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A MEASUREMENT OF COLLEGE INSTRUCTOR BEHAVIOR.

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THIS STUDY TESTS THE HYPOTHESIS THAT COLLEGE INSTRUCTOR BEHAVIOR CAN BE IDENTIFIED AND MEASURED BY THE USE OF A GRAPHIC RATING SCALE WHEN THE RATER RESPONDS TO COMMON BIPOLAR ADJECTIVES. THE BEHAVIORS WILL YIELD, WHEN SUBJECTED TO FACTOR ANALYSIS, CLUSTERS OF TRAITS WHICH WOULD IDENTIFY SUBGROUPS OF COLLEGE INSTRUCTORS. STUDENT RATINGS OF COLLEGE INSTRUCTOR BEHAVIOR WERE OBTAINED THROUGH THE USE OF A SCALE COMPOSED OF 12 BIPOLAR ADJECTIVES FROM THE OSGOOD SEMANTIC DIFFERENTIAL, 13 SINGLE ADJECTIVES FROM OTHER RESEARCH STUDIES, AND AN OVERALL GLOBAL RATING OF INSTRUCTION. THE SCALE WAS ADMINISTERED TO UNDERGRADUATE LIBERAL ARTS CLASSES OF THE SAME INSTRUCTORS ON TWO OCCASIONS SEPARATED BY A TIME INTERVAL OF 15 WEEKS. THE TOTAL SAMPLE OF 7,060 STUDENTS RATED 104 INSTRUCTORS IN HUMANITIES, NATURAL SCIENCES, AND SOCIAL SCIENCES AT THE UNIVERSITY OF PITTSBURGH. IT WAS CONCLUDED THAT STUDENTS DISTRIBUTED THEIR JUDGMENTS OF INSTRUCTORS IN A MARKEDLY RELIABLE MANNER, BUT THE VARIANCE OBSERVED DID NOT SIGNIFICANTLY DISCRIMINATE BETWEEN INSTRUCTORS ACCORDING TO ACADEMIC DIVISION NOR DID IT RELATE IN ANY APPRECIABLE DEGREE TO GLOBAL ESTIMATES OF EFFECTIVENESS. THE DISCRIMINATIONS EXPECTED WERE NOT WITHIN THE COMPETENCE OF THE OSGOOD SCALE OR OF THE SINGLE ADJECTIVES LISTED. THIS DOCUMENT IS ALSO AVAILABLE FROM UNIVERSITY MICROFILMS, ANN ARBOR, MICHIGAN, (MICROFILM NUMBER 67-4558), FOR MF $3.00, HC $7.60. (HW)

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A MEASUREMENT OF COLLEGE INSTRUCTOR BEHAVIOR

by

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B. S., University of Pittsburgh, 1960

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FOREWORD

The research reported herein was performed pursuant to a contract with the United States Department of Health, Education, and Welfare, Office of Education.

Sincere gratitude is expressed to the members of my committee, especially Dr. George L. Fahey, Chairman, who offered valuable advice and encouragement throughout this study.

Appreciation is extended to the University of Pittsburgh faculty members and students who participated in the project. Indebtedness is acknowledged to the many graduate students who assisted in the administration of the rating scales to the participating classes.

TABLE OF CONTENTS

LIST OF TABLES

I. INTRODUCTION

A. Education and Society

In a society which places an unswerving faith in education as a medium for the fulfillment of the objectives of democracy, the responsibility of the educator is difficult to exaggerate. While his most important professional duty to society is to teach in his specialized field, he must be cognizant that his obligation encompasses much more than mere transmission of facts.

> It seems reasonable to assume that good teachers--those who are skillful in developing understanding of the world in which man lives, insightful with respect to the ways and means of stimulating intellectual appetites, and capable of patience, understanding, and sincere feelings for others--may pave the way for an enlightened and productive society. Poor teaching, contrariwise, would seem to be a significant contributor of its unfortunate share to the perpetuation of ignorance, misunderstanding, and intellectual and cultural stagnation.[1]

Concomitant with the unquestioned value of education, our society has nurtured an unquestioned acceptance of the traditional means of teaching in our colleges and universities as being effective. "Young teachers, commencing their careers, naturally began to teach in the manner in which they themselves had been taught, and thus perpetuated the merits and errors of academic practice."[2] Recent protests by laymen and investigations by professionals have resulted in a possible

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[1]David G. Ryans, Characteristics of Teachers, American Council on Education (Menasha, Wisconsin: George Banta Company, Inc., 1960), p. 1.

[2]Gordon W. Allport, "How Shall We Evaluate Teaching?" A Handbook for College Teachers, An Informal Guide, ed. Bernice Brown Cronkhite (Cambridge: Harvard University Press, 1950), p. 37.

reversal of the belief that instructors are performing efficiently the task they have chosen for themselves.

Instruction may have been characterized at one time by a "semi-mystical nature,"[1] but current investigations into the teaching process and self-analyses by educators have begun to demonstrate that a thorough examination may be needed urgently. Education, as with any other social institution, is not likely to "suffer from the cautious search for sources of information, from a rigorous appraisal of whatever this search turns up, and from its judicious use"[2] by the college instructor. A critical evaluation of higher education may reveal that society will benefit if the aims of higher education are directed toward promoting individual needs and away from protecting the traditional.[3] Demonstrated shortcomings in the institutions, including ineffective teaching, must be acknowledged, for only through a realistic appraisal of deficiencies can advances be made toward a realization of democratic goals.

As a consequence of the profound faith placed in the benefits of education and the equally profound faith placed in the assumed teaching abilities of college and university instructors, higher education finds itself in a position requiring a constant and searching evaluation of its reasons for existence. Just as important is the

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[1] Ibid., p. 37.

[2] William R. Wilson, "Students Rating Teachers," The Journal of Higher Education, III (February, 1932), 82.

[3] Homer P. Rainey, "The Individualization of College Instruction," Association of American Colleges Bulletin, XVIII (May, 1932), 190-95.

search for greater efficiency, probably forced upon educators as a consequence of the enrollment explosion.

B. Review of Literature Pertaining to Teaching Behaviors

1. Criticisms of College and University Teaching

While appraisal of teaching depends upon the purpose of the evaluation, whether for administrative reasons, for individual self-improvement, for student surveys, or for research purposes, the process reflects a long history of attempts. Early appraisal, carried out largely on a subjective, intuitive basis, often led to unfortunate, biased results. Current approaches to the study of the problem of teaching behavior are characterized by a trend toward systematic and scientific appraisals. Possibly the growing demands by administrators, faculty, students, and parents for intensive questioning into the process of higher education have reinforced this trend.

A proper analysis of the criticisms associated with teaching behavior in institutions of higher education would be an overwhelming task, but the magnitude need not prevent a survey of some selected aspects. One of the frustrations encountered in an attempt to delimit the complexities of the problem arises from the belief that teaching is an innate ability and, as such, is not subject to experimentation. The hint that the process of teaching

> . . . stands in need of empirical support is often met with incredulous opposition, and men whose academic work is based upon a rigorous testing of accepted ideas, tend to think it somehow indecent to apply the same standard of enquiry to their own teaching and examining practice. Few university teachers are even aware that many of their instructional problems have been

> investigated experimentally, and only a tiny minority take the trouble to acquaint themselves with the results.[1]

According to Klapper, "experience repeatedly refutes the comforting hope that he who knows can teach."[2] Eckert wrote that "thinking often becomes vague and ill-defined when an attempt is made to judge the success of particular college teachers."[3]

> It is the habit of academic life to pretend such complete preoccupation with the affairs of pure contemplative scholarship that one cannot give much attention to the trivialities of college organization or to the task of studying methods of correcting defects in this organization.[4]

As long as this paradoxical assumption is present among instructors, scientific progress in correcting criticisms will be hampered seriously.

A second major criticism of college and university teaching is directed at the institutions themselves. Many analyzers of higher education have asserted that the main objective of college training is the production of scholars and researchers while little is done to equip the graduates with teaching skills. College instructors simply have not been prepared to teach. Remmers[5] has written that the accusations

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[1] J. P. Powell, "Experimentation and Teaching in Higher Education," Educational Research, VI (June, 1964), 179.

[2] Paul Klapper, "The Professional Preparation of the College Teacher," The Journal of General Education, III (October-July, 1948-1949), 229.

[3] Ruth E. Eckert, "Ways of Evaluating College Teaching," School and Society, LXXI (February 4, 1950), 66.

[4] Charles H. Judd, "The Improvement of Teaching," The Journal of Higher Education, III (December, 1932), 471-72.

[5] H. H. Remmers, "The College Professor As the Student Sees Him," Purdue University Bulletin, Studies in Higher Education, Nos. 7-12 (Lafayette, Indiana: Purdue University, 1926-1929), pp. 1-63.

of poor college and university teaching could be a scapegoating mechanism but they are true basically since the instructors are prepared for research while teaching skills are largely ignored.

According to Dodge,[1] the biggest barrier to improvement of teaching lies with the institutions neglecting to recognize their duties to the citizens. Because objectives have not been clearly defined, research activities have been placed ahead of teaching activities. With teaching relegated to a subsidiary level, institutions are looking more and more to the benefits of research while experimentation in teaching tends to be forgotten.

Brearley[2] made a similar criticism when he stated that the low prestige value attached to teaching as compared to research has resulted in giving less and less attention to the students.

Until institutions of higher education exhibit a genuine dedication to their primary objective, that of attempting to educate students through sincere teaching methods, this reversal of considerations is likely to prevail with the student, upon whom the lifeblood of higher education is dependent, being pushed even further into obscurity.

A third assertion critical of teaching behaviors in colleges and universities arises from the students who suffer the greatest loss when teaching is haphazard. Several sources have reported that students have expressed grave disappointments with much of the instruction

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[1]Homer L. Dodge, "The Improvement of College Teaching," The Journal of Higher Education, III (December, 1932), 481-86; 518.

[2]H. C. Brearley, "College Classroom Teaching--Problems and Procedures," Peabody Journal of Education, XXXVII (July, 1959), 66-76.

which they have experienced in higher education. Their complaint of being poorly taught has been interpreted by parents as contributing to the failures of many college and university students. Judd[1] maintained that a common criticism lies in the instructors' failure to stimulate intellectual creativity because the teaching has been boring, lackadaisical, and uninspired.

Students have indicated that they have experienced a feeling of isolation and a failure to identify with a model while enrolled in schools. After an investigation of the responses of certain Harvard graduates to their college experiences, Whitla[2] concluded that these academically average men continued to be accepting of comfortable inferences after graduation as an extension of their college instructors' satisfaction with average performances in the classroom. A frequent complaint has been related to the failure of the faculty to satisfy the personal interest need of these students, thus nourishing feelings of frustration and perhaps withdrawal from challenging academic opportunities.

Interest in the effect of educational contacts upon students has never been so intense as at the present time.[3] It has evolved from experimentation with the idea that higher education institutions may be

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[1] Judd, op. cit., pp. 470-74; 517-18.

[2] Dean K. Whitla, "Encounters with Learning," Harvard Educational Review, XXX (Fall, 1960), 331-49.

[3] Paul Heist, "The Entering College Student--Background and Characteristics," Review of Educational Research, XXX (October, 1960), 285-97.

perceived as actual living complexes with administrators, instructors, and students all contributing mutually to a shared goal.[1]

These three criticisms, selected from a wide range of criticisms of teaching, suggest that a questioning of the instructional methods has considerable validity. The voluminous literature concerned with instruction attests to the importance of the problem as felt by those who are disturbed with ineffective instruction. Administrators and faculty, occupying a strategic position in society, are able to contribute to the public's betterment if they will accept realistically the assertion that academic immunity is inappropriate and the assertion that teaching is a skill requiring training. The student, upon whose future action all democratic institutions rest, is no longer content with isolation from the educational process.

2. Suggested Procedures for Improving Teaching Behaviors

Numerous procedures have been suggested in the literature for improving college and university instruction. One of the commonest methods is an appraisal, through interviews and questionnaires, of approaches reported by administrators and faculty. Cordrey[2] reported in an early study that data collected from eighty-one state teachers colleges and normal schools indicated that the great majority of presidents questioned felt that efforts should be directed toward improvement of

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[1] Richard J. Medalie, "The Student Looks at College Teaching," The Preparation of College Teachers, A Report by the American Council on Education and the U. S. Office of Education, Series I--Reports of Committees and Conferences--Number 42, ed. Theodore C. Blegen and Russell M. Cooper (Washington, D. C.: American Council on Education, July, 1950), XIV, 49-54.

[2] E. E. Cordrey, "Efforts to Improve Instruction in State Teachers Colleges," Peabody Journal of Education, IX (July, 1931-May, 1932), 200-208.

instruction. Most of these presidents also indicated that their institutions were engaged in such efforts. A number of the most frequently mentioned methods used included faculty meeting discussions, departmental discussions, course outline or syllabi preparation, advanced graduate study, and curriculum evaluation. While these presidents agreed that the efforts produced some benefits, they stated that the biggest barrier to maximum success was traceable to reluctant faculty attitudes.

As a result of a similar survey, Reed concluded that some of the common procedures for improving instruction were "periodic restatement of objectives, joint conferences with other departments, recognition of teaching efficiency, and departmental conferences."[1] Munro[2] cautioned that the question of effective teaching will probably never be completely answered because of the extensive number of variables interacting to produce the behavior. However, he suggested that factors such as hiring policies, alumni evaluations, teaching schedules, and instructor examinations were worthy of investigation.

Two additional studies, designed by means of the questionnaire survey method, were reported by Bohannon[3] and Byrnes and Jamrich,[4]

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[1]Anna Y. Reed in collaboration with Frank P. Maguire, William A. Thomson, and Harriett van der Vate, The Effective and the Ineffective College Teacher (New York: American Book Company, 1935), p. 22.

[2]William B. Munro, "A Self-Study of College Teaching," The Journal of Higher Education, III (December, 1932), 459-63.

[3]C. D. Bohannon, "Improvement of College Instruction," Phi Delta Kappan, X (April, 1928), 161-73.

[4]Francis C. Byrnes and John X. Jamrich, "Survey of Policies and Practices Relating to Improved Instruction," Improvement of Instruction in Higher Education, A Report by the Subcommittee on Improvement of Instruction of the Committee on Studies (Washington, D. C.: The American Association of Colleges for Teacher Education, 1962), pp. 19-22.

the conclusions of which are similar to the previously reported publications.

After reviewing twenty studies of policies used to improve teaching, Kelley[1] summarized the ideas of the administrators and faculty members. Some of the most often mentioned procedures he found included supervision of teaching, provision for research, use of outside experts, and student appraisal of instruction. The total number of procedures identified was quite extensive, and the suggestions may be regarded as tentative criteria for educators interested in improving teaching.

By analyzing the results of approximately 1,800 questionnaires completed by college teachers, former college teachers, and graduate students, Gustad[2] attempted to determine why persons enter college teaching and why they leave the profession. He found that many teachers left the profession for reasons related to the rewards. They seldom knew what kind of teaching job they were doing because evaluation was haphazard. Evaluation of teaching was based largely on impressions, hearsay, and subjective opinions despite administrators' contentions that teaching was vital and was rewarded.

A slightly different approach to the task was taken by Dobbins[3] when he predicted success in efficient teaching by providing the

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[1]William Frederick Kelley, "Twenty Studies of In-Service Education of College Faculty and the Procedures Most Recommended," Educational Administration and Supervision, XXXVI (October, 1950), 351-58.

