GENERALIZATION OF TEACHER BEHAVIOR AS A FUNCTION
OF SUBJECT MATTER SPECIFIC DISCRIMINATION TRAINING

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The effect of training on the rate of behavior-specific praise for two fourth-grade teachers was investigated within a multiple-baseline design. Training teachers to identify instances of behavior-specific praise on videotaped presentations (discrimination training) combined with instructions to use praise, and audiotape recordings of the teachers' classroom interactions as feedback, increased the rates of behavior-specific praise. However, the effects were restricted to subject-matter areas in which training was conducted.

DESCRIPTORS: stimulus control, social reinforcement, teacher behavior, generalization, multiple baseline, classroom management, college instruction

The extensive literature on behavior modification leaves little doubt that contingency management effectively helps students to achieve desirable behavior. A number of studies have investigated the effects of contingent teacher attention on various student behaviors (*e.g.*, Cooper, Thomson, and Baer, 1970; Thomas, Becker, and Armstrong, 1968). Explicit or implicit within much of the literature is the modification of teacher behavior before behavioral change in the students. Precise and efficient procedures for accomplishing teacher behavior change have become a topic of interest within the applied behavior analysis literature (Holden and Sulzer-Azaroff, 1972; Rule, 1972; Saudargas, 1972; Thomas, 1971). A major problem for consultants, supervisory, and training personnel is to manage the consultant and/or training process such that teacher behavior changes may be initiated, maintained, and gen-

eralized across conditions, across responses of the same class, and over time. While the initiation and maintenance of changes in teacher behavior has been demonstrated directly or indirectly within the confines of experimental conditions and time, the generalization of these behaviors across conditions, behavior class, or over time remains to be demonstrated.

Procedures for developing a generalized response class have been isolated (Baer and Sherman, 1964; Baer, Peterson, and Sherman, 1967; Brigham and Sherman, 1968; Garcia, Baer, and Firestone, 1971; Peterson, 1968). By reinforcing some members of a response class, the rate of other members of that response class can be increased without reinforcement. This procedure generates new members of a response class that will obtain frequencies in proportion to the frequencies developed for the reinforced member of the class. It has been shown that discriminative stimuli are probably responsible for the generation of members of a response class across topographic boundaries, a factor that allows for great diversity in behavior (Garcia *et al.*, 1971; Peterson and Whitehurst, 1971).

Three mechanisms have been isolated by which the frequency of a behavioral class could be increased or maintained under stimulus con-

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ditions different than those used in training. The first involves schedules of reinforcement, where variable-interval schedules of reinforcement produced behaviors highly resistant to extinction over time (Ferster and Skinner, 1957). These scheduling procedures have been shown to produce durable behavior that is often regarded as a form of behavior generalization (over time).

The second has been called "entry into natural communities of reinforcement" (Baer and Wolf, 1970; Birnbrauer, 1971; Walker and Buckley, 1972). This procedure programs behavior change to accept the types of reinforcers that are naturally available to the individual and to accept schedules of reinforcement available in conditions other than those in which the behavior is originally trained.

A third procedure involves the stimulus control of behavior (Ferster and Hammer, 1966; Terrace, 1966). This procedure establishes stimulus control over the targeted behavior in such a way that a variety of stimulus conditions evoke and support the targeted behavior. This procedure may be a key factor in behavior control across environments, but it has not been considered directly in much of the applied literature. Theoretically, it should be possible to produce generalization by training to a sufficient number of relevant characteristics within a stimulus group. This procedure should produce stimulus control over behavior by a variety of stimuli within a particular stimulus group, such as appropriate student behavior. Once these stimuli have become operational in the control of teacher-differentiated responses in the form of verbal approval or teacher verbal instructions, over several instructional settings these in turn would control student behavior in these instructional settings.

The present research studied a procedure to achieve generalized teacher behavior change across many teaching conditions by employing stimulus control procedures. In particular, it focussed on the control of response systems (teacher approval behavior) by antecedent stim-

ulus events (appropriate student behavior). The initial experimental question was whether discrimination training in the use of a targeted teacher behavior in one of three subject-matter areas is sufficient to generate the use of this behavior in other subject-matter areas.

