The Effects of Modeling and Feedback in Training Tutors

Kathleen M. Krumhus

Western Michigan University

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THE EFFECTS OF MODELING AND FEEDBACK
IN TRAINING TUTORS

by
Kathleen M. Krumhus

A Dissertation
Submitted to the
Faculty of The Graduate College
in partial fulfillment
of the
Degree of Doctor of Philosophy

Western Michigan University
Kalamazoo, Michigan
August 1978
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Kathleen M. Krumhus
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Abstract

This study examined the differential effects of instructions, modeling, and feedback in the training of tutors in a remedial education program. The training program was designed to teach the correct use of descriptive social reinforcers to tutors of grade school and high school students. A multiple baseline design was employed to determine the experimental effects. Modeling and feedback were provided either immediately following the completion of a tutorial session or immediately prior to the next session. Instructions alone had little effect (2% to 12% correct), modeling produced a marked and rapid improvement (42% to 100% correct), and feedback produced slight additional improvement (72% to 100% correct). When feedback was provided, it did not produce a powerful effect within the parameters of this study. The use of modeling as a methodological control for the instructional effect of feedback is discussed.
The Effects of Modeling and Feedback in Training Tutors

Much training involves a set of procedures whose independent effects are frequently not isolated. In training behavior modifiers, these sets of procedures frequently use a standard format. First, the trainees receive simple instructions and a modeling demonstration of the target behavior. They then have an opportunity to role play or engage in the target behavior with their performance being observed. Shortly after the session, the trainers provide feedback over aspects of the performance observed during the role playing/testing session. This popular format has been shown to be effective in changing a variety of behaviors (Bailey, Timbers, Phillips, and Wolf, 1971; Martin, 1975; Frederiksen, Jenkins, Foy, and Eisler, 1976). However, the critical elements of this format have generally not been systematically examined within a single experimental procedure. Since training programs are generally expensive, it would be useful to test the effectiveness of the various components and eliminate those which are not critical.

Feedback and modeling appear to be two critical components of the typical training program; the remainder of this introduction will deal with these two features.

Feedback

The reinforcing function of feedback stimuli. Skinner (1969) defines feedback as "response produced stimuli", and states that this term is "widely misused as a synonym for operant reinforcement"
Since it is common for behavior analysts to conceptualize feedback as a conditioned reinforcer (Mager and Pipe, 1970; Fuqua, 1976; Pennypacker, 1976), they frequently assume that those variables which increase the strength of reinforcers will also increase the effectiveness of feedback. Thus, some authors apply the principle of immediate reinforcement to the effective use of feedback. Hall (1975) gives a clear example of this:

Providing information on the correctness or incorrectness of a response as quickly as possible facilitates learning. The more immediately after a response the feedback is provided, the more rapidly discriminations can be made and the more quickly learning will occur. (p. 25)

There are two problems related to the extension of the principle of immediate reinforcement to applied situations. The first problem is the definition of the term "immediate". Most of the research which reports that delay of reinforcement produces decrements in performance has been done with animals in laboratory settings. In these situations, a performance decrement occurs when reinforcement is delayed by only a few seconds (Renner, 1964). As the term "immediate" is used in applied settings, it may be more comparable to the time span associated with "delayed" reinforcement in the laboratory setting. In other words, the "immediate" reinforcement of the applied

---

1A more detailed discussion of feedback concepts may be found in Appendix A.
setting may really be "delayed" reinforcement—it may be well past the optimum interval for strong reinforcing effects, or perhaps any reinforcing effects at all. So in applied settings, comparisons of "immediate" and "delayed" reinforcement may in reality be comparisons of two different durations of delayed reinforcement, thereby reducing the likelihood of demonstrating differences between the two delays. This would, of course, depend upon their location in the delay of reinforcement gradient. Research is needed to investigate the applicability of laboratory data on the delay of reinforcement to the use of immediate and delayed feedback in applied settings.

The second problem with extrapolating the principle of immediate reinforcement to applied areas may also be a result of allowing too great a delay in the "immediate" reinforcement procedure. The studies that have been done to investigate the use of immediate feedback with human subjects have frequently failed to support the importance of this principle (Boersma, 1966; Sassenrath, Yonge, and Schrable, 1968; White, 1968; More, 1969; Sassenrath and Yonge, 1969; Sturges, 1969; Sturges, 1972; Calhoun, 1973; Newman, Williams, and Hillar, 1974; Sassenrath, 1975).

Bilodeau and Bilodeau (1958) investigated the effect of delay of knowledge of results as a function of the length of the intertrial interval. The authors used long intertrial intervals (an hour, a day, or a week), and relatively large differences in response feedback intervals (3 seconds, 1 hour, 24 hours). In general, performance deteriorated with long intertrial intervals. In only one condition was there any difference between delay conditions. A group in which
knowledge of results was delayed 24 hours performed better than one to which feedback was given within an interval of 3 seconds. These data suggest that the feedback stimulus was not acting as an effective behavioral consequence, since the time between the occurrence of the response and the subsequent feedback did not appear to produce an effect. On the other hand, the interval between the feedback and the next response produced an effect; the shorter the time interval, the greater the effect. This suggests the role of feedback as an antecedent stimulus may be crucial. Perhaps the feedback is functioning as a discriminative stimulus rather than as a reinforcing or punishing stimulus.

The discriminative function of feedback stimuli. Not all researchers have focused on the conditioned reinforcing properties of the feedback stimulus; some have considered its discriminative aspects. This research suggests that the feedback stimulus may exert antecedent or instructional control. If this is true, feedback should be compared with other instructional procedures when preparing research designs.

Researchers generally attempt to control for the instructional effects of the feedback stimulus by including an "instructions" control procedure (Hall, 1968; Geis and Chapman, 1971; Bricker, Morgan, and Grabowski, 1972; Sturges, 1972; Brookshire, 1973; Cossairt, Hall, and Hopkins, 1973; Hutchison, 1973; Panyan and Patterson, 1974; Harris, Bushell, Sherman, and Kane, 1975). Instructions are generally found to be less effective than feedback (Hall, Panyan, Rabon, and Broden, 1968; Cossairt et al., 1973;
Fink and Carnine, 1975; Harris et al., 1975; Goetz, Domash, and Allen, 1976; Seaver and Patterson, 1976). These latter studies, however, may not have ruled out the possibility that the principal effect of feedback is its discriminative function, since the comparison between instructions and feedback has rarely been of principal concern. The characteristics of the instructions and the situation under which they are provided, has not been equated with characteristics of the feedback procedure. For example feedback was often more specific than instructions, i.e., feedback was more likely to refer to the specific characteristics of the target response.

A second difference between instructions and feedback procedures is that instructions are often presented only a few times or are discontinued when the subject is actually working in the experimental situation. It may be the recurring aspects of feedback procedures that are responsible for the increased effectiveness of the feedback.

In summary, feedback may have a higher probability of improving performance than simple instructions because feedback is more likely to be interspersed with instances of the target response and is more likely to refer to the specific characteristics of the target response that will be reinforced. However, since previous research has not equated instructions and feedback in terms of specificity and frequency of occurrence, this observation is merely conjectural.

Such research would be important for two reasons. First, the results may indicate if feedback is controlling subsequent instances of the targeted response because it is acting as a reinforcer (or
punisher) or because it exerts more specific instructional or antecedent stimulus control of those subsequent responses than simple instructions. A comparison is needed of feedback procedures with control procedures that also have the features of being recurring and specific. If there is no difference between the two procedures, the inference could be made that the feedback is not an effective reinforcer (or punisher).

