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Generalization of Behavior Modification Skills Acquired through Observation Training Procedures

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GENERALIZATION OF BEHAVIOR MODIFICATION SKILLS ACQUIRED THROUGH OBSERVATION TRAINING PROCEDURES

by

Thomas E. McCarthy

A Thesis
Submitted to the
Faculty of The Graduate College
in partial fulfillment
of the
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Thomas E. McCarthy
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Special populations, especially the severely and profoundly retarded, are increasingly being "mainstreamed" into the public schools or special education programs. Additional money and personnel (e.g., Public Law 94-142, the Education for All Handicapped Children Act) have provided for the educational needs of these special students.

With the influx of special populations into the public schools a rapidly growing demand has emerged for trained personnel to teach basic skills in one-to-one tutoring situations. Rapid yet effective methods for training tutors are called for. Behavior analysts have successfully taught behavior modification principles to high school students (Gladstone & Sherman, 1975), parents (see reviews by Forehand & Atkinson, 1977; O'Dell, 1974; and Berkowitz & Graziano, 1972), teachers (Jones & Eimer, 1975; Koegel, Russo, & Rincover, 1977) and attendants (Gardner, 1972).

Behavior analysts have developed an extensive body of operant research to demonstrate effective teaching techniques for this population. Self-care skills such as toothbrushing (Horner & Keilitz, 1975) and toileting (Azrin & Foxx, 1971; Azrin, Bugle, & O'Brien, 1971), language skills such as articulation (Sailor, 1971; Murdock, Garcia, & Hardinau, 1977) and academic skills such as spelling (Neef, Iwata, & Page, 1977) or coin usage (Miller, Cuvo, & Borakove, 1977) have all been successfully taught to students previously thought of as "unteachable."

Koegel et al. (1977) trained teachers in comprehensive "behavior
modifications skills." Specific skills such as giving commands or instructions and dispensing reinforcers were subdivided into components. One or more specific rules for correct usage of these skills were provided for each component. The training procedures included demonstrations, lectures and videotapes. In this study correct usage of the "behavior modifications skills" by the teachers resulted in the autistic students learning various simple tasks.

Although previous research has reported various successes in training subjects and, as Koegel has demonstrated, changes in students' behavior, the training procedures sometimes required excessive staff time and cost. Training procedures have included lectures (Sepler & Myers, 1978), verbal instructions, modelling, verbal prompting and praise (Fabry & Reid, 1978), written instructions, videotapes of correct and incorrect models, practice with feedback and "live" modelling of correct procedures (Koegel, et al., 1977), video modelling, rehearsal with praise and corrective feedback and practice with praise and corrective feedback (Gladstone & Sherman, 1975).

Horton (1975) has described a discrimination training procedure consisting of instructions, discrimination training, corrective feedback and audiotape recording for self-monitoring which resulted in the teachers' correct use of "behavior-specific praise" with students. Discrimination training consisted of identifying and scoring correct and incorrect instances of
behavior-specific praise from a videotape of teacher and student interactions. Generalization of training occurred only to tasks displayed on the videotapes. Before the correct usage of behavior-specific praise generalized to other academic tasks, task specific videotape training was necessary. The contention was that the stimulus conditions observed on the videotapes (correct and incorrect teacher and student interactions) would develop stimulus control or "rule governed behavior" (Skinner, 1969). When the teachers were present in an actual teaching session the similar stimulus conditions would control their correct use of behavior-specific praise.

The present study was an attempt to extend the discrimination training model to teach a more complex set of behaviors. Specifically, can discrimination training be used as part of an observation training procedure to successfully teach a modified version of the behavior modification skills presented by Koegel, et al. (1977)? Included in the modified skills package were specific rules for physical prompting and prompt level reduction. Two additional evaluation questions were: Will the skills package that included the prompting rules result in student learning? Will the observation training procedure result in generalization to tasks both similar and dissimilar to those observed in the videotapes during training?
**Method**

**Subjects and Setting**

Seven undergraduate students, two female and five male, enrolled in an eight-week sophomore level course in behavior analysis served as trainees. When informed about the general nature of the study all trainees volunteered as subjects. The course included a daily one hour and forty minute practicum at a special education facility in addition to didactic course work at the university. All trainees had completed two freshman level psychology courses in behavior analysis and had some previous tutoring experience with the mentally retarded. The practicum session for trainees number 1 was from 10:00 a.m. to 11:40 a.m. while the practicum session for trainees 2 through 7 was from 12:20 p.m. to 2:00 p.m.

