An investigation of teacher-trainee attitudes toward lecturing
by Edwin Koerner Tucker

A thesis submitted to the Graduate Faculty in partial fulfillment of the requirements for the degree of
MASTER OF SCIENCE in Education
Montana State University

Abstract:
This study investigated and compared the attitudes of two groups of secondary-level teacher-trainees toward six percepts of teachings "to educate," "to explain," "to instruct," "to lecture," "to teach," and "audio-visual instruction," One group consisted of 47 teacher-trainees beginning their teacher-training program; the other group consisted of 108 trainees nearing the completion of their training.

The latter group was divided into those who had completed a course in audio-visual methods of instruction and those who had not completed such a course.

The subjects' attitudes were revealed through their rating of each concept on a set of nine bipolar semantic differential scales. Results were analyzed (1) in terms of each group's mean scale scores, (2) in terms of each group's mean factor scores on each of five dimensions of meaning; and (3) in terms of the distances each group perceived between the various concepts in a. two- and a three-dimensional semantic space.

It was found that the trainees nearing the completion of their program manifested a greater separation of the concept "to lecture" from the other concepts than did the beginning trainees. The beginning trainees perceived "audio-visual instruction" in less favorable terms and with less agreement among themselves than did the trainees nearing the completion of their training. Those trainees who had completed a course in audio-visual methods gave the concept "to lecture" a less favorable evaluation than did. those trainees who had not taken this course.

It was concluded that the trainees nearing completion of their program did not equate lecturing with teaching, and that a course in audio-visual methods of instruction favorably influenced these attitudes.

AN INVESTIGATION OF TEACHER-TRAINEE ATTITUDES TOWARD LECTURING

by

EDWIN KOERNER TUCKER

A thesis submitted to the Graduate Faculty in partial fulfillment of the requirements for the degree

of

MASTER OF SCIENCE

in

Education

Approved:

Head, Major Department

Chairman, Examining Committee

Graduate Dean

MONTANA STATE UNIVERSITY
Bozeman, Montana

June, 1969

ACKNOWLEDGMENTS

The writer would like to acknowledge the generous assistance given him by several individuals in the design and preparation of this study. The writer's appreciation goes to the members of his graduate committee, Dr. Lawrence Kavich, Chairman, Dr. Robert Van Woert, Dr. William Lassey, and Dr. George Stagg, for their patience, time, and advice. Special thanks are due Dr. Albert Suvak, of the College of Education, and Mrs. Hazel Zeier, of the Montana State University Computing Center for their invaluable assistance in writing and running the computer programs for the analysis of the data. Finally, and most importantly, the writer expresses his deepest appreciation to his wife, Eva, for her support and encouragement, in addition to many long, exacting hours of data transcription, typing, and proofreading.

TABLE OF CONTENTS

LIST OF TABLES

TABLE PAGE

TABLE PAGE

LIST OF FIGURES

ABSTRACT

This study investigated and compared the attitudes of two groups of secondary-level teacher-trainees toward six percepts of teaching: "to educate," "to explain," "to instruct," "to lecture," "to teach," and "audio-visual instruction." One group consisted of 47 teacher-trainees beginning their teacher-training program; the other group consisted of 108 trainees nearing the completion of their training. The latter group was divided into those who had completed a course in audio-visual methods of instruction and those who had not completed such a course.

The subjects' attitudes were revealed through their rating of each concept on a set of nine bipolar semantic differential scales. Results were analyzed (1) in terms of each group's mean scale scores, (2) in terms of each group's mean factor scores on each of five dimensions of meaning, and (3) in terms of the distances each group perceived between the various concepts in a two- and a three-dimensional semantic space.

It was found that the trainees nearing the completion of their program manifested a greater separation of the concept "to lecture" from the other concepts than did the beginning trainees. The beginning trainees perceived "audio-visual instruction" in less favorable terms and with less agreement among themselves than did the trainees nearing the completion of their training. Those trainees who had completed a course in audio-visual methods gave the concept "to lecture" a less favorable evaluation than did those trainees who had not taken this course.

It was concluded that the trainees nearing completion of their program did not equate lecturing with teaching, and that a course in audio-visual methods of instruction favorably influenced these attitudes.

CHAPTER I

INTRODUCTION TO THE PROBLEM

Some contemporary theorists in education, including Jerome Bruner, J. Lloyd Trump, and John Goodlad, are utilizing the research findings from several related fields to redefine the role of the teacher in the classroom.[1] John Goodlad, for example, discusses ". . . a changing role for tomorrow's teacher: a coordinator of instructional resources rather than a conveyor of knowledge."[2] If the assumption is made that most teachers, at some times, use a lecture method where other forms of presentation would better serve the needs of the class, it can be seen that the principal behavior to be changed in the adoption of the new role involves the verbal activity utilized by the teacher. The so-called "discovery" approach, the use of varied media, and the encouragement of individual study, all call for a sharp reduction of lecturing.

If a significant change in the teaching role is to be achieved it will require more than the empirical confirmation of the value of the proposed change. A good deal of attention will have to be paid to the dynamics of instituting social change. These dynamics, in turn,

---

[1]Jerome S. Bruner, The Process of Education (Cambridge: Harvard University Press, 1960); J. Lloyd Trump and Dorsey Baynham, Focus on Change: A Guide to Better Schools (Chicago: Rand, McNally and Company, 1961); and, John I. Goodlad, School Curriculum Reform in the United States (New York: The Fund for the Advancement of Education, 1964).

[2]Goodlad, op. cit., p. 72.

depend on individual teacher perceptions of the behaviors required by the teaching role.[3]

Since a primary behavioral change required would be the reduction of lecturing, an examination of teacher attitudes toward lecturing, particularly in relation to their attitudes toward teaching itself, is of fundamental importance to any program designed to achieve this change in the teacher's role. As the college and university teacher-training programs would serve as the primary agents of change in such a program, however, teacher-trainees should be regarded as the potential clients of the change program.[4] Therefore, an investigation of the attitudes of teacher-trainees toward lecturing as an aspect of teaching is required. Further, it is desirable to evaluate the changes these attitudes are presently undergoing during the course of a teacher-training program.

I. THE PURPOSES OF THE STUDY

This study was designed to investigate the organization of teacher-trainee attitudes toward teaching and lecturing as comparable educative processes. In addition, it was designed to measure the differences, in this organization of attitudes, between trainees just

---

[3]Tamotsu Shibutani, "Reference Groups as Perspectives," American Journal of Sociology, 60: 562-569, 1955; and Ward Hunt Goodenough, Cooperation in Change (New York: The Russel Sage Foundation, 1963), p. 147.

[4]Goodlad, op. cit., p. 87.

beginning, and of those nearing the completion of a teacher-training program. It is hoped that the study will further serve to stimulate more research concerning the conditions requisite for changing the role of teachers.

The Statement of the Problem

The problems addressed in this study are expressed in three basic questions: (1) What is the nature of the relationship between secondary teacher-trainee attitudes toward lecturing and their attitudes toward teaching, as processes of education? (2) What differences exist, in the organization of these attitudes, between trainees just beginning, and those nearing the completion of their teacher-training program? And, (3) what effect does a course in audio-visual instruction have on the organization of these attitudes?

The Experimental Hypotheses

The two experimental hypotheses to be tested in this study are as follows: (1) secondary teacher-trainees nearing the completion of their undergraduate teacher education program will manifest a greater separation of the concept "to lecture" from other percepts of teaching than will secondary trainees just beginning their undergraduate program; and, (2) secondary teacher-trainees having completed a course in audio-visual methods will manifest a greater separation of the concept "to lecture" from other percepts of teaching as compared with those trainees who have not completed such a course.

II. DEFINITION OF TERMS

Several terms are used in this report which need precise definition. Though some of them are again defined in the discussion to follow, their formal definition is included here to ensure clarity. For purposes of this study, Thurstone's definition of attitude will be used.[5] He defines an attitude as ". . . the sum total of an individual's inclinations and feelings, prejudice or bias, preconceived notions, ideas, fears, threats, and convictions about any specific topic." Lecturing, in this writer's definition, is taken to mean any exclusively verbal, one-way communication, with no provision for feedback from the audience. The term percepts refers to an individual's perceptions and discernments of phenomena and processes in his environment, a definition consistent with Goodenough's use of the term.[6] Finally, semantic differential, a phrase coined by Charles E. Osgood, denotes both a particular technique of determining the meaning attributed by a subject to a given concept, and any instrument designed to utilize this particular technique.[7]

---

[5] L. L. Thurstone and E. J. Chave, The Measurement of Attitude (Chicago: The University of Chicago Press, 1929), pp. 6-7.

[6] Goodenough, loc. cit.

[7] Charles E. Osgood, George J. Suci, and Percy H. Tannenbaum, The Measurement of Meaning (Urbana: The University of Illinois Press, 1957), p. 20.

III. THE EXPERIMENTAL PARADIGM

Two sample groups of teacher-trainees were selected for study: a control group consisting of secondary level trainees just beginning the teacher-training program, and an experimental group of secondary level trainees who had completed their student teaching and were close to finishing their program of training. The experimental group was further divided into those who had completed a course in audio-visual methods and those who had not taken such a course.

The subjects' attitudes toward the concepts "to teach," "to instruct," "to lecture," "to educate," "to explain," and "audio-visual instruction" were measured with a semantic differential instrument, and responses between groups were analyzed along dimensions of meaning established by factor analyses of the instrument.

IV. DELIMITATIONS OF THE STUDY

It was necessary to define the limits beyond which this study was not intended to function. These limits can be grouped into three primary categories, the first of which involves the control of the variables intervening between the control and the experimental groups. The variance obtained was undoubtedly a function of many variables, including age, sex, college major, academic program, grade point average, maturation, and intelligence quotients. No attempt was made to control these intervening variables. The study only examined the differences in attitudes among the groups at different stages in the training program,

and the samples were not matched on any criteria except enrollment in this particular training program. Adequate control of these intervening variables could only be achieved in a large sample longitudinal study.

Secondly, this study examined only secondary school trainees in one university teacher-training program during one particular year. Generalizations from the results of this study to other situations and programs are not the intent of this study.

Finally, no attempt was made to determine the extent to which differences in attitude observed would imply a concomitant difference in teaching procedures among the trainees. This question is beyond the scope of this study. This study did not measure attitudes *per se*, but compared sets of measurements from which differences in attitudes could be inferred.

A review of the literature pertinent to the study is presented in Chapters II and III; reports relevant to the study of social change are discussed in Chapter II, while material on the theory and practice of attitude measurement is included in Chapter III. The construction of a semantic differential instrument is discussed in Chapter IV, and the findings of the study are presented in Chapter V. The final chapter presents and discusses the conclusions drawn from the study.

CHAPTER II

THE THEORETICAL FRAMEWORK OF THE STUDY

The achievement of a change in role for elementary and secondary teachers would constitute a comparatively major social change in the lives of the people involved, with ramifications that are not evident at first glance. A program to achieve such changes should therefore be analyzed as a sociological problem as well as an educational problem. This chapter will present a discussion of the significance of this study viewed as a problem in social change, with particular attention to the psycho-sociological variables involved in such change.

I. THE NEED FOR CHANGE

The formulation and delineation of the new roles for teachers has been stimulated, to a great extent, by rapid social and technological changes. It is the view of the proponents of the role change that no longer can teachers depend exclusively upon the traditional methods of organization and teaching if they are to fulfill efficiently their obligations in the school systems of their society.[1] Rather, they must apply new technological advances in order to provide education and training for vastly increased numbers of individuals, for substantially longer spans of productive life, and at sharply

---

[1] John I. Goodlad, School Curriculum Reform in the United States (New York: The Fund for the Advancement of Education, 1964).

heightened levels of competency and skill.

Two social phenomena influencing this school of thought most directly are the increased student enrollments and the so-called "knowledge explosion." The number of students enrolling in elementary and secondary schools is growing almost geometrically, primarily because of two factors: rising birth rates and the greater percentages of each age group enrolled.[2] Simultaneously, the "knowledge explosion," i.e., the exponential rate at which new facts are being discovered in the sciences and other fields, has the potential to lessen the teacher's ability to convey all of the information needed by the students.[3] The combined effect of these two phenomena makes new demands on the educative process, and the efforts of contemporary educators, including J. Lloyd Trump, Jerome Bruner, and John Goodlad, among many others, have been directed toward effectively meeting the requirements of these demands.[4]

The ideas of these theorists are well represented in the development of various new school designs and curricula, including the Hagerman, Idaho, High School, and the Whitefish, Montana, Elementary School, where the key features of the new roles for teachers are quite

---

[2]William Marshall French, American Secondary Education (New York: The Odyssey Press, Inc., 1967), pp. 221-225.

[3]Ibid.

[4]J. Lloyd Trump and Dorsey Baynham, Focus on Change: A Guide to Better Schools (Chicago: Rand, McNally and Company, 1961); Jerome S. Bruner, The Process of Education (Cambridge: Harvard University Press, 1960); and, John I. Goodlad, loc. cit.

evident.[5] Emphasis is on team-teaching, the multi-media approaches to teaching, and other communications skills, and modifications of the physical plant of the school in ways consistent with maximum flexibility and variation of the scholastic program. The major behavioral differences between the traditional and the new roles occur in the amount of lecturing that the teacher is expected or permitted to do. This emphasis on minimizing the one-way verbal communication is the product of the research findings from mamy related fields, including psychology, communications, and education.

II. BACKGROUND RESEARCH

Through studies of B. F. Skinner and others at Harvard, psychologists have progressed a long way in developing sound theories of human learning.[6] These theories have generally been concerned with the prediction of responses to specific stimuli. However, while some psychologists stress the analysis of response probability with minimal attention to the state of the individual organism making the response, others are now emphasizing the importance of the state of the organism, as well as an analysis of stimulus and response.[7] Out of this research

---

[5] Designing Education for the Future: An Eight-State Project, Edgar L. Morphet, Project Director (Denver: The Eight-State Project, 1967).

[6] B. F. Skinner, Cumulative Record (New York: Appleton-Century-Crofts, Inc., 1959).

[7] N. L. Gage, editor, Handbook of Research on Teaching (Chicago: Rand, McNally and Company, 1963), p. 586.

have come a number of general principles applicable to many different learning situations, including the principles of immediate reinforcement, data on the use and abuse of repetition, linear and branched chaining in learning, and others.[8]

A significant development in utilizing these principles was contained in B. F. Skinner's paper "The Science of Learning and the Art of Teaching," written at Harvard in 1954. Many of his findings were embodied in the development of "programmed learning" and "teaching machines," whose worth, though still being carefully evaluated, seems to support earlier labcratory findings.[9]

The findings of research in the field of communications have considerable relevance to education. Controlled studies on the importance of feedback, group dynamics, and the encoding and decoding processes are directly applicable to teaching situations. Thus, the work of Paul Lazarsfeld, Kurt Lewin, Leon Festinger, and many others has greatly influenced contemporary ideas about the teaching processes.[10]

A particularly useful tool in this research has been the "interaction analysis technique" developed by Ned Flanders and Edmund Amidon. Results obtained by this technique demonstrate all too clearly that many teachers talk too much, with too little attention to

---

[8]Skinner, loc. cit. [9]Ibid., pp. 145-157.

[10]Wilbur Schramm, editor, The Science of Human Communication (New York: Basic Books, Inc., Publishers, 1963).

whether they are indeed communicating anything to their students.[11]

Thus, the theories on the new roles for teachers are the result of a particularly productive inter-disciplinary effort, concluding that the teacher should become a director of learning activities as opposed to a primary information source. The teacher in this role works as a member of a team of specialists, and this ulitization of a team effort is a key feature of the new role. The teacher draws upon many sources of information and cooperation, rather than relying upon his own knowledge exclusively.[12]

The position taken by many advocates of the new role for teachers suggests that, once the adequacy of the role is established and its advantages to education are pointed out, teachers will then adopt the new role and gain the solutions to the problems. In many of these arguments promoting change there is thus a lack of awareness of the conditions necessary for change to occur and the vast array of concomitants such changes imply.[13] It should be emphasized that confirmation of the value of a proposed change is a necessary, but not a sufficient requisite for change. Psychology and related fields have contributed

---

[11] Edmund J. Amidon and John B. Hough, Interaction Analysis: Theory, Research and Application (Reading: Addison-Wesley Publishing Company, 1967), p. 285.

[12] J. Lloyd Trump, "A Look Ahead in Secondary Education," Readings in Curriculum, Glen Hass and Kimball Wiles, editors (Boston: Allyn and Bacon, Inc., 1965), p. 511.

[13] Seymour B. Sarason, et.al, The Preparation of Teachers: An Unstudied Problem in Education (New York: John Wiley and Sons, Inc., 1962).

theories concerning the mechanics of human learning, and also insights into the dynamics and complexity of human behavior. These latter theories, particularly as expanded by contemporary sociologists, must play a large part in any design for a major change in the teaching role.[14] Significantly changing the behavior of a large group of individuals is a most complex task, requiring the manipulation of several major variables. Perhaps, the most crucial of these is the concept of personal identity.[15]

III. A PROBLEM IN IDENTITY CHANGE

"Human beings are anchored to reality and purpose by a firm sense of who they are."[16] According to Goodenough, how the individual perceives himself and how he thinks others perceive him are of primary importance in determining his behavior. These perceptions are key features in his identity.

The individual's sense of personal integrity can be defined as the consistent integration of all the lesser features of his identity with some existing key features on which he places a high value.[17] These key features of high value will depend, in turn, on his own wants, needs, and values. It may logically be inferred that any

---

[14] Arnold M. Rose, editor, Human Behavior and Social Processes (Boston: Houghton Mifflin Company, 1962).

[15] Ward Hunt Goodenough, Cooperation in Change (New York: The Russel Sage Foundation, 1963).

[16] Ibid., p. 176. [17] Ibid., p. 196.

activities to which an individual devotes a good share of his time must necessarily reflect in their structure some points of this personal value system. Thus, his profession, his hobbies, and his interests must all have major aspects consistent with the individual's value system if they are to prove satisfying to him. Stated differently, if the individual's activities are going to satisfy his needs, they must exhibit, to him, significant features consistent with his own identity and sense of personal integrity.[18] This system of values held by each individual as an identity feature can be further analyzed in terms of two reasonably distinct sets of criteria which he may use as a basis for judgment of possible behaviors: his "public values" and his "private values."[19]

Public versus Private Values

An individual's response to a given situation or stimulus is determined at two levels. First, his tendency to respond is influenced by a set of values shared by the other members of his society. Thus, citizens of the United States generally place a high value on material wealth, democratic process, and certain standards of cleanliness and hygiene; members of a particular social circle or group may all share a high regard for participation in a certain sport or a liking for a given type of music. Secondly, the individual's tendency to respond is swayed by more private wants and needs, and the

---

[18] Ibid., Chapter 8. [19] Ibid., pp. 86-92.

individual's own concepts and perceptions, which may or may not coincide, in nature and worth, with the individual's public values. Because of this, both the importance of power to the individual, for example, and the perception of what constitutes power will vary from person to person.[20]

Therefore, the features of a given activity to which an individual responds will be a function of both his private and his public values. It is appropriate to point out here that when an individual is asked about his motivations for participating in a given activity, he is more likely to respond in terms of public values than in terms of private values. Many of his private values may be held unconsciously, the overt behavior representing the product of ego-defense mechanisms of which the individual is not aware. Thus, it is found that questionnaires given to teachers on why they select teaching as a profession obtain factors like "to help others," and "contact with children" or "contact with adolescents," etc., while the more sophisticated instruments (including the various projective techniques) reveal motivations like "domination" and "identification with children."[21]

The new theories on the role of the teacher propose few if any changes in the common public values associated with teaching; in fact,

---

[20] Ibid.

[21] N. E. Dilley, "Personal Values Held by College Students Who Enter a Teacher Education Program," Journal of Teacher Education, 8:289, September, 1957; and George Stern, et al., "Two Scales for the Assessment of Unconscious Motivations for Teaching," Educational and Psychological Measurement, 20: 9-29, Spring, 1960.

some values, like "helping others," could be complimented in the new role.[22] But it is worthwhile to examine some of the aspects of teaching that are likely both to serve as focal points for private values, and consequently to become major or supporting features of a teacher's own identity.

Identity Features of Teaching

From one viewpoint, teaching is a position of influence. On the public value level this is reflected by the concept of "helping others" as a motivating desire among teachers. On the private value level, however, it might represent a need for power or a need for usefulness; teaching may provide feelings of superiority, since the teacher is often looked to by the students as an authority, and a knowledgeable source of information. According to Bush, this image of the teacher as a "purveyor of knowledge" is far from uncommon among teachers:

> According to research, the teacher perceives his main role to be that of purveying knowledge to students. . . . He also perceives that he should keep youngsters under direct control at all times. . . . While he will accord others some say in the selection of what is to be taught, how it is to be taught is strictly his own affiar, not subject to scrutiny by anyone else. The classroom is his castle.[23]

This image could be reflected in the persistence of the lecture and lecture-oriented methods as primary teaching procedures in the school systems, despite a long awareness among educators of the disadvantages

---

[22]Amidon, op. cit., p. 257.

[23]Robert Bush, "Redefining the Role of the Teacher," Theory into Practice, 6: 246-51, December, 1967.

of the lecture as a tool for communication.[24] The teacher as primarily a purveyor-lecturer has become so characteristic of education, particularly of education at the secondary level, that this role should not be ignored as a potential identity feature of teachers, as suggested by Bush.[25] It could provide a major stumbling block in any program designed to promote the proposed changes in role for teachers. Insofar as dependence on lecturing constitutes an identity feature for teachers, or insofar as it reflects a need for a position of superiority or authority, teachers may tend to resist any change in role that implies a restriction of lecturing behavior, unless other features of the new role provide them with gratifications and rewards strong enough to offset the loss.[26]

From another viewpoint, some teachers may evaluate their profession partially in terms of the expenditures of effort required by it.[27] Undoubtedly, the preparation needed to present material in the classroom through the use of audio-visual aids, discussions, and other non-directive techniques requires a greater outlay of time and effort than the preparation and presentation of a lecture on the same material.

---

[24]"Lecture-oriented teaching methods" can be defined here as any teaching procedures in which the instructor is talking to the students without provision for feedback from them, whether he is doing anything else, such as writing on the blackboard, or not. The term "lecture" will refer to exclusively verbal, one-way communication.

[25]Bush, loc. cit. [26]Goodenough, op. cit., pp. 215-250.

[27]Clifford F. S. Bebell, editor, The Educational Program (Denver: Designing Education for the Future, 1967), p. 37.

