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THE APPLICATION OF A COMPUTER ASSISTED TEACHER TRAINING SYSTEM TO SPEECH THERAPIST TRAINING

by
Harolyn Jean Filson VanEvery

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Education)
in The University of Michigan
1971

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CHAPTER I

STATEMENT OF THE PROBLEM

A training agent, such as a teacher, psychotherapist or social worker, is a person who carefully chooses and structures an interpersonal environment for a particular person or group with whom he interacts in order to produce a predictable change or effect in that person or group (Hunt, 1969). Therefore, a training agent's ability to use social interaction behaviors is his primary professional tool. The products of a training agent are measurable behavior changes in students, patients or clients.

The problem of preparing a professional to function as a training agent is an important concern for educational and related fields. Enrollment in a university or college program is generally required to become a training agent. Such academic programs are concerned with teaching their trainees to perform a set of social interaction skills with a professional competence not possessed by untrained individuals. Consequently many such programs have extended their concerns beyond the graduation of professional personnel. They have become involved both in basic research and applied research to identify training agent behaviors which consistently relate to client changes and methods which teach trainees to use those behaviors

(Gage, 1963; Imig, 1967; Flanders, 1967; Kunze, 1967; Matuschka, 1969; Donahue, 1970).

An apprenticeship model has been chosen by many training programs to teach their trainees the interaction behaviors deemed effective by the professionals in their specific field (Villarreal and Lawrence, 1967; Olson and Hahn, 1964; Anderson and Hunka, 1963). The components of this model incorporate the social learning principles of modeling, imitation, practice and feedback (Bandura and Walters, 1963) to effect trainee behavior change. For example, in a teacher preparation program trainees are assigned to spend time observing a "master teacher" conduct lessons. Later, the trainee is given opportunities to teach under supervision. It is assumed that he will attempt to imitate the behaviors he observed the "master teacher" exhibit. While the trainee is practicing he is observed either by the "master teacher" or by another supervisor experienced in the field. During a supervisory conference following the teaching session, this observer provides the trainee with feedback concerning his teaching behaviors. The effect of this feedback assumedly will be the modification by the trainee of his teaching behaviors in future teaching sessions (Semmel, 1968; Soar, 1970).

The use of an apprenticeship model by training programs has not been systematically examined by research to measure the effects of its modeling, practice and feedback components. However, it would appear that the model

is based on five interrelated assumptions. Each of these assumptions could be used to generate research questions for training agent programs.

> Assumption 1. Training programs can objectively define specific training agent behaviors which relate to specific client changes. That is, such programs know exactly what it is they want their trainees to do and why they are to do it.
>
> Assumption 2. "Master" training agents selected for trainees to observe actually exhibit the interaction behaviors expected by the training program.
>
> Assumption 3. Trainees who observe "master" training agents' behaviors can discriminate those behaviors which are effective or are believed to be effective in changing client behaviors.
>
> Assumption 4. Trainees who can discriminate those training agent behaviors associated with client change will attempt to imitate such behaviors.
>
> Assumption 5. The feedback a trainee receives concerning his interaction behaviors will assist him in modifying those behaviors to meet the criteria of the training program.

When training programs have become concerned with examining their effects on trainees' behavior, suggestions for improvement have primarily focused on increased practice opportunities. More opportunities to conduct therapy, teach or counsel have been recommended in efforts to improve the quality of trainee performance. However, training agent programs are currently faced with increasing enrollments in their programs and actually have had to consider a reduction in the amount of supervised practice provided to each trainee (Bailey, 1969). An alternative for a program to consider is improving the quality of the practice experiences it already provides to its trainees.

For practice to be effective in changing behavior two conditions must be present in the practice situation (Mager, 1962). First, there must be well defined goals (Locke, Cartledge and Koeppel, 1968). A trainee must know what interaction behaviors he is to practice. Second, there must be adequate feedback concerning the behaviors actually produced by the trainee during a practice session (Adams, 1968). A comparison by the trainee of his intended interaction behaviors with his produced behaviors will provide information he and his program supervisors can use in planning subsequent practice experiences to approximate defined goals. Unless these two conditions are present a practice experience may become a trial and error experience which may or may not assist a trainee in meeting the behavior criteria of the training program. A training program concerned with increasing the quality of its trainees' practice experiences will attempt to provide both well defined interaction behavior goals and efficient, objective feedback to a trainee.

Objective Feedback to Effect Trainee Behavior Change

A training program is structured around a theory of the relationship between a training agent and his client. The problem of defining specifically what a training agent does and how it affects his clients is presently being considered by several types of training agent programs (Bar, 1966; Bellman, Friend and Kurland, 1966; Emmer,

1967). Teacher training programs, in particular, have attempted to develop methods for recording specific teaching behaviors to use both in analyzing the effect of those behaviors on students and for feedback to teacher trainees (Zahn, 1965; Furst, 1967; Murray, 1970). There have been two recent developments of significance in methods of objective data collection in teacher training programs, (1) the use of interaction analysis observation systems (Simon and Boyer, 1967), and (2) the use of communication media (Schueler and Lesser, 1967).

During the past ten years a large number of interaction analysis observation systems have been developed and used both for research and for teacher training (Boyd and Devault, 1966). An interaction analysis system is intended for use by an observer to classify small units of classroom behavior according to a predetermined set of categories. The most widely used observation system, both in the areas of teacher behavior research and the training of student teachers, has been Flanders' Interaction Analysis system (Simon and Boyer, 1967). This system divides the verbal behaviors of the teacher and students into ten "all inclusive, mutually exclusive" categories (Flanders, 1964). The observer, assigned to record a classroom interaction, enters a tally on a sheet of paper every three seconds. The tally is a number which corresponds to one of the ten labels of classroom behavior as defined by the Interaction Analysis system. At the end

of the interaction session the tallies are summarized both by frequency counts of tallies in each category and by sequences of tallies. The resulting tally matrix may be used in supervisory conferences with teacher trainees to provide objective information to a trainee concerning his interaction behaviors.

A major drawback to the use of observation systems such as Interaction Analysis for teacher training has been the inordinate amount of time necessary to collect, summarize and analyze the data gathered by such a system (Semmel, 1968; Flanders, 1970). As a result, the use of observation systems has been reserved primarily for research and demonstration training programs. An increase in the use of observation systems by training programs is anticipated with the availability of direct access to computer facilities. The direct input of Interaction Analysis tallies into the computer can substantially reduce the amount of time now necessary to obtain summaries of objective interaction data (Schmichens, 1967). The investment a training program makes in collecting and using interaction data must yield adequate returns in observable behavior changes in trainees.

A second method of recording training agent-client interactions currently being explored by training programs is the use of communication media (Allen, 1968; Meier, 1966; Brady, 1970). Film, audio or video tape recordings are made of interaction situations. The taped record is

replayed later by the trainee, either alone or in the company of his supervisor. The record is critiqued and the trainee is expected to use the information, gathered both from his own observations of his behavior and the comments of the supervisor, to alter his subsequent interaction behaviors.

Communication media in training agent programs have been used both to present models and provide feedback to trainees. Researchers examining the effects of communication media on trainee behavior change report problems in measuring the effects of communication media. They indicate that, while the auditory or visual confrontation of a trainee with himself has an initial emotional impact, the trainee and his supervisor still need a definitive vocabulary to objectively discuss the recording they are monitoring. With the use of communication media the supervisor's feedback function has been to assist the trainee in focusing on the specific behaviors which are believed to be critical to the professional functioning of a training agent. As a result, some training programs have experimented with a combination of tape recording (video) and the use of Interaction Analysis to achieve the desired objective description (Minnas, 1968; Rosenshine, Furst and Hill, 1968).

To date training agent programs have been concerned with developing objective descriptions of training agent-client interactions and examining whether such

objective information, when used as feedback, is more effective in producing trainee behavior change than subjective evaluations presented in a supervisor conference (Murray, 1970). However, various components of learning theory (Hilgard and Bower, 1966; Bandura and Walters, 1963) suggest that research concerning the effective use of feedback by a training agent program can be expanded to consider other important dimensions of feedback. For example, one group of teacher training researchers have suggested that it is important to consider when and in what form feedback should be offered to a trainee (Semmel, 1968).

Insession vs. Postsession Feedback to Effect Trainee Behavior Change

Semmel (1968) and his associates have been engaged in the design and development of a computer assisted teacher training system (CATTS). CATTS provides the opportunity for direct data input into a computer by a classroom observer using any observation coding system (e.g. Interaction Analysis). These data are instantaneously stored and processed, providing a reduction in the tedium previously associated with summarizing and analyzing such information. Perhaps more important, however, the CATT system is designed to offer a trainee immediate feedback on some dimension of his interaction behaviors, immediate in the sense that a trainee receives this feedback while

he is engaged in the interaction rather than following the interaction.

In the CATTS prototype, a display was provided to a trainee within a classroom situation (Semmel, Kreider, Schmitt, Weaver and VanEvery, 1968; Semmel, Rand and Olson, 1968). This display was a graph presented on an oscilloscope. The function plotted on the graph represented the percentage of time the trainee spent using certain interaction behaviors. This feedback was offered to the trainee during the training session. With this insession feedback the trainee had the opportunity to monitor and alter his performance within a single session in order to achieve an effect either he and/or his supervisor desired.

Three initial studies were designed to test the efficacy of the insession feedback provided by the CATT system (Schmitt, 1969; Kreider, 1969; Weaver, 1969). These studies focused on the question of whether feedback offered within the interaction situation by a CATTS display was more effective in altering trainee interaction behaviors than feedback offered by viewing a CATTS display after the completion of the interaction situation.

Schmitt (1969) gave teacher trainees feedback on their use of <u>broad questions</u> (Davis and Tinsley, 1968). Those trainees who received insession CATTS feedback spent significantly more time using broad questions than trainees who received feedback from a CATTS display following each

interaction situation. This study also found that all trainees spent significantly more time using broad questions when teaching social studies lessons than when teaching arithmetic lessons regardless of when they received feedback. Finally, the study showed that all trainees gained significantly across time in their use of broad questions, but that trainees receiving insession CATTS feedback gained significantly more than postsession feedback trainees. These results suggest that the role of feedback in changing trainee behavior can be influenced by both the subject matter of the lesson and by accumulative trainee practice.

Kreider (1969) gave teacher trainees feedback on the amount of time they spent using student initiated ideas (Flanders, 1964). He found that trainees who received insession CATTS feedback did not differ significantly from trainees who received postsession CATTS feedback. The study also found, as did Schmitt's, that subject matter affected the interaction behaviors. All trainees used significantly more student initiated ideas in social studies lessons than they did in arithmetic lessons. Interestingly, when arithmetic lessons were considered alone, trainees who received insession CATTS feedback spent significantly more time in the use of student initiated ideas than trainees who received postsession CATTS feedback. With accumulated practice all trainees gained significantly in the amount of time they spent

using student ideas. However, again, in the area of arithmetic trainees receiving insession CATTS feedback gained significantly more than trainees receiving post-session CATTS feedback. These results support Schmitt's findings. Subject matter and the amount of practice affect the use of insession feedback by trainees. The results further suggest that feedback effects on trainees' behaviors may differ with the behaviors chosen for feedback, as Schmitt offered feedback on broad questions while Kreider offered feedback on use of student ideas.

Weaver (1969) also provided teacher trainees with feedback on their use of student ideas. Trainees who received insession CATTS feedback produced higher mean gains on this behavior than trainees who received post-session CATTS feedback. Since the trainees in Weaver's study were working with social studies lessons only, this result conflicts with Kreider's findings. Furthermore, Weaver found that all trainees did not gain significantly with practice in their use of student ideas. Again, this finding appears to conflict with the findings of both the Schmitt and Kreider studies. However, Weaver introduced a variable not considered in the other two studies. He manipulated teacher expectancy. Teacher trainees who were told to expect their students to do well spent significantly more time using student ideas than trainees who were not told to expect their students to do well. Furthermore, trainees who were given higher expectations of student

ability and insession CATTS feedback increased significantly more across trials in their use of student ideas than other treatment combinations applied to the remaining trainees in the study. These results suggest that feedback affects trainees' interaction behaviors differently when their perceptions of students' interaction potentials differ.

In summary, these three studies with the CATT system, comparing the effects of insession feedback with postsession feedback, do not resolve the question of their relative efficacy. They do indicate that a trainee's use of either insession or postsession feedback to alter his interaction behaviors can be significantly affected by:

1. The specific interaction behavior on which feedback is offered (i.e., broad questions, use of student ideas).
2. The content around which an interaction is organized (i.e., arithmetic, social studies).
3. The teacher trainee's perceptions of his students' interaction capabilities (i.e., higher expectations, lower expectations).

These factors need to be considered in the design and use of feedback techniques to change trainee interaction behavior.

To generalize from the above conclusions, it is suggested that a trainee's use of feedback is integrated into his perceptions of his total role as a training agent and his familiarity with the functions of that role. For example, a trainee may find using broad questions a more difficult task (Hughes, 1959; Gallagher, 1965) than

expanding and responding to student initiations since the former technique is a relatively less common classroom behavior for teachers. Likewise, the trainee may associate the role of a social studies teacher with the facilitating behaviors which encourage students to offer ideas and opinions, while, in contrast, he has seen arithmetic teachers imparting and eliciting "correct" information with little encouragement offered to student divergency (Taba, Levine, and Elzey, 1964). And finally, the trainee may be more willing to engage in what are represented as successful teaching techniques when he believes his students can improve and learn, while he will tend to chose management techniques for those students he views as not likely to improve (Rosenthal, 1966; Beez, 1968).

If the above implications can be reasonably derived from studies of the CATT system, then effective use of CATTS insession feedback depends on the appropriateness of particular experiences a trainee brings to an interaction training session. A trainee must have experiences which prepare him to understand and use CATTS feedback before offering him such feedback within training session. The behavioral goals of the training program must be precisely defined so that insession feedback carries maximum information to the trainee.

In order to structure appropriate experiences for trainees a training program might, first, select and present adequate models of the interaction behaviors to be

imitated (Brady, 1970; Orme, 1967). Second, the trainee might be taught to reliably discriminate critical elements of the modeled interaction behaviors (Johnson, 1968). Third, the trainee could be given reasonable opportunities to interpret and respond to the type of feedback he will receive within a training session. That is, he may need to acquire skills to rapidly assimilate and interpret feedback information in order to successfully respond to it while conducting a training agent-client interaction (Kreider, 1969).

Questions previously examined in testing the efficacy of the CATT system have focused narrowly on whether insession feedback is more effective than postsession feedback in modifying trainee behaviors. However, it would seem more productive to ask <u>how</u> to structure CATTS insession feedback so that it is effective in increasing the quality of practice experiences afforded the trainee. This study considered the relative effects of practice, CATTS insession feedback and well defined behavioral goals on trainee interaction behavior changes. Behavior goals were defined for the trainee by (1) presenting ideal interaction models, and (2) teaching use of an observation system which discriminated desired interaction behaviors. In addition, predicted relationships between trainee interaction behavior changes and client behavior changes were examined.

Developing CATTS Through Applied Research

In the development of CATTS it has become important to recognize that even training agent programs which use similar methods to teach their trainees interaction techniques, have training agent-client interaction goals which are unique to each program. Therefore, separate training programs will need to seek individual solutions to questions such as: what are effective interaction strategies; what observation systems discriminate reliably; what type of feedback is most effective in changing trainee interaction behaviors; and, by what methods should trainees be exposed to models.

The CATT system is intended to be developed as a flexible instrument, useful and applicable to a wide variety of training agent programs (Semmel, 1968). It is necessary, therefore, to design and demonstrate a viable model for application which will (1) move CATTS out of the isolation of the laboratory, (2) adapt CATTS to the requirements of individual training agent programs, and (3) facilitate the testing of specific research hypotheses concerning CATTS within actual training programs. In addition to examining the experimental problem outlined in the previous section of this chapter, the general purpose of this study was to demonstrate the feasibility of establishing a research site for testing and developing the CATT system within an existing training program.

The CATTS application model designed and implemented to test the research questions posed for this study consisted of three phases: (1) Consultation and Design; (2) Insession Feedback and Data Collection; and (3) Evaluation. Training program directors and CATTS personnel were designated separate but complimentary functions within each phase of the CATTS application model.

Phase 1: Consultation and Design. The flow chart of the activities occurring during Phase 1 is presented in Figure 1.1.

The directors of the training program are assigned the responsibility of behaviorally defining theories of effective training agent-client interaction. In addition, they are responsible for selecting and recording examples of ideal interaction behaviors.

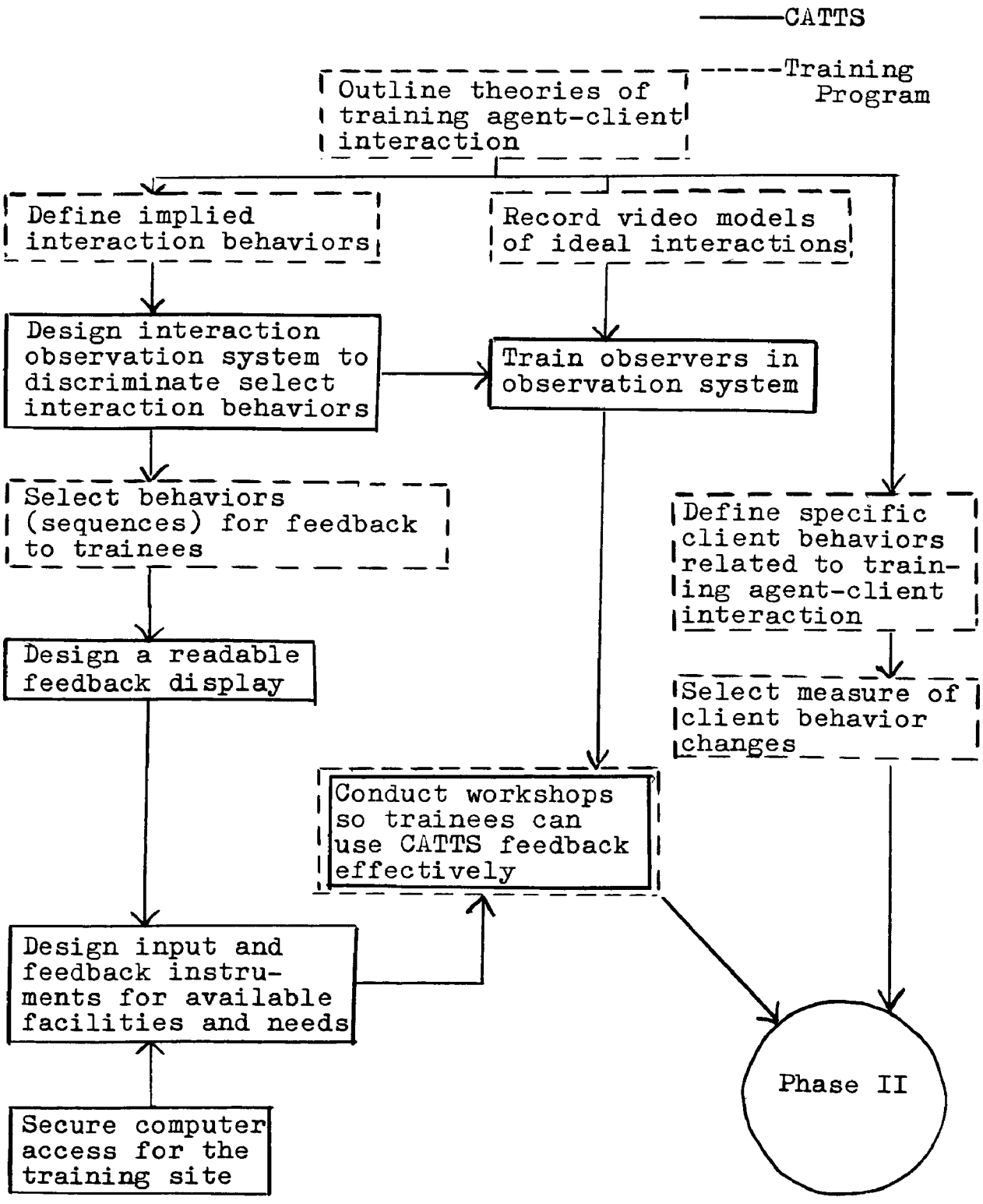
CATTS personnel use the behavioral definitions of training agent-client interaction, provided by the training program directors, to create an observation system which reliably discriminates the relevant interaction behaviors. CATTS personnel are also responsible for securing appropriate data collection, storage and feedback facilities for use in the Training and Data Collection Phase (Phase 2) of the study.

Both the training program directors and the CATTS personnel are jointly responsible for planning and providing prepractice experiences which teach trainees to interpret and respond to insession CATTS feedback.

Figure 1.1

CATTS Application Model Flowchart

Phase I: Consultation and Design



Phase 2: Insession Feedback and Data Collection. A flowchart of the activities occurring during Phase 2 is presented in Figure 1.2.

The training program directors conduct the training program as it has previously been conducted. Collection of interaction data and insession feedback are appended to the existing training program format. Trainee and client behavior changes are assessed by the training program directors using their accustomed methods of evaluation.

The CATTS personnel are responsible for collecting data on trainee-client interaction behaviors, recording trainee and client interaction behavior changes, and providing insession CATTS feedback to individual trainees.

Phase 3: Evaluation. A flow chart of the activities occurring during Phase 3 is presented in Figure 1.3.

The training program directors compare their assessments of trainee and client behavior changes with the interaction data provided by the CATT system. In addition, the directors provide the CATTS personnel with information concerning the adequacy of CATTS' adaptation to the particular needs of their training program.

The CATTS personnel analyze data relating to experimental hypotheses concerning the effect of CATTS insession feedback on trainee interaction behavior change. They provide to the training program directors interaction

Figure 1.2

CATTS Application Model Flowchart

Phase II: Insession Feedback and Data Collection

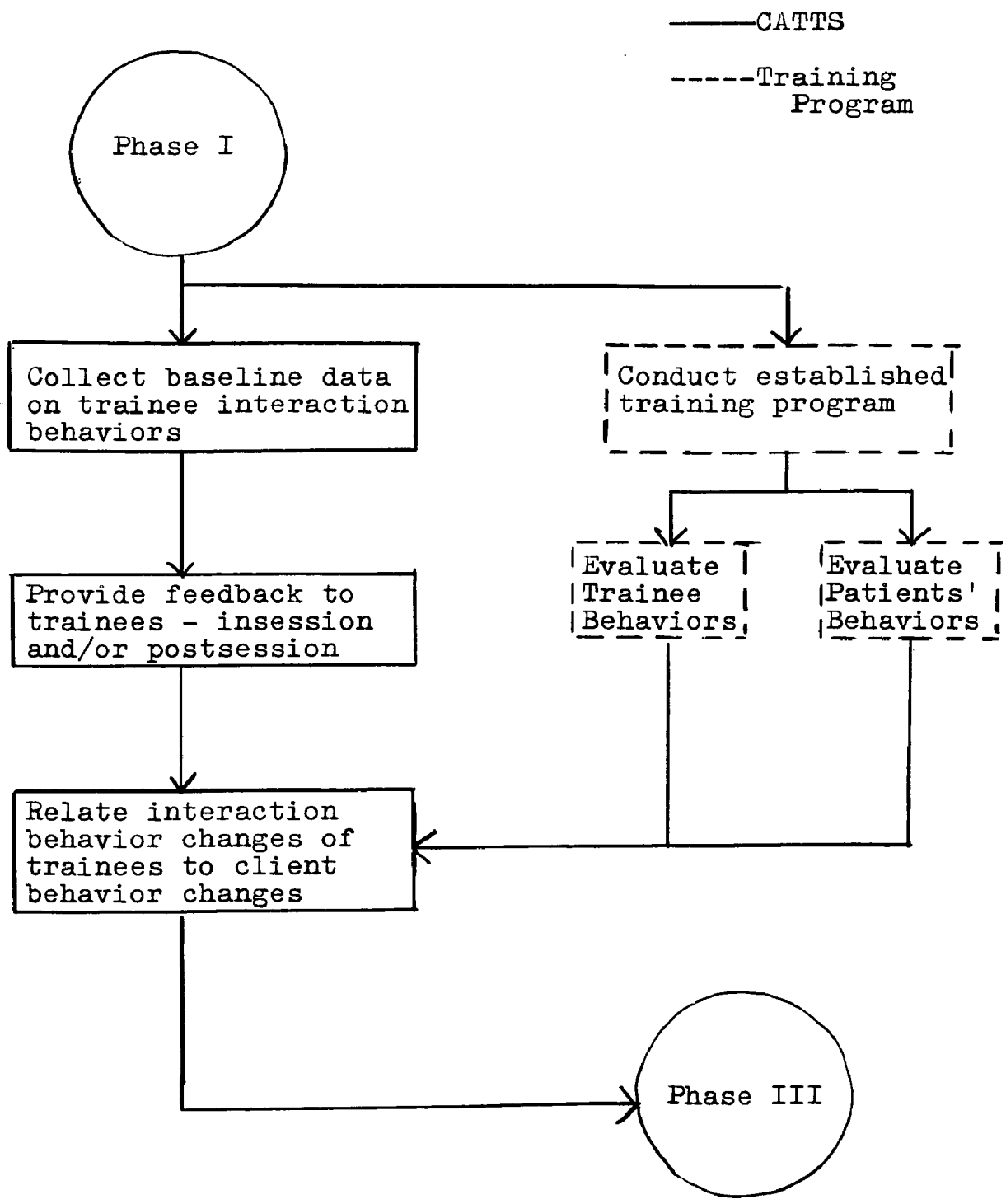
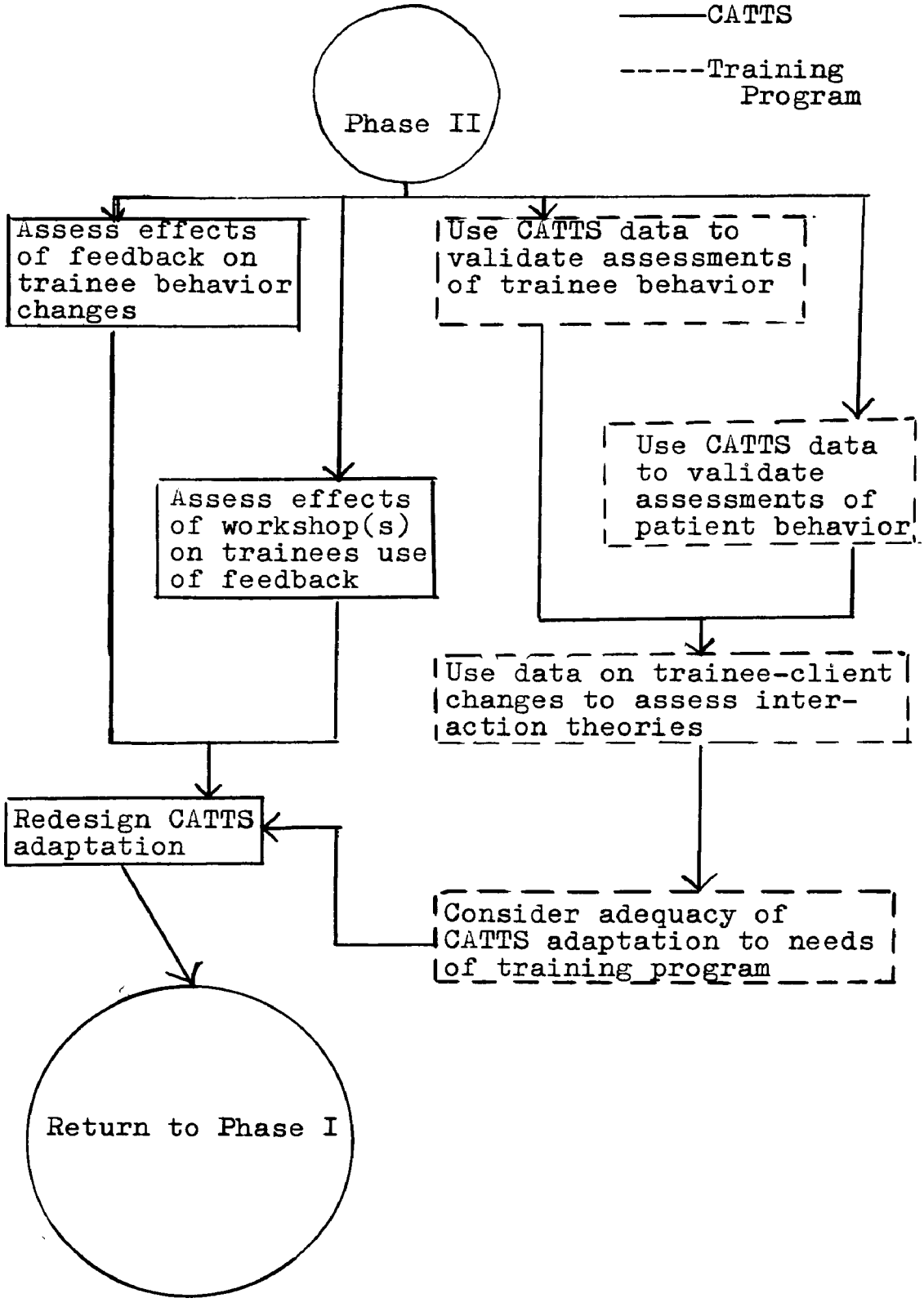


Figure 1.3

CATTS Application Model Flowchart

Phase III: Evaluation



data which relates trainee interaction behavior changes to client behavior changes.