Each trainee was assigned to one student for the duration of the practicum. Since trainees 1 and 3 were assigned to the same student, only six different students were observed for this study. All six students were assessed as severely mentally impaired (I.Q. 30 or below) using one or more standardized test instruments. Students 1 (also labeled as 3) and 2 were ambulatory; students 4 through 7 were nonambulatory. Ages ranged from 5 to 13 years. Each student exhibited one or more stereotyped self-stimulatory behaviors and were easily distracted from the training tasks presented by the tutors.

The study was conducted at a large open classroom of a
special education facility in Kalamazoo, Michigan. Twenty students attended class for 5½ hours daily. The tutoring sessions occurred on the floor, at small tables or in enclosed booth in the classroom. The observation training sessions were conducted in an adjacent observation room.

**Dependent Variables**

The primary dependent variables were the trainees' correct use of instructions, physical prompts and consequences. Each of these tutor behaviors was divided into several components with a specific criterion for a correct occurrence of each component. In order for instructions, physical prompts or consequences to be scored as correct in a trial, the criteria for all components in a category must have been met. The definition of each tutor behavior and the criteria for each component are given below.

**Instructions.** An instruction (S) was defined as a short vocal statement that directs the student to perform a task. For student 3, a physical demonstration of the task was included after the instruction. (See section on student correct responses.) The criteria for the components of an instruction were:

1. The student must be looking at and oriented towards the task or tutor at the initiation of the instruction. Also, the student must not be engaged in physical or vocal disruptive behavior (e.g., yelling, head banding, clapping, rocking, repetitive hand movements, throwing objects, etc.) when the instruction is given. The trainee could call the student's name or use manual
guidance to assure student readiness and orientation to the task or tutor.

2. There must be a distinct pause (approximately one second) prior to the instruction when no vocal behavior is directed toward the student.

3. The instruction must exactly match the $S^D$ (verbal instruction) stated in the written behavioral objective selected for each student (including word order and words used).

4. The instruction must be presente only once per trial.

**Physical Prompts.** A physical prompt was defined as the tutor touching, guiding, grasping or moving the student's arm or hand so that all or part of the desired response was completed. Different levels of physical prompts were classified as either full, partial, minimal or, when not used, as no prompt. Full assistance was defined as the tutor directing **all** of the desired student response; partial assistance as physically directing **some** of the response; minimum assistance as a **brief** touch or push that only gives an initial start to the student's response; and no prompt as no physical contact between tutor and student. The criteria for the two physical prompt components were:

1. The physical prompt, if used, must occur concurrently with or immediately after (within approximately one second) the end of the instruction.

2. Physical prompts must be at the lowest level of assistance necessary to evoke a correct response. Reduction of the
level of assistance may occur after a single correct response but must occur after ten consecutive correct responses (except at the no assistance level). Reductions or increases may change only one assistance level at a time.

Consequences. The conditions defined as consequences were reinforcers, verbal punishers and time-out. Reinforcers were classified as consumables (food, liquids or candy), tacticle stimuli (toys, hugs, hair touseling, etc.) and verbal praise ("Great!", "Good working!", "Nice job!", etc.). Verbal punishers were short statements (less than five words) that indicated an incorrect response ("No!", "That's wrong!", "That's not right!", etc.). Time-out was defined as the tutor turning away and withholding all reinforcers and attention for at least five seconds. The three criteria for the correct delivery of consequences in a trial were:

1. Delivery or student contact with the appropriate consequence must start within three seconds of the completed student response. When more than one reinforcer is used, all must be delivered within the three second time limit. If the student does not respond within five seconds of the no assistance level, a verbal punisher or time-out must begin immediately.

