CUES-PAUSE-POINT LANGUAGE TRAINING: TEACHING ECHOLALICS FUNCTIONAL USE OF THEIR VERBAL LABELING REPERTOIRES

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We evaluated the direct and generalized effects of cues-pause-point language training procedures on immediate echolalia and correct responding in two severely retarded females. Two experiments were conducted with each subject in which the overall goal was to encourage them to remain quiet before, during, and briefly after the presentation of questions and then to verbalize on the basis of environmental cues whose labels represented the correct responses. Multiple baseline designs across question/response pairs (Experiment I) or question/response pairs and settings (Experiment II) demonstrated that echolalia was rapidly replaced by correct responding on the trained stimuli. More importantly, there were clear improvements in subjects' responding to untrained stimuli. Results demonstrated that the cues-pause-point procedures can be effective in teaching severely retarded or echolalic individuals functional use of their verbal labeling repertoires.
    DESCRIPTORS: echolalia, language training, generalization, prompts

The most widely used operant program to teach correct stimulus-specific verbal responses to persons who exhibit immediate echolalia (i.e., repetition of one or more words in a temporally related sample verbalization) consists of a combination of procedures including imitation training, verbal prompts, stimulus fading, and differential reinforcement (e.g., Ausman & Gaddy, 1974; Carr, Schreibman, & Lovaas, 1975; Dunlap, Koegel, & O'Neill, 1985; Kent, 1974; Risley & Wolf, 1967). This program takes advantage of the student's echolalia by having the trainer state a correct response (which is likely to be echoed) at the end of the question or statement to be trained and then fade this verbal prompt across repeated trials (i.e., by saying the correct response progressively softer) until the subject uses the correct response without the prompt.

Although several studies have demonstrated that subjects acquire and continue to use responses trained in this manner when trained stimuli are presented, there has been little, if any, change in their echolalia or correct responding following novel or untrained verbal stimuli. As Schreibman and

Carr (1978) pointed out, this lack of generalization to untrained stimuli is a particularly important programmatic limitation because it is impossible to teach an echolalic a correct response for every verbal stimulus he or she might encounter in natural interactions. Thus, although this program many be useful in some clinical situations (e.g., to teach a particularly important set of responses), its practicality has been questioned (Schreibman & Carr, 1978).

In an effort to produce generalized improvements in echolalics' verbal behavior to untrained stimuli, McMorrow and Foxx (1986) evaluated a program that took advantage of the individual's verbal labeling skills (instead of his or her echolalia) as the means for establishing a repertoire of appropriate responses to verbal stimuli. In the initial effort McMorrow and Foxx developed "cues-pause-point" procedures to teach a persistent immediate echolalic to remain quiet when the trainer held up his index finger before, during, and briefly after the presentation of targeted questions and then to use a pretrained verbal label as the correct response when the trainer pointed to the appropriate environmental cue. These procedures made sense conceptually because previous research has shown that performance can be facilitated by having the student label relevant cues (Koegel, Dunlap, Richman, & Dyer, 1981), using a response

delay requirement (Dyer, Christian, & Luce, 1982), and suppressing off-task behavior (Koegel & Covert, 1972).

Results of this case study were quite promising. The cues-pause-point procedures replaced echolalia with 100% correct responding within three trials on each of three sets of 10 different questions (i.e., 30 questions) and the subject used the trained responses (a) when they were presented by individuals who had not been involved in training; (b) in settings where no training had been conducted; (c) when no prompts, cues, feedback, or consequences were used; and (d) 1 month following training. Perhaps more importantly, the procedures appeared to produce several improvements in the subject's responding to untrained verbal stimuli. First, following the initial training (Experiment I), the subject's echoing decreased in the next two experiments when new sets of questions were introduced in baseline even though the procedures that were in effect (i.e., feedback and consequences) had not influenced his echolalia previously. Second, correct responding increased in these baseline conditions even though no planned environmental cues (e.g., response cards) were present. Third, correct responding either improved (following initial decreases) or was maintained across post-training conditions in which the prompts, cues, feedback, and/or consequences were eliminated. Fourth, echolalia rarely occurred after the subject had been exposed to correct responses even though he did not always respond correctly (i.e., his inappropriate responses were usually misuses of trained responses for other stimuli, rather than echoes).

Although all of these effects were promising, McMorrow and Foxx (1986) did not use experimental designs that permitted the effects to be isolated. Thus, they had to infer that they were related to the training conducted in Experiment I. In addition, the study involved only one subject and he may have had some special skills (e.g., he could identify words) that limited the external validity of the results.

The present study had several aims. First, we wanted to determine whether the procedures used by McMorrow and Foxx (Experiment I, 1986) would be effective with lower functioning echolalics who did not display any extraordinary labeling skills. Second, we wanted to determine whether subjects could be trained to use different types of environmental cues (i.e., photographed and actual objects rather than word cards) to produce stimulus specific responses. Third, we hoped to experimentally isolate whether generalized improvements to untrained stimuli would occur. Finally, we wanted to begin to determine whether differences in the training setting (e.g., the presence or absence of objects that would not be trained as responses) influenced performance.