The adequacy of the CATTS application model outlined above was evaluated in this study by examining whether:

1. The necessary mechanical aspects of the CATTS system functioned economically and reliably within the field situation.
2. CATTS could be adapted to the expressed needs of the training program so that the original design of the training program was augmented rather than altered.
3. Basic requirements for research design were adequately fulfilled within the existing training program structure so that research hypotheses concerning the effects of CATTS feedback could be tested.

Summary

This study was designed to fulfill two purposes: (1) The experimental purpose of the study was to test hypotheses dealing with the effects of insession CATTS feedback on trainee behavior change and the effects of skills in discriminating modeled interaction behaviors and accumulative practice on trainee's use of CATTS insession feedback; (2) The demonstration purpose of this study was to implement and evaluate a field application model which both adapted CATTS to the training needs of a specific training agent program and to the collection of experimental data within a particular applied research situation.

Chapter II reviews research which considers the effects on trainee behaviors of: (1) the use of objective feedback; (2) the use of immediate feedback; and (3) the use of models.

CHAPTER II

REVIEW OF THE LITERATURE

Two problem areas were proposed for this research study. The demonstration aspect of the study examined the feasibility of conducting research on the CATT system within an actual training agent program rather than in a laboratory site. The experimental aspect of the study tested (1) the effects of insession feedback when compared to postsession feedback on selected trainee interaction behaviors, and (2) the effects of teaching trainees to correctly discriminate modeled therapy behaviors on trainees' subsequent use of insession feedback.

For a review of the literature, studies were selected which examined: (1) the use of objective feedback to effect trainee behavior changes; (2) the use of immediate feedback to effect trainee behavior changes; and (3) the presentation of models to effect trainee behavior changes.

Changing Trainee Behavior Through Objective Feedback

Observation Systems. The development of instruments to accurately and objectively record a training agent-client interaction has received growing interest from researchers during the past fifteen years. Attempts have been made to describe non-directive counseling techniques (Snyder, 1947), the process of psychotherapy (Rogers, 1951),

and speech therapy with stutterers (Bar, 1967). However, the preponderance of development in observational systems has taken place in the field of education (Medley and Mitzel, 1963).

Objective data, collected and quantified through observation systems, were required by training programs to describe training agent-client behaviors, relate training agent behaviors to client changes, and relate training agent characteristics, such as personality variables, attitudes or self-perceptions, to training agent interaction behaviors. Recently, various professionals responsible for training agent programs have also become interested in using observation data as objective feedback to their trainees in order to effect desired behavior changes.

Observation systems are usually divided into two types: sign systems and category systems (Murray, 1970; Medley and Mitzel, 1963). Sign systems, such as the Florida Taxonomy of Cognitive Behavior (Brown, Ober and Soar, 1967), record only the occurrence of certain behaviors but not their frequency. Category systems, such as the Interaction Analysis (IA) system described in Chapter I, use a discrete number of "all inclusive, mutually exclusive" categories (Flanders, 1964) to label interaction behaviors. The observer either assigns each behavior to a category as it occurs, or samples the interaction at intervals and labels the interval appropriately.

While there are over 40 observation systems which have been used for research, Flanders' IA system has been most frequently used for research and training (Simon and Boyer, 1967). The initial interest of Flanders was in the contrast of democratic and authoritarian classrooms. His observation system reflects this interest by classifying certain teacher behaviors as direct (authoritarian) or indirect (democratic) influences on classroom interaction. Each observation system tends to reflect its designer's theory of ideal training agent-client interaction by (1) focusing on dimensions which are believed to be critical in effecting client change and (2) ignoring other dimensions believed to be less relevant. Because of the wide use of Flanders' IA, more is probably known concerning teachers' use of direct behaviors (i.e., lecturing, giving directions and criticizing) and indirect behaviors (i.e., accepting feelings, praise and use of student ideas) than any other behaviors used by training agents.

The research studies which follow report the effects of using observation system data as feedback to professional trainees on subsequent interaction behavior changes. In all but two of the studies the IA system was used for data collection and feedback. Therefore, the behavior changes of trainees are classified in the dimensions of direct or indirect influences on the interaction climate.

In one of the earlier uses of observation data feedback to effect trainee behavior change, Hough and Amidon (1964) taught elementary school student teachers to analyze their own teaching behaviors using IA matrices in conferences with their college supervisors. An increase in indirect teaching behaviors was reported for these trainees during the training period.

Finske (1967) matched 18 elementary student teachers on the basis of their Minnesota Teacher Attitude Inventory scores (Cook, Leeds and Callis, 1952) and randomly assigned one member of each pair to receive training in the use of the IA observation system. Feedback was provided to the IA group on their teaching behaviors by means of matrix data during supervisory conferences. All trainees were measured on specific classroom behaviors during both the second and the eighth week of student teaching. Trainees who received IA training and feedback exhibited significantly more flexible teaching patterns (ability to move from direct to indirect influence behaviors and back), and significantly more indirect influence behaviors than did members of the control group at both times of comparison.

Ishler (1967) observed and coded the teaching behaviors of 17 elementary student teachers using the Withall Social-Emotional Climate Index (Withall, 1951). Objective data from this observation instrument were offered to the trainees approximately once a week during

the 11 week training period. In addition, five group sessions were held to assist trainees in understanding the concept of classroom climate and their importance in creating particular climates. The following semester, Ishler coded the teaching behaviors of 17 additional elementary student teachers which he labeled a control group. The control group received no instruction in the use of an observation system nor feedback which used observation data. The experimental trainees produced significantly higher final scores on the Social-Emotional Climate Index than did the control group. A high score on the Index indicates heavy use of learner-centered behaviors.

Kirk (1967) investigated verbal behavior changes of 15 student teachers provided with IA records of their classroom behaviors during supervisory conferences. The student teachers assigned to the experimental group participated in a five hour workshop which introduced them to the use of the IA system. During the student teaching semester each trainee participated in six conferences with a college supervisor who discussed with them the IA data collected on their classroom interaction behaviors. When compared with a group of student teachers who received no training or feedback from IA data, the experimental group produced significantly less teacher talk, accepted more student ideas and had more student initiated talk.

Emmers (1967) asked sixteen teachers in an inservice training situation to elicit increased student initiation in their classrooms. IA feedback concerning the verbal behaviors of both the teacher and the class was provided to twelve of the sixteen teachers in the study. At that point all teachers were again instructed to elicit more student initiation. All teachers increased the amount of student initiation in their classrooms when compared to their baseline measures. However, teachers who received IA feedback did not increase student initiation significantly more than teachers who did not receive IA feedback.

Yulo (1967) used IA to investigate the effect of objective feedback on the verbal teaching behaviors of science interns. Seven interns, assigned either to experimental or control groups, were observed for a period of six lessons. Computer printed matrices were used for supervisory feedback to the experimental group but not the control group. No significant differences in the changes of trainee verbal behaviors occurred between the two groups.

Ledbetter (1968) trained 30 student teachers in the use of IA at the beginning of their student teaching placement. The trainees were matched on test scores and one member of each pair randomly assigned to an experimental or control group. Data collected on the experimental trainees were used as feedback following teaching sessions observed on the fourth, sixth and eighth weeks of practice

teaching. Randomization did not equate the groups on their use of indirect teaching behaviors as there was a significant difference between the groups at the first time of data collection. Ledbetter felt that this difference precluded statistical analyses but did report that the ratio of indirect teaching behaviors to direct teaching behaviors changed in the predicted direction for the trainees in the experimental group.

Bondi and Ober (1969) provided elementary student teachers with computer printed matrices of IA data describing their classroom behaviors. No evaluation of the matrices was made by the supervisor but the trainees were encouraged to compare the matrices with previous performances during the student teaching semester. Student teachers in the control group (no IA feedback) also received weekly conferences with supervisors to discuss their student teaching performances "in a more traditional fashion." The experimental trainees produced significantly less teacher talk, more student initiated talk, used more praise, accepted more student ideas, asked more questions, lectured less, gave fewer directions and used less criticism than student teachers in the control group.

Matuschka (1969) provided IA training to counseling practicum students and compared them to a control group on subsequent use of indirect counseling behaviors. No differences between the two groups occurred on counseling behaviors, nor did other measures, the <u>16 Personality</u>

Factor Questionnaire and the Semantic Differential Test, differentiate the groups.

Leonard (1969) examined the effects of observation training on the verbal behaviors of student teachers. One trainee group was taught to evaluate videotapes of their own teaching segments using the IA system; another group used the IA system to observe selected classroom interactions; the third group received "traditional presentations on critical aspects of successful interaction." There were no significant differences observed between the three groups in choices of verbal teaching behaviors during subsequent student teaching sessions.

In summary, five of the reviewed studies reported a significant effect of objective feedback data on subsequent trainee interaction behaviors (Hough and Amidon, 1964; Finske, 1967; Ishler, 1967; Kirk, 1967; Bondi and Ober, 1969). One study reported positive trainee behavior changes in response to IA feedback but did not use statistical comparisons (Ledbetter, 1968). Four studies reported no differences between groups who received observation feedback and those who did not when their subsequent interaction behaviors were compared (Emmers, 1967; Yulo, 1967; Matuschka, 1969; Leonard, 1969). The reviewed studies did not provide unequivocal support for the effect of objective feedback but indicate possible considerations for future research.

Communication Media Feedback. Personnel responsible for the planning of training agent programs have also experimented with the use of communication media, such as videotape, audiotape and filmed recordings, for feedback to trainees. Attempts to assess the effects of such feedback often use measures of attitude change and supervisor ratings (Tintera, 1964; Olivero, 1965; Reynolds, 1967; Kallenbach, 1969; Petersen, 1969; Davis, 1970). However, studies have been conducted which attempted to relate the use of communication media feedback to significant changes in interaction behaviors of trainees and these studies have been selected for review.

Much of communication media feedback has been paired with a training technique called microteaching. Allen (1968) has described the use of microteaching as developed in the teacher training program at Stanford University. Teacher trainees were asked to plan and teach short segments (five to twenty minutes each) in which they attempted to master some specific teaching skill such as use of silence or divergent questioning. The teaching segments were recorded on videotape and the trainee viewed and critiqued his teaching performance with his supervising teaching. The trainee was then asked to replan and reteach the segment. The cycle was continued until the trainee had "mastered" the teaching skill.

The form of feedback a trainee received from a supervisor while viewing a videotape of his teaching

performance has varied. Some studies and programs report only that the supervisor "critiqued" the interaction (Donahue, 1970); others indicate that rating scales were used (Allen, 1968); some programs have used objective observational systems such as IA to quantify the recorded interaction (Minnas, 1968).

Scheuler, Gold and Mitzel (1962) used the OScAR (Medley and Mitzel, 1963) to measure behavior changes in student teachers randomly assigned to one of three supervision treatments. One group received personal visits and feedback from a supervisor; a second group viewed videotape records of their teaching behaviors in company with a supervisor; the third group received a combination of the two supervision treatments. No behavior changes which could be discriminated by the OScAR occurred between the three treatment groups during the training period.

Acheson (1964) assessed the effects of videotape feedback on student teacher behavior by measuring the amount of teacher monologue produced. Teacher monologue is defined as the "solo performance of a teacher addressing a classroom of children." Forty-eight student teachers were assigned randomly to one of four feedback conditions. The treatment group which received videotape feedback on their classroom behaviors produced significantly less monologue at the end of the training period than did the other groups who received no videotape feedback.

MacGraw (1966) compared 42 teacher trainees assigned to three different feedback conditions on their use of attending behaviors to the interest and work orientation of their students. One group viewed a 35 mm. time lapse photography record of their teaching behaviors and received graphed materials which represented the critical behaviors in the teaching interaction; the second group received only the graph materials; the third group received no feedback. The group which received both the visual and the graphed feedback performed significantly better than the other two groups on their use of attending behaviors.

Fanslow (1968) used 35 mm. time lapse photography to provide teacher trainees with feedback on the attending behaviors of students in their classrooms. All of the 82 trainees in the study received visual feedback information. Trainees were assigned to one of four feedback treatment groups. Three of those groups received additional feedback information. All trainees significantly increased their use of attending behavior cues from the first to the last observation of the study. No significant differences occurred between the four groups when additional feedback treatment effects were considered.

Rosenshine, Furst and Hill (1968) combined the use of videotape and IA feedback in a teacher training program. The training program was sequenced in five parts: (1) all trainees were instructed in the use of the IA system; (2) specific teaching skills were introduced and described

using the terms of the IA categories; (3) trainees were asked to practice the skills in microteaching sessions; (4) trainees were assigned to receive one of several feedback treatments concerning their interaction behaviors during microteaching; (5) trainees practiced the teaching skills in a practice teaching classroom. Trainees who did not receive IA information on their microteaching behaviors spent significantly more of the videotape viewing time comparing their perceptions of behavior with those of their supervisor than did trainees who received IA information. In addition, supervisors of the trainees for the subsequent student teaching practicum reported that the trainees who had received both videotape and IA feedback during microteaching training lectured less and used pupil ideas more than trainees who had not received such feedback.

Goodkind (1968) assessed the effects of videotape feedback on student teacher behaviors in a microteaching format. Trainees assigned to an experimental group received critiques of their teaching performance while viewing videotapes with a supervisor. A control group received critiques without the benefit of the videotape recording. The OScAR was used to measure resulting behavior changes in the trainees. The experimental group displayed significantly more awareness of personal habits and mannerisms, more awareness of teaching acts and techniques, more insight into the activities and interrelationships of their pupils and more awareness of the problems in pacing instruction than the control group.

Rousch (1969) compared the effects of audio, video and written feedback, without supervisor critiques, on the verbal behaviors of teaching trainees. The trainees were assigned to one of five treatment groups. One group viewed videotapes of their own teaching behaviors without a sound track; a second group listened to audio recordings of their teaching segments; a third group received both audio and visual feedback; the fourth group received audio and visual feedback paired with a typed script of the classroom interaction; the fifth group received no feedback. Trained observers used Flanders' IA to analyze three different videotapes of each trainee. No significant differences in the verbal behaviors were found between the groups.

Leonard (1969) compared the effects of different types of observation skill training on the verbal behaviors of student teachers. One group was trained to evaluate their own microteaching segments using IA matrices; the second group was trained to observe other classroom situations using the IA observation system; the third group attended classroom lectures on "how to observe." No significant effects of the three treatments on classroom verbal behaviors were evident in samples taken during student teaching episodes.

To summarize the studies considering the effects of communication media feedback to trainees, five of the studies reported significant changes in trainee interaction

behaviors (Acheson, 1965; MacGraw, 1966; Fanslow, 1968; Rosenshine, Furst and Hill, 1968; Goodkind, 1968). Of the three studies which reported no significant effects, one study offered feedback alone without supervisor direction as to the interaction behavior goals of the training program (Rousch, 1969). This leaves a trainee with only his own perceptions concerning the behaviors of a training agent to guide his choice of interaction behaviors. Objective feedback with no defined goals will not necessarily result in the trainee behavior changes desired by the training program. Another study measured the maintenance of interaction behaviors by considering student teaching episodes subsequent to the semester of microteaching training (Leonard, 1969). Ideally all aspects of a training agent program should focus on the acquisition of specific interaction skills. If different phases of the training program communicate different objectives to trainees the skills acquired in one phase of the program will probably not be demonstrated in another.

Changing Trainee Behavior Through Immediate Feedback

Training programs provide feedback to their trainees in the belief that feedback will alter the subsequent interaction behavior choices of the trainees. The previous section of this chapter presented studies which measured the effects of objective feedback on

trainees' interaction behaviors. A general discussion of the effects of feedback (knowledge of results) on learning has been presented by Locke, Carledge and Koeppel (1968). This discussion summarizes learning studies and draws the conclusion, among others, that the more immediate the feedback to a learner the more effect that knowledge has on subsequent responses.

In the field of education the most well known uses of immediate feedback are in the areas of programmed and computer assisted instruction (Crowder, 1959; Skinner, 1968; Stolurow and Davis, 1965; Zinn, 1966). Immediate feedback to learners concerning the correctness or appropriateness of their responses has been used to increase the amount of material learned, increase the rate of learning, decrease response latency, reduce response errors and reduce learner frustration.

An examination of research literature indicates that training agent programs have experimented with the use of immediate feedback primarily in the areas of diagnosis and decision making.

McNeil (1962) measured the acquisition of certain teaching behaviors when trainees were provided with immediate visual feedback on students' acquisition of material. Ten junior high school student teachers were assigned randomly to either an experimental or one of two control groups. Trainees in one control group taught lessons without receiving structured feedback. Trainees in both

the experimental and the second control group prepared a series of multiple choice questions to administer to students at the end of each lesson. Experimental trainees received immediate visual feedback on the correctness of their students' responses by means of "answer lights" mounted on the desk of each student. Trainees in the second control group presented the questions but did not receive immediate feedback. No significant differences occurred between the three groups in the development of appropriate teaching behaviors.

Meier (1966) measured student teachers' decisions to reteach materials when presented with immediate feedback from their students on their understanding of presented material. Nine student teachers prepared criterion questions to present to their classes at intervals during the lesson. Students responded to the questions by holding up color-coded cards so that the teacher received instant information concerning their grasp of the material. When the frequency of decisions to reteach material by the trainees receiving insession feedback was compared with the reteach decisions of a control group, the group receiving insession feedback made more decisions to reteach and their students scored higher on objective tests of class presented material.

Springman (1966) asked a group of student teachers and a group of experienced teachers to rate videotaped inner-city classroom episodes. Significant differences

occurred between the two groups on their assessment of problem classroom situations. Student teachers were then provided immediate feedback following each response as to the "correctness" of that response, that is, how closely it agreed with the responses of experienced teachers. Student teachers who received immediate feedback approximated the judgments of experienced teachers faster than did a control group of student teachers who received no feedback.

Imig (1967) asked freshmen in an introductory psychology course and graduate counselors to make predictions of academic success when given certain case history information on clients. Immediate feedback was given to both groups on the correctness of their decisions. Both groups increased significantly across trials in the accuracy of their predictions. Interestingly, no significant differences occurred between the freshmen and the graduate counselors on accuracy of predictions or prediction improvement.

Johnson (1968) trained 84 university students to critically observe specific pupil behaviors. The students were assigned to one of four treatment groups. Group 1 viewed a videotape of classroom interaction with the assistance of a programmed booklet which focused the student's attention on critical aspects of the classroom situation. The booklet provided immediate feedback to the students on the correctness of their responses.

Group 2 viewed a videotape of classroom interaction without the programmed booklet. Group 3 received lecture information on how to critically observe a classroom situation. Group 4 received no training. A second series of videotaped interactions were then presented to students in all four treatment groups. Group 1 was able to describe those episodes significantly better than the other three groups. Johnson reported that the other groups focused on the actions of the teacher rather than the pupils in spite of instructions to the contrary. In addition, the information offered tended to be evaluative rather than descriptive information.

Stewart (1969) asked a group of clinical psychologists and a group of advanced clinical psychology trainees to make judgments concerning protocols from the Thematic Apperception Test (TAT). One hundred and sixty stories in response to TAT cards were collected from patients in a psychiatric ward and patients in a surgical ward. Subjects were then asked to assign each story to the correct source. Immediate feedback was provided on the correctness of each decision. There was no significant difference between the two groups on response correctness nor was there a significant increase in the correctness of judgments across trials.

Heinrich and McKeegan (1969) matched teacher trainees according to subject area and randomly assigned one member of each pair to an experimental group. The

two groups were compared on discrepancy scores, computed by comparing what the student teacher thought he had taught to material he had actually covered. The experimental group received feedback from their students at regular intervals by means color coded cards presented in response to questions concerning material presumably just covered by the student teacher. The control group received no feedback. There was a significant decrease in the discrepancy scores of the experimental group across teaching sessions.

In summary, seven studies were reviewed which attempted to measure the effect of immediate feedback or knowledge of results on changes in training agents' diagnostic or interaction decision making skills. Five of these studies reported positive results from the use of immediate feedback (Meier, 1966; Springman, 1966; Imig, 1967; Johnson, 1968; Heinrich and McKeegan, 1969). Two of the studies reported no significant changes in trainee behavior (McNeil, 1962; Stewart, 1969). The study by McNeil asked student teachers to acquire certain teaching behaviors through feedback concerning students' knowledge of material. Stewart's study attempted to increase the correct assignment of TAT protocols to a particular patient population. In examining the studies it would appear that both researchers made strong and perhaps unwarranted assumptions about the relationship between the appropriateness of the feedback to the behaviors they wish the trainees to adopt.

Only three studies were available which compared the effects of insession feedback (immediate) to post-session feedback (delayed) on the interaction behaviors of trainees (Schmitt, 1969; Kreider, 1969; Weaver, 1969). These studies were reviewed in Chapter I. The results of these studies did not unequivocally support the superiority of insession feedback in effecting trainee behavior changes. Instead, the results suggested that important dimensions to consider when measuring the effect of feedback to trainees are (1) the ability of the trainee to relate the feedback to his expectations of training agent-client interactions, and (2) the ability of the trainees to correctly interpret the proferred feedback.

Changing Trainee Behavior Through Presentation of Models

One of the important components of social learning theory is the effect of modeled behavior on the later behavior of observers (Bandura and Walters, 1963). Training agent programs place credence in the effect of models by requiring trainees to participate in field observations of "master" training agents engaged in interaction with their clients. However, training agent programs have not produced much research to examine the characteristics or the effects of the models they chose to present to their trainees. This review of the literature selected studies in which trainees were exposed to modeled behaviors and subsequent behaviors of those trainees were measured for change.

One of the important components in social learning theory is the effect of models on behavior changes of observers (Bandura and Walters, 1963). Studies were reviewed in which trainees were exposed to models and their subsequent behavior changes measured.

Orme (1967) investigated the effects of two types of modeling and three types of feedback on the acquisition of a particular teaching strategy. The two types of modeling selected by Orme were (1) symbolic-verbal modeling, that is, presenting trainees with a written description of the desired teaching behavior, and (2) symbolic-pictorial modeling, a videotape demonstration of the desired teaching behavior. One hundred and twenty subjects were randomly assigned to one of six groups. Each group received a different combination of modeling and feedback treatment. When the teaching behaviors of the subjects were measured after treatment, no differences occurred as a result of the varying feedback treatments. However, trainees who received pictorial modeling were superior to those who received verbal modeling in acquiring a complex teaching strategy, and trainees who received a combination of both verbal and pictorial modeling were superior to all other treatments.

Hinckley (1969) investigated the effects of verbal modeling, visual modeling and evaluative feedback on the behaviors of teacher supervisors. Fifty student teacher supervisors were divided into five groups. Each group

received one of the following treatment combinations: (1) a verbal description of the desired interview behaviors, (2) a demonstration of the behaviors, (3) a verbal description and operant conditioning feedback as the trainee practiced interview behaviors, (4) a demonstration of the behavior and operant conditioning feedback as the trainee practiced, and (5) no treatment. Interviews, conducted by each teacher supervisor were filmed and the interview behaviors analyzed. No significant differences occurred between the treatment groups. Hinckley attributed the lack of differences to the behavior analysis system selected which had low inter-observer reliability.

Bailey (1969) asked a group of home economics trainees to observe videotape sessions of classroom interaction as a substitute for live classroom observations. When compared to a group of trainees who observed within a classroom, the group who had seen videotapes scored higher on critical evaluations of classroom episodes than did the control trainees. Significant differences between the two groups on evaluation scores may have been accounted for by the manner of presenting the videotape sessions. Videotapes were viewed in company with an instructor whose comments and reactions may well have served to focus trainee attention on interaction behaviors believed to be critical by the training program. Trainees observing in a regular classroom did receive this type of information.

It is interesting also that trainees who observed in a live classroom rated their experience as more valuable than did the videotape observers. Critical observation skills may not be perceived as valuable by naive trainees. Bailey concluded, as did Schueler, Gold and Stotler (1964) and Woodward (1964), that kinescope or videotape recordings were as effective as direct observational procedures in the presentation of training agent models to trainees.

Brady (1970) used a modeling and feedback treatment to change the interaction behaviors of prepracticum counseling trainees. Forty-eight volunteer trainees participated in the following program: (1) a microtherapy counseling session, led by the trainee, was recorded on videotape, (2) the trainees attended a didactic presentation of desired therapy techniques, (3) the trainees viewed videotaped models of exemplary therapy behavior, (4) each trainee viewed his own microcounseling segment and received a critique from a counseling supervisor, (5) the trainees engaged in a role-playing exercise to practice the correct therapy behaviors. Following the treatment program each trainee was again recorded as he directed two microtherapy sessions. The videotapes were scored by judges using the Counselor Verbal Response Scale and the Truax Accurate Empathy Scale. Sessions taped following the treatment procedure differed significantly from baseline sessions on both measures.