One rationale behind the extensive use of lecturing, therefore, could be derived from the teacher's work load. This may be a valid argument; the teacher simply may not have or want to use the time available for extensive material preparations. One answer to this argument, of course, is the increased use of paraprofessional personnel to relieve the teacher of some chores, allowing him to devote his time to the improvement of his classroom presentations. Even under these circumstances, a teacher may still perceive the work required to decrease the amount of lecturing as unnecessary effort not required in his perception of the teaching role.[28]

A third viewpoint suggests that many teachers seem to be insufficiently aware of their students' perceptions of them as teachers.[29] While the teacher may perceive a particular presentation as a discussion, with the students free to ask questions and interject their own ideas, the students often perceive it as a lecture. The teacher's intent is not shared by his audience. A student who has been severely reprimanded in one class for asking questions may not risk subjecting himself to such punishment a second time, preferring to hold his silence in class whether or not he understands the presented material. The teacher may interpret this reticence as the student's indication of his complete understanding of the material. If so, the teacher

---

[28] Ibid., p. 39.

[29] Ned A. Flanders, "Intent, Action, and Feedback: A Preparation for Teaching," Journal of Teacher Education, 14: 251-260, 1963.

then feels that he has accomplished a great deal, which serves to reinforce his use of this teaching method, while the student is left with the products of incomplete communication. It is only at examination time that the teacher becomes aware of the resultant deficiencies, which he may attribute to the student's poor retentive power, or to the test used. But rarely does the teaching method itself become suspect.[30]

In this latter viewpoint, the teacher apparently assumes that his own perceptions of himself and his motives are shared by his students. He builds for himself a self-reinforcing identity as a good teacher, an identity seldom penetrated by contrary evidence.[31] This is not to say that he will necessarily reject contrary evidence, if and when he becomes aware of it. It merely points out that in the normal course of events he will not realize the difficulty.[32]

In each of these three viewpoints it is suggested that lecturing behaviors may be associated with private level values significant in a teacher's identity, and that therefore a change in the behavior will involve a change in the identity. The importance of these suppositions at this point is not in the precise definition of the nature of

---

[30]Amidon, op. cit., p. 286. [31]Ibid.

[32]In his own limited experience with Flander's Interaction analysis, the writer has repeatedly heard teachers say, "But that's not what I meant to do," or, "I intended this to be a discussion," when shown the results of an analysis of their teaching. Most teachers observed were then quite anxious to correct the deficiencies indicated, and were very receptive to constructive criticism.

the association, but in an awareness of the complexity of the behavior determinants involved. A sound program of change must be designed to provide all of the requisites for changing such complex behaviors.

IV. THE SIGNIFICANCE OF ATTITUDES TOWARD LECTURING

Examining the attitudes of teachers toward lecturing is an objective both interesting and informative in its own right. Placed in the theoretical framework of a problem in social change, however, its importance is increased by virtue of the prominence of the concept of lecturing in the framework.

The disadvantages of lecturing in efficient communication make dependence on it unattractive with respect to the goal of effective education.[33] However, the persistence of lecturing reflects its gratification of some needs yet to be identified.[34] Thus, a teacher's attitudes towards lecture, when compared to other percepts of teaching, may reflect the teacher's dominant behavioral tendencies and goals.[35] The important information needed in this study, however, derives not from the

---

[33]N. Macoby, "New Scientific Rhetoric," The Science of Human Communication, Wilbur Schramm, editor (New York: Basic Books, Inc., Publishers, 1963), pp. 32-36.

[34]Goodenough, op. cit., pp. 70-75.

[35]Leon H. Warshay, "Breadth of Perspective," Human Behavior and Social Processes, Arnold M. Rose, editor (Boston: Houghton Mifflin Company, 1962), p. 152; and Raymond B. Cattell, Personality, a Systematic and Factual Study (New York: McGraw Hill Book Company, Inc., 1950), pp. 82-85; and Gardner Murphy, Personality, A Bio-Social Approach to Origins and Structure (New York: Harper and Row, Publishers, 1947), pp. 442-44.

attitudes themselves, but from a comparison of attitudes toward lecturing with attitudes toward teaching itself. Does the individual equate lecturing with teaching?

Such attitudes might be inferred from choices implicit in overt behavior, or be measured more formally by some specific instrument. Several factors complicate the task of determining attitudes, and most of the difficulties stem from the possible difference between an individual's public and private levels of attitude and value. Festinger makes this distinction when he speaks of "real" change of attitude versus publicly expresses attitude change in his hypothesis that public compliance without private acceptance occurs under conditions of threat of punishment for non-compliance.[36] Support for this hypothesis is gained from the work of Blake and Helson, who report that experimental subjects shifted from attitudes expressed when tested alone to group expressions when tested in group situations.[37] These studies indicate that attitude response is dependent upon different individual-situational interaction settings, and inferences drawn from measured attitudes must take this into account.

---

[36]Leon Festinger, "An Analysis of Compliant Behavior," Group Relations at the Crossroad, Muzafer Sherif and M. O. Wilson, editors (New York: Harper and Row, Publishers, 1953), pp. 232-256.

[37]Robert R. Blake and Harry Helson, "Adaptability Screening of Flying Personnel: Situational and Personal Factors in Conforming Behavior," United States Air Force, School of Aviation Medicine, Report Number 56-58 (Washington: Government Printing Office, 1956), p. 61.

It might be inferred from attitudes, if they can be validly measured, whether or not some degree of role change has already occurred. Lee's findings indicating that individuals shift attitudes when they shift roles are supported by Diggory, who concluded that differences in attitude organization generally parallel role differences.[38]

In summary, a valid exploration of private level teacher attitudes toward lecturing in relation to their attitudes toward other percepts of teaching is significant in the following ways: (1) as a reflection of dominant behavioral tendencies; (2) as a criterion behavior by which accomplishment of role change might be indicated; and (3) as a first step in an exploration of the requisites for changing the teaching role.

The Agent of Change

If a program designed to change the role of teachers is to be carried out, the primary change agent will be the undergraduate teacher-training programs. Though other agencies have a definite effect through publications and in-service training programs, it is the colleges and universities who have influence on the greatest number of teachers. It would be of value, then, to consider teacher-trainees as the potential clients of the change program, and to investigate what

---

[38]Alfred M. Lee, "Attitudinal Multivalence in Relation to Culture and Personality," American Journal of Sociology, 60: 294-299, November, 1954; and James C. Diggory, "Sex Differences in the Organization of Attitudes," Journal of Personality, 22: 89-100, January, 1953.

effects present teacher-training programs are having on their trainees' attitudes toward lecturing. This could not only be of value to the specific college programs involved in the study, but could also help to determine the conditions under which the change program would have to operate.

The writer found only one study which evaluated the effects of an audio-visual methods course on attitudes. This study concluded that taking a course in audio-visual methods did not significantly change prospective teachers' attitudes toward teaching.[39] It could be worthwhile to evaluate the effects such a course might have on attitudes toward lecturing, as attitudes toward a specific teaching method would probably not have been reflected in the study cited above because of the instrument used (the Minnesota Teacher Attitude Scale[40]).

---

[39]James H. Cole, "Effects of an Audio-Visual Course on Prospective Teachers' Attitudes Toward the Use of Audio-Visual Materials and Toward Teaching," (unpublished Doctoral dissertation, Indiana University, 1964).

[40]Carol H. Leeds and Walter W. Cook, "The Construction and Differential Value of a Scale for Determining Teacher-Pupil Attitudes," Journal of Experimental Education, 16: 149, December, 1947.

CHAPTER III

THE THEORY AND TECHNIQUES OF ATTITUDE MEASUREMENT

Attitudes, as psychological constructs, have been studied extensively in the last forty years, but only in the past twelve years has their measurement been effectively associated with semantic meaning in a quantitative fashion. The term "attitude," itself, has been defined in different ways by different investigators, and several heuristic definitions are in common use. Green stresses the importance of co-variance among responses, pointing out that such co-variance must be related to the variation of what he calls a "latent attitude variable," which is defined operationally by the correlations among the responses. He then formally defines an attitude as ". . . a psychological construct, inferred from observable responses to stimuli, which is assumed to mediate consistency and covariation among the responses."[1] While maintaining the importance of the relationship between responses as observed variables and the actual attitudes as latent variables, this study will operate within the definition of attitude offered by Thurstone because of the emphasis it puts on the many-faceted nature of attitudes. "The concept attitude . . . will denote the sum total of a man's inclinations and feelings, prejudice or bias, preconceived notions, ideas, fears, threats, and convictions

---

[1] Bert F. Green, "Attitude Measurement," Handbook of Social Psychology, Vol. I, Gardner Lindzey, editor (Reading: Addison-Wesley, Inc., 1954), Chapter 9.

about any specific topic."[2]

The early definitive works on attitude measurement are usually credited to Lickert[3] and Thurstone;[4] it was Thurstone who first adapted the methods of psychophysical scaling to the ratings of affective reaction toward various objects. The approaches to the study of attitudes are changing in contemporary research, however, as shown by Cartwright's statement:

> Current interest in attitudes centers not so much on the responses as on the relationships among them. These relationships, either among one subject's responses to different administrations of the same test or among different subjects' responses to the test, are taken as indicators of higher order constructs.[5]

Study of attitudes based on private level values by a questionnaire instrument is difficult. Getzels describes a respondant's answers to a questionnaire as a compromise between his actual opinion (which, says Getzels, is not directly available for study; cf. Green), and his perceptions of the requirements of his immediate situation.[6] The

---

[2]L. L. Thurstone, and E. J. Chave, The Measurement of Attitude (Chicago: The University of Chicago Press, 1929), pp. 6-7.

[3]Rensis Lickert, "A Technique for the Measurement of Attitudes," Archives of Psychology, Number 140 (New York: Columbia University, 1932).

[4]L. L. Thurstone, "The Measurement of Opinion," Journal of Social Psychology, 22: 415-430, December, 1928.

[5]Darwin Cartwright, "Social Psychology and Group Processes," Annual Review of Psychology, 8: 211-236, 1957.

[6]Jacob W. Getzels, "The Question-Answer Process: A Conceptualization and Some Derived Hypotheses for Empirical Examination," Public Opinion Quarterly, 18: 80-91, Spring, 1954.

word "lecture," for example, is likely to have become a negatively emotionally loaded word for most teacher-trainees, and will thus make their actual opinions about it particularly difficult to infer. The work of Razran concludes that, in general, the principles of learning apply as much to attitudes as to any other behavior, but the degree to which emotional loading as such represents potential behavior modification accompanied by private acceptance is difficult to ascertain.[7]

In the design of a study utilizing a questionnaire instrument, the researcher must decide whether to construct his own instrument or whether to use a previously established instrument. There are advantages and disadvantages both ways. An instrument he designs will be "custom-tailored" to his problem, but it will not have normative data to confirm its characteristics, nor will it have stood the test of the appraisal of other researchers and studies.[8] The instrument used for this study, of a semantic differential design, represents somewhat of a compromise, as succeeding discussion will show.

I. THE SEMANTIC DIFFERENTIAL

The semantic differential was developed by Charles Osgood, George Suci, and Percy Tannenbaum as an instrument to subject meaning to

---

[7] Gregory Razran, "The Conditioned Evocation of Attitudes (Cognitive Conditioning?)," Journal of Experimental Psychology, 48: 278-282, March, 1954.

[8] A. N. Openheim, Questionnaire Design and Attitude Measurement (New York: Basic Books, Inc., 1966), p. 106.

quantitative measurement. Kerlinger points out that, "While psychologists have siezed upon the semantic differential with enthusiasm, educators have shown much less ardor. Educational studies in which the SD [sic.] is used are rare."[9] There are a number of recent applications of the semantic differential to various educational problems, but none were found that used this approach to study teacher-trainee attitudes toward various percepts of teaching. This is one reason this instrument was selected for use in this study. It also provides a graphic view of the organization of these attitudes, both with respect to each other and with respect to cognitive landmarks of direction and strength.

Osgood assumes, at the outset, that meanings vary multidimensionally.[10] He goes on to characterize the basic rationale behind the instrument as follows:

> It is apparent that if we are to use linguistic encoding as an index of meaning we need (a) a carefully devised sample of alternative verbal responses which can be standardized across subjects, (b) the alternatives elicited from the subjects rather than emitted so that encoding fluency is eliminated as a variable, and (c) these alternatives need to be representative of the major ways in which meanings vary. In other words, rather than relying on the spontaneous emission of words relating to a particular stimulating sign, we need to play a game of "Twenty Questions" with our subject: SOPHISTICATED--is it hard or soft? Is it pleasant or unpleasant? Is it fast or slow? . . . The semantic differential is essentially

---

[9]Fred N. Kerlinger, Foundations of Behavioral Research (New York: Holt, Rinehart, and Winston, Inc., 1964), p. 576.

[10]Charles E. Osgood, George J. Suci, and Percy H. Tannenbaum, The Measurement of Meaning (Urbana: The University of Illinois Press, 1957), p. 17.

a combination of controlled association and scaling procedures.[11]

The wide applicability of this instrument has received general recognition. As Openheim indicates, it can be used to measure the perception of ". . . various political personages, different national or ethnic groups, or any other subject matter."[12] To be most useful, however, the concepts presented should have the potential of eliciting varied responses from people holding different attitudes.[13]

From the results of several carefully conducted factor analytical studies, Osgood, et al. have found that adjective pairs, used to define the bipolar rating scales, tend to fall into three primary clusters or factors. The most important factor consists of adjectives associated with evaluation, such as good-bad and pleasant-unpleasant. A potency factor, with adjectives like weak-strong, large-small, and an activity factor expressing motion or action, e.g., fast-slow, active-passive, are the other two important factors. Based on a demonstrated degree of independence of these three factors, Osgood conceptualizes what he calls the semantic space, whose three dimensions correspond to these three factors, and states,

> By semantic differentiation, then, we mean the successive allocation of a concept to a point in the multidimensional semantic space by selection from among a set of given scaled semantic

---

[11] Ibid., pp. 19-20.

[12] A. N. Openheim, Questionnaire Design and Attitude Measurement (New York: Basic Books, Inc., 1966), p. 205.

[13] Kerlinger, op. cit., p. 26.

alternatives. Difference in the meaning between two concepts is then merely a function of the differences in their respective allocations within the same space, i.e., it is a function of the multidimensional distance between the two points.[14]

II. THE CONSTRUCTION OF A SEMANTIC DIFFERENTIAL

Since "the semantic differential" refers not to any specific instrument, but to a pattern and technique by which an instrument may be designed, Osgood delineates several specific considerations involved in the construction of such an instrument, including the selection of the stimulus concepts to be rated, and construction of bipolar adjective rating scales.[15] These considerations, as presented by Osgood, are discussed in detail in the sections that follow, along with an analysis of the directions accompanying a semantic differential.

The Stimulus Concepts

The concepts selected for study constitute a stimulus, to which the subject's rating procedure is the response. Hence, the set of objects that can function as concepts for a semantic differential instrument is almost unlimited. Sounds, paintings, printed or spoken words or phrases, objects, photographs, or even people all could be rated meaningfully on appropriate sets of rating scales. The selection of the stimulus concepts to be used is a critical phase in the construction of a semantic differential, and the form in which they are presented is one of several considerations that should be taken into

---

[14] Osgood, op. cit., p. 26. [15] Ibid., pp. 76-85.

account. The concepts chosen must not only be relevant to the research problem, but must cover, to some extent, the semantic space being studied.

The majority of semantic differential instruments have used printed words for stimulus concepts, presumably for the ease of presentation. The use of nominatives such as "my ideal self" or "Democrats" is common, and adjectives and infinitives have also been used.

Concepts are usually selected to cover only one part of the total semantic space, i.e., the concepts are limited to the particular topic under investigation. For example, one would be unlikely to find political views and concepts of mental illness measured by the same instrument, even though such a comparison might be useful in an unusual research problem.

The concepts should, however, be reasonably representative of the portion of semantic space in question. If all of the concepts are close in meaning, it is difficult to adequately define the dimensions of the space involved.

The concepts will usually constitute a sample of all of the concepts relevant to the problem. They should provide variance sufficient for meaningful inferences to be drawn concerning the semantic space under investigation.

The Rating Scales

The next task in developing a semantic differential instrument is the selection of a set of adjective pairs to define the rating

scales. The objective of this selection is to provide a small sample of closely related scales to represent each dimension of the semantic space, but it is important that each set of scales represent only one dimension, to the exclusion of the others, insofar as possible, since analysis of the data assumes the independence of the various dimensions. Osgood reports several factor analysis studies that determined the dimensional or factor loadings of many adjective pairs when applied to a variety of concepts, and the selection of specific scales should take these factor loadings into account.[16]

A second consideration, according to Osgood, in the selection of adjective pairs, is their relevance to the concepts to be rated. Since irrelevant adjective pairs could be expected to produce a neutral judgement from subjects, their inclusion in an instrument would reduce the amount of information gained from a limited number of scales. However, all of the adjective pairs used in a semantic differential do not have to have obvious relevance to the concepts in order to be useful. As Kerlinger points out:

> Meanings are rich and complex, and an apparently irrelevant adjective pair may turn out to be relevant. If consistent systematic varience can be identified with an adjective pair, then one would have to conclude that the adjective pair is relevant to the concepts.[17]

Another criterion in the selection of adjective pairs involves what Osgood calls the semantic stability of the pair for the concepts and subjects involved. High-low would be expected to be stable

---

[16] Osgood, op. cit., Chapter II. [17] Kerlinger, op. cit., p. 570.

across a set of auditory signals, yet it would lose its stability if the set also included social concepts or concepts regarding emotional states. Further, the adjective pairs must also represent linear opposites passing through the theoretical origin of the semantic space. Rugged-delicate, for example, is not linear with respect to evaluation, according to Osgood, since both adjectives tend to be favorable in meaning, and hence the scale cannot pass through the origin.[18]

The Directions Given to Subjects

A semantic differential can be designed to be suitable for either individual or group administration; in either case the directions given the subjects are likely to be much the same. In The Measurement of Meaning, Osgood provides a quite detailed set of example instructions that have been used verbatim in a number of semantic differential instruments. The instructions explain the type of response the subject is expected to make, and the interpretation that is to be made of each of the possible response blanks. The subject is then told:

> Sometimes you may feel as though you've had the same item before on the test. This will not be the case, so do not look back and forth through the items. Do not try to remember how you checked similar items earlier in the test. Make each item a separate and independent judgment. Work at fairly high speed through this test. Do not worry or puzzle over individual items. It is your first impressions, the immediate "feelings" about the items, that we want. On the other hand, please do not be careless, because we want your true impressions.[19]

This particular wording was examined by Miron in a reliability study

---

[18] Osgood, op. cit., p. 79. [19] Ibid., pp. 82-84.

of a semantic differential. These instructions were varied systematically and checked for test-retest reliability. Though all correlations found were high enough to constitute good evidence of the reliability of the instrument in general, the findings supported most strongly the use of this particular wording.[20]

III. ANALYSIS OF A SEMANTIC DIFFERENTIAL

A semantic differential instrument provides a great amount of information from a relatively short administration time. Scores can be analyzed for differences between concepts, between scales, between subjects, or in any combination of these. Simple profile analysis can show the different ways in which several objects or concepts are rated on the same set of scales and how two or more groups differein these respects. A semantic differential instrument should contain equal numbers of scales for each factor or dimension; the scores from each of these can then be averaged separately to produce mean factor scores. These three sets of data can be analyzed separately or together: individuals or groups can be compared on one, two, or all of the semantic factors.[21]

To show how concepts are related to one another, the dimensional or factor scores of an individual or a group are treated as the coordinates

---

[20]Murray S. Miron, "The Influence of Instruction Modification upon Test-Retest Reliability of the Semantic Differential," Educational and Psychological Measurement, 21: 883-93, Winter, 1961.

[21]Osgood, op. cit., pp. 85-102.

of the location of that concept in the semantic space. If two concepts are close together in semantic space, they are interpreted as being alike in meaning for the individual or group making the judgements. The more they are separated in semantic space, the less alike they are in meaning. Similarity in meaning can thus be quantified as a function of the geometric distance between the two points. This distance is computed by Osgood's D-score which is simply the generalized distance formula of solid geometry:

$$D_{ij} = \sqrt{\sum d_{ij}^2}$$

where D is the linear distance between any two concepts, i and j, and d is the algebraic difference between the coordinates of i and j on the same factor (evaluative, potency, etc.). This computation can be repeated for all possible comparisons within a set of concepts to generate a D matrix representing the similarity relations among all of the concepts. This matrix can in turn be analyzed to search out the concepts within it that tend to cluster together, or two or more matrices can be compared by computing the coefficients of correlation between the D's of each pair of matrices.[22]

Several fundamental assumptions underlie these analytical procedures. The first assumption, that of normalacy of data, is made as soon as factor scores are defined as average or mean values. Osgood refers to this assumption only once, and then obliquely, when he says, "Although we have usually employed the <u>mean</u> to represent such group

---

[22] Osgood, op. cit., pp. 91-97.

measures, there are some reasons for favoring the median or even the mode in dealing with semantic data."[23]

It is further assumed, particularly in the use of D-scores, that the intervals both within a single scale and between different scales are equal, but Messick, in a study of the metric properties of the semantic differential, concluded that ". . . the scaling properties implied by the semantic differential procedures have some basis other than mere assumption."[24]

A third assumption that is made if the D-score is used is that the factors or dimensions are truly independent. Support for this assumption must come from the factor analytic work done with a particular instrument, as previously discussed.

In a letter to Dr. Osgood, the writer proposed an analysis technique that might have overcome some of the limitations presently imposed on the analysis of semantic differential data. No reply has been received at this writing.

IV. RELIABILITY AND VALIDITY

Quite a number of studies have been published supporting the reliability and validity of semantic differential instruments, and a few of these will be mentioned herein. In one study, students

---

[23] Ibid., p. 87.

[24] Samual J. Messick, "Metric Properties of the Semantic Differential," Educational and Psychological Measurement, 17: 200-266, Summer, 1957.

in an introductory psychology course were asked to rate the concepts "myself," "my ideal self," and "neurotic." The distance between "ideal self" and "neurotic" was found to be greater than the distance between "myself" and "neurotic," which was interpreted as evidence supportive of the validity of the instrument.[25]

In a study by Kelly and Levy, subjects were asked to match various concepts with unlabled semantic differential profiles, two at a time. Analysis of results showed that the greater the distance between the two concepts, as measured by the D-score, the greater the frequency of correct matchings.[26]

Osgood reports test-retest reliability for "meaning" in general as r = .85 and for attitudes as r = .91.[27] Smith measured the validity of a semantic differential against other types of scales and reported these correlations:

> against a Thurstone scale, r = .74 - .82;
> against a Guttman scale, r = .78;
> against the Bogardus Social Distance Scales, r = .72 - .80.[28]

These results are quite impressive, and are indicative of good

---

[25]Austin E. Grigg, "A Validity Study of the Semantic Differential Technique," Journal of Clinical Psychology, 15: 179-91, April, 1959.