[2]John W. Gustad, "They March to a Different Drummer: Another Look at College Teachers," The Educational Record, XL (July, 1959), 204-11.

[3]Charles G. Dobbins, "Excellence in College Teaching," School and Society, LXXXVII (December 19, 1959), 514-15.

necessary number of adequately prepared instructors and improving articulation among the elementary, secondary, and higher educational levels.

Fahey and Masoner[1] proposed the merits of a graduate seminar for students of all disciplines in which real problems, such as learning principles, evaluation methods, material organization, lecture presentation, and educational philosophy are discussed. The justification for the seminar is one answer to the inadequacies of graduate programs which fail to provide the future instructor with professional skills required for good teaching.

In his assertion that the preparation of college teachers is the most urgent task facing colleges today, Klapper[2] proposed that graduate institutions accept their responsibility for improving teaching by considering their candidates' potential for effective teaching as well as professional knowledge. While much of academia still feels that formalized teacher training courses are not appropriate, Buxton[3] suggested that the implementation of a training program is necessary before these institutions will be able to fulfill their objectives. The requisite characteristics of the training program he proposed included motivation for teaching by the candidate, his possession of knowledge of teaching skills and subject content, provision of teaching supervision, and opportunities for wide experiences in teaching.

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[1]George L. Fahey and Paul H. Masoner, "An Interdisciplinary Seminar in College Teaching," The Journal of Teacher Education, XI (1960), 391-97.

[2]Klapper, op. cit., pp. 228-44.

[3]Claude E. Buxton, "The Pros and Cons of Training for College Teachers of Psychology," American Psychologist, IV (October, 1949), 414-17.

Still another procedure suggested for the improvement of teaching behavior is concerned with the stated objectives of the institutions.

> . . . procedures and techniques of teaching, like those of any art, are not to be worked out by reference to ready-made ideas. Rather they are to be devised in terms of the materials and conditions at hand, and by reference to discoveries about these circumstances and what they require for the achievement of intended effects.[1]

Another step in the process is a measurement of the degree to which methods are effective in the fulfillment of the desired changes in student behavior.[2]

Numerous other procedures have been suggested for improving teaching behavior, including the undertaking of the institutional self-study;[3] the implementation of a tutorial system;[4] the study of and possible alteration of social, emotional, and intellectual variables;[5] and the application of behavioral science principles.[6]

Attempts by the instructor himself to improve his instruction by trying the "methods that seem to attain the best results in

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[1] B. Othanel Smith, "On the Anatomy of Teaching," The Journal of Teacher Education, VII (December, 1956), 339.

[2] D. W. Dysinger and W. S. Gregory, "A Preliminary Study of Some Factors Related to Student Achievement and Grades in the Beginning Course in Psychology," The Journal of General Psychology, XXIV (first half; January, 1941), 195-209.

[3] Wilfrid G. Hamlin, "A College Faculty Looks at Itself," The Journal of Higher Education, XXVIII (April, 1957), 202-206; 236.

[4] Whitla, op. cit.

[5] Brearley, op. cit.

[6] W. J. McKeachie, "Behavioral Sciences Can Improve Teaching," NEA Journal, XLIX (September, 1960), 79-81.

individual cases"[1] is another suggested procedure. According to Davis,[2] increasing involvement by instructors in the improvement of teaching was indicated.

Each of these methods represents considerable merit and is worthy of pursuing, but no one general approach has been discovered that is clearly more effective than the others in the improvement of teaching behavior. Considering the impact of education upon our social values, it is imperative that continuing efforts be directed toward the improvement of teaching. The current extensive interest in the problem is an encouraging sign for it indicates that some educators are courageous enough to face the conclusion that teaching has not been wholly satisfactory. The wide diversity of the methods suggested for improvement leads to the possibility that perhaps the wrong variables have been scrutinized or perhaps the right variables have not been studied closely enough. The interaction effects among complex variables may also be a contributing factor.

3. Philosophical Judgments of Effective Teaching Behaviors

An analysis of some of the numerous philosophical evaluations reveals that the underlying logic supporting the various judgments can be categorized into distinct systems. One approach evaluates effective teaching in terms of the predominance of the instructor-student relationships. Illustrative of this approach is Ryans' statement that

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[1] William B. Munro, Chairman, "Report of the Committee on College and University Teaching," Bulletin of the American Association of University Professors, XIX (section two; May, 1933), 34.

[2] Hazel Davis, "Evolution of Current Practices in Evaluating Teacher Competence," Contemporary Research on Teacher Effectiveness, ed. Bruce J. Biddle and William J. Ellena (New York: Holt, Rinehart, and Winston, Inc., 1964), pp. 41-66.

> . . . teaching is effective to the extent that the teacher acts in ways that are favorable to the development of basic skills, understandings, work habits, desirable attitudes, value judgments, and adequate personal adjustment of the pupil.[1]

Brearley[2] represented a similar philosophy when he wrote that the effective instructor serves as an inspiration to his students. The relationship is reciprocal because the student ranks high in the instructor's value system. Emphasis on the importance of the impact between teacher and learner has also been asserted by McKeachie[3] and Buch.[4]

A second philosophy supports the belief that effective teaching is to be evaluated directly in terms of the desired goals. Examples of this line of thinking are the following: ". . . teaching consists of a succession of acts by an individual whose purpose is either to show other persons how to do something or to inform them that something is the case,"[5] and "good teaching . . . is the kind of teaching which gains the end desired."[6]

A third philosophy, which holds that appraisal of teaching begins with the ambiguous, less discernible characteristics of the instructor, is illustrated by Kriner when he wrote "that a type of

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[1]David G. Ryans, "Measurement and Prediction of Teacher Effectiveness," Invitational Conference on Testing Problems, November 1, 1958 (New Jersey: Educational Testing Service, 1959), p. 56.

[2]Brearley, op. cit.

[3]McKeachie, op. cit.

[4]Robert Nelson Buch, "A Study of Student-Teacher Relationships," Journal of Educational Research, XXXV (May, 1942), 645-56.

[5]B. Othanel Smith, op. cit.

[6]William B. Munro, "A Self-Study of College Teaching," The Journal of Higher Education, III (December, 1932), 461.

scientific mind--as opposed to an artistic temperament; that consistency in purpose and action; and that emotional stability, all go far in determining teacher success."[1] Kegel[2] stated that great teaching, although it cannot be evaluated objectively, is identified by love of knowledge, dedication to truth, and inspiration of students. Reports by Whitla,[3] Champlin,[4] and the biographical study of distinguished teachers by Lamper[5] are also examples of this particular philosophy.

The widely divergent conclusions resulting from the separate philosophical judgments concerning effective instruction leads to the possibility that an empirical approach may yield more specific results.

4. The Empirical Criterion for Measuring Behaviors

Evaluating teaching effectiveness adequately is one of the most perplexing problems facing educators today. The magnitude of the task is affirmed by the frequency of studies directed toward its solution, and the perplexity of the problem is indicated by the inconclusiveness of the efforts. Most educators are aware of the problem, and some are attempting to solve it. Until satisfactory criteria of effective teaching behavior have been developed, little progress can be anticipated beyond the current stage. "The lack of an adequate,

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[1]Harry L. Kriner, "Second Report on a Five Year Study of Teachers College Admissions," Educational Administration and Supervision, XXI (January, 1935), 60.

[2]Charles H. Kegel, "The Distinguished Teacher," Improving College and University Teaching, XII (Spring, 1964), 102-104.

[3]Whitla, op. cit.

[4]Carroll D. Champlin, "Professors of Education," Education, LXXIII (February, 1953), 346-50.

[5]Neil Lamper, "Characteristics of Great Teachers," Dissertation Abstracts, XXI (1960-61), 3694.

concrete, objective, universal criterion for teaching ability is thus the primary source of trouble for all who would measure teaching."[1] Though this was pointed out in 1935, the situation seems not to have changed in over thirty years.

While a concept as complex as instructor effectiveness cannot be clarified by a simple pointing out of past errors, awareness of shortcomings is necessary before positive measures can be taken. In the final analysis, value judgments form the basis for establishment of the criterion. Unfortunately judgments do not agree clearly on examples of good teachers or on specific manifestations of effective ability. Even before clarifying these problems, educators should decide upon the desired outcomes of teaching.

Many studies in the past have tried to deal with the entire problem rather than throwing light on a single, carefully defined aspect of the problem. No one study by itself can add much to the final solution, but "faith is to be placed in a large variety of well planned studies, each aimed at contributing some essential element of understanding, and planned so as to afford greater insights by which subsequent studies may be guided."[2]

Hedges and MacDougall[3] summarized the various approaches which have been used in the measurement of teaching efficiency by including

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[1] Helen M. Walker (ed.), The Measurement of Teaching Efficiency (New York: The Macmillan Company, 1935), pp. x and xi.

[2] N. L. Gage and Jacob S. Orleans, "Guiding Principles in the Study of Teacher Effectiveness," The Journal of Teacher Education, III (December, 1952), 296.

[3] William D. Hedges and Mary Ann MacDougall, "Recording Student Perceptions of Teacher Behavior by Means of a Student Response Monitor," Journal of Educational Research, LVIII (December, 1964), 163-66.

the following: (a) attributes of most-liked and most-disliked instructors as listed by students, (b) characteristics of effective and ineffective instructors categorized for careful study of possible common factors, (c) correlation between training and practice, and (d) evaluation by experts.

A characteristic commonly found in the criteria of studies designed to measure instructor behavior is the indirectness of the measures used as the criteria. If the ultimate goal of higher education is a satisfactory adjustment of the student to self and others, then the logical criterion should be a measure of this adjustment. Since a statistical appraisal of adjustment after graduation is almost impossible to attain, research workers are forced to rely upon criteria which are assumed to be indirectly related to this ultimate goal. According to Orleans, Clarke, Ostreicher, and Standlee,[1] the problem then becomes one of selecting appropriate predictors to serve as approximations to the ultimate objective. The selection involves choosing a predictor that is an accurate measure of the final objective and making a statistical decision concerning the applicability of the criterion to other populations.

5. Specific Empirical Studies of Teaching Behaviors

a. Administrator Ratings. A listing of the various criteria used in the appraisal of instruction would represent an extensive compilation of factors which have been considered to be influential. Some

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[1]Jacob S. Orleans, Daniel Clarke, Leonard Ostreicher, and Lloyd Standlee, "Some Preliminary Thoughts on the Criteria of Teacher Effectiveness," Journal of Educational Research, XLV (May, 1952), 641-48.

of the criteria are not mutually exclusive, hence overlap is unavoidable. Nevertheless, a study of some of those which are commonly employed may serve to illuminate the problem.

One of the variety of criteria employed in the evaluation of instruction is the use of administrative ratings. A characteristic of the American system of higher education is the priority usually given to the administrator for making decisions of hiring, dismissal, salary increases, and promotion in rank. Since the educational structure is built in this manner, administrators find it necessary to evaluate the instructors in their departments based upon some conception of performance. Unfortunately, "few systematic plans"[1] are available to the administrator who wants to determine whether or not he has a good faculty. Of those techniques which have been developed, "none . . . has proved entirely satisfactory, either because of insufficient objectivity or because of too great emphasis on quantitative aspects."[2]

Survey studies, usually of the questionnaire design, reported in the literature have attempted to ascertain the characteristics of instructors which administrators consider the most and least desirable. One of the earliest is by Kelly[3] who asked executives and administrators of church-affiliated colleges to identify the individuals whom these college officials felt to be the outstanding teachers. The hypothesis supporting his study was that these nominees for greatness

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[1]W. W. Charters, "Sizing Up the Faculty," The Journal of Higher Education, XI (December, 1940), 457.

[2]Henry Beaumont, "The Measurement of Teaching," The Journal of Higher Education, IX (February, 1938), 96.

[3]Robert L. Kelly, "Great Teachers and Methods of Developing Them," Association of American Colleges Bulletin, XV (March, 1929), 49-67.

were largely a product of educators' imaginative idealism and these individuals achieved their stature in the profession simply because of circumstantial forces. Some of the results of this study characterized the great teachers as having appeared in the present century, as always having taught the prestigeful subjects, as having demanded productivity from their students, and as not having been popular with the students.

Rather than identifying individually distinguished educators with their accompanying postulated traits, Breed,[1] reporting an administrative analysis of teaching at the University of Chicago, focused on broad categories which could be used as a basis for appraisal and self-improvement. Listed in rank order, the suggestions included subject knowledge, teaching skills, personality characteristics, professional growth, and institutional atmosphere. The administrators acknowledged that inefficient teaching, when present, was traceable to careless hiring practices and poor teaching improvement plans.

Reed in collaboration with Maguire, Thomson, and van der Vate,[2] by means of written inquiries or questionnaires sent to liberal arts colleges, universities, teachers colleges and normal schools, reported administrators' conceptions of the effective and the ineffective college teacher. Even though the results lacked statistical refinement, the study has merit in the tabulation and synthesization of administrative opinions. For example, the survey showed that the liberal arts college administrators pictured the effective instructor as presenting

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[1] Frederick S. Breed, "A Guide for College Teaching," School and Society, XXIV (July 17, 1926), 82-87.

[2] Reed et al., op. cit., pp. 1-344.

concise, organized lectures; as exhibiting genuine interest in students; and as continuing his professional advancements. The personality of the effective instructor was stable and coordinated. The ineffective teacher was described generally as manifesting the negative dimensions of the traits characterizing the effective teacher.

The teachers college administrators surveyed in Reed's study indicated close agreement with the liberal arts college administrators concerning traits of effective and ineffective instructors. Highly desirable descriptions included thorough knowledge of subject, diverse academic interests, and compassionate feeling toward students. The ineffective instructor was described as being unable to adjust to professional demands, to be lacking in scholarship, and to be incapable of a healthy attitude toward students.

A highly similar classification of positive traits was developed by college executives as reported by Trabue.[1] Highest ranking was given to the instructor's academic record in his teaching field. Other top ranking characteristics were attitude toward students, stability of emotions, and tolerance toward debatable topics.

Stauffer,[2] investigating the relationship between the judgments of academic deans and young teachers concerning the behaviors of good college instructors, determined the product-moment coefficient of correlation to be .96. Judged to be most important were behaviors related

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[1]M. R. Trabue, "Judgments by 820 College Executives of Traits Desirable in Lower-Division College Teachers," Journal of Experimental Education, XXI (June, 1953), 337-41.

[2]John Nissley Stauffer, "Judgments of Liberal Arts College Teachers and Deans Regarding College Teacher Qualifications," Dissertation Abstracts, XVII (Part 1; 1957), 285-86.

to actual teaching, personal and social life, mental awareness, and professional issues.

Studies employing the criterion of administrators' ratings for the evaluation of instruction demonstrate that little systematic evidence is available with which to make accurate decisions. Administrators have been attempting to find a solution despite the lack of objective means.

b. Ratings by Instructors. As revealed in the literature, systematic evaluation of the instructional process is more frequent among the instructors than among the administrators. A basic assumption of many research projects is that instructors feel a need to improve their teaching behavior because of the ego satisfactions derived from successful performance. The critical incident technique developed by Flanagan[1,2] for use in the United States Air Force is suggested as a means of collecting data which could be used for self-improvement.

Simpson[3] reported a list of approaches to self-improvement used by 5,303 instructors. The most frequently mentioned devices were evaluation of one teaching method against a second method, discussion with other instructors, use of student comments, visitation of other instructors' classes, and use of student ratings. The author concluded that teachers were eager to improve their instruction but many were

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[1]John C. Flanagan, "The Critical-Requirements Approach to Educational Objectives," School and Society, LXXI (May 27, 1950), 321-24.