Higgins (1970) used the Interpersonal Interaction Rating Scale and a semantic differential self-rating instrument to test behavior changes of college student dyads following a modeling and feedback treatment. Each subject participated in a five minute interaction. Subjects assigned to Groups 1 and 2 then viewed a videotaped "ideal" interaction pattern and received programmed instruction materials on correct interaction techniques. In addition, each member of Group 1 viewed videotapes of his own interaction behaviors. Group 3 read a textbook article on social competence during the treatment period. Group 1 received significantly higher scores on the rating scale than did Group 3. The self-rating instrument did not effectively differentiate the groups.

Of the five studies reviewed, four reported significant effects of viewing models on trainee behavior changes (Orme, 1968; Bailey, 1970; Brady, 1970; Higgins, 1970). Hinckley (1969) criticized the instrument used in his study to assess behavior changes.

The conclusion that videotape recordings are as effective as direct observations (Schueler, Gold and Stotler, 1964; Woodward, 1964; Bailey, 1970) allows training programs to consider the careful selection of ideal modeled behaviors and the structured presentation of such models to trainees in order to achieve specific behavioral results in subsequent trainee behavior. The field placement situation is often a matter of chance, that is, the

trainee may observe training agent behavior valued by the program or he may not.

Summary

Studies reviewed in this chapter considered the effects of (1) objective feedback, (2) immediate feedback, and (3) the presentation of models on changes in trainee behaviors.

Chapter III presents (1) the training agent program selected as the site for the present research, and (2) hypotheses which predict effects of the use of objective observation data for insession feedback to trainees and the presentation of models on changes in trainee interaction behaviors.

CHAPTER III

HYPOTHESES

The CATT system was designed and intended to augment a training agent program which used the principles of goal definition and feedback to effect behavior change in trainees. It was felt that development and testing of the CATT system could profitably take place within an actual training program setting rather than a laboratory setting. A CATTS application model (Figures 1.1, 1.2 and 1.3) was designed to adapt the CATT system to the specific needs of an individual training program. This chapter presents: (1) the training agent program selected for use in this study, and (2) the research hypotheses chosen for testing within that particular training program.

The Site of the Study

The Aphasia Clinic at the University of Michigan regularly conducts an intensive summer program to train a modest number of speech therapists to work with adult aphasia patients in group therapy situations. The Aphasia Clinic personnel indicated their willingness to assist in the field application of the CATT system. It was believed that such a speech therapist training program could comfortably define its structure within the types of services the CATT system could provide.

The field of speech therapy is currently expressing a desire to develop training programs which insure the

acquisition of the particular skills defined as necessary for speech therapists (Bloomer, 1956; Villarreal and Lawrence, 1967). Kunze (1967) states that a basic clinical skill of speech therapists should be the ability to differentiate behavioral events from behavioral impressions. The necessary training experiences which lead to the acquisition of such a skill, according to Kunze, are: (1) classification of behavioral events; (2) search for behavioral patterns; (3) defining and investigating unanswered questions; and (4) hypothesis testing. Kunze strongly suggests that viewing models of desired behavior and acquiring the ability to make structured recordings of communicative events are necessary experiences in the efficient use of the trainees' time by the training program. Such goals and experiences are compatible with the various components of the CATT system.

As described in Phase I of the CATTS application model (Figure 1.1), the directors of the aphasia therapist training program first chose a specific behavioral goal for the therapist trainees who would conduct aphasia group therapy. The trainees were to learn the role of <u>stimulus presenter-reinforcer</u>. That is, each therapist trainee would structure the therapy interaction by either (1) asking a question, (2) requesting a language performance, or (3) beginning an utterance which the patient would finish. After a patient responded, the trainee would provide appropriate social reinforcement for the response by either

(1) repeating the response, (2) evaluating it, or (3) providing information as to the correctness of the response. This desired sequence of verbal behaviors was called a social reinforcement (SR) pattern.

The role of a therapist as a structurer of SR patterns as outlined above was not intended by the training program to be a finite definition of all therapy interaction skills needed by an aphasia therapist. Rather, the ability to use SR patterns was felt to be one valuable interaction skill a trainee could acquire which would also be appropriate for the purposes of this study, that is, to test whether CATTS insession feedback could assist the trainee in increasing the frequency of his SR pattern use.

The second task of the program directors, as defined by Phase I of the CATTS application model, was to provide videotaped models of aphasia group therapy interaction. The two senior clinicians of the training program were taped using SR pattern behavior, as they conducted therapy. These videotapes were used in workshops to teach trainees to discriminate the SR pattern behaviors of therapists and patients. The workshops were labeled Modeling-Discrimination (MD) Training workshops.

The third task of the program directors was to select a behavior measure which would discriminate the patient behavior changes believed to occur from therapy interaction. The Michigan Picture Language Inventory

(MPLI), a linguistically based test (Lerea, 1958), was selected and believed to be representative of the language behaviors frequently chosen for emphasis in aphasia therapy.

The tasks designated by Phase I of the CATTS application model to CATTS personnel were performed by the investigator. Those tasks were: (1) the design of an interaction observation system which discriminated the verbal behaviors used in SR patterns, (2) the design of a visual insession feedback display to represent to the trainees their use of SR patterns while they conducted therapy, and (3) the securing of access to online data processing services for the training program site.

Most training agent programs do not currently have computer facilities available on the training site. In this study, interaction analysis data were input at the training site and transmitted through a telephone connection to a data processing center some distance away. The insession feedback display offered to the trainees at the training site was controlled by the computer via another telephone connection.

As indicated in Chapter I, the demonstration purpose of this study was evaluated, in part, by examining whether experimental hypotheses relating to the development of CATTS could be adequately tested within such an actual training program. Specific research hypotheses were chosen which predicted: (1) effects of CATTS insession feedback on therapy interaction behaviors of trainees, (2) effects

of viewing modeled therapy (MD Training) on trainees' use of CATTS insession feedback, and (3) effects of therapist trainees' interaction behaviors on patient behaviors.

Research Hypotheses

The specific independent variables considered in the experimental phase of this study were: (1) the effects of CATTS insession feedback, (2) the effects of trainee participation in an MD workshop, and (3) the effects of accumulative practice during the three weeks of the study (baseline week, training week, and maintenance week).

The selected hypotheses predicted changes in: (1) trainees' use of SR patterns, (2) the ratio of therapist reinforcement to patients' responses, (3) the amount of therapy time used for patients' responses, (4) the mean length of patients' responses, and (5) patients' scores on the MPLI test.

Effects of Insession Feedback

Hypothesis 1. Trainees who receive CATTS feedback produce significantly more social reinforcement patterns than trainees who do not receive CATTS feedback.

The CATT system furnishes immediate information to a trainee concerning his behavior in an interaction situation (Semmel, 1968). With this information it was anticipated that the trainee would modify his behavior so that it became more consistent with the goals he and his supervisors had established for therapy. CATTS is viewed by its developers as an amplification of feedback already

present in the interaction situation (Schmitt, 1969). This amplification is intended to assist a trainee with his own perceptions of the therapy session. Therefore it was expected that the efficacy of such a feedback system would be demonstrated by the trainees' increased use of social reinforcement (SR) patterns, the goal of the training program selected for consideration in this study.

Effects of Modeling-Discrimination Training

Hypothesis 2. Trainees who participate in MD training produce significantly more social reinforcement patterns than trainees who do not receive this training.

The MD workshop presented models of desired therapist interaction behaviors. The trainees were taught interaction analysis skills and received practice in the accurate observation and classification of specific interaction behaviors and patterns of behaviors. It was anticipated that, as a result of awareness produced by practice in the accurate observation of models, the trainees would be more successful in the planning, evaluation and modifying of their own verbal behavior patterns in an interaction situation (Orme, 1968). Therefore, they should produce more social reinforcement patterns than trainees who have not had MD training.

Effects of Feedback and Modeling-Discrimination Training

Hypothesis 3. Trainees who receive both CATTS feedback and MD training produce significantly more social reinforcement patterns than trainees assigned to receive other treatment combinations.

Hypothesis 4. Trainees receiving neither CATTS feedback nor MD training produce significantly fewer social reinforcement patterns than trainees who receive either CATTS feedback or MD training alone.

The MD workshop was designed to operationalize specific therapy interactions which were viewed as goal behaviors by the speech therapist training program. The CATTS feedback was used to operationalize, for the therapist trainee, his own interaction with a patient group as he conducted therapy. It was anticipated that the exposure to videotape models of ideal therapy interaction and the ability to accurately observe and classify these modeled behaviors would make CATTS feedback more meaningful to a therapist trainee. Therefore the trainee who received both experimental treatments, CATTS feedback and MD training, would demonstrate the highest use of social reinforcement patterns when compared to trainees receiving other treatment combinations. Conversely, the trainees who had received more abstract definitions of ideal therapy interaction and/or experienced delayed information concerning their therapy behaviors would have more difficulty consistently producing social reinforcement patterns.

Therefore, fewer social reinforcement patterns would be demonstrated by these trainees.

Effects of Practice

Hypothesis 5. All speech therapist trainees will produce fewer SR patterns during the baseline week than during either the training week or the maintenance week.

Practice is essential to the acquisition of a complex verbal skill. Sufficient opportunity to perform correctly such a skill leads to increased efficiency in its production (Underwood, 1964). Therefore it was assumed that members of a speech therapist training program would show the effects of practice by producing more social reinforcement patterns during the second and third weeks of the training program than during the initial week. This increase was expected for all trainees of the speech therapist training program. However, differing increments were expected between the treatment groups as predicted in Hypothesis 6.

Effects of Feedback and Practice

Hypothesis 6. Trainees who receive CATTS feedback use more social reinforcement patterns during the training week and during the maintenance week when compared with the baseline week than trainees who do not receive CATTS feedback.

While it was anticipated that practice would increase the use of social reinforcement patterns for all speech therapist trainees in the training program, it was predicted

that trainees who received CATTS feedback would increase their use of social reinforcement patterns more than those who did not receive such feedback. The insession feedback provided by the CATT system should serve to focus a trainee's attention on his own specific therapy interaction behaviors and allow him to evaluate and modify those interaction behaviors as he conducted a therapy session. The focus of attention on social reinforcement patterns combined with increments of practice should result in a significant increase in the production of those patterns by the trainees receiving CATTS feedback (Schmitt, 1969).

Effects of Therapist Verbal Behavior on Patient's Behaviors

Hypothesis 7. Patient groups who interact with trainees receiving CATTS feedback increase the percentage of therapy time used for patient responses significantly more than patient groups whose therapists do not receive CATTS feedback.

Hypothesis 8. Patient groups who interact with trainees receiving CATTS feedback increase the mean length of patient responses significantly more than patient groups whose therapists do not receive CATTS feedback.

It was anticipated that changes in the verbal behavior of therapist trainees would cause corresponding changes in the patient groups' verbal behaviors (Cogan, 1967). Specifically the effect of the increased use of social reinforcement patterns on the patient groups' verbal behavior would be an increase in the percentage of therapy time used for patient responses because the therapist would

both elicit more patient responses and would offer more consistent reinforcement of those responses. Therefore, patient groups which have therapists producing more social reinforcement patterns should produce more patient responses when compared with groups whose therapist produces fewer social reinforcement patterns.

Another effect of the changes in therapist use of social reinforcement patterns was anticipated to be increases in the mean length of patient utterances. Increased opportunities for patients to respond should result in more opportunity for patients to attempt complex language behavior was compatible with the information which could be collected by the interaction analysis system selected for this study and sufficient evidence exists to suggest that mean length of utterance correlates highly with other available measures of language complexity (Ervin-Tripp, 1966).

Hypothesis 9. Patient groups who interact with trainees receiving CATTS feedback demonstrate a significantly higher ratio of therapist reinforcement to patient response than patient groups whose trainees do not receive CATTS feedback.

The training program supervisors indicated that they desired consistent and selective use of social reinforcement by their trainees. It was believed this use would lead to increased patient responding and more correct patient responses. Since the feedback being offered by the CATT system focused the trainee's attention on his use

of social reinforcement patterns it was anticipated that the relative amount of therapist reinforcement to patient response would be higher for those trainees when their behavior was compared to that of trainees who did not receive CATTS feedback.

Hypothesis 10. Patients who interact with trainees receiving CATTS feedback increase their scores on the Michigan Picture Language Inventory significantly more than patients who interact with trainees not receiving CATTS feedback.

Training agents are concerned with both the behaviors of clients during the interaction situation (Hunt, 1966) and also with long range changes of clients in an area of intellectual, affective or skill functioning. Therefore, it was considered desirable in this study to attempt to relate therapy content and interaction behaviors to anticipated changes in general language functioning of patients. If it can be assumed that the MPLI represents an adequate measure of the speech clinic's goals for speech therapy with adult aphasiacs, and if it can be assumed that the test is sensitive enough to respond to the patient language function changes which can reasonably be expected to occur within the three week period of this study, then patients' performance on this test may serve as information on the efficacy of the interaction behaviors selected by the trainees for use in therapy. Hence it was anticipated that patients who interacted with CATTS feedback trainees who used more social reinforcement patterns would

show more changes in language functioning than patients who interacted with trainees who did not receive CATTS feedback.

In summary, Hypotheses 1 through 6 predict the effects of specific treatment combinations of CATTS insession feedback, modeling-discrimination training and accumulative practice on the use of social reinforcement patterns of speech therapist trainees. Hypotheses 7 through 10 anticipate causal relationships between the changes in therapist trainee interaction behaviors and changes in patients' behaviors.

The method designed to test the research hypotheses presented above was applied to an existing aphasia therapist training program. In order to maximize the generalizability of the results of the study, it was anticipated that the existing training program would be modified as little as possible. The CATTS field application model described in Chapter I was used to design the research method for testing the above hypotheses. Chapter IV presents the method designed for the experimental phase of this study.

CHAPTER IV

METHOD

The method designed for testing the experimental hypotheses presented in Chapter III is discussed in this chapter.

Subjects

Therapist Trainees. Eight of the ten graduate students enrolled for training as aphasia therapists at the University of Michigan Speech Clinic were selected for use in this study. Each trainee was assigned to one of four treatment combinations. The trainee dyad assigned to Treatment I received both CATTS insession feedback and modeling-discrimination (MD) training; the trainee dyad assigned to Treatment II received CATTS feedback only; the trainee dyad assigned to Treatment III received MD training only; and the trainee dyad assigned to Treatment IV received neither CATTS feedback nor MD training. A summary of the therapist trainee characteristics is presented in Table 4.1.

The trainees were assigned by the senior clinicians of the training program, as their respective class schedules permitted, to a group therapy time. Two group therapy sessions were scheduled to be conducted simultaneously. One session of each pair was assigned randomly by the experimenter to receive CATTS feedback. Within each of the two feedback conditions half of the trainees

TABLE 4.1

CHARACTERISTICS OF THERAPIST TRAINEES

Treatment Combination	Therapist	Sex	Age	Degree	Speech Therapy Practicum Experience	Therapy Related Work Experience	Experience with Aphasiacs
Feedback +MD Training	1	F	23	BA	400 hours	1 summer	no
	2	F	21	BS	230 hours	1 summer	no
Feedback only	3	F	23	MS	450 hours	3 summers	no
	4	F	25	M.Ed.	350 hours	3 years	yes
MD training only	5	F	22	BS	550 hours	none	yes
	6	M	32	BS	200 hours	6 years	no
No Feedback + no MD	7	F	22	MS	735 hours	1 summer	no
	8	M	24	MA	200 hours	none	no

were randomly assigned to participate in the MD workshop.

Patients. Eleven adult aphasia patients were scheduled to be involved in treatment at the Speech Clinic during the speech therapist training program. The Clinic regularly selects patients to represent a variety of etiologies in order to provide broad experiences for the therapist trainees. Psychological and neurological examinations are conducted by a clinical psychologist and a neurologist respectively before each patient is admitted to therapy.

All patients are housed in the Speech Clinic dorm during the session. Meals are eaten together and social activities are planned. Each patient participates in individual therapy, testing and other research activities of the Clinic, aspects of the therapy program which were not directly considered by this study.

This study was concerned with patients' behavior change as a result of participation in group therapy with CATTS or No CATTS feedback therapist trainees. Patients were assigned to participate three hours a day in group therapy. All patients were assigned to interact in more than one therapy group, but each patient was assigned to only one of two therapist trainee feedback conditions. That is, if a patient was assigned to interact with one trainee who received CATTS feedback that patient was to interact, during his other group therapy sessions, only

with therapist trainees receiving CATTS feedback. Conversely, if a patient was assigned to interact with one trainee who did not receive CATTS feedback, his other group therapy sessions were to be with trainees who also did not receive CATTS feedback. In this way it was anticipated the relationship of CATTS feedback to therapist trainees and patient behavior changes over time might be assessed.

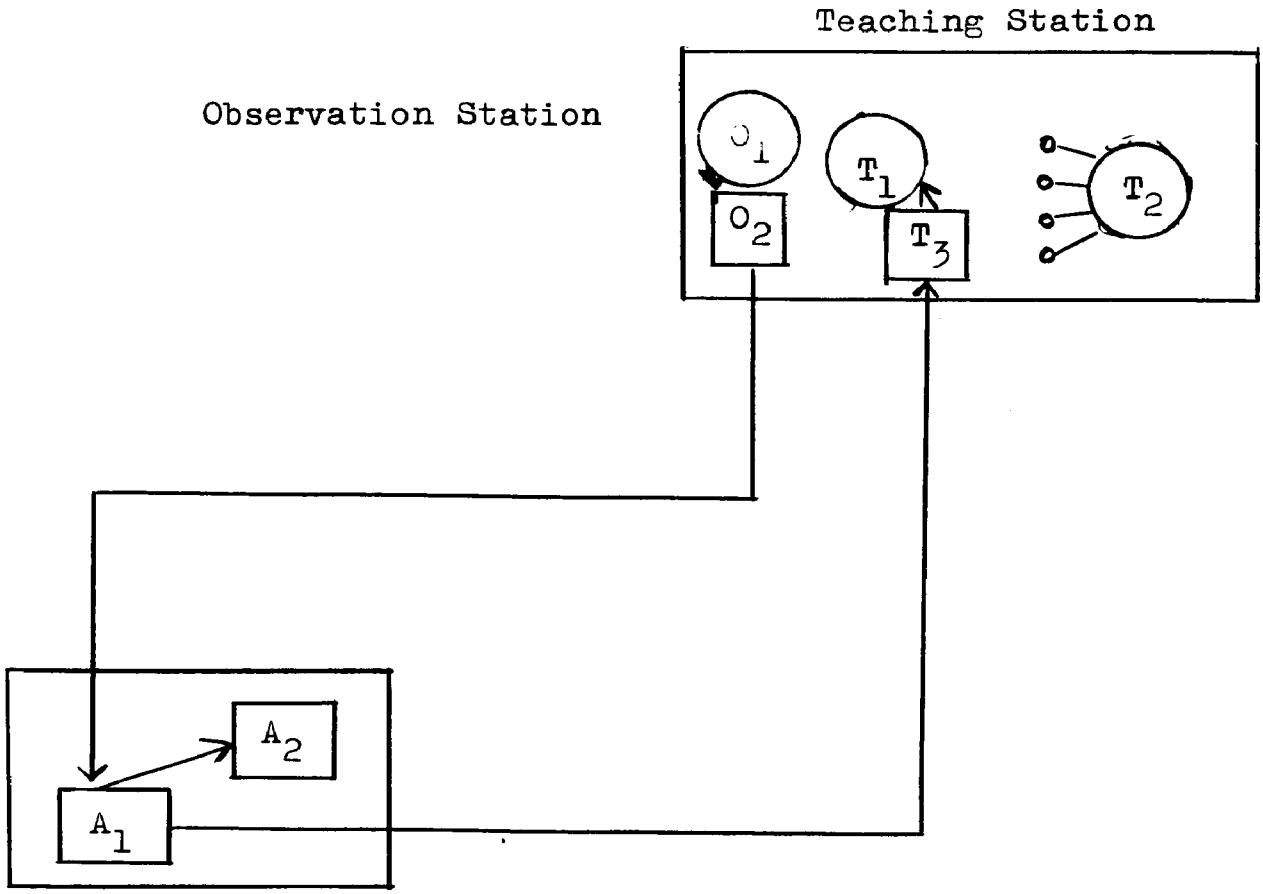
Materials

CATTS. Performance feedback, generally offered by senior clinicians to the therapist trainees, was augmented in this study by the use of a computer assisted teacher training system (CATTS). CATTS is described by the developers (Semmel, 1968) as a closed-loop feedback system analogous to a cybernetic system. This system provides prompt, insession feedback to a trainee on the relevant aspects of ongoing classroom interaction. The advantage of insession feedback over postsession feedback is felt to be in the possibility of the trainee monitoring and regulating his own behaviors within a single interaction situation.

CATTS is designed as three interdependent stations: I. a Teaching Station; II. an Observation-Coding Station; and III. an Analysis-Encoding Station (Semmel, 1968). A diagram representing these interrelated stations is presented in Figure 4.1.

Figure 4.1

Diagram of CATTS Stations
(Adapted from Semmel, 1968)



T_1 = Therapist

T_2 = Patients

T_3 = Chart Recorder

O_1 = Observer

O_2 = Input Box

A_1 = PDP-4 Digital Computer

A_2 = Teleprinter

Teaching Station. Station I was located for this study in two classrooms at the University of Michigan Speech Clinic where two therapy sessions were conducted simultaneously. A therapist trainee and three or four patients comprised each interaction group. Operating in the CATTS feedback room during the second week (training week) of the study was a chart-recorder on which a visual representation of the trainee's behavior was drawn as feedback to that trainee. No such feedback was offered on the recorder placed in the other (No-CATTS feedback) classroom.

Observation-Coding Station. Also located in the Speech Clinic, Station II contained two coders and two input button boxes. A one-way mirror and a sound hook-up allowed the coders to observe the interactions in the two Teaching Stations without disturbing the therapy sessions.

Two therapy sessions were conducted simultaneously. One of these sessions was assigned to receive CATTS feedback during the training week. One coder entered tallies on a button-box which was connected by telephone lines to the digital computer located at the Analysis-Encoding Station.

The other therapy session being conducted was assigned to receive no CATTS feedback. Data for this session was recorded by the other coder who entered tallies on a button-box which produced various sound frequencies depending on the button pressed. These frequencies were

recorded on a audiotape. This tape was later played through an attenuator network which converted the audio frequencies into ten steps (corresponding to the ten input buttons) of direct current (DC) voltage. Input in this form was accepted and analyzed by the computer.

Analysis-Encoding Station. This station was located in the laboratory of the Center for Research on Language and Language Behavior, one mile from the Speech Clinic. Contained in this station were a PDP-4 digital computer and a hard-copy printout source. Signals were accepted either from the telephone line connected with the Observation-Coding Station or from the audio-tape input, processed instantaneously and recorded as a hard-copy printout on the teleprinter at this station. This printout contained the tallies in input sequence and provided a matrix printout for each therapy session.

a. Insession Feedback Room. Signals from the Speech Clinic over the telephone line were accepted directly by the computer and processed. A second signal produced by the computer and transmitted over another telephone line directed the stylus of the chart recorder. The line drawn by the stylus provided a prompt, insession feedback display to the therapist trainee for self-monitoring.

b. Data Collection--No Feedback Room. The interaction data of the trainees not receiving CATTS feedback was not entered directly into the computer, as was the

input for the trainees receiving CATTS feedback. This data was recorded as frequencies on an audio tape and entered into the computer for processing after the therapy session was over. A comparison was made of four hours of the same data, first, entered directly from the Analysis-Coding Station and second, recorded on audiotape and those recorded frequencies entered into the computer. Comparison of the two methods of entry indicated high agreement between them. When the two hard-copy printouts of the tally sequencies for four hours of therapy interaction were compared, 97.69% of the entered tallies were the same.

Instrument for Interaction Data Collection. An interaction analysis system containing thirteen categories, subscripted to indicate the speaker or combination of speakers, was designed to discriminate the verbal moves of language drill patterns used by speech therapists and their patients. This system was adapted from the Verbal Interaction Category System designed by Mrs. E. DeLing to define interactions of groups involved in second language learning. The analysis system used in this study was called the Social Reinforcement Category System (SRCS) and appears in Appendix A.

This study was concerned not only with uses of specific categories of verbal behavior but also sequences of these categories. The particular sequencies of categories chosen to examine were those of interest to the

supervisors of the therapist training program. These sequences were labeled social reinforcement (SR) patterns. Such patterns were theorized by the training program to be sequences which lead to modification or strengthening of specific language habits of patients.

SR patterns were constructed to contain the elements of stimulus-presentation, response and reinforcement. Therapist trainees, who controlled the therapy interaction, could initiate an SR pattern by presenting a stimulus move. Stimulus moves were defined as questions, directions or utterances which needed to be completed by the patient. Response moves were offered by a patient and were in the form of answers, expansions or repetitions. The therapist trainee completed the SR pattern by a reinforcement move of positive or negative evaluation or repetition. Examples of sequences which could initiate or complete an SR pattern appear in Appendix B. These examples were taken from material already in use in the existing speech therapy training program. This type of material was presented to all speech therapy trainees in the study during the regular classes of the training program.

Modeling-Discrimination Training Tapes. Videotapes were made of the training program's two senior clinicians in group therapy with adult aphasia patients. Examples of SR patterns used by the clinicians were selected and compiled into an edited training tape. The training tape contained thirty minutes of therapy interaction

in which each type of pattern defined in Appendix B appeared and 103 SR patterns were modeled.

Training by Consensus Coding. Consensus coding (Gess, 1969) was the technique used (1) for training and determining the reliability scores of the coders used in this study and (2) to acquaint therapist trainees with the concept of interaction analysis coding during the MD workshop.

Consensus coding involves the simultaneous entry of tallies on button-boxes by two coders (or more) who are viewing the same video-taped interaction. If the tally entered by one coder does not agree with the tally entered by the other, the computer accepting and analyzing the tallies accepts no further entries and the video-tape machine is stopped. The coders then discuss the disagreement until they can reach a consensus on the category to assign to that behavior. Replay of the video-tape is available to assist the coders in their decision. When the consensus is reached it is entered, the computer accepts it, and the coding of the video-tape continues.

Consensus coding was used in this study to facilitate trainee discrimination between categories in the coding system and to provide feedback to the coders immediately on each point of disagreement.

Training of Observers. Three coders were trained to use the SRC system. Two of the coders (female) had just graduated from a teacher training curriculum and one

(male) was a liberal arts undergraduate majoring in dramatics.

Consensus coding was used both for training the coders and for determining their intra-coder reliability. Reliability in this study means the proportion of the initial tallies entered by each coder which agree with the final consensus tallies for each pair of coders (Gess, 1969). Coders each produced reliability performances with every other coder. The intra-coder reliability figures were .77, .88 and .77 respectively.

