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A COMPARISON OF REINFORCEMENT AND MODEL-  
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VERBAL PARTICIPATION.

University of North Carolina at Greensboro,  
Ed.D., 1973  
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A COMPARISON OF REINFORCEMENT AND MODEL-REINFORCEMENT  
TECHNIQUES IN INFLUENCING VERBAL  
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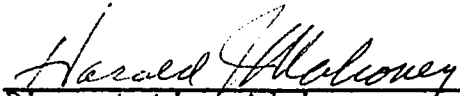
by

William Henry Cain

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### Purpose

The purpose of this study was to compare reinforcement and model-reinforcement techniques in increasing students' classroom verbal participation. Primary hypotheses to be investigated were: (1) there is no significant difference between model-reinforcement and reinforcement groups' adjusted posttest frequency of responding in the small group; and (2) there is no significant difference between model-reinforcement and reinforcement groups' adjusted posttest frequency of responding in class.

### Method

Twenty graduate subjects at The University of North Carolina at Greensboro were randomly selected from the 28 members of one class. These subjects were randomly assigned to one of two groups: a model-reinforcement group and a reinforcement group.

The model was selected upon professor recommendation and two days of observation of the student's verbalization in class. The model was trained by the experimenter to exhibit and reinforce verbal participation in the group.

Six volunteer undergraduate students, trained in behavior observational procedures by the experimenter, served as observers. Satisfactory observer reliabilities (.90) were

achieved under training prior to the beginning of class observation. Observers were paired for 30 minutes of each 90 minute pretest and posttest period and reliabilities were computed for each pair.

The same group leader was used in both the reinforcement and model-reinforcement groups. The group leader was a graduate student in the Counselor Education program at The University of North Carolina at Greensboro.

In the model-reinforcement group the group leader differentially reinforced verbal participation of all group members including the model. The model was instructed to exhibit and to reinforce verbal participation of group members. In the reinforcement group procedures were the same with the exception that no model was employed. Subjects' responding was observed and recorded in 30-second intervals for a total of 90 minutes in the small group before and after treatment procedures, and for a total of 180 minutes in the classroom before and after treatment procedures.

## Results

A pretest-posttest experimental design was employed, and an analysis of covariance was used in the evaluation of the data. The analysis of covariance revealed that there was no significant difference between the reinforcement technique and the model-reinforcement technique. However, a comparison of mean increases within groups revealed a greater increase in the model-reinforcement group in both the small group and the classroom. Factors which may have contributed to

these results could have been, (1) the established verbal behavior of the subjects, (2) peer-reinforcement and a peer-modeling effect, and (3) maximum limit of verbalization within a group session.

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CHAPTER I  
INTRODUCTION AND NEED FOR RESEARCH

Studies have been reported that used role playing and reinforcement in counseling to increase an individual's frequency of verbalization. This study was designed to investigate both the use of students as verbal models and the use of differential reinforcement in groups (model reinforcement) to determine their effectiveness in increasing the frequency of verbal participation of graduate students.

Divergent counseling theories have led to various approaches and techniques in helping individuals solve their problems. The earlier more "directive" approach emphasized rational and cognitive processes and sought to help people solve their problems largely through techniques utilizing intellectual means. Later the approach was less directive and emphasized emotional factors and techniques such as support, acceptance, and understanding in aiding the individual to grow and develop his own problem-solving abilities. Recently, a behavioral approach to counseling has emerged which offers alternative techniques and concepts to be applied in the counseling relationship. Behavioral counseling is based on learning theory and deals with changing human behaviors (Osipow and Walsh, 1970)

Behavioral counseling offers specific features that distinguish it from other counseling approaches, and it is not limited to one method or technique for dealing with the problems of individuals. Much research has been done in behavioral counseling, but in order for one to realize all benefits which may come from the application of learning theory to counseling, more research is needed (Krasner and Ullmann, 1965; Krumboltz and Thorensen, 1969).

Bandura and his associates (1963, 1965, 1969) have conducted considerable research in verbal reinforcement and model reinforcement, which are two techniques used in behavioral counseling. Verbal reinforcement assumes that a positive reward, which follows the desired behavior, will increase the frequency of that behavior. Model reinforcement has the added element of imitation, which is based on the assumption that when one individual observes another individual receiving a reward he will imitate the latter's behavior in order to receive the reward.

The behavioral counseling technique with which this study was concerned is model reinforcement, which has its theoretical base in imitative learning and social reinforcement. Three recent reviews (Wodtke, 1967; Flanders, 1968; Bourdon, 1970) have presented and discussed literature and research concerning imitation and modeling. These reviews show that model reinforcement has been used successfully in

counseling with such client problems as juvenile delinquency, career planning, study behavior, and social acceptance.

### Need for Study

The practicality and efficiency of model reinforcement have been demonstrated and it has begun to be applied to many school and social problems. A further area in which model reinforcement may be effective is with students who are non-participative in small group or classroom discussion. Counselors have been concerned about students who are non-assertive and low-verbalizing (Krumboltz, 1969). The trend away from an exclusively teacher/professor-centered class with a traditional lecture to a more student-centered class emphasizes intra-group participation and a high frequency of verbalization on the part of students.