[2]John C. Flanagan, "The Critical Incident Technique," The Psychological Bulletin, LI (July, 1954), 327-58.

[3]Ray H. Simpson, "Use of Teacher Self-Evaluative Tools for the Improvement of Instruction," Improvement of Instruction in Higher Education, A Report by the Subcommittee on Improvement of Instruction of the Committee on Studies (Washington, D. C.: The American Association of Colleges for Teacher Education, 1962), pp. 49-62.

handicapped because of not knowing how to proceed with the process, thus inferring a deficiency in their professional training and in their orientation by the employing institution.

A real problem debated by instructors is the implementation of a rational program to govern advancement and promotion. One such program was described by Springer.[1] The criteria for advancement and promotion which this faculty group felt were important included the following: (1) teaching behavior, covering aspects of instruction such as proficiency in lecturing and in class discussion, effect upon students, and writing of syllabi; (2) professional contributions, with emphasis upon publications; (3) service to the institution; (4) community service; (5) professional activities before present appointment; (6) longevity at current institution; and (7) concrete indication of present and future professional leadership.

Criteria such as these, while ambiguous and perhaps subject to some misinterpretation, do serve to identify some of the main issues in the teaching evaluation task. Evaluation of instruction by the instructors themselves is a substantial improvement over purely subjective appraisal provided the process is systematic.

c. Alumni Ratings. If the ultimate goal of higher education is the successful adjustment of the individual to a democratic society, then a reasonable assumption is that research on effective teaching should consider this goal. One criterion suggested is evaluation of teaching by students and alumni. Student ratings will be discussed in a later section of this study.

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[1]E. Kent Springer, "Criteria for Advancement and Promotion of the Teaching Staff," Higher Education, VII (January, 1951), 117-18.

While alumni ratings might appear to be a decisive indication of the effects of instruction, there are several deficiencies inherent in the approach. With the passage of time and the accumulation of additional experiences, normal humans have a tendency to forget unpleasant events while, simultaneously, they usually recall more easily the pleasant events. Unless the instrument devised to assess alumni reactions to instruction can be designed to correct for this factor, the results may be misleading. A difficulty of this method is the sheer physical task of contacting these individuals. Because of human errors in keeping records, mobility of the American citizen, and other circumstances, the research worker intending to use alumni as subjects must be aware of the possibility of a biased sample. Fully recognizing that studies employing alumni attitudes toward instruction probably reflect the aforementioned deficiencies, an analysis of several of them, nevertheless, may be illuminating.

Bogardus[1] reasoned that reports of graduate students and alumni collected over a time interval of fifteen years would reflect more stable judgments than the decisions which characterized the undergraduate students. The desirable traits which were identified included knowledge of subject, familiarity with contemporary views, logicality of presentation, fairness in evaluation, and balance in perspective. A moralistic approach, lax personal habits, and egocentric attitude were some of the disliked traits mentioned by these subjects.

All available graduates who had earned the Ph. D. degree or who had been candidates for the degree at George Peabody College for

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[1]Emory S. Bogardus, "Behavior Patterns of College Teachers," Sociology and Social Research, XXX (July-August, 1946), 484-90.

Teachers during the period 1919 to 1950 were asked by Hedges[1] to select the discriminating qualities of the instructor who had affected each student to the greatest degree. Some of the classes of teaching mentioned by these subjects, arranged according to rank, were academic scholarship, student relationships, subject knowledge, outstanding instruction, and pleasant receptiveness. A total of twenty-six broad classes were identified. The responses were then divided into clusters of traits. Three clusters emerged and were arranged according to instructor-student interrelationships, academic standing of the instructor, and classroom expectations of the instructor. Almost one-half of the responses referred to the instructor-student interrelationship, while those relating to the academic standing of the instructor ranked second and the classroom expectations of the instructor ranked third. The author concluded that the personal interaction between teacher and student was of much greater significance in the lives of these individuals than any other single factor.

Testing the hypothesis that student conceptions of the elements of effective instruction were altered with the passage of time, Drucker and Remmers[2] compared the reactions of undergraduates with those of alumni. Attempts were made to secure a representative sample of subjects by limiting the number of alumni and students from each school and department to a proportion of instructors represented in

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[1]William D. Hedges, "The Effective Teacher at the Doctoral Level in Education," Peabody Journal of Education, XXXIX (May, 1962), 351-54.

[2]A. J. Drucker and H. H. Remmers, "Do Alumni and Students Differ in Their Attitudes Toward Instructors?" Purdue University Bulletin, Studies in Higher Education, Nos. 61-73 (Lafayette, Indiana: Purdue University, 1947-50), pp. 62-74.

the sample. A correlation of .92 was found between the ratings of the two groups, leading to the conclusion that a high positive relationship existed between the ratings of instructors by alumni and by students.

A major generalization that can be made from studies of alumni ratings is that alumni ratings are in substantial agreement with student ratings of effective instruction.

d. Student Changes. A measure judged to be important as a predictor of the ultimate criterion of education is student change, measured in a variety of ways such as grades, achievement scores, attitudes, skills and other behaviors which can be expressed objectively. If the record of the specific unit of behavior being evaluated is in quantitative form, the results have an advantage over less exact indices. The greater the objectivity present in the measure being used, the greater the likelihood of reliability and validity. Inversely, as subjectivity becomes a more potent factor, reliability and validity of the measurement decrease.

Using the examination performance of about 36,000 students as the criterion of teaching effectiveness, Cheydleur[1] arrived at the following results: (1) Instructors engaged in graduate studies while teaching simultaneously did not teach as well as those instructors who were not engaged in graduate studies. (2) Instructors who held the rank of assistants and instructors did not perform as well as those who held a higher academic rank. (3) No conclusive evidence existed to indicate that the sexes differed in teaching effectiveness. (4)

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[1] Frederic D. Cheydleur, "Judging Teachers of Basic French Courses by Objective Means at the University of Wisconsin--1919-1943," Journal of Educational Research, XXXIX (November, 1945), 161-92.

Instructors born in America were better teachers than those born elsewhere. (5) Holding other factors constant, teaching was more effective with small classes. (6) Grade-point average appeared to be more closely related to a division of students into upper and lower sections than to either quality of teaching or size of class. (7) Characteristics of able instructors showed high positive relationship to student performance on departmental and standardized examinations, while less able instructors showed low relationship. (8) Evidence was conclusive that the superior instructor possessed a thorough knowledge of the subject taught, showed enthusiasm with his profession, and demanded quality performance from the students.

Research workers make a continual appeal to the effect that a respectable study of teaching effectiveness involves the determination of the relationships between the instructor and the student. Such an investigation would imply that effectiveness is not unidimensional, but rather that it is a process of multivariate interaction. Knowing what kind of instructor is most effective with what kind of students would do much to eliminate the notion that there is only one type of effective teaching. Assuming that the interests and personality traits of instructors and students interacted with achievement level, Krumm[1] collected interest, personality, and achievement scores for 656 students enrolled in an introductory psychology class and interest and personality scores for the eleven instructors. His results demonstrated that the studied personality attributes of the instructors

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[1]Richard L. Krumm, "Inter-Relationships of Measured Interests and Personality Traits of Introductory Psychology Instructors and Their Students as Related to Student Achievement" (unpublished Doctor's dissertation, University of Pittsburgh, 1952), pp. 1-52.

and the students' interests interacted to influence significantly the achievement scores.

Another investigation demonstrating the differential effects of instructors upon student achievement was conducted by Elliott.[1] He used four criteria: student ratings of teachers, instructor knowledge of mental hygiene, instructor knowledge of subject, and student achievement with ability held constant. The sample consisted of thirty-six instructors of a required general chemistry course. His results were: (1) student achievement in classes of instructors who adhered closest to specific teaching methods was lower than in classes where the instructor was not so greatly concerned with teaching methods, (2) achievement of students was negatively related to knowledge of subject among the graduate students who taught, (3) student achievement was positively related to student ratings of instructors, (4) the absolute grade did not interact with student ratings of instructors, (5) instructor knowledge of subject was not correlated with student ratings of teachers, and (6) there was no clear-cut relationship between ability of student and instructor.

An illustration of the disappointing results which could occur when achievement scores are used as the criterion is the study by Novak[2] who, in comparing the conventional approach to a project-centered approach, found no significant differences between the groups

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[1]Donald N. Elliott, "Characteristics and Relationships of Various Criteria of College and University Teaching," Purdue University Bulletin, Studies in Higher Education, Nos. 61-73 (Lafayette, Indiana: Purdue University, 1947-50), pp. 5-61.

[2]Joseph D. Novak, "An Experimental Comparison of a Conventional and a Project Centered Method of Teaching a College General Botany Course," Journal of Experimental Education, XXVI (March, 1958), 217-30.

except that the conventional group showed a greater retention of facts. The experimental group displayed greater variability of performance on the achievement tests. One of the benefits suggested by the author was the opportunity for individual attention afforded by the experimental approach.

Variations of the commonly used experiments which manipulate approach to teaching and measure efficiency by student scores are those which investigate the relationship between class size and achievement. Even though there appears to be little theoretical support for using class size as a variable, the number of studies employing it is quite large, probably because the statistic is conveniently available. According to Powell,[1] the interest in experimentation with class size has been motivated by administrators anxious to lower cost of instruction.

In a very early study, Edmonson and Mulder[2] found little difference in achievement when a large and small class taught by the same instructor were compared. Rohrer[3] reported that achievement and attitudes were related to the differences in instructors and not to the differences in the class size. Confirming the conclusion that achievement is related to the student-instructor interaction and not class

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[1]Powell, op. cit., pp. 179-91.

[2]J. B. Edmonson and F. J. Mulder, "Size of Class as a Factor in University Instruction," Journal of Educational Research, IX (January, 1924), 1-12.

[3]John H. Rohrer, "Large and Small Sections in College Classes," The Journal of Higher Education, XXVIII (May, 1957), 275-79.

size per se is the exploration of Cammarosano and Santopolo[1] who demonstrated that student achievement with ability controlled in a large class was similar to that in a small class.

Further evidence indicating that decisions based on class size are probably ill-advised is the work of Macomber and Siegel[2] who sought to determine the impact of large classes on achievement. Compared were large groups taught by the lecture method, large classes taught by problem-solving or case-study methods, groups taught by television, and groups taught by graduate assistants. Results showed that the better students performed at the same level regardless of the approach used. The students' preference for instructor was based upon quality of teaching rather than upon method of teaching or size of class. The attitude of the student toward the instructor was viewed as being the crucial variable.

The "Eight-Year Study"[3] is another example comparing student performance and teaching method. The college records of 1,475 graduates from traditional schools were compared with a matched sample of 1,475 graduates from progressive schools. Evidence collected over a number of years indicated that those students from the progressive schools were "at least as successful as their more conventionally

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[1] Joseph R. Cammarosano and Frank A. Santopolo, "Teaching Efficiency and Class Size," School and Society, LXXXVI (September 27, 1958), 338-41.

[2] F. G. Macomber and Laurence Siegel, "A Study in Large-Group Teaching Procedures," The Educational Record, XXXVIII (July, 1957), 220-29.

[3] Dean Chamberlin, Enid Chamberlin, Neal E. Drought, and William E. Scott, Did They Succeed in College? (New York: Harper and Brothers, 1942), pp. 1-291.

trained matches."[1] While the study disclosed that there need not be a conflict between the progressive and the traditional view of preparing students for college, several criticisms can be made of the project.

The selection procedures were different for the two groups. The students from the experimental group were chosen on the basis of recommendations from teachers and principals while those from the comparison group were selected from college admission files by members of the project staff. In order for the groups to have been matched, the selection procedures should have been the same for all subjects. Since the experimental group was chosen on the basis of general potential while the comparable group was selected initially on the basis of aptitude test performance, it is likely that the effects of regression toward the mean showed an overestimated mental ability for the comparable group.

Because of the differences in emphases between the two school groups, it is likely that students from the traditional schools were better prepared for test-taking experiences than those from the progressive schools. The capacity of the experimental group was probably underestimated, and they did show more success in college.

While the study was designed to measure differences between the two instructional methods, there is the possibility that differences among the instructors influenced the results. The instructors from the progressive schools could have been enthusiastic over the experiment and thus contributed to a Hawthorne effect.

A summarizing statement of the use of student changes as a measure of teaching effectiveness reiterates previous conclusions

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[1] Ibid., p. 41.

that no clear-cut breakthroughs have been demonstrated. No really significant differences among methods can be claimed because of differences among students, instructors, and situations. What appears to be best for one student is not necessarily the best for another. While the scores representing student change may be free from subjectivity, their use as a measure of teaching efficiency cannot be justified completely since the ultimate results are not manifested until years after the scores have been accumulated and decisions made. The influence of one instructor upon students probably can never be evaluated fully. Scores representing student change, whether that change is accumulation of knowledge and skills, attitude toward class size or teaching method, are more a measure of student change than of teaching success.

e. Student Performance and Persistence in Subsequent Courses.

If the final goal of higher education is adjustment of the student, then a reasonable criterion of teaching effectiveness should be reflected in his behavior. Measures of student behavior are almost impossible to accumulate after graduation, but measures of his behavior in subsequent courses while still enrolled in the institution may indicate certain outcomes of the instruction the student has experienced. A number of studies have assumed that the quality of work done by students in later course sequences and the persistence of students in continuing the sequence is evidence of the effect of teaching and, thus, a measure of teaching effectiveness.

An attempt to measure teaching effectiveness by means of student performance in departmental advanced courses was undertaken by

Beaumont[1] who concluded that the results substantiated the existence of wide variations among the instructors when evaluated by student performance in subsequent courses. Readily admitted was the possible presence of relevant factors interacting to bring about the variations, but the ability of students and demands of the specific course were not judged to be of greatest influence.

Using the performance of the group in sequential courses and the tenacity of the group in pursuing the sequence of courses as criteria of teaching outcomes, Lancelot[2] confirmed that students did show variances which were related to different instructors. His subjects were engineering students who enrolled as freshmen from 1920 to 1928 and the members of the mathematics faculty who taught these students during the same period of time. By controlling the ability factor, he demonstrated by inference that, if the best students had been taught only by the most effective instructors, the grades throughout the sequence would have been higher than the students actually received and the percentage of students successfully finishing the sequence would have been increased.

Studies which use student performance and persistence in subsequent courses as the criterion for teaching behavior measure only one aspect of teaching. Only the short-range effect of instruction on a limited dimension of student behavior is investigated. This approach

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[1]Henry Beaumont, "A Suggested Method for Measuring the Effectiveness of Teaching Introductory Courses," The Journal of Educational Psychology, XXIX (November, 1938), 607-12.