[26]Jane A Kelly and Leon H. Levy, "The Discriminability of Concepts Differentiated by Means of the Semantic Differential," Educational and Psychological Measurement, 21: 53-58, Spring, 1961.

[27]Osgood, op. cit., pp. 126-128.

[28]Raymond G. Smith, "Validation of a Semantic Differential," Speech Monographs, 30: 50-55, March, 1963.

reliability and validity. However, it should be kept in mind that each study validates only one particular set of concepts as ranked on one particular set of scales. The versatility of the semantic differential idea derives from its ability to be adapted to a great variety of situations by selecting different concepts and different adjective pairs. Though these and other studies suggest the general stability of many different semantic differential instrument, it can clearly be seen that each new adaption is a new instrument and has the potential to depart from any previously determined norms of performance. Osgood has recently concluded that the evaluative, potency, and activity dimensions are likely to be stable across sets of subjects, but relatively unstable across concepts. And of these three dimensions, the evaluative and potency factors seem to be more stable than the activity dimension.[29]

V. APPLICABILITY OF THE INSTRUMENT TO THE PROBLEM

A semantic differential instrument, as discussed in this chapter, constitutes an appropriate instrument to be used in accomplishing the objectives of this study. The data from a semantic differential cannot be analyzed for all of the estimates of significance that might be desirable because of statistical limitations, but it does provide a unique view of the structure of subjects' attitudes toward various concepts. It is of value in this study to examine the multidimensional

---

[29]Charles E. Osgood, "Explorations into Semantic Space," The Science of Human Communication, Wilbur Schramm, editor (New York: Basic Books, Inc., Publishers, 1963), pp. 32-36.

aspects of attitudes in keeping with Thurstone's definition of attitude,[30] though Osgood himself defines attitudes operationally as the projection of meaning onto the evaluative dimension.

A semantic differential permits an examination of the organization of teacher-trainee attitudes toward lecturing and other percepts of teaching; it also allows a comparison of the attitudes of trainees just beginning their teacher education program with the attitudes of trainees just completing their program. Further, a comparison of the attitudes of trainees having completed a course in audio-visual methods with the attitudes of trainees not having had such a course will provide a basis for inferences regarding the ability of this course to influence trainee attitudes.

---

[30]L. L. Thurstone and E. J. Chave, The Measurement of Attitude (Chicago: The University of Chicago Press, 1929), pp. 6-7.

CHAPTER IV

THE RESEARCH DESIGN

Preceding chapters have described the purposes of this study, the theoretical framework within which results were to be interpreted, and the theories and techniques pertinent to the collection of data for the study. The delimitations of the study were discussed and specific hypotheses to be tested were stated. The formulations of a precise research design involved the construction and pre-testing of a specific instrument, the selection and testing of a suitable sample of subjects, and the choice and application of the particular statistical tools needed.

I. THE CONSTRUCTION OF THE INSTRUMENT

In light of the objectives of the study, the selection of the stimulus concepts to be used required particular attention. The form in which these concepts were to be presented also warranted careful deliberation. Concepts had to be selected whose rating by the subjects would indicate the subjects' perceptions of lecturing and teaching as comparable entities. A list of approximate synonyms for the infinitive "to teach" was selected from Roget's International Thesaurus.[1] After considerable study with members of the writer's

---

[1] Roget's International Thesaurus (New York: Thomas J. Crowell Company, 1958).

graduate committee and several other educators, the following infinitives were selected for trial in the pilot study: to teach, to explain, to instruct, to lecture, to communicate, to educate, and to discuss.

It was decided to present the concepts as printed infinitives for ease of presentation in the instrument, but with each infinitive accompanied by a brief explanatory sentence directing the subject to rate the concept rather than rating an individual who performs the indicated action. The stimulus concept "to teach," for example, appeared as follows in the instrument:

"TO TEACH

Use only the concept of 'teaching'

not any specific teacher."[2]

Because of the hypothesis regarding the effects of a course in audio-visual methods, the concept "audio-visual instruction" was also included as a stimulus concept. It was decided, however, to present it separately, both because it could not be put meaningfully in an infinitive form parallel to the other stimuli used, and because it might have influenced the context in which the other concepts were rated.

The Rating Scales

Proceeding on the assumption that the evaluative, potency, and activity dimensions would prove to be the significant measures of

---

[2]The complete instrument finally used in the study is included in Appendix A.

these concepts, three bipolar pairs of adjectives were selected for each of the dimensions from the lists of adjectives whose factor loadings had been determined in various studies reported by Osgood.[3] The three pairs chosen to represent the evaluative dimension were good-bad, successful-unsuccessful, and valuable-worthless; the three potency dimension pairs were strong-weak, hard-soft, and severe-lenient; the three scales representing activity were active-passive, fast-slow, and sharp-dull.

The Assembly of the Instrument

The form in which the instrument was used in the study follows the recommendations made by Osgood.[4] Each stimulus concept, with its explanatory sentence, was given at the top of a page, followed by the nine bipolar rating scales. The instrument was assembled to be administered in two parts, one containing the general directions and the infinitive form concepts, the other containing the "audio-visual instruction" concept. The experimental group was also given a brief questionnaire to determine whether each subject had taken or was presently taking an audio-visual methods course, and, if not, whether he intended to do so.

The order of presentation of adjective pair scales was fixed

---

[3]Charles E. Osgood, George J. Suci, and Percy H. Tannenbaum, The Measurement of Meaning (Urbana: The University of Illinois Press, 1957), Chapter IV.

[4]Ibid., pp. 80-85.

as follows: first, the order of polarity of the scales (i.e., which adjective of each pair would appear on the left) was randomly determined through the use of a table of random numbers. Then the order of presentation of the scales on the page was determined randomly. This order of presentation was subsequently maintained on every page of every copy of the instrument. Those pages headed by infinitive form concepts were then randomized within each copy of the instrument.

The Instructions

The instrument was designed to be suitable for either group or individual administration; in both cases, the verbal instructions given all subjects were as follows:

> This study is being conducted for the College of Education. The instrument is designed to determine the meaning of certain words to various people. The instrument is in two parts; when you finish the first part I will give you the second. When you complete a given section, please do not go back and change any answers, since it is your first impressions we are interested in. And will you please not discuss the instrument, either while you are taking it, or after you take it, with anyone who may still be on the sample list.

The written instructions, as discussed in Chapter III, were presented at the beginning of the instrument in the wording suggested by Osgood.[5] These instructions, as they appeared in the instrument, are included in Appendix A. It was then thought advisable to pre-test the instrument before making final adjustments of the concepts and rating scales.

---

[5] Ibid., pp. 83-84.

II. THE PILOT STUDY

The objectives of the pilot study were: (1) to determine which concepts elicited systematic variance differentiating a control and an experimental group; (2) to ascertain whether the stimulus concepts used included a close synonym for the infinitive "to lecture;" and (3) to determine if the rating scales used elicited a predominance of meaningful ratings and a minimum of "neutral or unrelated" (position 4) ratings.

Sampling and Data Collection

In order to approximate the sample to be used in the study, two groups of subjects were selected for testing in the pilot study. Thirty-three freshmen students, the total enrollment of three sections of a freshman English course at Montana State University, served as the control group. Thirty-four junior and senior teacher-trainees, the fall quarter enrollment in a secondary education general methods course at Montana State University, served as the experimental group. Though no measure of the college majors represented in either group was obtained, the group of freshmen were likely to be drawn from most of the departments on campus, since that particular English course is a required course for most freshmen. The juniors and seniors were likely to represent the typical majors found in a secondary education program, since that general methods course is required to all secondary level teacher-trainees.

It was determined that none of the subjects used in the pilot study were used in the main study sample. The juniors and seniors were further assumed to be well advanced in their teacher training program because of the advanced position of the methods course in the secondary teacher-training program. None of these students had enrolled for student teaching, and thus would not be included in the main study sample.

The instrument, as described in preceding paragraphs, was administered to these two groups of subjects, the freshmen being tested in three separate groups, and the juniors and seniors being tested in one group. All tests were conducted by the writer. No questionnaire was included in the pilot study.

Results and Conclusions from the Pilot Study

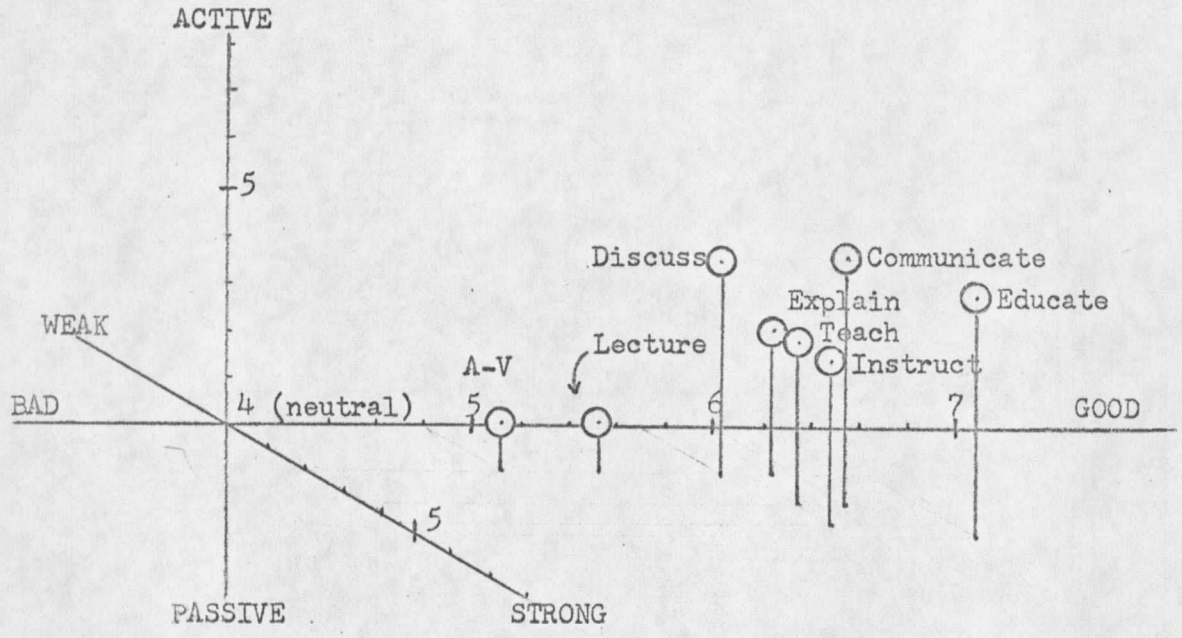
Time prevented a complete analysis of the data obtained from the pilot study. However, several findings of significance to the problem were discovered.

Assuming the evaluative, potency, and activity dimensions, the ratings of each subject were averaged, first across the three scales representing each dimension, and then across all of the subjects in the group. Three factor scores for each concept were obtained for each of the two groups of subjects. Since the three dimensions were assumed to be independent, each set of three factor scores could be treated as the coordinates of the location of a particular concept in a three dimensional semantic space. Therefore, the locations of

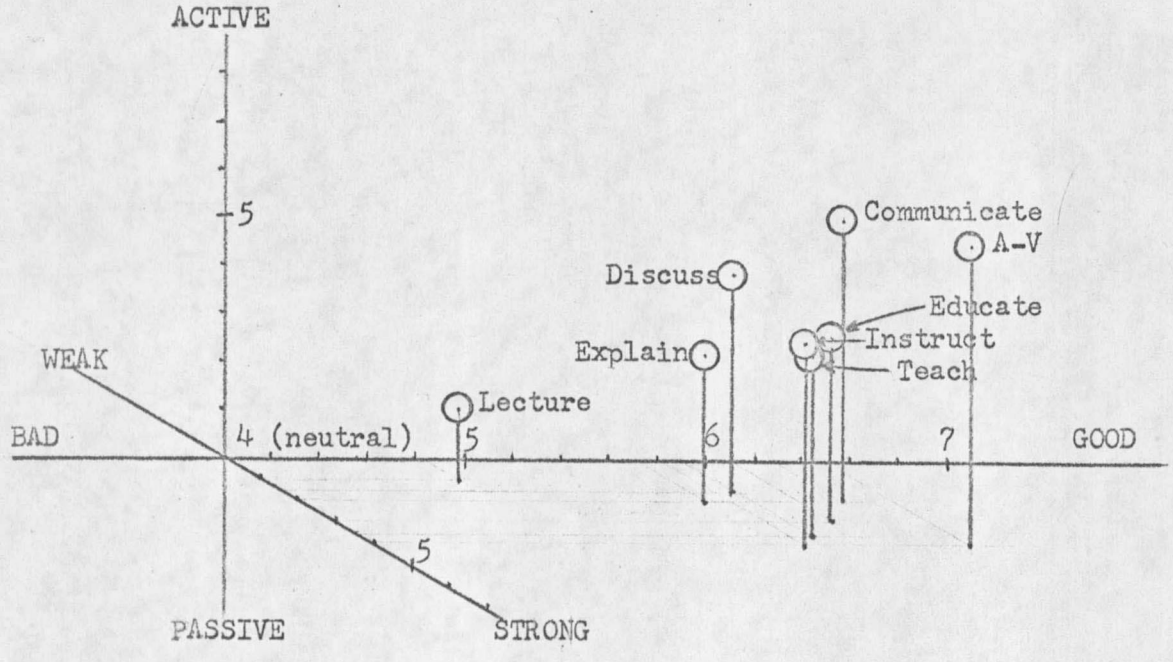
the eight concepts rated were plotted for each group, and the results compared. A sketch showing the results of this graphing, for the pilot project, is presented in Figure 1 on the following page.

As can be seen in Figure 1, the most significant difference between the two groups is the location of the concept "audio-visual instruction," while "to discuss" and "to communicate" did not differentiate between the two groups at all. The teacher-trainees seemed to perceive "to teach," "to instruct," and "to educate" as quite close to each other in meaning, but different from "to explain." The freshmen appeared to cluster the concepts "to teach," "to instruct," and "to explain," but tended to separate "to educate" as something different. Both groups apparently attributed about the same "activity" to "to lecture," yet the freshmen seemed to rate it higher on the evaluative and potency dimensions than did the teacher-trainees. On the basis of these observations it was decided to delete the concepts "to discuss" and "to communicate" from the main study, since they failed to differentiate between the two groups, but to include the other six concepts. It can further be seen from Figure 1 that neither group perceived a synonym for "to lecture" among the other seven concepts rated.

Examination of all the subjects' ratings on each separate rating scale revealed that no scale received more than four "neutral or meaningless" ratings. Since this is just over five percent of the total responses made on each scale, it indicated that the scales were being perceived as relevant to the concepts rated.



Control Group Results



Experimental Group Results

Figure 1. Three Dimensional Representation of the Pilot Study Results

As a consequence of the findings of the pilot study, no change was made in the rating scales in the assembly of the final instrument. The pages headed by one of the five infinitive form stimulus concepts were randomized in each copy of the final instrument. The questionnaires were attached to the copies of the instrument that were to be administered to the experimental group subjects.

III. SAMPLING PROCEDURES AND DATA COLLECTION

The control group consisted of all of the secondary education teacher-trainees enrolled in the Fall, 1968, College of Education orientation course. This course is the first in the normal sequence of education courses for secondary level trainees; the students in this course were just beginning their teacher education program, though not all of them were freshmen. It cannot be assumed that this group constituted a representative sample of secondary trainees beginning the program, since not all secondary trainees at Montana State University take this particular course; some departments on campus offer their own orientation courses for their majors intending to teach.

All subjects responded to the instrument anonymously, and no measure was taken of each individual's sex or college major, but from the class records of the group it was determined that they consisted of twenty-one males and twenty-six females, making a total of forty-seven subjects in the control group. The college majors represented were as follows: thirteen subjects were majoring in Secondary Education,

ten in Mathematics, four each in English and General Studies, three each in Botany and History, two in Sociology, and one each from Physics, Biology, Modern Languages, Social Science, Commerce, Chemical Engineering, Speech, and Psychology.

The experimental group was defined as all secondary teacher-trainees who completed their student teaching during the Fall or Winter quarter of the 1968-69 school year at Montana State University. This limited the experimental group to seniors who had completed all but one of the course requirements in the secondary teacher-training program. Due to the restrictions of time, it was not feasible to collect data on the trainees who student taught during Spring quarter, 1969; it was felt to be desirable to limit the sample to subjects who had completed this experience. The exclusion of these subjects from the sample was not considered to be a serious detriment to the sample, since normally very few trainees do not complete their student teaching before Spring quarter.

A list of their Fall and Winter student teachers was obtained from the Department of Secondary Education at Montana State, and each of these students was sent a letter, signed by the Dean of the College of Education, requesting their appearance during any one of five two-hour periods for participation in the study. (A copy of this letter is included in Appendix B.) Approximately half of the students to whom letters were sent appeared. The remainder, where possible, were telephoned and appointments made for their testing. Out of these 170 secondary teacher-trainees, 49 had graduated or for other reasons left

school. Of the remaining 121 students, 108 were tested. Of the remaining thirteen students, four failed to appear after being contacted. The other nine could not be reached to telephone or mail.

The 108 subjects in the experimental group consisted of 42 males and 66 females. The college majors represented in the group were as follows: fourteen subjects were majoring in Home Economics, twelve in Physical Education, eleven in English, ten each in Agricultural Education and Secondary Education, eight each in Mathematics and Music or Music Education, seven in History, six each in Modern Languages and Art or Art Education, three each in Industrial Arts, Social Science, and Biology, two each in Commerce, Chemistry, and Business Education, and one in General Science.

Data Collection Procedures

Subjects in the control group were tested just after mid-quarter, Fall, 1968, in three groups of approximately equal size, drawn from the three sections of the orientation course. The writer was introduced by the professor of the course as conducting a study for the College of Education. The students were taken from the class as a group to a separate room where the test was administered. The time taken to complete the testing was about twenty minutes per group. Each group was given the verbal instructions as described previously, and the first part of the instrument was then administered. When all subjects in the group had completed the first part, these were collected. The second part,

consisting for the control group of only the single page bearing the "audio-visual instruction" concept, was then administered. When all subjects in the group had finished, this page was collected, and the students returned to their class.

Subjects in the experimental group were tested during the last three weeks of Winter quarter, 1968-69. Testing was done in a large room with many individual work spaces available. As each subject appeared he was given the verbal instructions previously described, then was handed the first part of the instrument. As each subject finished Part I he brought it to the author who handed him Part II, which consisted, for the experimental group, of the "audio-visual instruction" stimulus page followed by the questionnaire. When the subject finished Part II, he was free to leave.

Subject Cooperation

The cooperation given by the subjects was consistently high. Though a number of subjects expressed mild puzzlement with the instrument, none indicated any hostility or rancor in the testing situation, and the majority were overtly friendly and cooperative. Only two subjects out of 157 responded with facetious marks impossible to analyze. Their responses were discarded.

The Identification of Sub-Groups

The data from the 108 subjects in the experimental group was organized into several sub-groups on the basis of the subjects' responses to the questionnaire. Twenty-four subjects had not had a course in

audio-visual methods and indicated that they did not intend to take such a course before their graduation. (The audio-visual methods course is not required for secondary teacher-trainees at Montana State.) Another eighteen subjects had not had an "A-V" course, but intended to take it before graduation. These two sub-groups were combined to form the "No A-V" experimental group of forty-two subjects. Eighteen subjects were enrolled in the audio-visual methods course at the time of the testing, and another forty-eight subjects indicated that they had previously completed an audio-visual course. Since the testing took place quite near the end of the quarter, data from these two groups of subjects was combined to form the "Have A-V" experimental group of sixty-six subjects.

None of the control group subjects had completed the pre-requisite course for the audio-visual methods course. Therefore, no breakdown of the data on these forty-seven subjects was used in the study.

IV. PROCEDURES FOR THE ANALYSIS OF THE DATA

The responses of all subjects to the instrument were reproduced on IBM data sense form sheets from which the data was transferred to IBM cards for computer analysis. The entire statistical analysis was accomplished under the direction of Dr. Albert Suvak, through the services of the Montana State University Computing Center.

The Factor Analysis

It was considered advantageous to perform a factor analysis of the data obtained with the instrument, to determine the actual dimensions involved and to identify the specific scales representing them. To this end, the individual scores on each scale were summed, first across the six concepts and then across all subjects. The intercorrelations among the nine scales were then computed as Pearson Product Moment Correlations.[6] These thirty-six correlations were then factored by Thurstone's centroid method to identify the particular factors and compute the factor loadings of each scale on each factor.[7] A varimax rotation of the factors was then performed to provide clarity of interpretation.[8]

The Intra-Group Comparisons

The data were analyzed in terms of four groups of subjects: (1) the control group, N = 47; (2) the "Have A-V" experimental group, N = 66; (3) the "No "A-V" experimental group, N = 42; and (4) the total experimental group, N = 108. The structure and organization of concepts

---

[6]Quinn McNemar, Psychological Statistics (New York: John Wiley and Sons, Inc., 1955), p. 118.

[7]L. L. Thurstone, Multiple Factor Analysis (Chicago: The University of Chicago Press, 1947), pp. 125-147.

[8]Henry F. Kaiser, "An Analytic Rotational Criterion for Factor Analysis," (abstract) The American Psychologist, 10: 438, August, 1955.

for each group was analyzed by examining group mean scale and factor scores for each concept. The factor scores were then treated as the coordinates of the location of each concept in a multi-dimensional space, and the distances between concepts for each group were computed.

The Inter-Group Comparisons

Four separate inter-group comparisons were made among these four groups. One was on the basis of the separate group scale scores, two were on the basis of group mean dimension or factor scores, and the last was on the basis of the group D-score matrices.

The scale score comparisons. The average group response on each scale for each concept was computed for each of the four groups, yielding fifty-four average scale scores for each group. Each of these group scale score distribution was compared with the corresponding scale score distribution from each of the other three groups by computing the F- and t-ratios for uncorrelated distributions.[9] The F-ratios were used to test for differences in variance of response, while the t-ratios tested for differences between means.

---

[9]The F-test is defined as follows: $F = \frac{s_1^2}{s_2^2}$

where s_1^2 is the larger of the two sample variances and s_2^2 is the smaller variance. The t-test is defined as follows: $t = \frac{X_1 - X_2}{s_{d_x}}$

where X_1 and X_2 are the means and s_{d_x} is the standard error of the difference between the two means. McNemar, op. cit., p. 109, and p. 145.

The factor score comparisons. The average group dimension or factor score for each of the factors found in the factor analysis of the instrument was calculated by summing the individual scale scores across the scales representing each dimension, then averaging across the subjects of each group. These factor score distributions for each group were compared with the corresponding distributions from each of the other groups, again by computing the F- and t-ratios.[10] The four groups were also compared on the originally assumed evaluative, potency, and activity dimensions by calculating the factor scores on these dimensions for each group in the manner just described.