The second reason why such research is needed is because feedback may function as a form of stimulus control rather than as a behavioral consequence. Feedback differs from other simpler forms of stimulus control or instructional control in that it is feedback about the previous instances of the targeted response. In other words, changes in the feedback given to the trainees will reflect changes in previous instances of that trainee's own performance. For instance, the trainer might say, "In the last session, you performed the response correctly on these occasions and you performed the response incorrectly on these other occasions. Furthermore, here is the nature of the errors you made...." This is about the previous instances of the subject's own responses. A methodological control would allow us to assess the importance of this "about" relationship, the relation between past instances of the subject's own behavior and the current feedback or instructions.

Again, we need to compare the feedback procedure with a control procedure that also has the features of being recurring and specific, but one that does not have the feature of being about previous instances of the trainee's own responses. The data obtained from such
a comparison would allow us to determine whether our instructional procedure should be a feedback procedure. It need not involve the "about" relationship, if there are no differences between the two procedures. Fortunately, the modeling procedure can serve as such a control procedure.

Modeling

Modeling in training programs. Modeling is another component of the typical training program examined in this study. We will examine the nature of modeling by first looking at Skinner's (1969) definition of imitation, since the two terms, "modeling" and "imitation", are essentially synonymous: "Behaving in a way which resembles the observed behavior of another organism" (p. 194). Modeling is therefore a procedure in which a trainer provides a set of stimulus events to a trainee who is required to produce a similar set of stimuli. For example, the trainer may model the appropriate use of social reinforcement with a class of children and then ask the trainee to engage in similar behavior.  

The effectiveness of an instructional procedure may be enhanced by requiring trainers to actively respond to the model's behavior (Becker, Engelmann, and Thomas, 1975; Holland, Solomon, Doran, and Frezza, 1976). In this procedure, the trainer may ask the trainee to identify instances of correct responding by the model. For example, the model role plays a number of vignettes involving a teacher interacting with children in a classroom. The trainee may

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2 A more comprehensive discussion of modeling is included in Appendix B.
then be asked to identify those vignettes in which the model provided appropriate social reinforcement and those in which the model's reinforcing behavior was inappropriate.

Classes of stimuli seem to develop accurate conceptual stimulus control over behavior most readily when a wide variety of instances and non-instances of that concept are used in discrimination training (Becker et al., 1975; Holland et al., 1976). We might extend these results as follows: The trainer could vary critical features of the model's behavior comprising these vignettes to ensure that the trainee was responding to the critical features of the model's performance. This sort of systematic variation should help ensure that the stimulus and response class of the trainee would coincide with those of the trainer by eliminating irrelevant or incorrect stimulus-response relationships.

**Modeling as a methodological control procedure.** As suggested earlier, we should assess the effects of the essential nature of feedback by comparing it with an instructional procedure that provides cues or discriminative stimuli relative to the precise details of the target response and we should intersperse those cues among occurrences of the target response in order to adequately control for these potentially confounding variables. The modeling procedure can serve as such a methodological control. It can provide cues relevant to the details of the target behavior by providing instances and non-instances of the target behavior itself and by arranging for variation in the details of that targeted response. The trainer can comment, or ask the trainee to comment, about the correctness of the details
of the model's performance rather than commenting about the details of the trainee's own performance, as would be the case with a feedback procedure. This modeling procedure can thereby control for the confounding effects of detailed cues or instructions by dealing with the details of the targeted response of a model rather than of the trainee.

It is quite easy to control for the effects of interspersing those instructions simply by arranging for the modeling sessions to be interspersed among the trainee's target responses in the same way as the feedback sessions are interspersed. Thus we may use modeling as an effective procedure for eliminating the confounding effects of variables that seem to have been generally overlooked in other research on the effects of feedback.

Panyan and Patterson (1974) approximated the use of modeling as a methodological control. These researchers evaluated the effects of receiving instructions, video playback, and modeling on the training performance of attendants. They found that the modeling produced the greatest improvements in performance. This result may have been partially due to the fact that instruction and modeling occurred before the session while video playback occurred following it.

Statement of the Problem

This experiment addressed two issues—a practical issue and a theoretical issue. The practical issue concerns the development of a simple staff training procedure. This was dealt with by examining the effects of its individual components—simple instructions, modeling, and feedback. The theoretical issue concerns a determina-
tion of the importance of various functions of the feedback pro-
cedure—the function of general stimulus control, stimulus control
based on a relationship with previous instances of the target re-
response (the "about" relationship), and consequential control (its
reinforcing or punishing effects). Two comparisons were made to
deal with the theoretical issue. The first comparison was between
a modeling procedure and a feedback procedure, incorporating the
modeling procedure as a methodological control to assess the neces-
sity for the "about" relationship and the consequential relation-
ship. The modeling procedure can serve as an effective control
because it can contain the general stimulus control feature of the
feedback procedure without the "about" relationship and the be-
havioral consequences. Thus the trainer can comment on the correct-
ness of the model's behavior, using the modeling procedure, in
precisely the same way as he or she would comment on the correctness
of the trainee's behavior, using the feedback procedure. Yet, those
comments will not be about the trainee's own behavior, as they must
be in the feedback procedure, and those comments will not act as
consequences for the trainees behavior, as they might in the feedback
procedure. Therefore, if the modeling procedure is as effective as
the feedback procedure, we will conclude that only general stimulus
control is operative in the feedback procedure. Otherwise, we will
conclude that either the "about" relationship or the consequential
relationship is crucial. In that case, it will be important to
determine the relative importance of the "about" relationship and
the potential behavioral consequences in the feedback procedure. We
can do this with a second comparison. Here we will compare two procedures—one with feedback immediately before the response (favoring the "about" form of stimulus control) and one with the feedback immediately after the response (favoring the behavioral consequences).

**Method**

**Subjects**

The subjects were volunteers from a class of 10 university students who earned course credit for remedial tutoring. The experimenter was also the course instructor. The students received a written description of the ways in which they would accumulate points toward their final course grade. The instructor-experimenter also told them that participation in this study, or the quality of their performance if they did participate, would not affect their course grades. This occurred during a group lecture on the first day of class. Subjects were also informed at that time about the general issues and procedures under investigation. Although all 10 students volunteered to participate, two worked with mathematics curriculum materials and were therefore not included in this study.

**Setting**

The setting was a university sponsored tutorial program. Parents, teachers, and counselors referred children to the program to remediate basic reading and mathematics skills. The children

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3A replica of the informed consent form signed by each subject is in Appendix C.
attended the program 4 days per week, Monday through Thursday, 2 hours per day. The tutors worked with the children individually, using a field study copy of The Corrective Reading and Language System (Engelmann, S., Becker, W. C., Carnine, L., Meyers, L., Becker, J., and Johnson, G., in press). This is a highly structured program which used primarily oral exercises to teach basic reading comprehension and decoding skills.4

The basic format of the tutoring interaction was a series of oral questions and answers. The tutor read a question aloud and waited for the client to respond. If the response was correct, the tutor proceeded to the next question. If the child responded incorrectly, the tutor went into a correction routine until a correct response was given.

The materials were divided into a series of tasks, each of which taught a specific concept, such as inductions, analogies, or parts of speech. Points for correct responding were generally awarded at the end of each task. The children could exchange these points at the end of each day in the project store for such items as toys and sugarless candy. The program emphasized the use of descriptive social reinforcement, as recommended by Becker et al., (1975). The tutors therefore, were told to provide descriptive social reinforcers following a corrected error and at the end of a task. Consequently, descriptive social reinforcers seemed to be an appropriate behavior to investigate in this study.

