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INCREASING SPONTANEOUS VERBAL RESPONDING IN AUTUSTIC CHILDREN USING A TIME DELAY PROCEDURE

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One oft-cited problem with teaching speech skills to autistic children is the failure of the speech to be spontaneous. That is, the children's speech often remains under the control of the verbal behavior of others rather than under the control of other nonverbal referents in the environment. We investigated the effectiveness of a time delay procedure to increase the spontaneous speech of seven autistic children. Initially, the experimenter presented a desired object (e.g., cookie) and immediately modeled the appropriate response "I want (cookie)." Gradually, as the child imitated the vocalization, the experimenter increased the time between presentation of the object and the modeled vocalization in an attempt to transfer stimulus control of the child's vocalization from the experimenter's model to the object. Results indicated that all the children learned to request items spontaneously and generalized this behavior across settings, people, situations, and to objects which had not been taught. These results are discussed in relation to the literature on spontaneous speech, prompting, and generalization.

DESCRIPTORS: time delay procedure, speech, prompting, generalization, autistic children

One of the most prominent characteristics of autistic children is their failure to acquire appropriate speech (Kanner, 1943; Ricks & Wing, 1975; Rutter, 1978; Wing, 1978). Approximately 50% of autistic children are mute (Rimland, 1964). Others are echolalic, repeating words or phrases in a parrotlike manner, but not using words to communicate (Carr, Schreibman, & Lovaas, 1975; Kanner, 1943; Rimland, 1964; Schreibman & Carr, 1978). Those children who do learn to speak appropriately often appear quite unnatural. That is, they often speak only when another individual gives them a specific cue, such as a question, but they seldom speak spontaneously (Carr & Kologinsky, 1983; Lovaas, 1966).

Although researchers have been successful in teaching autistic children appropriate speech (e.g., Carr et al., 1975; Coleman & Stedman, 1974; Freeman, Ritvo, & Miller, 1975; Lovaas, 1977; Lovaas, Koegel, Simmons, & Long, 1973; Schreibman & Carr, 1978), little generalized improvement in their functional speech has been reported (Fay & Schuler, 1981). Gains tend to be task specific and typically do not generalize to other situations. Indeed, one of the greatest problems in teaching new behaviors of any kind is the failure of newly acquired responses to generalize to other situations (e.g., Baer, Wolf, & Risley, 1968; Birnbrauer, 1968; Kazdin & Bootzin, 1972; Lovaas et al., 1973; Rincover & Koegel, 1975; Stokes & Baer, 1977; Wahler, 1969; Walker & Buckley, 1972). Thus, researchers are not only faced with the task of teaching autistic children to be more spontaneous in their speech, but they must also address generalization of such speech.

Few studies have addressed the acquisition and generalization of spontaneous speech (e.g., speech *not* tied to verbal cues) with autistic children. Carr and Kologinsky (1983) demonstrated that spontaneous signing can be taught to nonverbal autistic

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children and expressed the need to explore such spontaneous communication with speaking autistic children.

One procedure that shows promise for teaching spontaneous speech and includes provisions for facilitating generalization is the time delay technique (Halle, Baer, & Spradlin, 1981; Halle, Marshall, & Spradlin, 1979). Generally, a time delay training procedure consists of initially presenting the target stimulus (e.g., cookie) and prompting the appropriate response (i.e., "I want cookie"). Once the child can imitate the experimenter's model, the onset of the prompt is delayed for a few seconds. Gradually, the delay between the presentation of the target stimulus (cookie) and the experimenter's prompt ("I want cookie") is increased until the child spontaneously requests the cookie. An alternate form of time delay involves allowing a certain predetermined amount of time (e.g., 15 s) before the prompt is provided (Halle et al., 1979). Response before the onset of the prompt indicates that stimulus control has successfully transferred from the prompt to the target stimulus.

Additionally, provisions for generalization can be incorporated into this procedure. Stimuli that are both common and salient to the natural (extra-therapy) environment may be used. For example, a desired food is likely to be present in extra-therapy environments, as well as the training setting. Thus, the likelihood that the behavior will occur in extra-therapy settings is increased (Koegel & Rincover, 1976; Stokes & Baer, 1977). Also, behaviors that are likely to be reinforced (functional) in the natural environment could be taught (Stokes & Baer, 1977). For example, the child could be taught the response for asking for a favorite food, toy, or activity.