The D-score matrices. The matrix of mean D-scores for each group was computed, and various inter-group "D's" were compared by computing F- and t-ratios for each pair of mean D-scores.[11] This use of the F- and t-ratios with D-scores assumed the normalcy of the D-score distribution.

V. SUMMARY

To accomplish the objectives of the study, an instrument of a semantic differential design as discussed in Chapter III was constructed. The instrument was pre-tested on two groups of subjects, comparable to the control and experimental subjects which were to be used in the study.

---

[10] Ibid. [11] Ibid.

The adjusted instrument was administered to a control group of 47 secondary level teacher-trainees beginning their teacher-training program, and to an experimental group of 106 secondary level teacher-trainees nearing the completion of their teacher-training program. Subjects in the experimental group were divided into those who had completed a course in audio-visual methods of teaching, and those who had not had such a course.

The procedures for the analysis of data collected provided for a factor analysis of the data to determine the major dimensions of variance. In terms of these dimensions, then, each group's organization of the concepts rated in the instrument could be examined. Procedures were then established for comparing the various groups in terms of their mean scale scores, factor or dimension scores, and their D-score matrices.

CHAPTER V

THE ANALYSIS OF THE DATA

The data obtained on the subjects was analyzed in terms of Osgood's evaluative, potency, and activity dimensions, which the scales had been selected to represent, and, in a separate analysis, with respect to the two factors identified in the centroid factor analysis.[1] Table I on page 56 shows the final results of this factor analysis, obtained after a varimax rotation of the factors.[2] The factor loadings of each scale show that the first two factors identified were clearly interpretable, but the third was not. Therefore, the factor analysis was discontinued after the extraction of three factors.

As can be seen in Table I, the first factor identified correlated highly with the three presumed evaluative scale, good-bad, successful-unsuccessful, and valuable-worthless, with two of the three presumed activity scales, active-passive and sharp-dull, and with one of the supposed potency scales, strong-weak. The remaining activity scale and the two remaining potency scales were nearly independent of Factor I, but correlated negatively with Factor II. The complete results of the centroid factor analysis and the varimax rotation are presented in Tables XVI and XVII in Appendix C.

---

[1] L. L. Thurstone, Multiple-Factor Analysis (Chicago: The University of Chicago Press, 1947).

[2] Ibid.

TABLE I

FACTOR LOADINGS OF EACH SCALE ON THE FACTORS
EXTRACTED BY VARIMAX ROTATION

Osgood's Dimensions	scales	factors I	II	III
evaluative	Good-Bad	0.90865	0.00159	0.00066
activity	Active-Passive	0.80596	-0.11410	0.00054
evaluative	Successful-Unsuccessful	0.88423	-0.02835	0.00072
potency	Strong-Weak	0.85277	-0.18705	0.00059
activity	Sharp-Dull	0.75793	-0.12314	0.00078
potency	Severe-Lenient	0.07740	-0.39910	0.00010
evaluative	Valuable-Worthless	0.60779	-0.22559	0.00106
activity	Fast-Slow	0.12039	-0.39258	0.00024
potency	Hard-Soft	-0.04321	-0.78473	0.00025

Factor I, then, apparently represents a "dynamic-goodness" dimension, similar to one of several "modes of evaluation" identified by Osgood.[3] Factor II, being represented most heavily by the severe-lenient and hard-soft scales, could be described as a "permissiveness" dimension. Therefore, in succeeding discussion, these names will be used to refer to these two factors.

I. THE INTRA-GROUP ANALYSIS

The subjects participating in the experiment were divided into four groups, as described in the preceeding chapters. The data obtained on each of these four groups will be discussed separately before the inter-group comparisons are presented.

The Control Group

The data collected on the forty-seven subjects in the control group was first analyzed in terms of mean scale scores obtained on each concept. These results are presented in Table II on page 58.[4] The control group subjects tended to rate "to lecture" lower than any other concept on all but three scales: the three scales representing the permissiveness dimension.

When mean scores for the dynamic-goodness and the permissiveness

---

[3]Charles E. Osgood, George J. Suci, and Percy H. Tannenbaum, The Measurement of Meaning (Urbana: The University of Illinois Press, 1957), p. 62.

[4]The standard deviations for each of these distributions are presented in Table XVIII in Appendix C.

TABLE II

CONTROL GROUP MEAN SCORES ON EACH SCALE FOR EACH CONCEPT

Scale	Educate	Explain	Instruct	Lecture	Teach	A-V Inst.
Good-Bad	6.38	5.91	6.00	5.19	6.30	6.13
Active-Passive	5.94	5.64	5.81	5.02	6.15	5.57
Successful-Unsuccessful	5.89	5.72	5.70	4.89	6.04	5.68
Strong-Weak	5.44	5.32	5.36	4.57	5.87	5.38
Sharp-Dull	5.34	4.89	5.08	4.36	5.49	5.21
Severe-Lenient	4.06	4.02	4.04	4.45	4.06	3.89
Valuable Worthless	6.21	6.13	6.08	5.45	6.42	5.83
Fast-Slow	4.08	4.04	4.34	4.25	4.36	5.13
Hard-Soft	4.49	4.25	4.31	4.36	5.53	4.11

dimensions were computed, the results presented in Table III, below, were obtained.

TABLE III

CONTROL GROUP MEAN SCORES FOR EACH CONCEPT ON THE DYNAMIC-GOODNESS AND PERMISSIVENESS DIMENSIONS

Dimension	Educate	Explain	Instruct	Lecture	Teach	A-V Inst.
Dynamic-Goodness	5.87	5.61	5.67	4.92	6.05	5.64
Permissiveness	4.22	4.11	4.23	4.35	4.32	4.38

Analyzed with respect to the dynamic-goodness dimension, the lower rating of "to lecture" is emphasized, particularly in comparison with the concept "to educate," which tended to receive the highest ratings on most scales. Ratings on the permissiveness dimension appear to reverse these trends; higher ratings on the permissiveness scales indicate that a concept is perceived as strict rather than permissive, the highest ratings being associated with the three adjectives hard, fast, and severe. The control group tended to rate "to lecture," "to teach," and "A-V instruction" as less permissive than most of the other concepts. "To lecture," therefore, is being consistently rated closer than most of the other concepts to the adjectives bad, passive, unsuccessful, weak, dull, severe, worthless, fast, and hard.

This same trend is maintained when the mean responses on the evaluative, activity, and potency dimensions are examined, as can

be seen in Table IV, below.[5]

TABLE IV

CONTROL GROUP MEAN SCORES FOR EACH CONCEPT ON THE EVALUATIVE, ACTIVITY, AND POTENCY DIMENSIONS

	Educate	Explain	Instruct	Lecture	Teach	A-V Inst.
Evaluative	6.16	5.92	5.93	5.18	6.26	5.88
Activity	5.12	4.86	5.08	4.55	5.33	5.31
Potency	4.67	4.53	4.57	4.46	4.82	4.46

The trend is most obvious along the evaluative dimension, as might be expected, since the three presumed evaluative scales contributed most heavily to the dynamic-goodness dimension.

The distances between the various concepts can best be examined by representing each distance as a D-score.[6] Analyzing each possible pair among six concepts generates fifteen D-scores, which can then be placed in a 5 X 5 matrix. Table V on the following page shows the D-scores obtained with respect to the dynamic-goodness and the permissiveness dimensions. The smaller D-scores suggest that "to educate," "to explain," "to instruct" and "to teach" are somewhat clustered together while both "to lecture" and "A-V instruction" are separate from

---

[5]The standard deviations for each of the distributions in Tables III and IV are presented in Table XIX in Appendix C.

[6]Osgood, op. cit., p. 91.

TABLE V

MATRIX OF CONTROL GROUP D-SCORES COMPUTED WITH RESPECT TO THE DYNAMIC-GOODNESS AND PERMISSIVENESS DIMENSIONS

	Explain	Instruct	Lecture	Teach	A-V Inst.
Educate	4.48	4.23	7.75	3.54	8.02
Explain		4.37	7.61	4.68	8.82
Instruct			6.46	4.53	7.67
Lecture				8.23	9.26
Teach					7.94

them and from each other.

The D-scores computed with respect to the evaluative, potency, and activity dimensions are presented in Table VI on page 63. Here again, "to explain," "to instruct," "to educate," and "to teach" are clustered, but "to lecture" and "A-V instruction" are separate or isolated.

When mean factor scores for a concept are treated as the coordinates of the location of that concept in the multidimensional space, a representation of results is obtained that gives the clearest summary of the responses of the group. In such a representation, two concepts located close together in the space are similar in meaning, while two concepts that are far apart in the space are also further apart in the meaning attributed to them by the group. The actual geometric distance between the concepts in the space is the D-score computed for those concepts with respect to those dimensions. Thus, both a two-dimensional and a three-dimensional representation of the organization of these concepts for the control group can be drawn. These representations are presented in Figures 2 and 3 on pages 64 and 65, where the control group structure is contrasted with the organization of the total experimental group on the same dimensions. The analysis of the total experimental group responses is then discussed in the following section.

In the preceeding discussion of the analysis of the control group responses, it was shown how response trends indicated in mean scale scores were further clarified in the analysis of mean factor

TABLE VI

MATRIX OF CONTROL GROUP D-SCORES COMPUTED WITH RESPECT TO THE EVALUATIVE, ACTIVITY, AND POTENCY DIMENSIONS

	Explain	Instruct	Lecture	Teach	A-V Inst.
Educate	4.24	3.85	6.01	3.21	6.36
Explain		3.91	5.84	4.07	7.22
Instruct			5.38	3.76	6.54
Lecture				5.95	7.46
Teach					6.23

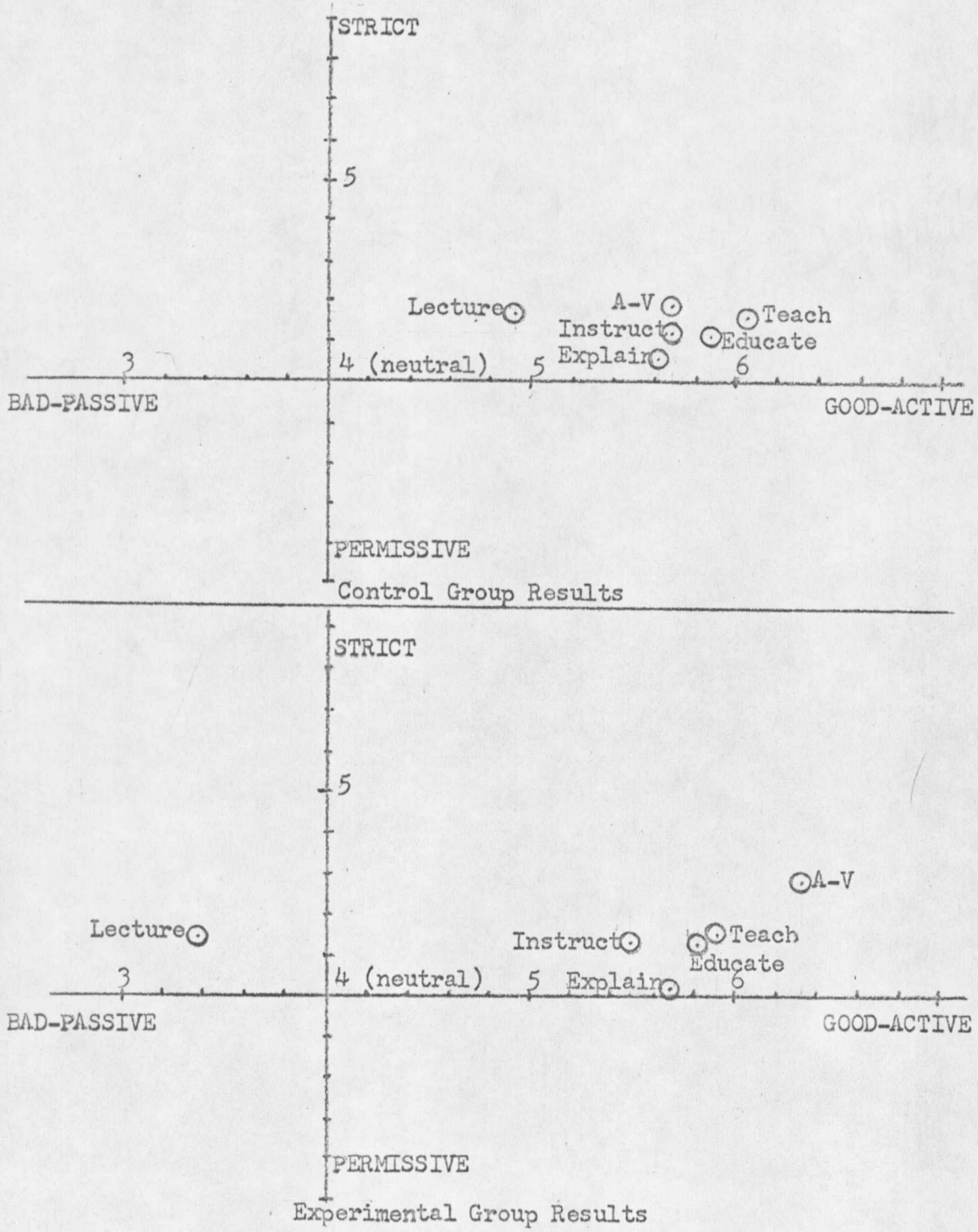
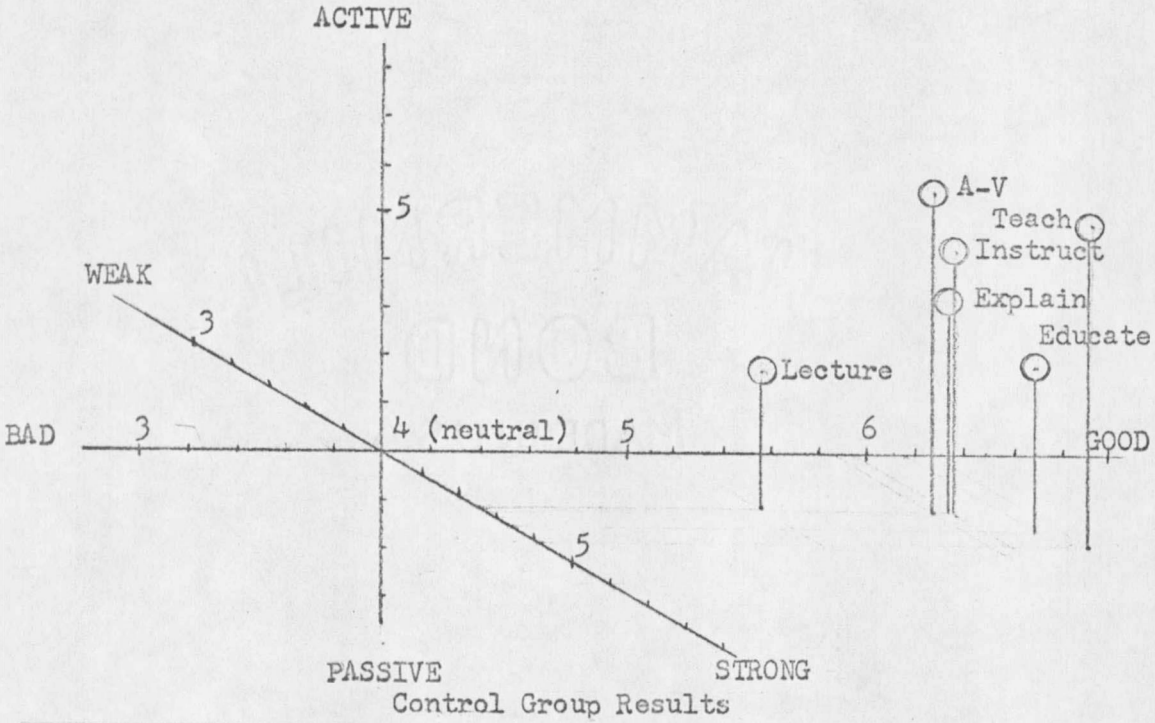
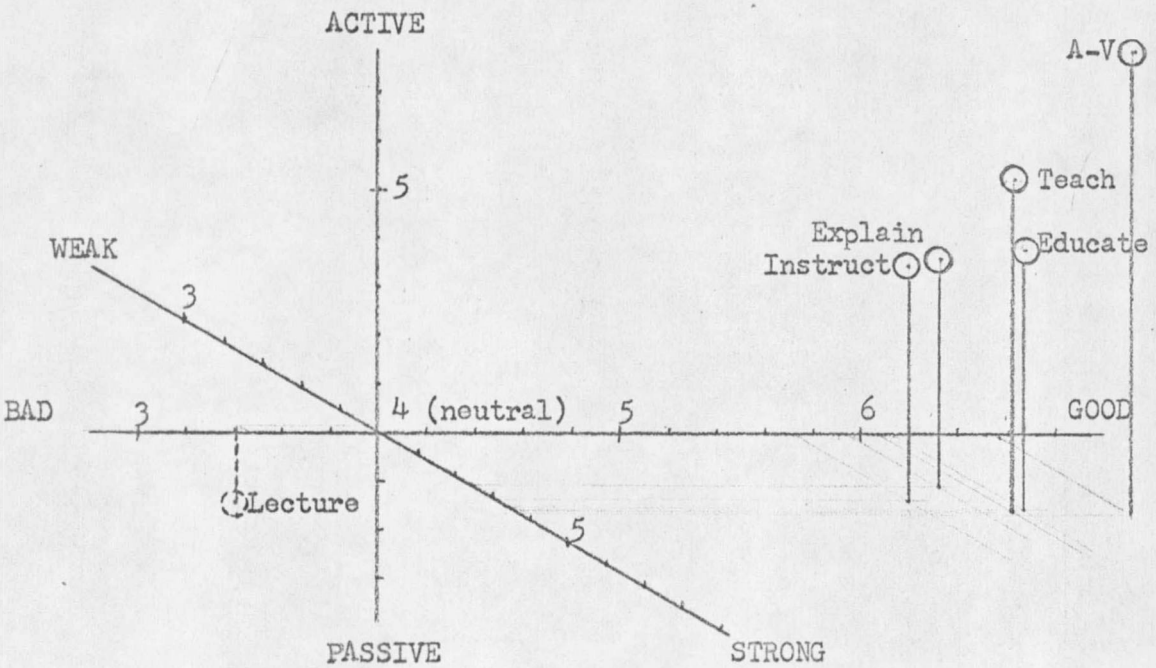


Figure 2. Two Dimensional Representation Contrasting Control and Experimental Group Results.



Control Group Results



Experimental Group Results

Figure 3. Three Dimensional Representation Contrasting Control and Experimental Group Results.

scores, D-score matrices, and in the two and three dimensional representations of the responses of the group. Similar situations occur in the analysis of the total experimental group responses and in the analysis of the two experimental sub-groups. Therefore, in the discussions to follow, only the D-score matrices and the two and three dimensional representations are presented; the mean scale and factor scores are presented in the appropriate tables in Appendix C.

The Total Experimental Group

Examination of Figures 2 and 3 on pages 64 and 65 reveals that the general clustering of concepts by the experimental group was similar to the clustering perceived by the control group. "A-V instruction" was still separated to some extent, but the most striking feature is the complete isolation of the concept "to lecture." The D-score matrices for the experimental group are shown on pages 67 and 68, Table VII corresponding to the experimental group representation in Figure 2, and Table VIII corresponding to the experimental group drawing in Figure 3.[7] In these matrices the clustering and separations of the various concepts reflected in Figures 2 and 3 are quite evident, particularly in the large D-scores that indicate the relative isolation of the concept "to lecture."

The total experimental group was divided into two sub-groups by ascertaining which experimental subjects had completed a course in

---

[7]The mean scale and factor scores and standard deviations for each concept are presented in Tables XX and XXI in Appendix C.

TABLE VII

TOTAL EXPERIMENTAL GROUP D-SCORE MATRICES COMPUTED WITH RESPECT TO THE DYNAMIC-GOODNESS AND PERMISSIVENESS DIMENSIONS

	Explain	Instruct	Lecture	Teach	A-V Inst.
Educate	5.79	5.57	16.38	5.53	6.04
Explain		5.62	15.42	5.37	6.10
Instruct			14.07	5.59	6.99
Lecture				16.59	18.72
Teach					5.18

TABLE VIII

TOTAL EXPERIMENTAL GROUP D-SCORE MATRICES COMPUTED WITH RESPECT TO THE EVALUATIVE, ACTIVITY AND POTENCY DIMENSIONS

	Explain	Instruct	Lecture	Teach	A-V Inst.
Educate	4.94	4.81	11.24	4.70	5.45
Explain		4.86	10.52	4.71	5.24
Instruct			9.77	4.59	5.84
Lecture				11.25	12.99
Teach					4.57

audio-visual methods. The responses of the "Have A-V" and the "No A-V" experimental sub-groups are discussed in the next two sections.

The "Have A-V" Group

The mean scale and factor scores and their standard deviations for the subjects who had completed a course in audio-visual methods are presented in Tables XXII and XXIII in Appendix C. On the basis of the dynamic-goodness and permissiveness dimension mean scores, the D-scores presented in Table IX on page 70 were computed. The D-scores computed from the evaluative, activity, and potency dimension mean scores are presented in Table X on page 71. Both of these matrices indicate a clustering of the concepts "to explain," "to educate," "to instruct," and "to teach," with a slight separation of the concept "A-V instruction." "To lecture" is separated more completely in these matrices than in any other matrices presented.

The overall organization of the concepts by the "Have A-V" group can best be seen in Figures 4 and 5, on pages 72 and 73. These graphs show the two and three dimensional representations of the locations attributed to the concepts in semantic space by the group.