4See Appendix D for a more complete description of this program and the teaching strategies it incorporates.
The Target Behavior

Descriptive social reinforcement was defined as vocal praise that names the response being reinforced. In this study, the tutors were expected to provide descriptive social reinforcement following the completion of a task. It probably would be relevant to question the use of the term "reinforcement" to describe a stimulus event which might occur a few minutes after the responses which occurred early in the task. At least for early responses, the "social reinforcer" may really have been too delayed to serve as a reinforcer at all.

To be counted as descriptive, the tutor's social reinforcer at the end of a task had to refer to the concept being taught in the task. For example, "Great, Johnny, you read all those words with the 'a' sound perfectly!" The completion of a task provided a natural interruption in tutoring. A descriptive social reinforcer occurring at that point could also cue the client that he or she had now completed a task and was about to begin working on a different concept. This procedure was preferred to that of providing descriptive social reinforcement after each response because the latter would greatly slow the client's progress through the program.

Tutors were also expected to provide descriptive social reinforcement following a corrected error. The social reinforcer at this point had to refer to critical features of the response which made that response preferable to the previously incorrect response. For example, "Nice job, Nancy, you said the 'th' sound exactly right that time." Descriptive social reinforcement provided in this format
might strengthen and cue critical features of the correct response.

Descriptive social reinforcers at times other than described above were not recorded in this study in order to keep a balance between sufficient descriptive social reinforcement and too slow a pace of stimulus presentations. The latter is important since Carnine (1976) has shown that rapid stimulus presentations decrease off task behavior and increase the frequency of correct responses and participation.

The dependent variable in this study was the percentage of times the tutors correctly used descriptive social reinforcement given the opportunity to do so, as defined above. Observers monitored tutors for 20 minutes per day during their tutoring and met with them for 10 minutes per day throughout all phases.

Procedure

The experiment consisted of a sequence of four conditions.

Instructions. The subjects received a handout and a group lecture over the use of descriptive social reinforcement. They subsequently completed a written test which required them to successfully generate two examples of descriptive social reinforcement appropriate to their tutoring. All tutors met this criterion. Tutors were then told to provide descriptive social reinforcement to their clients. During this "Instructions" condition the tutors were told that they were doing a good job and that they should keep trying to provide descriptive social reinforcers to their clients.

Copies of these materials may be found in Appendix E.
Modeling. The tutors listened to audio tapes of others engaged in the same type of remedial tutoring. These other tutors served as models for the trainee, much like a live model or a video taped model. The procedure differed slightly from traditional modeling procedures in that an observer selected three instances and three non-instances of descriptive social reinforcement from these modeling tapes and then asked the tutor to identify whether or not it was a correct instance. In addition, imitation did not occur immediately after each modeled act. During the modeling phases, tutors were told that they were generally doing a good job and that they should keep trying to provide descriptive social reinforcers to their clients.

The modeling sessions occurred either immediately before or immediately after the tutorial session. Half of the tutors received per session modeling and half received post session modeling.²

Feedback before. An observer reviewed with the trainee a tape recording of that trainee's most recent session and provided feedback on appropriate and inappropriate uses of descriptive social reinforcement. The observers provided feedback to the tutors by presenting them with three instances and three non-instances of appropriate descriptive social reinforcement from a tape of their most recent tutoring session. After each instance or non-instance, the tutor was requested to identify whether or not it was a correct instance. The observer then told the tutor whether he or she was correct. Some exceptions occurred during feedback sessions early and late in the

²A flow chart of the modeling procedure is in Appendix F.
study, when the tutor may have failed to emit either three instances or three non-instances during the tutoring session being reviewed.

These feedback sessions occurred immediately before the next tutorial session. In no phases did observers show tutors a graph of their performance or provide specific quantitative information regarding performance with respect to either within session performance or performance across sessions.\(^7\)

**Feedback after.** This condition was the same as the preceding one, except that the feedback sessions occurred immediately after the tutorial sessions.

**Design**

A table of random numbers was used to randomly assign the subjects to two groups. The design was a multiple baseline across subjects (Baer, Wolf, and Risley, 1968). The subjects moved to each new phase of the experiment after their performances appeared to have stabilized. The final phase terminated at the end of the semester. However, for two reasons some of the subjects stayed in a phase longer than they might have. This occurred in order to conform to the multiple baseline design and in order to move pairs of subjects, one subject from each group, into a new phase simultaneously. The pairing of subjects varied from phase to phase.

**Reliability**

Two additional observers used audio tape recordings to determine the reliability of scoring by the primary observers. Reliability was

\(^7\)A flowchart of the feedback procedure is in Appendix F.
sampled on one session per week for each observer. Each tape was scored twice. A calculation was made of the number of opportunities to provide descriptive social reinforcement within plus or minus five units on the tape index counter (a maximum interval of approximately 10 seconds). The reliability of observing opportunities was measured by dividing agreements by disagreements plus agreements.

For the second reliability calculation, the reliability observer received a list of index numbers referring to places on the tape where the primary observer had indicated there was an opportunity to provide descriptive social reinforcement. The reliability observer then indicated whether a descriptive social reinforcer had been given at those points. The reliability of observing descriptive social reinforcement was measured by dividing agreements by agreements plus disagreements. Reliability observers were not informed as to the group assignment or phase of those subjects they scored.

The reliability of observing opportunities to provide reinforcement ranged from 77% to 100% with a median of 93%. The reliability for observing descriptive social reinforcers ranged from 79% to 100% with a median of 98.5%.

The experimenter then calculated a conditional reliability by multiplying the reliability of observations of the number of opportunities to provide descriptive social reinforcers times the reliability of observations of the number of descriptive social reinforcers presented, given that an opportunity for such a reinforcer occurred. This conditional reliability ranged from 71% to 100%
with a median of 88%.  

Results

Detailed instructions were ineffective in providing a high percentage of descriptive social reinforcers. On the other hand, the modeling procedure produced a striking increase. There was some difference between the effects of pre and post session modeling procedures. The group which received post session modeling achieved a mean increase of 86% over performance during the instructions condition, while the pre session modeling group only improved 69%.

The addition of feedback produced some improvement over what had already been obtained with modeling. It is difficult, however, to assess the degree of this effect since a regression line fitted to the modeling data might predict the trends shown in the feedback condition. The timing of the feedback did not seem to matter, within the parameters of this study. This may be observed in the changes in the final two conditions; 50% of the subjects showed an increase and 50% showed a decrease. There was no relationship between group assignment and these changes. This result may be seen in Table 1 and Fig. 1. Since there were no clear differences in the performance of the two groups, we will restrict our analysis to within group and within subject comparisons.

Insert Table 1 and Fig. 1 about here

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8 Individual reliability scores and graphic summaries of these data are shown in Appendix G.
Table 1

Individual and Group Data on the Correct Use of Descriptive Social Reinforcement

### Group I

<table>
<thead>
<tr>
<th>Conditions</th>
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<td>A</td>
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<tr>
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<tr>
<td>Feedback before</td>
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<td>Feedback after</td>
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<tr>
<td>Feedback before</td>
<td>.94</td>
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</tbody>
</table>

^These numbers are the medians of the last four sessions in each phase for each subject who had at least four data points. For those subjects with less than four data points, all available points in that phase were used to compute the medians.

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Figure 1. The rate at which individual subjects provided descriptive social reinforcement to their clients. (Horizontal lines are drawn through the median of the last four data points of each phase.)
PER CENT DESCRIPTIVE SOCIAL REINFORCERS PER OPPORTUNITY

GROUP 1

GROUP 2

SESSIONS
Instructions alone failed to produce an increase in the correct use of descriptive social reinforcement; however, performance rose to a relatively high level when the modeling procedure was added. Feedback slightly improved performance although the placement of the feedback either before or after the session had no apparent effect.