Our study was designed to assess the efficacy of a time delay procedure for teaching autistic children to speak spontaneously, requesting desired objects (e.g., food, drinks). Because there has not been consensus in the literature on the use of the term "spontaneity," we defined it, for our purposes, as a verbal response to a nonverbal discriminative stimulus (an object) in the absence of a verbal discriminative stimulus. Additionally, we investigated whether such manding behavior would generalize across settings, objects, and people. We planned this study to extend the findings of Carr and Kologinsky (1983) by using speech as opposed to sign language as the dependent variable. We also sought to extend the promising leads provided by the literature on time delay (Halle et al., 1979; Halle et al., 1981) by: (a) the participation of autistic children, (b) the assessment of generalization to untrained stimuli as well as to unfamiliar settings and persons, and (c) the assessment of response variability in the presence of several untrained referents.

METHOD

Participants

Seven autistic boys participated in this study. The chronological ages of Child 1 through Child 7 were 10.9, 6.3, 11.5, 6.3, 6.5, 5.1, and 6.9 years, respectively (M = 7.6). Mental age, as derived from standardized tests, ranged from untestable to 6.1 years (M = 3.9 years for testable children). Each of the children had been diagnosed as autistic by an agency not affiliated with this study and based on the diagnostic criteria of the National Society for Autistic Children (Ritvo & Freeman, 1978). All the children exhibited marked deficits in social behavior, language, academic skills, and play behaviors. All engaged in self-stimulatory behaviors such as rocking, repetitive hand or arm movements, and gazing at lights. Children 2, 4, 5, 6, and 7 exhibited immediate as well as delayed echolalia. Child 1 and Child 3 were initially nonverbal but as a result of speech training could now vocally imitate although they seldom spoke. All but rare spontaneous vocalizations exhibited by these children were delayed echolalia. When requested to speak, the children generally answered in one or two word phrases. Manding was very infrequent (or never observed) in these children prior to this study.

Stimulus Materials and Setting

Four highly preferred stimuli were used for each child during this experiment. The desirability of

the items (drinks and food) was based on reports from the children's mothers, teachers, and therapists.

The experimenter worked two mornings each week with Child 1 and Child 2 in a small area of their classroom partitioned off from the other students. Training sessions with the other children were conducted two afternoons per week in a small (2.9 × 2.9 m) experimental room. In both settings the child and the experimenter were seated facing each other, separated by a small table. Generally, an assistant sat approximately 1.2 m behind the child and used a stopwatch to cue the experimenter at the termination of each delay. Each session lasted approximately 30 minutes; typically, one session per day was conducted. The number of trials per session varied depending on the condition (i.e., pretests) and the step in the time delay procedure (e.g., 2-s pause versus 10-s pause). The number of trials presented also varied depending on the cooperation of the specific child. On the average, approximately 15 trials were presented in a session. The experimenters in this study were the first and third authors; they had 10 and 3 years of experience, respectively, with behavior therapy treatment of autistic children.

Procedure

Pretests. Two pretests were administered to each child. Pretest 1 was designed to determine whether the child could properly label the four preferred stimuli. The experimenter presented each stimulus five times and asked, "What is this?" each time. If the child appropriately labeled the stimulus at least four times, it was assumed that the child knew the correct label. If, however, a child did not reach this criterion, he was taught to label the objects.

Pretest 2 was designed to determine whether the child already had the "I want (object's label)" response in his repertoire and if he required only a prompt to use it in this situation (Simic & Bucher, 1980). The experimenter presented each of the four stimuli in sets of five trials for a total of 20 trials. During the first two trials of each set, the experimenter presented the stimulus and immediately said, "I want (object's label)." For example, the experimenter held up a cookie and said, "I want cookie." The child was given approximately 10 s to repeat the experimenter's response correctly. The experimenter reinforced the correct response by giving the child the cookie. The experimenter did not model the correct response during the three trials that followed. Instead, she simply held the stimulus in front of the child and waited 10 s before removing it. If a child demonstrated that he had acquired the appropriate response to a particular stimulus during the nonprompted trials, he would have been excluded from the experiment; this never occurred. Because the children frequently reached for the object, a failure to request it was assumed to indicate the absence of the correct response rather than reflecting that the child did not want the object.

Two of the four objects were randomly selected for each child as training stimuli; the remaining two were used later to assess generalization. To control for learning over time, a multiple-baseline across children for Pretest 2 was used.