2. The consequences delivered within a single trial must be consistent. That is, either reinforcers or verbal punishers/extinction should occur in a particular trial, not both.

3. Reinforcers must follow prompted or unprompted correct
responses; a verbal punisher or extinction must follow prompted or unprompted incorrect response.

**Student Correct Responses.** Each student's education plan was divided into specific behavior objectives. Some of the objectives described tasks the student should learn in a semester. One objective was chosen for each student and tutor pair. All objectives required additional and more precise definitions for reliable observations than those included in the written objectives given to the trainees. Below is a list of the $S^D$'s (verbal instruction) and scoring definitions used for each student and tutor pair. All responses were to occur within five seconds of the $S^D$.

1. $S^D$: "Rich, touch the spoon."
   Correct response: Any part of the palm side of the hand (from the wrist to the fingers) contacting the spoon for any duration.

2. $S^D$: "Tom, touch your (nose/mouth)."
   Correct response: One or more fingers of either hand contacting the designated body part for any duration.

   Correct response: The student claps his hand at least once.
4. $S^D$: "Donna, push the truck."
Correct response: The student uses either hand to push the truck at least four inches in one direction.

5. $S^D$: "Barb, put the sucker in your mouth."
Correct response: With the sucker taped to the hand, the student brings the sucker completely into the mouth (past the vertical plane formed by the outer part of the lips).

6. $S^D$: "Pete, get the (dowel/banjo/ring)."
Correct response: Either hand closes so that the palm and fingers (except the thumb) make contact with the object simultaneously for any duration.

7. $S^D$: "Lois, get the dowel."
Correct response: Same as number six.

Observation and Reliability Procedures

All observations were conducted daily in the classroom by classroom staff. Observers were trained by first using previously staged videotapes of teaching interactions. Then, for the first four weeks of the practicum, the observation staff used the data sheet to monitor the trainees' teaching interactions with their students. For both training situations listed above, the experimenter used instruction, practice, and feedback to teach the
observation procedures. For each trial the observer would score a "+", "-", or "NA" on all components except prompt level. To score the prompt level, a circle was marked on F, P, M, or 0 corresponding to the prompt level used in that trial. The percentage correct for instructions, prompts and consequences was determined for each session by dividing the number of trials scored "+" for all components by the total number of trials. The "At correct level?" prompting component was calculated separately after each session and not scored by the observers.

Reliability scores were obtained in the following manner for each category of tutor behaviors for all student and tutor pairs. For each tutor behavior category (instructions, prompts or consequences), an agreement was scored if both observers independently marked either all components as correct or any component as incorrect for a given trial. Reliability was assessed at least once for each experimental condition except for trainees 2 and 3. Reliability was not taken during the observation training condition for these two subjects. For the student response category, an agreement was scored if both observers independently marked either a "+" or a "-" on a given trial. The percentage of agreement for each category was obtained by dividing the number of agreements by the number agreements plus disagreement in each session and multiplying by 100. The mean reliability scores by subject, by experimental condition, and by dependent variable is shown in Table 1.
Experimental Design

A multiple baseline design across groups of tutors was employed (Baer, Wolf, & Risley, 1968). Individual data for three trainees are presented in the first phase of the multiple baseline. The data for the remaining four trainees are in the second phase. The second group did not begin training until the first group entered the post training feedback condition.

Baseline. On the first day of the practicum, the trainees were provided with a lab manual that summarized school regulations, data collection and graphing rules, and various examples. Also included in the lab manual were definitions of the tutor target behaviors and a flow chart of a typical tutor and student behavior sequence in a teaching session. All trainees were required to pass two quizzes on the contents of the lab manual at 80% accuracy. Passing the quiz on general rules and procedures earned points towards a course grade whereas the quiz on the target behavior definitions did not. Remedial quizzes were administered until all trainees passed both quiz sections.