The performance of individual subjects corresponded with the group effects described above. This may be seen in Table 1 and Fig. 1. For each subject, the modeling procedure following the instructions alone condition produced a striking increase in performance. For seven of the eight subjects, the addition of feedback produced a slight improvement over modeling alone. Subject F did not reach stability in the final phases. Because of time constraints, this subject was simply exposed to a few sessions of treatment during the last days of the study.

Percent descriptive reinforcers per opportunity to reinforce are plotted in Fig. 1 for each subject as a function of the number of sessions in which that subject participated. There were from 12 to 23 class days during which either the subject, the client, or the observer were absent. The phase changes, therefore, span a wider chronological range than is obvious from this figure. The number of calendar days between the time the first subjects and the last subject shifted from baseline to modeling was 16 days, from modeling to the first feedback phase spanned 29 days, and from the first to the second feedback phase spanned 29 days.

The range of six to 41 opportunities indicates that there was considerable variability in the number of opportunities to provide
descriptive social reinforcement in tutoring sessions. The mean opportunity for both groups combined was 17. If less than six opportunities occurred in a session, the data were not included in the study. A sample of less than six was considered to be too small to adequately sample the tutors repertoire. There did not appear to be a correlation between variations in the number of opportunities to provide descriptive social reinforcement and trends apparent in the data.

**Discussion**

Within the parameters of this study, audio recordings of a model proved to be an effective means of training tutors to dispense descriptive social reinforcers to their clients. This effect was so striking as to make it difficult to discern any others. All subjects showed substantial improvement during this phase of the study. Vocal instructions alone produced little or not effect, in spite of the fact that the tutors received instructions, passed an examination which indicated that they understood the instructions, and were encouraged to provide descriptive social reinforcers to their clients. The effect produced by feedback, if reliable, fell between these two extremes. All subjects but one actually showed improvement during the feedback phase. This subject was already providing descriptive social reinforcement 100% of the time at the beginning of the feedback phase. The improvement, though consistent, was small but this may well be due to the fact that the tutors were performing at such a high level before the feedback phase began.
Modeling Versus Simple Instructions

An examination of the modeling procedure illuminates the difference between performance in the instructions and modeling phases. The design of the modeling procedure was based on the hypothesis that teaching tutors to provide descriptive social reinforcement may be facilitated by teaching the concept of this type of reinforcement. After tutors have learned the concept of descriptive social reinforcement, their behavior may be automatically reinforced when it matches the criterion behavior (Holland et al., 1976). A number of authors (Tiemann and Markle, 1973; Becker et al., 1975) have suggested that teaching a concept requires that the learner make a series of discriminations in which all of the relevant and irrelevant characteristics of the stimulus are varied in a systematic fashion.

The training tapes used in the modeling and feedback conditions of this study contained both instances and non-instances of descriptive social reinforcement. Some of these instances and non-instances were easy to discriminate while others required fine discriminations. The model's presentations also varied the relevant and irrelevant characteristics of the target response. For example, a presentation might vary irrelevant aspects of lesson materials, such as voice inflections and length of praise. Alternatively, the teaching sequence might include variations in the specific phrase that was used, e.g., relevant aspects of the stimulus materials.

Modeling is an antecedent or instructions procedure. Yet the modeling procedure used in this study produced dramatic changes in performance while the more typical instructions procedure resulted
in minimal changes. An analysis of the characteristics of the modeling and typical instructions procedure incorporated in the present study may be helpful to understand why this difference occurred.

If learning the concept of descriptive social reinforcement increases the rate at which tutors provided this type of reinforcement, then it may be assumed that the antecedent procedure which does the best job of teaching the concept of descriptive social reinforcement will facilitate performance. The instructions control procedure used in this study did not require the tutors to make subtle discrimination along critical dimensions of the stimulus materials. In fact, these training materials, like most, contained primarily positive examples of the target response. It may be that as instructions procedures begin to resemble those procedures described by Becker et al., (1975) and Tiemann and Markle (1973), they produce more powerful effects on behavior.

Another way in which the modeling differed from the instructions procedure was that the modeling was recurring and interspersed between tutoring sessions. The subjects reviewed the modeling tapes each day for 10 minutes either immediately before or immediately after their tutoring session. The instructions procedures used in this study were typical in that they occurred only one time. Repeated exposures to the stimulus materials may facilitate performance.

In the modeling procedure, observers required that the trainees orally identify instances and non-instances of descriptive social reinforcement. This assured that the subjects were responding to the critical features of the instructional materials. In the in-
Instructions procedures there was no comparable requirement.

**Modeling as a Methodological Control Procedure**

Instructions procedures are generally included in research as a methodological control to examine the amount of change in the target behavior that can be produced simply by specifying the desired performance. The above analysis suggests that modeling constitutes a more detailed form of specification than most instructions procedures and thus modeling should replace typical instructions procedures as a methodological control procedure in research designs that incorporate feedback as an independent variable. For example, if the instructions control procedure in the present study is considered the methodological control for the instructional properties of the feedback procedure, then it would appear as though the effects of the feedback are far more powerful than that which can be attributed to instructional effects. Alternatively, if one considered modeling as the instructional control, then it would seem as though a large portion of the feedback effects can be subsumed under instructional or antecedent control. This may, however, be due to the fact that following modeling, it was not possible for the trainees to demonstrate a great deal more improvement. This is consistent with an analysis provided by Kazdin (1973) who suggests that modeling may function as a discriminative stimulus and serve as a kind of instructional control over the behavior of the subject. This analysis may further suggest that much of the effect of feedback might simply be due to the opportunity it provides for the formation of discriminations between instances and non-instances of descriptive social reinforce-
ment from the subject's own behavior. If this is the correct interpretation, then these results provide support for Malott and Whaley's (1976) premise that stimulus control rather than reinforcement may be a major component of behavioral feedback.

Feedback as an Antecedent Event

It should also be noted that the feedback procedure used in this study differs somewhat from typical feedback procedures in that subjects were not provided with graphs or other quantitative descriptions of their performance. Feedback procedures often include this kind of summary information, sometimes displayed publicly and other times combined with bonuses or other forms of social reinforcement (Panyan et al., 1970; Bricker et al., 1972; Quilitch, 1975; Knight, Christie, Egner, and Paolucci, 1976). These studies have clearly focused on the feedback stimulus as a consequence rather than as an antecedent event. Thus, when researchers consider control procedures, they concentrate on controlling for other consequences that might be present in the experimental situation or they attempt to compare the strength of the feedback stimulus with commonly used conditioned reinforcers such as those mentioned above. The feedback stimulus may also be combined with these previously identified conditioned reinforcers.

In this study, the focus was on the potential function of feedback as an antecedent event. Consequently, an attempt was made to control for other antecedent or instructional events that might be present in the environment while also attempting to compare the strength of the feedback stimulus with commonly used instructions.
procedures. The procedure used in this study would seem to provide a clearer opportunity to evaluate the importance of reviewing instances of one's own behavior separate from the additional effects often included in the feedback package.

Including additional feedback procedures would not have been particularly necessary or useful even if they had improved performance above that which could be measured in this training program. Performance following the modeling procedure was well acceptable limits for this training program.