Training. Two experimental (i.e., preferred) stimuli were concurrently trained (e.g., the experimenter presented apple during one trial and cookie during the next trial). The order of presentation of stimuli was random, except that no stimulus was presented more than three times in succession.

When the child was sitting quietly and exhibiting eye contact, the experimenter presented the training stimulus. The presentation of the stimulus marked the start of the trial. Immediately after presenting the object, the experimenter modeled the correct response, "I want (object's label)." If the child correctly imitated this model, the experimenter reinforced the response by giving the child the requested stimulus. However, if the child did not appropriately respond or failed to respond, he was told "No," and the stimulus was removed. Once the child had responded correctly for three consecutive trials, the time delay procedure was implemented.

Time delay. To facilitate speech in children who had a history of difficulty in expressive speech tasks, we designed our procedure to be similar to that of

the special training procedure in the Halle et al. (1979) study. After the presentation of the stimulus, the experimenter waited 2 s before modeling the desired response. If the child requested the object correctly within the 2 s, the request was immediately reinforced by giving the child the requested object. Requests made prior to the experimenter's model as well as imitated requests were considered correct responses. The delay was increased by an increment of 2 s when the child, during three consecutive trials, imitated the correct response or spontaneously requested the object prior to the experimenter's model. This pattern was continued until a delay of 10 s had been reached (although the child might respond well before the 10-s limit). As the delay was progressively increased, it was expected that the child would not wait for the prompt, but would attempt to request the stimulus prior to the presentation of the prompt. The training was terminated when the child reached criterion by requesting the object within 10 s of its presentation and prior to the experimenter's model during 18 out of 20 consecutive trials. The child was next presented with the probe conditions.

Probes

Generalization to unfamiliar setting. To assess generalization across settings, the child was taken to an unfamiliar room where the experimenter presented the training stimuli individually in a random order. The child received no verbal consequences for correct or incorrect responding (or failure to respond). However, if he properly requested a stimulus within 10 s, it was given to him. If the child requested a stimulus on the first trial, then the behavior was said to have generalized to an unfamiliar environment. If the child continued to request a stimulus with at least 70% accuracy, the child was said to have generalized and maintained the correct response across trials. Children 1 through 4 were presented with 10 trials in the unfamiliar setting, Child 5 was presented with 20 trials, and Child 6 and Child 7 with 40 trials as additional maintenance trials.

Generalization to unfamiliar setting and unfamiliar person. During this condition the child was taken to another unfamiliar room. A person unfamiliar to the child presented the trials in the same manner and number as previously described.

Generalization to untrained stimuli. This probe was presented in the therapy environment by the experimenter. The two experimental stimuli that had not been used for training were used here to test for generalization of requests to untrained objects. Each generalization stimulus was presented separately followed by a maximum of 10 s. Because these were objects the children could label (as demonstrated in pretest 1), generalization in this setting was demonstrated by the application of the appropriate verbal response, i.e., "I want (object's label)" to previously untrained (yet familiar) stimuli. Trials were presented in the manner previously described.

Assessing stimulus control. This condition was designed to assess the degree of stimulus control that the nonverbal stimuli had acquired over the verbal response. If the delay technique had been successful in teaching the child to respond only to the presence of the stimulus as opposed to the experimenter's verbal behavior, then the child would properly request the object regardless of what was said prior to the presentation of the stimulus. Two distractor phrases were presented: "What do you want?" and an irrelevant phrase, "Mary had a little lamb." In the therapy room environment, the experimenter said one of these phrases and then immediately presented a training stimulus. The child was given 10 s to respond correctly. Each phrase was presented for each of the two training stimuli (a total of four trials). It was thought that if the child was responding to the experimenter's verbal cue, (rather than to the object), then an echolalic response or some other incorrect response may have been made.

Variability of response. After the generalization probes and the probe for stimulus control, Child 5, Child 6, and Child 7 were presented with additional trials to determine if they would demonstrate variability of response and choose several different items. For these children, 10 generalization trials (as previously described) for Child 5 and Child 6 and 30 trials for Child 7 were presented

in the training setting with the experimenter and in an unfamiliar setting with an unfamiliar person. For each trial, all four stimuli were put in a tray and placed on a table next to the child. That is, no specific stimulus was held in front of the child to occasion a specific response. Thus, the child could continually choose one specific food item or request different items over trials. This condition was added to the study in an attempt to ascertain how the children would respond in a more unstructured, natural situation. All trials during these probes were presented between 2 and 5 days after criterion had been met during training.