[2]William H. Lancelot, "A Study of Teaching Efficiency as Indicated by Certain Permanent Outcomes," The Measurement of Teaching Efficiency, ed. Helen M. Walker (New York: The Macmillan Company, 1935), pp. 3-69.

may have some merit, but it has serious deficiencies also. A safe assumption appears to be that the type of interaction between students and faculty determines, in part, the students' interest in future courses of study. Completely ignored in this approach to teaching effectiveness are factors such as initial motivation and interest of the student. The personal influence of the instructor on students' decisions to persist in school may be regarded as a tentative index of the instructor's ability to inspire students to forego immediate benefits in deference to long-range gratification. A thoroughly conceptualized study which measured teaching effectiveness by using this criterion would take account of the inherent deficiencies. While the procedure could produce objective measures of differences among students who had been taught by different instructors, the results would be biased unless factors such as variances in ability, background, motivation, and other influences were controlled. Unless the groups were similar in all measurable characteristics, the results would be distorted. In addition, the investigation would need to be restricted to introductory courses, since the students' experiences in a beginning course taught by a specific instructor are assumed to be crucial in influencing his subsequent choices.

f. Student Comments and Ratings of Instructors. Only recently have educators recognized that properly organized and cooperatively sponsored systems of student evaluation of instruction can contribute toward improvement of instruction. As the educational structure has become less authoritarian and more democratic, the privilege of judging quality of instruction is no longer restricted to the administrators but has been granted to others.

Although still questioned by many persons associated with education, evaluation of instruction by students appears to be gaining in support, particularly since objective evidence has accumulated to demonstrate its value.[1] Student rating is an attempt to improve teaching by a consultation with the students. When used properly, student rating seems to contribute to improvement since the responsibility for finding and handling reported weaknesses is usually placed with the instructor.[2,3,4,5]

A demonstrated factor of significance in the teaching process is the nature of the student-instructor relationship. Student opinion of the effectiveness of teaching, because it is a reflection of this interaction, might contribute to clarification of needed steps toward improvement of teaching. A reasonable hypothesis in regard to student evaluation is that students are good judges of teaching. They are in a position to make direct and extended observations of the process, an activity which few instructors and fewer administrators can pursue. "There is no better criterion of teaching aptitude than teaching

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[1]Joseph E. Morsh and Eleanor W. Wilder, Identifying the Effective Instructor: A Review of the Quantitative Studies, 1900-1952, Research Bulletin AFPTRC-TR-54-44 (San Antonio, Texas: Air Force Personnel and Training Research Center, Lackland Air Force Base, October, 1954), pp. 1-151.

[2]W. D. Armentrout, "Improving College Teaching by Consulting the Consumer," School Executives Magazine, LI (July, 1932), 476-77.

[3]Jeanette A. Vanderpol, "Student Opinion--Sacred Cow or Booby Trap?" The Journal of Teacher Education, X (December, 1959), 401-12.

[4]N. L. Gage, "The Appraisal of College Teaching," The Journal of Higher Education, XXXII (January, 1961), 17-22.

[5]R. W. Lewis, "A Garland of Ratings, or Just Try to Know Thyself," College English, XXV (May, 1964), 587-90.

performance, and there are no better judges of teaching performance than students and colleagues."[1]

The idea of students rating instructors produces differences of opinion when it is discussed or proposed as a procedure. One of the general sources of criticisms originates with the instructors themselves, some of whom claim that evaluation by students might be derogatory to their status.[2] According to Brannon,[3] student rating of instructors showed evidence of lack of confidence by students in many instructors.

Many investigators assert that a study of teaching procedures is useful for facilitating the educational process. A knowledge of student opinion toward subjects, toward methods, and other features could lead to improvements in teaching. Using the relationship between attitude toward a subject and feeling toward instructor of the subject as a criterion, Corey and Beery[4] determined that student dislike of a high school teacher of a specific subject was manifested through his not electing to enroll for the same subject while in college. The data implied that student feeling toward a subject was closely related to the feeling toward instructor. This feeling was transferred to the college situation.

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[1]E. R. Guthrie, "The Evaluation of Teaching," The Educational Record, XXX (April, 1949), 115.

[2]David G. Ryans, "Notes on the Rating of Teacher Performance," Journal of Educational Research, XLVII (May, 1954), 695-703.

[3]C. H. Brannon, "Professors Are Poor Teachers," School and Society, XLVII (April 30, 1938), 576-77.

[4]Stephen M. Corey and George S. Beery, "The Effect of Teacher Popularity upon Attitude Toward School Subjects," The Journal of Educational Psychology, XXIX (December, 1938), 665-70.

Instructors may hold an untested assumption that one method of teaching is more productive than another. These preconceived notions could be measured objectively by the use of student ratings thus serving as a confirmation or negation. Suspecting that the outcomes of lecture and discussion methods might represent contrasts, Ruja[1] hypothesized that students in discussion sections would rate their instructors more favorably than would students in lecture sections. Assuming that students' measured attitudes toward instructors could be diagnosed as attitudes toward subjects and education generally, he developed and administered a ninety-item scale designed to assess emotional reactions toward instructors. After statistical analysis of the results, he concluded the following: (1) students enrolled in discussion classes showed no greater mastery of subject than students enrolled in lecture classes, (2) students enrolled in discussion classes exhibited no significant adjustment gains over students enrolled in lecture classes, (3) philosophy instructors of lecture and discussion sections were rated differently by students while no such difference occurred for psychology instructors, (4) students in discussion sections were able to become acquainted with one another in greater numbers than in lecture sections.

Another assumption, often untested, relates certain methodological procedure with the development of critical thinking. Factors that might contribute to development of changes in critical thinking were

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[1] Harry Ruja, "Outcomes of Lecture and Discussion Procedures in Three College Courses," Journal of Experimental Education, XXII (June, 1954), 385-94.

investigated by Lyle.[1] Despite the use of experimental and control groups, he concluded that there were no significant differences between the students' performance on a test of critical thinking. The experimental subjects rated the instructor more favorably while the control subjects rated the course more favorably. The control group scored higher on an achievement test of subject knowledge, but the experimental subjects displayed more independent thought on a final examination and greater awareness of problems in their term papers.

Student ratings may not be ideal in all situations, but the instructor could be benefited by evidence indicating that he is perceived differently by different groups. Wedeen[2] investigated the hypothesis that two sections of the same course would react differently to the same instructor. Opinions were collected at the conclusion of the semester. One class, which was slightly older in chronological age and one semester ahead of the second group, reacted to the course by rating it less favorably than the second group. Differences were noted in reactions to the personal characteristics of the instructor, the appropriateness of the examinations, and the severity of the grading. The findings indicated that the same instructor teaching the same course to two sections of students concurrently was rated differently by the two groups.

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[1]Edwin Lyle, "An Exploration in the Teaching of Critical Thinking in General Psychology," Journal of Educational Research, LII (December, 1958), 129-33.

[2]Shirley Ullman Wedeen, "Comparison of Student Reaction to Similar, Concurrent Teacher-Content Instruction," Journal of Educational Research, LVI (July-August, 1963), 540-43.

A common argument against the use of student ratings is that students are not competent to judge effective teaching.[1] Evidence is found by pointing to the lack of agreement between student ratings and faculty ratings.[2] The low correlation between the two groups of raters indicated the presence of differences.

When students are asked to list the primary attributes of effective instruction from their viewpoint, the results indicate genuine and sound suggestions which could be used profitably for the improvement of teaching. The qualities which they regard as most important usually are professionally desirable and are not necessarily ones which tend to make the course easier or less demanding for them.

The study by Smith[3] in which students selected traits associated with good university teaching is an example. The qualities considered to be ranking highest by these subjects included empathy toward students, balance in perspective, knowledge of subject, contemporary in outlook, and inspirational in intellect. Those qualities ranking lowest, from among a total of twenty-six traits, were adequate vocabulary, flexibility, university loyalty, integrity, and acknowledgment of responsibility. When the rankings by freshman, sophomore, junior, and senior students were compared, the agreement that subject knowledge and organized teaching were among the most desirable traits

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[1]H. Taylor Morse, "The Improvement of College Instruction," American Association of Colleges for Teacher Education, Twelfth Yearbook of the American Association of Colleges for Teacher Education (Washington, D. C.: American Association of Colleges for Teacher Education, 1959), pp. 118-32.

[2]Guthrie, The Educational Record, XXX, 109-15.

[3]Allan A. Smith, "College Teachers Evaluated by Students," Sociology and Social Research, XXVIII (July-August, 1944), 471-78.

was very close. Smith acknowledged that the investigation would have been improved considerably if the qualities had been defined.

A survey study of more than 6,600 Brooklyn College students[1] revealed strikingly similar qualities considered of greatest and least importance. Traits descriptive of professional competence, such as knowledge of subject, organization of material, and ability to inspire, were given highest rating, while those descriptive of personal qualities, such as speaking ability and pleasing personality, were rated as of lesser importance to the students.

In a slightly different approach to the problem, Taylor[2] attempted to discover the characteristics of the "best liked" and "least liked" teachers according to students' perceptions and the differences between these two extremes. His design consisted of responses by 775 seniors and graduate students to unstructured sentences and of responses to a sixty-item check list. The results appeared to indicate that these students looked for a combination of personal and professional traits in their instructors. Enthusiasm, understanding, and professional pride were some of the personal characteristics which identified the "best liked" faculty member, and skillful evaluation, organized classwork, and careful data analysis described his professional characteristics. The "least liked" instructor was characterized largely in terms of a personal frame of reference including such undesirable qualities as egocentrism, authoritarianism, and resentfulness. He was disliked

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[1] Medalie, op. cit.

[2] George Flint Taylor, "Characteristics of Best Liked Teacher, Least Liked Teacher and Most Effective Teacher in Teacher Training Institutions," Dissertation Abstracts, XX (1959-60), 1233.

professionally because of emphasis upon rote memorization of facts. None of the subjects indicated that the "least liked" teacher was his "most effective" teacher, but 88 per cent of the students indicated that their "best liked" instructor was also their "most effective" instructor.

Some studies have sought to correlate student ratings with faculty ratings for the purpose of comparing judgments. An example of such a study is the exploration by Yourglich[1] who assumed that, since the student-instructor interaction represented a vital component of the teaching-learning situation, both students and instructors behaved with reference to their conceptualized images of an "ideal-teacher" and an "ideal-student." By means of questionnaires, thirty-five instructors, representing all departments of a Pacific Northwest university, all ranks from instructor to professor, and experience from one to twenty years, and 101 undergraduates, representing freshmen, sophomores, juniors, and seniors, were asked to list the traits which they felt characterized the "ideal-teacher" and "ideal-student." Yourglich concluded that there was less agreement between instructors and students concerning the "ideal-teacher" attributes than between instructors and students concerning the "ideal-student" attributes. The respective coefficients of correlation were .592 and .888.

Findings such as these, providing they can be replicated, enable interested persons to pursue statistically the possible reasons for the differences identified in the traits students assign to

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[1] Anita Yourglich, "Study on Correlations between College Teachers' and Students' Concepts of 'Ideal-Student' and 'Ideal-Teacher'," Journal of Educational Research, XLIX (September, 1955), 59-64.

effective teaching and in those which faculty members assign. A further investigation into the reasons why there was substantial agreement concerning the characteristics of the "ideal-student" would be of value also.

A second study illustrating the benefits which can be gained from correlating student ratings and instructor ratings was conducted by Isaacson, McKeachie, and Milholland[1] who asked students enrolled in an introductory psychology class to complete instructor rating forms evaluating a group of equated teaching fellows. The instructors completed peer group nomination forms, self-evaluative check lists, and personality inventories. These scores were compared to the student rating scores. The only discernible trend was a high relationship between student ratings and a total culture score. The instructors who were rated as effective by the students were rated by other instructors as "sensitive," "intellectual," "polished," and "imaginative." Results such as these could lead to the eventual conclusion that evaluations by students and faculty members are in closer agreement when cultural factors are investigated.

A third study exemplifying the values that could be attained with use of student comments is by Allport[2] who compared student ratings with observer ratings. The coefficient of correlation between the two sets of ratings was around .50. Even though there were considerable divergencies as indicated by the modest correlation, both groups agreed

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[1] Robert L. Isaacson, Wilbert J. McKeachie, and John E. Milholland, "Correlation of Teacher Personality Variables and Student Ratings," Journal of Educational Psychology, LIV (1963), 110-17.

[2] Allport, op. cit., pp. 36-56.

that the best instructors exhibited acceptance of the student, gave an occasional verbal reward, and displayed self-confidence in their teaching behaviors. The author inserted a qualifying caveat which is applicable to all empirical studies; namely, generalizations should never be accepted without consideration of the situation and the individual. Most studies are designed around a specific frame of reference and a particular set of assumptions which cannot be transferred to other circumstances without some modification. If generalization to another set of circumstances is desired, acknowledgment must be made of the original conditions to avoid any possible misinterpretation of conclusions.

Solomon, Bezdek, and Rosenberg[1] used student ratings combined with observations and tape recordings to investigate the relationship between teaching behavior and adult learning. The subjects were twenty-four college and university instructors of night classes. The scores were factor analyzed producing eight factors. The general conclusion was that student gains in factual knowledge and in comprehension were affected by different kinds of teaching behavior. Instructors ranking high in "warmth" and "clarity" factors were rated favorably by the students.

Recognizing that this earlier study had limitations because of the small sample, Solomon[2] attempted a replication using 229 college and university instructors of night classes. The factors identified

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[1]Daniel Solomon, William E. Bezdek, and Larry Rosenberg, Teaching Styles and Learning (Chicago: Center for the Study of Liberal Education for Adults, 1963), pp. 1-164.

[2]Daniel Solomon, "Teacher Behavior Dimensions, Course Characteristics, and Student Evaluations of Teachers," American Educational Research Journal, III (January, 1966), 35-47.

were similar to those found in the prior study. Significant relationships were found between student ratings and instructors who were able to communicate factual knowledge clearly.

Teaching, as distinguished from the permission of independent study, is basically an interaction process. There is a substantive content which is independent of teacher and student but which is mediated through both. Teaching effectiveness per se is dependent upon the strategic management of the content and upon the effects of the interaction. Instructors may differ in the relative emphasis placed on these two crucial variables but neither can be reduced to zero. Student judgment, however collected, is a measure of the impact impression of an instructor in a given class. Ratings by supervisors or by the instructor himself can do no more than infer this impact.

g. Theoretical Logic and Statistical Requirements of Rating Scales. Examination of the theoretical logic and statistical requirements of the rating scale, when used to measure the attitudes of students toward individual instructors, will answer most of the criticisms which have been directed at the device.

> Rating systems are widely used in the armed forces, in civil service, and in industry as routine methods for evaluating personnel, and such ratings are often the most available criterion record. In many cases, no other type of record is readily available or conveniently procurable.[1]

A subcommittee of the Committee on Personnel Methods of the American Council on Education, in undertaking a three-year study of rating techniques, concluded the work convinced that rating scales had been demonstrated to be of sufficient value to justify their

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[1]Robert L. Thorndike, Personnel Selection (New York: John Wiley and Sons, 1949), p. 155.

careful use and to warrant further experimentation even though the subcommittee began the project with a skeptical attitude. The study indicated that the reliability of rating scales may, under favorable conditions, approximate the reliability of good objective tests.[1]

While there may be several acceptable methods of securing students' judgments of teaching effectiveness, the method which employs rating scales is used at least as frequently as any other recognized method. Remmers referred to the definition of the rating scale as a device used to evaluate "products, attitudes, or other characteristics"[2] and stated that the rating device is used in educational research more than any other method because teaching is too complex to be evaluated by any procedure that is less adequate. Guilford wrote that

> . . . the forms of rating scales in common use fall into five broad categories: numerical, graphic, standard, cumulated points, and forced choice. Any such classification must necessarily be a very loose one, based on shifting principles. The types are all alike in that they call for the assignment of objects by inspection, either along an unbroken continuum or in ordered categories along the continuum. They are all alike in that the end result is the attachment of numbers to those assignments. They differ in the operations of placement of objects, in the kind and number of aids or cues, and in the fineness of discrimination demanded of the rater.[3]

Research workers in business and industry have demonstrated the crucial role of attitudes as opposed to skills in the productivity of

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[1] Francis F. Bradshaw, "Revising Rating Techniques," Personnel Journal, X (June, 1931 to April, 1932), 232-45.