The "No A-V" Group

The mean scale and factor scores and standard deviations for the experimental subjects who had not taken a course in audio-visual methods are presented in Tables XXIV and XXV in Appendix C. The D-scores computed with respect to the dynamic-goodness and permissiveness dimensions are shown in Table XI on page 75, while the D-scores computed with

TABLE IX

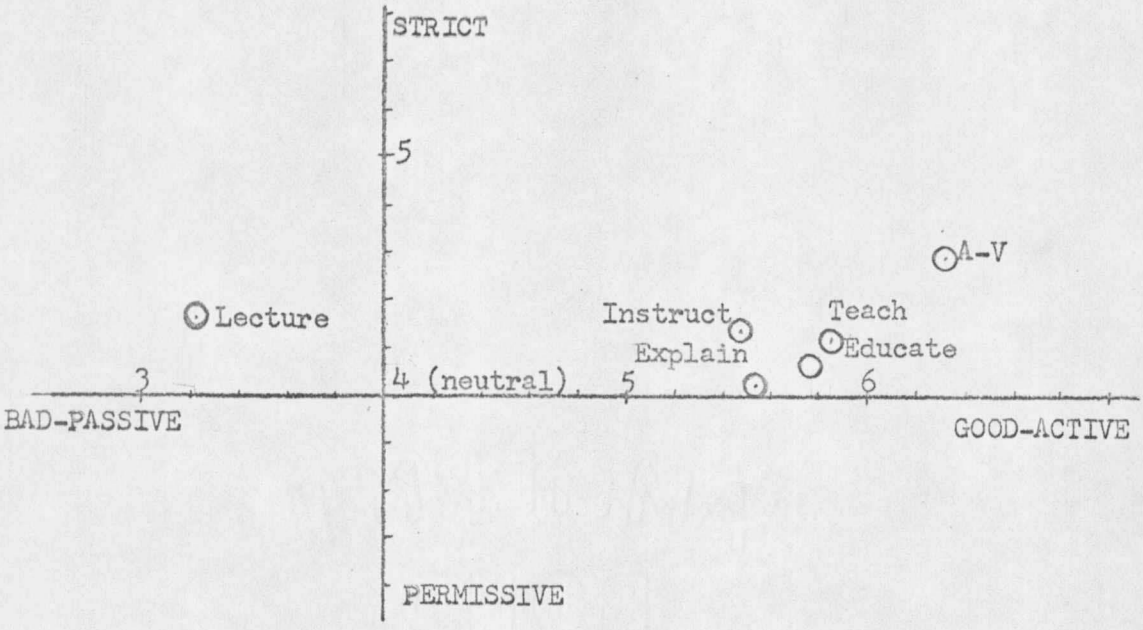
MATRIX OF "HAVE A-V" GROUP D-SCORES COMPUTED WITH RESPECT TO THE DYNAMIC-GOODNESS AND PERMISSIVENESS DIMENSIONS

	Explain	Instruct	Lecture	Teach	A-V Inst.
Educate	6.00	5.71	16.60	5.68	6.06
Explain		5.78	16.03	5.25	6.70
Instruct			14.48	5.98	7.42
Lecture				16.95	19.87
Teach					5.34

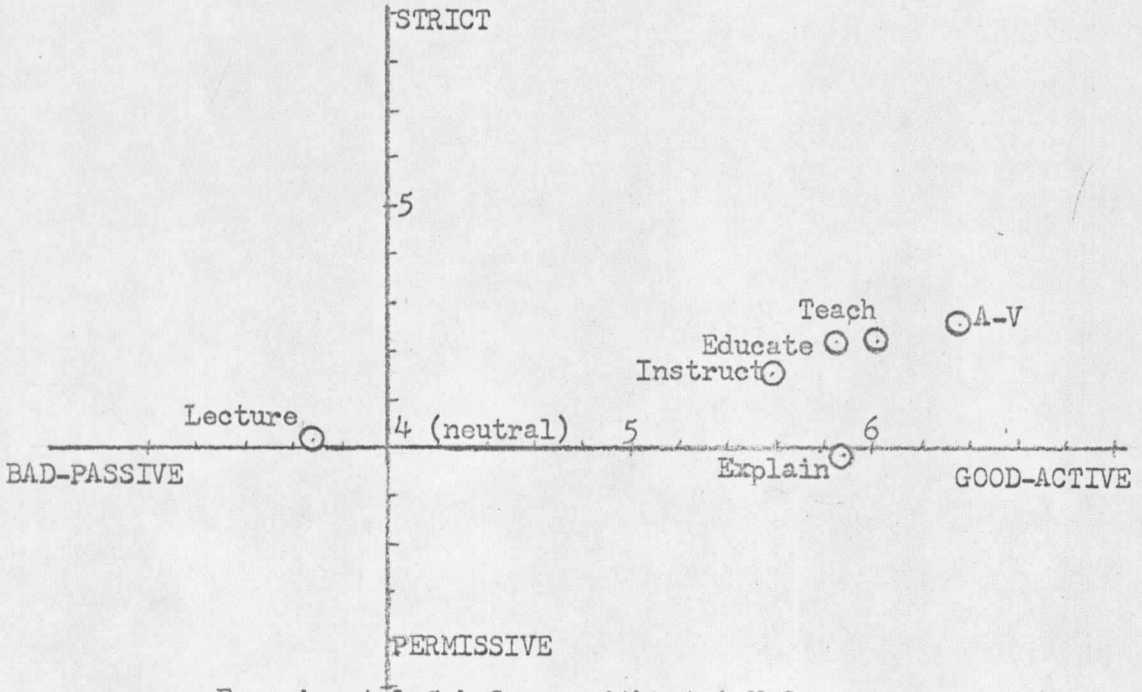
TABLE X

MATRIX OF "HAVE A-V" GROUP D-SCORES COMPUTED WITH RESPECT TO THE EVALUATIVE, ACTIVITY, AND POTENCY DIMENSIONS

	Explain	Instruct	Lecture	Teach	A-V Inst.
Educate	4.79	4.77	11.25	4.65	5.21
Explain		4.77	10.86	4.31	5.44
Instruct			10.14	4.90	6.01
Lecture				11.40	13.71
Teach					4.47

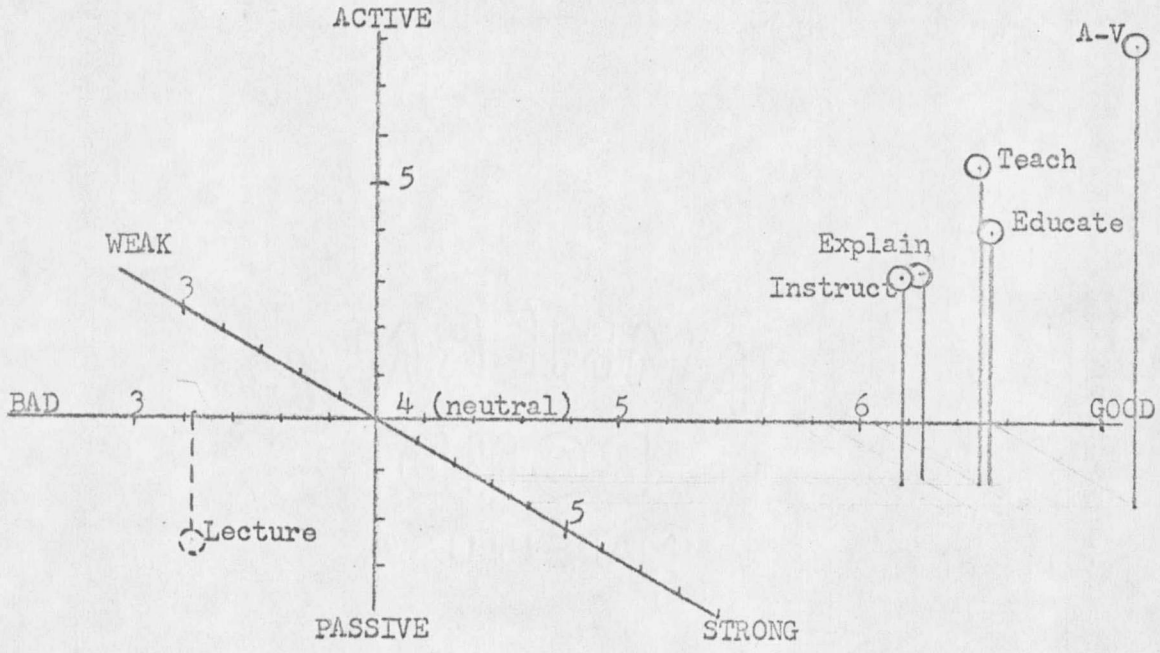


Experimental Sub-Group with A-V Course

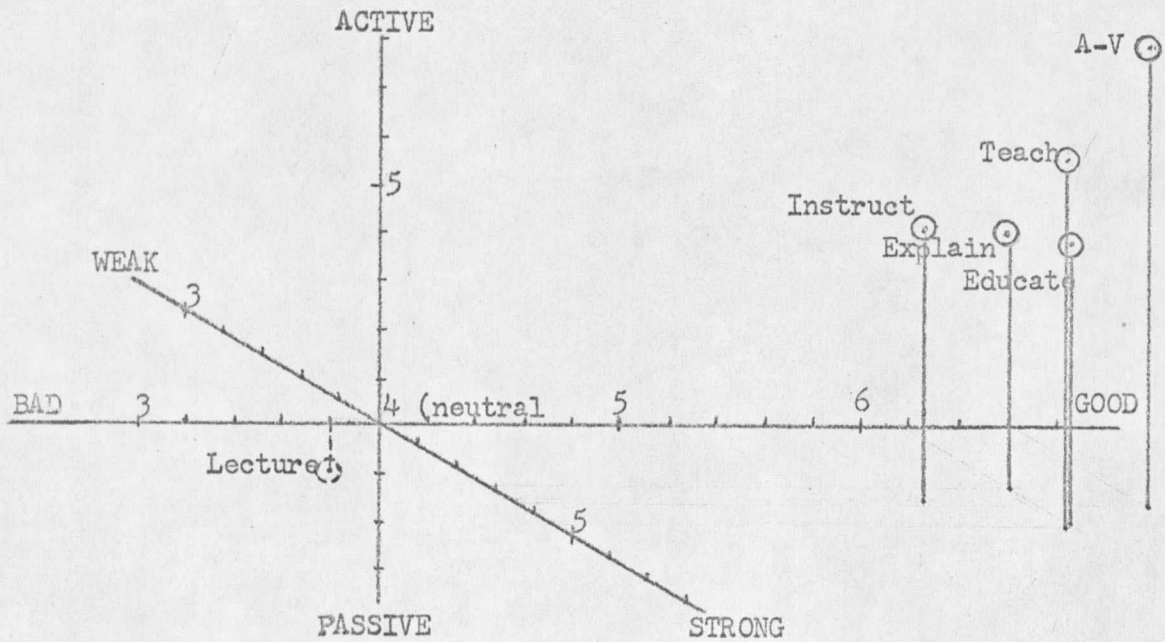


Experimental Sub-Group without A-V Course

Figure 4. Two Dimensional Representation Contrasting the Results of the Two Experimental Sub-Groups.



Experimental Sub-Group with A-V Course



Experimental Sub-Group without A-V Course

Figure 5. Three Dimensional Representation Contrasting the Results of the Two Experimental Sub-Groups.

respect to the evaluative, activity, and potency dimensions are presented in Table XII on page 76. Tables XI and XII reflect a configuration similar to that obtained for the other groups, with a clustering of five of the concepts and the isolation of the concept "to lecture," but this latter separation was less than that manifested by the "Have A-V" group.

Summary of the Intra-Group Analysis

Each of the four groups examined manifested essentially the same configurations in their perceptions of the concepts. The concepts "to educate," "to explain," "to instruct," and "to teach" were all rated toward the "positive," that is, the active, good, potent, end of every dimension except on the permissiveness dimension, where they were rated at or near the neutral midpoint. "A-V instruction" was perceived even more positively by each of the groups, except, again, on the permissiveness dimension, where it was rated near the lenient or permissive end. "To lecture" was isolated by all groups, being rated lower than all other concepts on all dimensions except the permissiveness dimension, where it was rated as being more severe or strict than the other concepts.

Though all groups evidenced similar organizations of the concepts, these organizations were by no means the same. The precise differences between the various groups is analyzed in the following section.

TABLE XI

MATRIX OF "NO A-V" GROUP D-SCORES COMPUTED WITH RESPECT TO THE DYNAMIC-GOODNESS AND THE PERMISSIVENESS DIMENSIONS

	Explain	Instruct	Lecture	Teach	A-V Inst.
Educate	5.44	5.36	16.03	5.30	6.00
Explain		5.37	14.47	5.57	5.16
Instruct			13.42	4.98	6.32
Lecture				16.02	16.90
Teach					4.92

TABLE XII

MATRIX OF "NO A-V" GROUP D-SCORES COMPUTED WITH RESPECT TO THE EVALUATIVE, ACTIVITY, AND POTENCY DIMENSIONS

	Explain	Instruct	Lecture	Teach	A-V Inst.
Educate	5.19	4.88	11.23	4.78	5.81
Explain		5.00	9.99	5.33	5.94
Instruct			9.18	4.11	5.58
Lecture				11.01	11.87
Teach					4.73

II. THE INTER-GROUP ANALYSIS

Four separate inter-group analyses were made. The total experimental group, the "Have A-V" sub-group, and the "No A-V" sub-group were each compared to the control group, and the "Have A-V" group was additionally compared to the "No A-V" group.

The Control Group and Total Experimental Group Compared

The control and the total experimental groups' mean responses on each scale for each concept were compared by computing the F- and t-ratios for uncorrelated means for each corresponding pair of scales.[8] The values of the ratios obtained, and the corresponding degrees of freedom are presented in Table XXVI in Appendix C. The scales that revealed differences between the two groups that were significant at or beyond the .05 level are summarized in Table XIII on page 78. The results shown in Table XIII indicate that the concept "to lecture" was rated consistently and significantly higher by the control group than by the experimental group on six of the nine scales. (It should be noted that these six scales define the dynamic-goodness dimension extracted in the factor analysis, discussed in the previous section.) In contrast, the control group rated the concept "A-V instruction" significantly and consistently lower than did the total experimental group on the same six scales. The control group manifested a significantly

---

[8]Quinn McNemar, Psychological Statistics (New York: John Wiley and Sons, 1955), p. 109 and p. 245.

TABLE XIII

SUMMARY OF SIGNIFICANT DIFFERENCES BETWEEN CONTROL GROUP AND TOTAL EXPERIMENTAL GROUP MEAN RESPONSES TO EACH SCALE FOR EACH CONCEPT AS INDICATED BY F AND T TESTS*

	Educate		Explain		Instruct		Lecture		Teach		A-V Inst.	
	T	F	T	F	T	F	T	F	T	F	T	F
Good-Bad**							TT-				T+	FF-
Active-Passive							TT-				TT+	FF-
Successful-Unsuccessful						F-	TT-				TT+	FF-
Strong-Weak							TT-				TT+	F-
Sharp-Dull							TT-	F-			T+	FF-
Severe-Lenient												
Valuable-Worthless		FF-					TT-				TT+	FF-
Fast-Slow										FF+		
Hard-Soft				F+				F+				

*Levels of significance reported in this table and in the other tables in this chapter were obtained from Charles D. Hodgman (editor), The Handbook of Chemistry and Physics, 40th edition (Cleveland; Chemical Rubber Pbulishing Company, 1958), pp. 216-223.

**Key to interpretation of this table:
T = t-ratio for means significant at or beyond .05 level;
TT = t-ratio for means significant at or beyond .01 level;
F = F-ratio for variance significant at or beyond .05 level;
FF = F-ratio for variance significant at or beyond .01 level;
+ = experimental group figure greater than control group figure;
- = control group figure greater than experimental group figure.

wider variance in their ratings of "A-V instruction" than the experimental subjects. Experimental subjects, however, exhibited wider variance on two of the three permissiveness scales on certain concepts.

The two groups' mean factor scores were also compared by computing the F- and t-ratios for uncorrelated means. The results of these comparisons are presented in Table XXVII in Appendix C, and a summary of significant differences between the two groups on these factors is shown in Table XIV on page 80.

The results shown in Table XIV confirm the differentiating ability of the dynamic-goodness dimension with respect to the concepts "to lecture" and "A-V instruction," for the control and total experimental groups. It can also be seen that the experimental group subjects exhibited a wider variation in their activity dimension responses to the concept "to teach" than the control group subjects, but the control group subjects varied more than the others in their evaluative responses to the concept "to instruct" ($.05 > p > .01$).[9]

The corresponding D-scores for each group, both those computed with respect to two dimensions and those derived from the three-dimensional system, were also compared with F- and t-tests for uncorrelated means. The values obtained for these ratios are presented in Tables XXVIII-XXX in Appendix C. A summary of the significant differences between the two groups is shown in Table XV on page 81.

---

[9]This notation indicates that the level of confidence obtained was between the .05 and the .01 levels.

TABLE XIV

SUMMARY OF SIGNIFICANT DIFFERENCES BETWEEN CONTROL GROUP AND TOTAL EXPERIMENTAL GROUP RESPONSES ON THE EVALUATIVE, ACTIVITY, POTENCY, DYNAMIC-GOODNESS, AND PERMISSIVENESS FACTORS FOR EACH CONCEPT AS INDICATED BY F AND T TESTS*

	Educate		Explain		Instruct		Lecture		Teach		A-V Inst.	
	T	F	T	F	T	F	T	F	T	F	T	F
Evaluative						F-	TT-				TT+	FF-
Activity							TT-	F-		F+	TT+	FF-
Potency							TT-				T+	
Dynamic-Goodness							TT-				TT+	FF-
Permissiveness												

*Key to interpretation of this table:
T = t-ratio for means significant at or beyond .05 level;
TT = t-ratio for means significant at or beyond .01 level;
F = F-ratio for variance significant at or beyond .05 level;
FF = F-ratio for variance significant at or beyond .01 level;
+ = experimental group figure greater than control group figure;
- = control group figure greater than experimental group figure.

TABLE XV

SUMMARY OF SIGNIFICANT DIFFERENCES BETWEEN CONTROL GROUP AND TOTAL EXPERIMENTAL GROUP D-SCORES IN BOTH THE TWO AND THE THREE DIMENSIONAL SYSTEMS AS INDICATED BY F AND T TESTS*

		Explain		Instruct		Lecture		Teach		A-V Inst.	
		T	F	T	F	T	F	T	F	T	F
dynamic-goodness and permissiveness dimensions	Educate		FF+		FF+	TT+		T+	FF+		FF-
	Explain				FF+	TT+			FF+	T-	FF-
	Instruct					TT+	F+		FF+		
	Lecture							TT+		TT+	
	Teach									T-	FF-
evaluative, activity, and potency dimensions	Educate		FF+		FF+	TT+		T+	F+		FF-
	Explain				FF+	TT+			FF+	T-	FF-
	Instruct					TT+	F+		FF+		
	Lecture							TT+		TT+	
	Teach									T-	FF-

*Key to interpretation of this table:
T = t-ratio for means significant at or beyond .05 level;
TT = t-ratio for means significant at or beyond .01 level;
F = F-ratio for variance significant at or beyond .05 level;
FF = F-ratio for variance significant at or beyond .01 level;
+ = experimental group figure greater than control group figure;
- = control group figure greater than experimental group figure.

It should first be noted in Table XV that the significant differences found between the control and total experimental groups were identical in the two- and three-dimensional systems, with the exception of one F-ratio which was less significant in the three-dimensional system. Thus, analysis with respect to Osgood's evaluative, activity, and potency factors revealed almost exactly the same organization of concepts as did the analysis with respect to the dynamic-goodness and permissiveness factors.

The greater separation of the concept "to lecture" from all of the other concepts by the experimental group than by the control group was significant beyond the .01 level in all cases. Table XV also indicates that the total experimental group showed considerably more variance in their D-scores than the control group did except on the D-scores computed from the concept "A-V instruction." Finally, it can be seen in Table XV that the control group perceived a significantly greater distance between "to explain" and "A-V instruction" and between "to teach" and "A-V instruction" than did the total experimental group.

The "Have A-V" Group and "No A-V" Group Compared

It will be of value to examine in some detail the same comparisons between the "Have A-V" group and the "No A-V" group as were made between the control and total experimental groups. The corresponding mean scale scores will first be compared, followed by a comparison of corresponding factor scores, D-scores, and D-score matrices.

The "Have A-V" and "No A-V" groups' mean responses on each scale for each concept were compared by computing the F- and t-ratios for uncorrelated means for each corresponding pair of scales.[10] The values of the ratios obtained are presented in Table XXXI in Appendix C. One significant difference in means was found: the "No A-V" group rated "to lecture" as closer to valuable than did the "Have A-V" group ($.05 > p > .01$). Several differences in variance of responses were found, but in no apparent pattern, except that the "Have A-V" group exhibited greater variance in rating the concept "A-V instruction" on the three evaluative scales ($.05 > p > .01$).

When these two groups' mean factor scores were compared, the F- and t-ratios presented in Table XXXII in Appendix C were obtained. Again, one significant difference in means was found: the "No A-V" group rated "to lecture" higher on the evaluative scale than did the "Have A-V" group ($.05 > p > .01$). The "Have A-V" group exhibited wider variance in their responses to the evaluative and dynamic-goodness dimensions ($p < .01$), while the "No A-V" group manifested wider variance in their responses to the potency and permissiveness dimensions ($p < .01$). Thus, the only differences in mean scale or factor scores between the two groups was in their placement of the concept "to lecture" on the evaluative dimension.

The corresponding D-scores for each group, both those computed with respect to two dimensions and those derived from the three-

---

[10] McNemar, loc. cit.

dimensional system, were compared with F- and t-tests, yielding the ratios presented in Tables XXXIII-XXXV in Appendix C. Three differences between the two groups were found; all three were in terms of the variance in D-scores within each group. In the two-dimensional system, the "Have A-V" group showed significantly more variance than the "No A-V" group in the distance perceived between "to educate" and "to explain" ($.05>p>.01$), and in the distance perceived between "to explain" and "A-V instruction" ($p<.01$). In the three-dimensional system, the "No A-V" group showed more variance in the distance perceived between "to instruct" and "A-V instruction" ($.05>p>.01$).

The comparisons reported in this section were also made of the "Have A-V" group with the control group, and of the "No A-V" group with the control group. The results of these comparisons, as summarized in the following section, reflect further differences between the "Have A-V" and "No A-V" groups.

The Two Experimental Sub-Groups and the Control Group Compared

The F- and t-ratios obtained from comparisons of the "Have A-V" and "No A-V" groups with the control group are presented in Tables XXXVI-XLI in Appendix C. These two groups each differed from the control group, in their mean responses, in the same places and to approximately the same degree that the total experimental group differed from the control group, with the following exceptions:

1. The "Have A-V" group exceeded the control group in its rating of the concept "to teach" on the strong-weak scale ($.05>p>.01$); the

"no A-V" group did not differ significantly from the control group on this item.

2. The "Have A-V" group exceeded the control group in their ratings of the concept "A-V instruction" on the sharp-dull scale ($.05 > p > .01$); the "No A-V" group did not differ significantly from the control group on this item.

3. The "Have A-V" group exceeded the control group in their rating of the concept "A-V instruction" on the potency dimension ($.05 > p > .01$); the "No A-V" group did not differ significantly from the control group on this item.

4. The "Have A-V" group exceeded the control group in the separation they made of the concepts "to educate" and "to teach" in the two-dimensional system ($.05 > p > .01$); the "No A-V" group did not differ significantly from the control group on this D-score.