METHOD

Subjects

Dot was a 20-year-old mentally retarded female (IQ 21, Stanford-Binet) who had been institutionalized for 5 years. She had resided at our facility for 3 months prior to the study. She exhibited several maladaptive behaviors including physical aggression, throwing objects, window breaking, self-abuse, and a variety of stereotypies. In addition, she was not toilet trained, wore diapers, and occasionally threw feces. Dot's verbal behavior was limited almost exclusively to labeling objects when prompted and repeating one or more words in statements or questions that were directed to her. Her echolalic responses virtually never included words that were not contained in the sample verbalization. Her school program focused on managing her maladaptive behavior and training basic skills such as labeling and matching-to-sample rather than her echolalic speech.

Eva was a 14-year-old female who had been institutionalized for 3 years. She was diagnosed as mentally retarded (IQ of 35, Stanford-Binet) and dysphasic. Eva engaged in a variety of motor stereotypies (e.g., rocking, hand movements) and most of her unprompted vocal behavior was stereotyped as well. For example, she frequently made repetitious, high-pitched sounds and sometimes repeated phrases from television commercials. When presented with verbal stimuli other than those used

in labeling exercises (e.g., "What is this?"), Eva usually repeated one or more of the words although she occasionally made unrelated vocalizations. At the time of the study, Eva's school program was not focused on her echolalia.

Target Behaviors and Recording

In each experiment, the first word or sequence of words that followed the initiation of a question was scored in one of three, mutually exclusive, categories: echolalia, incorrect, or correct. Echolalia was defined as a repetition of one or more of the words contained in the question regardless of whether other verbalizations occurred. An incorrect response was scored when a verbalization contained a stimulus-irrelevant word(s), regardless of whether a correct response was included. A correct response was scored when a verbalization either matched the trained response or provided a different appropriate answer to the question. Using these definitions, a response that contained any combination of echolalic, correct, or incorrect verbiage was scored as an echo and a response that included any combination of correct and incorrect verbiage was scored incorrect. Responses were scored by the trainer immediately after each question was presented. If no response occurred, the question was repeated. If the subject failed to respond a second time, the trainer moved on to the next question. Dot never failed to respond and Eva's failures to do so were extremely rare. All sessions were either audio- or videotaped.

Reliability. Using randomly selected tapes, one of three independent raters transcribed and scored responses from at least 20% of the trials from each condition in each experiment. To limit the possibility that their scoring would be influenced by the trainer's feedback, the raters were instructed to stop the tapes immediately after each response (i.e., before the feedback was given). Interobserver agreement was computed by dividing agreements on the occurrence of each behavior by agreements plus disagreements, and multiplying by 100. Excluding the few taped verbalizations that could not be scored because they were inaudible, percent agreement on all target behaviors for Dot averaged 97%

in Experiment I and 95% in Experiment II, whereas for Eva it averaged 99% and 97%, respectively.

Trained stimuli and responses. In each experiment, stimulus (i.e., question) and response (i.e., object) pairs were developed by identifying objects that the subjects were likely to encounter in their current living arrangements and creating a question that pertained to each object. Question/response pairs were then arbitrarily separated into the sets that would be used in each experiment. No question/response pair from Experiment I was used in Experiment II. The trained responses (i.e., object labels) were one- to three-syllable words such as crayon, toothbrush, shoe, cheese, apple, toy, shampoo, broom, cigarette, book, coffee, and flower. The questions were between four and nine words long and never contained the response or part of a response. Examples included "What do you use to clean your teeth?", "What do you wear on your feet?", "What has pages with pictures on them?", "What is hot and sipped from a mug?", and "What is pretty and grows outside?" The subjects' responses to these questions had not been assessed prior to the baseline conditions. In Experiment I, pictures of objects were used, whereas in Experiment II actual objects were used.

General Procedures

The following sequence of conditions was run in both experiments.

Response identification training. Prior to each experiment the subjects were taught to verbally label each pictured or actual object that would be used. Labeling training consisted of the trainer (a) displaying the pictures or objects from each set on a table; (b) verbally (i.e., "what's this?") and/or gesturally (i.e., pointing to or tapping the object) prompting the subjects to identify the objects; (c) providing feedback (i.e., "good answer" for a correct response, "that's not right" for an incorrect response) and a gentle "no" (Van Houten & Doleys, 1983) for an echo; (d) saying the correct label when the subject failed to do so and then prompting her (as above) to label correctly; and (e) giving intermittent edible consequences for correct responses. This training continued until each object

was correctly labeled during three consecutive trials when the trainer simply pointed to the picture or object. Training generally progressed quickly since the subjects already could label the majority of the objects that were used.

Baseline. The baselines were conducted after the subjects had been trained to label correctly. Nevertheless, each trial during conditions where objects were available was started by labeling the pictures or objects that were displayed. After this labeling, the trainer (third author) said "I am going to ask you some questions and I want you to answer them the best you can." He then asked each of the questions in a random order and provided response-specific feedback following the subject's verbalization. His feedback was the same as in the response identification training except that whenever a subject verbalized an object label that was being used as a correct response for any of the targeted stimuli from any set he said "almost, keep it up," even though the response was scored incorrect. Subjects received a sip of coffee or soda or a bit of cookie for each correct response.