**Timing of Feedback**

Another major area of evaluation in this study was to determine the importance of the timing of the feedback. Researchers who suggest that it is important to provide immediate feedback generally refer to applied situations where immediate feedback procedures would resemble those incorporated in this study (Mager and Pipe, 1970; Pennypacker, 1975; Hall, 1975; Fuqua, 1975). However, within the parameters of this experiment, the timing of the feedback was of no significance. If feedback functions as a conditioned reinforcer in changing behavior, then those factors which tend to increase the effectiveness of a conditioned reinforcer should also tend to increase the strength of the feedback stimulus. Immediate reinforcement is generally more powerful than delayed reinforcement in changing behavior. If feedback is functioning as a conditioned reinforcer then it should operate in the same way. Yet delaying the feedback 23 hours in this procedure did not appear to result in a decrement in performance, though it is possible that the procedures used in
this study may not have been immediate enough for this effect to be observed. In terms of the delay-of-reinforcement gradient, it may be that 10 minutes is not sufficiently different from longer time periods. However, it seems odd that no effect in this direction was observed, even with 23 hours delay. In fact, feedback was delayed more than 23 hours over each weekend break. This argues against the importance of reinforcement in this feedback procedure. In turn, it argues for feedback as a self-produced discriminative stimulus.

Analysis of Training Package Components

It is interesting to analyze the results of this study in terms of the typical training package. This training procedure resembled the popular training package in that it contained many of the same components: instructions, modeling, role playing, testing situation, and feedback. However, the sequence of events was somewhat different. The usual training procedure typically includes a single instance of the model followed by a single instance of the behavior of the subject imitating the model, probably followed by reinforcement and/or feedback (Flower, 1975; Marlatt and Perry, 1975). This cycle may be repeated a number of times. In the present study, feedback did not seem to be necessary to improve performance; modeling seemed to be sufficient. The modeling procedure used in this study included approximately six samples of the target behavior per individual session, followed by practice (the 2 hour tutoring session), followed by a series of modeling trials. This may be much easier to arrange in applied settings than the typical training package and it appears
to be extremely effective.

Characteristics of the Feedback Stimulus

A final implication of these data involves the nature of the task and the type of feedback stimulus. The task in this study was a recurring one, in which the essential characteristics of the task remained the same each day. The modeling and feedback stimuli were designed to refer to the critical features of that task. Too often, however, the stimulus refers only to a portion of the target response, particularly in the case of many feedback procedures. The stimulus provided is often the score on a test or the number of math problems performed correctly. The stimulus does not refer to the essential characteristics of the response that produced the improved terminal behavior. This is not surprising, given that tasks are frequently defined in such a way that one day's performance seems to have little to do with the next day's behavior. For example, preparing and taking a quiz over the concept of conditioned reinforcement is viewed as a different set of behaviors than preparing and taking a quiz over the concept of stimulus control. Consequently, the feedback provided in one case may not be relevant to performance in the other. The task could easily, and probably should, be broken down into a number of recurring components including, reading the text, writing the study objectives, reviewing the study objectives, carefully reading the quiz questions, and writing and reviewing the answers. Feedback that refers to performance on each of these components would probably be more effective than typical feedback procedures.
Conclusions

In summary, the data obtained in the present study suggest that modeling is extremely effective as a training procedure. Feedback following the modeling procedure produced slight improvements in performance, as compared and measured within the parameters of this study. The results failed to support the hypothesis that giving feedback immediately after the completion of a session was more effective than giving it immediately prior to the next day's session. This is not in keeping with textbook rules which suggest that delaying feedback reduces its effectiveness.
APPENDIX A

FEEDBACK
Many researchers have demonstrated that feedback is a powerful tool in changing human behavior. Feedback procedures generally take the form of providing subject with data which refer to features of their own behavior, and within this context have been used to change performance across a variety of tasks and populations. A number of behavior analysts have suggested the importance of feedback in higher education (Semb, 1974; Born and Davis, 1974; Johnston and O'Neil, 1973; Lloyd and Knutzen, 1969; Miller et al., 1974; Davis, 1976).

Feedback has been used to alter the behavior of classroom teachers (Saudargas, 1972; Rule, 1972; Harris et al., 1975; Cossairt et al., 1973; Cooper et al., 1970; McKenzie et al., 1970; Jones and Eimer, 1975; Hall et al., 1968) and their students (Van Houten et al., 1974; Schwarz and Hawkins, 1970; Salzberg, 1971; Packard, 1970; Harris and Sherman, 1973; Drabman and Lahey, 1974; O'Leary et al., 1970; Cossairt et al., 1973; Fink and Carnine, 1975). Feedback procedures have also been used as a training component with university students (Knight et al., 1976; Weaver and Miller, 1975; Fawcett and Miller, 1975) and paraprofessionals (Quilitch, 1975; Pomerleau, 1973; Panyan et al., 1970; Panyan and Patterson, 1974; Gladstone and Sherman, 1975; Bricker et al., 1972; Barnard et al., 1974). In the clinical setting, feedback has been shown to be a useful therapeutic tool (Wincze et al., 1972; Leitenberg et al., 1968; Azrin and Powell, 1968), and feedback from clients seems to affect the performance of the therapist (Loeber and Weisman, 1975). Feedback has also proved to be a useful tool in training parents to more effectively manage their children's behavior (Hebert and Baer, 1972;
Miller and Sloane, 1976). Feedback may have small effect on the rate at which people consume fuel (Seaver and Patterson, 1975). O'Leary et al. (1975), has shown that feedback can greatly bias the collection of experimental data.

The effects of feedback on fine motor responses have also been extensive (Schroeder and Holland, 1968; Roll, 1973; O'Brien and Azrin, 1970; Ingham and Andrews, 1973; Budzynski and Stoyva, 1969; Hardy et al., 1967).

While feedback effects have been widely investigated across a variety of dependent variables, a popular target response has been the subject's use of social reinforcement. Social reinforcement has been investigated extensively among elementary school teachers, where experimenters have been primarily concerned with attempts to increase the probability that teachers provide attention or social reinforcement to students for occurrences of appropriate behavior (Cossairt et al., 1973; Cooper et al., 1970; Harris et al., 1975; Hall et al., 1968; Jones and Eimer, 1975).

Saudargas (1972), however, has considered the question of social reinforcement in more detail. He set criterion rates of social reinforcement at two or five responses per minute and posted daily graphs of each teacher's performance relative to the criterion. He found that teachers' rates of social reinforcement changed with changes in criterion.

On the other hand, behavior has sometimes proven resistant to the effects of feedback alone, and has been more responsive when it was combined with social reinforcement, such as experimenter praise.
(Cossairt et al., 1973). Occasionally, instructions and bonus payments must be added to the feedback and experimenter praise to produce significant changes in performance (Harris et al., 1975; Kent et al., 1976).

There has been considerable variability, however, in the feedback procedures used in these experiments. Feedback may be provided in an individual daily interview with the experimenter (Cossairt et al., 1973), orally with other teachers present (Jones and Eimer, 1975), or in the form of a graph which is updated daily and publicly displayed (Saudargas, 1972; Rule, 1972). Feedback may have been provided before sessions, within sessions (Rule, 1972; Jones and Eimer, 1975), at the end of a session (Hall et al., 1968) or at the end of the day (Rule, 1972; Saudargas, 1972). Feedback may have included samples of the target response in the form of experimenter written or oral samples (Jones and Eimer, 1975) or on video-tape (Rule, 1972; Saudargas, 1972). The characteristics of these stimuli which are called feedback may be important to consider in attempting to interpret the results of feedback interventions. Johnston and Simon (1975) in their analysis of grading procedures stress the importance of this variable when they state:

In other words, relevant accurate, academically descriptive information must be communicated to a user in a useful form which then controls the emission of appropriate behavior by that user. If the information is not relevant, accurate, and useful, the resulting responses may well be erroneous or inadequate, or, perhaps, absent entirely. (p. 207)
The literature described above is representative of the wide range of procedures which are incorporated in the term feedback. Recently a few investigators have attempted to isolate feedback effects from the effects of social reinforcement (Fink and Carnine, 1975; Wincze et al., 1972; Seaver and Patterson, 1976; Cossairt et al., 1973; Harris et al., 1975). In general, these researchers report only small changes in behavior when feedback is presented without concurrent social reinforcement. The data suggest that it is an error to assume that feedback procedures will affect behavior in the same way as a social reinforcer. Unfortunately our applied literature, particularly in the area of educational technology, frequently attribute reinforcing properties to the feedback stimulus (Pennypacker, 1976; Fuqua, 1976; Mager and Pipe, 1970). For example, Skinner suggests (1953) that sensory feedback may have some unlearned reinforcing effects. He postulates that this reinforcing function may have arisen in the evolutionary process and may be analogous to the unlearned reinforcing effect from controlling one's environment or "making the world behave."