Instrument for Data Collection on Patient Language Changes. The Michigan Picture Language Inventory (MPLI), an experimental test developed at the University of Michigan Speech Clinic (Lerea, 1958), was selected in consultation with the speech therapist training personnel, as a measure appropriate to assess general language function changes in aphasia patients.

The test consists of two parts which assess vocabulary and language structure use. Each of these areas is assessed by requiring both expression and comprehension performances. Sub-tests of language structure use sample the ability to produce and/or recognize correct forms of nouns, personal pronouns, possessives, adjectives, demonstratives, articles, adverbs, prepositions and verbs and auxiliaries. Since these sub-tests correspond to the types of language skills to be emphasized in aphasia group therapy, it was believed that the MPLI might be an

instrument adequately sensitive to short-term language function gains.

The MPLI was administered during the first week of the summer clinic as a pre-test and during the fourth week of the clinic (after the three weeks of the study) as a post-test. The pre and post tests were administered by the same clinical psychologist who was unaware of the assignments of patients to experimental groups.

Experimental Conditions

CATTS Feedback. Half of the therapist trainees (N = 4) received CATTS feedback during the second week of the study. Feedback was provided by means of a display drawn on a chart recorder. Information represented in the display was related to the structure of SR patterns and informed the trainee as to whether he was in-pattern, in-pattern-too-long, out-of-pattern, or out-of-pattern-too-long. In this study, goal pattern length was defined as three seconds and goal out-of-pattern time as two seconds. The stylus rested at one of four points on the paper passing through the chart recorder. When a therapist trainee began a pattern the stylus moved to the in-pattern point. When the SR pattern was completed it returned to the out-of-pattern point. The display was drawn over time as the paper moved through the recorder. The number of SR patterns produced by a trainee could be determined by counting the peaks drawn on the display. A schematic

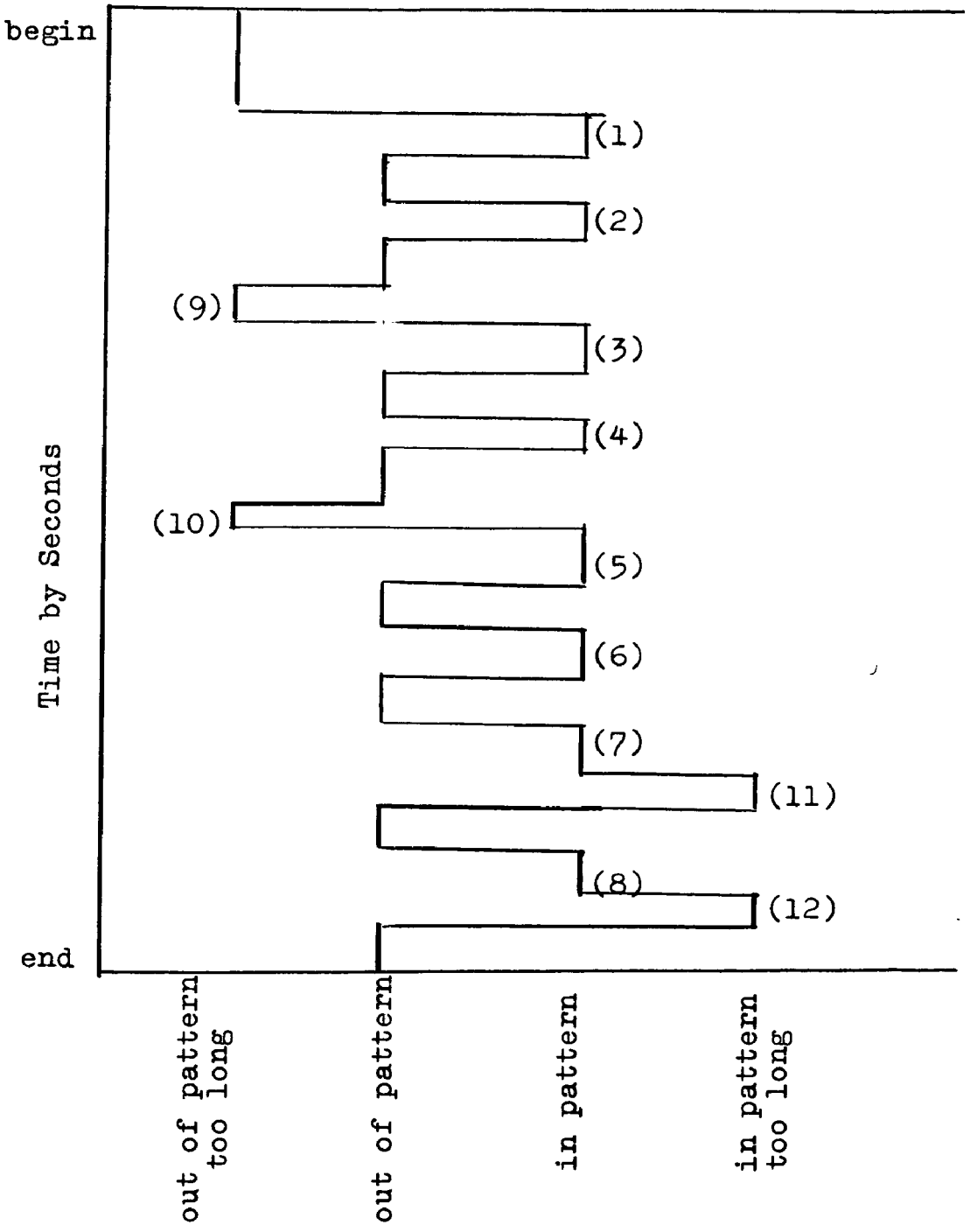
representation of the information available in the visual display is presented in Figure 4.2. It was anticipated that the trainee would use the information available in this display to monitor and modify his interaction behaviors, specifically to increase his use of SR patterns.

Modeling-Discrimination Training. Half of the therapist trainees who received CATTS feedback and half of the therapist trainees who did not receive CATTS feedback (N = 4) participated in a modeling-discrimination (MD) workshop designed to give them skills in observing and classifying verbal interaction behaviors of models conducting aphasia group therapy. They used the consensus coding apparatus to learn the SRC observation system while viewing videotapes of the senior clinicians in therapy. It was anticipated that observation of the tapes would operationalize for the therapist trainees the interaction behaviors they were expected to produce themselves in therapy.

Contrast Conditions. Half (N = 4) of the therapist trainees did not receive CATTS feedback during the second week (training week) of the study. This half did not participate in the CATTS feedback training workshop but in the Contrast A workshop. Half of the therapist trainees (N = 4) did not participate in the MD workshop but in the Contrast B workshop. Of this half, two were assigned to receive CATTS feedback and two were not. Contrast workshops A and B are described under the section on procedure.

Figure 4.2

Feedback Display of SR Patterning Drawn by Chart-Recorder



Interpretation: (1-8) Eight completed SR patterns.
(9-10) Two SR patterns started after too long a time out of pattern.
(11-12) Two SR patterns which continued too long without the therapist delivering a reinforcement.

Procedure

This study consisted of three week-long phases: The first week was designated the baseline week; the second week was designated as the training week; and the third week as the maintenance week. Before the speech therapy training program began trainees were shown the Observation-Coding station and informed that information concerning their therapy interactions would be collected. The observation room is a standard method of supervision in the speech therapy training program and is open for use by the senior clinicians, the trainees themselves and other interested personnel. The addition of coders to this room was a natural extension of an existing evaluation and feedback paradigm already in use.

On the weekend between the baseline and training weeks each therapist trainee participated in two of four workshops. One workshop presented training in the meaning and use of CATTS immediate feedback, another workshop consisted of training modeling-discrimination skills; the remaining two workshops were introduced as contrast conditions. The procedures used in each of these four workshops are described below.

CATTS Feedback Workshop. This workshop presented trainees with: (1) the concept of using the SRC system of coding therapy interaction; (2) practice in identifying behaviors for each of the SRC categories; (3) examples of SR patterns (Appendix B); (4) the chart-recorder and the

meaning of the display it prepared (Figure 4.2) and; (5) a role-playing exercise in which each trainee had an opportunity to practice SR pattern producing while receiving feedback from the chart-recorder display.

The role-playing exercise was conducted by distributing booklets to each member of the workshop. Each page of the booklet assigned the role of either patient, therapist or coder to the trainee. Each trainee had an opportunity to experience each role. The coder interpreted the interaction and the CATTS feedback to the group at the end of each microtherapy exercise. The contents of the Microtherapy Exercise booklets are presented in Appendix C.*

Modeling-Discrimination Workshop. Four therapist trainees participated in the MD workshop. Two of these trainees had participated in the CATTS workshop and two had participated in the Contrast A workshop. The trainees participated in pairs; one member of the CATTS feedback group with one member of the Contrast A group.

Trainee pairs were introduced to the use of the SRC system for use in classifying interaction behaviors occurring on the edited video-tape of the senior clinicians conducting aphasia group therapy. The technique of consensus coding was used for training these therapist trainees in observation skills. Each pair worked for one and a half hours in tallying the observed interactions,

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*Dr. Jean (Schmitt) Elder designed and conducted the CATTS Feedback Workshop.

discussing tally disagreements and entering the consensus tally. It was pointed out to these trainees that this was the way the coders stationed in the Observation-Coding station had been trained and that this was the information being collected on their therapy behaviors.

Contrast A Workshop. The four trainees who had not been assigned to receive CATTS feedback participated in the Contrast A workshop. This workshop was designed to resemble in form the CATTS feedback workshop. A role-playing exercise, similar to those used by training agent programs concerned with group dynamics, was used. This exercise was designed to demonstrate the effect roles adopted by group members have on the behavior of the group leader.

Booklets were distributed to each trainee. Each page of the booklet assigned a role of a group member, a leader or an observer to the trainee. Each trainee had the opportunity to experience each role. The observer led the discussion of the group after each role-playing session and interpreted the group's behaviors. The contents of the Group Influence Exercise booklets are presented in Appendix D.*

Contrast B Workshop. Four trainees participated in the Control B workshop. Two of these trainees had participated in the CATTS feedback workshop and two had

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*Dr. Philip VanEvery designed and conducted the Contrast A Workshop.

participated in the Contrast A workshop. None of the trainees participated in the MD workshop.

This workshop was designed to approximate in form the MD workshop. The concept of coding an interaction situation by means of an observational system was introduced. An analysis system designed to collect data on mother-child interactions was presented and the trainees viewed video-tapes of these interactions. Discussions as to the different styles of these interactions and types of analysis systems which might be designed to define these styles were presented. The subject matter for this workshop was drawn from a dissertation in progress which is using CATTS primarily as a data collection device (Dolley, 1971).*

Time Line Design. The three consecutive weeks of the study, designated as (1) baseline week, (2) training week, and (3) maintenance week, are defined below.

Baseline Week. During the first week of the study each therapist trainee conducted five fifty minute group therapy sessions and participated in the classes regularly required by the speech therapist training program. Interaction behaviors during the group therapy sessions were recorded by the coders stationed in the Observation-Coding Station. Data from four of each trainee's therapy sessions were used for testing the hypotheses of this study. The first day's data for all the therapist trainees was not used as this was a get-acquainted day for the groups and

*Mrs. Diane Dolly designed and conducted the Contrast B Workshop.

little attempt at structured therapy occurred. The data from this week represented therapist-patient group interactions without the intervention of CATTS feedback or MD training.

Training Week. During the second week of the study, following the presentation of the treatment and contrast workshops, CATTS feedback was provided to four of the therapist trainees. This feedback was provided by a function drawn on the chart-recorder (Figure 4.2) present in the therapy room. The function indicated to the trainee the number of SR patterns completed during the therapy session. CATTS feedback was provided first to the trainee during the therapy interaction and second each graph produced by the chart-recorder was saved and continued to be available to the trainee for reference during the remaining period of the study.

Since it was conceivable that the simple introduction of a mechanical device such as a chart-recorder into a therapy room might contribute to trainee behavior change, both CATTS and no CATTS feedback trainees had such equipment placed in their therapy rooms.

All trainees continued to participate in the regular classes of the speech therapy training program.

Data from the last four days of the training week were used for analysis in this study. The data from this week were expected to reflect the effects of CATTS feedback and MD training on the interaction behaviors of trainees and patient groups.

Maintenance Week. During the third week of the study observational data was collected as during the baseline week. That is, no CATTS feedback was available to speech therapist trainees.

All trainees continued to participate in the regular classes of the speech therapy training program.

The first four days of this week were used for analysis in this study. Data from this week were expected to reflect each trainee's ability to maintain the level of SR pattern production attained after exposure to CATTS feedback and/or MD training.

A schematic drawing of the time sequence and experimental conditions for therapist trainees participating in the study is presented in Figure 4.3.

A schematic drawing of the time sequence and experimental conditions for patients participating in the study is presented in Figure 4.4.

In summary, four days of baseline interaction data were collected on each of eight speech therapist trainees conducting group therapy. During the weekend following the baseline week and preceding the training week each therapist trainee participated in two of four workshops. One workshop taught trainees to use CATTS feedback; one workshop taught trainees to discriminate specific therapy interaction behaviors modeled by senior clinicians on video-tape; two workshops were used as contrast conditions and were designed to resemble the CATTS feedback workshop

Figure 4.3

Time Sequence of the Study: Therapist Trainees

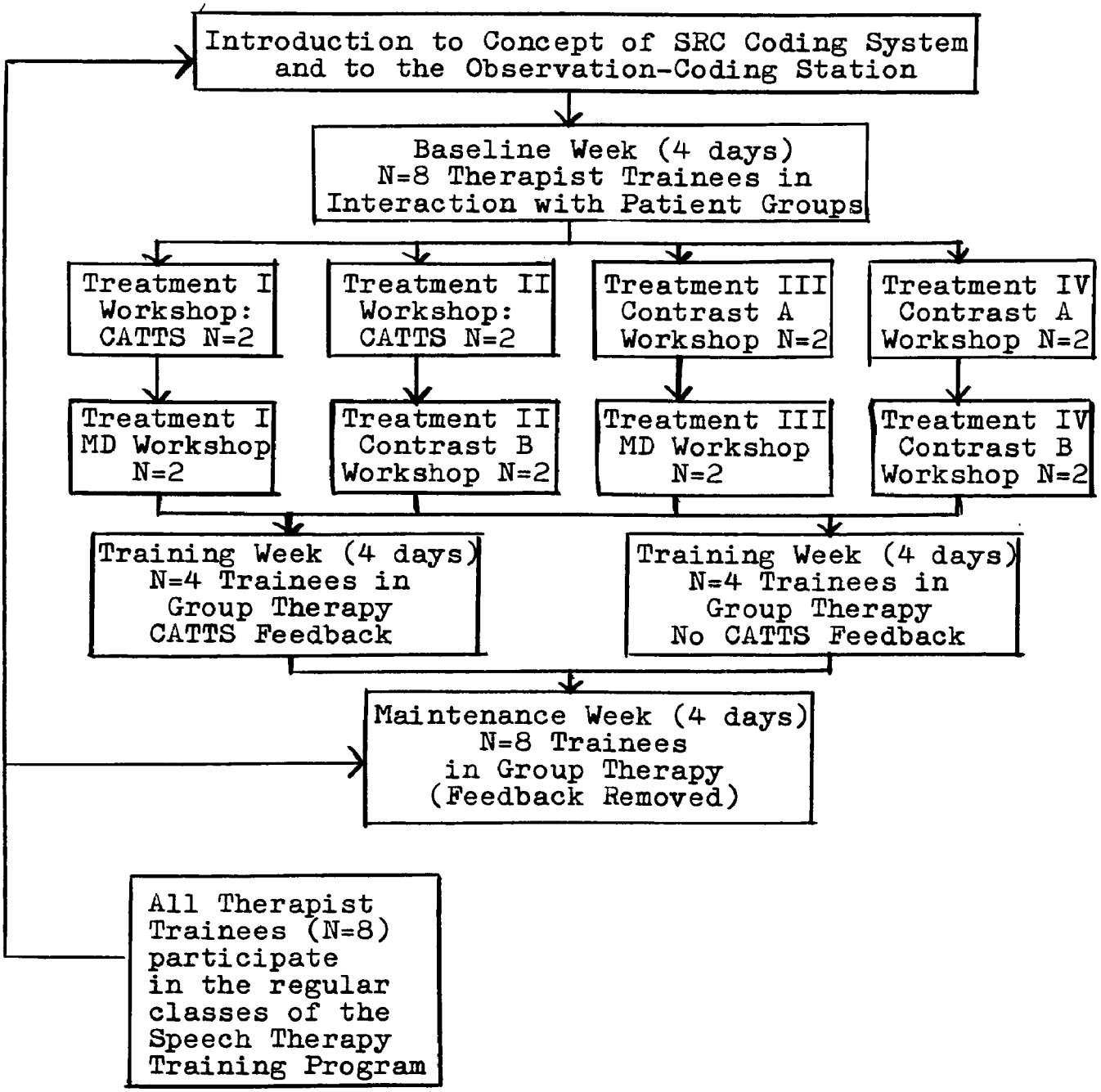
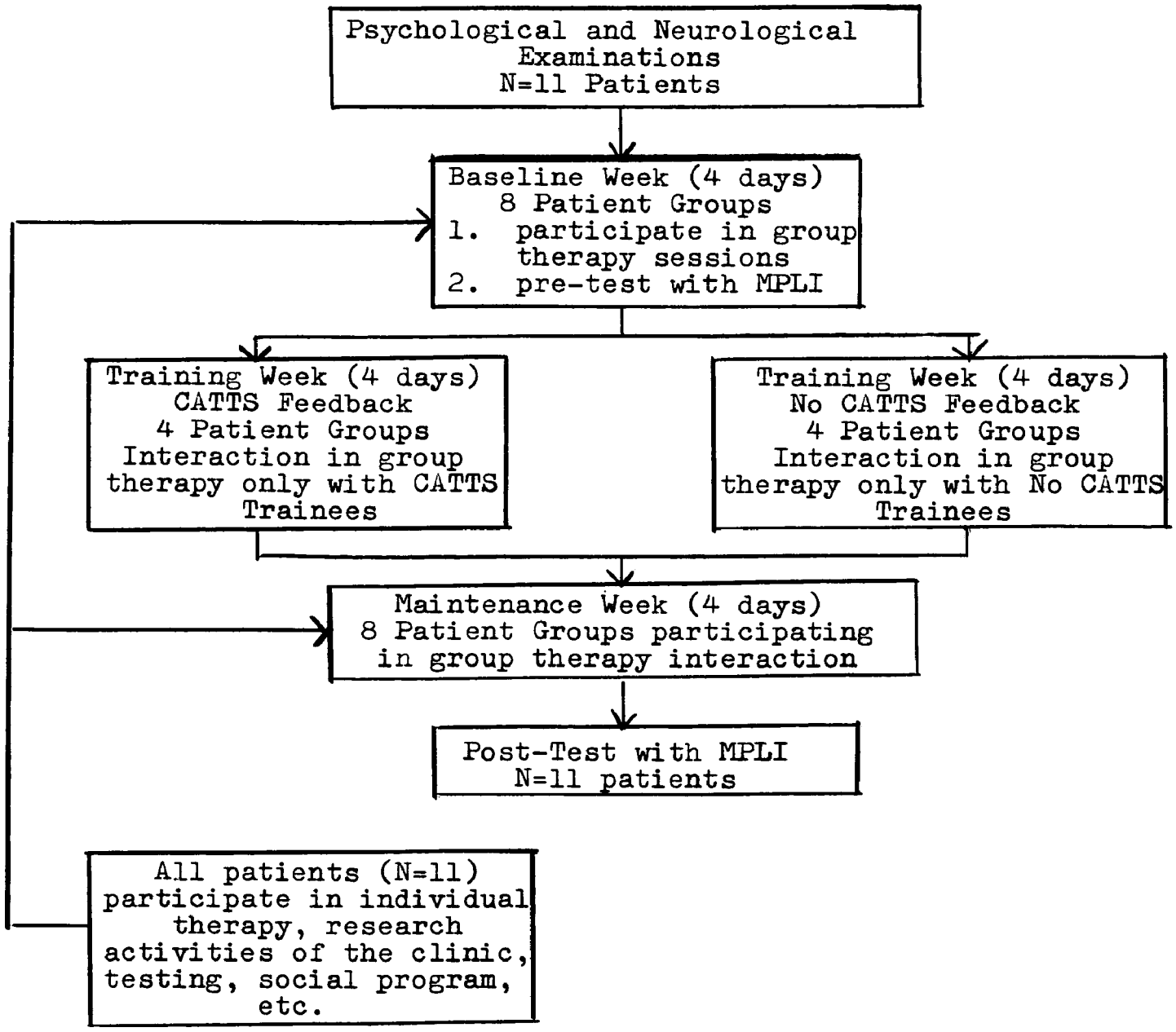


Figure 4.4

Time Sequence of the Study: Patients



and the MD workshop in form but not in content. During the training week, interaction data were collected on the four therapist trainees receiving insession CATTS feedback while conducting therapy and on the four receiving no such feedback. The feedback was removed during the third week and interaction data were collected on the maintenance of therapy behaviors demonstrated during the training week.

The analyses of the interaction data collected by the procedures described in this chapter are presented in Chapter V.

CHAPTER V

RESULTS

The statistical analyses of the data collected by the procedures described in Chapter V considered the effects of the following three sources of variance on the performance of therapist trainees and aphasia patients:

A. Feedback (CATTS insession feedback or no CATTS insession feedback).

B. Modeling-Discrimination (MD) Training (participation in an MD workshop or participation in a contrast workshop).

C. Practice (three consecutive weeks designated as baseline week, training week and maintenance week, respectively).

The analyses tested the effects of the above independent variables on:

1. Social reinforcement (SR) patterns: frequency of therapists' use.

2. Patients' responses during therapy: percentage of therapy time used for patients' responses; the mean length of patient responses.

3. Patients' scores on the Michigan Picture Language Inventory (MPLI).

All tests of significance were assessed using the .05 criterion level for rejection of the null hypothesis and acceptance of the research hypothesis (McNemar, 1962).

Effect of Treatment on Frequency of SR Pattern Use

The Dependent Variable. The frequency of SR pattern use by each of the eight speech therapist trainees was used to test Hypotheses 1 through 6. Thirty minute

samples of uninterrupted therapy time were taken from each of 12 different therapy sessions for each trainee. Four of these sessions were selected from the baseline week, four from the training week and four from the maintenance week. These frequency scores, along with the means and standard deviations for each of the four treatment dyads, are presented in Appendix E.

Use of SR Patterns During Baseline Week. Baseline data on the frequency of therapist SR pattern use were gathered for four days. Trainees were assigned to treatment dyads. These dyads were compared on their baseline production of SR patterns using a two-way (4 x 4) analysis of variance with repeated measures on one factor. A summary of this analysis appears in Table 5.1.

TABLE 5.1

SUMMARY OF TWO-WAY ANOVA: COMPARISON OF TRAINEE DYADS' USE OF SR PATTERNS ACROSS FOUR DAYS OF BASELINE WEEK

Source of Variation	df	MS	F ratio
Between Subjects	7		
A (Trainee Dyad)	3	111.03	.150
Subj. w. groups	4	737.84	
Within Subjects	24		
B (Days of the Week)	3	79.37	.830
AB	9	218.50	2.290
B x Subj. w. groups	12	95.43	

No significant differences occurred between the four treatment dyads on this analysis. The groups did not differ significantly in their use of SR patterns before receiving CATTS insession feedback and/or MD training, nor was there a significant effect of accumulative practice across the four days of the baseline measure.

Tests of Predications. Hypotheses 1 and 2 considered the effect of CATTS insession feedback and the effect of MD training respectively on therapist trainees' use of SR patterns. Hypothesis 1 predicted that trainees receiving CATTS insession feedback ($\bar{x}$ = 466.45, sd = 138.21) would produce more SR patterns than trainees who did not receive such feedback ($\bar{x}$ = 232.00, sd = 70.346). Hypothesis 2 predicted that trainees who participated in an MD workshop ($\bar{x}$ = 427.50, sd = 166.27) would produce more SR patterns than trainees who did not participate in an MD workshop ($\bar{x}$ = 271.25, sd = 108.40).

These hypotheses were tested using a three-way (2 x 2 x 2) mixed model analysis of variance with repeated measures on one factor. Treatment conditions (CATTS feedback and MD training) and practice conditions (training or maintenance week) were fixed factors and subjects were a random factor. Subjects were nested under treatment combinations but crossed with practice. The summary of this ANOVA is presented in Table 5.2.

TABLE 5.2

SUMMARY OF THREE-WAY ANOVA: EFFECTS OF CATTS FEEDBACK, MODELING-DISCRIMINATION TRAINING, AND PRACTICE WEEK ON TRAINEES' USE OF SR PATTERNS

Source of Variation	df	MS	F ratio
Between Subjects	7		
A (CATTS Feedback)	1	55107.568	10.102*
B (MD Training)	1	24414.063	4.480
AB	1	1870.557	.343
Subj. w. groups	4	5454.687	
Within Subjects	8		
C (Practice Week)	1	8055.063	2.505
AC	1	430.557	.134
BC	1	7098.062	2.207
ABC	1	1463.068	.455
C x Subj. w. groups	4	3215.938	

*Significant at .05 level.

Hypothesis 1 was supported by the analysis ($F = 10.102$; $df = 1,4$; $p < .05$). CATTS insession feedback, when considered across both the training week and the maintenance week, produced significant differences in the frequency of SR pattern use by the speech therapist trainees participating in this study.

Hypothesis 2 was not supported by the analysis ($F = 4.48$; $df = 1,4$; $p > .05$). MD training, when

considered across both the training week and the maintenance week, did not produce significant differences between therapist trainees in their use of SR patterns.

Hypotheses 3 and 4 were concerned with the combined effects of CATTS insession feedback and MD training on trainees' use of SR patterns and predicted rank ordering of the effects of treatment combinations. It was anticipated that MD training would operationalize the meaning of the CATTS feedback for the trainee dyad which received this combination of treatments. Hypothesis 3 predicted that this dyad would produce significantly more SR patterns than the other treatment dyads. Conversely, Hypothesis 4 predicted that trainees who received neither CATTS insession feedback nor MD training would produce significantly fewer patterns than the remaining treatment dyads. The means for each of the four treatment dyads are presented for the training week in Figure 5.1 and for the maintenance week in Figure 5.2.