For the first four weeks of the practicum the trainees received a general orientation of the program, received student assignments, and were given a day to simply familiarize themselves with the students. School staff provided a brief demonstration
of the training procedure for each student. The demonstration consisted of identifying suitable reinforcers, task materials, and modelling a typical trial presentation including the instructions, prompts and consequences. Also presented was the written behavioral objective and the operational definition of the correct student response. No feedback was given to trainees on their use of the target behaviors during baseline or observer training conditions. Feedback that was presented consisted of verbal statements concerning attendance, preparation for training sessions, voice inflection, and strategies for ensuring student attention during the tutoring sessions.

Beginning with the fifth week of the practicum (the first week of baseline observations) a weekly monitoring form was completed on each trainee that listed the points earned for that week in several areas of importance: data collection, maintenance tasks, professional conduct, and contingency management. Trainees earned all points possible in each category of the monitoring form in all experimental conditions.

Observation training. Each group of trainees was exposed to discrimination training procedures. Trainees were taught to identify and score correct and incorrect occurrences of the target behaviors (instructions, prompts and consequences) and student responses from a videotape. Training sessions lasted from 45 minutes to one hour for three days for both groups of trainees. Training procedures consisted of:
1. Instructions for using the data sheet, scoring rules and procedures, and a brief explanation of the definitions of the target behaviors.

2. Feedback and short discussion on items scored incorrectly by any trainee in the group.

Because of staggered scheduling of trainees, two separate observation training times were held for the first group. For Rick (1) and his tutor, training occurred from 10:00 a.m. to 11:00 a.m. The other two student and tutor pairs in the first group and all the second group were trained in the afternoon from 12:30 p.m. to 1:30 p.m.

The videotape used in training was constructed by utilizing roleplayers for both student and tutor. A script was prepared for every trial that specified various correct and incorrect instances of each component of the target behaviors. Over a set of ten trials, each component had from four to seven randomly assigned errors with a mean of five errors per component. Two sets of ten trials were developed for training while a set of 20 "pilot" trials were used for a brief initial screening shown to both groups. The training tasks used in the tapes were:

1. "Touch your nose"
2. "Clap your hands"

Thus, student and tutor pairs 2 and 3 worked with tasks that were very similar in topography to those viewed on the videotapes.

Initially, five to ten sample trials were quickly shown to
familiarize the trainees with the pacing and format of the videotapes. Then, ten trials were individually displayed each training session. The trainees were provided with a definition of the correct student response for each task presented on the training tapes just prior to observations. Trainees were instructed to make their decisions for scoring the components as they viewed a trial. After the trial, the trainees scored their data sheets. All trainees then took turns reading the component headings listed on the data sheet and announced their scores. The trainer said either "yes" or "no" as to the accuracy of the score for each component as it was given and gave a brief explanation of the correct scoring when an error occurred. Typically, the explanation was a restatement of the rule for that component.

At the end of each observation training session the trainees were instructed to utilize what they had learned in training during their tutoring sessions with their respective students. Observations of trainee performance occurred immediately after the training sessions in all experimental conditions.

Feedback. In this condition the trainees received daily verbal feedback after the observation training condition was completed. The weekly monitoring forms, which had point values attached, were continued. Immediately after each tutoring session the classroom staff or experimenter gave a short (2 minutes or less) statement to each trainee on their performance in the target behavior categories. Typically, the staff told the
trainee their approximate score in each of the categories. Suggestions for correcting specific errors and praise for correct performance were included in all feedback sessions for each trainee. However, point values on the weekly monitoring form were not contingent on performance (as specified by the verbal feedbacks) in the target behavior categories.

RESULTS

Trainee Behavior

Figure 1 shows the performance of all trainees with their assigned students across experimental conditions. Each data point represents the percent of trials in a session where all components of a given category of tutor behavior were scored as correct.

Insert Fig. 1 here

In baseline, five of the seven trainees consistently had low percentages for the correct usage of instructions (vocal ST's). Trainees 3 and 4 had much higher performance scores. During the observation training condition (acquisition phase), all performance scores for the trainees improved to as much as 85% or more. During the feedback condition (post-training), most of the trainees' performance remained at or rose above the levels established during the
training condition. Only trainee 7 showed any decrease for the correct performance of instructions in the feedback condition.