While it has been demonstrated that model reinforcement may be employed to increase certain client behaviors, this writer has found no published studies of the use of model reinforcement for increasing verbal participation in group or classroom discussion. Therefore, an investigation of model reinforcement with graduate students in small group and classroom discussion would be of value. An increase in one's frequency of verbalization would be of value to the individual who has expressed a desire for this increase which may lead to personal growth and satisfaction. There

would also be value in terms of educational goals for college courses in which class discussion is either central or plays an important role. An increase in the frequency of student verbalization may lead to more effective achievement of class goals.

The value of simply increasing the frequency of a student's verbalization may be questioned. Reinforcement procedures have been successfully employed in producing an increase in simple verbalization (Greenspoon, 1955). However, if model reinforcement in small groups results in the increase of the frequency of student verbalization in the classroom, there would be implications for the possibility of changes in the quality of student verbalization.

#### Statement of Problem

This study was designed to compare reinforcement and the effectiveness of a model-reinforcement technique in influencing verbal participation of graduate students in small group and classroom discussion. Model reinforcement in a small group was compared with reinforcement to assess the relative effectiveness of these procedures in increasing the frequency of responding in the small group and in the classroom.

### Definition of Terms

Model reinforcement. The technique of differentially reinforcing a subject's desired behavior by the group leader, and providing a model of the desired behavior. The desired behavior in this study is verbal participation in group discussion.

Reinforcement. The technique of differentially reinforcing a subject's desired behavior by the group leader.

Small group. The small group in this study will refer to each of the two experimental groups consisting of nine or ten subjects.

Verbalization. This was defined as any verbal participation by the subject in small group and classroom discussion where that verbalization was directed to the entire group, to the instructor, or another group member where that verbalization was the focal point of the group.



## CHAPTER II

### RELATED RESEARCH

Because of the absence of research studies regarding the use of the model-reinforcement technique in counseling to increase the frequency of verbalization in college classroom discussions, this review will present the use of the model-reinforcement technique in modifying other human behaviors. This review is primarily concerned with the model-reinforcement technique in counseling, and research will be reviewed in four major areas: individual model-reinforcement counseling, non-counseling group modeling procedures, modeling procedures in quasi group counseling, and group model-reinforcement counseling.

#### Individual Model-reinforcement Counseling

Schroeder (1964) employed experimental procedures in order to investigate the relative effectiveness of reinforcement counseling and model-reinforcement counseling in increasing the frequency of information-seeking behavior of high school students. Fifty-four male and female students were randomly assigned to one of three groups: (1) reinforcement counseling, (2) model-reinforcement counseling, and (3) control. Each subject in the two experimental groups was counseled

individually in two tape-recorded counseling sessions held one week apart. The measure used was student self-reports of information-seeking behavior occurring outside the counseling session. Results showed: (1) Reinforcement and model-reinforcement counseling were more effective in increasing information seeking behavior of subjects outside the counseling sessions than were either of the control groups. (2) The two experimental treatments appeared to be equally as effective for female subjects as for males, whereas model-reinforcement counseling was more effective for male subjects. Krumboltz and Schroeder (1965) conducted a study using the same experimental design with similar results.

#### Non-counseling Group Modeling Procedures

Smith (1969) trained teachers to serve as group leaders in the employing of a social modeling-reinforcement procedure to encourage high school students to use their unscheduled time constructively. Eighty students who were spending a high percentage of their unscheduled time in non-work-oriented areas were selected from a group of volunteers. A model tape of students who were able to learn how to use their time effectively was employed, and verbal statements indicating understanding, agreement, and appropriate planning for unscheduled time were reinforced. Following the discussion sessions, those students who met in

the model-reinforcement discussion sessions did significantly increase the amount of unscheduled time spent in school work-oriented areas.

Krieger (1970) compared the effectiveness of two vocational planning procedures (a model-reinforcement counseling treatment to a structured interview control treatment) on the vocational planning behavior of mentally retarded adolescents. A total sample of 56 subjects were randomly assigned to four groups. Experimental groups heard a taped model and received verbal reinforcement from the counselor for vocationally relevant responses. The control group received a structured interview in which tapes of athletic interests, school interests, and job plans were presented. Criterion variables were: (1) scores on a measure of Vocational Planning Strategies, (2) scores on a measure of Vocational Planning Behaviors, and (3) scores on a measure of Vocational Interest. There was a significant difference ( $p \leq 0.05$ ) between the experimental group and the control group on Vocational Planning Strategies scores and on Vocational Planning Behaviors scores with the experimental group being higher.

#### Modeling Procedures in Quasi Group Counseling

Brody(1968) investigated the effectiveness of three modeling procedures in modifying the frequency of emission

of self-referent affect responses in quasi-counseling interviews. Subjects were 60 female college students who were non-volunteers for counseling. Subjects were asked to express their feelings and reactions to their first year in college and were randomly assigned to one of four groups: (1) modeling tape group in which the subjects passively listened to the model describe her feelings and reactions to her freshman year in college, (2) modeling interaction group in which the experimenter emitted 15 self-referent affect modeling statements in verbal interaction with subjects, (3) modeling reinforcement group in which the experimenter immediately reinforced self-referent affect responses of a model on an intermittent schedule, and (4) control group in which subjects received no experimental treatment. The results revealed the model-reinforcement procedure to be more effective than either of the other treatments in significantly increasing the frequency of emission of self-referent affect responses during the experimental period and in maintaining the initial level of responding during the post-experimental period.