Malott and Whaley (1976) refer to feedback as feedback stimulus control and define it as "control of the form or path of a response by stimuli resulting from a preceding response" (p. 76). Skinner (1969) defines feedback as "response produced stimuli," and states that this term is "widely misused as a synonym for operant reinforce-

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9It might be possible, however, to get an effect if they made reinforcement contingent on improvement, while still keeping it isolated from the delivery of the feedback.
ment" (p. 26). Geis and Chapman (1971) support these analyses. Thus, the analysis of feedback provided by Malott and Whaley, and Geis and Chapman, differs from that suggested by Pennypacker (1976), Fuqua (1976), and Mager and Pipe (1970). The first group of authors state that feedback functions as a kind of stimulus control while the second group of authors attribute reinforcing properties to the feedback stimulus. Skinner seems to describe feedback as a type of weak reinforcer in his earlier writing (1953), but later emphasizes its functions as a discriminative stimulus (1969). To some extent these differing analyses imply differing procedures in using feedback stimuli to alter behavior. Those authors who believe that feedback functions as a conditioned or unlearned reinforcer would tend to follow the rules regarding maximizing the effectiveness of a reinforcer when designing feedback procedures. If, however, feedback functions more closely resemble those of a discriminative stimulus (with respect to the ongoing or target behavior) then we would be drawing from the research in this area when we design feedback procedures.

One way to evaluate these differing premises is to investigate an hypothesis drawn from each analysis. If feedback functions mainly as a conditioned reinforcer, then we would expect that those factors that affect the strength of a conditioned reinforcer should also affect the strength of a feedback stimulus. For example, if the reinforcing value of the feedback stimulus seems to vary with the schedule or frequency of presentations of the feedback stimulus in the same way that these factors seem to effect the reinforcing value
of a stimulus, then we would feel more confident in incorporating other principles regarding the use of conditioned reinforcement in feedback procedures. If, however, the principles regarding the effective use of reinforcement do not seem to hold up for feedback, then we should be very cautious in relying on reinforcement effects in our feedback procedures.

Since it is common for behavior analysts to conceptualize feedback as a conditioned reinforcer (Pennypacker, 1976; Fuqua, 1976; Mager and Pipe, 1970), it is also very common to assume that those variables which tend to increase the conditioned reinforcing value of a stimulus will also increase the effectiveness of feedback. Thus, it is not unusual to find authors suggesting the application of the principle of immediate reinforcement to the effective use of feedback in changing behavior. Hall (1975) provides a clear example of this situation. These authors go well beyond the data we have on immediacy of feedback (Calhoun, 1973; White, 1968; Sturges, 1969; Sturges, 1972; Sassenrath, 1975; Sassenrath and Yonge, 1969; Sassenrath, Yonge, and Schable, 1968; Newman, Williams, and Hillar, 1974; More, 1969, Boersma, 1966). The data produced in these studies are extremely difficult to interpret. There is often little difference in effects between feedback and no feedback conditions, so it is not a great surprise that differences of 5 to 10 seconds in the length of delay of the feedback stimulus do not produce differential results.

The designs are often set up to test retention (i.e. how subjects perform on tests given some time after they were exposed and tested over some stimulus materials), with long test-retest intervals.
(days or weeks) and very little variation between delay intervals (often 5 to 10 second differences). Subjects in these studies are usually treated in one of two ways. In one procedure, subjects are asked to study a set of materials, given a test over the materials, and given feedback regarding their performance after a period of time determined by their group assignment. Later, they are retested over the materials.

In the second format, subjects are asked to work on programmed instructional materials. Feedback on the correctness of an answer may be delayed several frames. Subjects are later tested over the materials included in the program.

Neither format seems to successfully isolate the multiple controls that affect the probability that a subject will write a particular word or chose a particular item in a multiple choice test. The subjects choices may, for example, be controlled by the original stimulus materials and, thus, remain unaffected by the feedback stimulus.

Another problem with analyses of these data is that the designs do not look at the effect of feedback on recurring behavior. These designs tend not to focus on those aspects of a task which recur, such as, the number of times the subject read through a set of materials in preparation for a test or whether or not the subject took notes. Instead the feedback stimuli tend to refer to non-recurring aspects of the stimulus materials, like whether a particular question was correct or incorrect or the total points accumulated on a particular question was correct or incorrect, or the
total points accumulated on a particular test.

Feedback in applied settings should focus as much as possible on the recurring aspects of a response, so that it facilitates future performance. When feedback refers to particular aspects of materials that the subject is unlikely to encounter again, it will be unlikely to control behavior which can be measured in subsequent evaluations.

If feedback is to meet the requirements outlined by Johnston and Simon (1975, p. 207), then it must be useful to the subject (effective in improving performance relative to reinforcing contingencies). For example, feedback over individual quizzes where each quiz covers different material is not particularly useful to the subject or necessarily effective in altering the quiz performance. Studying, on the other hand, is a recurring behavior directly related to quiz performance. Researchers who provide feedback on characteristics of the subject's studying behavior may have a better chance of achieving positive results than studies which only provide feedback on quiz performance.

Knowledge of Results

Research which comes closer to meeting the criteria specified above, may be found in the literature on delay of knowledge of results (Saltzman et al., 1955; Noble and Alcock, 1958; McGuigan, 1959; Greenspoon and Foreman, 1956; Denny et al., 1960; Bilodeau, 1956; Bilodeau and Ryan, 1960; Bilodeau and Bilodeau, 1958; Annett, 1959). The responses in these studies tend to be simple motor tasks, such as target tracking or moving a level 37 degrees and, thus, are less likely to be under the control of the original stimulus materials.
These researchers have examined the importance of immediacy of knowledge of results. Only one of these studies reports any detrimental effect as the result of delay (Greenspoon and Foreman, 1956), and an attempt to replicate this effect was unsuccessful (Bilodeau and Ryan, 1960).
APPENDIX B

MODELING
Bandura (1967) has probably done the most extensive research in the area of modeling. He refers to modeling as an observational learning process. In this process, the behavior of one individual or groups, the model, acts as a stimulus for the attitudes, behavior, or thoughts of those persons who observe the model's performance.

Bandura (1967) identifies three categories of situations in which modeling may be useful in changing behavior:

1. **Observational learning effects**: the learning of new or novel, discrete behaviors or newly integrated patterns of behavior.

2. **Inhibitory or disinhibitory effects**: the effect of the model is to either increase or decrease the rate of performance of this behavior by the observer.

3. **Response facilitation effect**: the effect of the model is simply to provide an informational 'cue' which triggers similar behavior on the part of the observer. (p. 321)

A large portion of the research done by Bandura and his colleagues has focused on characteristics of the model which facilitate behavior on the part of the observer. This research has been summarized by Marlatt and Perry (1975), who suggest that the observer is more likely to imitate the behavior of the model:

1. If the model is competent and possesses prestige in the eyes of the observer.

2. If the model is regarded as warm and nurturant by the observer.

3. If the observer associates rewarding qualities to the model's behavior, and thus, is more motivated to match the behaviors. (p. 118)

These authors have also suggested that observers may reject the model, if the model is "too dissimilar to the observer, too superior or too
advanced technically, or if the model appears to possess 'magical' powers" (p. 119).