Photos/objects-pause-point. All of the baseline procedures remained in effect. During this condition the trainer prompted the subject to remain silent before, during, and briefly after he presented the questions and then to label one of the photos or objects (i.e., the correct response) that was present in the training setting. This was done by having the trainer (a) hold up his right index finger at eye level midway between the subject and himself whenever silence was desired (i.e., during the instructions, questions, and for approximately 1 s following the question) and say "no" or "shh" whenever a verbalization occurred (i.e., the pause prompt); (b) move this finger so that it touched the correct cue (photo or object) approximately 2 s after the question was completed (recall that at the end of response identification training each subject was responding correctly to the point prompt only); (c) use the response identification training prompts (e.g., tapping the object, "what's this?") if necessary to ensure that the labeling response occurred; (d) cover the photo or object with

a folder or poster board and use a bridging stimulus (i.e., a head nod or smile) immediately after the labeling response, pause prompt again, restate the question, and move his right index finger so that it touched the folder or poster board when a correct response was desired (i.e., he point prompted again and used the response identification prompts if a response did not occur even though the photo or object was covered); and (e) provide the same verbal feedback and consequences that were used in baseline for the first verbalization that occurred. The trainer always presented the questions in a random order and only scored responses that occurred when the photo or object was covered. Since the above training sequence relies heavily on manual prompts, verbal mediation was kept to a minimum.

Pause only. During this condition, the pretrial labeling was discontinued, the pictured or actual objects were removed from the training setting, and no point prompts were used. The trainer simply used the pause prompt as he presented the question and then withdrew his hand so that it was closed and in contact with his chest when a response was desired. The feedback and reinforcement contingencies were the same as before.

Baseline II. This condition was identical to the initial baseline except that the photos or objects were not present. In other words, the trainer simply asked the questions in a random order and provided feedback and consequences as he always had.

Programming generalization and maintenance. This condition consisted of several phases. First, sessions were conducted with a new trainer(s) (T2, or T2 and T3) providing the feedback and consequences. Second, the original trainer (T1) returned and faded the feedback and consequences. This was accomplished in a few trials by progressively reducing the number of responses that were followed by feedback and consequences until they were eliminated. Finally, generalization trials were conducted in either the training room (Experiment I) or a library in a different part of the building (Experiment II). These trials are described in more detail below.
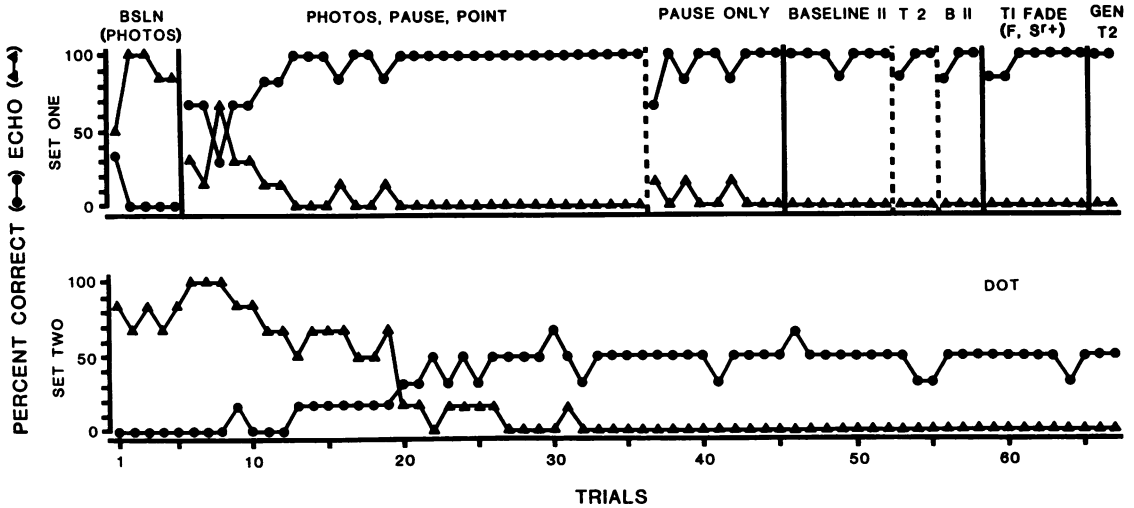
Figure 1. Experiment I (Dot). The percentage of echolalic and correct responses on trained (set one) and untrained (set two) questions. "T2" refers to a condition in which a new trainer presented the set-one questions. "B II" was identical to the initial baseline except that the photos were absent. In the T1 FADE condition, the "F" and "S⁺" denote feedback and positive consequences. "GEN T2" refers to trials in which T2 presented the questions but used no cues, prompts, feedback, or consequences.