5. The "Have A-V" group was significantly exceeded by the control group in the distances manifested between the concepts "to teach" and "A-V instruction" in the three-dimensional system ($.05 > p > .01$). The "No A-V" group was not significantly different from the control group on this D-score.

6. The "No A-V" group exceeded the control group in the distances manifested between the concepts "A-V instruction" and "to explain" in both the two- and the three-dimensional systems ($.05 > p > .01$). The "Have A-V" group was not significantly different from the control group on these D-scores.

III. SUMMARY OF THE ANALYSIS OF THE DATA

Analysis of all of the data obtained was made in terms of four groups of subjects: (1) the control group, N = 47, (2) the total experimental group, N = 108, (3) those experimental subjects who had completed a course in audio-visual methods, N = 66 (referred to as the "Have A-V" group), and (4) those experimental subjects who had not taken an audio-visual methods course, N = 42 (referred to as the "No A-V" group). When the organization of the six concepts by each of the four groups was examined, it was found that all four groups tended to cluster the concepts "to educate," "to explain," "to instruct," and "to teach," and to separate the concepts "to lecture" and "A-V instruction" both from the other concepts and from each other. "To lecture" was rated closer than any other concept to the "negative" adjectives, bad, passive, weak, unsuccessful, dull, and worthless, by all four groups, while the concept "A-V instruction" was generally perceived closer to the "positive" adjectives, good, active, strong, successful, sharp, and valuable, by each of the groups.

The differences between groups were investigated by computing the F- and t-ratios for corresponding mean scale, factor, and D-scores.[11] In each comparison made, the differences between groups was evident in their mean scale score responses. The quantification of these differences was then confirmed and refined by comparison of the group

---

[11] Ibid.

factor and D-scores.

All groups were investigated in terms of Osgood's evaluative, activity, and potency dimensions, and with respect to the dynamic-goodness and permissiveness dimensions indicated by a Thurstone centroid method of factor analysis of the data.[12] Results obtained in these two systems of analysis were similar, and in many cases identical, except that the permissiveness factor usually failed to differentiate between groups where the other factors did reveal differences.

It was found that the total experimental group consistently rated the concept "to lecture" further from the other concepts, in a "negative" direction, than did the control group on most scales and factors ($p < .01$). The experimental group also rated the concept "A-V instruction" closer to the "positive" adjectives than did the control group on most scales and factors ($.05 > p > .01$). The control group showed much greater variance in their ratings of the concept "A-V instruction" than did the total experimental group on most scales and factors ($p < .01$). In many of the D-scores, the experimental group showed significantly more variance than the control group, except on D-scores related to the concept "A-V instruction," where the control group exceeded the experimental group in variance.

The two experimental sub-groups were compared to each other, and each was compared to the control group. The only significant difference in means between the two sub-groups was that the "No A-V" group rated

---

[12] Thurstone, loc. cit.

"to lecture" higher on the valuable-worthless scale and on the evaluative factor than did the "Have A-V" group ($.05 > p > .01$). The "Have A-V" group exhibited wider variance in some of their responses on the evaluative and dynamic-goodness dimensions, while the "No A-V" group suggested wider variance in some of their responses on the potency and permissiveness dimensions.

When each of the two sub-groups was compared to the control group, the significant differences from the two comparisons were the same in all but six instances. In three of these instances, the "Have A-V" group rated the concept "to teach" or the concept "A-V instruction" in more positive terms than did the control and the "No A-V" groups ($.05 > p > .01$). The "Have A-V" group also perceived a larger distance between "to educate" and "to teach" and a smaller distance between "to teach" and "A-V instruction" than the control and the "No A-V" groups. In the final instance, the "No A-V" group perceived a greater distance between the concepts "to explain" and "A-V instruction" than did the control group and the "Have A-V" group.

CHAPTER VI

GENERAL SUMMARY AND CONCLUSIONS

I. GENERAL SUMMARY

The concept of a new role for teachers is receiving increasing emphasis in contemporary theories of education. Proponents of the change see the teacher in the new role as ". . . a coordinator of instructional resources rather than a conveyor of knowledge."[1] The principal behavioral change required for the adoption of the new role involves the expected amount of lecturing by the teacher. Findings of educational, psychological, and communications research are being applied to an assessment of lecturing as an educative process.[2]

Changing the role of teachers in the classroom is more than a matter of providing alternative behavior patterns.[3] It should be viewed in the context of a problem in social change, with the emphasis on the dynamics of human behavior such a framework provides.[4] From this perspective, teacher-trainee perceptions of the teaching role,

---

[1]John I. Goodlad, School Curriculum Reform in the United States (New York: The Fund for the Advancement of Education, 1964), p. 72.

[2]Wilbur Schramm, editor, The Science of Human Communication (New York: Basic Books, Inc., Publishers, 1963).

[3]Seymour B. Sarason, et al., The Preparation of Teachers: An Unstudied Problem in Education (New York: John Wiley and Sons, Inc., 1962).

[4]Ward Hunt Goodenough, Cooperation in Change (New York: The Russel Sage Foundation, 1963).

and their attitudes toward the various processes of teaching, become particularly relevant. Information concerning the changes wrought in these attitudes during the course of a teacher-training program could prove to be crucial to the design of a sound program seeking to change the role of teachers in the classroom.

This study was concerned with an investigation of teacher-trainee attitudes toward lecturing as compared with their attitudes toward other processes of teaching. It also examined the differences, in the organization of these attitudes, between trainees beginning, and those near the completion of their teacher-training program. The study has significance for a critical evaluation of the particular training program involved in the investigation; it could have a greater significance in an analysis of the requisites for changing the role of the teacher in the classroom.

The Experimental Design

This study investigated the attitudes of two samples of secondary level teacher-trainees toward six percepts of teaching: "to educate," "to explain," "to instruct," "to lecture," "to teach," and "audio-visual instruction." The subjects' attitudes were revealed through their rating of each of these concepts on a set of semantic differential scales.[5] One sample consisted of 47 teacher-trainees just beginning

---

[5]Charles E. Osgood, George J. Suci, and Percy H. Tannenbaum, The Measurement of Meaning (Urbana: The University of Illinois Press, 1957).

their teacher-training program. The other sample consisted of 108 trainees who had completed their student teaching and were nearing the completion of their training program. The latter sample was divided into two groups: those who had completed a course in audio-visual methods of teaching during their training program, and those who had not taken such a course. Thus, four groups of subjects were considered: (1) the control group just beginning their training, (2) the total experimental group nearing the completion of their training, (3) the experimental sub-group having a course in audio-visual methods, and (4) the experimental sub-group not having taken an audio-visual methods course. All subjects involved in the study were enrolled in the secondary education teacher-training program at Montana State University.

The nine bipolar adjective scales used in the instrument were selected to represent the evaluative, activity, and potency dimensions of meaning established by Osgood.[6] A factor analysis of the data obtained with the instrument revealed two primary dimensions, a "dynamic-goodness" factor and a "permissiveness" factor. Analysis of the data was made in terms of each of the two separate systems of dimensions.

It was hypothesized that secondary teacher-trainees nearing the completion of their undergraduate teacher education program would manifest a greater separation of the concept "to lecture" from the other percepts of teaching than would secondary trainees just beginning

---

[6] Ibid.

their undergraduate program. Further, it was hypothesized that secondary teacher-trainees having completed a course in audio-visual methods would manifest a greater separation of the concept "to lecture" from the other percepts of teaching than those trainees who had not completed such a course.

The General Findings

The control and the experimental groups exhibited similar organizations of the six concepts. Each group tended to separate the concepts "to lecture" and "audio-visual instruction," both from the other concepts and from each other. Both groups consistently rated "to lecture" closer than the other concepts to the adjectives bad, passive, unsuccessful, weak, dull, and worthless, while "A-V instruction" was generally rated closer than the other concepts to the adjectives good, active, successful, strong, sharp, and valuable by both groups. The remaining four concepts were somewhat clustered toward the "positive" adjectives by both groups.

The experimental exceeded the control group in their separation of the concept "to lecture" from the other concepts to a degree statistically significant beyond the .01 level of confidence, thus supporting the first experimental hypothesis. The control group showed a greater variance in their ratings of the concept "audio-visual instruction," a difference significant at the .01 level of confidence.

When the two experimental sub-groups were compared, it was found that the "Have A-V" group rated the concept "to lecture" lower on the

valuable-worthless scale and lower on the evaluative dimension than did the "No A-V" group. This difference was significant between the .05 and the .01 levels of confidence, and indirectly supports the second experimental hypothesis. These two groups did not differ significantly in their perceived separations of the concept "to lecture" from the other concepts on any other dimensions, and their D-scores were not significantly different.

When each of the experimental sub-groups was compared to the control group, it was found that the two sub-groups differed from the control group in essentially the same ways, with six exceptions. In five of these instances, the "Have A-V" group responses differed from the responses of the control group ($.05 > p > .01$), while the "No A-V" and control groups' responses were not significantly different. In the sixth instance, it was the "No A-V" group that differed from the control group ($.05 > p > .01$) when the "Have A-V" group did not.

II. CONCLUSIONS AND DISCUSSION

In keeping with the statement of the problem expressed in Chapter I, the conclusions are discussed in three parts. First, the organization of the six concepts as perceived by teacher-trainees is considered. Each of the experimental hypotheses is then discussed.

Teacher-Trainee Perceptions of Lecturing

The findings of the study present a reasonably stable, clear impression of the teacher-trainees' general organization of these six

concepts. Students in this program having completed most of their training perceived "to teach" and "to educate" as very close in meaning, and interpreted "to explain" and "to instruct" as close in meaning. All four concepts were clustered in a position indicative of positive affect: they were perceived much closer to the adjectives good, strong, and active than to bad, weak, and passive. "Audio-visual instruction" was perceived even more positively, with higher ratings along all of these factors. "To lecture," however, was completely isolated, being regarded as closer to bad, passive, and weak, but it was seen as no more strict than the others.

This pattern leads to the conclusion that "to teach," "to explain," "to instruct," and "to educate" were perceived as almost synonymous, and "audio-visual instruction" was seen as a comparable, but highly favorable process. "To lecture" was perceived as a different process entirely with quite an unfavorable connotation.

The First Hypothesis

The first hypothesis, involving the control and experimental group separations of the concept "to lecture," was strongly supported by the experimental results. The most outstanding difference between the control and experimental groups was in the degree of separation of the concept "to lecture" from the other concepts manifested by each group. Moreover, this difference was apparent in every measurement taken: first in the mean scale scores, then in the various dimension scores, and finally in the D-score matrices of the two groups. The

results do not resolve the question of the degree to which this difference of separation might reflect only a difference in negative emotional loading of the word "lecture."

The results do support the conclusion that trainees beginning their teacher-training program perceive lecturing and teaching as closer in meaning than do trainees nearing the completion of their training. The results also suggest that the trainees nearing the completion of their program rate the concept of "audio-visual instruction" more positively and with less intra-group variance than do the beginning trainees.

The Second Hypothesis

The second hypothesis concerned differences between the two experimental sub-groups. It was indirectly supported by the finding that experimental subjects having taken a course in audio-visual methods rated the concept "to lecture" as less valuable, and gave it a lower general evaluation than did the experimental subjects who had not taken such a course.

This finding suggests that the audio-visual methods course helps to emphasize the disadvantages of lecturing, perhaps by providing suitable alternatives. The two groups did not differ significantly, however, in their perceptions of the value of "audio-visual instruction," nor did they differ significantly in their overall separations of the concept "to lecture" from the other concepts.

These two experimental sub-groups were quite similar in most regards, and differed from the control group in the same places for

the most part. However, in the instances where they differed, it was the "No A-V" group who most closely resembled the control group in five out of the six instances. It seems reasonable to suggest that the audio-visual methods course played a significant role in the organization of the attitudes of the trainees who took the course.

III. LIMITATIONS OF THE RESEARCH DESIGN

Several weaknesses in the design of the study put definite limitations on the of the conclusions that can be drawn from the experimental results. These can be discussed in two categories: limitations of the instrument and other limitations of the experimental design.

Limitations of the Instrument

The greatest weaknesses in the instrument occurred because of the inadequate analysis of the results of the pilot study. If a factor analysis of the pilot study data had been accomplished, the scales could have been effectively adjusted to represent the dimensions found. For example, the three permissiveness dimension scales contributed almost no significant information, and could have been deleted.

The two-dimensional D-score analysis did not rigorously follow the assumptions made in the use of the D-score statistic. Normally, equal numbers of scales are used to represent each factor or dimension, if D-scores are to be computed. Violation of this assumption, according to Osgood, could produce spuriously high D-scores by summing across more correlated scales on one dimension than on another. Thus,

some of the two-dimensional D-scores reported could have been spuriously high values.[7] However, judging from the congruence of the two-dimensional and three-dimensional results, the writer would consider it to be unlikely.

It was unfortunate that no synonym for "to lecture" could be provided. The use of such a synonym might have compensated for the possibility of the emotional loading of the term "lecture."

It is likely that the form of the presentation of the concept stimuli with the explanatory sentences was not entirely satisfactory. However, the writer can offer no improvement on this form.

Other Limitations of the Design

The lack of control of intervening variables between the control and experimental groups has already been discussed as a delimitation of the study, but it also constitutes a weakness in the study design. Factors interior and exterior to the training program, such as the student's maturation and his tenure at the university, could have greatly influenced the obtained results.

Though it was not intended to match the two samples of subjects, it would have been very advantageous if both samples could have been defended as representative samples of their respective populations at Montana State University. The experimental group comes closest to being representative, since the majority of trainees graduating in 1969 were

---

[7] Ibid., p. 93.

included in the study. Those included, however, were not randomly chosen, and there exists a considerable chance for bias in the sample. The control group was biased, at least with respect to college major, being weighted with mathematics and education majors.

These limitations and weaknesses could have impaired the effectiveness of the study, and an awareness of them should be included in a consideration of the findings of the study. Generalizations from the findings should therefore be made with caution.

IV. IMPLICATIONS FOR FURTHER RESEARCH

This study cannot claim to have investigated any changes in attitude attributable to a specific teacher-training program. To study change requires a longitudinal research design, not a cross-sectional design. The differences observed between the control and experimental groups may or may not reflect changes that were wrought during the course of training. It is suggested, therefore, that a study closely following the progress of a sample of trainees through a teacher-training program could give specific, valuable information on the processes of teacher-trainee attitude change. Such an investigation might determine whether the differences observed in this study reflected the beginning of a change in role for these students.

The findings of the study suggest that, at the completion of their training, these students do not equate lecturing with teaching, at least on a public-value level. This separation of the two concepts

might be the result of several influences: (1) the separation may reflect a negative emotional loading of the word "lecture" as previously discussed. (2) The separation might reflect a developed familiarity with suitable alternatives to lecturing. This possibility is suggested in at least three of the experimental findings: (a) the differences in perceptions of the concept "to lecture" exhibited by the "Have A-V" and "No A-V" groups, (b) the more positive perception of the concept "audio-visual instruction" exhibited by the total experimental group, and (c) the smaller intra-group variance of response to the "A-V instruction" concept exhibited by the experimental group. (3) The separation of the concept "to lecture" might also reflect a negative identification with lecturers encountered by the students during their college training. Reference groups for identifications can serve as positive or negative patterns for behavior.[8]

These three possibilities would seem to constitute potentially fruitful areas for further investigation. In addition, it is not known whether the findings of this study reflect private or public values. The non-threatening nature of the experimental situation, and the oblique approach taken by the instrument might have produced responses influenced by essentially private values. It would be informative to see a similar study done with the same or comparable subjects in the same teacher-training program, using a direct questionnaire designed

---

[8]Arnold M. Rose, editor, Human Behavior and Social Processes (Boston: Houghton Mifflin Company, 1962), p. 11.

to measure only the attitudes held as public values. Differences in results might indicate the degree to which this instrument measured privately held values.

This study provides no information on other identity features of teaching discussed in Chapter II. It may, however, prove to be of value when interpreted in light of future research findings. The greatest value of the study may lie in its potential to stimulate more research into the requisites for changing teacher behavior in the classroom.

Finally, the study suggests the applicability of the semantic differential to educational research. The instrument provides a model that is quite suitable for comparing the results of different studies; such comparisons could be very valuable in the formulation of general theories of education and teacher-training. Therefore, this type of instrument should be critically compared to the other instruments available to researchers in education. It might well prove to be an invaluable tool in educational research.

LITERATURE CONSULTED

LITERATURE CONSULTED

Amidon, Edmund J. and John B. Hough. Interaction Analysis: Theory, Research and Application. Reading: Addison-Wesley Publishing Company, 1967.

Bebell, Clifford F. S., editor. The Educational Program. Denver: Designing Education for the Future: An Eight-State Project, 1967.

Blake, Robert R. and Harry Helson. "Adaptability Screening of Flying Personnel: Situational and Personal Factors in Conforming Behavior," United States Air Force, School of Aviation Medicine, Report Number 56-58. Washington: Government Printing Office, 1956.

Brown, Bob Barton and Tom R. Vickery. "The Belief Gap in Teacher Education," Journal of Teacher Education, 18: 417-421, Winter, 1967.

Bruner, Jerome S. The Process of Education. Cambridge: Harvard University Press, 1960.

Bush, Robert. "Redefining the Role of the Teacher," Theory into Practice, 6: 246-51, December, 1967.

Cartwright, Darwin. "Social Psychology and Group Processes," Annual Review of Psychology, 8: 211-236, 1957.

Cattell, Raymond B. Personality, a Systematic and Factual Study. New York: McGraw Hill Book Company, Inc., 1950.

Cole, James H. "Effects of an Audio-Visual Course on Prospective Teachers' Attitudes Toward the Use of Audio-Visual Materials and Toward Teaching." Unpublished Doctoral dissertation, Indiana University, 1964.

Diggory, James C. "Sex Differences in the Organization of Attitudes," Journal of Personality, 22: 89-100, January, 1953.

Dilley, N.E. "Personal Values Held by College Students Who Enter a Teacher Education Program," Journal of Teacher Education, 8: 289-294, September, 1957.

Festinger, Leon. "An Analysis of Compliant Behavior," Group Relations at the Crossroads, Muzafer Sherif and M. O. Wilson, editors. New York: Harper and Row, Publishers, 1953.

Flanders, Ned A. "Intent, Action, and Feedback: A Preparation for Teaching," Journal of Teacher Education, 14: 251-260, 1963.

French, William Marshall. American Secondary Education. New York: The Odyssey Press, Inc., 1967.

Gage, N.L., editor. Handbook of Research on Teaching. Chicago: Rand McNally and Company, 1963.

Getzels, Jacob W. "The Question-Answer Process: A Conceptualization and Some Derived Hypotheses for Empirical Examination," Public Opinion Quarterly, 18: 80-91, Spring, 1954.

Goodenough, Ward Hunt. Cooperation in Change. New York: The Russel Sage Foundation, 1963.

Goodlad, John I. School Curriculum Reform in the United States. New York: The Fund for the Advancement of Education, 1964.

Green, Bert F. "Attitude Measurement," Handbook of Social Psychology, Vol. I, Gardner Lindzey, editor. Reading: Addison-Wesley Publishing Company, 1954.

Grigg, Austin E. "A Validity Study of the Semantic Differential Technique," Journal of Clinical Psychology, 15: 179-191, April, 1957.

Harrell, John. Teaching is Communicating. New York: The Seabury Press, 1965.

Harris, Chester W., editor. Encyclopedia of Educational Research. New York: The Macmillan Company, 1960.

Jenkins, J. J., W. A. Russell, and J. Suci. "An Atlas of Semantic Profiles for 360 Words," American Journal of Psychology, 71: 688-699, 1958.

Kaiser, Henry F. "An Analytic Rotational Criterion for Factor Analysis" (abstract), The American Psychologist, 10: 438, August, 1955.

Katz, David. "The Functional Approach to the Study of Attitudes," Public Opinion Quarterly, 24: 163-204, Summer, 1960.

Kelley, Jane A. and Leon H. Levy, "The Discriminability of Concepts Differentiated by Means of the Semantic Differential," Educational and Psychological Measurement, 21: 53-58, Spring, 1961.

Kerlinger, Fred N. Foundations of Behavioral Research. New York: Holt, Rinehard, and Winston, Inc., 1964.

Koch, Sigmund, editor. Psychology: A Study of a Science, Vol. 6. New York: McGraw Hill Book Company, Inc., 1963.

Lee, Alfred M. "Attitudinal Multivalence in Relation to Culture and Personality," American Journal of Sociology, 60: 294-299, November, 1954.

Leeds, Carol H., and Walter W. Cook. "The Construction and Differential Value of a Scale for Determining Teacher-Pupil Attitudes," Journal of Experimental Education, 16: 149, December, 1947.

Lickert, Rensis. "A Technique for the Measurement of Attitudes," Archives of Psychology, No. 140. New York: Columbia University, 1932.

Macoby, N. "New Scientific Rhetoric," The Science of Human Communication, Wilbur Schramm, editor. New York: Basic Books, Inc., 1963.

McNemar, Quinn. Psychological Statistics. New York: John Wiley and Sons, Inc., 1955.

Mehling, Reuben. "A Simple Test for Measuring Intensity of Attitudes," The Public Opinion Quarterly, 23: 576-578, Winter, 1959-60.

Messick, Samuel J. "Metric Properties of the Semantic Differential," Educational and Psychological Measurement, 17: 200-266, Summer, 1957.

Miller, Richard I. Perspectives on Educational Change. New York: Appleton-Century-Crofts, Inc., 1967.

Miron, Murray S. "The Influence of Instruction Modification upon Test-Retest Reliability of the Semantic Differential," Educational and Psychological Measurement, 21: 883-93, Winter, 1961.

Morphet, Edgar L., Project Director. Designing Education for the Future: An Eight-State Project. Denver: The Eight-State Project, 1967.

Morphet, Edgar L. and Charles O. Ryan, editors. Implications for Education of Prospective Changes in Society. Denver: Designing Education for the Future: An Eight-State Project, July, 1967.

Murphy, Gardner. Personality, a Bio-Social Approach to Origins and Structure. New York: Harper and Row, Publishers, 1947.

Openheim, A. N. Questionnaire Design and Attitude Measurement. New York: Basic Books, Inc., 1966.

Osgood, Charles E. "Explorations into Semantic Space," The Science of Human Communication, Wilbur Schramm, editor. New York: Basic Books, Inc., Publishers, 1963.

Osgood, Charles E., George J. Suci, and Percy H. Tannenbaum. The Measurement of Meaning. Urbana: The University of Illinois Press, 1957.

Proceedings of the Fourteenth Conference of the American Association for Public Opinion Research. "The Semantic Differential: Its Use and Abuse" (abstract), The Public Opinion Quarterly, 23: 435-438, Fall, 1959.