The emphasis on characteristics of the model exemplifies the difference between Bandura's approach to this area and the work of behavior analysts. Behavior analysts tend to focus on the imitative process, which would necessitate specifying events in the environment that affect the probability that the observer will imitate the model. Consequently, behavior analysis research on this topic is more likely to be found under the heading, imitation. Skinner (1969) defines imitation as "behaving in a way which resembles the observed behavior of another organism" (p. 194). In this analysis, the model constitutes a kind of discriminative stimulus for the behavior of the observer. Malott and Whaley (1976) place modeling clearly in the area of stimulus control when they define imitation as "a type of stimulus control in which the form of the response matches the form of the discriminative stimulus" (p. 333). The model's behavior serves as a kind of stimulus, and whether or not the observer will imitate this behavior depends on the reinforcement history of the observer whether such imitative behavior has been reinforced in the past. For example, Malott and Whaley (1976) state "we imitate important people-people who get rewards and people who give rewards, though often we're not aware we're imitating" (p. 331).

Staats (1977) suggests that the acquisition of an imitative repertoire is important in the developmental history of a child. A child who has learned to imitate, can be taught more efficiently, than the child whose behavior must be shaped using successive
approximations of the desired behavior. Most parents begin early, reinforcing children when their behavior matches the behavior of the parent. This training is particularly important in early speech training when parents reinforce their children for primitive imitative approximations of desired responses like "Ma ma" or "Da da." Thus, one of the reasons we imitate is because we have been heavily reinforced directly for doing so. The repertoire persists because we are periodically reinforced by others for our imitative skills. For example our peers might say "Your hair is so beautiful, it looks just like Farah Fawcett's."

Staats (1977) provides a second analysis of our imitative repertoire. He suggests that we imitate because it is reinforcing to match our behavior to the behavior of individuals who are reinforcing to us. Characteristics of the individual who supplies us with reinforcers tend to become conditioned reinforcers. Our behavior is thus automatically reinforced when it matches the behavior of the reinforcement dispenser. Consequently, children tend to dress up in their parent's clothes, to wear mommy's lipstick, or daddy's shoes.

Staats describes these two forms of acquisition of an imitative repertoire in the following way:

The child learns the skills of imitation at the beginning to a large extent because the behaviors of the parent become reinforcing. Behaviors of the child that imitate the parent are thereby also reinforcing, and are thus learned. In addition, the child also comes to find imitating-attempting to match the stimuli of his behavior to the stimuli of someone else's behavior-to also be reinforcing through direct experience. This occurs when the child has been reinforced many times for imitating. We will then see that the child will strive to imitate others simply for the reward value involved in making the imitation.
It may be added that the parent thus affects his child's imitation learning in these two ways. That is, if the parent has many interactions where he as a complex stimulus (his voice, appearance, and so on) is paired with rewarding stimuli, he will become a rewarding stimulus himself. The child will thus find imitating him rewarding. Moreover, if the parent rewards the child for imitating him and others, the child will learn that matching his behavior to that of someone else is rewarding. (pp. 99-100)

Our imitative behavior persists because these contingencies continue to varying degrees throughout our lifetime. In addition, events in the environment tend to reinforce our behavior when it matches the behavior of successful or reinforcing individuals. For example, a child observes the swing of his favorite baseball player (who is probably very skilled in this area). When the child matches his swing to that of his favorite baseball player, he is reinforced by getting hits. We receive thousands of trials of this sort during our lifetime. Thus, we tend to imitate the behavior of individuals who receive reinforcers.

It is not surprising that modeling has been incorporated into therapeutic and training procedures, given its importance in the initial development of behavioral repertoires. Modeling has been shown to be effective in changing a variety of behaviors (Carlington and Dericco, 1977; Gladstone and Spencer, 1977; Lahey, 1977; Strain, Shores, and Timm, 1977). For example, Gladstone and Spencer (1977) have used modeling to train therapists to work with retarded citizens. Modeling is also often combined with instructions, role-playing, reinforcement, and/or feedback procedures to produce changes in behavior. A large amount of applied research which includes modeling is devoted
to identifying the various types of behaviors and situations in which this type of treatment package is effective (Bailey, Timbers, Phillips, and Wolf, 1971; Frederiksen, Jenkins, Foy, and Eisler, 1976; Garcia and Batista-Wallace, 1977; Martin, 1975; Rogers-Warren and Baer, 1976). For example, Garcia and Batista-Wallace (1977) have investigated the use of a training package in the parental teaching of plural morphemes to their children.

Other applied research on modeling effects frequently focuses on evaluating components of treatment packages like that described above, particularly the importance of reinforcement in modeling procedures (Bondy and Erickson, 1976; Kazdin, 1973; Stromer, 1975; Weisberg and Clements, 1977; Boren and Colman, 1970). While modeling generally produces improvements in performance, direct reinforcement to the observer for imitating the behavior of the model is usually more powerful.
APPENDIX C

CONSENT FORM
While many authors refer to the importance of specific social reinforcement, its use is rarely taught or maintained in applied settings in any systematic fashion. In this study, we will be attempting to evaluate procedures to improve the quality of social reinforcement tutors in the Project HELP program provide to their clients. We will be attempting to increase the rate at which tutors use descriptive rather than evaluative social reinforcement in the tutorial program. Different feedback procedures will be evaluated in this study to ascertain the best method of training and maintaining this performance.

Participation in this study will in no way affect your grade in this course. The rate of providing social reinforcement is not consequated in our course contingencies.

Volunteers may be assigned to one of three groups to evaluate these procedures, including one group in which only instructions, no feedback will be provided.

Data from this investigation will be maintained and presented in such a way that there is no way subjects can be identified with their data. Data collected in this study will be included in a dissertation being conducted in the program during Fall, 1978. Tapes recorded during this study may be retained for 6 months following completion of data collection.

You may withdraw from this study at any time. Withdrawal will be effective upon receipt of a letter to this effect by the experimenter.

We believe that participating in this study will provide you an opportunity to improve the overall quality of the tutoring you provide your client and to acquire a skill which will be useful to you in many settings.

_____________________________________________________________________

Student

_____________________________________________________________________

Date

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APPENDIX D

A DESCRIPTION OF THE INSTRUCTIONAL MATERIALS
The Corrective Reading and Language System (CRLS) is a remedial reading program developed by the Engelmann-Becker Corporation (Engelmann, S. et al., in press). It includes two tracks, a decoding and a reading comprehension track. The materials may be used in individual or small group tutoring situations. Engelmann and Becker also are primarily responsible for the DISTAR (Direct Instructional Systems for Teaching Arithmetic and Reading) basic reading, language, and arithmetic programs. Both the CRLS and DISTAR materials are highly effective teaching program which share similar specific teaching procedures called the Direct Instruction System. It is important that teachers adhere to teaching procedures specified if the program is to be successful.

The use of attention and response signals, precise correction routines and descriptive, social reinforcement constitute important components of the Direct Instruction procedures used in the Corrective Reading and Language System.

Although this study examined only the frequency with which tutors provided descriptive, social reinforcement to their clients, tutors were also expected to use other components of the Direct Instruction System in their teaching.