METHOD

Subjects and Setting

The two teachers randomly selected from the eight who volunteered to participate in the experimental training procedures were from different school districts. One additional teacher was used to prepare video demonstration-tape recordings.

Both teachers participating in the study were male, aged 28 and 47 yr, with 4 and 15 yr teaching experience. Both subjects held master's degrees in education. The numbers of students in each classroom (fourth grade) were 28 and 31.

The main setting for the experiment was the classroom of each teacher. In addition, videotaped discrimination training took place in a specially equipped room on the University of Oregon campus.

Dependent Variables

The teacher behavior selected for experimental manipulation was labelled "behavior-specific praise". This verbal behavior had one component that differentiated it from other praise statements, the identification of the student behavior to be praised, which was attached to a word or group of words that connoted approval or praise, *e.g.*, "You did that problem correctly, John."

"General approval statements" were also measured as a control variable. General approval statements were defined as praise statements that did not identify the pupil behavior being praised.

Teacher Training

Teacher discrimination training. On the evening before Experimental Period 1, each teacher

was trained to discriminate behavior-specific praise as described previously, with examples taken only from the subject area of reading. The training was completed in three parts, and included: (1) reading a prepared statement defining the target behavior and discussing the content of the statement with the experimenter, (2) viewing a videotaped discrimination training sequence while identifying instances and noninstances of the target behavior by marking a specially prepared form and continuing discrimination training until a criterion of 100% responses was obtained, and (3) listening to an audiotape recording while marking number of instances of target behavior heard (this was also done to a criterion of 100%) and graphing the number of instances.

The videotape presentation included 11 instances of behavior-specific praise statements that were arbitrarily scattered among noninstances of this behavior. These taped examples showed a child-teacher interaction as follows: a child was shown engaged in an appropriate or inappropriate behavior for the specific instructional setting; a teacher was shown delivering a verbal statement that commended, disapproved, or was not contingent on the behavior. Noninstances included: general approval statements, disapproval statements, positive interjectory remarks, which were defined as words common to the speech habits of the speaker, but not used to express approval, and direction or instructional remarks, which were defined as remarks that directed the student's attention to something or told the students how to do something. The noninstances included a wide range of statements used in responding to or directing pupil behavior. This format was consistent throughout all discrimination-training video presentations.

After the teacher had viewed each instance, he indicated which of the two categories, instance or noninstance, of behavior-specific praise he had observed. This was done each time a segment was presented. The first teacher correctly identified nine of the instances presented

on the first trial; the second teacher identified eight. When the entire videotape recording had been played, the experimenter corrected the choices made by the teacher and the videotape was replayed until the teacher obtained a criterion score of 100%. One replay was required to obtain criterion for each teacher.

After completing the videotape training, the teacher listened to a 10-min audiotape containing five instances of behavior-specific praise statements that he was to identify and plot on graph paper without knowing how many instances were contained in the recording. This recording was also to be replayed until the 100% criterion was reached. However, this was unnecessary because each teacher reached criterion on the first trial. This part of the training procedure was designed to acquaint the teacher with the equipment and procedures for recording his own behavior.

The teachers were asked to raise their rate of behavior-specific praise to one statement per minute. This target of performance was selected on the basis of previous work with teachers in which higher targets of performance had been rejected as too high a response cost for the procedures employed. It was decided that to ensure continued cooperation from the volunteers, lower targets would be employed. Each teacher was given sealed envelopes containing instructions for obtaining a cassette recording from the master recording for each day of the experimental period. They were told not to open an envelope until the end of each teaching day.

On the evening preceding Experimental Period 2, each teacher was again put through the training sequence. This sequence differed from Experimental Period 1 in that the subject areas of reading, language arts, and mathematics were included in the videotaped samples and the audiotape segment was dropped from the training sequence.