Hypotheses 3 and 4 were tested by means of planned comparisons (Hayes, 1963, pp. 468-471). The trainee dyad receiving both CATTS feedback and MD training produced significantly more SR patterns than the other treatment combination dyads during both the training week ($t = 2.975$; $df = 3$; $p < .05$, one-tailed) and the maintenance week ($t = 2.362$; $df = 3$; $p < .05$, one-tailed). These analyses provided support for Hypothesis 3. The planned comparisons between the trainee dyad receiving neither CATTS insession

Figure 5.1

Effects of Treatment Combinations on Trainees' Use of SR Patterns: Training Week (Week II)

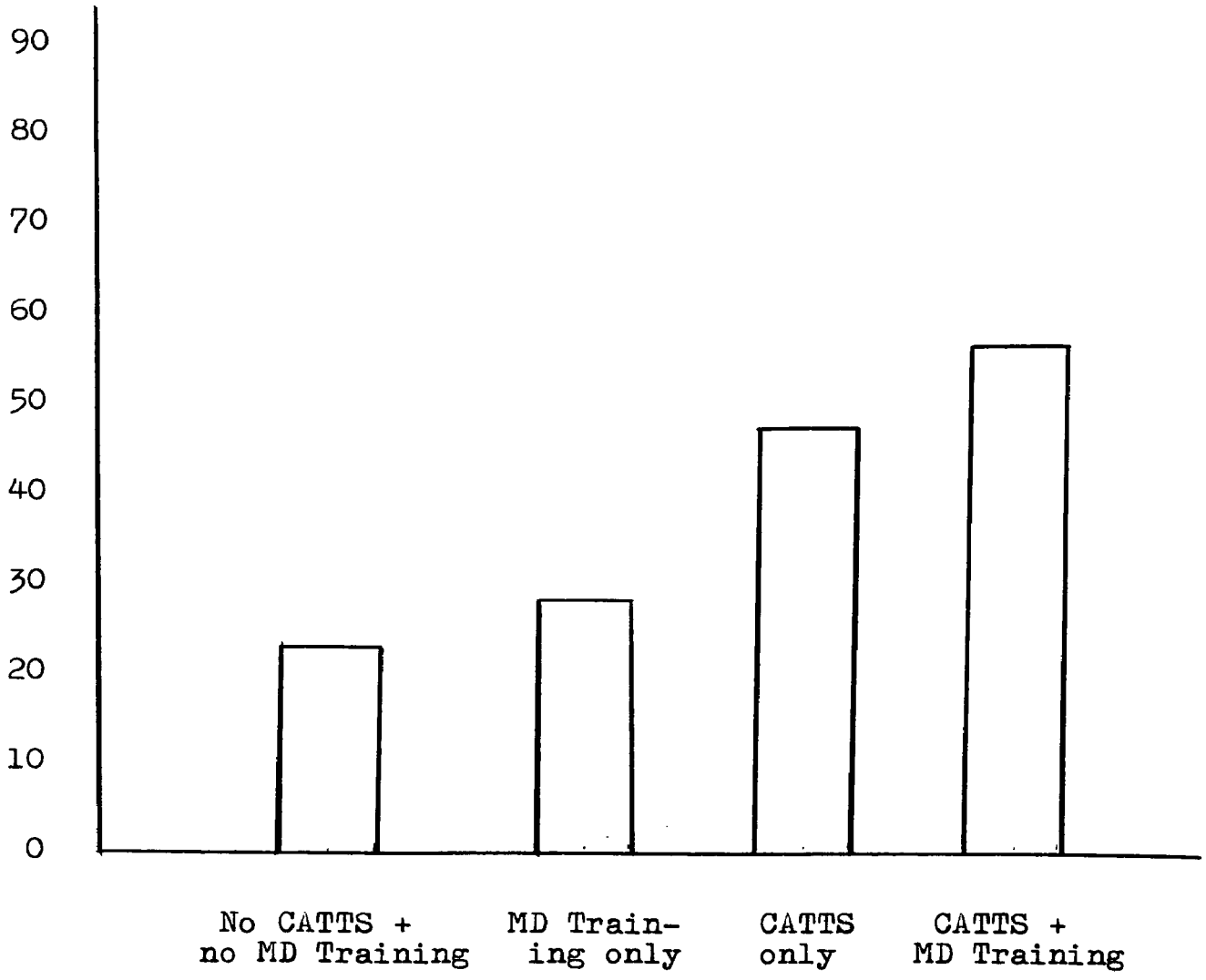
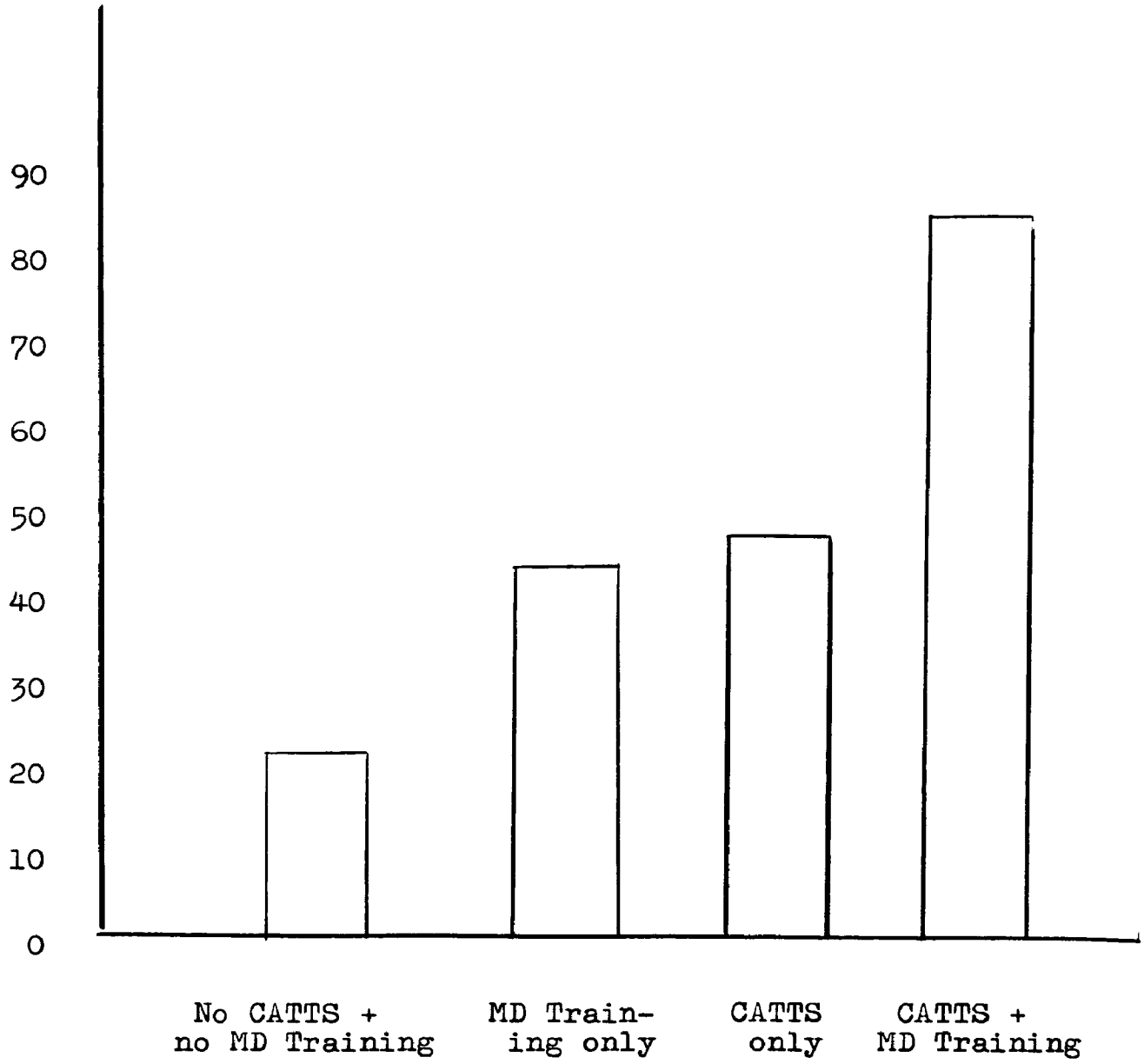


Figure 5.2

Effects of Treatment Combinations on Speech Therapist Trainees' Use of Social Reinforcement Patterns During the Maintenance Week (Week III)



feedback nor MD training and the remaining trainee dyads did not show significant differences between the dyads during either the training week or the maintenance week. Hypothesis 4 was not supported by these analyses.

The above analyses indicated that the speech therapist trainees in this study, receiving the treatment combination of CATTS insession feedback and MD training, produced significantly more SR patterns than trainees receiving other treatment combinations. However, the absence of both CATTS insession feedback and MD training did not make that trainee dyad differ significantly from the remaining trainee dyads in frequency of SR pattern use.

Effect of Accumulative Practice (Week) on SR Pattern Frequency. Hypothesis 5 predicted a significant linear increase across practice weeks in SR pattern use by all speech therapist trainees. That is, trainees would use more SR patterns during the training and maintenance weeks than they did during the baseline week. This prediction was tested by an analysis of trends for linear and quadratic within subject effects (Winer, 1962, pp. 354-365). The summary table for these analyses is presented in Table 5.3.

The linear component for the overall trend analysis demonstrated a significant effect of the week of practice on the use of SR patterns ($F = 11.085$; $df = 1,4$; $p < .05$) supporting the directional prediction of Hypothesis 5. Speech therapist trainees did produce significantly more

TABLE 5.3

SUMMARY OF THE ANALYSIS OF LINEAR AND QUADRATIC WITHIN SUBJECT TRENDS: EFFECTS OF CATTS FEEDBACK, MODELING-DISCRIMINATION TRAINING AND PRACTICE WEEK ON THERAPISTS' USE OF SR PATTERNS

Source of Variation	df	MS	F ratio
Within Subjects	16		
C (weeks)	2	979.0979	6.1959*
Linear	1	654.5546	11.085*
Quadratic	1	.1302	.0009
AC (feedback x weeks)	2	825.5052	5.2239*
Linear	1	1406.2500	7.9610*
Quadratic	1	245.2552	1.7593
BC (MD training x weeks)	2	558.3776	3.5335
Linear	1	1089.0000	6.1650
Quadratic	1	27.7552	.1990
ABC	2	56.2214	.3557
Linear	1	76.5625	.4334
Quadratic	1	35.8802	.2573
C x Subj. w. groups	8	158.0234	
Linear	4	176.6406	
Quadratic	4	139.4063	

*Significant at .05 level.

SR patterns when the second (training) and third (maintenance) weeks of practice were compared with the first (baseline).

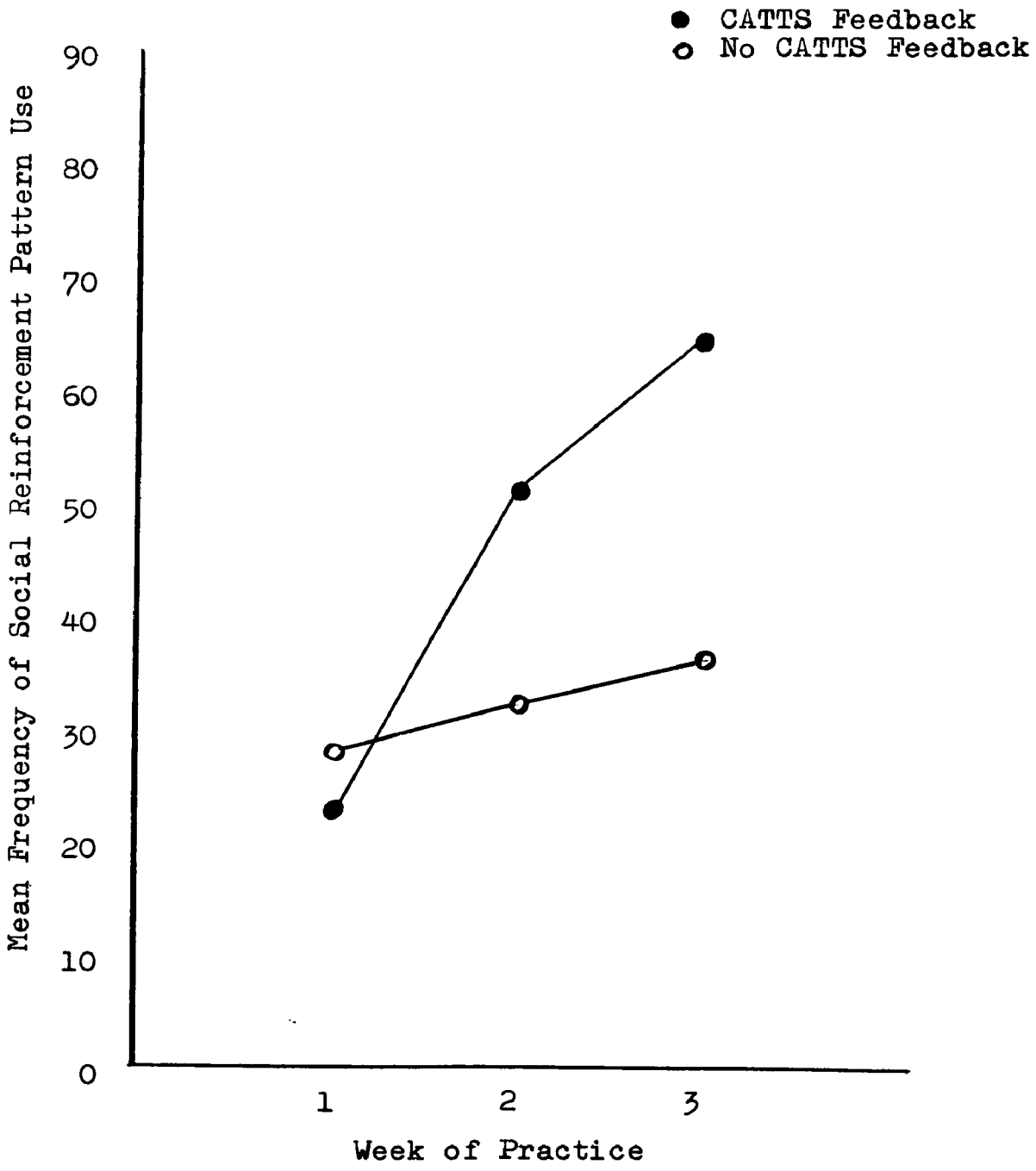
Hypothesis 6 anticipated an interactive effect of practice and feedback conditions on therapist trainees' use of SR patterns. That is, it was predicted that trainees who received CATTS insession feedback would increase their use of SR patterns more than trainees who did not receive CATTS feedback across the three practice weeks. The means for the feedback by practice week comparisons are presented in Figure 5.3.

The analysis of linear trends (Table 5.3) produced a significant interaction between feedback conditions and practice week ($F = 7.961$; $df = 1,4$; $p < .05$). The analysis of the quadratic component was not significant, however. This suggests that, while the trends of the means differ significantly in their linear components, they do not show significant differences in curvature. That is, the significant interaction of feedback by practice week is attributable to simple cumulative effects of the main factors of feedback and practice rather than to differences in the shape of the curves for the two feedback conditions.

Profiles of Individual Therapist Trainees. Since each treatment dyad was composed of only two therapist trainees it was possible for an individual performance to substantially affect the group mean in the increase or

Figure 5.3

Effects of Feedback and Practice Week on Trainees' Use of SR Patterns



decrease of SR pattern use. The means for each individual therapist in each treatment dyad were graphed across practice weeks. These means are presented in Figures 5.4, 5.5, 5.6 and 5.7.

The individual trainee means reflect the contributions of each to the profiles of the treatment dyads. All trainees produced increases in SR pattern use except those in the dyad receiving neither CATTS insession feedback nor MD training.

Percentage Change Scores of Interaction Categories. The description of a group interaction by an interaction analysis system requires the assigning of each individual verbal behavior to a specific category of the analysis system. The relative percentage of therapy time spent in each category may be used to describe the therapy group interaction. This study was designed to investigate changes in group interaction which might be related to the treatment condition(s) assigned to the therapist trainee.

Therapist Trainees. Mean percentages of therapy time spent by each therapist trainee in each category of the SRC system were computed for each week of the practice conditions. Change scores for each category were obtained by subtracting the score for the baseline week from the score for the training week; and by subtracting the score for the baseline week from the score for the maintenance week. The means of these change scores are presented for the four treatment combination dyads in Tables 5.4 and 5.5.

Figure 5.4

Individual Trainees Receiving CATTS Feedback and MD Training: Mean Frequency of SR Patterns Across Practice Weeks

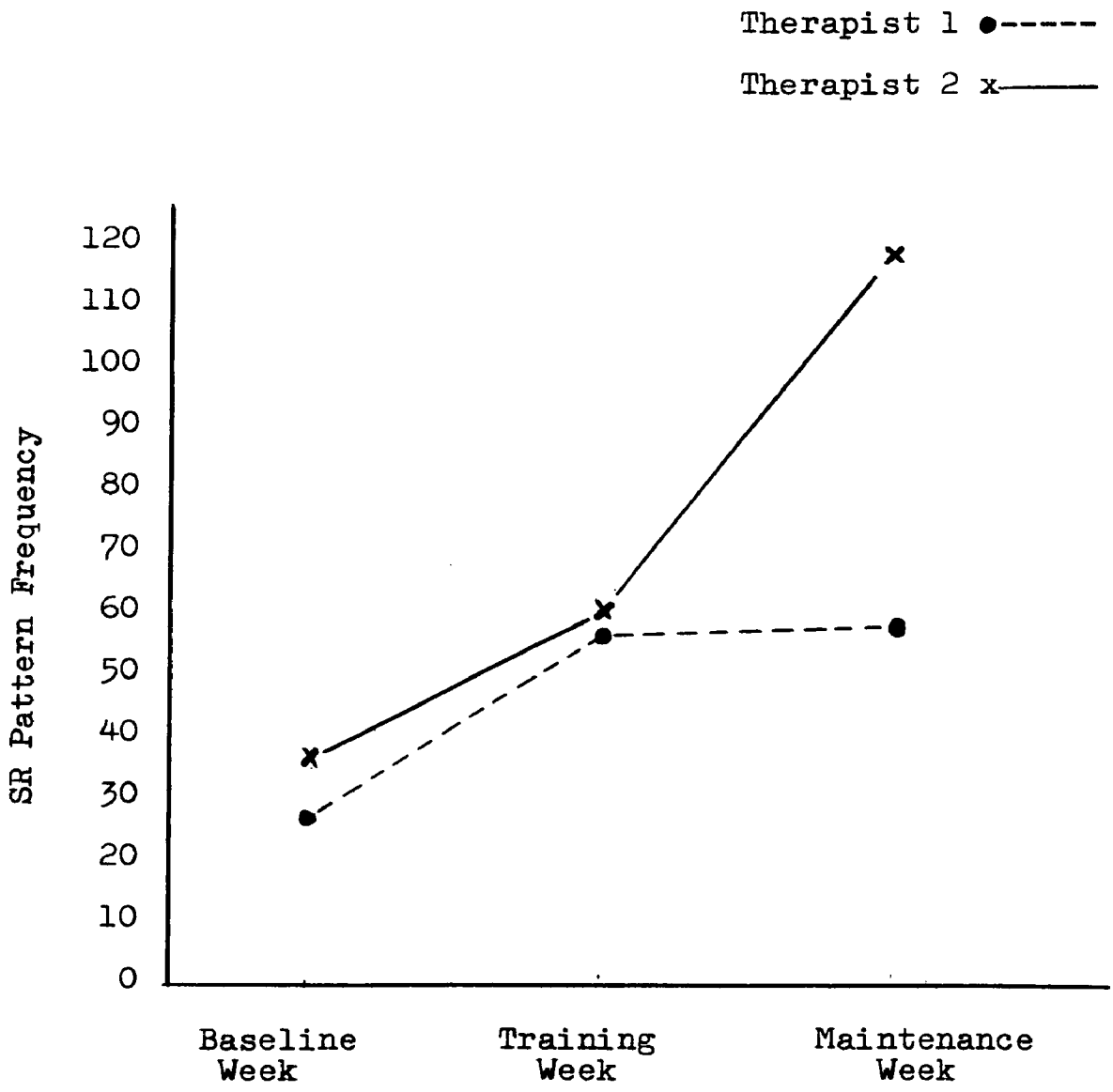


Figure 5.5

Individual Trainees Receiving CATTS Feedback: Mean Frequency of SR Patterns Across Practice Weeks

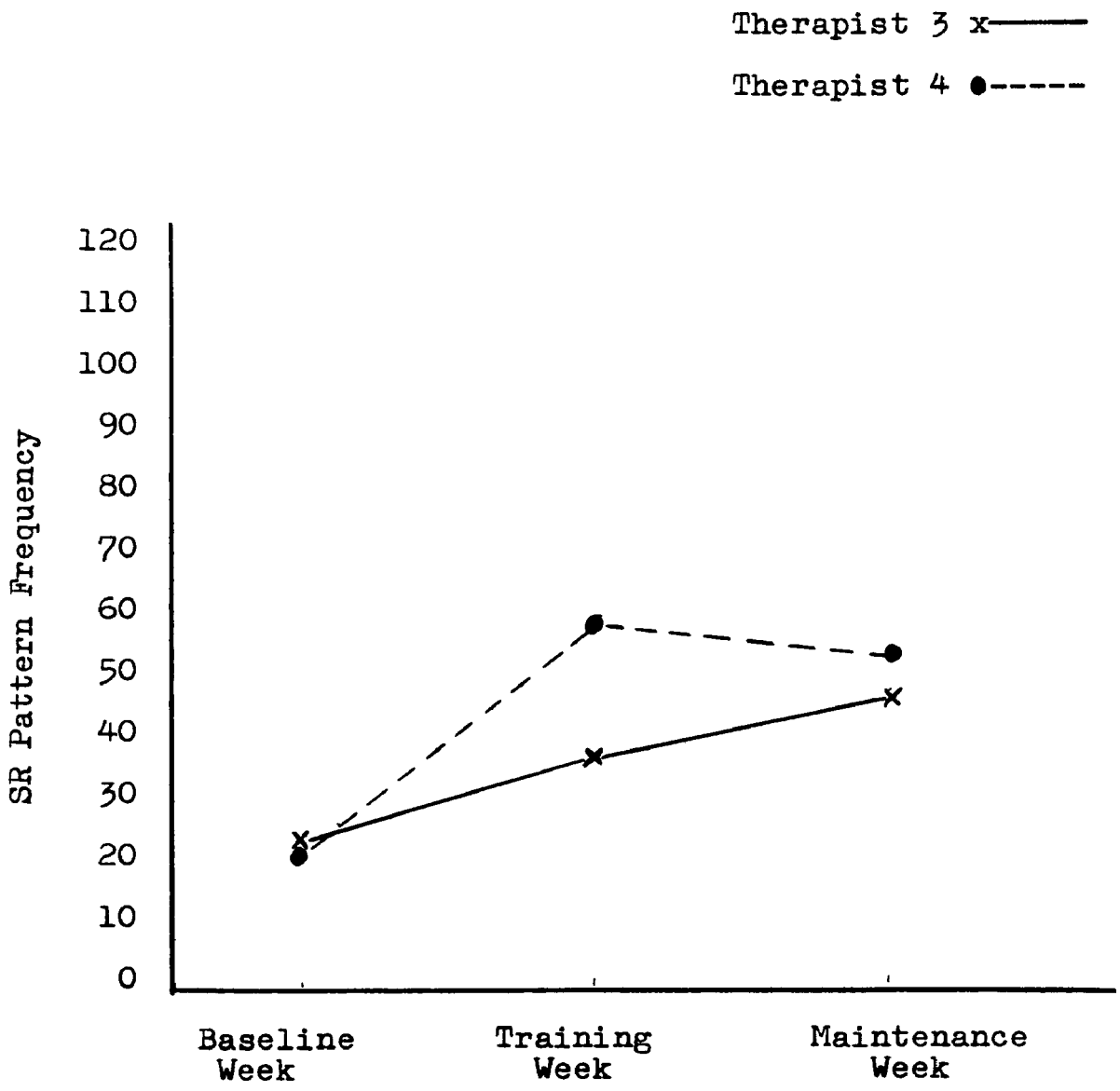


Figure 5.6

Individual Trainees Receiving MD Training: Mean Frequency of SR Patterns Across Practice Weeks

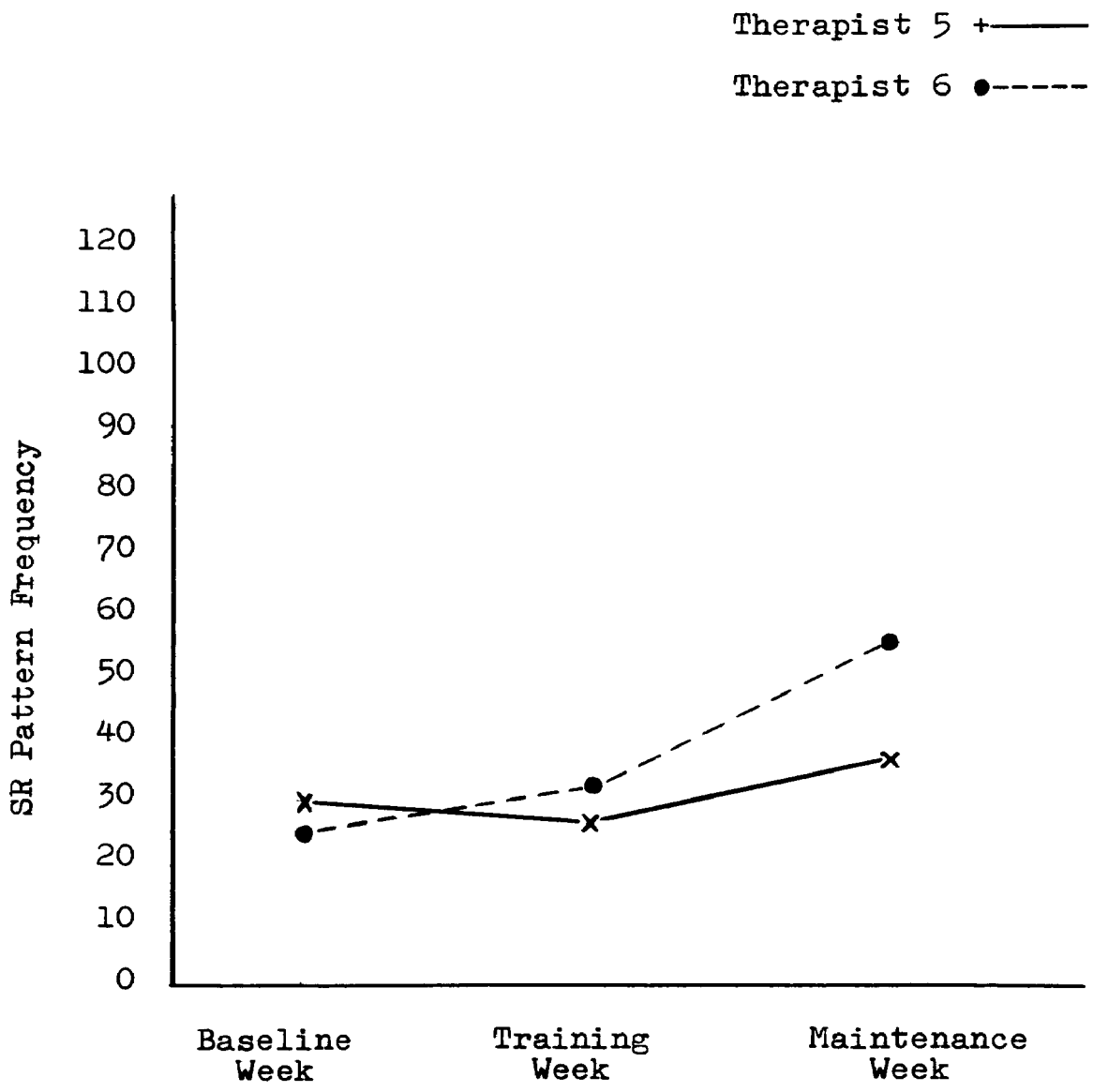


Figure 5.7

Individual Trainees Receiving No CATTS Feedback or MD Training: Mean Frequency of SR Patterns Across Practice Weeks