#### Group Model-reinforcement Counseling

Three kinds of models were used in the research employing group model-reinforcement counseling: written, tape, and live.

Written Models: In a study conducted by Sudyk (1967), the effect of modeling and model reinforcement on student's

use of unscheduled time was investigated. The purpose of the study was to test the influence of three experimental treatments on students spending an excessive amount of time in the luncheteria. Subjects were high school students randomly assigned to one of five groups: (1) modeling-only group where a symbolic model (an illustrated booklet) was employed to encourage greater use of school work-oriented areas, (2) model-counseling group where the symbolic model was presented in addition to reinforcement counseling, (3) model-reward group where the symbolic model was presented and those subjects who registered in school work-oriented areas received letters of commendation, (4) pretreatment and posttreatment control group, and (5) posttreatment only control group. Subjects use of unscheduled time was obtained by means of self-reports. The analysis of posttreatment means revealed that subjects presented the symbolic model in the three experimental groups spend a significantly smaller percentage of their unscheduled periods in the luncheteria than subjects in the control groups: ( $p < .10$ ) for modeling only, ( $p < .05$ ) for model-reinforcement counseling, and ( $p < .01$ ) for model reward. There was a significant interaction of aptitude and treatment ( $p < .05$ ).

Jones investigated the effectiveness of three group procedures in improving study behaviors of college students: (1) model-reinforcement group counseling, (2) desensitization

group counseling, and (3) group-centered counseling. Subjects were randomly assigned to one of nine groups, each with seven members. Each of the three counselors led a group using the three approaches. In Group I a symbolic model (a two-page handout) offered concrete suggestions for studying. During counseling sessions the counselor reinforced subjects who had practiced an activity from the written model. In Group II systematic desensitization involving a common hierarchy of anxiety-provoking situations was used. The hierarchy ranged from the least anxiety-provoking to the most anxiety-provoking situations in the school setting. The subjects in this group also received copies of the written model. In Group III there was little structure. Expression of student problems and feelings was encouraged. Two criterion measures were used to measure changes in student study performance, the "Study Effectiveness Form" and the "Time Evaluation Form", both of which are self-report measures. Some meaningful changes were reported, but due to timing and some administration problems many subjects did not complete the posttests. Therefore, no overall results were obtained for them. The experimenter, however, was presented data as to how counselors confronted with student problems of academic performance can try out new techniques.

Tape Models. Krumboltz and Thorensen (1964) conducted a study which has contributed heavily to the growing amount of model-reinforcement counseling data and has served as a basic experimental design for further studies. The study was designed to investigate ways of increasing the information-seeking behavior of students about their own educational and vocational decisions. The two principal treatments were reinforcement counseling and model-reinforcement counseling which were applied in both individual and group settings. Reinforcement counseling consisted of differential verbal reinforcement of information-seeking behavior. Model-reinforcement counseling added two 15-minute tape-recorded model counseling sessions in which information-seeking behavior was reinforced in the interaction between the model subject and model counselor. Interviews were held with the subjects to determine the frequency and variety of information-seeking behaviors which occurred outside the counseling interviews for the three weeks following the first interview. The results showed: (1) model-reinforcement and reinforcement counseling significantly increased information-seeking behavior, (2) model-reinforcement counseling was significantly more effective for male subjects, and (3) model-reinforcement counseling was significantly more effective for male subjects in group settings than in individual counseling.

Beach (1969) investigated the effect of group model-reinforcement counseling on the academic achievement of seventh and eighth grade underachievers. One hundred ninety-two subjects who were considered underachievers on the basis of discrepancies between standard scores derived from GPAs and IQs were randomly assigned by sex and grade into one of three groups. (1) Model-reinforcement counseling groups met weekly for seven weeks. At the beginning of each session a role-played five minute tape-recording of a group counseling session was played. The counselor then verbally reinforced any achievement-oriented response made by the subjects. (2) Instructional groups met weekly, concurrently with the model-reinforcement counseling groups. Talks concerning the value of education and information on study techniques were given. (3) Inactive control groups received no special counseling. Results revealed: (1) male subjects in both groups showed an increase in higher GPAs at the end of the school year, (2) by the middle of the following school year, only eighth grade male subjects who had received instructional counseling had higher GPAs, and (3) the findings were inconsistent among female subjects.

Thorensen and Krumboltz (1967) investigated the relationship of client external information-seeking behaviors with interview-response categories and examined the interrelationships of response categories based on individual



and group counseling interviews. The subjects were students from six high schools who volunteered for educational and vocational counseling. The subjects were randomly assigned by sex into reinforcement and model-reinforcement groups of two male subjects and two female subjects each. The instruments were audio tape analysis of counseling interviews and evaluation interviews which were rated by judges. The results were: (1) counselor reinforcement of information-seeking responses was positively associated with client information-seeking outside the interview, (2) frequency of information-seeking responses of subjects during counseling interviews was positively related to frequency and variety of information-seeking responses outside the interview, (3) model-reinforcement counseling subjects engaged in a significantly greater number of external information-seeking behaviors than did reinforcement counseling subjects, and (4) there was no significant difference in client ratings of helpfulness among treatments.