[2] H. H. Remmers, "Rating Methods in Research on Teaching," Handbook of Research on Teaching, ed. N. L. Gage, The American Educational Research Association, National Education Association (Chicago: Rand-McNally and Company, 1963), p. 329.

[3] J. P. Guilford, Psychometric Methods (2d ed.; New York: McGraw-Hill Book Company, Inc., 1954), p. 263.

personnel. Student attitudes toward instructors is one variable in the teaching-learning situation as well, exerting some influence on the students' ideas of the effectiveness of teaching.

> That these attitudes are important in the learning situation and that they profoundly affect both achievement and retention is the testimony of both common sense experience and many empirical studies in which the experimental approach has been applied to problems in educational psychology.[1]

Traits are verbal descriptions of personality characteristics which individuals are thought to possess, or which individuals have been demonstrated to possess. Basic to this assumption is the general agreement of the culture upon the connotation of a particular label attached to a particular behavior.

The use of the rating scale in the evaluation of teaching rests upon the assumption that human behaviors have certain common features which lie within broad extremes, thus human behaviors can be described in general categories. In addition, each person possesses certain qualities relatively unique to a degree with him. Hence, an individual rating will show certain peaks and valleys within the broad pattern. Both of these characteristics are compatible with rating scale measurement.

While much confidence is being placed in the benefits derived from the use of rating scales, judged by the frequency with which they are used and the statistical accuracy with which the instrument is acclaimed, it is incumbent upon the user to be aware of certain

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[1]John A. Creager, "A Multiple-Factor Analysis of the Purdue Rating Scale for Instructors," Purdue University Bulletin, Studies in Higher Education, Nos. 61-73 (Lafayette, Indiana: Purdue University, 1947-50), p. 75.

requirements which must be satisfied before the rating scale can be used appropriately and the results interpreted accurately.

The basic consideration of any instrument designed to measure some variable is the validity characteristic. Broadly stated, validity is concerned with the degree to which the instrument measures that which it has been designed to measure. When a rating scale is used to measure student attitudes toward the effectiveness of an instructor, the validity is concerned with the accuracy with which the student attitudes are being measured. Brandenburg and Remmers[1] agreed by pointing out that student reactions to the instructor were being measured and not student judgment of the true effectiveness of the instructor.

Russell said

> . . . that so long as one is interested only in measuring student-evaluation of an instructor or course, then assuming reliability of the measure, by definition the measure is valid. However, if one's interest lies in an evaluation of teacher effectiveness, then student-evaluation measures only one of the many possible aspects of the criterion. Since one's measure is no longer defining the criterion, then validity is not synonymous with reliability.[2]

Ideally, student attitudes toward instructors should be correlated with some independent criterion of teaching effectiveness, but no universally accepted objective criterion is available. Hence, reliance must be placed in the face validity of the instrument. An instrument has face validity "if it looks valid--particularly if it looks

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[1]G. C. Brandenburg and H. H. Remmers, "Rating Scales for Instructors," Educational Administration and Supervision, XIII (September, 1927), 399-406.

[2]Harold E. Russell, "Interrelations of Some Indices of Instructor Effectiveness: An Exploratory Study" (unpublished Doctor's dissertation, University of Pittsburgh, 1951), p. 47.

valid to laymen."[1] If the items give the impression that they are related to the criterion, the effect will be likely to increase the motivation of the student, a highly desirable condition.

Research studies have confirmed the assumption that students are capable of accurately describing instructors' behavior as it is manifested in the classroom. Of all segments of the population, students are the one group which has the opportunity to observe instructors over an extended period of time. Because of this lengthy association, the student has information not possessed by others for giving descriptions of the instructors' behavior. Since this is the case, student attitude is regarded as an accurate reflection of the criterion being measured. In the final analysis, human judgments form the basis of social decisions.

> If competent judges appraise Individual A as being as much better than Individual B is better than Individual C, then it is so, as there is no higher authority to appeal to.[2]

French[3] reported a factor analysis study of the relationship between student attitudes and instructor characteristics. At least eight dimensions were considered influential in students' ideas of effective instruction. Ability to explain, ability to stimulate, and knowledge of subject were three broad characteristics which students

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[1] Edward E. Cureton, "Validity," Educational Measurement, ed. E. F. Lindquist, American Council on Education, Washington, D. C. (Menasha, Wisconsin: George Banta Publishing Company, 1951), p. 672.

[2] Truman Lee Kelley, The Influence of Nurture upon Native Differences (New York: The Macmillan Company, 1926), p. 9.

[3] Grace Marian French, "College Students' Concept of Effective Teaching Determined by an Analysis of Teacher Ratings" (unpublished Doctor's dissertation, University of Washington, 1957), pp. 1-61.

judged to be among the most important. When compared with an earlier study by Guthrie[1] the results were highly similar.

> Such agreement becomes even more striking when we remember that the populations of students in the two studies are more than a generation apart. Apparently, student notions of good teaching are rather stable things.[2]

A second consideration by which an instrument is evaluated for its adequacy of measurement is that of reliability. A measure possesses reliability to the extent that the scores it yields are free from error variance. The larger the error, the lower the reliability. Reliability is increased if duplicated measurements show a high degree of consistency. The reliability coefficient of particular concern in student ratings is stability, a measure of dependability over a time interval yielded by an administration of the same instrument on two occasions. The probability of obtaining significant differences between the scores of two administrations of the same instrument is decreased with lack of reliability, as the presence of error variance will mask any true variance. In the words of Remmers, "since it is student judgments that constitute the criterion, reliability and validity in this case are synonymous,"[3] and of Russell, "validity is defined as being synonymous with reliability which, if we are interested in only the 'opinions' or 'attitudes' is a satisfactory definition."[4]

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[1]E. R. Guthrie, The Evaluation of Teaching: A Progress Report (Seattle: University of Washington, 1954), pp. 1-10.

[2]French, op. cit., pp. 46-47.

[3]H. H. Remmers, "Reliability and Halo Effect of High School and College Students' Judgments of Their Teachers," The Journal of Applied Psychology, XVIII (1934), 621.

[4]Russell, op. cit., p. 49.

Critics of the rating scale point out that student judgments lack consistency because of characteristics such as immaturity, subjectivity, and naiveté, the combined effects of which will operate so as to lower reliability. Studies which have investigated this criticism demonstrated that the reliability coefficient of student ratings usually has been found to lie in the respectable range. Voeks and French[1] found the reliability coefficient of student ratings to be .944, and Guthrie[2] arrived at a total reliability coefficient of .93 when he surveyed student ratings of instructors. High reliability of student ratings was confirmed further by Smeltzer and Harter,[3] Heilman and Armentrout,[4] Root,[5] Hayes,[6] and Snedeker.[7]

Even though the rating scale is widely used and generally accepted as an adequate instrument for measuring human behavior, certain

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[1]Virginia W. Voeks and Grace M. French, "Are Student-Ratings of Teachers Affected by Grades?" The Journal of Higher Education, XXXI (June, 1960), 330-34.

[2]Edwin R. Guthrie, "Evaluation of Faculty Service," Bulletin of the American Association of University Professors, XXXI (Summer, 1945), 255-62.

[3]C. H. Smeltzer and R. S. Harter, "Comparison of Anonymous and Signed Ratings of Teachers," Educational Outlook, VIII (January, 1934), 76-84.

[4]J. D. Heilman and W. D. Armentrout, "The Rating of College Teachers on Ten Traits by Their Students," The Journal of Educational Psychology, XXVII (March, 1936), 197-216.

[5]Alfred R. Root, "Student Ratings of Teachers," The Journal of Higher Education, II (1931), 311-15.

[6]Robert Bennett Hayes, "A Measure of Student Attitude Towards Teaching Effectiveness," Dissertation Abstracts, XXII (1961-62), 2265-66.

[7]John Haggner Snedeker, "The Construction of a Forced-Choice Rating Scale for College Instruction," Dissertation Abstracts, XX (1959-60), 1273-74.

influences surrounding rating scale measurements could operate so as to distort the yielded results. One of these influences is the "halo effect."[1,2]

Lorge[3] indicated that the presence of the bias was related to the method by which the instrument was marked by the rater, pointing out that the positive correlations found between certain responses of several specific psychological instruments may be indicative of underlying personality dimensions. While the influence of the "halo effect" must be recognized as possibly contributing to the distortion of results, its contribution is not significant as long as the rating scale is used to measure student descriptions of instructors.

Another bias thought to exert a possible influence on student ratings measured by rating scales is the relationship between the ratings given to instructors and the grades obtained by students from the instructors rated. The relationship may not be a simple one as evidenced by Weaver[4] who found that, while the ratings were biased in direction of expected grades, most of the bias was aimed at the teaching skills of the instructor rather than personality dimensions. In addition, those students who expected to earn C grades appeared less

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[1] Edward L. Thorndike, "A Constant Error in Psychological Ratings," The Journal of Applied Psychology, IV (March, 1920), 25-29.

[2] Frederic Lyman Wells, "A Statistical Study of Literary Merit with Remarks on Some New Phases of the Method," Archives of Psychology, ed. R. S. Woodworth, Columbia University Contributions to Philosophy and Psychology (New York: The Science Press, 1907), XVI, 1-30.

[3] Irving Lorge, "Gen-Like: Halo or Reality," The Psychological Bulletin, XXXIV (October, 1937), 545-46.

[4] Carl H. Weaver, "Instructor Rating By College Students," The Journal of Educational Psychology, LI (1960), 21-25.

discriminating than those who anticipated higher grades. Generally, the conclusion is that the relationship is so insignificant as to cause little effect on the ratings.[1,2,3,4]

Results from rating scales may suffer from sex differences of the raters. However, investigations which have studied this potential source of bias demonstrated that no significant differences existed between male and female raters.[5,6]

Additional biases which might intervene so as to distort the measures obtained through the use of rating scales include the relationship between contact of the rater and the rated. Freeberg,[7] using twenty-three groups of three unacquainted men in each group, concluded that ratings were valid only to the degree to which earlier observed behavior was related to the traits being rated. Investigating the relationship between the number of relevant rater contacts and the

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[1]H. H. Remmers, "The Relationship between Students' Marks and Student Attitude Toward Instructors," School and Society, XXVIII (December 15, 1928), 759-60.

[2]A. W. Bendig, "The Relation of Level of Course Achievement to Students' Instructor and Course Ratings in Introductory Psychology," Educational and Psychological Measurement, XIII (Autumn, 1953), 437-48.

[3]Charles M. Garverick and Harold D. Carter, "Instructor Ratings and Expected Grades," California Journal of Educational Research, XIII (November, 1962), 218-21.

[4]Earl Hudelson, "The Validity of Student Rating of Instructors," School and Society, LXXIII (April 28, 1951), 265-66.

[5]Drucker and Remmers, op. cit.

[6]George D. Lovell and Charles F. Haner, "Forced-Choice Applied to College Faculty Rating," Educational and Psychological Measurement, XV (Autumn, 1955), 291-304.

[7]Norman Edward Freeberg, "Effect of Relevant Contact upon the Validity and Reliability of Ratings," Dissertation Abstracts, XVI, Part I (1956), 789.

accuracy of the rating, Bare[1] found through factor analysis that ratings increased in accuracy in proportion to the number of relevant rater contacts.

Among other sources of bias which must be recognized as possibly contributing to errors in ratings are factors such as the likelihood of projecting attitudes held by raters toward the instructor;[2] the readiness to recall a greater number of pleasant experiences than unpleasant experiences;[3] the influence of item style on responses;[4] the tendency of raters to respond with what they believe to be the socially desirable responses[5] or those that make a good impression.[6] The effect of the human element on the probability of an event's occurrence,[7] and the error of central tendency[8] are also possible sources of bias.

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[1]Roderick Hughes Bare, "Bias as Related to Rater Contacts," Dissertation Abstracts, XX (1959-60), 2883-84.

[2]Norman M. Chansky, "The Attitudes Students Assign to Their Teachers," The Journal of Educational Psychology, XLIX (1958), 13-16.

[3]W. A. Bousfield, "An Empirical Study of the Production of Affectively Toned Items," The Journal of General Psychology, XXX (second half; April, 1944), 205-15.

[4]Lee J. Cronbach, "Response Sets and Test Validity," Educational and Psychological Measurement, VI (1946), 475-94.

[5]Anne Anastasi, "Some Current Developments in the Measurement and Interpretation of Test Validity," Proceedings of the 1963 Invitational Conference on Testing Problems (Princeton, New Jersey: Educational Testing Service, 1964), pp. 33-45.

[6]David R. Saunders, "Moderator Variables in Prediction," Educational and Psychological Measurement, XVI (Summer, 1956), 209-22.

[7]Louis D. Goodfellow, "The Human Element in Probability," The Journal of General Psychology, XXIII (first half; July, 1940), 201-205.

[8]Guilford, op. cit., p. 278.

While the use of student rating scales is subject to the criticisms directed against other rating scale uses, when the situation calls for a description of instructor attributes as reported by students, many of the criticisms no longer apply.

6. The Osgood Semantic Differential

Most scales used for instructor ratings by students list obvious behaviors. In consequence, students gain immediate insight into the structural design of the instrument, introducing the possibility of "halo effect." The use of a rating scale possessing less obvious trait descriptions may help to overcome a concomitant variable of bias which distorts the correlation between the traits.

The Semantic Differential, devised by Osgood,[1] is an example of a rating scale with items which might be effective in reducing the correlation between traits. Since the scale is composed of common, bipolar adjectives with clear and precise meanings, the results should be more satisfactory than would a scale which worded obviousness by ambiguous and subjective items.

Describing it as a scale that has undergone exacting experimentation and as being widely adaptable to the measurement of an almost infinite number of concepts, Remmers wrote that "its most obvious shortcoming for the naive rater is its apparent lack of 'face validity'."[2]

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

[2] H. H. Remmers, "Rating Methods in Research on Teaching," Handbook of Research on Teaching, ed. N. L. Gage, The American Educational Research Association, National Education Association (Chicago: Rand-McNally and Company, 1963), p. 362.

The Semantic Differential is basically a graphic scaling procedure, each scale consisting of seven units extended over a continuum with bipolar adjectives at the termination of each scale. The task of the subject is to differentiate a concept against the adjectives by indicating the direction and intensity of his differentiation on the seven-unit scale. The overt behavior recorded on the instrument is inferred as representing the cognitive behavior that takes place internally.

Osgood conceived the idea of using opposite adjectives to describe semantic judgments from the results of early research with music, color, and mood interrelationships. He also made reference to an anthropological study of five diverse cultures in which linguistic similarities were compared and to an investigation of social stereotype expressions in which judgments of concepts were found to reveal definite clusters.

As a consequence of early investigations with the Semantic Differential, Osgood concluded that three factors were dominant in the judgment process. Generally, the evaluative factor accounted for about 50 to 75 per cent of the variance extracted, while the potency and activity factors each accounted for about 50 per cent of the variance associated with the first factor.