EXPERIMENT I

All sessions were conducted at approximately the same time daily for each subject in a room (6 m by 8 m) that was barren except for two tables and several chairs. Two 6-question photo/response sets were used for each subject and a combined multiple baseline (across sets) and withdrawal design was used to assess the direct and generalized effects of the training. Prior to the experiment each subject participated in response identification training that used Polaroid color photographs of objects as the labeling stimuli. During each trial (i.e., the presentation of all six questions in a set), the trainer sat knee to knee with a subject and held a lap board so that the photos were facing the subject. Reinforcers, scoring materials, and a tape recorder were placed on a nearby table. At the end of a trial on one set, the trainer and subject simply moved to a table and chairs in a different area of the room and began another set. Between two and four trials on each set were conducted daily with each subject.

The purposes of Experiment I were to replicate the results of McMorrow and Foxx (1986) with lower functioning subjects, to determine whether photographed objects could be used as cues instead of word cards, and to begin to isolate any generalized effects that might occur by delaying or withholding training on one set of stimuli (i.e., using the multiple baseline design to assess generalization to untrained stimuli). The training sequence (see General Procedures above) was implemented on the first set of questions with both subjects. Whether it was implemented on the second set was determined by each subject's baseline performance on that set.

RESULTS

Dot. Figure 1 shows that Dot echoed in response to between 50% and 100% of the set-one questions during baseline even though the photos were present and feedback was provided after each response. Although she answered two set-one questions correctly on the first baseline trial, no correct responses occurred thereafter. During the first five set-two trials, Dot echoed between 67% and 83% of the questions and never responded correctly.
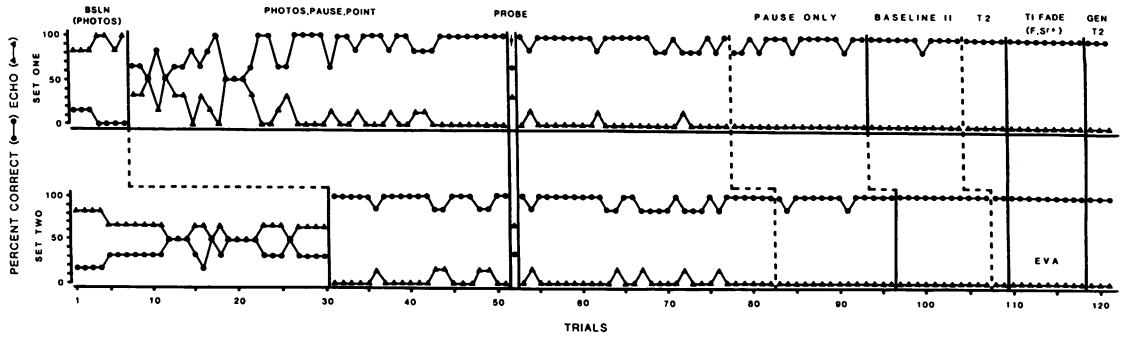
Figure 2. Experiment I (Eva). The percentage of echolalic and correct responses on two question sets. A return to baseline probe was conducted during trial 52 on both sets.

The addition of the pause and point prompts replaced echolalia with 100% correct responding during the eighth training trial on set one (trial 13). In fact, following training trial 14, correct responding was never below 100% and echoing did not occur for the remainder of the photos-pause-point condition. During the pause only condition, correct responding decreased and an echolalic response reappeared although correct responding recovered to 100% and echolalia decreased to zero on the last three trials. A high level of correct responding (i.e., usually 100%) and no echolalia were maintained thereafter. Dot's generalization assessments were conducted by T2 in the training room. No photos were present and no feedback or consequences were provided. During both trials, Dot answered all of the questions correctly and did not echo.

Figure 1 shows that Dot's echolalia on the set-two questions began to decline after three training trials had been conducted on set one. It decreased to zero by trial 22 and did not occur during the remaining 36 trials. Correct responding showed a clear increase several trials after echoing began to decrease. Specifically, it increased from 17% to 67% between trials 19 and 30 and thereafter ranged between 33% and 67%. After trial 26, Dot's incorrect responses were almost exclusively misuses of correct responses for other stimuli.

Eva. Figure 2 shows that during baseline Eva echoed between 83% and 100% of the set-one questions and never answered more than one correctly. During the first seven set-two trials, echoing ranged between 67% and 83% and correct responses between 17% and 33%.

The pause-point procedures produced 100% correct responding and no echolalia during training trial 11 on set one (trial 18). However, responding on this set did not stabilize at this level and Eva's set-two performance in corresponding trials was also variable. As a result, training was implemented on set two in trial 31. Interestingly, correct responding increased to 100% and echolalia was reduced to zero in the first training trial. In an attempt to determine which aspect of the training program was influencing performance, a return to baseline probe on both sets was conducted during trial 52. It revealed that correct responding dropped and echolalia returned, most notably on set two where Eva had received fewer training trials. Given these results, training was continued on both sets. Although correct responding remained quite high, it was not always at 100% on either set even after an additional 25 to 30 training trials.

The removal of the photos and point prompt in the pause only condition did not influence correct responding and echolalia did not occur. Eva performed without error during the three generalization trials.

