in more natural settings, and examination of treatment components in isolation to find the most parsimonious treatment package. Also, participants in this study had severe language impairments. Future studies may wish to address whether greater or swifter effects occur with autistic children who have less severe impairments.

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