The authors pointed out that no standardized form of the Semantic Differential exists, but, rather, the instrument is a technique which can be generalized to a wide variety of situations, the modifications being dependent upon the problem under consideration. The concepts, which can be selected as stimuli to which the subject responds by marking the continuum separating the bipolar adjectives, are almost

limitless. Criteria recommended for the selection of concepts include the use of concepts which are likely to yield a variety of different responses, to carry only one specific meaning to the subject, and to be familiar to the subjects. The selection of scales calls for greater precision than that of concepts. Selection of about three scales for each factor representing maximum loading on one factor and minimum loading on other factors plus the selection of scales which are relevant to the concepts being judged are recommended. If the problem is an attempt to disguise the purpose of the investigation, scales giving the appearance of being unrelated are appropriate.

When the Semantic Differential is evaluated against criteria of measuring devices, the instrument is found to possess many of the acceptable standards. The collection of results is absolutely objective. The precision of the procedure leads to replication. The interpretation of extracted factors is a subjective process, but this is not a criticism of the instrument.

The basic measure of the Semantic Differential is the numerical value of the check which the subject has placed opposite each set of adjectives as he has judged the concept against the scale. Average errors of measurement are less than one scale unit, a satisfactory criterion of reliability. Results have demonstrated that reliability of the measures decreased as the time lapse between test and retest is increased.

A number of assumptions related to the scales are held when the Semantic Differential is used as a measuring instrument. The characteristic of equal intervals is assumed in the assignment of a numerical score to each position on the scale. The falling of the zero point

at the center of each scale, or the neutral position, is assumed when the measures are factor analyzed.

A study which used the Semantic Differential includes the investigation by Westley and Jacobson.[1] Twelve concepts related to a ninth-grade experimental mathematics class and adjectives representing each of three factors were judged by two groups, one of which had been taught the course by television instruction and the other had not. The findings demonstrated that the group taught by television rated its instructor more favorably than the other group.

Evans, Smith, and Colville[2] reported giving the Semantic Differential to a university faculty group. Generally, this group rated itself more favorably than students who rated the instructors.

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[1]Bruce H. Westley and Harvey K. Jacobson, "Instructional Television and Student Attitudes Toward Teacher, Course, and Medium," AV Communication Review, XI (1963), 47-60.

[2]Richard I. Evans, Ronald G. Smith, and William K. Colville, The University Faculty and Educational Television: Hostility, Resistance, and Change. Supported by a Grant from the U. S. Department of Health, Education, and Welfare, Office of Education (Houston, Texas: University of Houston, 1962), pp. 1-104.

II. STATEMENT OF PROBLEM AND HYPOTHESIS

A. Statement of Problem

This study was designed to provide evidence which would serve two functions: (1) the possible contribution to a theory of college and university teaching behavior by an improved description of teaching, and (2) the provision of inferences for the improvement of teaching behavior.

Many research workers concerned with measuring and describing teaching behavior have employed the device of student ratings. While this device has been established as both reliable and valid, some of the experiments have led to unsatisfactory results because the terms used to identify the behavior were ambiguous and inherently subjective. The present study attempted to overcome this specific deficiency through the use of a rating scale composed of common, bipolar adjectives whose meanings were clear and precise.

For purposes of this study, the rating scale was defined as a measure of student attitudes toward instructors as defined by the traits comprising the scale. Regarded in this way, the rating scale is not a direct measure of teaching effectiveness, but an objective measure of the students' perceptions of the instructors' traits. The purpose of the rating scale can be thought of as the drawing of a picture by the student for the benefit of the instructor.

An attitude was defined in this study as the written response of the student to the instructor-stimulus described by the traits appearing on the rating scale.

A trait, in the present study, referred to the behaviors described by the adjectives selected for inclusion in the rating scale. Such adjectives, assumed to be pertinent in the evaluation of instruction, were indirect inferences of instructional behaviors and represented the students' judgment of the degree to which the teachers possessed the specific trait under consideration.

Validity was defined as a measure of the student descriptions of instructor behavior. Whether or not student descriptions were an accurate measure of the true effectiveness of the instructor was unknown and was not a variable being measured. The problem was concerned with a description of instructor behaviors because of the significance of these behaviors to the learning process.

Reliability was defined as identical with validity since the question was only whether student ratings were valid descriptions of instructor behaviors.

B. Hypothesis

The specific hypothesis tested was that college instructor behavior could be identified and measured by the use of a graphic rating scale when the rater responded to common bipolar adjectives. The behaviors would yield, when subjected to factor analysis, clusters of traits which identified subgroups of college instructors.

III. PROCEDURE

A. Pilot Study

1. Experimental Instrument

A structured check list of familiar single and bipolar adjectives based on the work of George L. Fahey,[1] the Osgood Semantic Differential,[2] and the Classroom Observation Record, Teacher Characteristics Study, devised by Ryans,[3] was constructed and subjected to pilot-study experimentation. A sample of the instrument in its experimental stage is in Appendix I. The design of this instrument was considered to be particularly appropriate since the problem assumed that students were capable of discrimination when they responded to simple, common adjectives whose meanings were in general agreement.

In the absence of an adequate teaching theory, this study relied upon the rational assumptions as described by Fahey.[4]

> It is assumed that what he [the instructor] thinks, or feels, or believes is of import only as he projects it to the individual learners. This impact impression is the heart of his influence, not his psychic integration.[5]

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[1] George L. Fahey, "Paradigm for Research on College Teaching" (Pittsburgh: University of Pittsburgh, December, 1963). (Mimeographed)

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

[3] David G. Ryans, Characteristics of Teachers, American Council on Education (Menasha, Wisconsin: George Banta Company, Inc., 1960).

[4] George L. Fahey, "The Behavioral Sciences," Professional Advancement Through Higher Education, Proceedings 15th Annual Conference, Department of Higher Education, October 29-30, 1965 (Harrisburg: The Pennsylvania State Education Association, 1965), pp. 48-54.

[5] Ibid., p. 50.

Fahey identified eight approaches describing the instructor's behavior. These eight approaches were: (a) approach to life; (b) approach to self; (c) approach to work; (d) approach to authority; (e) approach to ideas; (f) approach to communication; (g) approach to students; and (h) approach to methodology.

In order to keep the data to a manageable size during the pilot-study stage, only four of the eight approaches were included in the experimental instrument. The four approaches, arbitrarily selected, were: (a) approach to authority; (b) approach to ideas; (c) approach to communication; and (d) approach to students. The instrument thus consisted essentially of two parts: on the first four pages, each identified by one of the four approaches, were listings of the fifty selected bipolar adjectives; on the last four pages, each similarly identified by one of the four approaches, were listings of the forty selected single adjectives.

The eight-page instrument, with an instruction sheet attached, was administered to one university graduate class consisting of twenty-four students, one university undergraduate class consisting of eighteen students, and one junior college class consisting of twenty-nine students during the final weeks of the 1964 spring session. The instrument was again administered to a university graduate class consisting of twenty students and a junior college class consisting of twenty-five students during the final weeks of the 1964 fall session. The total number of subjects in the pilot-study rating sample was 116.

The teachers who were rated anonymously by the pilot-study sample were a professor and two instructors. The professor and one

instructor were rated on two different occasions while the second instructor was rated on one occasion.

Ratings of the three instructors were punched on IBM cards and submitted for analysis to the University of Pittsburgh Computation Center. Two objectives were primary:

(a) A frequency count of the number of times each set of bipolar adjectives and each single adjective was checked as being relevant to evaluating instructor behaviors. Reference to a frequency count was felt to be necessary because this information would aid in shortening the rating scale. Those adjectives which were chosen least frequently were omitted from the revised form.

(b) A measure of intercorrelation among the adjectives to determine whether any patterns of relationship were discernible.

The number of times each set of the fifty bipolar adjectives was selected as being relevant to the approach being evaluated, plus the mean and standard deviation, is shown in Table 1.

TABLE 1

FREQUENCY OF SELECTION OF ADJECTIVES

Set of Adjectives	Number of Times Selected	Mean	S. D.
Good-Bad	446	2.3027	1.3509
Relaxed-Tense	421	2.5606	1.6473
Pleasant-Unpleasant	411	2.4939	1.4388
Honest-Dishonest	409	1.8362	1.0779
Calm-Agitated	403	2.3672	1.5674
Valuable-Worthless	401	2.3067	1.2622
Clear-Hazy	398	2.5754	1.5266
Strong-Weak	382	2.6597	1.4084
Fair-Unfair	382	2.1754	1.3034
Kind-Cruel	379	2.5013	1.4093
Happy-Sad	368	2.9484	1.3349
Sharp-Dull	358	2.8184	1.4698
Active-Passive	358	2.7151	1.4941
Deep-Shallow	333	2.9940	1.3775
Hard-Soft	330	3.6697	1.5108
Nice-Awful	330	2.7455	1.4106
Healthy-Sick	326	2.3988	1.3245
Loud-Soft	322	4.1708	1.6096
Young-Old	318	3.0975	1.5050
Ferocious-Peaceful	317	4.7918	1.5409
Brave-Cowardly	317	2.7445	1.2979
Fresh-Stale	311	2.8457	1.5394
Fast-Slow	306	3.2778	1.4042
Clean-Dirty	300	2.2067	1.2791
Large-Small	297	2.9158	1.4530
Bright-Dark	297	2.9327	1.5647
High-Low	295	2.6475	1.4158
Empty-Full	290	4.8448	1.7089
Rough-Smooth	287	4.1463	1.5486
Sacred-Profane	286	3.4790	1.3264
Wide-Narrow	286	3.000	1.8506
Bitter-Sweet	279	4.4229	1.5502
Sweet-Sour	274	3.4781	1.3912
Rugged-Delicate	262	3.5649	1.3510
Rich-Poor	261	3.1149	1.4709

TABLE 1--Continued

Set of Adjectives	Number of Times Selected	Mean	S. D.
Tasty-Distasteful	260	3.0385	1.3321
Heavy-Light	259	4.1931	1.4552
Beautiful-Ugly	255	3.4824	1.1900
Hot-Cold	243	3.8519	1.4384
Near-Far	229	3.4716	1.4795
Angular-Rounded	223	3.9910	1.5967
Thick-Thin	221	3.9548	1.3777
Fragrant-Foul	221	3.2081	1.2068
Long-Short	220	3.7545	1.4154
Wet-Dry	219	4.5616	1.4588
Bass-Treble	210	3.6143	1.5370
Black-White	205	4.4244	1.6746
Pungent-Bland	199	3.8844	1.3896
Yellow-Blue	198	3.8535	1.5227
Red-Green	180	3.6889	1.4885

Further information considered to be of aid in shortening the rating scale was a measure of correlation. Since the set of adjectives "good-bad" was selected most frequently by the pilot sample as being relevant to the evaluation of teaching behavior, this set was designated tentatively as the criterion against which the remaining forty-nine sets of adjectives were correlated. Based on 456 cases, the correlations with the criterion (good-bad) are shown in Table II.

TABLE 2

CORRELATIONS WITH CRITERION SET OF ADJECTIVES "GOOD-BAD"

Set of Adjectives	Correlation	Set of Adjectives	Correlation
Large-Small	.584	Sacred-Profane	.050
Beautiful-Ugly	.549	Relaxed-Tense	.403
Yellow-Blue	.108	Brave-Cowardly	.359
Hard-Soft	-.031	Long-Short	.244
Sweet-Sour	.171	Rich-Poor	.527
Strong-Weak	.553	Clear-Hazy	.510
Clean-Dirty	.256	Hot-Cold	.260
High-Low	.538	Thick-Thin	.043
Calm-Agitated	.369	Nice-Awful	.416
Tasty-Distasteful	.467	Bright-Dark	.483
Valuable-Worthless	.600	Bass-Treble	.178
Red-Green	.215	Angular-Rounded	-.042
Young-Old	.323	Fragrant-Foul	.224
Kind-Cruel	.396	Honest-Dishonest	.427
Loud-Soft	.087	Active-Passive	.431
Deep-Shallow	.537	Rough-Smooth	-.153
Pleasant-Unpleasant	.422	Fresh-Stale	.418
Black-White	-.103	Fast-Slow	.288
Bitter-Sweet	-.138	Fair-Unfair	.374
Happy-Sad	.303	Rugged-Delicate	.186
Sharp-Dull	.478	Near-Far	.220
Empty-Full	-.375	Pungent-Bland	.193
Ferocious-Peaceful	-.112	Healthy-Sick	.469
Heavy-Light	-.007	Wide-Narrow	.377
Wet-Dry	.195		

An analysis of these correlations with the criterion set of adjectives revealed that the highest relationships were among adjectives suggestive of general characteristics of the instructor. Since the students had been requested to check those adjectives which they felt to be most relevant to the rating, the evidence appeared to indicate that students frequently associated general characteristics with

instructor evaluation. This particular pattern of relationships can probably be explained by reference to a stereotyped image of the instructor whereby the individual is judged as "good" or "bad" on the basis of the impact of first impressions. The strong agreement among the raters on adjectives connoting general characteristics led to the inference that these characteristics were more readily discernible to the students and carried greater weight in their judgment than specific instructor characteristics.

The forty single adjectives were taken from Fahey's "Paradigm for Research on College Teaching."[1] He used them as illustrative of behaviors under each of his "approaches." He[2] has explained that some were adopted from Solomon, Bezdek, and Rosenberg[3] and others were developed rationally for use in the study of relations of personality traits to teaching effectiveness.

A study of the single adjectives appearing in the rating scale revealed extensive variation in the number of times the adjective was not chosen as being pertinent to the rating task. The number of times each adjective was not checked as being pertinent is shown in Table 3.

The early intention was to list these single adjectives as sets of bipolar opposites so that the design of this section of the scale would be similar to that of the first section of the scale.

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[1]Fahey, op. cit.

[2]George L. Fahey, Professor, Psychology and Education, University of Pittsburgh, private communication.

[3]Daniel Solomon, William E. Bezdek, and Larry Rosenberg, Teaching Styles and Learning (Chicago: Center for the Study of Liberal Education for Adults, 1963).

TABLE 3

NUMBER OF TIMES ADJECTIVES NOT CHECKED

Adjective	Number of Times Not Checked (456 Possible)	Adjective	Number of Times Not Checked (456 Possible)
Uncertain	51	Dogmatic	111
Cautious	52	Isolated	112
Vague	59	Intimate	113
Cynical	67	Evaluative Skill	117
Rude	71	Inconspicuous	118
Courteous	72	Protective	126
Planful	72	Dry	126
Anxious	72	Meticulous	126
Flexible	73	Meandering	128
Egotistical	73	Aloof	133
Objective	74	Omniscient	139
Pretentious	78	Lucid	156
Masculine	84	Hypochondriacal	160
Crusading	88	Lethargic	162
Unconforming	93	Flamboyant	172
Rebellious	94	Pragmatic	178
Hypercritical	95	Deferent	178
Compulsive	99	Abasive	180
Perceptive	103	Voluble	194
Threatening	103	Ethereal	248

Reference was made to Roget's University Thesaurus[1] for the purpose of listing the opposites to the forty single adjectives. The completed list with opposites was subjected to the judgment of a graduate class. Disagreement among the students as to the appropriate adjectival opposite was so extensive that it was decided to continue listing these adjectives as singles rather than as sets of questionable opposites.

[1]Sylvester Mawson (ed.), Roget's University Thesaurus (Apollo ed.; New York: Thomas Y. Crowell, 1963).

To test the hypothesis that fewer dimensions were being measured, the ratings from the bipolar sets of adjectives were factor analyzed using the principal axes method. Rotation was done using Kaiser's varimax procedure. Three factors were retained for inspection. The rotated factor loading matrix which appeared is shown in Table 4 on the following page.