DISCUSSION

Experiment I replicated the results of McMorrow and Foxx (1986) with two lower functioning echolalic individuals. The training program

rapidly replaced both subjects' echolalia with correct responses and these communicative improvements were maintained during conditions where the prompts, cues, feedback, and consequences were either faded or eliminated. Experiment I also demonstrated that the pause-point training was effective when photographed objects (rather than the word cards used in the previous study) were used as the environmental cues.

The generalization of effects to untrained stimuli differed between subjects. For example, Dot's improvements on set two began to occur within a few trials after training began on set one, whereas 23 training trials on set one failed to produce clear generalized effects on set two for Eva. Furthermore, while Dot never echoed and usually responded correctly to 50% of the set-two questions after trial 32, Eva's performance varied considerably longer on both sets even though training was implemented on both. One possible explanation for the differences between Dot and Eva's data is that generalized effects to untrained stimuli are possibly dependent on some subject-specific interaction between amount of training time and the number of exemplars that have been trained. However, the performance differences and design limitations in this experiment suggest that more rigorous experimental designs are necessary to further isolate these generalized effects. Accordingly, a second experiment was conducted with each subject.

EXPERIMENT II

In this experiment, six sets of five and one set of 10 question/response pairs were developed for each subject and actual objects instead of photos were used as the cues. The questions were of the same type used in Experiment I, except that the 10-question set contained questions that we felt the subjects would be unlikely to answer correctly unless they were trained directly because no objects would be used and the stimuli and responses were somewhat abstract. For example, two of the questions were "What is white and up in the sky?" and "Where do you go to learn things?" Prebase-

line response identification training was conducted on all 30 objects (i.e., six sets with five objects per set). This training was not given on the 10-question set.

The experimental design and training sequence were arranged as follows. For each subject, two sets of questions and objects were used in each of three rooms. The first room (Table Top) was arranged as in Experiment I, except that instead of using the lap board, each set of objects was displayed on a separate table and the trainer and subject simply sat at the table facing each other. In the second room (Wall), the two object sets were displayed from hooks on two sections (2 m by 2 m) of different walls. In the third room (Cluttered), two separate areas were created so that the targeted objects could be displayed amidst a variety of objects and furnishings that were not to be trained. Each room was partitioned so that only the display being used could be seen by the subject. In the Wall and Cluttered environments, the subject was seated so that she faced the object display area and the trainer stood to her side during presentation of the questions and implementation of the procedures (i.e., he never blocked a subject's view of the object displays). Another room (Barren) was used for the 10-question set. In this setting, the trainer and subject sat across from each other at a large conference table in an otherwise "object-free" area.

Our aim in Experiment II was to use this arrangement of settings and question/response sets to isolate any generalized effects to untrained stimuli that might occur and to begin to establish what seemed to be a reasonable training sequence that progressed from simple to more complex training environments. This was accomplished by evaluating each subject's performance in all seven settings during each trial, and implementing the training sequentially in the Table Top, Wall, and Cluttered settings on only one of the two displays that were available (i.e., one generalization set was used in each setting). We did not plan to implement training in the Barren environment. It was included in order to determine how echolalia in response to
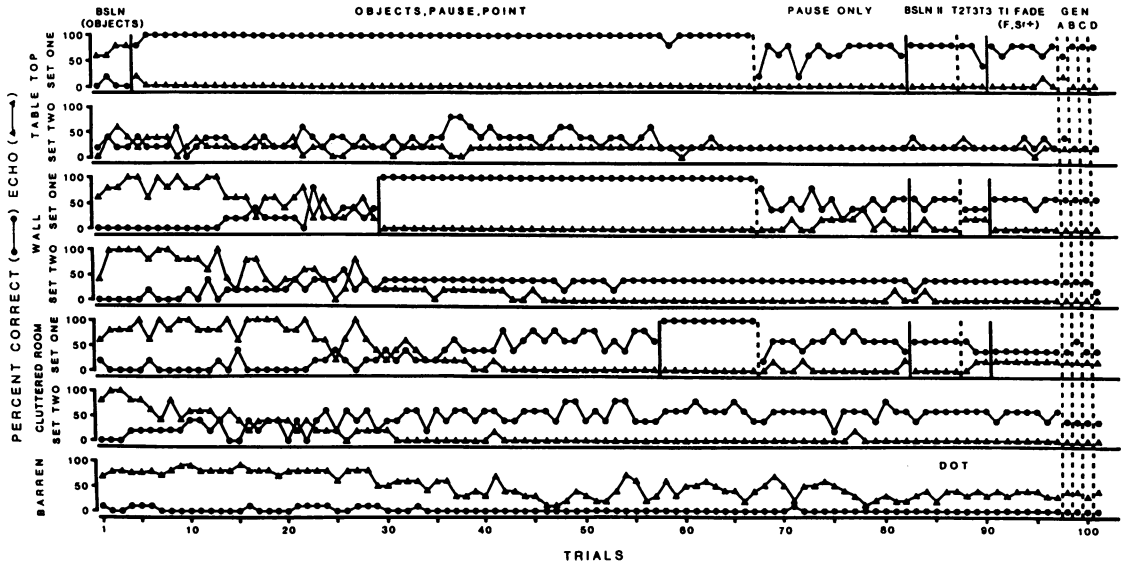
Figure 3.   Experiment II (Dot). The percentage of echolalic and correct responses on one trained and one untrained question set in each of three settings (Table Top, Wall, or Cluttered room displays) and one untrained set in a Barren setting. Training was implemented sequentially on one question set in the Table Top, Wall, and Cluttered settings. The figure labels are the same as those used previously except the GEN A–D represent different generalization tests (see text).