Observation and Rating Procedures

To avoid the problems of stimulus control of teacher behavior as a function of the pres-

ence of the experimenter and observers, teacher verbal behavior was observed electronically. A small wireless FM microphone (Mura WX-127B) was used to broadcast the teacher's voice to an FM receiver (Realistic #12-632A, pocket model) connected to a tape recorder (Sony TC 106 AV). The tape recorder was loaded with 3600-ft (1080-m) reels of recording tape. At 3.75 in. (9.2 cm) per second, the recorder would run continuously for 6 hr. Each teacher was trained to operate the equipment. Three days were allowed to familiarize both the teacher and students with the equipment.

The experimenter collected the master recordings every other day. From these, the experimenter made cassette tape recording samples at arbitrarily selected and varied intervals (without listening to them) within each of the subject-matter time periods.

Independent raters were used to compile the data for the study from the cassette recordings. The raters had been trained previously to be behavioral observers in other experiments. However, to ensure that the observational definitions were understood, the raters were trained to a 100% criterion of agreement on tapes from the demonstration teacher's classroom and tapes from the familiarization period preceding baseline. A retraining period was held midway through the experiment. The retraining consisted of independently rating a tape recording, writing down the verbal behavior observed, discussing any disagreements, rereading the definition of the behavior observed, independently rating another tape recording, and so on, until 100% agreement was reached on a tape recording not previously rated. Three tape recordings were required to reach 100% criterion.

As both raters rated each tape throughout the experiment, it was possible to calculate the percentage of agreement for the dependent behavior over each of the five subject-matter periods for each teacher.

The mean percentage of agreement for the dependent variable of behavior-specific praise over all conditions was calculated to be 97.6%

and ranged from 86.5% to 100%. Agreement was calculated by dividing the number of samples agreed on by the total number of samples rated. In this calculation, a sample was not counted as an agreement unless both raters recorded an identical number of the behaviors within the sample.

Experimental Design

The experimental phases were: (1) a baseline period in which dependent measures were taken in five subject-matter areas, (2) training in the subject area of reading followed by experimental observations of its effects with daily feedback, (3) withdrawal of the feedback, (4) training in reading, mathematics, and language arts followed by experimental observations of its effects with daily feedback.

(1) *Baseline.* The teachers were not told which behaviors were to be studied. They were not informed of their progress and were asked not to listen to the tapes they had made.

(2) *Experimental Period 1.* The teachers rated and graphed their own behavior-specific praise each day from cassette tape recordings.

(3) *"No-Feedback" period.* On the morning following the last day of Experimental Period 1, the cassette recording equipment was removed from each of the teacher's classrooms. The teachers were instructed to continue making the master recordings. These were collected as in baseline. They were told that after a week to 10 days they would begin another phase of the study. All information about their progress was withheld during this period.

(4) *Experimental Period 2.* The data collection and self-observation procedures were the same as in Experimental Period 1, but included reading, language arts, and mathematics as feedback periods.

RESULTS

Teacher versus Rater Observations

The first teacher trained produced self-observation data that corresponded closely with the

observations of the two raters ($r = 0.90$). Over the 42 sets of observations, the mean disagreement of rate-per-minute data (observations of the two raters as opposed to teacher observations) was 0.14. The range of disagreements was from 0.0 to 0.7. The second teacher trained also produced self-observation data that corresponded closely to the observations of the two raters ($r = 0.76$). Over 31 sets of observations, the mean disagreement was also 0.14 and the range was from 0.0 to 0.7.

Effects of Training

Figures 1 and 2 show the effects of the training and feedback procedures on the rates of behavior-specific praise. Baselines for the five subject-matter periods of reading, language arts, mathematics, social studies, and science and health were essentially zero for both teachers.

During Experimental Period 1, the mean rate for behavior-specific praise rose for both teachers, during reading primarily.

The No-Feedback period showed a decline in the rate of behavior-specific praise statements, but the behavior did not revert to the near-zero rate shown during the baseline period for either teacher.

In Experimental Period 2, when training and feedback procedures were applied to reading, language arts, and mathematics, each showed rapid increases in rates of behavior-specific praise for both teachers. Day-to-day variability is present, but experimental effects are still quite apparent.