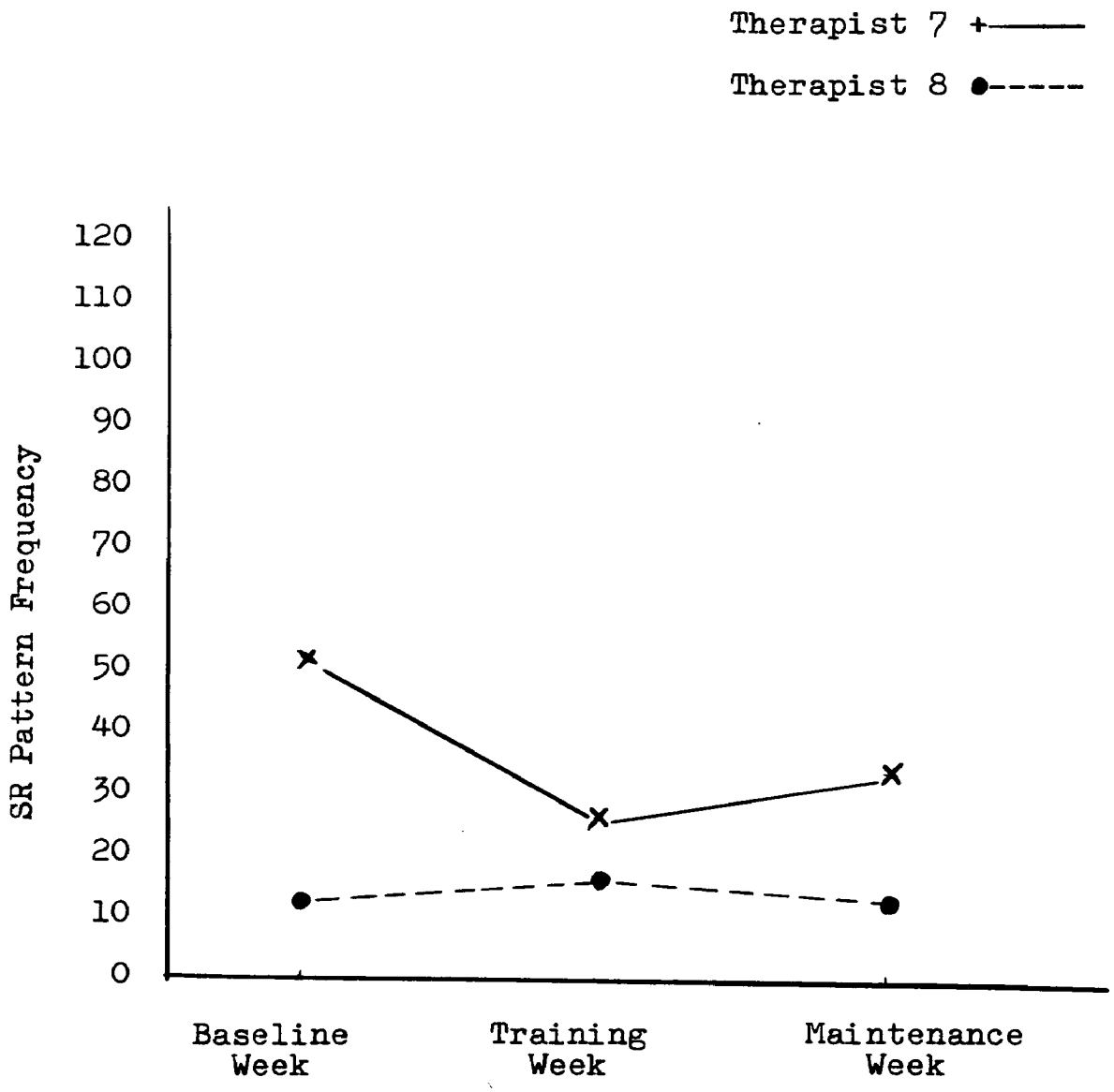


TABLE 5.4

TRAINEE DYADS' MEAN CHANGE SCORES FOR EACH INTERACTION CATEGORY: TRAINING WEEK MINUS BASELINE WEEK

	CATTS + MD Training	CATTS	MD Training	No CATTS + No MD Training
Statement	1.5	-0.3	-1.0	6.0
Direction	-1.1	-1.0	-3.4	-1.3
Question, Narrow	4.0	2.5	1.7	-0.9
Question, Broad	-2.0	-0.6	0.0	-0.3
Answer	1.1	1.2	-2.2	3.1
Expansion	0.0	1.4	-2.5	-1.7
Acknowledgment	4.3	2.7	0.5	0.7
Repetition	-3.9	-1.2	-2.5	2.1
Positive Evaluation	1.2	0.6	-0.2	-1.0
Negative Evaluation	0.1	0.1	0.2	0.1
Social Statement	-0.3	-0.3	-0.2	-0.4
Confusion	0.0	-0.1	0.4	-0.1
Silence	-0.8	-7.8	0.9	-5.7
Total Therapy Time	5.2	-1.7	-8.7	0.6

TABLE 5.5

TRAINEE DYADS' MEAN CHANGE SCORES FOR EACH INTERACTION CATEGORY: MAINTENANCE WEEK MINUS BASELINE WEEK

	CATTS + MD Training	CATTS	MD Training	No CATTS + No MD Training
Statement	2.0	0.5	8.4	8.6
Direction	-0.5	-0.1	-5.5	-1.6
Question, Narrow	4.4	-0.6	-0.6	-1.5
Question, Broad	-2.0	-0.4	-0.2	-0.1
Answer	1.2	1.3	-2.4	1.8
Expansion	0.3	1.1	-2.4	-2.0
Acknowledgment	5.3	0.1	-1.9	0.4
Repetition	-5.1	-2.9	-4.7	-0.5
Positive Evaluation	0.2	0.0	-1.5	-0.5
Negative Evaluation	-0.1	0.0	-0.2	0.0
Social Statement	-0.7	-0.6	-0.2	-0.5
Confusion	0.0	0.0	0.4	1.6
Silence	-1.9	-4.0	-1.2	-0.6
Total Therapy Time	2.5	-6.3	-12.2	5.0

Categories used to elicit responses from patients were directions and broad and narrow questions. Categories defined as social reinforcers were repetition and positive and negative evaluation. These categories were used in the definition of SR patterns (Appendix B). The change profiles of each treatment dyad were examined to determine changes in the total use of each of these categories.

The dyad receiving both CATTS feedback and MD training increased their use of total therapist time, narrow questions and acknowledgement for both the training and maintenance weeks. These increases were reflected in the significant differences in SR pattern use by this group (Table 5.2). It is also possible that the trainees were not flexible in the type of SR pattern they selected as there was a decrease in the use of repetition during both weeks. It is interesting that the increase in SR patterns is also paired with an increase in percentage of therapy time used in therapist talk, thus decreasing the amount of patient talk.

The dyad receiving only CATTS feedback increased their use of narrow questions and acknowledgement during the training week. These increases were not noticeably present during the maintenance week however. Decreases in total therapist time, repetition and silence were present in both practice weeks. This dyad appeared to use less therapy time for therapist talk and to sequence their use of the elicitation and reinforcement categories efficiently

enough to produce a gain in SR pattern use (Table 5.2) without large gains in time spent in the individual categories.

The dyad receiving only MD training increased statements during the maintenance week. Decreases were present in total therapist time, directions, answers, expansions and repetition for both practice weeks. It is possible that this dyad was experimenting with types of patterns other than the SR pattern and felt freer to do so in the absence of feedback. A computer search for reoccurring sequences of categories would aid in the future definition of patterns other than the language drill pattern (SR patterns) focused on for this study.

The dyad which received neither CATTS feedback nor MD training increased their use of statements and answers during both practice weeks. An increase in the use of repetition occurred during the training week. This was the only increase by any dyad in this category. Total therapist time increased during the maintenance week. A decrease in silence was present during the training week but not during the maintenance week. Except for the repetition category, no large changes occurred for this dyad in either the eliciting or the reinforcement categories.

Patient Groups. Mean percentages of time spent by each patient group in each category of the SRC observation system were computed for each week of practice. Change

scores were obtained for each interaction category by subtracting the score for the baseline week from the score for the training week; and by subtracting the score for the baseline week from the score for the maintenance week. The means for the group change scores are presented for the two feedback to therapist conditions in Tables 5.6 and 5.7.

TABLE 5.6

PATIENT GROUPS' MEAN CHANGE SCORES FOR EACH INTERACTION CATEGORY: TRAINING WEEK MINUS BASELINE WEEK

	CATTS Feedback	No CATTS Feedback
Statement	-0.3	0.3
Direction	-0.2	0.2
Question, Narrow	0.4	0.5
Question, Broad	-0.6	0.1
Answer	2.1	1.7
Expansion	0.2	-2.6
Acknowledgement	-0.8	-0.8
Repetition	-4.7	-1.9
Positive Evaluation	-0.7	-0.6
Negative Evaluation	-0.2	0.5
Social Statement	-0.9	-0.4
Confusion	-0.4	-0.3
Silence	5.4	7.6
Total Therapy Time	-1.3	4.0

TABLE 5.7

PATIENT GROUPS' MEAN CHANGE SCORES FOR EACH INTERACTION CATEGORY: MAINTENANCE WEEK MINUS BASELINE WEEK

	CATTS Feedback	No CATTS Feedback
Statement	0.3	6.2
Direction	0.0	0.2
Question, Narrow	0.6	-0.2
Question, Broad	-0.6	0.3
Answer	3.0	-0.1
Expansion	0.3	-2.3
Acknowledgement	-0.2	-0.1
Repetition	-5.6	-0.9
Positive Evaluation	-0.4	-0.4
Negative Evaluation	0.3	0.0
Social Statement	-0.9	-0.3
Confusion	-0.8	0.5
Silence	5.9	3.0
Total Therapist Time	1.9	3.6

The patient groups who interacted with therapist trainees not assigned to receive CATTS insession feedback increased their total interaction time and their use of the silence category during both the training and maintenance weeks. An increase in statements occurred during the maintenance week. Decreases occurred in the expansion category during both practice weeks.

The patient groups who interacted with therapist trainees assigned to receive CATTS insession feedback increased their use of answers and silence during both the training and the maintenance weeks. Decreases occurred during both practice weeks in the use of repetition. These changes reflect the use of eliciting categories by therapist trainees receiving CATTS feedback (Table 5.3).

It is interesting to note that repetition decreased for both therapist trainees and their patient groups except for the trainee dyad receiving neither CATTS insession feedback nor MD training. Repetition strategies were included in the SR patterns presented during training to therapist trainees (Appendix B). It might be expected that patients with low language functioning would benefit from repetition types of language drill, however, the trainees apparently chose not to use this particular type of SR pattern and repetition shows the most consistent decrease of any category.

Effects of Therapist Verbal Behavior on Patients' Behavior

Assignment of Patient Groups to Therapist Trainees. The scores obtained by individual patients on the Minnesota Test of Differential Diagnosis of Aphasia at the beginning of the summer Aphasia Clinic indicated that there were two different levels of language functioning in the admitted patients. Five of the patients were diagnosed as exhibiting severe deficits in the expressive areas of the test and

had some difficulty with receptive language functioning. These patients were defined as lower language functioning. The remaining six patients were diagnosed as having moderate deficits in expressive language and had little difficulty with receptive areas of the test. These patients were defined as higher in language functioning.

The supervisors of the Aphasia Clinic felt that it would not be profitable for individual patients of different language levels to receive therapy in the same therapy group. Therefore the Clinic personnel assigned patients to therapy groups to assure homogeneous grouping. This resulted in four therapy groups which had individuals with lower language functioning and four therapy groups which had patients of higher language functioning.

When the patients had been assigned to therapy groups by language functioning level certain potential problems existed in exploring the research hypotheses posed for this study. If therapist trainees who received CATTS insession feedback interacted with both levels of patients, questions concerning the effect of CATTS feedback on trainee interaction behaviors could be assessed. However, questions concerning the effect of trainee interaction behavior changes on patient interaction behavior changes would be confounded by the fact that patients would be assigned to interact with therapists receiving both types of feedback treatment. This type of confounding was present in earlier CATTS studies (Schmitt, 1969;

Kreider, 1969) and might have accounted for the lack of student behavior changes reported in those studies.

It was decided to avoid the latter type of confounding and to assign insession feedback to trainees who would work with one level of patient and no-feedback treatment to trainees who would work with the other language level patients. Patient changes would be assessed rather than absolute levels of patient behavior. Baseline data were examined to determine initial differences between the patient groups in therapy interaction which might be assumed to be present from the tested performances on language functioning.

Effect of Language Level on Baseline Interaction Behaviors. Table 5.1 presented the ANOVA comparing the frequency of SR pattern use by therapist trainees across the four days of the baseline week. There were no significant differences between trainee dyads on this measure. That is, patient language level did not significantly affect therapist use of SR patterns during the baseline week. Nor did practice interact significantly with patient language level (trainee dyad) to affect trainees' use of SR patterns during the baseline week.

Hypothesis 7 had predicted that feedback to therapists would increase the amount of therapy time used for patients' responses. Patients' response categories in the SRC observation system were defined as answer, expansion and repetition. The time spent by each patient group in

all of these categories was totaled for each therapy session and the percentage of the total time for each therapy session in these categories was computed. The resulting percentage scores for each patient group response time are presented in Appendix F.

A two-way ANOVA (2 x 4) with repeated measures on one factor was used to compare patient groups' response scores for the four days of the baseline week. A summary of this analysis is presented in Table 5.8.

TABLE 5.8

SUMMARY OF TWO-WAY ANOVA: EFFECT OF PRACTICE AND LANGUAGE LEVEL ON PATIENTS' USE OF RESPONSE CATEGORIES (BASELINE WEEK)

Source of Variation	df	MS	F ratio
Between Therapy Groups	7		
A (Language Level)	1	26.83	.008
Groups w. language level	6	35.15	
Within Therapy Groups	24		
B (day of practice)	3	54.47	.987
AB	3	96.28	1.745
B x groups w. language level	18	55.18	

No significant differences

There were no significant differences between different language levels in patient groups' use of response categories during the baseline week. Practice did not

produce significant changes in patient groups' use of response categories nor did it interact significantly with level of patient language functioning.

Hypothesis 8 predicted that feedback to therapist trainees would increase the mean length of patient responses. The repetition category was omitted from this analysis of patient response length as it was anticipated that the mean length of stimulus items offered by the therapist for patient repetition would not increase over time. The frequency of each patient group's use of answer and expansion was computed for each therapy session. Time spent in these two categories by each patient group was tabulated for each therapy session. The time spent in the response categories was divided by the frequency of occurrence of the response categories to give a mean length of response scores for each patient group and each therapy session. These mean response length scores are presented in Appendix G.

A two-way ANOVA (2 x 4) with repeated measures on one factor was used to compare the mean response length scores for patient groups during the four days of the baseline week. A summary of this analysis is presented in Table 5.9.

There were no significant differences between language levels in patient groups' mean response length scores during the baseline week. Practice did not produce significant changes in patient groups' mean response length

scores nor did it interact significantly with level of patient language functioning.

TABLE 5.9

SUMMARY OF TWO-WAY ANOVA: EFFECTS OF PRACTICE AND PATIENT LANGUAGE LEVEL ON MEAN LENGTH OF PATIENT RESPONSES (BASELINE WEEK)

Source of Variation	df	MS	F ratio
Between Therapy Groups	7		
A (Language Level)	1	.36	.11
Groups w. language level	6	3.27	
Within Therapy Groups	24		
B (day of practice)	3	18.69	3.09
AB	3	4.77	.79
B x groups w. levels	18	6.04	

No significant differences.

It was concluded from the analyses reported in Tables 5.1, 5.8 and 5.9 that therapist trainees were not responding differently to patient language levels in their structuring of group aphasia therapy during the baseline week. Nor did increased familiarity with the patients in their groups (days of practice) change the structure of the therapy session significantly as measured by the dependent variables chosen for this study.

Since the expected differences between patient groups did not occur in the examination of the data from

the baseline week, it was theorized that patients with lower levels of language functioning were perhaps being asked to perform closer to their level of actual language competence by the structure of group therapy than were patients with higher levels of language functioning. If this were so, a change in the structure of therapy interaction which allowed patients to exhibit language performances which more nearly reflected their basic language competence should result in immediate changes in the quantity and quality of the language productions of higher level patients during therapy interaction. This would not reflect a change in language performance attributable to the effects of speech therapy but would be an artifact of the particular therapy interaction structure.

Since it was anticipated that the observable therapy performance of high language level patients would be most easily and rapidly affected by small alterations in the structure of therapy interaction, these patient groups were assigned to interact with therapist trainees not receiving CATTS insession feedback during the training week.

Low language functioning patients were assigned to interact with therapist trainees receiving CATTS insession feedback during the training week. It was theorized that it would be more difficult to change the level of language performance exhibited by these patients during therapy interaction since this performance more nearly approximated their language competence. Therefore,

changes which might occur in lower functioning groups' performances could more reliably be attributed to the training effects of CATTS feedback-to-therapists, rather than to changes in therapy structure therapists might make primarily in response to patients' language ability.

Effects of Trainee Interaction Behaviors on Patients' Responses

Hypothesis 7 predicted that patient groups who interacted with therapist trainees receiving CATTS feedback would increase the percentage of therapy time used for patient responses more than patient groups who interacted with therapist trainees not receiving CATTS feedback. This hypothesis was predicated on the assumption that trainees receiving CATTS feedback would use more SR patterns than trainees not receiving CATTS feedback (Hypothesis 1, significant at .05 level). The percentage of therapy time used for patient responses was compared by feedback-to-therapist treatment and week of practice using a two way analysis of variance with repeated measures on one factor. A summary of this analysis is presented in Table 5.10.

There were no significant differences between patient groups whose therapists received CATTS feedback and patient groups whose therapists did not receive CATTS feedback in the percentage of time spent in patients' responses. Practice did not significantly increase patients' use of the response categories nor did

accumulative practice interact with feedback to therapists to produce significant increases in patients use of response categories. In fact, an examination of the feedback treatment means by practice week (Appendix F) indicated that patient groups responses decreased over time though this change was not statistically significant. Hypothesis 7 did not receive support from this analysis. Patient groups interacting with CATTS feedback therapist trainees, who used significantly more SR patterns than no CATTS feedback trainees, did not increase their use of response categories significantly.

TABLE 5.10

SUMMARY OF TWO-WAY ANOVA: EFFECTS OF PRACTICE WEEK AND FEEDBACK TO THERAPIST ON PATIENT GROUPS' USE OF RESPONSE CATEGORIES

Source of Variation	df	MS	F ratio
Between Therapy Groups	7		
A (Feedback to Therapist)	1	975.38	4.48
Groups w. Therapist Feedback	6	217.64	
Within Therapy Groups	16		
B (Practice Week)	2	549.24	3.14
AB	2	75.15	.43
B x groups w. levels	12	174.84	

No significant differences.

Hypothesis 8 had predicted that patients groups who interacted with therapist trainees receiving CATTS feedback would increase the mean length of their responses more than patient groups who interacted with trainees not receiving CATTS feedback. The mean response length scores of each patient group were totaled for each practice week. These totals were compared on feedback-to-therapist treatment and week of practice using a two-way analysis of variance with repeated measures on one factor. This analysis is summarized in Table 5.11.

TABLE 5.11

SUMMARY OF TWO-WAY ANOVA: EFFECTS OF PRACTICE WEEK AND FEEDBACK TO THERAPIST ON MEAN LENGTH OF PATIENTS' RESPONSES

Source of Variation	df	MS	F ratio
Between Therapy Groups	7		
A (Feedback to Therapist)	1	4.78	.52
Groups w. Therapist Feedback	6	9.19	
Within Therapy Groups	16		
B (Practice Week)	2	217.06	60.80**
AB	2	2.40	.67
B x groups w. levels	12	3.57	

**Significant at .01 level.

There were no significant differences between patient groups on feedback treatment to therapist. CATTS

feedback helped trainees use significantly more SR patterns than no-feedback trainees but this difference did not significantly change patients' mean length of response.

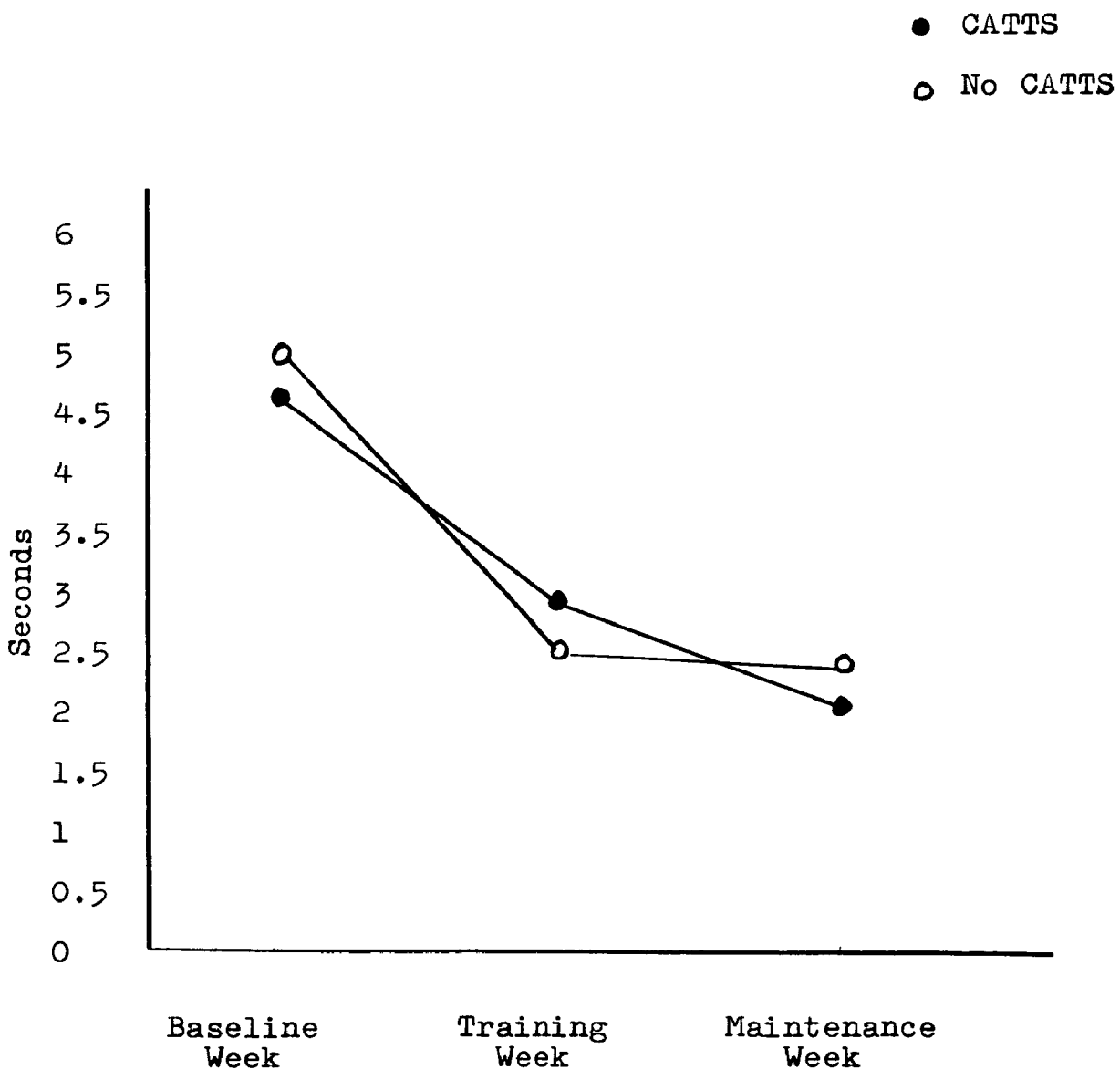
A significant effect of practice week occurred in this analysis ($F = 60.80$, $df = 2,12$, $p < .01$). However an increase in mean response length had been predicted while an examination of the practice week means (Appendix G) indicated a significant decrease in mean length of patient response over time. Furthermore, the means for both feedback-to-therapist treatments decreased. These means are presented in Figure 5.8. Practice week did not interact significantly with feedback treatment-to-therapist. These results provided no support for Hypothesis 8.

Therapist Reinforcement and Patient Responses

Hypothesis 9 had predicted that patient groups who interacted with therapist trainees receiving CATTS feedback would demonstrate a higher ratio of therapist reinforcement to patient response than groups interacting with no feedback trainees. Frequency data for patients' responses and therapists' use of reinforcement categories were tabulated for each therapy session. Ratio scores were computed for each therapy session by dividing the frequency of patients' responses into the frequency of therapist reinforcement. These ratio scores are presented in Appendix H.

Figure 5.8

Mean Length (in seconds) of Patients' Responses:
Feedback Treatment to Therapist
by Practice Week



Comparisons between the groups whose therapists were assigned to receive CATTS feedback (lower level language patients) and groups whose therapists were not assigned to receive CATTS feedback (higher level language patients) were made across the four days of the baseline week using a two-way analysis of variance with repeated measures on one factor. A summary of this analysis is presented in Table 5.12.

TABLE 5.12

SUMMARY OF TWO-WAY ANOVA: EFFECTS OF PRACTICE AND LANGUAGE LEVEL ON RATIO OF THERAPIST REINFORCEMENT TO PATIENT RESPONSE (BASELINE WEEK)

Source of Variation	df	MS	F ratio
Between Therapy Groups	7		
A (Patient Language Level)	1	.02	2.00
Groups w. Language Level	6	.01	
Within Therapy Groups	24		
B (days of practice)	3	.02	.42
AB	3	.03	.75
B x groups w. levels	18	.04	

No significant differences.

There were no significant differences between the groups during the baseline week nor was there a significant effect of accumulative practice on this measure. Language level of the patients did not significantly affect the

reinforcement-response ratio of therapist-patient group interaction.

Comparisons were then made across practice weeks by feedback-to-therapist treatment using a two-way analysis of variance with repeated measures on one factor. A summary of this analysis appears in Table 5.13.