untrained stimuli would be influenced if correct responses never occurred. This, of course, is why difficult questions, no response identification training, and no objects were used. Thus, the training sequence was conducted within a seven-leg multiple baseline across question/response sets and settings. This design permitted analyses of generalization to untrained stimuli within and between settings and the effects of the sequential application of treatment from simple to more complex environments.

RESULTS

Dot. Figure 3 shows that during baseline on Table Top/set one, Dot echoed 60% to 80% of the questions and only answered one question correctly, even though the objects were present and feedback was provided. Her performance on the other six sets during the corresponding trials (i.e., trials 1 to 4) was similar and did not appear to be influenced by the feedback or consequences that were used in all sets.

The implementation of objects-pause-point training on Table Top/set one produced 100%

correct responses and no echolalia during the second training trial and, except for trail 59, this level of performance continued throughout the condition. Training on just these five stimuli appeared to have a slight effect on responding in some of the untrained sets since by trial 30 echolalia decreased slightly in all of the baselines except the Barren set and correct responding increased on Wall/sets one and two and Cluttered/set two.

Training on Wall/set one produced errorless responding on the first trial (trial 30) which continued throughout the condition. This training on five additional stimuli also clearly affected performance on the five sets that remained in baseline. Most notably, echolalia decreased and remained at zero in Wall/set two and Cluttered/sets one and two, whereas it stabilized at 20% on Table Top/set two and showed a clear decline during trials 28 and 47 on the Barren set. Correct responding also increased, especially on Table Top/set two and Cluttered/sets one and two.

The addition of training on Cluttered/set one (trial 58) produced 100% correct responding and no echolalia during the first training trial. How-

ever, this training had no clear additional influence on performance in the four sets that remained in baseline.

In trial 68 (i.e., the pause only condition), the objects and point prompts were eliminated in set one of the Table Top, Wall, and Cluttered settings. Dot's correct responses decreased in all three and, in some cases (e.g., Wall/set one) echolalia reoccurred, but not nearly to baseline levels. In general, the pause only condition had little, if any, influence on responding in any of the four baselines (see trials 68 to 82).

Dot's performance changed very little thereafter on either the trained or untrained sets. Consider that except for the Barren and Table Top/set two settings, Dot was correctly responding at between 40% and 80% and echolalia was occurring at 20% or less. Echolalia remained low in the Barren setting even though none of the questions were being answered correctly.

Generalization tests A, B, C, and D were conducted as follows: (A) T2 presented the question sets in the settings where they were originally used; (B) T1 presented the sets in a novel room, a library; (C) a novel person presented the sets in the library; and (D) T1 presented all 40 questions in a random order in the library. No objects, feedback, or consequences were used in any test. Thus, these were the first times the set-two Table Top, Wall, and Cluttered questions had been asked without the objects, feedback, and consequences being used. Figure 3 shows that Dot's performance on these tests differed little, if it all, from her performance after the pause only condition.

Eva. Eva's baseline on Table Top/set one was extended to determine whether prolonged exposure to the feedback and consequences would influence her performance (recall that Dot's Table Top/set one baseline lasted only four trials). Figure 4 shows that during this baseline, Eva echoed between 80% and 100% of the questions and answered just one question correctly. Her performance in the other settings during the corresponding trials (i.e., trials 1 to 11) was similar and unaffected by the feedback and consequences.

After two trials of objects-pause-point training

on Table Top/set one, echolalia was virtually eliminated in all seven settings. However, there was no immediate training effect on correct responding. Instead, Eva began responding "no" after virtually every question. No procedural alterations were made until trial 20 (see arrow, Figure 4), when the feedback for responding "no" was changed from "that's not right" (the feedback for an incorrect response) to "no" (the feedback for an echo). Because this change had no effect on Eva's use of the "no" response, a different strategy was used. Prior to trial 25, an intensive training session was conducted using only the Table Top/set one questions and objects. In this session, the trainer used the training sequence except that (a) on the initial trials he only partially covered the object on the covered trial and (b) if a correct response did not occur, he continued to prompt (i.e., by tapping or saying "What's this?") until it did. After approximately 35 min Eva had responded correctly to 100% of the questions when the object was covered and the usual prompts (i.e., the trainer simply pointing) were used. At that point, the trainer and Eva "reentered" the design. On trial 25, Eva correctly responded at 80% and near errorless responding (i.e., virtually 100% correct and no "no" responses or echoing) occurred in all subsequent Table Top/set one training trials. This training had no influence on correct responding in the other sets.