Stewart (1969) made audio tapes of a model group to use with eleventh graders to stimulate career planning and discussion in small groups. The experimenter sought to illustrate and reinforce information-seeking behavior and suggest sources of information. The groups were randomly selected from interested eleventh graders in the Michigan State University area. A model tape served as stimulus

along with handouts at the beginning of the group. The experimenter presented an interesting method, but no experimental evaluation was done.

Warner and Hansen (1970) investigated the effects of model-reinforcement and verbal-reinforcement group counseling on alienated high school students. There were four treatment groups: model-reinforcement counseling, verbal-reinforcement counseling, placebo, and control. Subjects were randomly assigned to these groups. A pretest-posttest control group experimental design was employed. Results showed that both verbal-reinforcement and model-reinforcement counseling groups were more effective in reducing the subjects' feelings of alienation than were either the placebo or control groups ( $p < .01$ ). There was no significant difference between model-reinforcement counseling and verbal-reinforcement counseling groups.

Live Models. Hansen, Niland, and Zani (1969) investigated the comparative effectiveness of model-reinforcement counseling and reinforcement group counseling on the sociometric status of elementary school children. Fifty-four sixth grade students with low social acceptance (Gronlund's Sociometric Test) and 18 students with high social acceptance took part. Eighteen low subjects were put in groups with three high subjects and three low subjects for the model-reinforcement counseling group. Eighteen low subjects were

placed in reinforcement counseling groups with no high subjects, and 18 low subjects served as a control group. An analysis of covariance was used to measure the difference of change in sociometric scores among the three treatment groups. Low sociometric subjects in the model-reinforcement group made significantly more gains ( $p < .05$ ) in social acceptance than did those in group counseling without models and the control group. The experimenter suggests that when group members share a common problem, it is difficult for them to learn the desired behaviors from each other.

### Summary

A review of these experimental studies showed that model-reinforcement procedures, employing symbolic, tape, or live models, have been used effectively to increase the frequency of information-seeking behavior and career planning, to increase a student's constructive use of time, to modify self-referent affect responses, to increase academic performance, and to bring about a gain in social acceptance among peers. These procedures were used with primary, secondary, and college students.

This research supports the contention that model-reinforcement procedures may effectively increase certain behaviors. However, a gap exists in the research in that

there is a lack of experimental studies demonstrating the effect of model-reinforcement counseling on the frequency of student verbalization.

### CHAPTER III

#### DESIGN AND SCOPE

This research compared the effectiveness of a reinforcement technique and a model-reinforcement technique in influencing verbal participation of graduate students in small group and classroom discussion. Reinforcement refers to the differential reinforcement by the counselor of subjects' verbal participation in group discussion. Model reinforcement is identical to reinforcement with the addition of a highly verbal subject who serves as a model for verbalization.

This investigation employed a pretest-posttest experimental group design. Subjects were randomly assigned to each group. Pretest and posttest data were collected on individual subjects.

In this study the independent variables were the two techniques: model reinforcement and reinforcement. The dependent variables were the change in frequency of responding in class discussion and the change in frequency of responding within the small group.

#### Delimitations

The extent of this study was limited to the investigation of the comparative effectiveness of the reinforcement

technique and model reinforcement technique with graduate students. The effectiveness of these techniques was measured by the change in frequency of verbal responses in the small group and classroom discussion.

A number of studies have investigated the sex of the model in relationship to the subject and other model characteristics, (Flanders, 1968; Bourdon, 1970). The effect of model characteristics, including sex, appears to be related to the behaviors being modeled and subject characteristics. In this study, the same male model was used throughout the study.

Research on the effect of model reinforcement on specific classes of verbalization and on the quality of verbalizations may prove most interesting and beneficial. However, this study was designed to investigate the frequency of verbalization as a function of the experimental conditions.

### Hypotheses

The main question asked in this study was: Is there a difference between reinforcement and model reinforcement in increasing the frequency of verbalization of students in class? Specific hypotheses tested were the following:

1. There is no significant difference between model-reinforcement and reinforcement groups' adjusted posttest

frequency of responding in the small group.

2. There is no significant difference between model-reinforcement and reinforcement groups' adjusted post-test frequency of responding in class.

## CHAPTER IV

## METHOD

Subjects

The subjects were graduate students at The University of North Carolina, Greensboro, enrolled in a graduate course in the area of Guidance and Counseling entitled Principles of Guidance. Twenty subjects were randomly selected from the members of one class and were randomly assigned to one of two groups: A model-reinforcement group and a reinforcement group. There were 28 students enrolled in the class so the eight students not used as subjects were assigned a project of additional reading and did not participate in the small group sessions.

Five days after the study began one subject in the reinforcement group was hospitalized and dropped the course. This left nine subjects in the reinforcement group and ten subjects in the model-reinforcement group.

Prior to the experiment, a graduate student was selected to serve as a model for verbalization. The following criteria were used in his selection: professor recommendation and two days of observation of the student's verbalization in class. The two days of observation of this student showed that he exhibited a higher frequency of verbalization than any other student in this class.