Razran, Gregory. "The Conditioned Evocation of Attitude (Cognitive Conditioning?)," Journal of Experimental Psychology, 18: 80-91, Spring, 1954.

Roget's International Thesaurus. New York: Thomas J. Crowell Company, 1958.

Rose, Arnold M., editor. Human Behavior and Social Processes. Boston: Houghton Mifflin Company, 1962.

Ryans, D. Characteristics of Teachers. Washington, D. C.: American Council on Education, 1960.

Sarason, Seymour B., et al. The Preparation of Teachers: An Unstudied Problem in Education. New York: John Wiley and Sons, Inc., 1962.

Schramm, Wilbur, editor. The Science of Human Communication. New York: Basic Books, Inc., Publishers, 1963.

Shaw, Marvin E. Scales for the Measurement of Attitudes. New York: McGraw Hill Book Company, Inc., 1967.

Shibutani, Tamotsu. "Reference Groups as Perspectives," American Journal of Sociology, 60: 562-569, 1955.

Skinner, B. F. Cumulative Record. New York: Appleton-Century-Crofts, Inc., 1959.

Smith, Raymond G. "Validation of a Semantic Differential," Speech Monographs, 30: 50-55, March, 1963.

Stern, George, et al. "Two Scales for the Assessment of Unconscious Motivations for Teaching," Educational and Psychological Measurement, 20: 9-29, Spring, 1960.

Thurstone, L. L. Multiple Factor Analysis. Chicago: The University of Chicago Press, 1947.

Thurstone, L. L. "The Measurement of Opinion," Journal of Social Psychology, 22: 415-430, 1928.

Thurstone, L. L. and E. J. Chave. The Measurement of Attitude. Chicago: The University of Chicago Press, 1929.

Trump, J. Lloyd. "A Look Ahead in Secondary Education," Readings in Curriculum, Glen Hass and Kimball Wiles, editors. Boston: Allyn and Bacon, Inc., 1965.

Trump, J. Lloyd and Dorsey Baynham. Focus on Change: A Guide to Better Schools. Chicago: Rand,

Warshay, Leon H. "Breadth of Perspective," Human Behavior and Social Processes, Arnold M. Rose, editor. Boston: Houghton Mifflin Company, 1962.

Wilhelms, Fred T. "Curriculum Letter for Administrators Concerned with Secondary Schools," The Association for Supervision and Curriculum Development, Vol. 8, Number 6. New London: Croft Educational Services, 1969.

Woodring, Paul and John Scanlon. American Education Today. New York: McGraw Hill Book Company, Inc., 1963.

Wright, Benjamin D. and Shirley A. Tuska. "The Childhood Romance Theory of Teacher Development," The School Review, 75: 123-154, Summer, 1967.

APPENDIX A

THE COMPLETE INSTRUMENT AS USED IN THE STUDY

APPENDIX A

THE COMPLETE INSTRUMENT AS USED IN THE STUDY

INSTRUCTIONS

The purpose of this study is to measure the meanings of certain things to various people by having them judge them against a series of descriptive scales. In taking this test, please make your judgments on the basis of what these things mean to you. On each page of this booklet you will find a different concept to be judged and beneath it a set of scales. You are to rate the concept on each of these scales in order.

Here is how you are to use these scales:

If you feel that the concept at the top of the page is very closely related to one end of the scale, you should place your check-mark as follows:

fair __X__:____:____:____:____:____:____ unfair

or

fair ____:____:____:____:____:____:__X__ unfair

If you feel that the concept is quite closely related to one or the other end of the scale (but not extremely), you should place your check-mark as follows:

strong ____:__X__:____:____:____:____:____ weak

or

strong ____:____:____:____:____:__X__:____ weak

If the concept seems only slightly related to one side as opposed to the other side (but is not really neutral), then you should check as follows:

active ____:____:_X_:____:____:____:____ passive

or

active ____:____:____:____:_X_:____:____ passive

The direction toward which you check, of course, depends upon which of the two ends of the scale seem most characteristic of the thing you're judging.

If you consider the concept to be neutral on the scale, both sides of the scale equally associated with the concept, or if the scale is completely irrelevant, unrelated to the concept, then you should place your check-mark in the middle space:

safe ____:____:____:_X_:____:____:____ unsafe

IMPORTANT: (1) Place your check-marks in the middle of spaces, not on boundaries:

THIS NOT THIS

____:____:_X_:____:____:____:____

(2) Be sure you check every scale for every concept -- do not omit any.

(3) Never put more than one check-mark on a single scale.

Sometimes you may feel as though you've had the same item before on the test. This will not be the case, so do not look back and forth through the items. Do not try to remember how you checked similar items earlier in the test. Make each item a separate and independent judgment. Work at fairly high speed through this test. Do not worry or puzzle over individual items. It is your first impressions, the immediate "feelings" about the items, that we want. On the other hand, please do

not be careless, because we want your true impressions.

TO EDUCATE[1]

Use only the concept of "educating,"
not any specific educator.

bad	_____:_____:_____:_____:_____:_____:_____	good
passive	_____:_____:_____:_____:_____:_____:_____	active
valuable	_____:_____:_____:_____:_____:_____:_____	worthless
fast	_____:_____:_____:_____:_____:_____:_____	slow
unsuccessful	_____:_____:_____:_____:_____:_____:_____	successful
weak	_____:_____:_____:_____:_____:_____:_____	strong
dull	_____:_____:_____:_____:_____:_____:_____	sharp
lenient	_____:_____:_____:_____:_____:_____:_____	severe
hard	_____:_____:_____:_____:_____:_____:_____	soft

[1]In each copy of the instrument administered, the order of the first six concepts was randomized.

TO EXPLAIN

Use only the concept of "explaining," not any specific person who explains.

bad	_____:_____:_____:_____:_____:_____:_____	good
passive	_____:_____:_____:_____:_____:_____:_____	active
valuable	_____:_____:_____:_____:_____:_____:_____	worthless
fast	_____:_____:_____:_____:_____:_____:_____	slow
unsuccessful	_____:_____:_____:_____:_____:_____:_____	successful
weak	_____:_____:_____:_____:_____:_____:_____	strong
dull	_____:_____:_____:_____:_____:_____:_____	sharp
lenient	_____:_____:_____:_____:_____:_____:_____	severe
hard	_____:_____:_____:_____:_____:_____:_____	soft

TO INSTRUCT

Use only the concept of "instructing,"
not any specific instructor.

bad	_____:_____:_____:_____:_____:_____:_____	good
passive	_____:_____:_____:_____:_____:_____:_____	active
valuable	_____:_____:_____:_____:_____:_____:_____	worthless
fast	_____:_____:_____:_____:_____:_____:_____	slow
unsuccessful	_____:_____:_____:_____:_____:_____:_____	successful
weak	_____:_____:_____:_____:_____:_____:_____	strong
dull	_____:_____:_____:_____:_____:_____:_____	sharp
lenient	_____:_____:_____:_____:_____:_____:_____	severe
hard	_____:_____:_____:_____:_____:_____:_____	soft

TO LECTURE

Use only the concept of "lecturing,"
not any specific lecturer.

bad ____:____:____:____:____:____:____ good

passive ____:____:____:____:____:____:____ active

valuable ____:____:____:____:____:____:____ worthless

fast ____:____:____:____:____:____:____ slow

unsuccessful ____:____:____:____:____:____:____ successful

weak ____:____:____:____:____:____:____ strong

dull ____:____:____:____:____:____:____ sharp

lenient ____:____:____:____:____:____:____ severe

hard ____:____:____:____:____:____:____ soft

TO TEACH

Use only the concept of "teaching,"
not any specific teacher.

bad ____:____:____:____:____:____:____ good

passive ____:____:____:____:____:____:____ active

valuable ____:____:____:____:____:____:____ worthless

fast ____:____:____:____:____:____:____ slow

unsuccessful ____:____:____:____:____:____:____ successful

weak ____:____:____:____:____:____:____ strong

dull ____:____:____:____:____:____:____ sharp

lenient ____:____:____:____:____:____:____ severe

hard ____:____:____:____:____:____:____ soft

AUDIO-VISUAL INSTRUCTION

as a teaching method,
not as a specific course

bad	_____:_____:_____:_____:_____:_____:_____	good
passive	_____:_____:_____:_____:_____:_____:_____	active
valuable	_____:_____:_____:_____:_____:_____:_____	worthless
fast	_____:_____:_____:_____:_____:_____:_____	slow
unsuccessful	_____:_____:_____:_____:_____:_____:_____	successful
weak	_____:_____:_____:_____:_____:_____:_____	strong
dull	_____:_____:_____:_____:_____:_____:_____	sharp
lenient	_____:_____:_____:_____:_____:_____:_____	severe
hard	_____:_____:_____:_____:_____:_____:_____	soft

Check the appropriate blanks:

1. Have you completed a course in audio-visual instruction?

   Yes_____ No_____

2. Are you presently enrolled in such a course? Yes_____ No_____

3. If "yes" for number 2, is it the regular quarter course (1:00 PM class) or the returning teachers course (11:00 AM class) ?

   Regular_____ Returning Teachers_____

4. If "no" for numbers 1 and 2, do you intend to take such a course before you graduate?

   Yes_____ No_____

APPENDIX B

LETTER SENT TO EXPERIMENTAL GROUP SUBJECTS REQUESTING THEIR PARTICIPATION IN THE STUDY

APPENDIX B

LETTER SENT TO EXPERIMENTAL GROUP SUBJECTS REQUESTING THEIR PARTICIPATION IN THE STUDY

College of Education
Montana State University
Bozeman, Montana
February 18, 1969

Dear (name),

A study of significance to out teacher education program is being conducted for the College of Education during the week of February 24 - February 28. Your name appears on the list of subjects being asked to participate. About 20 minutes of your time will be required on any one of the five afternoons, between 4:00 and 6:00 p.m., in Room #5 (in the basement) of Reid Hall.

IT IS VERY IMPORTANT THAT YOU APPEAR ON ONE OF THESE FIVE AFTERNOONS. Personnel conducting the study will be present anytime between 4:00 and 6:00 p.m. on these five days.

Your cooperation is very much appreciated.

Sincerely,

Earl N. Ringo
Dean, College of Education

APPENDIX C

COMPLETE RESULTS OF THE ANALYSIS OF DATA

APPENDIX C

COMPLETE RESULTS OF THE ANALYSIS OF DATA

TABLE XVI

REFINED FACTOR LOADINGS OF EACH SCALE ON FACTORS EXTRACTED BY CENTROID METHOD

scales	factors I	II	III
Good-Bad	0.82698	0.37650	0.00066
Active-Passive	0.78120	0.22874	0.00054
Successful-Unsuccessful	0.81710	0.33915	0.00072
Strong-Weak	0.85395	0.18161	0.00059
Sharp-Dull	0.74118	0.20068	0.00078
Severe-Lenient	0.23523	-0.33157	0.00010
Valuable-Worthless	0.64671	0.04539	0.00106
Fast-Slow	0.27170	-0.30789	0.00024
Hard-Soft	0.28454	-0.73260	0.00025

TABLE XVII

REFINED FACTOR LOADINGS OF EACH SCALE ON FACTORS AFTER THE VARIMAX ROTATION

scales	factors I	II	III
Good-Bad	0.90865	0.00159	0.00066
Active-Passive	0.80596	-0.11410	0.00054
Successful-Unsuccessful	0.88423	-0.02835	0.00072
Strong-Weak	0.85277	-0.18705	0.00059
Sharp-Dull	0.75793	-0.12314	0.00078
Severe-Lenient	0.07740	-0.39910	0.00010
Valuable-Worthless	0.60779	-0.22559	0.00106
Fast-Slow	0.12039	-0.39258	0.00024
Hard-Soft	-0.04321	-0.78473	0.00025

TABLE XVIII

MEANS AND VARIANCE FOR CONTROL GROUP SCALE SCORE DISTRIBUTIONS*

Scale	Educate	Explain	Instruct	Lecture	Teach	A-V Inst.
Good-Bad	6.38 1.89	5.91 2.47	6.00 2.09	5.19 2.94	6.30 2.21	6.13 2.24
Active-Passive	5.94 2.15	5.64 2.45	5.81 1.94	5.02 2.46	6.15 1.65	5.57 2.81
Successful-Unsuccessful	5.89 2.01	5.72 2.68	5.70 2.91	4.89 2.97	6.04 1.61	5.68 2.57
Strong-Weak	5.45 2.34	5.32 2.09	5.36 2.06	4.57 2.86	5.87 1.50	5.38 2.24
Sharp-Dull	5.34 2.01	4.89 1.88	5.08 1.99	4.36 4.24	5.49 1.99	5.21 3.13
Severe-Lenient	4.06 1.76	4.02 1.76	4.04 1.43	4.45 1.43	4.06 1.32	3.89 1.18
Valuable-Worthless	6.21 2.34	6.13 2.50	6.08 2.08	5.45 2.60	6.42 1.51	5.83 2.93
Fast-Slow	4.08 1.77	4.04 2.52	4.34 1.45	4.25 2.89	4.36 0.84	5.13 2.55
Hard-Soft	4.49 1.82	4.25 1.02	4.32 1.61	4.36 1.06	4.53 1.34	4.11 1.57

*First figure given in each cell is the group mean scale score; the second figure in each cell is the variance for that distribution.

TABLE XIX

MEANS AND VARIANCE FOR CONTROL GROUP
FACTOR SCORE DISTRIBUTIONS*

Factors	Educate	Explain	Instruct	Lecture	Teach	A-V Inst.
Evaluative**	18.49 13.86	17.77 16.36	17.79 15.87	15.53 19.34	18.77 11.31	17.64 20.10
Activity**	15.36 8.67	14.57 9.47	15.23 8.10	13.64 18.02	16.00 6.26	15.91 16.73
Potency**	14.00 6.09	13.60 7.07	13.72 7.73	13.38 7.20	14.47 5.73	13.38 6.55
Dynamic-Goodness†	35.21 46.30	33.62 50.15	34.04 50.00	29.49 75.39	36.28 36.25	33.81 71.33
Permissiveness**	12.64 5.37	12.32 7.22	12.70 6.65	13.06 6.58	12.96 5.22	13.13 7.59

*The first figure given in each cell is the sum of the group mean scale scores for the scales constituting that factor; the second figure given is the variance for that distribution.

**This factor was represented by three scales; the means presented here were averaged across subjects, but not across scales. When presented in Tables III and IV these figures were averaged across scales to make them comparable to the various mean scale scores.

†This factor was represented by six scales; the means presented here were averaged across subjects, but not across scales. When presented in Table III these figures were averaged across scales to make them comparable to the various mean scale scores presented.

TABLE XX

MEANS AND VARIANCE FOR TOTAL EXPERIMENTAL GROUP SCALE SCORE DISTRIBUTIONS*

Scale	Educate	Explain	Instruct	Lecture	Teach	A-V Inst.
Good-Bad	6.27 2.14	5.98 2.49	5.87 1.81	3.06 2.67	6.20 1.81	6.62 0.85
Active-Passive	6.07 2.26	5.83 2.76	5.74 2.45	3.64 3.67	6.28 1.87	6.47 1.30
Successful-Unsuccessful	5.71 1.83	5.68 2.35	5.27 1.86	3.44 2.47	5.62 1.75	6.49 0.49
Strong-Weak	5.31 2.24	5.36 2.14	5.20 1.98	3.42 3.07	5.49 2.27	6.00 1.29
Sharp-Dull	5.09 1.95	4.96 2.28	4.86 2.08	2.88 2.57	5.45 2.25	5.77 1.45
Severe-Lenient	4.16 1.68	3.79 1.59	4.00 1.70	4.25 1.81	3.92 1.67	4.06 1.19
Valuable-Worthless	6.39 1.27	6.25 1.83	6.00 1.38	3.94 2.39	6.43 1.05	6.62 0.44
Fast-Slow	4.03 2.12	3.94 2.61	4.23 1.82	4.39 3.34	4.42 2.02	5.46 2.10
Hard-Soft	4.59 1.68	4.32 1.68	4.62 1.77	4.25 1.72	4.58 1.98	4.19 1.35

*First figure given in each cell is the group mean scale score; The second figure in each cell is the variance for that distribution.

TABLE XXI

MEANS AND VARIANCE FOR TOTAL EXPERIMENTAL GROUP
FACTOR SCORE DISTRIBUTIONS*

Factors	Educate	Explain	Instruct	Lecture	Teach	A-V Inst.
Evaluative**	18.38 11.88	17.92 14.04	17.14 9.50	10.44 17.05	18.25 10.00	19.73 3.97
Activity**	15.19 7.63	14.74 10.96	14.83 9.75	10.92 11.48	16.15 9.83	17.70 7.95
Potency**	14.06 7.46	13.47 6.05	13.82 7.02	11.92 7.85	13.99 7.88	14.25 4.97
Dynamic-Goodness†	34.86 42.96	34.07 52.65	32.94 39.73	20.38 61.62	35.47 43.71	37.97 20.91
Permissiveness**	12.78 7.18	12.06 7.38	12.85 7.10	12.90 8.69	12.92 6.84	13.71 6.34

*The first figure given in each cell is the sum of the group mean scale scores for the scales constituting that factor; the second figure given in each cell is the variance for that distribution.

**This factor was represented by three scales; the means presented here were averaged across subjects, but not across scales.

†This factor was represented by six scales; the means presented here were averaged across subjects, but not across scales.

TABLE XXII

MEANS AND VARIANCE FOR "HAVE A-V" GROUP SCALE SCORE DISTRIBUTIONS*

Scale	Educate	Explain	Instruct	Lecture	Teach	A-V Inst.
Good-Bad	6.20 2.13	5.76 3.17	5.85 1.85	2.85 2.16	6.14 2.09	6.59 1.01
Active-Passive	6.06 2.03	5.64 3.34	5.51 2.50	3.48 3.51	6.20 1.88	6.47 1.39
Successful-Unsuccessful	5.64 1.87	5.62 2.33	5.18 2.06	3.23 2.09	5.64 1.71	6.47 0.62
Strong-Weak	5.30 2.03	5.18 2.40	5.08 1.89	3.21 2.75	5.33 2.13	5.97 1.44
Sharp-Dull	5.00 1.81	4.88 2.66	4.81 1.87	2.83 2.36	5.33 2.23	5.80 1.76
Severe-Lenient	4.06 1.16	3.82 1.54	4.03 1.54	4.21 1.74	3.89 1.30	4.13 1.07
Valuable-Worthless	6.45 0.87	6.17 2.23	6.12 0.72	3.70 2.06	6.42 0.80	6.62 0.55
Fast-Slow	4.03 1.78	3.98 2.66	4.17 1.53	4.29 3.10	4.39 2.15	5.45 2.19
Hard-Soft	4.33 1.39	4.35 1.71	4.61 1.67	4.42 1.60	4.38 1.65	4.18 1.38

*First figure given in each cell is the group mean scale score; the second figure in each cell is the variance for that distribution.

TABLE XXIII

MEANS AND VARIANCE FOR "HAVE A-V" GROUP FACTOR SCORE DISTRIBUTIONS*

Factors	Educate	Explain	Instruct	Lecture	Teach	A-V Inst.
Evaluative**	18.29 10.30	17.54 16.47	17.15 8.65	9.77 13.35	18.20 9.98	19.68 5.30
Activity**	15.09 7.04	14.50 12.10	14.50 8.53	10.61 9.53	15.92 8.87	17.73 9.03
Potency**	13.70 5.11	13.35 5.49	13.71 7.47	11.85 7.55	13.61 6.24	14.29 5.07
Dynamic-Goodness †	34.65 40.29	33.24 67.04	32.56 36.10	19.30 50.83	35.06 42.77	37.92 28.41
Permissiveness**	12.42 5.05	12.15 7.23	12.80 7.33	12.92 8.81	12.67 7.30	13.77 6.52

*The first figure given in each cell is the sum of the group mean scale scores for the scales constituting that factor; the second figure in each cell is the variance for that distribution.

**This factor was represented by three scales; the means presented here were averaged across subjects, but not across scales.

† This factor was represented by six scales; the means presented here were averaged across subjects, but not across scales.

TABLE XXIV

MEANS AND VARIANCE FOR "NO A-V" GROUP SCALE SCORE DISTRIBUTIONS*

Scale	Educate	Explain	Instruct	Lecture	Teach	A-V Inst.
Good-Bad	6.38 2.19	6.33 1.25	5.90 1.80	3.38 3.36	6.31 1.39	6.67 0.62
Active-Passive	6.09 2.67	6.14 1.73	6.09 2.23	3.88 3.91	6.40 1.86	6.48 1.18
Successful-Unsuccessful	5.83 1.80	5.79 2.42	5.40 1.56	3.78 2.95	5.59 1.86	6.52 0.30
Strong-Weak	5.33 2.62	5.64 1.65	5.40 2.10	3.74 3.47	5.74 2.44	6.05 1.07
Sharp-Dull	5.24 2.19	5.09 1.70	4.92 2.46	2.95 2.97	5.64 2.28	5.71 0.99
Severe-Lenient	4.31 2.51	3.74 1.71	3.95 2.00	4.31 1.97	3.95 2.29	3.93 1.38
Valuable-Worthless	6.31 1.93	6.38 1.22	5.81 2.40	4.33 2.71	6.43 1.47	6.62 0.29
Fast-Slow	4.02 2.71	3.88 2.59	4.33 2.32	4.57 3.76	4.45 1.86	5.48 2.01
Hard-Soft	5.00 1.90	4.29 1.67	4.64 1.99	3.98 1.83	4.90 2.38	4.21 1.34

*First figure given in each cell is the group mean scale score; the second figure in each cell is the variance for that distribution.

TABLE XXV

MEANS AND VARIANCE FOR "NO A-V" GROUP
FACTOR SCORE DISTRIBUTIONS*

Factors	Educate	Explain	Instruct	Lecture	Teach	A-V Inst.
Evaluative**	18.52	18.50	17.12	11.50	18.33	19.81
	14.65	9.96	11.08	21.48	10.28	1.96
Activity**	15.36	15.12	15.36	11.40	16.50	17.67
	8.72	9.18	11.45	14.44	11.38	6.42
Potency**	14.64	13.67	14.00	12.02	14.59	14.19
	10.82	7.01	6.44	8.51	10.05	4.94
Dynamic-Goodness †	35.19	35.38	33.55	22.07	36.12	38.05
	48.06	28.24	45.86	75.43	45.57	9.51
Permissiveness**	13.33	11.90	12.93	12.86	13.31	13.62
	10.22	7.75	6.90	8.71	6.02	6.19

*The first figure given in each cell is the sum of the group mean scale scores for the scales constituting that factor; the second figure is the variance for that distribution.

**This factor was represented by three scales; the means presented here were averaged across subjects, but not across scales.

†This factor was represented by six scales; the means presented here were averaged across subjects, but not across scales.