Design

A single-subject design, replicated across children with a multiple baseline control was used. Pretest 1 and Pretest 2 were presented in both training and generalization conditions. Pretest 1 was presented once. Pretest 2 was presented once in generalization conditions and in multiple baseline in the training condition. Generalization probes were presented 2 to 5 days after training was completed, with 2 to 5 days between probes.

No pretest for assessment of stimulus control (using distractor phrases) was conducted because this was not a generalization probe. Similarly, no formal pretest was conducted for the variability in response condition because the items on the tray had been present in the same manner over several months of therapy and had never been spontaneously requested by any child.

Following the pretests and subsequent training, the three generalization probes were presented in a counterbalanced order across children. The probe for assessment of stimulus control and the probe for variability in response (Children 5, 6, and 7) were then presented.

Reliability

Another observer recorded correct and incorrect responses while in the same room as the child and experimenter, but seated behind the child so that his or her presence was minimally intrusive. Reliability observers were naive as to the objective of the investigation. Percent agreement for occurrences and nonoccurrences of correct responses on a trial-by-trial basis was calculated by dividing the total number of agreements between the experimenter and the reliability observer by the total number of agreements plus disagreements and multiplying by 100. Interrater reliability was calculated for 60% of all trials across all conditions for all children. Interobserver reliability was 98%.

RESULTS

Pretests

Children 1, 2, 4, 5, 6, and 7 performed at 100% during Pretest 1 and labeled each of the four experimental stimuli correctly during five consecutive trials. Child 3, who was earlier described as untestable on standardized IQ tests, did not label the four experimental stimuli on at least four out of five consecutive trials. He had considerable difficulty in learning all four labels and needed 4 months of two 30-min sessions per week to reach criterion. Once criterion for Pretest 1 was met, Pretest 2 was presented.

Performance during Pretest 2, "I want (object's label)," is presented for all but Child 4 in Figure 1. Child 4's performance is presented as the initial data points in the top graph of Figure 2. All six children failed to reach criterion in Pretest 2 (requests of stimuli two or more times during nonprompted trials) in training and generalization settings and were then presented with the time delay training procedure.

Training

Figure 1 shows the performance of all children except Child 4 (discussed later) during training and subsequent probes. Acquisition of spontaneous requesting of the stimuli appears on the left and performance during probes appears on the right of the figure. For training graphs, blocks of 10 trials are plotted along the abscissa with percent correct responding plotted along the ordinate.

Children 1, 2, 3, 5, 6, and 7 all acquired the target behavior within 60 trials (see Figure 1). Child 1 reached criterion (correct response on 18