To facilitate the interpretation of common factors, the matrix data were organized according to adjectives represented in each of the three separate factors. The data which results are shown in Table 5, page 69.

Examination of the bipolar adjectives having the most substantial loading in Factor I led to the tentative interpretation that this factor represented the general characteristics of the instructor as judged by the student. A listing of some of the adjectives having high loadings in Factor I included "large-small," "beautiful-ugly," "strong-weak," "active-passive," "fast-slow," and "healthy-sick." These were clearly identified as general descriptions.

Factor II was evidently a value judgment related to moral qualities and personal traits of the instructor as perceived by the student. High loadings in adjectives "ferocious-peaceful," "rough-smooth," "loud-soft," "sweet-sour," "sacred-profane," and "clean-dirty," were interpreted as representing meanings common to this factor. The appearance of "large-small," "strong-weak," "active-passive," and "healthy-sick" with almost negligible loadings on this factor was rationalized further as evidence that Factor II had common features not shared by Factor I.

TABLE 4

ROTATED FACTOR LOADING MATRIX

	Variables	Factor I	Factor II	Factor III
1.	Good-Bad	.9931	-.1093	.0423
2.	Large-Small	.9451	-.1833	-.2704
3.	Beautiful-Ugly	.7771	-.5509	-.3042
4.	Yellow-Blue	.4301	-.9016	-.0451
5.	Hard-Soft	.2110	.7735	.5977
6.	Sweet-Sour	.3213	-.9233	-.2102
7.	Strong-Weak	.9594	.1531	.2367
8.	Clean-Dirty	.6067	-.6759	.4184
9.	High-Low	.9710	-.2122	.1102
10.	Calm-Agitated	.5652	-.8161	-.1203
11.	Tasty-Distasteful	.8768	-.3888	-.2828
12.	Valuable-Worthless	.9856	-.1533	-.0708
13.	Red-Green	.7030	.6779	-.2151
14.	Young-Old	.6545	-.7153	-.2450
15.	Kind-Cruel	.4955	-.7988	-.3412
16.	Loud-Soft	.3300	.9436	-.0281
17.	Deep-Shallow	.9603	-.0914	-.2634
18.	Pleasant-Unpleasant	.6061	-.7087	-.3610
19.	Black-White	-.1146	.7858	-.6078
20.	Bitter-Sweet	-.2725	.9061	.3235
21.	Happy-Sad	.5905	-.6959	-.4087
22.	Sharp-Dull	.9733	.0890	.2116
23.	Empty-Full	-.9473	.2257	.2274
24.	Ferocious-Peaceful	-.1463	.9892	-.0048
25.	Heavy-Light	.0533	.8365	-.5454
26.	Wet-Dry	.4136	-.0137	-.9104
27.	Sacred-Profane	.1442	-.8796	.4533
28.	Relaxed-Tense	.7991	-.5141	-.3116
29.	Brave-Cowardly	.9978	-.0108	-.0649
30.	Long-Short	.7912	.1749	-.5860
31.	Rich-Poor	.9253	-.3055	-.2245
32.	Clear-Hazy	.9991	.0390	.0174
33.	Hot-Cold	.4480	-.5567	-.6995
34.	Thick-Thin	.2344	-.4578	-.8576
35.	Nice-Awful	.5737	-.7773	-.2584

TABLE 4--Continued

	Variables	Factor I	Factor II	Factor III
36.	Bright-Dark	.7650	-.5852	-.2689
37.	Bass-Treble	.4793	.2201	-.8496
38.	Angular-Rounded	.1750	.9719	.1571
39.	Fragrant-Foul	.6098	-.7924	-.0129
40.	Honest-Dishonest	.8322	-.5355	.1439
41.	Active-Passive	.9823	-.0087	-.1870
42.	Rough-Smooth	-.1146	.9851	.1284
43.	Fresh-Stale	.8818	-.4125	-.2287
44.	Fast-Slow	.8397	.4624	.2849
45.	Fair-Unfair	.7083	-.6632	-.2419
46.	Rugged-Delicate	.5828	.7522	-.3075
47.	Near-Far	.4774	-.4831	-.7339
48.	Pungent-Bland	.7533	.4683	-.4619
49.	Healthy-Sick	.9173	-.2814	-.2817
50.	Wide-Narrow	.6739	-.4055	-.6176
Per Cent of Common Variance		48.3465	36.4865	15.1670
Communality		100.0000		

Factor III was interpreted as a sensorially oriented perception of the instructor. The highest loading on "wet-dry" suggested that Factor III involved the sensation of touch as, at a moderately high loading, did "hot-cold." The loadings of the pairs, "black-white," "thick-thin," "near-far," "wide-narrow" (vision), and "bass-treble" (auditory) on this factor suggested that sensory inferences combined to measure student judgments.

TABLE 5

ADJECTIVES REPRESENTED IN FACTORS

Factor I		Factor II		Factor III	
Adjectives Showing Highest Loadings	Loading	Adjectives Showing Highest Loadings	Loading	Adjectives Showing Highest Loadings	Loading
Good-Bad	.9931	Yellow-Blue	-.9016	Black-White	-.6078
Large-Small	.9451	Hard-Soft	.7735	Wet-Dry	-.9104
Beautiful-Ugly	.7771	Sweet-Sour	-.9233	Hot-Cold	-.6995
Strong-Weak	.9594	Clean-Dirty	-.6759	Thick-Thin	-.8576
High-Low	.9710	Calm-Agitated	-.8161	Bass-Treble	-.8496
Tasty-Distasteful	.8768	Red-Green	.6779	Near-Far	-.7339
Valuable-Worthless	.9856	Young-Old	-.7153	Wide-Narrow	-.6176
Red-Green	.7030	Kind-Cruel	-.7988		
Deep-Shallow	.9603	Loud-Soft	.9436		
Sharp-Dull	.9733	Pleasant-Unpleasant	-.7087		
Empty-Full	-.9473	Black-White	.7858		
Relaxed-Tense	.7991	Bitter-Sweet	.9061		
Brave-Cowardly	.9978	Happy-Sad	-.6959		
Long-Short	.7912	Ferocious-Peaceful	.9892		
Rich-Poor	.9253	Heavy-Light	.8365		
Clear-Hazy	.9991	Sacred-Profane	-.8796		
Bright-Dark	.7650	Nice-Awful	-.7773		
Honest-Dishonest	.8322	Angular-Rounded	.9719		
Active-Passive	.9823	Fragrant-Foul	-.7924		
Fresh-Stale	.8818	Rough-Smooth	.9851		
Fast-Slow	.8397	Fair-Unfair	-.6632		
Fair-Unfair	.7083	Rugged-Delicate	.7522		
Pungent-Bland	.7533				
Healthy-Sick	.9173				

To test the assumption which held that instructor behaviors could be categorized by the four approaches arbitrarily selected from the eight approaches identified, the pilot-study data were subjected to a correlation study and factor analysis of the four approaches. The results indicated that one factor was highly represented on all pages of the instrument. A plotting of the factors demonstrated that one factor was contributing the greatest share of the variance and that the variance contributed by the other three factors was very similar. Additional evidence for the presence of one approach rather than four was found by reference to the eigenvalues. Three of the factors were represented by eigenvalues of less than unity while Factor I had an eigenvalue of 2.80. Based on these results, the decision was made to use only one approach on the revised instrument and label it "Approach to Teaching."[1]

2. Final Instrument

The decision was made to include in the final instrument the three factors which had been extracted as suggested by Osgood.[2] In order to keep the final instrument to a convenient length, the four sets of bipolar adjectives having the highest loading in their respective factors were selected. The adjectives and factor loadings selected as representing Factor I were clear-hazy, .9991; brave-cowardly, .9978; good-bad, .9931; and valuable-worthless, .9856. The adjectives representing Factor II were ferocious-peaceful, .9892; rough-smooth, .9851; angular-rounded, .9719; and loud-soft, .9436.

[1]Glenn E. Roudabush, Assistant Professor, Computer Science and Psychology, University of Pittsburgh, personal communication.

[2]Osgood, op. cit.

Representing Factor III were wet-dry, -.9104; thick-thin, -.8576; bass-treble, -.8496; and near-far, -.7339. The final instrument thus consisted of twelve sets of bipolar adjectives which comprised Part I of the rating scale. The appearance order of the adjectives was completely randomized.

The format of the scale was modified slightly so as to make the task easier for the respondents. Rather than request students to indicate their choice by inserting the choice in a separate column at the extreme right of the page, the modified instructions were to encircle the number which represented the desired choice.

Since Part II of the instrument had not been factor analyzed, reliance had to be placed in the data which gave evidence as to the number of times each single adjective had not been checked as being pertinent to the evaluation task. By simple subtraction of the number of times the adjective had not been checked from the total number of cases (456), the list of adjectives checked most frequently was derived. The adjectives occurring most frequently were "uncertain," "cautious," "vague," "cynical," "rude," "courteous," "planful," "anxious," "flexible," "egotistical," "objective," "pretentious," "masculine," "crusading," "unconforming," and "rebellious."

Assuming normal distribution of the sample of judgments, testing the null hypothesis demonstrated that nothing but chance factors were operating in the selection by the students of these sixteen adjectives. Using the formula $\sqrt{Npq}$, z scores demonstrated that all choices were significant beyond the .01 level.[1]

[1]J. P. Guilford, Fundamental Statistics in Psychology and Education (3d ed.; New York: McGraw-Hill Book Company, Inc., 1956), pp. 211-13.

The adjectives "uncertain," "courteous," "masculine," and "crusading," were omitted from the final list because the meaning was similar to a second selected adjective, or because the meaning was the opposite of a second selected adjective, or because the meaning was held to be too ambiguous for the evaluating task.

Upon suggestion of Grace French Lazovik,[1] the adjective "stimulating" was included in the final list. The rationale was that the characteristic corresponded highly with student overall judgment as found in previous studies.

Part II of the revised instrument thus consisted of thirteen single adjectives. The appearance order of the adjectives was completely randomized.

Part III of the revised instrument was developed as a criterion measure against which the results of Part I would be correlated since it was assumed that a practical criterion of global judgment would facilitate interpretation and add to the utility of the results. A copy of the revised instrument appears in Appendix II.

B. Current Study

During the beginning weeks of the fall trimester, 1965-1966, the project was explained to members of the Liberal Arts undergraduate faculty of the University of Pittsburgh by means of a personal visit to the chairman or his designate in each of the departments. If a verbal agreement to participate in the project was reached, the names of all

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[1]Grace French Lazovik, Associate Professor, Psychology and Education, Director of University Testing Service, University of Pittsburgh, personal communication.

faculty, regardless of academic rank, who were teaching undergraduate Liberal Arts classes at the University of Pittsburgh during the trimester were obtained from the departmental secretary.

In order that the results could be kept confidential to the instructor who was being rated, the project was explained also to the Dean of the School of Liberal Arts, the Dean of the Division of Humanities, the Dean of the Division of Natural Science, and the Dean of the Division of Social Science, University of Pittsburgh. Each of these Deans signed a mimeographed letter approving the conditions of the project but detaching himself from any knowledge of individual ratings. The detailed letter, with the signatures of the Deans, which was sent to each faculty member inviting him to participate in the project is reproduced in Appendix III. Attached to the letter was a card requesting biographical data which the instructor was invited to complete and return to the project office. A total of 438 letters was mailed to the Liberal Arts undergraduate instructors.

Restrictive factors, such as taking sabbatical leave, teaching only graduate students, teaching only one of the two trimesters, and teaching non-repetitive courses during the two trimesters, eliminated some instructors from the project. A total of 112 instructors, representing 25.57 per cent of the population contacted, participated in the evaluation. An analysis by Division of instructors participating is presented in Table 6.

A total of 117 classes of liberal arts students evaluated the 112 instructors. An analysis of classes participating in the evaluation arranged by Division is presented in Table 7.

TABLE 6

PARTICIPATION OF DIVISION

Division	Instructors Participating	
	Number	Percentage of Total (112)
Humanities	43	38.39
Natural Science	44	39.28
Social Science	25	22.32
	112	99.99

TABLE 7

CLASSES PARTICIPATING BY DIVISION

Division	Classes Participating	
	Number	Percentage of Total (117)
Humanities	46	39.31
Natural Science	46	39.31
Social Science	25	21.37
	117	99.99

The difference between the 117 classes and the 112 instructors was accounted fo. by the request of several instructors to have more than one class participate in the evaluation.

A set of instructions was read to the students before the rating scale was administered to the class. These instructions are reproduced in Appendix IV.

An attempt was made to have the instructor absent from the room during the evaluation process since his presence or absence was considered to be a factor influencing the ratings. Twenty-five instructors were present during the administration of the scale over the two trimesters.

The rating scale was administered to a total of 4,916 undergraduate liberal arts students during the fall trimester, 1965-1966. An analysis of students who completed the rating scale arranged by Division is shown in Table 8.

TABLE 8

UNDERGRADUATE STUDENTS COMPLETING RATING SCALE

Division	Students Participating	
	Number	Percentage of Total (4,916)
Humanities	1,634	33.24
Natural Science	2,477	50.39
Social Science	805	16.37
	4,916	100.00

A total of 192 graduate students completed the rating scale but this group was not included in the analysis since the project was concerned with undergraduate ratings.

Results of the ratings were mailed by confidential letter to each of the participating instructors at the opening of the winter trimester, 1965-1966. This time was chosen because final grades for the fall trimester were due in the Office of Student Records before the close of the fall trimester, 1965-1966. Release of the ratings after the grades were recorded by the Office of Student Records would prevent

the instructor from altering the grades on the basis of ratings by students.

An analysis of Part I of the rating scale composed of the twelve bipolar adjectives was delayed until the following trimester since these ratings were to be subjected to factor analysis.

Results of Part II of the rating scale composed of the thirteen single adjectives were furnished to the instructor in the form of means computed for the individual instructor, his Division, and the School of Liberal Arts.

Detailed results of Part III of the rating scale were furnished to each participating instructor by listing the number of undergraduate and graduate students represented in the rating, the number of students who ranked him according to the five traits listed, the behaviors of the instructor listed as being most helpful to the students accompanied by the number of times these behaviors were mentioned, and the improvements mentioned by the students accompanied by the number of times these improvements were mentioned.

The three-page letter which was sent to each instructor who was rated during the fall trimester, 1965-1966, is shown in Appendix V.

A short note of acknowledgment was sent to each of the instructors who had indicated an inability to participate in the study. This note is reproduced in Appendix VI.

At the beginning of the winter trimester, 1965-1966, a letter asking instructors to participate a second time for purposes of scale reliability was sent to the 112 instructors who had participated during the fall trimester, 1965-1966. This letter is reproduced in Appendix VII.

Restrictive factors, such as unexpected changes in teaching schedules, teaching of non-repetitive courses, and granting of faculty leaves, eliminated some of the initial sample. A total of fifty-nine instructors representing 52.67 per cent of those contacted the second trimester, 1965-1966, were able to participate a second time in the evaluation project. An analysis of instructors participating during the winter trimester, 1965-1966, is presented in Table 9.

TABLE 9

PARTICIPATION OF DIVISION

Division	Instructors Participating	
	Number	Percentage of Total (59)
Humanities	23	38.98
Natural Science	24	40.67
Social Science	12	20.34
	59	99.99

A total of sixty-two classes of liberal arts students evaluated the fifty-nine instructors who participated in the project a second time. An analysis of classes who rated these instructors is shown in Table 10.