Training on Wall/set one in trial 30 produced 100% correct responding by the third training trial (trial 33) and between 80% and 100% correct responding throughout the remainder of the condition. During this training, echolalia began to replace "no" responses when Eva failed to respond correctly (see trials 38 to 56). Wall/set one training produced some increase in correct responding on Table Top/set two, Wall/set two, and Cluttered/sets one and two.

In contrast to the two previous training conditions, Eva responded correctly to all Cluttered/set one questions and did not echo during the first training trial (trial 47). This performance was maintained throughout the condition. Training on Cluttered/set one also enhanced performance in all
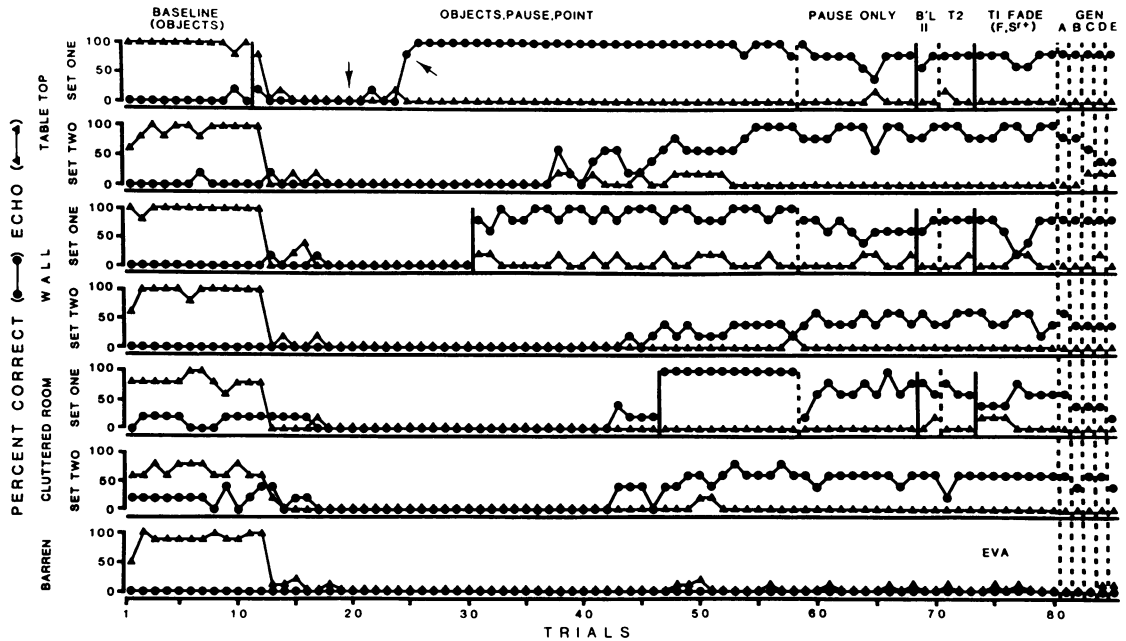
Figure 4. Experiment II (Eva). The percentage of echolalic and correct responses on one trained and one untrained question set in each of three settings (Table Top, Wall, or Cluttered room displays) and one untrained set in a Barren setting. The arrow at TT-one, trial 20 represents a change in the feedback, whereas the arrow at trial 25 indicates when the intensive training was conducted (see text). The remaining figure labels are the same as in Figure 1 for Dot.

of the remaining baselines, except for the Barren set. In fact, Eva had reached 100% correct in Table Top/set two and 80% correct in Cluttered/set two by the end of the condition. Her use of the "no" response at this point was very infrequent. In fact, her incorrect responses were much more likely to be misuses of correct responses for other stimuli rather than echoes or "no" responses. This pattern continued throughout the study.

During trial 59, the objects and point prompts were eliminated in set one of the Table Top, Wall, and Cluttered settings (see pause only). Although correct responding decreased somewhat in each and a few echolalic responses occurred, performance on the untrained sets was not influenced. Correct responding on the three second sets ranged between 40% and 100% and echolalia was absent while performance in the Barren set remained unchanged.

Little change in performance occurred during the remaining conditions. For example, during the last two T1 Fade trials, when the trainer was simply asking questions and provided no feedback or

consequences on all set-one questions, correct responding ranged between 40% and 100% and echolalia was absent. As with Dot, there was no clear difference in Eva's performance on either the trained or untrained stimuli by the end of the T1 Fade condition.

Generalization assessments A, B, C, D, and E were conducted as follows: (A) a new person presented the sets in their original settings; (B and C) T1 and then T2 presented the sets in the library; and (D and E) T1 and then another new person presented the sets in a random order in the library. Once again, no objects, feedback, or consequences were used in any test. In general, Eva's performance differed little from her performance after the pause only condition. In fact, the only clear performance decrement occurred during tests C, D, and E on the Table Top/set two.

DISCUSSION

The seven-leg multiple baseline designs demonstrated that the cues-pause-point procedures rapidly replaced the subjects' echolalia with correct

responses to the trained stimuli and also produced positive changes in their responding to the untrained stimuli. In fact, with the exception of correct responding on the Barren set (which we did not expect to increase), correct responding always increased and echolalia always decreased on the untrained question sets. In addition, both subjects' echolalia decreased on the Barren set even though neither ever correctly responded to more than one question.