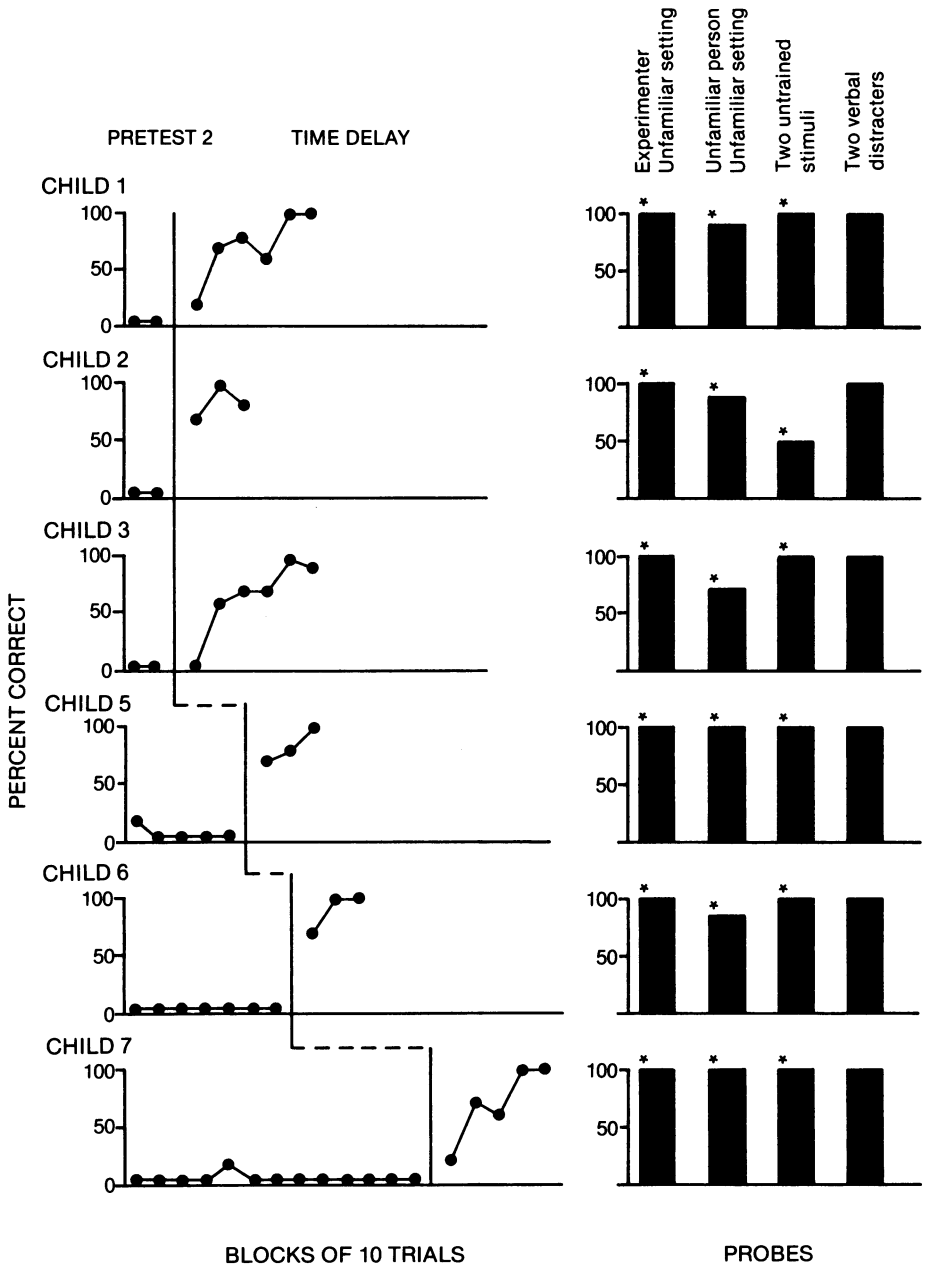

Figure 1. Performance during training and probe trials for Child 1, Child 2, Child 3, Child 5, Child 6, and Child 7.