The results for the physical prompts and consequences categories were similar to those for instructions. All trainees improved or maintained high performance scores for the prompting category after implementation of the observation training procedure. Trainees maintained or improved their scores during the feedback condition.

In the consequences category, four subjects showed large improvements in scores after training (trainees 1, 2, 4, 5). Subject 3 maintained a high performance score and subject 7 showed a slight improvement during training that increased to 90% in the feedback condition. Subject 6 evidenced some decrement in performance during training that was eventually corrected within three feedback sessions.

**Student Correct Response**

Data collected on the students' correct responses at each of the physical prompt levels and across experimental conditions are shown in Figure 2. These results indicate that most of the trainees learned to use less physical assistance as stated in the lab manual and demonstrated in the training tapes (fading of prompts) while teaching the assigned tasks to the students. During baseline, the trainees typically presented physical prompts at various levels of assistance on different trials. For example, trainee 1
alternated between full and no prompts in baseline. Trainee 2 presented physical prompts at all levels on different trials with most occurring at full assistance, the next most frequent at the no assistance level. During observation training, most of the trainees began decreasing the number of trials presented at the higher assistance levels while increasing the number trials at lower assistance levels. This systematic prompt fading technique continued throughout the feedback condition. In addition, the students' correct responses occurred at a consistently high percentage of trials as the physical assistance level decreased.

Insert Fig. 2 here

For trainees 1, 2, 4, 6, and 7 more correct student responses occurred at lower prompt levels after training. The procedure for subject 2 was changed in the training condition from pointing to five body parts (three of which were consistently performed correctly) to pointing to the two least known body parts, mouth and nose. However, partial prompts did increase in frequency with a corresponding increase of correct student response at this prompt level. Subject 5 did not reduce his assistance level but the student's correct responses increased in frequency at the full prompt level.
A training package for teaching college students basic tutoring or behavior modification skills that were applicable with severely and profoundly retarded children was evaluated. The definitions, or rules, for the target behaviors provided in the lab manual prior to baseline did not generate consistently high performance scores on all categories for any trainee. Trainees were then taught to correctly identify and score on a form the correct and incorrect instances of from two to four components of instructions, prompts and consequences. With the implementation of the three-hour observation training procedure, all trainees improved their performance scores on one or more of the target behavior categories.

The observation training procedure required repetitive use of the rules and close attention to the significant stimulus features displayed by both role players on the videotape. During baseline the responses of students failed to exert appropriate stimulus control over the trainees' training behaviors. With the feedback provided by the trainer to the group for incorrect responses and the repetitive rule usage required for correct scoring, each of the trainees began to function under more appropriate stimulus control as defined by the experimenter. The demonstration of more appropriate stimulus control occurred during each trainee's tutoring session with students. For most trainees, improved performance
scores occurred rapidly in all categories showing performance deficits. The data from the short feedback condition suggests that verbal feedback on trainee performance after each tutoring session may have maintained improvements in performance scores.

The present study extends the applicability of the discrimination training procedure demonstrated by Horton (1975). In addition to scoring from prepared videotapes, Horton used audiotapes of each teacher's behavior as feedback, audiotape scoring, and instructions as independent variables to increase the target behavior rate to a criterion level. The present study required the trainees to score the videotapes and utilize this training in their tutoring sessions. During observation training, the feedback procedure was to give verbal corrections for incorrect scoring by the trainee reciting their scores for a trial. If necessary, a brief explanation of the applicable rule was included.