TABLE 5.13

SUMMARY OF TWO-WAY ANOVA: EFFECTS OF PRACTICE WEEK AND FEEDBACK TO THERAPIST ON RATIO OF THERAPIST REINFORCEMENT TO PATIENT RESPONSE

Source of Variation	df	MS	F ratio
Between Therapy Groups	7		
A (Feedback to Therapist)	1	2.55	12.49*
Groups w. Feedback Treatment	6	.20	
Within Therapy Groups	8		
B (Week of Practice)	1	.18	2.66
AB	1	.01	.12
B x groups w. treatment	6	.07	

*Significant at .05 level.

Therapists who received CATTS feedback provided a significantly higher ratio of reinforcement to patient response during the training and maintenance weeks ($F = 12.49$, $df = 1,6$, $p < .05$) than therapists who did not receive CATTS feedback. Practice week did not significantly affect this ratio. This analysis provided support for Hypothesis 9.

Michigan Picture Language Inventory

A series of related behavior changes were predicted in this study. It had been hypothesized that CATTS feedback, MD training and accumulative practice would significantly affect therapist trainees' use of SR patterns. Such a change in therapist interaction behaviors would result in significant changes both in patients' interaction behaviors and in patients' language functioning as measured by a linguistically based test, the Michigan Picture Language Inventory (MPLI).

The MPLI was administered twice, during the first week of the study (pre-test) and the week following the three practice weeks (post-test). The MPLI consists of measures of two modes of language use, expression and comprehension, and two language abilities, vocabulary and grammar (language use). The pre and post treatment scores for each of the four subtests of the MPLI are presented in Appendix I.

Hypothesis 10 predicted that patients interacting with trainees who received CATTS insession feedback would increase their scores on the MPLI more than patients who interacted with trainees receiving no-CATTS feedback. The scores for each of the four subtests were compared for the two times of testing (time) and the two feedback-to-therapist conditions. A two-way ANOVA with repeated measures on one factor was used for each of the four MPLI subtests are presented in Tables 5.14, 5.15, 5.16 and 5.17.

TABLE 5.14

SUMMARY OF TWO-WAY ANOVA: EFFECTS OF FEEDBACK AND TIME OF TESTING, MPLI, VOCABULARY (EXPRESSION)

Source of Variance	df	MS	F ratio
Between Subjects	10		
A (feedback)	1	1464.074	14.788**
Subj. w. groups	9	99.001	
Within Subjects	11		
B (pre or post)	1	4.454	.646
AB	1	33.438	4.853
B x subj. w. groups	9	6.890	

**Significant at the .01 level.

TABLE 5.15

SUMMARY OF TWO-WAY ANOVA: EFFECTS OF FEEDBACK AND TIME OF TESTING, MPLI, VOCABULARY (COMPREHENSION)

Source of Variance	df	MS	F ratio
Between Subjects	10		
A (feedback)	1	17.347	1.903
Subj. w. groups	9	9.113	
Within Subjects	11		
B (pre or post)	1	.726	.889
AB	1	4.923	6.026*
B x subj. w. groups	9	.817	

*Significant at the .05 level.

TABLE 5.16

SUMMARY OF TWO-WAY ANOVA: EFFECTS OF FEEDBACK AND TIME OF TESTING, MPLI, LANGUAGE USE (EXPRESSION)

Source of Variance	df	MS	F ratio
Between Subjects	10		
A (feedback)	1	5886.123	21.359**
Subj. w. groups	9	275.572	
Within Subjects	11		
B (pre or post)	1	127.682	4.412
AB	1	36.401	1.258
B x subj. w. groups	9	28.935	

**Significant at the .01 level.

TABLE 5.17

SUMMARY OF TWO-WAY ANOVA: EFFECTS OF FEEDBACK AND TIME OF TESTING, MPLI, LANGUAGE USE (COMPREHENSION)

Source of Variance	df	MS	F ratio
Between Subjects	10		
A (feedback)	1	708.873	7.701*
Subj. w. groups	9	92.044	
Within Subjects	11		
B (pre or post)	1	11.636	.654
AB	1	1.364	.078
B x subj. w. groups	9	17.444	

*Significant at the .05 level.

There were significant differences between the two feedback conditions on three of the four MPLI subtests--the Vocabulary, Expression subtest, the Language Use, Expression subtest, and the Language Use, Comprehension subtest. These differences were expected and represent the types of differences in patients' language abilities noted on the Minnesota Test of Differential Diagnosis of Aphasia when the patients were admitted to the Aphasia Clinic.

Hypothesis 10 had predicted a significant treatment by time interaction for patients' MPLI scores. Such an interaction occurred only for the Vocabulary, Comprehension subtest ($F = 6.026$, $df = 1,9$, $p < .05$). However the significant interaction was not in the direction predicted. Patients assigned to therapist-trainees receiving no-CATTS feedback had scores significantly higher than patients assigned to therapist trainees receiving CATTS feedback at the time of the post-test ($t = 4.22$, $p < .001$). The other aposterori comparisons did not produce significant differences. Hypothesis 10 received no support from any of the analyses of the four subtests. CATTS insession feedback to therapists did not result in significant increases in patients' MPLI scores.

Summary

There were no significant differences between the treatment dyads during the baseline week of practice on: (1) the frequency of SR pattern use, (2) the percentage of

therapy time used for patients' responses, (3) mean length of patients' responses, or (4) the ratio of therapist reinforcements to patients' responses.

Feedback conditions (CATTS and no-CATTS), MD training (MD workshop and Contrast B workshop), and practice week (baseline, training and maintenance) measurably influenced speech therapist trainees' use of SR patterns during group therapy as predicted by Hypotheses 1 through 6. In addition, CATTS feedback significantly affected the ratio of therapist reinforcements to patients' responses as predicted by Hypothesis 9. The treatments selected did affect therapist behaviors.

The effect of changes in speech therapist trainees' use of SR patterns and reinforcement-response ratios on patients' interaction behaviors during therapy was not apparent in the dependent variables chosen for this study (Hypotheses 7 and 8). Nor were patients' MPLI scores affected in the predicted directions by treatment-to-therapist conditions (Hypothesis 10). The predicted relationships between therapist behaviors and patient behaviors did not occur in this study.

A summary of specific comparisons and hypotheses is presented in Table 5.18.

TABLE 5.18

SUMMARY OF HYPOTHESES AND ANALYSES

Hypothesis/Comparison Dependent Variable	Analysis	Results
Baseline Week (SR patterns, frequency)	2-Way ANOVA	no sig. dif.
H. 1 - CATTS > no CATTS (SR patterns, frequency)	3-Way ANOVA	$p < .05$
H. 2 - MD Training > no MD Training (SR patterns, frequency)	3-Way ANOVA	no support
H. 3 - CATTS + MD > Other Dyads (SR patterns, frequency)	Planned Comparisons	
a. Training Week		$p < .05$
b. Maintenance Week		$p < .05$
H. 4 - No CATTS + no MD < Other Dyads (SR patterns, frequency)	Planned Comparisons	
a. Training Week		no support
b. Maintenance Week		no support
H. 5 - Baseline Week < Training Week < Maintenance Week (SR patterns, frequency)	Linear Trend	$p < .05$
H. 6 - CATTS + Practice > No CATTS + Practice (Sr patterns, frequency)	Linear Trend	$p < .05$
Baseline Week (patients' responses, percentage of therapy)	2-Way ANOVA	no sig. dif.
Baseline Week (patients' responses, mean length)	2-Way ANOVA	no sig. dif.
H. 7 - CATTS > no CATTS (patients' responses, percentage of therapy)	2-Way ANOVA	no support

TABLE 5.18--Continued

Hypothesis/Comparison Dependent Variable	Analysis	Results
H. 8 - CATTS > no CATTS (patients' responses, mean length)	2-Way ANOVA	no support
Baseline Week (reinforcement/response ratio)	2-Way ANOVA	no sig. dif.
H. 9 - CATTS > no CATTS (reinforcement/response ratio)	2-Way ANOVA	$p < .05$
H. 10 - CATTS + Time > no CATTS + Time (patients' MPLI scores)	2-Way ANOVA	
a. Vocabulary, Expression		no support
b. Vocabulary, Comprehension		no support
Hi language + time > lo language + time		$p < .05$
Hi language posttest > lo language posttest	Scheffe	$p < .001$
c. Language Use, Expression		no support
d. Language Use, Comprehension		no support

The demonstration purpose of this study, to implement and evaluate the CATTS application model, was assessed in part by examining whether basic requirements for research design could be adequately fulfilled in an existing training program structure so that specific experimental hypotheses could be tested. The adequacy of the application model and conclusions which can be drawn from the analyses presented above are discussed in Chapter VI.

CHAPTER VI

DISCUSSION AND CONCLUSIONS

Training programs for training agents produce graduates with skills in structuring interpersonal environments to effect particular changes in persons or groups who are clients of training agents. It is important that a training program serve the function of assisting trainees in acquiring interaction skills rather than simply selecting individuals already possessing such skills to enter the training program (Ward and Webster, 1965).

The complex problems of teaching a trainee to effectively structure an interaction have led some training programs to experiment with innovations which promise to assist in the definition, evaluation and transmission of interaction skills. This study was concerned with contributing to the development and testing of a computer assisted teacher training system (CATTS) which can provide feedback to trainees on their interaction behaviors and collect data relating trainee interaction behaviors to client behaviors.

There were two parts to this study. The demonstration aspect of the study attempted to assess the feasibility and the advantages of developing the CATT system on the site of actual training programs rather than in a laboratory situation. The experimental aspect of the study was designed primarily to answer questions concerning the

effect of insession CATTS feedback on trainee interaction behaviors and the effect of teaching trainees to discriminate ideal interaction behavior sequences on their subsequent use of CATTS insession feedback.

This chapter will discuss (1) the adequacy of the CATTS application model for adapting CATTS to a specific training program so that experimental hypotheses can be tested in an applied research situation, (2) the results of experimental hypotheses selected for testing, and (3) some implications of this study for consideration by training programs who use modeling, practice and feedback procedures with their trainees.

Demonstration: Field Development of CATTS

A CATTS application model, described in Chapter I (Figures 1.1, 1.2 and 1.3), was designed and implemented to adapt the CATT system capabilities to the needs of a training program for speech therapists conducted at the Aphasia Clinic of the University of Michigan. The usefulness of the CATTS application model to assist in the field development of the CATT system was evaluated in this study by considering (1) whether the mechanical aspects of the CATT system (i.e., long distance transmission of data and feedback information) functioned reliably, (2) whether the CATT system could be adapted so that it augmented and did not alter the training program, and (3) whether basic requirements for research design could

be met and experimental hypotheses concerned with the development of CATTS could be adequately tested.

Long Distance Transmission of Data and Feedback. Interaction observation data were input via a button box by observers located at the Aphasia Clinic. These data were transmitted over a telephone line to the PDP-4 computer located one mile away at the Center for Research on Language and Language Behavior. The computer processed the data and guided, over another long distance telephone connection, the stylus of a chart recorder located in the therapy room. The stylus drew a line on the paper of the chart recorder which represented to the therapist trainee his interaction behaviors, specifically his use of social reinforcement (SR) patterns.

A minimum of difficulty was experienced with the mechanical aspects of the CATTS feedback mechanism. The reliability of the telephone input system was high. The feedback display was reported to be unobtrusive and easy to read by the trainees who used it. Storage of the data gathered by the observation system chosen for this study remains available for the testing of other hypotheses or comparison with trainees or patients served by the Aphasia Clinic at a later date. This information has already been helpful in the description of certain aspects of aphasia therapy interaction styles (VanEvery and Wiig, 1969).

CATTS Augmentation of the Training Program. The regular scheduling of patients to therapists and therapists

to therapy time was not changed by the introduction of the CATT system into the training program. Courses of the program were taught as they previously had been and supervisor conferences were conducted just as they had been before the addition of the CATT system.

The Social Reinforcement Category System (SRCS) was designed to describe a particular type of therapist-patient interaction specified as desirable by the training program personnel. It should be stressed that the SRC system was restricted to a particular type of information collection and that SR patterns are not represented as even the largest proportion of a therapist's interaction skills. However, the SRC system adequately discriminated this particular sequence of behaviors which was of interest to the training program. There is no reason to believe that similar observation analysis systems could not be created to reflect other important interaction behaviors and patterns.

It is possible that a speech therapy program may be especially receptive to the design requirements represented in the CATTS application model as necessary in the successful implementation of the CATT system. Speech therapists deal with clients who have a handicap. As a result they are particularly concerned with rapid, beneficial behavior changes in those clients. Speech therapy is involved in the prescriptive diagnosis of the disabilities exhibited by clients and the assessment devices

used by this training agent group reflect concern with precise behavioral descriptions. In addition, specific interest has been shown in describing the total therapy situation in behavioral terms (Hatter, 1966; Bar, 1967; Egolf, 1967; Davis, 1968). Such precise behavior descriptions are necessary to implement CATTS in either a data collection or a feedback capacity.

While it is possible that CATTS adaptation success may be unique to a speech therapy program, it may be concluded that the addition of CATTS did not alter the character or structure of the aphasia training program participating in this study. Furthermore, CATTS increased the capacities of the feedback component of the training program on one type of behavior sequence.

Research Design and Field Research with CATTS. In order for the CATT system to be developed in a field setting, research designs should be selected which are most compatible with the existing structure of a particular training program. The use of a field research setting should anticipate that the full control of external stimuli available in a true experimental situation will rarely be possible (Campbell and Stanley, 1966). On the other hand, the central purpose of the CATT system, that it can be used in various training agent training settings, suggests generalizability is an important consideration in the testing of CATTS. Semmel (1970) has recently indicated interest in moving CATTS into public school classrooms for in situ

training opportunities. Hence, heightened external validity in terms of generalizability may make a field research setting a particularly attractive choice and the price of lowered control over experimental variables well worth the sacrifice. However, the CATTS researcher needs to be thoroughly aware of the specific variables his design fails to control adequately when choosing such a field setting for research (Glass and Stanley, 1970).

In the application of CATTS to a speech therapist training program for this study several problems are evident in the use of experimental design parameters.

First, the training program only accepted a small number of therapist trainees and aphasia patients during each training session. A small population has, of course, its effects on the use of parametric statistics to test hypotheses. This problem was anticipated and was felt to be a potentially chronic problem in the use of field settings to test and develop CATTS. Most training agent programs work with a relatively small number of trainees in practicum and internship situations. Choosing another setting for research and development is not likely to result in avoiding the problem of a small experimental population. In addition, while the experimental unit (the training agent trainee) is small, the administrative problems of pairing each trainee with a group of clients and securing a competent observer for a reasonable number of interaction sessions makes even a small experimental

population seem large during the duration of the experiment. However, caution should be used when considering conclusions drawn from experiments using small populations. The possible effects of a small population for this study are discussed in the next section of this chapter.

A second problem with implementing the design chosen for this study was the potential problem of subject mortality. This study was fortunate in not losing either trainees, patients or observers to illness or transfer. Nor was interaction data lost to mechanical failures, interfering types of scheduling such as fire drill or impromptu vacations, or human failures. Other field studies may not be as fortunate and the choice of design should anticipate the possibility of subject or data loss.

Third, the language level differences between the admitted patients, affecting the assignment of patients to therapy groups, were not anticipated. These differences and the resultant therapy group assignments had implications for the adequacy of the design chosen to answer the research questions posed in this study. However, an examination of the data collected during the baseline week did not show significantly different interaction behaviors between any of the treatment dyads or the patient groups assigned to them. This homogeneity of baseline week behavior suggests that differences which appeared between the dyads during the training and maintenance weeks are

more likely to be the result of intervention with MD training and/or CATTS insession feedback than tested level of patient language functioning. It would seem that designs which call for the gathering of baseline data would be advisable when a researcher can anticipate such problems as a small population or a bimodal distribution on some critical variable.

Finally, the sensitivity of the Michigan Picture Language Inventory (MPLI) to the types of changes likely to result from the specific therapy interaction pattern chosen for this study is questionable. It is probable that a measuring instrument, similar to a classroom test, focusing on the specific behaviors practiced during particular therapy sessions, rather than a test standardized or constructed to sample a client's general language behavior, would have been more appropriate and consistent with the short time duration of the study.

It was felt that, in spite of the problems which did exist in the control of certain experimental variables, tentative conclusions could be advanced concerning the experimental hypotheses tested in this study.

Demonstration: Conclusions. The evaluation of the CATTS application model suggested the following conclusions:

1. CATTS can be moved into an established training program with a minimum of apparatus difficulty. As a result CATTS could be used by many training programs in the sites they now occupy.

2. Specific interaction behaviors and sequences of behaviors can be adequately discriminated by interaction observation systems. Data collected with such observation systems can be represented in a visual display for use by trainees in insession feedback.

3. CATTS was introduced into at least one training agent training program without altering the character or structure of that program significantly.

4. Research design requirements can be adequately met, though the design will probably fit the definition of a quasi-experimental than an experimental situation. Trends from a number of studies with the CATT system in a field setting will lend validity to the results of single studies.

Experimental Hypotheses: Discussion

The experimental hypotheses examined in this study predicted significant effects of CATTS insession feedback, MD training and accumulated practice on speech therapist trainees' use of SR patterns. Predictions were also made concerning significant effects of trainees' use of SR patterns on patients' behaviors.

Baseline Week. Comparison of therapist trainees' interaction behaviors and patient group interaction behaviors during the baseline week of data collection produced no significant differences between the various groups on any of the dependent variables.

CATTS Insession Feedback. During the training and maintenance weeks therapist trainees who received CATTS insession feedback produced significantly more SR patterns and a higher therapist reinforcement-patient response ratio than trainees who received no CATTS feedback. It would

appear that insession feedback can assist in changing some types of trainee interaction behaviors.

Patient groups who were assigned to therapist trainees receiving CATTS feedback did not significantly increase their percentage of response time, their mean response length, or their scores on the MPLI, when compared to patient groups assigned to therapist trainees receiving no CATTS feedback. Therefore, none of predicted relationships between therapist interaction behaviors and patient behavior changes were supported by the data gathered in this study. In fact, one of the measures, mean length of patient response, showed a significant decrease rather than the predicted increase over practice weeks. Furthermore, the fact that data collected during the baseline week did not reveal any significant differences between treatment dyads in therapy interaction behaviors, in spite of the fact that there were language level differences between patient groups on the MPLI and the MTDDA, language function tests, indicate that language level of the patients did not significantly influence structuring therapy. Both of these results should be useful to the therapist training program directors as they continually reevaluate their theories of effective therapy intervention.

MD Training. There were no significant differences between trainees who participated in MD training and those who did not. However, the interest of this

study was primarily in the effect of MD training on trainees' subsequent use of CATTS insession feedback, a non-additive effect. Comparisons between treatment dyads showed that trainees who received both CATTS feedback and MD training produced significantly more SR patterns during both the training and maintenance weeks than the other trainees. It was concluded that MD training effectively increased trainees' ability to use CATTS insession feedback to assist him in producing a goal interaction behavior such as SR patterning. Such experiences could profitably be incorporated by training programs concerned with the effective uses of modeling and feedback to achieve trainee behavior changes.

Accumulated Practice. An examination of therapist trainees' use of SR patterns across the three weeks of practice produced a significant linear increase of SR patterns. It was predicted and found that trainees who received CATTS insession feedback showed a significantly greater increase in the use of SR patterns across practice weeks than trainees who did not receive CATTS feedback. This result is consistent with the feedback by practice interactions which occurred in both the Schmitt (1969) and Kreider (1969) studies with the CATT system.

Opportunities to observe or interact in a training agent role do not in themselves assure the growth of the trainee in specific interaction skills (Semmel, 1970). Goal behaviors must be defined and fed back, which is

adequate and efficient, provided for trainee use in effecting behavior change.

Effects of Individual Differences. The eight therapist trainees in this study were assigned randomly to receive particular treatment combinations. However, randomization with such a small sample population does not insure that treatment groups have the same distribution as the parent population. Individual differences among the eight trainees (Table 4.1) could well have significantly influenced the results of this study. For this reason baseline data were analyzed to determine whether treatment groups initially differed significantly, a problem in the three previous CATTS studies (Schmitt, 1969; Kreider, 1969; Weaver, 1969). In addition each individual trainee's use of SR patterns across the three practice weeks was examined (Figures 5.4, 5.5, 5.6 and 5.7).

It is interesting to note that the trainee dyad which received neither CATTS feedback nor MD training were the only two trainees who demonstrated no increase at all in SR pattern use (Figure 5.4). The large increase in SR pattern use by therapist trainee #2 (Figure 5.4) during both training and maintenance weeks probably reflects an interaction between that trainee's particular personality and the treatments applied to that dyad. However, it is less probable that random assignment would place both the trainees, who were least likely to increase their SR pattern use, in the no CATTS, no MD treatment dyad.

Therefore it is tentatively concluded that some type of intervention, such as CATTS feedback or MD training, is necessary to increase particular interaction behaviors. Lectures and discussions in college classrooms (insight) are not enough (Semmel, 1970).

Experimental Conclusions. The following conclusions are tentatively advanced within the limitations of the design of the study as discussed in previous sections of this chapter:

1. CATTS insession feedback can significantly affect trainees' use of certain interaction behaviors.

2. Participation in a workshop which exposes trainees to models of ideal interaction behaviors and teaches them to use an interaction observation system can significantly affect trainees' use of CATTS insession feedback.

3. Accumulated practice can significantly increase trainees' use of certain interaction behaviors. CATTS insession feedback tends to interact significantly with accumulated practice to produce greater increases of goal interaction behaviors in those trainees receiving such feedback.

4. None of the theorized relationships between specific therapist interaction behaviors and patient group behaviors were supported by this study. This suggests CATTS data collection capacities could be of great assistance in testing, revising and refining such theories of training agent-client interaction behavior relationships.

Considerations in the Use of Modeling and Feedback

Training agent training programs have made heavy use of an apprenticeship model to effect behavior changes in their trainees (Anderson and Hunka, 1963). The

apprenticeship model is built primarily on the components of (1) observation and imitation of models, and (2) supervised practice with feedback from an "expert" on the adequacy of the trainee's performance. In spite of common use, very little systematic research on the apprenticeship model has been reported.

Various training programs have become interested in improving the effects of the experiences they provide their trainees. In keeping with this goal a computer assisted teacher training system (CATTS) was developed to amplify the data collection and feedback capacities of a training program. The CATT system accepts observation data from interaction analysis systems and processes it for data summary and feedback. Research has fairly well established that objective feedback is more effective in producing trainee behavior change than subjective feedback (Boyd and DeVault, 1966). The CATT system has the added capacity of being able to provide objective feedback to a trainee while he conducts an interaction session.

The initial studies with CATTS were concerned primarily with comparisons of insession and postsession feedback (Schmitt, 1969; Kreider, 1969; Weaver, 1969). The results of those studies suggested that even more appropriate questions might be: (1) what types of trainee interaction behaviors can be effected by insession feedback, and (2) what prepractice experiences can be offered to a trainee to allow him to use CATTS feedback in effectively monitoring his own interaction behaviors.

Interaction Behaviors and Insession Feedback. From the results of the CATTS studies to date it would appear that CATTS insession feedback has been effective when the trainee behavior to be acquired is a low probability behavior.

Schmitt (1969) attempted to increase the use of broad questions by teacher trainees interacting with mentally retarded pupils. Minskoff (1967) reports that teachers generally choose to use narrow questions and that this use relates significantly to the age and perceived intelligence of the pupils. Insession feedback produced a significant increase over time in teacher use of broad questions with their mentally retarded pupils, a low probability behavior.

Kreider (1969) reported that CATTS insession feedback significantly increased teacher trainees' use of pupil ideas while teaching arithmetic lessons to retarded pupils. Minskoff (1967) had suggested that teachers tend to view arithmetic as an area where there was little room for student opinion or ideas. Certainly retarded pupils would be viewed by teachers as even less capable of generating ideas in a mathematical area of study. The use of pupil ideas by teacher trainees interacting with retardates on arithmetic lessons is a low probability behavior.

Finally, this study found a significantly greater use of SR patterns by speech therapist trainees receiving

CATTS insession feedback when compared to trainees not receiving CATTS feedback. The very nature of an SR pattern, a prescribed sequence of interaction behaviors, makes it a complicated type of response to require of a therapist trainee. A controlled or selected response should decrease in its probability of occurrence in relationship to the complexity of the response.

It should be suggested that training programs systematically examine the relationship of feedback information to the manner of presenting the feedback. Future studies need to be concerned with discovering what types of trainee behaviors are most efficiently changed by insession feedback and the self monitoring aspects of CATTS. With this information the addition of the CATT system to a training program increases the program's supervisory and feedback capabilities and allows it to make more efficient use of trainees' time in the training program.

Prepractice Experiences and Trainees' Use of Insession Feedback. Feedback offered by an observation system, whether it is insession or postsession feedback, is abstract. Individual instances of interaction behaviors have been grouped and the concept given a label which is used to identify new behavioral instances of the concept. A trainee who imperfectly understands a concept cannot make efficient use of feedback concerning that concept regardless of the objectivity or time of that feedback. Carefully

planned prepractice experiences must be part of training program so that a trainee knows what to observe and how to classify it.

Training programs have traditionally required of their trainees to make field observations. A systematic investigation of the model's characteristics in relation to a trainee's values and expectations would increase the effectiveness of the observation requirement. The effect of models on the subsequent behavior of observers has been reported to vary with the sex of the model, the prestige of the model and the perceived appropriateness of the model's performance (Flanders, 1968).

Sechrest (1961) has stated that the success of modeled behavior contributes differentially to the vicarious learning of an observer. That is, a rewarded model's behavior is imitated and a punished model's behavior is avoided. It would seem crucial that training programs be aware of the effect of perceived success or failure of a model on a trainee's decisions to select behaviors to copy or avoid. A teacher, whose students demonstrate consistent gains on reading tests, may be perceived as a failure by an observer because the class is noisy. If an observer equates "good teaching" with "quiet behavior" he may reject all the behavior patterns exhibited by the teacher model with a noisy class.

This study attempted to increase the meaning of CATTS insession feedback by providing trainees with skills

in using an observation system to discriminate SR patterns and exposing them to models using SR patterns. The results of the study suggest such prepractice experiences contribute to a trainee's effective use of CATTS insession feedback. However, more data, concerning the variables to be considered when exposing trainees to models, need to be systematically collected and analyzed by individual training programs. The data processing and storage capabilities of CATTS located within the training program make this task possible.

Feedback and Reinforcement. Locke, Artledge and Koeppel (1968) have argued that "knowledge of results should be effective in motivating performance to the extent that: (a) specific goal setting is facilitated and (b) the goals set are hard or difficult goals." The CATT system is based on the assumption that immediate knowledge of results is motivating and/or reinforcing to the trainee. Therefore, eventually the relationship of training agent behaviors to client behaviors must be considered as it relates to the motivating-reinforcing aspects of the CATTS feedback.

Semmel (1968, 1970) has contended that the efficacy of the CATT system should be evaluated only by an increase in the type of behavior contained in the feedback to the trainee. This is certainly a reasonable goal for an experimental training device, as minimal research evidence is currently available to support the relationship of

specific training agent behaviors to specific client changes (Morsh and Wilder, 1954; Flanders and Simon, 1969).