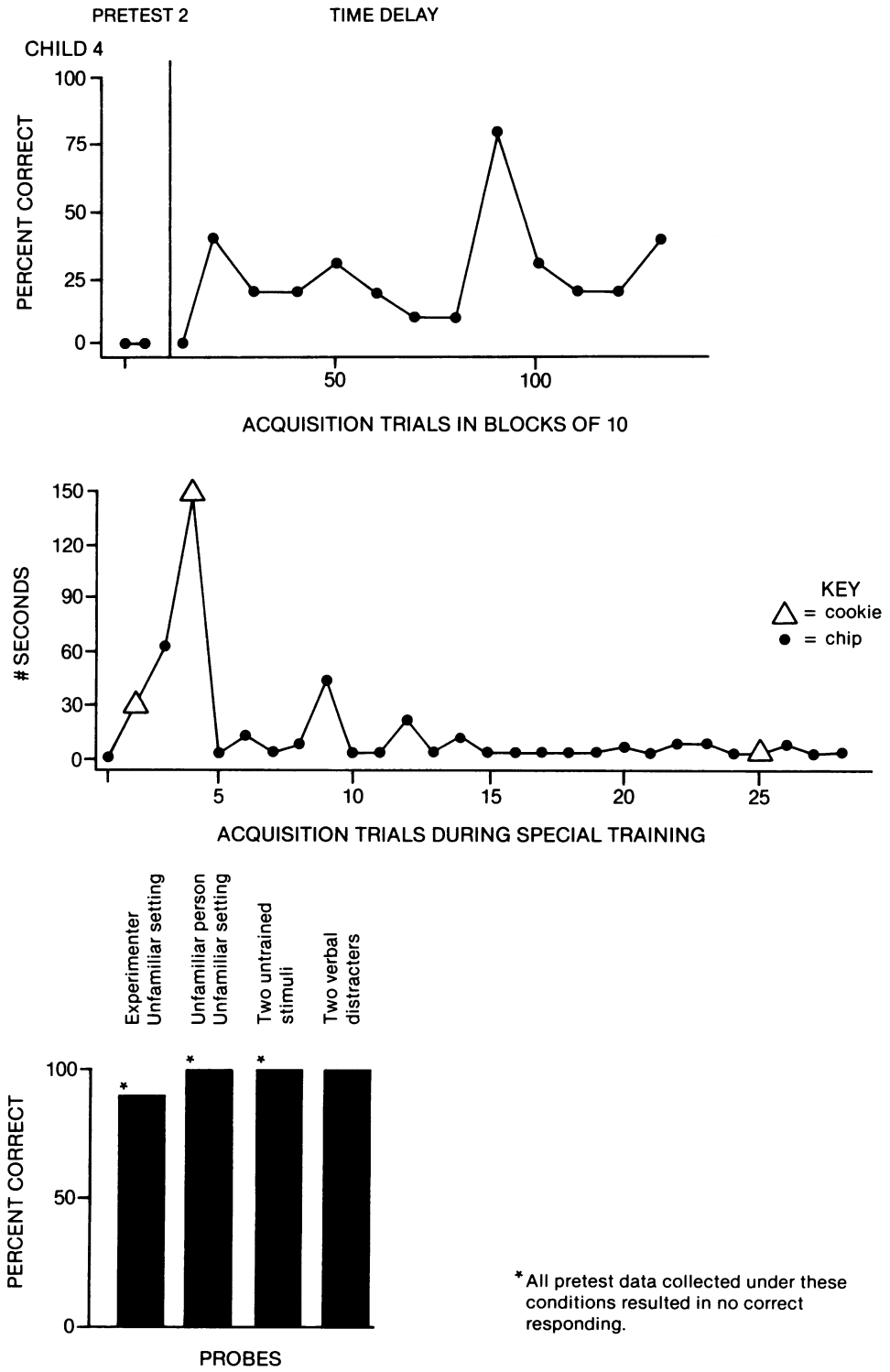

Figure 2. Child 4's performance during training, special training, and probe trials.

out of 20 consecutive trials) after 60 trials by spontaneously requesting the stimuli within the allotted 10-s delay period. Child 2 reached criterion after 30 trials and spontaneously requested the stimuli within a 2-s period after presentations of the items on every trial. Child 3 acquired the response after 60 trials and spontaneously requested the items, on the average, within 6 s after presentation of the stimuli. Child 5 and Child 6 acquired the response after 30 trials and spontaneously requested the items, on the average, within 4 s and 6 s after presentation, respectively. Child 7 acquired the response after 50 trials and requested the items within an average of 5 s. Incorrect responses consisted of the failure to respond in the allotted time as opposed to incorrect labels.

Child 4's performance can be seen in Figure 2. His first appropriate response was made during a 4-s delay (not plotted). Although Child 4's performance indicated that he spontaneously requested the stimulus, his appropriate responses were too sporadic to meet criterion (see top graph, Figure 2). Consequently, after 130 trials, Child 4 still had not responded correctly during 18 out of 20 successive training trials. During training, it appeared that Child 4 was exhibiting a preference for one of the two training stimuli (cookie and chip). The child's preference, however, seemed to vary across sessions. Thus, it was decided to implement a special training procedure that allowed Child 4 to make a choice between cookie and chip during each trial. Thus, during this training the experimenter simultaneously presented *both* of the experimental stimuli and waited until the child spontaneously requested *one* of the two stimuli. No modeled responses were presented. The experimenter recorded the length of each delay and initially did not use a maximum delay of 10 s. Child 4 met criterion when he spontaneously requested one or both of the stimuli within 10 s during 18 out of 20 consecutive trials. Performance during this special training is displayed in the middle graph of Figure 2. The number of seconds for each delay is plotted along the ordinate, and the number of trials is plotted along the abscissa. Child 4 reached criterion within 28 trials. It was evident from the child's performance that he had preferred to eat cookies, which he asked for 25 times as opposed to chips, which he requested a total of 3 times.

Probes

Generalization. Generalization to an unfamiliar setting was assessed for each child. Children 1, 2, 3, 5, 6, and 7 (see Figure 1, graphs on right) exhibited 100% generalization and maintained correct responding across trials in the unfamiliar setting. Child 4 (Figure 2, bottom graph) generalized and maintained correct responding on 90% of the trials.

All the children generalized and maintained appropriate responding in an unfamiliar setting with an unfamiliar person. Child 1 and Child 2 correctly requested the stimuli for 90% of the trials, with Child 3 responding appropriately on 70% of the trials (see Figure 1). Children 4, 5, and 7 responded at 100% (see Figures 1 and 2). Child 6 responded with 85% accuracy across trials (see Figure 1).