TABLE XXVI

F- AND T-RATIOS OBTAINED IN COMPARING THE MEAN SCALE SCORES OF THE CONTROL GROUP AND THE TOTAL EXPERIMENTAL GROUP†

Degrees of freedom used was 153

Scale	Educate	Explain	Instruct	Lecture	Teach	A-V Inst.
Good-Bad	1.13 0.45	1.01 0.24	1.15 0.54	1.10 7.37**	1.22 0.39	2.62** 2.50*
Active-Passive	1.05 0.53	1.23 0.68	1.26 0.26	1.49 4.35**	1.13 0.55	2.17** 3.88**
Successful-Unsuccessful	1.10 0.75	1.14 0.14	1.56* 1.68	1.20 5.12**	1.09 1.85	5.19** 4.38**
Strong-Weak	1.05 0.50	1.02 0.16	1.04 0.64	1.07 3.82**	1.51 1.53	1.74* 2.81**
Sharp-Dull	1.03 1.01	1.21 0.27	1.04 0.89	1.64* 4.84**	1.13 0.14	2.16** 2.27*
Severe-Lenient	1.04 0.41	1.11 1.05	1.19 0.19	1.27 0.86	1.26 0.67	1.01 0.85
Valuable-Worthless	1.85** 0.84	1.37 0.49	1.50 0.39	1.09 5.49**	1.44 0.01	6.60** 4.15**
Fast-Slow	1.19 0.23	1.04 0.35	1.26 0.48	1.16 0.46	2.39** 0.24	1.21 1.28
Hard-Soft	1.08 0.45	1.64* 0.32	1.10 1.31	1.62* 0.52	1.48 0.22	1.16 0.42

†The first figure presented in each cell is the F-ratio; the second figure presented in each cell is the t-ratio. Those figures significant at or beyond the .05 level are marked with an asterisk. Those figures significant at or beyond the .01 level are marked with a double asterisk.

TABLE XXVII

F- AND T-RATIOS OBTAINED IN COMPARING THE MEAN FACTOR SCORES OF THE CONTROL GROUP AND THE TOTAL EXPERIMENTAL GROUP†

Degrees of freedom used was 153

Factors	Educate	Explain	Instruct	Lecture	Teach	A-V Inst.
Evaluative	1.17 0.18	1.16 0.22	1.67* 1.10	1.13 6.91**	1.13 0.92	5.06** 4.03**
Activity	1.14 0.34	1.16 0.29	1.20 0.75	1.57* 4.25**	1.57* 0.27	2.10** 3.15**
Potency	1.23 0.14	1.17 0.28	1.10 0.21	1.09 3.03**	1.37 1.02	1.32 2.13*
Dynamic-Goodness	1.07 0.30	1.05 0.36	1.26 0.96	1.22 6.43**	1.21 0.71	3.41** 3.97**
Permissiveness	1.34 0.31	1.02 0.56	1.07 0.32	1.32 0.33	1.31 0.09	1.20 1.29

† The first figure presented in each cell is the F-ratio; the second figure presented in each cell is the t-ratio. Those figures significant at or beyond the .05 level are marked with an asterisk. Those figures significant at or beyond the .01 level are marked with a double asterisk.

TABLE XXVIII

MEANS AND VARIANCE FOR THE CONTROL GROUP D-SCORE DISTRIBUTIONS IN BOTH THE TWO- AND THREE-DIMENSIONAL SYSTEMS*

		Explain	Instruct	Lecture	Teach	A-V Inst.
dynamic-goodness and permissiveness dimensions	Educate	4.48 11.46	4.23 9.61	7.75 48.92	3.54 11.73	8.02 72.87
	Explain		4.37 13.04	7.61 44.00	4.68 12.92	8.82 74.50
	Instruct			6.46 36.70	4.53 11.30	7.67 59.90
	Lecture				8.23 52.50	9.27 67.76
	Teach					7.94 67.53
evaluative, activity, and potency dimensions	Educate	4.24 6.69	3.85 5.26	6.01 18.68	3.21 8.76	6.36 31.38
	Explain		3.91 5.48	5.84 17.85	4.07 5.82	7.22 33.64
	Instruct			5.38 15.02	3.76 5.81	6.54 27.07
	Lecture				5.95 21.36	7.46 31.12
	Teach					6.23 28.56

*The first figure given in each cell is the group mean D-score; the second figure in each cell is the variance for that distribution.

TABLE XXIX

MEANS AND VARIANCE FOR THE EXPERIMENTAL GROUP D-SCORE DISTRIBUTIONS IN BOTH THE TWO- AND THREE-DIMENSIONAL SYSTEMS*

		Explain	Instruct	Lecture	Teach	A-V Inst.
dynamic-goodness and permissiveness dimensions	Educate	5.79 31.32	5.57 21.39	16.38 57.96	5.53 30.88	6.04 28.26
	Explain		5.62 24.77	15.42 61.69	5.37 24.59	6.10 31.81
	Instruct			14.07 59.54	5.59 29.68	6.99 34.53
	Lecture				16.59 71.54	18.71 67.11
	Teach					5.18 27.20
evaluative, activity, and potency dimensions	Educate	4.94 14.48	4.81 10.34	11.24 23.75	4.70 13.53	5.45 12.92
	Explain		4.86 10.43	10.52 22.71	4.71 13.27	5.24 14.79
	Instruct			9.77 23.85	4.59 12.10	5.84 14.80
	Lecture				11.25 30.27	12.99 28.06
	Teach					4.57 12.37

*The first figure given in each cell is the group mean D-score; the second figure in each cell is the variance for that distribution.

TABLE XXX

F- AND T-RATIOS OBTAINED IN COMPARING THE MEAN D-SCORES OF THE CONTROL GROUP AND THE EXPERIMENTAL GROUP IN BOTH THE TWO- AND THE THREE-DIMENSIONAL SYSTEMS †

Degrees of freedom used was 153

		Explain	Instruct	Lecture	Teach	A-V Inst.
dynamic-goodness and permissiveness dimensions	Educate	2.73** 1.48	2.23** 1.81	1.18 6.65**	2.63** 2.27*	2.58** 1.76
	Explain		1.90** 1.56	1.40 5.96**	1.90** 0.87	2.34** 2.33*
	Instruct			1.62* 6.00**	2.63** 1.24	1.73 0.60
	Lecture				1.36 5.90**	1.01 6.59**
	Teach					2.48** 2.52*
evaluative, activity, and potency dimensions	Educate	2.16** 1.15	1.97** 1.85	1.27 6.35**	1.54* 2.45*	2.43** 1.22
	Explain		1.90** 1.82	1.27 5.81**	2.28** 1.10	2.27** 2.50*
	Instruct			1.59* 5.45**	2.08** 1.48	1.83* 0.94
	Lecture				1.42 5.77**	1.11 5.88**
	Teach					2.31** 2.28*

†The first figure presented in each cell is the F-ratio; the second figure in each cell is the t-ratio. Those figures significant at or beyond the .05 level are marked with an asterisk. Those figures significant at or beyond the .01 level are marked with a double asterisk.

TABLE XXXI

F- AND T-RATIOS OBTAINED IN COMPARING THE MEAN SCALE SCORES OF THE "HAVE A-V" GROUP AND THE "NO A-V" GROUP †

Degrees of freedom used was 106

Scale	Educate	Explain	Instruct	Lecture	Teach	A-V Inst.
Good-Bad	1.03 0.63	2.53** 1.87	1.03 0.21	1.56 1.66	1.50 0.65	1.64 0.41
Active-Passive	1.32 0.12	1.93* 1.56	1.12 1.90	1.11 1.05	1.01 0.77	1.17 0.03
Successful-Unsuccessful	1.04 0.73	1.04 0.54	1.31 0.83	1.42 1.82	1.08 1.16	2.04** 0.39
Strong-Weak	1.29 0.10	1.45 1.61	1.11 1.19	1.26 1.53	1.14 1.37	1.35 0.35
Sharp-Dull	1.20 0.86	1.57 0.72	1.31 0.38	1.26 0.37	1.03 1.05	1.78* 0.37
Severe-Lenient	2.15** 0.97	1.11 0.32	1.30 0.30	1.14 0.36	1.77* 0.23	1.29 0.96
Valuable-Worthless	2.22** 0.65	1.83* 0.80	3.32** 1.35	1.32 2.12*	1.83* 0.02	1.88* 0.02
Fast-Slow	1.52 0.02	1.02 0.32	1.52 0.62	1.21 0.78	1.15 0.21	1.09 0.07
Hard-Soft	1.36 2.68**	1.02 0.24	1.20 0.14	1.14 1.75	1.44 1.91	1.03 0.14

† The first figure presented in each cell is the F-ratio; the second figure presented in each cell is the t-ratio. Those figures significant at or beyond the .05 level are marked with an asterisk. Those figures significant at or beyond the .01 level are marked with a double asterisk.

TABLE XXXII

F- AND T-RATIOS OBTAINED IN COMPARING THE MEAN FACTOR SCORES OF THE "HAVE A-V" GROUP AND THE "NO A-V" GROUP †

Degrees of freedom used was 106

Factors	Educate	Explain	Instruct	Lecture	Teach	A-V Inst.
Evaluative	1.42 0.34	1.65* 1.29	1.28 0.05	1.61 2.15*	1.03 0.22	2.70** 0.32
Activity	1.24 0.49	1.32 0.95	1.34 1.40	1.51 1.20	1.28 0.93	1.41 0.11
Potency	2.12** 1.71	1.28 0.65	1.16 0.55	1.13 0.32	1.61 1.80	1.03 0.22
Dynamic-Goodness	1.19 0.41	2.37** 1.50	1.27 0.79	1.48 1.80	1.06 0.81	2.99** 0.14
Permissiveness	2.03** 1.73	1.07 0.46	1.06 0.24	1.01 0.11	1.21 1.25	1.05 0.31

†The first figure presented in each cell is the F-ratio; the second figure presented in each cell is the t-ratio. Those figures significant at or beyond the .05 level are marked with an asterisk. Those figures significant at or beyond the .01 level are marked with a double asterisk.

TABLE XXXIII

MEANS AND VARIANCE FOR THE "HAVE A-V" GROUP D-SCORE DISTRIBUTIONS IN BOTH THE TWO- AND THREE-DIMENSIONAL SYSTEMS*

		Explain	Instruct	Lecture	Teach	A-V Inst.
dynamic-goodness and permissiveness dimensions	Educate	6.00 37.02	5.71 19.96	16.60 61.52	5.68 33.01	6.06 26.98
	Explain		5.78 28.49	16.03 60.68	5.25 27.05	6.70 39.24
	Instruct			14.48 63.53	5.98 32.24	7.42 30.44
	Lecture				16.95 76.57	19.87 60.97
	Teach					5.34 24.69
evaluative, activity, and potency dimensions	Educate	4.79 15.38	4.77 9.41	11.25 22.92	4.65 13.38	5.21 11.89
	Explain		4.77 11.19	10.86 23.08	4.31 12.87	5.44 16.81
	Instruct			10.14 23.91	4.90 12.99	6.01 11.94
	Lecture				11.40 31.35	13.71 24.40
	Teach					4.47 10.48

*The first figure given in each cell is the group mean D-score; the second figure in each cell is the variance for that distribution.

TABLE XXXIV

MEANS AND VARIANCE FOR THE "NO A-V" GROUP D-SCORE DISTRIBUTIONS IN BOTH THE TWO- AND THREE-DIMENSIONAL SYSTEMS*

		Explain	Instruct	Lecture	Teach	A-V Inst.
dynamic-goodness and permissiveness dimensions	Educate	5.44 22.84	5.36 24.11	16.03 53.52	5.30 28.17	6.00 30.99
	Explain		5.37 19.36	14.47 63.29	5.57 21.23	5.16 19.33
	Instruct			13.42 53.96	4.98 25.73	6.32 41.10
	Lecture				16.02 64.76	16.90 72.97
	Teach					4.92 31.73
evaluative, activity, and potency dimensions	Educate	5.19 13.31	4.89 12.06	11.23 25.63	4.78 14.08	5.81 14.64
	Explain		5.00 9.45	9.99 22.21	5.33 13.57	4.94 11.81
	Instruct			9.18 23.76	4.11 10.60	5.58 19.59
	Lecture				11.01 29.21	11.87 32.44
	Teach					4.73 15.63

*The first figure given in each cell is the group mean D-score; the second figure in each cell is the variance for that distribution.

TABLE XXXV

F- AND T-RATIOS OBTAINED IN COMPARING THE MEAN D-SCORES OF THE "HAVE A-V" GROUP AND THE "NO A-V" GROUP IN BOTH THE TWO- AND THE THREE-DIMENSIONAL SYSTEMS †

Degrees of freedom used was 106

		Explain	Instruct	Lecture	Teach	A-V Inst.
dynamic-goodness and permissiveness dimensions	Educate	1.62* 0.50	1.21 0.38	1.15 0.38	1.17 0.34	1.15 0.05
	Explain		1.47 0.42	1.04 1.00	1.27 0.33	2.03** 1.39
	Instruct			1.18 0.70	1.25 0.93	1.35 0.95
	Lecture				1.18 0.55	1.20 1.85
	Teach					1.28 0.41
evaluative, activity, and potency dimensions	Educate	1.15 0.53	1.28 0.18	1.12 0.02	1.05 0.17	1.23 0.85
	Explain		1.18 0.36	1.04 0.92	1.05 1.43	1.42 0.65
	Instruct			1.01 0.99	1.23 1.15	1.64* 0.57
	Lecture				1.07 0.35	1.33 1.77
	Teach					1.49 0.37

† The first figure presented in each cell is the F-ratio; the second figure in each cell is the t-ratio. Those figures significant at or beyond the .05 level are marked with an asterisk. Those figures significant at or beyond the .01 level are marked with a double asterisk.

TABLE XXXVI

F- AND T-RATIOS OBTAINED IN COMPARING THE MEAN SCALE SCORES OF THE "HAVE A-V" GROUP AND THE CONTROL GROUP †

Degrees of freedom used was 111

Scale	Educate	Explain	Instruct	Lecture	Teach	A-V Inst.
Good-Bad	1.12 0.68	1.28 0.49	1.13 0.57	1.36 7.79**	1.06 0.58	2.21** 1.97*
Active-Passive	1.06 0.45	1.36 0.01	1.29 1.02	1.43 4.59**	1.14 0.19	2.02** 3.33**
Successful-Unsuccessful	1.08 0.97	1.15 0.34	1.41 1.76	1.42 5.58**	1.06 1.65	4.13** 3.46**
Strong-Weak	1.15 0.51	1.15 0.48	1.09 1.07	1.04 4.27**	1.42 2.06*	1.55 2.31*
Sharp-Dull	1.11 1.29	1.42 0.05	1.06 1.01	1.78* 4.52**	1.12 0.56	1.78* 2.03*
Severe-Lenient	1.51 0.01	1.15 0.83	1.07 0.05	1.22 0.97	1.02 0.78	1.10 1.20
Valuable-Worthless	2.70** 1.04	1.12 0.13	2.87** 0.17	1.26 6.07**	1.88* 0.01	5.35** 3.35**
Fast-Slow	1.00 0.21	1.06 0.19	1.05 0.74	1.07 0.10	2.54** 0.13	1.16 1.12
Hard-Soft	1.30 0.65	1.67* 0.41	1.03 1.17	1.51 0.28	1.23 0.65	1.14 0.33

†The first figure presented in each cell is the F-ratio; the second figure presented in each cell is the t-ratio. Those figures significant at or beyond the .05 level are marked with an asterisk. Those figures significant at or beyond the .01 level are marked with a double asterisk.

TABLE XXXVII

F- AND T-RATIOS OBTAINED IN COMPARING THE MEAN FACTOR SCORES OF THE CONTROL GROUP AND THE "HAVE A-V" GROUP†

Degrees of freedom used was 111

Factors	Educate	Explain	Instruct	Lecture	Teach	A-V Inst.
Evaluative	1.35 0.31	1.01 0.28	1.83* 0.98	1.45 7.58**	1.13 0.92	3.79** 3.17**
Activity	1.23 0.51	1.29 0.12	1.05 1.33	1.89* 4.40**	1.42 0.14	1.85* 2.72**
Potency	1.19 0.68	1.29 0.52	1.03 0.02	1.05 2.95**	1.09 1.84	1.29 1.99*
Dynamic-Goodness	1.15 0.45	1.34 0.25	1.38 1.20	1.48 6.83**	1.18 1.01	2.51** 3.17**
Permissiveness	1.06 0.49	1.00 0.33	1.10 1.20	1.34 0.26	1.40 0.60	1.16 1.28

†The first figure presented in each cell is the F-ratio; the second figure presented in each cell is the t-ratio. Those figures significant at or beyond the .05 level are marked with an asterisk. Those figures significant at or beyond the .01 level are marked with a double asterisk.

TABLE XXXVIII

F- AND T-RATIOS OBTAINED IN COMPARING THE MEAN D-SCORES OF THE "HAVE A-V" GROUP AND THE CONTROL GROUP IN BOTH THE TWO- AND THE THREE-DIMENSIONAL SYSTEMS †

Degrees of freedom used was 111

		Explain	Instruct	Lecture	Teach	A-V Inst.
dynamic-goodness and permissiveness dimensions	Educate	3.23** 1.55	2.08** 1.95	1.26 6.19**	2.81** 2.27*	2.70** 1.51
	Explain		2.18** 1.58	1.38 6.02**	2.09** 0.65	1.90* 1.52
	Instruct			1.73* 5.81**	2.85** 1.57	1.97** 0.20
	Lecture				1.46 5.60**	1.11 6.96**
	Teach					2.73** 2.09*
evaluative, activity, and potency dimensions	Educate	2.30** 0.83	1.79* 1.73	1.23 5.97**	1.53 2.23*	2.64** 1.35
	Explain		2.04** 1.52	1.29 5.75**	2.21** 0.40	2.00** 1.92
	Instruct			1.59* 5.55**	2.24** 1.88	2.27** 0.66
	Lecture				1.47 5.47**	1.27 6.28**
	Teach					2.73** 2.17*

† The first figure presented in each cell is the F-ratio; the second figure in each cell is the t-ratio. Those figures significant at or beyond the .05 level are marked with an asterisk. Those figures significant at or beyond the .01 level are marked with a double asterisk.

TABLE XXXIX

F- AND T-RATIOS OBTAINED IN COMPARING THE MEAN SCALE SCORES OF THE "NO A-V" GROUP AND THE CONTROL GROUP†

Degrees of freedom used was 87

Scale	Educate	Explain	Instruct	Lecture	Teach	A-V Inst.
Good-Bad	1.16 0.01	1.97* 1.43	1.16 0.32	1.14 4.81**	1.59 0.04	3.63** 2.09*
Active-Passive	1.24 0.48	1.41 1.63	1.15 0.94	1.59 3.03**	1.12 0.91	2.38** 2.97**
Successful-Unsuccessful	1.12 0.20	1.11 0.18	1.86* 0.93	1.01 3.03**	1.15 1.60	8.44** 3.24**
Strong-Weak	1.12 0.34	1.27 1.11	1.02 0.14	1.21 2.22*	1.62 0.45	2.09** 2.41*
Sharp-Dull	1.09 0.33	1.10 0.71	1.23 0.49	1.42 3.48**	1.14 0.49	3.16** 1.62
Severe-Lenient	1.43 0.80	1.03 1.01	1.39 0.33	1.38 0.50	1.73* 0.39	1.17 0.15
Valuable-Worthless	1.22 0.31	2.06** 0.87	1.16 0.87	1.04 3.22**	1.03 0.01	10.08** 2.86**
Fast-Slow	1.52 0.19	1.03 0.48	1.61 0.02	1.30 0.82	2.21** 0.37	1.27 1.08
Hard-Soft	1.04 1.76	1.64* 0.12	1.23 1.14	1.72* 1.52	1.77* 1.30	1.17 0.42

† The first figure presented in each cell is the F-ratio; the second figure presented in each cell is the t-ratio. Those figures significant at or beyond the .05 level are marked with an asterisk. Those figures significant at or beyond the .01 level are marked with a double asterisk.

TABLE XL

F- AND T-RATIOS OBTAINED IN COMPARING THE MEAN FACTOR SCORES OF THE CONTROL GROUP AND THE "NO A-V" GROUP †

Degrees of freedom used was 87

Factors	Educate	Explain	Instruct	Lecture	Teach	A-V Inst.
Evaluative	1.06 0.04	1.64 0.95	1.43 0.85	1.11 4.21**	1.10 0.62	10.24** 3.01**
Activity	1.01 0.01	1.03 0.84	1.41 0.19	1.25 2.60*	1.82* 0.80	2.60** 2.39*
Potency	1.78* 1.05	1.01 0.13	1.20 0.49	1.18 2.29*	1.75* 0.21	1.32 1.58
Dynamic-Goodness	1.04 0.02	1.78* 1.32	1.09 0.34	1.00 4.02**	1.26 0.12	7.50** 3.07**
Permissiveness	1.91* 1.18	1.07 0.71	1.04 0.41	1.32 0.35	1.15 0.70	1.22 0.88

† The first figure presented in each cell is the F-ratio; the second figure presented in each cell is the t-ratio. Those figures significant at or beyond the .05 level are marked with an asterisk. Those figures significant at or beyond the .01 level are marked with a double asterisk.

TABLE XLI

F- AND T-RATIOS OBTAINED IN COMPARING THE MEAN D-SCORES OF THE "NO A-V" GROUP AND THE CONTROL GROUP IN BOTH THE TWO- AND THE THREE-DIMENSIONAL SYSTEMS †

Degrees of freedom used was 87

		Explain	Instruct	Lecture	Teach	A-V Inst.
dynamic-goodness and permissiveness dimensions	Educate	1.99* 1.10	2.51** 1.31	1.09 5.46**	2.40** 1.88	2.35** 1.30
	Explain		1.48 1.18	1.44 4.44**	1.64* 1.03	3.85** 2.48*
	Instruct			1.47 4.89**	2.28** 0.50	1.46 0.89
	Lecture				1.23 4.81**	1.08 4.29**
	Teach					2.13** 2.00*
evaluative, activity, and potency dimensions	Educate	1.99* 1.42	2.29** 1.67	1.37 5.25**	1.61 2.19*	2.14** 0.53
	Explain		1.72* 1.90	1.24 4.38**	2.33** 1.93	2.85** 2.22*
	Instruct			1.58 4.09**	1.82* 0.57	1.38 0.94
	Lecture				1.37 4.76**	1.04 3.69**
	Teach					1.83* 1.49

†The first figure presented in each cell is the F-ratio; the second figure in each cell is the t-ratio. Those figures significant at or beyond the .05 level are marked with an asterisk. Those figures significant at or beyond the .01 level are marked with a double asterisk.