This model was trained by the experimenter to verbalize in the group as well as to socially reinforce verbal participation of the other group members by attention and approval. Quality control of model performance throughout the experiment was maintained by his receiving feedback from the experimenter who periodically observed his in-group performance via a one-way screen.

The model was not present in the classroom and was not introduced to the model-reinforcement group until after the three-day pretest period of the small group. He was then introduced as a graduate student who was knowledgeable in the area of guidance and who was able to verbalize this knowledge effectively (see Appendix II).

### Observers

Six volunteer college students served as observers for the experiment. These observers were trained by the experimenter in the observational procedures as described by Bijou, et. al. (1969).

Training procedures for all observers were identical and consisted of three phases. The first phase consisted of one two-hour session in which the behavioral category and rating system were explained. During this session the trainees observed a class in progress on video tape and the behavioral category was discussed during the observation.

When the behavioral category had been clarified, observation sheets were distributed and verbal behavior was observed (see Appendix I).

The second phase was classroom observation via a one-way screen. Observers were paired during this observation in order to achieve satisfactory reliability ( $r=.90$ ). Observer reliability was computed by dividing the number of agreements on time segments between observers by the total number of time segments observed.

The third phase was employed to ensure continued reliability. Observers were paired for 30 minutes of each 90 minute pretest and posttest period. The observers recorded the frequency of response of each subject in 30-second segments. They observed the small group 30 minutes each day, and observed the subjects in class 60 minutes each day. Over-all observer reliability during all observational periods was .96 (see Table 1).

#### Group Leader

The same group leader served for the two groups so that consistency in behavior and operation of the groups was maintained. The group leader was a graduate student in Guidance and Counseling at The University of North Carolina, Greensboro, and received the endorsement of a member of the Counselor Education staff as being competent to serve as a

group leader for the purpose of this study. She was instructed by the experimenter to differentially reinforce both subjects and model for verbal participation in the group. The group leader received periodic feedback from the experimenter regarding her observed behavior in reinforcing verbal participation. The group leader was instructed in the material to be presented in the small group.

TABLE 1  
Averages of Observer Reliability Coefficients

---

Small group	Pretest	.96
	Posttest	.93
Classroom	Pretest	.96
	Posttest	.98
Average Reliability		.96

---

### Experimental Procedure

The subjects were randomly assigned to two groups: a reinforcement group and a model-reinforcement group. At the first meeting the subjects were told that the purpose of the group was to discuss material related to the course and to facilitate and encourage their participation in small group and classroom discussion.

A pretest (frequency of responding in class discussion) was taken in the classroom for three days prior to the small group meetings. A posttest (frequency of responding in classroom discussion) was taken in the classroom for three days following the last small group meeting.

Subjects in both groups met 45 minutes for 16 small group sessions. Pretest data (frequency of responding in group discussions) were gathered in the small group during the first three days. The subjects were then exposed to treatment during the next ten small group sessions. During the last three small group sessions posttest data (frequency of responding in group discussions) were gathered. During the treatment period, subjects in the reinforcement group were differentially reinforced for their verbal participation in group discussion. During the treatment period, subjects in the model-reinforcement group were reinforced for verbal participation in group discussion but were also exposed to a verbal model. When the model was employed, he was introduced by the group leader to the subjects as a member of the

group who was able to freely verbalize in small group and classroom discussion. It was explained to the subjects that the model was in the group to participate in the discussions and to express his feelings concerning his verbal participation in group discussion.

### Measurement

The measures of the experiment consisted of the frequency of response in the small group and in classroom discussion. This was defined as any verbal participation by the subject in small group and classroom discussion where that verbalization was directed to the entire group, to the instructor, or another group member where that verbalization was the focal point of the group.

Pretest data (frequency of response) were collected in the classroom for subjects in both groups via a one-way screen for three days prior to the small group sessions. Verbal participation of each subject was recorded in the classroom in 30-second intervals for 60 minutes of each class session during the pretest and posttest periods. Two observers recorded periodically, and the experimenter made a weekly check of reliability.

Pretest data (frequency of response) were collected for subjects in both small groups via a one-way screen for three days prior to the treatment period. Posttest data

(frequency of response) were collected for subjects in both small groups via a one-way screen for three days following the treatment period. Verbal participation of each subject was recorded in 30-second intervals for 30 minutes of each small group session during the pretest and posttest periods. Two observers recorded periodically, and the experimenter made a weekly check of reliability.

### Analysis of the Data

Data Transformation. Ratio scores (RS) were computed for each subject in order to facilitate the analysis of frequency of responding (FOR) because the total frequency of responding (T FOR) varied from subject to subject.

$RS = \text{FOR} / \text{T FOR} \times 100$  (Cormier, 1970). This variation resulted from the fact that eight subjects were absent during part of the observational period. No one student was absent more than one day during the pretest or posttest measure.

Tests On the Assumptions Underlying the Analysis of Covariance. Several statistical methods were employed to test basic assumptions underlying the analysis of covariance (Winer, 1962). The first check employed was the F maximum test. This tests to see if the variance due to the experimental error within each of the treatment populations is homogeneous. The results obtained from this test in the analysis of the data of the small group was  $F_{\max} = 1.38$  and

$F_{max} = 1.57$  in the analysis of the data of the classroom. Since the observed value of the  $F_{max}$  statistic was less than the critical value for a .01-level test, the hypothesis of homogeneity of variance was not rejected.