During the probe for generalization to untrained stimuli, each child was required to use the phrase "I want" to appropriately request the two experimental stimuli for which they had not been trained. All but Child 2 generalized and maintained 100% correct responding to the untrained objects (see Figures 1 and 2). Child 4 continued to demonstrate a preference for certain stimuli during this probe. When the experimenter held up a pretzel, Child 4 said "I want pretzel." However, when the peanut was presented, Child 4 pushed the peanut away and said "I no want peanut." This was considered a correct response. Child 2 (Figure 1) responded correctly in the presence of only one of the probe stimuli, suggesting that he also may have established a preference. Consequently, Child 2 attained 50% correct responding.

Assessment of stimulus control. The fourth probe assessed whether the child would respond spontaneously to the presence of various objects as opposed to verbal questions. During this probe, when the experimenter said "What do you want?" and presented the stimulus, each of the seven children responded appropriately with "I want (ob-

ject's label)." When the experimenter said "Mary had a little lamb" before presenting the stimulus, the children continued to respond correctly. Each child thus requested the appropriate stimulus regardless of what the experimenter said prior to its presentation.

Variability of response. Recall that Child 5, Child 6, and Child 7 were presented with additional trials in which a food tray with all four stimuli was placed next to the child. In the training setting, the children responded with 100% accuracy, with Child 5 and Child 7 requesting two items and Child 6 requesting three. In an unfamiliar setting with an unfamiliar person, the children maintained their same preferences with additional requests by Child 6 for Coke and Child 7 for french fries, items not displayed. Child 7 also spontaneously requested a break from working.

DISCUSSION

Our study was designed to determine if a time delay procedure could be used to teach autistic children to request desired items in the absence of verbal cues. Generalization of the spontaneous speech was also assessed. All seven autistic boys learned from the time delay procedure to ask spontaneously for items they desired without any verbal prompting. The spontaneous speech generalized from the training environment to unfamiliar persons, places, stimuli and was demonstrated after the presentation of a verbal distractor stimulus.

For the purpose of this investigation, "spontaneity" was defined as the occurrence of a verbal response to a nonverbal discriminative stimulus. In this case, the response trained was manding behavior. Although it is arguable that such responding is not "true" spontaneity because the response is pretrained in the presence of the discriminative stimulus, we contend that the use of "spontaneous" here is appropriate. We propose that spontaneity can be viewed as a continuum of behavior, represented here toward the end of this continuum where the stimulus control of the speech is transferred from a verbal stimulus to a physically apparent (and trained) nonverbal stimulus. The other end of the continuum might be represented by speech under the stimulus control of internal, historical, or future events. Additionally, although the "spontaneous" speech was originally trained, the children participating in this research demonstrated generalization both on our specific assessments and in their natural environment (e.g., requested untrained items, requested activities at home), suggesting that their verbal behavior did come under control of natural stimuli in their environment. This relates to Skinner's (1957) discussions of mand responses initially occurring as tacts. Thus, responses initially acquired as tacts are later used in manding as they are functional in the environment.

For each child, stimulus control transferred from the therapists' verbal prompt to the target stimulus. It is important to note that the use of prompts in the instruction of autistic children is frequently unsuccessful (e.g., Koegel & Rincover, 1976; Schreibman, 1975; Schreibman, Charlop, & Koegel, 1982). Typically, prompt procedures require the child to respond to the simultaneous presentation of multiple cues (the prompt and the target stimulus). The prompt is then faded to transfer stimulus control from the prompt to the training stimulus. It has been demonstrated that autistic children frequently have difficulty transferring from prompts to target stimuli, and it has been hypothesized that this is due to "stimulus overselectivity," the failure to respond to the simultaneous presentation of multiple cues (e.g., Lovaas, Koegel, & Schreibman, 1979; Lovaas, Schreibman, Koegel, & Rehm, 1971; Schreibman & Charlop, 1981; Schreibman et al., 1982). If the child is "overselecting" to the prompt and thus not responding to the target stimulus, prompt procedures would most likely fail.