The present study taught trainees a complex behavior repertoire described as behavior modification skills (Koegel, et al., 1977). In addition to Koegel's format, the current procedure included a set of rules for reducing the level of physical assistance. Trainees were able to adapt the behavior modification skills format to train the different tasks assigned to them in each of their tutoring sessions. Trainees 2 and 3 were assigned tasks that were similar in topography to those viewed on the videotapes while tasks assigned to the other trainees were of a somewhat different topography. As it was, there were no differential effects for
tasks that were similar or dissimilar to those displayed on the videotapes. After the study, when several trainees were questioned on how they utilized the training they received, they stated that when stimulus conditions were appropriate on the videotapes and in tutoring sessions (i.e., the trainee was about to give an instruction or the student made a correct response) they frequently covertly recited the appropriate rule and attempted to abide by it. Regardless of the topography of the selected task, it may be that the behavioral requirements for the tutor and many of the stimulus features from actually tutoring or scoring a tutoring session were the same, or very nearly so. Nevertheless, the rules or definitions for the target behaviors were the same in both settings. The present results thus support Koegel's findings that subjects can be trained in behavior modification skills that generalize to other settings or training tasks.

Student correct responding was also assessed. The general result was that students did learn all or some of the requirements of the tasks on which they received training. As tutors learned to use the behavior modification skills and faded prompts, the students either increased their rates of correct responding at the same prompt level or began responding correctly at lower levels of physical assistance. These findings help to establish the validity or usefulness of the behavior modification skills taught to the trainees. Since two of the students met criteria for the current behavioral objective, they were assigned to a new objective the
following semester. The other students were scheduled to continue working on the same objectives in the same manner.

In the special education facility where this study was conducted, the administration voiced an intense need for a rapid yet effective tutor training procedure. Every semester (15 weeks each in Fall and Winter; 8 weeks each in Spring and Summer sessions) new groups of practicum students from the university were utilized as tutors. Since many of these new tutors had little or no experience with one-to-one training of severely and profoundly retarded students, many hours of individual classroom staff time were required for tutor training. It was reported that in some cases half the semester was completed before compliance with a specific tutoring procedure by the practicum student was considered adequate by classroom staff. The observation training procedure utilized in the present study is a potential answer to this training problem. Since the observation training did not occur until the sixth or seventh week of the semester, it is not clear from the current data that the same results can be expected from only a few days of orientation. However, other applications of this training procedure suggest that similar results can be expected.

Because of the successful outcome of the present study, the administration of the special education facility has both requested replication of the procedure for the next group of practicum students and is making plans for incorporating the procedure as a program-wide training procedure for new staff and all practicum students.
The discrimination training (observation training) procedure described here and by Horton (1975) may have wide applicability for training other complex behavioral repertoires. In addition to tutor training in different procedural formats, the observation training procedure may be useful in training assertiveness skills, interviewing skills, group tutoring skills, counseling skills, etc. Future research may indicate for what populations or behavioral repertoires this training technique may prove useful. For example, for a population of trainees with poor reading skills, it may be possible to eliminate the written definitions or rules and simply give them verbally during observation training. Also, since no effort was made to assess the number of training sessions or the level of accuracy of training scores needed for superior performance scores, these topics may be of research interest. As it was, none of the trainees reached 100% accuracy with the script of the videotape in any of the three training sessions, although each trainee did improve their accuracy scores in the next training session. The lowest accuracy score averaged across categories on the first day of training was 33.3%, on the last day the highest score was 93.3%. The mean score for all trainees on the last day of training was 75.2%. Other applications of this procedure may question whether higher accuracy scores during training would result in higher performance scores. Finally, since the practice each trainee had with their students immediately after the training session may have assisted in their rapid acquisition and subsequent performance this variable requires further exploration.
The present study did not assess the long term maintenance of the behavior modification skills training for the trainees. It is not clear from the current study that systematic feedback in the third experimental condition functioned to maintain high performance scores over extended time periods. Future investigations may determine the utility of the observation training technique by a thorough evaluation of skills maintenance.
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Table 1

Mean Reliability Scores Per Subject, Category and Experimental Condition

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Figure Captions

Figure 1. Percentage correct trials in each session for instructions, prompts and consequences across subjects and experimental conditions.

Figure 2. Percentage correct student responses by experimental conditions across subjects and prompt levels. Both the percentage of trials presented (open bar) and the percentage correct of all trials (shaded bar) are displayed.
FIGURE 1

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% CORRECT

DAYS

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