An internal check was made on the assumption that the within-class regressions were homogeneous. The results obtained from this check was  $F = 1.20$  for the small group data and  $F = .588$  for the classroom data. The experimental data did not contradict the hypothesis of homogeneity of within-class regressions.

If the within-class regressions were homogeneous, and if the covariate was not affected by the treatments, it is reasonable to expect that the between-class regressions would also be homogeneous. However, a check was made on the assumption that the between-class regressions were homogeneous. The results obtained from this check was  $F = .0001$  for the small group data and  $F = .004$  for the classroom data. The experimental data did not contradict the hypothesis of homogeneity of between-class regressions.

A final test was made on the linearity of the over-all regression of the set of data. The results obtained from this test was  $F = .62$  for the small group data and  $F = .29$  for the classroom data. Thus, the computed  $F$  value from this data does not contradict the hypothesis of linearity of over-all regression.



Since all of the assumptions which were checked appeared to have been met, the data were analysed by analysis of covariance.

## CHAPTER V

## RESULTS

An analysis of covariance revealed that the groups did not differ significantly (see Table 2), although certain trends indicated a difference in the frequency of responding in classroom discussion from group to group (see Tables 3-6). The model-reinforcement group had a mean increase of 6.19 in the small group and a mean increase of .75 in the classroom, while the reinforcement group had a mean increase of only 5.65 in the small group and .56 in the classroom.

Trends which appeared in comparing the mean gains suggested that the frequency of responding in both the classroom and the small group increased more in the model-reinforcement group than in the reinforcement group.  $t$  tests were employed to check for pretest-posttest significance in the four groups. A significant difference was found with model reinforcement in the small groups ( $p < .05$ ). The other groups revealed no significant differences (see Table 19).

Research done with the model-reinforcement technique in career planning resulted in a significant difference between male and female subjects in their frequency of information-seeking behavior (Schroeder, 1964; Krumboltz and Thorensen, 1964; and Thorensen and Krumboltz, 1967). The

experimenter, therefore, analyzed the data with a two-factor analysis of variance to check for difference between male and female subjects in their increase in frequency of verbalization in small group and classroom discussion (see Tables 7-10). The analysis of variance showed that the male and female subjects did not differ significantly from pretest to posttest frequency of responding in small group and classroom discussion.

In comparing the mean gains, certain trends indicated a difference in the frequency of responding in small group and classroom discussion from group to group (see Tables 11-18). The results were mixed in the reinforcement group with male subjects having a higher mean increase in the small group and with female subjects having a higher mean increase in the classroom. Female subjects had a higher mean increase in model reinforcement in both the small group (7.22-5.51) and the classroom (1.87-.00).  $t$  tests were computed in the four groups for both male and female subjects. A significant difference between the pretest and posttest means was found for female subjects with model reinforcement in the small group ( $p < .01$ ) and with reinforcement in the classroom ( $p < .05$ ). The other groups revealed no significant differences (see Table 20). The trends which appeared in comparing the mean gains suggested that female subjects in the model-reinforcement group resulted in more change in their frequency of responding in both the classroom and the small group than did male subjects.

Table 2  
Analysis of Covariance

Small Group

Source of Variation	Sum of Squares	df	Mean Square	F
Total	S'yy 1,208.15	17		
Error	E'yy 1,205.30	16	75.33	
Treatments	TyyR 2.85	1	2.85	.038

Classroom

Source of Variation	Sum of Squares	df	Mean Square	F
Total	S'yy 37.31	17		
Error	E'yy 37.15	16	2.32	
Treatments	TyyR .16	1	.16	.069

Table 3

Ratio Scores of Frequency of Responding for Subjects  
in the Small Group with Model Reinforcement

Subject	Pretest	Mean	Posttest	Mean
1	3.89		3.33	
2	3.89		16.67	
3	42.22		36.67	
4	8.89		15.00	
5	1.11		4.44	
6	11.11		15.56	
7	7.78		12.78	
8	26.11		44.17	
9	10.56		18.89	
10	6.11		16.11	
		12.17		18.36

Table 4

Ratio Scores of Frequency of Responding for Subjects  
in the Small Group with Reinforcement

Subject	Pretest	Mean	Posttest	Mean
1	.00		5.56	
2	41.11		25.83	
3	5.56		13.33	
4	29.44		30.56	
5	.00		1.67	
6	4.44		17.78	
7	17.22		24.44	
8	5.00		33.89	
9	.00		.56	
		11.42		17.07

Table 5

Ratio Scores of Frequency of Responding for Subjects  
in the Classroom with Model Reinforcement

Subject	Pretest	Mean	Posttest	Mean
1	.28		1.11	
2	.00		.00	
3	2.50		4.72	
4	.56		2.22	
5	.83		.83	
6	1.39		3.61	
7	.28		1.67	
8	6.11		1.67	
9	.83		4.44	
10	.00		.00	
		1.28		2.03

Table 6

Ratio Scores of Frequency of Responding for Subjects  
in the Classroom with Reinforcement