It has been suggested that delaying the onset of the prompt, which initially controls the behavior, might in some cases avoid the problem of overselectivity (Touchette, 1971). This is because the prompt and training stimulus are no longer simultaneous. Perhaps the prompt procedure in this study was successful for this reason. The children's transfer of response from the prompt (experimenter's model) to the target stimulus (object) suggests

that the children did not overselect to the verbal prompt. Indeed, other studies have demonstrated the effectiveness of using a delay between prompt and response (i.e., Halle et al., 1979; Halle et al., 1981; Lovaas, 1966). The results of the probe for assessment of stimulus control further suggest the successful transfer of stimulus control from the verbal prompt to the target stimuli. When presented with the irrelevant verbal stimulus "Mary had a little lamb," the children did not echo, but maintained response to the target stimulus and responded appropriately.

In addition to the delay of the prompt as being instrumental in the success of the training procedure, the type of target stimuli used may also be of importance. It has been suggested that children may more readily respond to target stimuli that are extremely salient (Dunlap & Koegel, 1980; Egel, 1980; Stokes & Baer, 1977). The stimuli used in this study were reinforcing for the children as they consisted of food and beverages the children favored (although as we found with Child 4, preferences can change). Additionally, the target stimulus and the reinforcer were one and the same. When the child spontaneously requested "I want peanut," he was given the peanut to eat. Thus, the incorporation of salient stimuli and this stimulus specific reinforcement may have facilitated response to the target stimuli (Litt & Schreibman, 1981).

The advantage of this time delay procedure can also be seen in the generalizability of treatment gains. The results of the generalization probes demonstrate that the spontaneous speech transferred to unfamiliar settings, with unfamiliar stimuli, and unfamiliar persons. Although overselectivity has been implicated as interfering not only with acquisitions of behaviors but with generalization of treatment gains as well (Lovaas et al., 1979), it did not appear to interfere with generalization in this study. This, perhaps, is due to the nature of the discriminative stimulus. If, for example, the discriminative stimulus contained multiple cues (e.g., sounds, intonation, pitch) such as in the verbal prompt "What do you want?" then it is feasible that the child may have responded to only one component of the discriminative stimulus. When the same question is subsequently presented in another manner, the appropriate response might not generalize (Rincover & Koegel, 1975). The use of the food item itself as the discriminative stimulus perhaps circumvented interference of overselectivity in generalization by providing one cue (or a consistent complex cue in which the relevant component cue was always present).

Stokes and Baer (1977) stated that generalization may be engineered simply by teaching behaviors during therapy that will be functional in the natural environment. In this way, therapeutically acquired behaviors will be maintained by the normal environmental contingencies. An example of such behaviors is the behavior taught in this study. Because the boys were trained to express themselves in an appropriate manner, it is likely that the people around them will respond to their requests. Even occasional reinforcement may be sufficient to maintain this new behavior. For instance, it has been anecdotally noted that Child 4 continued to request his own reinforcers 4 months after treatment had terminated. Child 6 continues to request desired items with all members of his family. Child 7 now spontaneously asks for desired items by first addressing a person by name (e.g., "Marjorie, I want chocolate"). More importantly, the probe for variability of response with Child 5, Child 6, and Child 7 demonstrated that these children did not perseverate on one of the previously learned responses, but perhaps demonstrated choice (Carr & Kologinsky, 1983).

Previous research has demonstrated that once a child learns the grammatical structure "I want (object's label)," the child will generalize it to new requests (Hewett, 1965; Lovaas, 1966; Risley & Wolf, 1967). As a result, these children may develop a "real feel for language" (Lovaas, 1966). Our study replicated the use of the "I want (object's label)" as functional speech and further demonstrated the generalization of the phrase to untrained stimuli. Additionally, the children were observed using the expression in connection with many other stimuli at home and school. Child 3, for example, requested "I want tickle" and "I

want toilet" demonstrating the use of "I want" to request social interaction and assistance.

The children who participated in this experiment learned to interact with the environment. It must be noted, however, that the experimental stimuli were extremely salient and probably facilitated the acquisition of this behavior. Therefore, the use of other types of stimuli in future research may affect the success of this technique. Also, one must be cautious in generalizing from these results. These procedures may not be successful with autistic children whose MAs are lower than those who participated in the study (mean MA = 3.9). Additionally, the time delay procedure may not be feasible for those children who display severe stimulus overselectivity.

To demonstrate the applicability of this approach to spontaneity further advanced along the continuum, we are currently attempting to gradually fade out the immediate physical referent (e.g., cookie) and transfer control of the children's manding behavior to a particular environment rather than a specific physical object. The success of such a procedure would have important implications for the development of appropriate speech in autistic children.

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