DISCUSSION

The present results support the work of others that have focused upon the generalization of behavior (O'Leary and Drabman, 1971; Wahler, 1969; Walker and Buckley, 1972; Walker, Mattson, and Buckley, 1971). The present study showed no generalization beyond the specific experimental periods in which the target behavior was trained and supported by the experimental procedures.

For the first teacher to receive discrimination training (Figure 1), there was some indication of an increase in behavior-specific praise outside the training condition for Experimental Period 1. This weak effect took place in the subject-matter area (language arts) most similar in activity to that in which training was given (reading). In observing these two periods, the differences would be obvious only to those well acquainted with the class materials. It is likely that the specific setting events were so similar that the training received by the teacher was applicable to either subject-matter area. However, the rates during the language arts period were considerably lower than those in the reading period. It is safe to conclude that the effects of training were specific to the discriminative cues provided by the training for use of behavior-specific praise.

The data for the second teacher (Figure 2) support this conclusion. Behavior-specific praise occurred only under the conditions trained. For this teacher, the language arts period was not contiguous to the reading period, as it was for the first teacher, and the two periods were further differentiated by content. Thus, the restriction of behavior-specific praise rate change to the reading period is again consistent.

A second set of teachers was employed as a yoked control for the discrimination-training procedures. The data for these teachers are not reported here, but are available (Horton, *unpublished*). These teachers, who did not receive discrimination training, did not produce high rates of the targeted behavior but did obtain higher rates of general approval behavior under the procedures used. This finding suggests that discrimination training is important in the development of a complex behavior. The teacher training procedures for the teachers who did not receive discrimination training approximated those generally relied upon by teacher training institutions and by classroom consultants. The result was a lack of discrimination between the targeted behavior and another related response class.

Fig. 1. Averaged rates per minute for behavior-specific praise by the first teacher to receive discrimination training. Broken lines indicate the days for which data samples were unobtainable. Experimental Period 1 featured feedback in reading. Experimental Period 2 featured feedback in reading, language arts, and mathematics.

Fig. 2. Averaged rates per minute for behavior-specific praise by the second teacher to receive discrimination training. Broken lines indicate the days for which data samples were unobtainable. Experimental Period 1 featured feedback in reading. Experimental Period 2 featured feedback in reading, language arts, and mathematics.

Thomas (*unpublished*) was concerned with the accuracy of self-observation by his teachers in the use of video-feedback procedures designed to increase use of praise. It is clear that the discrimination training procedures used in the present study were effective in obtaining high correspondence between the two independent raters and the self-observations of the teachers, who received the discrimination train-

ing. This was not true for teachers who did not receive discrimination training. This implies that the consulting psychologist could provide teachers with discrimination training directed toward a targeted behavior, and feel some confidence that a self-monitored feedback mechanism could have sustaining effects.

An implication of this study is that teacher trainers and consultants should not be surprised

to find that training directed toward one set of teaching conditions does not guarantee that the behaviors trained will appear under another set of teaching conditions. Apparently, the only way that a set of behaviors will appear under diverse sets of teaching conditions is when these behaviors are originally trained for all of these conditions and support of the behaviors (in the form of performance feedback) is programmed into each of these situations. A more generalized training effect could probably be generated by providing discrimination training inclusive of all subject-matter areas and the variations in presentation modes. This seems particularly important when audio-visual media are being used to present subject material, for this type of presentation does not allow a great amount of latitude for a teacher to use behavior-specific praise effectively.

The present study indicated that training in the use of behavior-specific praise in one of three specific subject-matter areas did not produce this behavior in other subject-matter areas where this behavior was not trained or supported by feedback. Another study conducted simultaneously (Horton, *unpublished*) confirmed the expectation that training that included all subject-matter areas does lead to a teacher's use of behavior-specific praise in all areas. One teacher was given the training procedure reported here but with examples from each subject-matter area. This teacher subsequently was found not to confine the use of behavior-specific praise to any one subject-matter area. Thus, the training procedure *per se* is useful for modifying teacher behavior. However, it remains to be shown that training on some sub-set of subject-matter areas and modes of presentation will produce a generalized state of the behavior to other areas and modes of instruction.

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