Subject	Pretest	Mean	Posttest	Mean
1	.28		.28	
2	1.67		3.61	
3	.56		2.22	
4	11.94		6.67	
5	.00		.00	
6	1.11		3.61	
7	1.67		3.61	
8	.00		1.67	
9	.00		.56	
		1.91		2.47



Table 7

Analysis of Variance  
Reinforcement in the Small Group

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Source of Variation	df	MS	F
A (Sex)	1	232.70	1.30
B	1	143.65	.80
A X B	1	91.85	.51
Within	15	178.91	

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Table 8

Analysis of Variance  
Reinforcement in the Classroom

Source of Variation	df	MS	F
A (Sex)	1	16.95	1.90
B	1	1.39	.16
A X B	1	3.00	.34
Within	15	8.91	

Table 9

Analysis of Variance  
Model Reinforcement in the Small Group

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Source of Variation	df	MS	F
A (Sex)	1	82.38	.47
B	1	191.89	1.09
A X B	1	3.53	.02
Within	15	176.30	

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Table 10

Analysis of Variance  
Model Reinforcement in the Classroom

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Source of Variation	df	MS	F
A (Sex)	1	.00	.00
B	1	2.80	.84
A X B	1	4.22	1.27
Within	15	3.32	

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Table 11

Ratio Scores of Frequency of Responding for Male Subjects  
in the Small Group with Reinforcement

Subject	Pretest	Mean	Posttest	Mean	Gain
1	.00		5.56		
2	29.44		30.56		
3	17.22		24.44		
4	5.00		33.89		
		12.92		23.61	10.69

Table 12

Ratio Scores of Frequency of Responding for Female Subjects  
in the Small Group with Reinforcement

Subject	Pretest	Mean	Posttest	Mean	Gain
1	41.11		25.83		
2	5.56		13.33		
3	.00		1.67		
4	4.44		17.78		
5	.00		.56		
		10.22		11.83	1.61

Table 13

Ratio Scores of Frequency of Responding for Male Subjects  
in the Small Group with Model Reinforcement

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Subject	Pretest	Mean	Posttest	Mean	Gain
1	3.89		3.33		
2	3.89		16.67		
3	42.22		36.67		
4	1.11		4.44		
5	7.78		12.78		
6	26.11		44.17		
		14.17		19.68	5.51

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Table 14

Ratio Scores of Frequency of Responding for Female Subjects  
in the Small Group with Model Reinforcement

Subject	Pretest	Mean	Posttest	Mean	Gain
1	8.89		15.00		
2	11.11		15.56		
3	10.56		18.89		
4	6.11		16.11		
		9.17		16.39	7.22



Table 15

Ratio Scores of Frequency of Responding for Male Subjects  
in the Classroom with Reinforcement

Subject	Pretest	Mean	Posttest	Mean	Gain
1	.28		.28		
2	11.94		6.67		
3	1.67		3.61		
4	.00		1.67		
		3.47		3.06	-.41

Table 16

Ratio Scores of Frequency of Responding for Female Subjects  
in the Classroom with Reinforcement

Subject	Pretest	Mean	Posttest	Mean	Gain
1	1.67		3.61		
2	.56		2.22		
3	.00		.00		
4	1.11		3.61		
5	.00		.56		
		.67		2.00	1.33

Table 17

Ratio Scores of Frequency of Responding for Male Subjects  
in the Classroom with Model Reinforcement

Subject	Pretest	Mean	Posttest	Mean	Gain
1	.28		1.11		
2	.00		.00		
3	2.50		4.72		
4	.83		.83		
5	.28		1.67		
6	6.11		1.67		
		10.00		10.00	.00

Table 18

Ratio Scores of Frequency of Responding for Female Subjects  
in the Classroom with Model Reinforcement

Subject	Pretest	Mean	Posttest	Mean	Gain
1	.56		2.22		
2	1.39		3.61		
3	.83		4.44		
4	.00		.00		
		.70		2.57	1.87

Table 19

t Values

	<u>t</u> value	df
Model Reinforcement		
Classroom	1.09	9
Small Group	2.94 $p < .05$	9
Reinforcement		
Classroom	.71	8
Small Group	1.44	8

Table 20

t Values

		<u>t</u> value	df
Model Reinforcement			
Classroom:	Male	.00	5
	Female	2.49	3
Small Group:	Male	1.56	5
	Female	5.92 $p < .01$	3
Reinforcement			
Classroom:	Male	.25	3
	Female	2.89 $p < .05$	4
Small Group:	Male	2.58	3
	Female	.33	4

## CHAPTER VI

## DISCUSSION

The primary question asked in this study was: Is there a difference between reinforcement and model reinforcement in increasing the frequency of verbalization of students in class? The answer to this question is that there was no significant difference between the two groups in increasing the frequency of verbalization of students in class. Since the analysis of covariance revealed no significant difference between the two groups, the null hypothesis could not be rejected. In comparing the mean increase of the two groups, however, the model-reinforcement group had a larger mean gain in both the classroom and the small group (6.19 and .75) than did the reinforcement group (5.65 and .56). A  $t$  test revealed a significant difference between the pretest and posttest means for model reinforcement in the small group ( $p < .05$ ).