The CATT system provides reinforcement/feedback to a trainee by a visual display representing the trainee's behavior. However, the interaction behavior goal continues to be reinforcing only if the trainee can perceive the anticipated effects on his clients. For example, if the trainee is doing well on asking broad questions according to the feedback display and his students refuse to respond, he will eventually abandon this behavior because silence is not reinforcing (or expected) to a teacher who is soliciting responses. It is possible the trainee will even position himself in the classroom so that he cannot see the visual feedback being provided by the CATT system display, a behavior observed in a subject participating in a pilot study (Semmel et al, 1968). On the other hand, if the feedback is enhanced by the expectations the trainee brought to the training situation, he should make even more efficient use of the feedback information than a trainee who did not share his expectations (Weaver, 1969).

By threat or reward a training program can assure trainee compliance to specific interaction behavior usage while the trainee is in the training program. However, those interaction behaviors will most likely be maintained by graduates if the behaviors successfully produce the

client changes they are represented as being able to produce. The data collection, storage and analysis services the CATT system can offer a training program, can assist in searching for adequate descriptions of effective training agent-client interactions.

Implications: Summary. Directions for training program and CATTS research discussed in this section are summarized as follows:

1. The type of feedback and the time to offer that feedback may vary according to the interaction behavior being described. "Talk less," is a simple direction and may make insession feedback superfluous for most trainees. On the other hand, complicated or low probability behavior choices may be most easily acquired when insession feedback is provided.

2. A training program needs to provide adequate prepractice experiences so the trainee can understand and use the feedback tendered. Those prepractice experiences might reasonably include (a) training in the use of an observation analysis system, (b) exposure to carefully selected models of desired interaction behaviors, and (c) practice in interpreting examples of the type of feedback which will be offered.

3. The characteristics of models and the effects of trainees' perceptions and expectations on trainees' response to feedback should be systematically examined by each training agent profession. This information will allow the program to carefully select and sequence the trainee's observation experiences so that maximum behavior change results in the training time available.

4. CATTS data collection and analysis capacities, available on the site of the training program, now give a training program the potential capability of systematically searching for and objectively describing a professional repetoire of successful training agent-client interaction patterns.

Summary

This chapter has presented conclusions relating to: (1) the adequacy of the CATTS demonstration model for adapting CATTS to a specific training agent program; (2) the results of experimental hypotheses testing the effects of CATTS insession feedback, MD training and practice on trainee interaction behaviors, and relationships between trainee interaction behaviors and patient behavior changes; and (3) considerations in the planned use of modeling, practice and feedback by training agent programs to effect trainee behavior change.

It is hoped that developments of the type described in this study can be exploited by training programs to economically and efficiently provide experiences and supervision which produce training agents who have a positive effect on their clients.

APPENDICES

APPENDIX A

SOCIAL REINFORCEMENT INTERACTION SYSTEM

Subscripts: Therapist (1), Therapist-Group Duet (2), Group (3), Patients (4-n)

Stimulus

11. Statement--on drill pattern. No question precedes this. It doesn't necessarily require a response.

12. Direction. A structure that gives an order, requires either a verbal or motoric response, usually precedes a statement or a question.

13. Question, narrow. This structure requires a verbal response that is short and predictable, usually one word.

14. Question, broad. This structure requires a verbal response that is usually long and not predictable.

Response

21. Answer. A structure delivered in response to a question or a direction (usually the move preceding it).

22. Expansion. This is a structure that completes a sentence or phrase produced by another speaker. Also it may be a structure which makes a complete sentence or phrase out of a verbalization delivered by another speaker.

Reinforcement

31. Acknowledgment. A verbalization that recognizes some production by another speaker. It does not communicate value or correctness.

32. Repetition. A duplication of an item in the drill pattern which precedes it and is the focus of the drill.

33. Positive Evaluation. Any statement that praises or states the correctness of a previous statement.

34. Negative Evaluation. Any statement that devalues or denies the correctness of a previous statement.

Other

41. Statement--Social. These are verbalizations which are not part of the drill pattern but are important to the interpersonal interaction of the therapy group.

42. Confusion. Several group members talking or laughing at the same time, movement around the room, etc.

43. Silence. Self-explanatory. Also to be coded within the speech productions of individual group members. It will be subscripted to indicate which group member still "has the floor" in the drill session.

APPENDIX B

EXAMPLES OF CATEGORY SEQUENCES TO INITIATE AND TERMINATE SR PATTERNS

Moves which initiate a pattern

		Example	Code
1.	T:	Say: It's a car.	12_1, 11_1
	O:	It's a car.	32_{2-n}
2.	T:	Say: It's a car.	12_1, 11_1
	O:	A car.	21_{2-n}
3.	T:	Say: It's a car.	12_1, 11_1
	O:	Silence	43_{3-n}
4.	T:	What's this?	13_1
	O:	It's a truck	21_{2-n}
5.	T:	What's this? It's a car.	13_1, 21_1
	O:	It's a car.	32_{2-n}
6.	T:	What's this? It's a car. What's this?	13_1, 21_1, 13_1
	O:	It's a car.	32_{2-n}
7.	T:	What's this?	13_1
	O:	Silence	43_{3-n}
8.	T:	This is a	11_1
	O:	... car.	22_{2-n}

Moves to end pattern

9.	T:	It's a car.	32_1
10.	T:	Yes! That's right!	33_1
11.	T:	No! That's wrong!	34_1

APPENDIX C

MICROTHERAPY EXERCISE: CATTS

INSESSION FEEDBACK WORKSHOP

Directions for Workshop Leader: Today we are going to participate in an exercise which will help you become skilled in the use of social reinforcement patterns in aphasia therapy. Each member of the group has a booklet. There are booklets labelled A, B, C, D, and E. Each one of you will play a role. Every five minutes your role will change. Turn to the first page. One member has the role of therapist; one has the role of an observer; the rest are patients. Your therapist will conduct therapy for five minutes. During this time you will all play your roles as defined on that first page. At the end of the five minutes I will say "Time." You will stop and your observer will read what is written on his page of instructions, that is, what he was observing and tell the group what he saw. Also he will interpret the graph drawn on the CATTS chart-recorder. The group may respond to the observations and we will discuss what happened during the micro-therapy session. This pattern will continue until everyone has been a therapist. Are there any questions? Begin.

Trainee Roles by Time

Trainee	Role				
	Time				
	1	2	3	4	5
A	Therapist	Observer	Patient	Patient	Patient
B	Patient	Therapist	Observer	Patient	Patient
C	Patient	Patient	Therapist	Observer	Patient
D	Patient	Patient	Patient	Therapist	Observer
E	Observer	Patient	Patient	Patient	Therapist

Booklet for Trainee A

Page 1.

Lesson Format: Therapist presents magazine pictures demonstrating situations.
Your instructions: Ask patients B & C broad questions, i.e. Tell me about this picture; what's happening in the picture?
Ask patient D specific questions, i.e. who is in the picture; what are they doing; where are they; how do they feel?

Page 2.

B, C and D are going to discuss what they think you were trying to do. When they finish, ask D how it felt to be restricted to being asked only specific questions.

Page 3.

Your instructions: You are to observe the micro-therapy session & critique it.

Page 4.

1. What was the therapist's basic lesson format? Was he successful in his attempts to elicit the "correct" patient responses?
2. Compare your critique with the print-out material. Does the data support your conclusions? Do you see a pattern(s) in the data?

Page 5.

Your instructions: Be a cooperative patient in the therapy session.

Page 6.

1. Discuss with D & E what the therapist was trying to do. Was she successful?

Page 7.

1. Discuss with B & C what the therapist was trying to do.
2. Ask the therapist how he felt about your behavior.

Page 8.

Your instructions: You are bored!

Page 9.

Discuss with B & E what you think the therapist was trying to do. How did he handle your therapy "problem"?

Page 10.

Your instructions: Give inappropriate social responses when called on in the therapy session, i.e. embarrassed laughter.

Booklet for Trainee B

Page 1.

Your instructions: Always say "I don't know" as your first response when called on.

Page 2.

Discuss with the other patients what you think the therapist was trying to do. C will begin the discussion.

Page 3.

Lesson Plan Format: Use of possessive pronouns. Therapist requests a watch, ring, pen, etc. from each group member. He asks for my watch, his pen, etc. (patient must listen and hand the correct object to the therapist). Then have each patient ask for an object using the correct possessive pronoun.

Your instructions: Give positive reinforcement only to patient D.

Page 4.

1. After patients have discussed what they thought you were attempting to do confirm or disfirm their position.
2. Check with observer to see if you fulfilled your role successfully.

Page 5.

Your instructions: You are to observe the micro-therapy session & critique it.

Page 6.

1. What was the therapist's basic lesson format? Was he successful in his attempts to elicit the "correct" patient responses?
2. Compare your critique with the print-out material. Does the data support your conclusions? Do you see a pattern(s) in the data?

Page 7.

Your instructions: Cooperate as a patient in the microtherapy.

Page 8.

You will begin the discussion. What types of reinforcement did the therapist use with you? What type of lesson format was the therapist using?

Page 9.

Your instructions: You are to respond to the therapist as often as you can. If another patient does not respond readily you provide the correct answer.

Page 10.

Discuss with A & C what the therapist was trying to do. What effect do you think your role had on his behavior?

Booklet for Trainee C

Page 1.

Your instructions: As a patient you are unable to answer "what," "where," "who," "when" and "why" questions. Respond readily when the therapist uses a cloze procedure with you.

Page 2.

You begin the discussion. Discuss with the other patients what the therapist was trying to do.

Page 3.

Your instructions: Answer questions cooperatively as a patient. However use a long latency before responding.

Page 4.

Discuss with patients D & E what the therapist was trying to do. Ask the therapist what his diagnosis of your problem was.

Page 5.

Lesson Format: Present sentences to be repeated by patients. Start with three word units and move to four, five and six word units. Present at least two sentence units of each length before moving on to a longer unit.

Your instructions: Pay attention to correct repetition of the items you present for repetition. Be sure to provide reinforcement for correct performance.

Page 6.

Ask A, D & E if you moved the lesson fast enough for them. Listen to their comments on the pattern of your lesson.

Page 7.

Your instructions: You are to observe the micro-therapy session & critique it.

Page 8.

1. What was the therapist's basic lesson format? Was he successful in his attempts to elicit the "correct" responses?

2. Compare your critique with the print-out material. Does the data support your conclusions? Do you see a pattern(s) in the data?

Page 9.

Your instructions: Participate cooperatively as a patient in the microtherapy.

Page 10.

How many times did the therapist ask you to respond? Was this more or less than the other patients? Why do you think that the therapist patterned his interaction this way?

Booklet for Trainee D

Page 1.

Your instructions: Participate in microtherapy as a cooperative patient.

Page 2.

Your instructions: Cooperate with the microtherapy session. You have trouble with prepositions. Use them inappropriately.

Page 3.

You begin the discussion. With which patient did the therapist spend the most time? What patterns did the therapist use?

Page 4.

Your instructions: Your cooperation in the therapy is only mild. You have difficulty producing more than one word responses.

Page 5.

Was the therapist successful in making you perform within the lesson format? How often did you respond and what was the average length of your responses?

Page 6.

Lesson Format: Present your patients with a core sentence in writing of the present progressive verb form, i.e. _____ is writing _____; _____ is running _____. Use these stimulus questions: who is _____; what is _____; where _____. Tell the patients to fill in a word at the beginning and the end or to finish the sentence.

Your instructions: Be supportive and encouraging. Attempt to give all the patients an equal amount of practice with the material.

Page 7.

Ask C if you fulfilled your goal of giving each patient an equal amount of practice. Ask A & B if they have suggestions for the way you give encouragement.

Page 8.

Your instructions: You are to observe the microtherapy session & critique it.

Page 9.

1. What was the therapist's basic lesson format? Was he successful in his attempts to elicit the "correct" patient responses?

2. Compare your critique with the print-out material. Does the data support your conclusions? Do you see a pattern(s) in the data?

Booklet for Trainee E

Page 1.

Your instructions: You are to observe the micro-therapy and critique it.

Page 2.

1. What was the therapist's basic lesson format? Was he successful in his attempts to elicit the "correct" patient responses?
2. Compare your critique with the print-out material. Does the data support your conclusions? Do you see a pattern(s) in the data?

Page 3.

Your instructions: You are to participate in micro-therapy as a cooperative patient.

Page 4.

What did the therapist's non-verbal behaviors say to you? How do you think this affected the responses of the patients?

Page 5.

Your instructions: You have difficulty responding to the therapist, become frustrated when you cannot produce the appropriate response and swear and otherwise present angry behaviors.

Page 6.

What types of patterns did the therapist use to assist you in responding to his stimulus items? Would you suggest any other techniques which might be effective?

Page 7.

Your instructions: You tend to produce irrelevant responses when called on by the therapist.

Page 8.

Ask the therapist how he felt about your role in the session. Ask him what types of responses he finds most difficult to handle in therapy sessions.

Page 9.

Lesson Format: Present cards with place names, one at a time, i.e. florist, postoffice, bank, Miami, barber. Ask questions such as "where are you going; what are you going to do there; when are you going? Use repetition as a reinforcer for A.

Page 10.

Listen to the critique of your format by D. Ask A, B & C if you used the appropriate amount and type of reinforcers.

APPENDIX D

GROUP INFLUENCE EXERCISE: CONTRAST A WORKSHOP

Directions for Workshop Leader: Today we are going to participate in a group exercise which will help you become aware of the influence members of a group have on each other. This exercise is particularly designed for training agents such as psychologists, social workers, teachers, speech therapists and so forth. Each member of the group has a booklet. There are booklets labeled A, B, C, D, and E. Each one of you will play a role in the group. Every five minutes your role will change. Turn to the first page. One of the group has the role of discussion leader. One has the role of an observer. Your leader will lead a discussion for five minutes. You will all play your roles as defined on that first page during this time. At the end of five minutes I will say "Time." You will stop and your observer will read what is written on his page of instructions, that is, what he was observing, and tell the group what he saw. The group may respond to his observations and we will discuss what happened during the interaction and why. After this we will turn to the next page, assume new roles and begin a new interaction. This pattern will continue until everyone has been a leader. Are there any questions? Begin

Group Member	Role				
	Time 1	Time 2	Time 3	Time 4	Time 5
A	Leader	Bored	Hostile	Observer	Pleasant mind-changer
B	Enthu-siastic	Leader	Observer	Nod, non-verbal	Shy
C	Enthu-siastic	Pleasant	Leader	Nod, non-verbal	Observer
D	Ask questions	Observer	Withdrawn	Leader	Aggressive, verbal
E	Observer	Bored	Hostile	Nod, non-verbal	Leader

Booklet for Group Member A

Page 1.

Lead a Group Discussion:
TOPIC: Major Problems which the United States must face Today: Present a few critical facts on the topic you chose from this list: poverty, city problems, race relations, crime, Vietnam.
Ask broad and narrow questions alternately.

Page 2.

Be bored. Clean your nails. Answer the leader reluctantly.

Page 3.

Be aggressive. Be hostile. Criticize the topic presented. Criticize the points made by the leader. Ask why this topic was presented in the first place.

Page 4.

Observe the interaction. Who talks the most? Why do you think this happened? How do you think the leader feels about his role as discussion leader?

Page 5.

Be pleasant and participate in the discussion. Change your mind often and agree with whatever ideas are advanced by others.

Booklet for Group Member B

Page 1.

Participate enthusiastically in the discussion.

Page 2.

Lead the Discussion:
Present a few critical facts on the issue of assassinations of important figures in the U.S. Be aggressive and make everyone participate. Ask questions rapidly and insist on answers which require thought and insight.

Page 3.

Observe the discussion. What is happening? How might the leader have handled the discussion differently? What would have happened then?

Page 4.

Lean forward and nod. Watch the leader closely and make sympathetic gestures at appropriate times. However, only participate when the leader insists you talk.

Page 5.

Be withdrawn and shy. Be reluctant to give your opinions and check to see if the leader approves of what you say. Say "I don't know" a lot.

Booklet for Group Member C

Page 1.

Participate enthusiastically. Nod and smile at the discussion leader. Tell him what good points he is making.

Page 2.

Be pleasant and cooperative. Volunteer information and attempt to draw out your fellow discussants.

Page 3.

Discussion Leader:
Present a few critical data on the 1968 presidential campaign. For instance you might initiate comments on Agnew, the Chicago convention, Humphrey's late surge, the role of McCarthy, et. When you have initiated the topic let the other discussants carry the ball. Nod and be reinforcing but don't enter into an argument.

Page 4.

Nod agreeably but say little. Smile alot.

Page 5.

Observe the interaction. What is happening? Why do you think this is occurring?

Booklet for Group Member D

Page 1.

Ask questions of the discussion leader. When he makes a point let him know you agree with him. Always be ready to respond.

Page 2.

Observe the discussion. What patterns of interaction occurred? With whom did the leader talk the most? Why do you think that was?

Page 3.

Be disagreeable. But withdraw from the group interaction. Look gloomy but speak only when someone insists.

Page 4.

Discussion Leader:
Begin with a few pertinent facts about man's efforts in space. Discuss for example, the space race, expenditure, impetus to education, dangers of space travel, future of the space program. Be pleasant and reinforcing. Attempt to get everyone to participate.

Page 5.

Be aggressive. Put forth your ideas with authority. Attempt to win the leader's approval. Speak to all members of the group to elicit their support.

Booklet for Group Member E

Page 1.

Observe the discussion. What type of pattern was the leader attempting to structure? How did the group respond to him? Do you think he was successful? Why?

Page 2.

Be bored. Look everywhere but at the leader. Sigh audibly at times. Resist entering the discussion.

Page 3.

Be hostile. Participate loudly. Agree with nothing that is presented. Compete for the opportunity to present your viewpoint.

Page 4.

Participate non-verbally but very pleasantly in the group. Smile, nod, stare with fascination at the leader who can say such marvelous things. However don't speak unless the leader insists.

Page 5.

Discussion Leader:
Present a few facts on the topic of campus unrest. Consider, for example, the take over of S. University, the protests of the black students, faculty encouragement of student protest. Speak only to persons A and B. Ignore C and D.

APPENDIX E

THERAPIST TRAINEES' SR PATTERN FREQUENCY SCORES
BASELINE WEEK (WEEK I)

Treatment	S	Days				$\bar{x}$	sd
		1	2	3	4		
CATTS + MD Training	1	21	29	27	37		
	2	7	8	16	44		
						23.35	12.35
CATTS only	3	23	22	26	22		
	4	24	17	21	46		
						25.13	8.25
MD Training only	5	36	21	24	38		
	6	17	16	45	25		
						27.75	9.95
no CATTS + no MD Training	7	16	22	9	8		
	8	59	71	37	35		
						32.13	21.64

THERAPIST TRAINEES' SR PATTERN FREQUENCY SCORES
TRAINING WEEK (WEEK II)

Treatment	S	Days				$\bar{x}$	sd
		1	2	3	4		
CATTS + MD Training	1	40	63	94	39		
	2	61	26	65	62		
						56.25	19.62
CATTS only	3	71	53	36	70		
	4	51	23	13	56		
						46.63	19.65
MD Training only	5	10	25	27	44		
	6	24	55	17	29		
						28.88	13.47
no CATTS + no MD Training	7	31	14	7	13		
	8	22	24	34	19		
						20.50	8.59

THERAPIST TRAINEES' SR PATTERN FREQUENCY SCORES
MAINTENANCE WEEK (WEEK III)

Treatment	S	Days				$\bar{x}$	sd
		1	2	3	4		
CATTS + MD Training	1	104	131	146	76		
	2	6	9	139	72		
						85.38	51.70
CATTS only	3	50	41	57	37		
	4	62	23	60	31		
						45.13	13.43
MD Training only	5	22	51	29	55		
	6	131	31	3	24		
						43.25	36.56
no CATTS + no MD Training	7	25	0	21	11		
	8	21	89	19	1		
						23.38	26.32

APPENDIX F

PERCENTAGE OF TIME USED FOR PATIENT RESPONSES
BASELINE WEEK (WEEK I)

Treatment	Groups	Days				$\bar{x}$	sd
		1	2	3	4		
CATTS	1	21.7	43.2	31.3	29.6		
	2	34.6	38.3	34.9	27.1		
	3	23.4	37.4	20.5	28.7		
	4	24.1	26.1	22.1	30.6		
						29.6	8.9
no CATTS	5	26.2	34.9	30.1	21.3		
	6	25.8	35.6	31.1	24.7		
	7	25.4	12.4	49.4	28.4		
	8	30.9	24.0	23.2	20.9		
						27.8	7.9

PERCENTAGE OF TIME USED FOR PATIENT RESPONSES
TRAINING WEEK (WEEK II)

Treatment	Groups	Days				$\bar{x}$	sd
		1	2	3	4		
CATTS	1	29.7	40.4	29.7	23.0		
	2	23.8	25.1	22.8	23.7		
	3	22.7	42.2	32.8	27.1		
	4	21.4	22.4	23.0	32.7		
						27.7	6.3
no CATTS	5	31.0	24.7	19.9	24.2		
	6	23.4	31.6	30.1	28.8		
	7	23.4	22.9	29.1	20.4		
	8	16.3	27.0	27.0	16.6		
						24.8	4.7

PERCENTAGE OF TIME USED FOR PATIENT RESPONSES
MAINTENANCE WEEK (WEEK III)

Treatment	Groups	Days				$\bar{x}$	sd
		1	2	3	4		
CATTS	1	30.4	21.8	27.1	33.0		
	2	30.0	25.8	27.3	26.5		
	3	32.7	21.9	24.2	21.0		
	4	28.3	34.6	24.4	22.9		
						27.0	4.1
no CATTS	5	17.2	24.6	23.1	10.2		
	6	26.7	21.9	34.5	29.4		
	7	13.7	15.1	13.2	24.4		
	8	29.7	17.3	33.3	20.0		
						22.1	7.1

APPENDIX G

MEAN LENGTH OF PATIENT RESPONSES (BY SECONDS)
BASELINE WEEK (WEEK I)

Treatment	Groups	Days				$\bar{x}$	sd
		1	2	3	4		
CATTS	1	5.22	3.85	2.96	2.55		
	2	3.93	9.52	4.54	2.62		
	3	4.58	2.94	5.15	2.89		
	4	4.66	12.50	3.99	1.88		
						4.61	2.65
no CATTS	5	5.58	4.82	4.67	1.57		
	6	5.59	3.31	11.45	1.54		
	7	4.98	6.49	5.85	4.72		
	8	4.12	6.81	2.29	3.20		
						4.81	2.32

MEAN LENGTH OF PATIENT RESPONSES (BY SECONDS)
TRAINING WEEK (WEEK II)

Treatment	Groups	Days				$\bar{x}$	sd
		1	2	3	4		
CATTS	1	2.41	2.24	3.01	2.57		
	2	2.28	3.29	2.77	3.07		
	3	2.13	2.50	1.89	1.74		
	4	2.92	3.46	2.20	2.89		
						2.59	.48
no CATTS	5	1.91	2.16	1.91	3.47		
	6	2.48	1.69	2.18	2.94		
	7	4.20	2.36	2.74	3.23		
	8	3.35	2.30	1.79	2.04		
						2.55	.69

MEAN LENGTH OF PATIENT RESPONSES (BY SECONDS)
MAINTENANCE WEEK (WEEK III)

Treatment	Groups	Days				$\bar{x}$	sd
		1	2	3	4		
CATTS	1	2.14	2.33	1.83	2.82		
	2	1.21	3.42	1.86	2.42		
	3	2.20	1.68	1.70	2.03		
	4	1.58	2.59	1.27	2.62		
						2.11	.57
no CATTS	5	3.84	1.51	3.19	1.38		
	6	3.65	3.45	3.04	1.63		
	7	3.89	1.49	1.79	3.76		
	8	2.29	2.18	1.79	2.94		
						2.61	.91

APPENDIX H

RESPONSE-REINFORCEMENT RATIO SCORES
BASELINE WEEK (WEEK I)

Treatment	Groups	Days				$\bar{x}$	sd
		1	2	3	4		
CATTS	1	.34	.19	.24	.14		
	2	.43	.23	.54	.42		
	3	.28	.39	.26	.33		
	4	.24	.44	.45	.36		
						.33	.11
no CATTS	5	.29	.37	.23	.13		
	6	.43	.51	.04	.03		
	7	.30	.27	.33	.29		
	8	.41	.35	.15	.30		
						.28	.13

RESPONSE-REINFORCEMENT RATIO SCORES
TRAINING WEEK (WEEK II)

Treatment	Groups	Days				$\bar{x}$	sd
		1	2	3	4		
CATTS	1	.35	.34	.29	.27		
	2	.41	.44	.26	.52		
	3	.55	.62	.41	.45		
	4	.51	.73	.50	.46		
						.44	.12
no CATTS	5	.13	.22	.12	.35		
	6	.13	.02	.12	.38		
	7	.35	.16	.24	.40		
	8	.55	.16	.11	.29		
						.23	.14

RESPONSE-REINFORCEMENT RATIO SCORES
MAINTENANCE WEEK (WEEK III)

Treatment	Groups	Days				$\bar{x}$	sd
		1	2	3	4		
CATTS	1	.33	.12	.13	.25		
	2	.32	.43	.30	.48		
	3	.45	.36	.76	.36		
	4	.38	.37	.66	.37		
						.38	.16
no CATTS	5	.31	.08	.40	.01		
	6	.20	.34	.34	.20		
	7	.08	.08	.02	.25		
	8	.29	.05	.08	.33		
						.19	.13

APPENDIX I

MICHIGAN PICTURE LANGUAGE INVENTORY
PRETEST SCORES

Treatment	S	Vocabulary		Language Structure	
		Express.	Comp.	Express.	Comp.
CATTS	1	0	35	6	45
	2	20	33	10	39
	3	12	35	14	30
	4	14	34	15	37
	5	6	28	7	47
$\bar{x}$		10.4	33.0	10.4	39.6
sd		8.9	2.6	3.6	6.1
no CATTS	6	11	33	19	40
	7	31	35	58	59
	8	31	35	38	51
	9	29	34	42	54
	10	26	35	37	43
	11	20	31	50	56
$\bar{x}$		24.7	33.8	40.7	50.5
sd		7.2	1.5	12.1	6.9

MICHIGAN PICTURE LANGUAGE INVENTORY
POSTTEST SCORES

Treatment	S	Vocabulary		Language Structure	
		Express.	Comp.	Express.	Comp.
CATTS	1	0	32	2	32
	2	10	33	12	34
	3	10	34	15	36
	4	17	33	22	38
	5	8	26	11	48
$\bar{x}$		9.0	31.6	12.4	37.6
sd		5.4	2.9	6.5	5.6
no CATTS	6	13	34	22	42
	7	33	35	68	61
	8	32	35	61	41
	9	30	34	50	54
	10	29	34	31	43
	11	28	34	55	56
$\bar{x}$		27.5	34.3	47.8	49.5
sd		6.7	.5	16.3	7.8

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