As in Experiment I, the rapidity of the generalized effects differed between subjects. For example, training on Table Top/set one (i.e., only five question/response pairs) produced changes in Dot's correct responding and echolalia in both sets of the Wall and Cluttered setting baselines, whereas it had no influence on Eva's correct responding in any baseline even though echolalia was eliminated. Eva's correct responding to the untrained stimuli did not begin to increase until midway through her Wall/set one training and it continued to improve during Cluttered/set one training, whereas the addition of this latter training had no clear influence on Dot's responding. Interestingly, by the end of the T1 Fade condition on all three trained sets, Eva was echoing neither trained nor untrained stimuli, Dot rarely echoed both types, and both subjects were responding correctly to trained and untrained stimuli about equally well. Neither subject's performance deteriorated significantly in the generalization tests even though these were the first times the untrained stimuli had been presented without the objects being present and during some tests all of the stimuli were presented randomly in a novel setting by novel individuals.

GENERAL DISCUSSION

As in previous research, this study demonstrated that echolalia can be replaced with stimulus-specific responses that the echolalic will use in a variety of stimulus conditions (e.g., with other persons, in other settings). However, unlike previous research, this study demonstrated that the cues-pause-point procedures did much more than simply replace echolalia with correct responses to a few trained stimuli. First, with the exception of Eva's set-two

baseline in Experiment I (which may not have been continued long enough to reveal generalized effects) and both subjects' Barren set data in Experiment II, correct responding always increased on the untrained question sets (i.e., Dot's set-two baseline in Experiment I and both subjects' untrained baselines in Experiment II). Second, with the exception of Eva's set-two baseline in Experiment I, echolalia always decreased on the untrained sets. Third, and perhaps most important, reductions in echolalia did not directly correspond with increases in correct responding on the untrained sets. That is, both subjects' echolalia on the untrained sets was near zero in the later stages of both experiments even though their responses were not always correct.

This lack of direct correspondence between correct responding and echolalia is explained by the fact that the subjects began to use incorrect and correct object labels as their responses to untrained stimuli after cues-pause-point training was conducted on relatively few stimuli. For example, prior to trial 18 in the set-two baseline of Experiment I, Dot had never used more than one of the object labels as a response during any trial. However, during trial 20, her echolalia decreased and incorrect use of object labels increased to 50% of her responses. Interestingly, her correct responding then increased to a high of 67% during the following 10 trials, while echolalia dropped to zero and disappeared after trial 31. A similar effect occurred in Experiment II since both subjects' responding with object labels (a) rarely, if ever, occurred on any of the sets during the trials that corresponded to their Table Top/set one baselines (i.e., trials 1–4 for Dot and 1–11 for Eva); (b) increased dramatically when echolalia began to decrease on the untrained sets; (c) was usually incorrect more often than correct when it first occurred; and (d) constituted virtually all of their incorrect responses at the end of the experiment. Thus, it appears that while the procedures directly replaced echolalia with correct responses to the trained stimuli, their effect on responding to the untrained stimuli was to increase the use of object labels which then led to increases in correct responding.

This increased use of object labels was particu-

larly important because it not only increased the likelihood that correct responding would occur to untrained stimuli, but represented a much more useful and higher level communicative strategy than echolalia. In other words, it appears that both subjects learned to verbalize either on the basis of cues that were present or their established repertoires of labeling responses. This strategy is quite similar to one used by higher functioning individuals. This analysis suggests that if Eva and Dot's repertoires of labeling responses were expanded and feedback regarding their use of these labels continued, their language development would more closely approximate that of their nonecholalic peers.

These results replicate and extend those of McMorrow and Foxx (1986) since they were obtained using lower functioning echolalic subjects who had no extraordinary labeling skills; pictured or actual objects rather than printed words as the cues; and experimental designs that were capable of isolating the generalized effects to untrained stimuli. Experiment II also demonstrated that setting differences (e.g., type of object display, the presence of objects that would not be trained) had little influence on either the rapidity of training effects or generalization. However, there was at least one major difference between the studies. In the earlier study, the subject's correct responding and echolalia were influenced in his Experiment II and III baselines, whereas Dot and Eva's were not during the trials that corresponded to the Table Top/set one baselines in Experiment II. This difference was probably related to the number of stimuli that were trained in Experiment I. Consider that 30 stimuli were trained in the McMorrow and Foxx study, whereas Dot and Eva received training on only 6 and 12 stimuli, respectively. Indeed, both Dot and Eva's responding on the generalization sets was influenced soon after they began receiving training in Experiment II on just one set.

In conclusion, this study suggests that (a) reducing echolalia by teaching correct responses to questions may be quite practical clinically, but procedural differences may determine whether or not generalization to untrained stimuli occurs (cf. Schreibman & Carr, 1978), (b) the cues-pause-

point procedures teach subjects a strategy that may approximate that used by higher functioning individuals and thereby enhance the likelihood of generalized improvements in their language development, and (c) individuals who label (or can be trained to label) can be trained to use these labels in a functional way.

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