The program is primarily oral. The tutor asks a question that is answered by a vocal response from the client. For example, the tutor might say "All birds have wings, a Robin is a bird. What do we know about Robins?" The child should respond with, "Robins have wings." A series of oral questions and answers on a particular concept combine to form tasks. The number of question and answer
sequences in a task may vary considerably anywhere from 10 questions and answers to a hundred may be included. A series of tasks combine to form a lesson. Each client completes approximately two lessons per day, one in decoding and one in reading comprehension.
APPENDIX E

WRITTEN MATERIALS PROVIDED TO TUTORS
Tutors were given copies of the following materials. The first portion was excerpted from Becker, Engelmann, and Thomas' book, *Teaching I*, (1975). The experimenter wrote the objectives included below and tested the subjects on the second objective.

**Descriptive Social Reinforcement**

**Objectives:**

1. Given examples, be able to identify instances and not instances of descriptive social reinforcement.

2. Be able to generate original examples of descriptive social reinforcement if asked to do so.

**Make it Work - Use Behavior - Specific Praise**

Dr. Haim Ginott, author of *Between Parent and Child*, has pointed out that often a child does not react to what we consider praise. Take a child who has been repeatedly told he is stupid and who has failed often. He is not likely to be overwhelmed with joy by a teacher telling him, "You are smart." The praise statement doesn't fit with his own experience. On the other hand, if this same child has been working hard for 20 minutes to complete 10 long division problems and he gets them all done correctly, he might believe this: "I saw you working hard on your arithmetic for 20 minutes. I've checked every problem and every one is right. And you know, your writing is really neat and clear." This describes what the child did and shows appreciation by the detailed attention given to the child's work or behavior. Ginott says it's usually better to make praise descriptive rather than evaluative. Describe - don't judge. Praise specific behavior.

There is much to be said for this viewpoint. The less you know about a child, the more likely it is that descriptive praise will be effective and evaluative praise will miss the mark. However, it is also possible to make phrases such as "good", "great", and "that's clever" effective for children by initially accompanying such phrases with descriptive statements.

"Jimmy watched carefully throughout the whole lesson. That's paying attention well."

"Mary is sitting up straight with her hands on her desk, ready to listen. She's going to be a good listener."

"Aaron, you kept at that one for a long time and you finally got it. That's good working. When we work hard, we learn."
There are systematic ways to make short phrases effective. Simply describing what a child does or did that you appreciate is the first step to effective praising. Tying such descriptive phrases to short praise words is the next step in making teaching efficient. Finally, the teacher uses a mixture of short statements or gestures to signify approval or correctness, and more detailed descriptions of praiseworthy behavior. Remember: Make praise descriptive. Praise the behavior; not the whole child. (p. 184)

While it is important to use descriptive social reinforcement when working with clients, it is probably not cost effective to use it after each response. Specific social reinforcement takes more time to compose and emit than evaluative reinforcement. This is time during which the child cannot be responding. Bernhardt and Forehand (1975, Journal of Experimental Child Psychology) used an FR 2 schedule of labelled reinforcement and were able to generate a higher rate of responding than occurred with evaluative social reinforcement. We feel there are two situations, however, when it is important to use specific social reinforcement:

1. At the end of a task (descriptive social reinforcement in this case would refer to the rule or concept which was illustrated by the instances included in that series of responses).

2. After the child completes a correction procedure and returns to the main tract of the program materials (in this situation, descriptive social reinforcement would refer to the characteristics of the new responses which make it better than the original response which resulted in the correction procedure).

All this sound considerably more complex than it really is. The issue, is, perhaps, best described by using examples (instances and not instances).

Instances of Descriptive Social Reinforcement

At the end of a task:

1. "Good!" "You got all the questions right on when to use paddle and when to use peddle."

2. "Fantastic!" "You got all those facts right about hot water and germs."

3. "Great!" "I knew you could learn that poem." "It was a long poem, but you said it very well."

4. "Good!" "You've learned that 'p' and 'pp' make different sounds."
5. "Great, Ann!" "You got them all right." "Words with s's and some without can be confusing, but you got them all right."

6. "Right!" "You figured out when to use the rule, an apple doesn't have anything to do with tools."

7. "Good!" "You got all of those difficult pronounciations right."

8. "Ann, that was good!" "You caught all of your own mistakes in that story and immediately corrected them."

9. "You're doing really well on your digestive system!" "Your spelling is really improving."

**Following a correction procedure:**

1. "Good!" "You got the 'a' sound right."

2. "Great!" "You used the rule about double 'e's' to sound out this word."

3. "All right!" "You got 'winter' right." "You got the season both of these holidays are in."

4. "Great, Ann!" "You've learned the difference between tape and tap, now."

5. "Good!" "You remembered that 'e' makes the sound 'e.......'." 

6. "Really great!" "You got it right that 'a' makes the 'a....' sound when the word has an 'e' on the end."

7. "Good!" "You got instructed right that time, you were careful to put an 'ed' on the end."

8. "Great!" "That word is 'heaps' you got it right that time."

9. "Good!" "You said it fast that time."

10. "Right!" "All bears don't live in a zoo only some do."

**Not Instances of Descriptive Social Reinforcement**

1. "Great, Ann!" "You remembered it."

2. "Good job, Mark!"

3. "Really, really good!" "You got them all right!"

4. "Boy, Mark!" "You are really cookin'!"
5. "Fantastic, Ann!" "You are really doing well today!"

6. "Wow, Ann!" "You're really smart."

7. "Good!" "Much, much better than the last time!"

8. "Great!" "You're really using your noggin'."


Rule: Descriptive social reinforcement always names the response to which it refers. A pronoun should not be substituted for the specific response.
APPENDIX F

THE SEQUENCE OF EVENTS DURING MODELING AND FEEDBACK SESSIONS
The flowcharts on the following two pages describe the sequence of events in the modeling interview (Figure 2) and the feedback interview (Figure 3). The only differences between the two interviews occurred in the third step.
Figure 2. Conducting the modeling interview.
(In this figure the terms tutor and student are synonymous.)
Greet students and converse briefly over non-target events.

Make general statements regarding overall positive aspects of tutoring.

Select 2 or 3 instances and 2 or 3 non-instances of descriptive, social reinforcement from training tape and play them for student.

Can the student identify instances and non-instances of descriptive, social reinforcement?

Yes

Answer any questions on descriptive social reinforcement.

No

Prompt for any general questions the tutors might have.

Review rules specifying critical features of instances and non-instances of descriptive social reinforcement.

Summarize issues covered in session.

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Figure 3. Conducting the feedback interview. (In this figure the terms student and tutor are synonymous.)
Greet students and converse briefly over non-target events

Make general statements regarding overall positive aspects of tutoring

Select 2 or 3 instances and 2 or 3 non-instances of descriptive, social reinforcement from tape of tutoring session and play them for student

Can the student identify instances and non-instances of descriptive, social reinforcement?

Yes

Answer any questions on descriptive, social reinforcement

Prompt for any general questions the tutors might have

Summarize issues covered in session

No

Review rules specifying critical features of instances and non-instances of descriptive, social reinforcement
APPENDIX G

RELIABILITY DATA
The following graphs provide a detailed description of the scores obtained in this study on the various reliability measures taken.

Figure 4 shows the conditional reliability scores obtained by each observer across sessions.

Figure 5 illustrates the conditional reliability scores obtained by each observer grouped according to the phase the subject was in when the sample was taken.

Figure 6 describes the conditional reliability scores obtained on samples chosen from each group of subjects.

Reliability scores obtained were very high with no apparent trends correlated with any of the variables described in these figures.
Figure 4. Conditional reliability scores obtained by each observer across sessions.
Figure 5. Conditional reliability scores obtained by each observer in each phase.
Figure 6. Conditional reliability scores obtained by each observer across groups.
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