The two hypotheses tested were: (1) There is no difference between model-reinforcement and reinforcement groups' adjusted posttest frequency of responding in the small group. (2) There is no significant difference between model-reinforcement and reinforcement groups' adjusted posttest frequency of responding in class.

No statistical difference was found between groups' pretest and posttest data, therefore, the above null hypotheses

could not be rejected. These results are not consistent with the results found where model reinforcement and reinforcement have been investigated with other problems such as social acceptance among peers (Hansen, Niland, and Zani, 1969) where model reinforcement was found significantly more effective than reinforcement. Neither are they consistent with the results in career planning (Schroeder, 1964; Krumboltz and Thoresen, 1964; and Thoresen and Krumboltz, 1967) where model reinforcement was found significantly more effective than reinforcement with male subjects.

These results do not contradict the results of those in career planning (Schroeder, 1964; Krumboltz and Thoresen, 1964; and Thoresen and Krumboltz, 1967) in terms of over-all results. The studies in career planning did not show model reinforcement to be more effective for all subjects, only male subjects.

This research with verbalization did not show statistical difference between male and female subjects in their increase in frequency of verbalization, however, trends appeared in comparing the mean gains (see Tables 11-18). These trends suggested that female subjects in the model-reinforcement group demonstrated more change in the frequency of responding in both the small group and the classroom than did male subjects. By use of t tests a significant difference was found for female subjects with model



reinforcement in the small group ( $p < .01$  and with reinforcement in the classroom ( $p < .05$ ). The other groups revealed no significant differences.

There may be an explanation for the inconsistency of these results with those of Hansen, Niland, and Zani (1969). Hansen, et. al., worked with elementary school children whose social behavior may not have been as well established as the verbal behavior of graduate students, and because of their age, these children may have been more susceptible to modeling.

A factor in any comparison of model reinforcement with reinforcement in verbalization is the presence of the modeling effect in non-experimental settings. There was a modeling effect for verbalization in classroom discussion which actually took place for both groups. This modeling was done by verbal subjects and may have occurred in other members of the class who were verbal. All subjects were exposed to one or more students with a high frequency of verbalization in the classroom (see Tables 3-6). While there was no model reinforcement in the classroom, there may have been peer reinforcement as well as a peer-modeling effect. Wahler (1970) emphasized the importance of peer reinforcement in modifying classroom behavior.

Any research employing the frequency of verbalization as a measure must take into account the fact that there is a maximum limit to the number of times subjects can speak in

a session. Group discussion was the method employed in both groups, and someone, either the leader, model or subject, was speaking most of the time. One interesting observation from the small group was that as less verbal subjects were reinforced for verbalization, the more verbal subjects in the pretest became less verbal in the posttest (see Tables 3-4). This same trend was true in the classroom even though by its structure there was more opportunity for subjects to verbalize (see Tables 5-6).

## CHAPTER VII

## SUMMARY

An analysis of covariance showed no significant difference between the model-reinforcement and reinforcement groups. A comparison of the mean increase of the two groups, however, revealed that the model-reinforcement group had a larger mean gain in both the classroom and the small group. The  $t$  tests revealed a significant difference for model reinforcement in the small group ( $p < .05$ ). An analysis of variance showed no significant difference between male and female subjects, but a comparison of the mean increase of the sexes revealed that female subjects had a higher mean increase in model reinforcement in both the small group and the classroom. The  $t$  tests for pretest and posttest measures revealed a significant difference for female subjects with model reinforcement in the small group ( $p < .01$ ) and with reinforcement in the classroom ( $p < .05$ ).

The implications of these findings for counseling would appear relevant. The trend in these results suggested that the model-reinforcement technique was more effective in increasing a subject's frequency of verbalization in both the small group and the classroom than was the reinforcement technique. This trend appeared especially relevant for

female subjects as revealed by comparing the mean increase between male and female subjects. This trend was not strong enough to produce significant differences among groups, therefore, another technique for increasing student verbalization should be sought.

Implications for further research would include investigation of the characteristics of the individual serving as a verbal model. An exploration of verbal model characteristics could prove interesting as well as beneficial to the counseling field.

Further research should include studies which investigate other variables such as the modeling effect which occurs in the classroom and the contingencies of reinforcement for verbal behavior in both the small group and the classroom.

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APPENDIX I  
RECORDING SHEET

OBSERVER \_\_\_\_\_ INSTRUCTOR \_\_\_\_\_  
 SUBJECTS \_\_\_\_\_ DATE \_\_\_\_\_  
 TIME \_\_\_\_\_ SECTION \_\_\_\_\_

Minute	Observation Intervals (30 seconds each)	Comments	Minute	Observation Intervals (30 seconds each)	Comments
1			2		
3			4		
5			6		
7			8		
9			10		
11			12		
13			14		
15			16		
17			18		
19			20		
21			22		
23			24		
25			26		
27			28		
29			30		



## APPENDIX II

We have a new member in our group today. His name is Eric Hennig. He is a graduate student in the Counselor Education Department and teaches Educational Psychology. Eric is knowledgeable in the area of guidance and is able to verbalize this knowledge effectively. He will participate and help facilitate our group discussion. Although we are using the textbook material as a basis for our discussion, please feel free to discuss any feelings you may have about your ability or inability to verbalize in group discussion.