The difference between the sixty-two classes and the fifty-nine instructors was accounted for by the request of several instructors to have more than one class participate in the evaluation process.

TABLE 10

CLASSES PARTICIPATING BY DIVISION

Division	Classes Participating	
	Number	Percentage of Total (62)
Humanities	25	40.32
Natural Science	25	40.32
Social Science	12	19.35
	62	99.99

Administration of the rating scale replicated that of the fall term. The rating scale was completed by 2,967 undergraduate liberal arts students during the winter trimester, 1965-1966. An analysis of raters arranged by Division is shown in Table 11.

TABLE 11

UNDERGRADUATE STUDENTS COMPLETING RATING SCALE

Division	Students Participating	
	Number	Percentage of Total (2,967)
Humanities	1,093	36.83
Natural Science	1,440	48.53
Social Science	434	14.63
	2,967	99.99

A total of seventy-five graduate students completed the rating scale but these ratings were not included in the analysis.

Results of the ratings were compiled and mailed to the participating instructors in a manner similar to that of the fall term. The covering letter accompanying the results was slightly different from that sent initially and is reproduced in Appendix VIII. Notes of acknowledgment were sent to those instructors unable to participate.

An abstract of the project results was mailed to all instructors who had been evaluated (Appendix IX).

The data were analyzed using a discriminant analysis and a factor analysis.

C. Sample Characteristics

Characteristics of the entire sample of instructors who were rated are shown in Table 12.

TABLE 12

INSTRUCTOR RANK AND YEARS OF TEACHING

Instructors	Division		
	Humanities	Natural Science	Social Science
Academic Rank	2.55	1.96	2.04
Standard Deviation	1.88	1.00	.91
Years of College and/or University Teaching	2.68	2.84	2.24
Standard Deviation	1.51	1.15	1.12

Number of Instructors = 104.
Academic Rank Code:
1. Professor
2. Associate Professor
3. Assistant Professor
4. Instructor
5. Guest Lecturer
6. Graduate Assistant or Teaching Fellow

These data indicated that the average Humanities instructor held the academic rank of Assistant Professor and had 2.68 years of teaching experience at the college and/or university level. The average Natural Science instructor held the academic rank of Associate Professor and had 2.84 years of college and/or university experience. The average Social Science instructor held the academic rank of Associate Professor and had 2.24 years of college and/or university experience.

Characteristics of the entire sample of undergraduate students who rated the instructors are listed in Table 13.

TABLE 13

STUDENT AGE AND YEAR

Students	Division		
	Humanities	Natural Science	Social Science
Age	19.55	19.44	20.00
Standard Deviation	3.03	2.51	2.70
Number of Raters	2080	3780	1200
Year in School	1.92	2.03	2.45
Standard Deviation	1.10	1.09	1.13

Total Number of Raters = 7060.

Inspection of these data indicated that the average ages of all students were between 19.44 and 20.00 years. Students who rated the Social Science instructors were the oldest within this range, those who rated the Humanities instructors were next oldest, and those who rated Natural Science instructors were the youngest of the group.

Means representing the student year in school indicated that the averages fell between the freshman and sophomore levels.

None of the means for either instructor or student populations differed sufficiently from the others of its class to suggest that the samples were not drawn from the same populations.

Academic rank of the participating instructors is shown in Table 14.

TABLE 14

ACADEMIC RANK OF INSTRUCTORS

Academic Rank	Number	Percentage of Total Sample (104)
Professor	26	25
Associate Professor	33	32
Assistant Professor	20	19
Instructor	11	10
Graduate Assistant or Teaching Fellow	14	13
Total	104	99

IV. FINDINGS

A. Discriminant Analysis

A discriminant analysis procedure was used to analyze the data with a program written for the present study. The method requires that group membership be predetermined and that the same kinds of measurements be available for all members of the groups. The criterion of excellence for distinguishing between good and bad subjects is not used.

The procedure determines whether or not there are differences in the measurements of the populations of which the obtained measurements represent samples. The measurements are plotted as points in a dimensional space and the linear distances which separate the groups determine the extent of the differences. If stable differences among the group measurements are found, then the problem examines the linear distances which separate the groups, the directions of the differences, and the assignment of individuals to one of the groups.

The linear combination of variables which best discriminates among the groups is the discriminatory function. It is computed as the ratio of the among-groups sum-of-squares to the within-group sum-of-squares and is interpreted as a coefficient. A large coefficient indicates that the groups are divergent while the individuals in the group are relatively homogeneous. A small coefficient indicates that both groups and individuals are homogeneous.

The number of discriminant functions computed is one less than the number of groups. The line of closest fit to the means, representing the maximum separation of the groups, is the first discriminant function; the second line of closest fit, orthogonal to the first, is

the second discriminant function, and so on. To test the significance of a discriminant function, one may "select a subset of the computed functions that accounts for a major portion of the discriminating power of the test battery, say approximately 80 or 90 per cent of it."[1]

Additional information concerning the discriminant analysis technique can be found in Kendall,[2] Rulon,[3] Tiedeman and Bryan,[4] Martin and Scott,[5] and Tatsuoka and Tiedeman.[6]

In the present study, the discriminant analysis technique was used to determine which adjectives or combinations of adjectives best discriminated among the three divisions of instructors. Each instructor was represented as a point in a 26-dimensional space according to the division in which he belonged. It was then determined if the separate divisions occupied different regions of the space. If the points identifying the division instructors did not occupy different regions

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[1] William W. Cooley and Paul R. Lohnes, Multivariate Procedures for the Behavioral Sciences (New York: John Wiley and Sons, Inc., 1962), p. 118.

[2] M. G. Kendall, A Course in Multivariate Analysis (New York: Hafner Publishing Company, 1961).

[3] Phillip J. Rulon, "Distinctions between Discriminant and Regression Analyses and a Geometric Interpretation of the Discriminant Function," Harvard Educational Review, XXI (January-December, 1951), 80-90.

[4] David V. Tiedeman and Joseph G. Bryan, "Prediction of College Field of Concentration," Harvard Educational Review, XXIV (January-December, 1954), 122-38.

[5] Ann Martin and Russell Scott, "Occupational Group Differences in Job-Incentive Dimensions Among Academic and Industrial Personnel," Paper Presented at 1965 American Psychological Association Meeting, Chicago, Illinois. (Mimeographed.)

[6] Maurice M. Tatsuoka and David V. Tiedeman, "Discriminant Analysis," Review of Educational Research, XXIV (December, 1954), 402-20.

of the 26-dimensional space, the variables did not isolate the instructors. The pertinent question was: Did the Semantic Differential provide information that would be useful in differentiating instructors by division?

To test the hypothesis that there were no significant differences among the three divisions on the 26 variables of the rating scale, the discriminant analysis was carried out. The F test was computed. With 52 and 14,064 degrees of freedom, the obtained F was .0062, indicating no significant differences among the means. The three groups occupied the same area in the discriminant space. Therefore, the null hypothesis was not rejected and the assumption accepted that the samples representing the subject areas of Humanities, Natural Science, and Social Science represented the same population, not three separate populations.

Since there were three groups, the maximum number of discriminate functions necessary to discriminate among the groups was two. A comparison of the two discriminate functions indicated that the first function accounted for approximately 56 per cent of the discriminating power of the rating scale and the second function accounted for approximately 44 per cent of the discriminating power.

On the basis of this analysis, it was concluded that this rating scale did not discriminate among the three divisions of instructors.

B. Intervariable Correlations

Means, standard deviations, and number of students for each of the variables, arranged by division, representing a total sample, are presented in Table 15. Means, standard deviations, and number of

TABLE 15

MEANS, STANDARD DEVIATIONS, AND NUMBER OF RATERS FOR EACH RATED VARIABLE BY DIVISION TOTAL SAMPLE

Variables	Humanities			Natural Science			Social Science		
	Mean	Standard Deviation	Number of Raters	Mean	Standard Deviation	Number of Raters	Mean	Standard Deviation	Number of Raters
1. Peaceful-Ferocious	2.79	1.43	2073	2.73	1.37	3765	2.64	1.43	1196
2. Thick-Thin	4.14	1.20	2050	3.84	1.16	3718	3.85	1.25	1175
3. Clear-Hazy	2.42	1.54	2071	2.93	1.82	3756	3.20	1.79	1193
4. Good-Bad	2.18	1.41	2071	2.51	1.54	3767	2.53	1.48	1195
5. Loud-Soft	3.63	1.39	2074	3.65	1.42	3767	4.10	1.43	1194
6. Wet-Dry	3.82	1.26	2068	3.97	1.22	3740	4.08	1.34	1186
7. Near-Far	3.12	1.50	2070	3.62	1.55	3756	3.57	1.56	1188
8. Rough-Smooth	4.74	1.54	2069	4.48	1.51	3759	4.46	1.52	1191
9. Angular-Rounded	4.20	1.47	2062	4.18	1.33	3737	4.27	1.48	1181
10. Brave-Cowardly	3.02	1.31	2069	3.29	1.29	3753	2.98	1.30	1190
11. Valuable-Worthless	2.23	1.35	2072	2.44	1.43	3768	2.38	1.40	1197
12. Bass-Treble	3.68	1.23	2069	3.73	1.25	3759	3.70	1.20	1188
13. Egotistical	3.27	.92	2079	3.32	.85	3778	3.37	.83	1198
14. Planful	1.95	.84	2077	1.99	.88	3775	2.13	.91	1199
15. Rude	3.76	.59	2078	3.75	.59	3778	3.76	.56	1200
16. Objective	2.14	.88	2077	2.08	.83	3775	2.10	.84	1197
17. Cynical	3.24	.86	2079	3.36	.85	3777	3.20	.92	1198
18. Rebellious	3.32	.85	2080	3.59	.70	3776	3.29	.84	1198
19. Vague	3.46	.75	2078	3.20	.91	3778	3.09	.86	1200
20. Pretentious	3.54	.73	2072	3.54	.71	3764	3.61	.68	1199
21. Cautious	2.93	.84	2078	2.81	.83	3775	2.91	.83	1199
22. Flexible	2.30	.91	2079	2.50	.87	3774	2.34	.86	1199
23. Anxious	2.93	.99	2078	2.99	.93	3774	3.13	.91	1197
24. Unconforming	2.96	.93	2077	3.16	.85	3771	2.95	.90	1198
25. Stimulating	2.08	.98	2080	2.43	1.02	3778	2.32	1.00	1199
26. Criterion Rating	2.18	1.04	1881	2.41	1.08	3513	2.45	1.05	1132

students for each of the variables, arranged by division, representing the fall trimester ratings separately are presented in Appendix X. Examination of the data contained in the two tables indicated high similarity of the ratings among the three divisions for the two trimesters.

A 26 x 26 correlation matrix representing the intercorrelations among the combined fall and winter trimester ratings for the entire sample appears in Table 16. The product-moment correlation coefficient was used in computing this matrix.

Examination of the correlation coefficients shown in Table 16 indicated that high relationships were involved between "clear-hazy" and "good-bad" and between "good-bad" and "valuable-worthless." The coefficients were .732 and .769 respectively. Coefficients ranging from .695 to .596 were found between "good-bad" and "stimulating"; "clear-hazy" and "vague"; "valuable-worthless" and "stimulating"; "good-bad" and "vague"; "clear-hazy" and "valuable-worthless"; and "clear-hazy" and "stimulating." The remaining coefficients were less than .596.

Correlation coefficients with the 5-scale validity criterion, represented as Variable 26 in Table 16 and as the global judgment item on the rating scale, ranged from .647 to -.012. Variables showing highest correlation with the criterion were "good-bad" (.647), "stimulating" (.614), "valuable-worthless" (.610), "clear-hazy" (.542) "vague" (-.496), and "near-far" (.412). A comparison of the variables showing highest relationship to the criterion with the variables showing strongest intercorrelations revealed that the same variables in general were involved. Stated otherwise, certain variables seemed to carry most of the relationships found.

TABLE 16

CORRELATION MATRIX REPRESENTING RATINGS FOR ENTIRE SAMPLE

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1. Peaceful-Ferocious																										
2. Thick-Thin	-.065																									
3. Clear-Hazy	.113	-.126																								
4. Good-Bad	.103	-.099	.732																							
5. Loud-Soft	-.280	.061	.203	.220																						
6. Wet-Dry	-.042	.083	.228	.274	.190																					
7. Near-Far	.098	-.093	.536	.532	.166	.305																				
8. Rough-Smooth	-.258	.131	-.318	-.321	.117	-.077	-.264																			
9. Angular-Rounded	-.104	.008	-.197	-.217	.037	-.096	-.208	.332																		
10. Brave-Cowardly	-.076	.017	.278	.374	.236	.187	.297	-.114	-.083																	
11. Valuable-Worthless	.095	-.081	.613	.769	.176	.247	.493	-.297	-.205	.413																
12. Bass-Treble	-.091	.120	.122	.140	.255	.112	.116	.073	.007	.216	.149															
13. Egotistical	-.300	.102	-.209	-.240	.116	-.032	-.221	.178	.126	-.028	-.252	.059														
14. Planful	.095	-.089	.443	.432	.124	.096	.314	-.246	-.140	.224	.417	.070	-.118													
15. Rude	-.277	.109	-.233	-.284	.110	-.043	-.226	.246	.138	-.075	-.299	.031	.428	-.182												
16. Objective	.067	-.073	.314	.330	.075	.074	.230	-.166	-.096	.192	.344	.056	-.144	.333	-.184											
17. Cynical	-.297	.073	-.167	-.182	.119	-.026	-.147	.182	.119	-.003	-.199	.105	.474	-.128	.441	-.110										
18. Rebellious	-.298	.020	-.025	-.006	.136	.075	.003	.120	.062	.168	-.033	.087	.341	-.047	.287	-.049	.441									
19. Vague	-.049	.146	-.689	-.621	-.169	-.207	-.474	.289	.190	-.250	-.575	-.088	.245	-.394	.247	-.280	.198	.080								
20. Pretentious	-.148	.092	-.239	-.286	.049	-.046	-.213	.180	.118	-.097	-.306	-.006	.423	-.149	.336	-.157	.345	.213	.309							
21. Cautious	.234	-.058	.035	.013	-.111	-.057	.028	-.079	-.027	-.093	.022	-.079	-.090	.102	-.094	.088	-.130	-.151	.013	.003						
22. Flexible	.118	-.069	.346	.409	.063	.160	.355	-.243	-.186	.260	.409	.087	-.218	.231	-.243	.285	-.143	.015	-.301	-.186	.042					
23. Anxious	-.002	-.001	.003	.025	.092	.039	.036	.049	.016	.022	.011	.002	.062	.050	.049	.026	.026	.085	.041	.079	.186	.054				
24. Unconforming	-.149	.033	-.041	.002	.067	.052	.001	.056	.018	.151	-.006	.081	.222	-.028	.173	-.012	.276	.434	.095	.155	-.112	.078	.087			
25. Stimulating	.026	-.088	.596	.695	.198	.280	.500	-.266	-.183	.383	.672	.138	-.157	.396	-.224	.326	-.113	.104	-.529	-.212	-.010	.454	.049	.113		
26. Criterion Rating	.023	-.077	.542	.647	.204	.227	.412	-.244	-.172	.311	.610	.134	-.166	.390	-.165	.280	-.111	.050	-.496	-.194	-.012	.344	.030	.048	.614	

N = 7060.

Certain other variables appeared to carry little of the relationships. Although they had high reliabilities, those which had little variance associated with others were: "rebellious" (.050), "unconforming" (.048), "anxious" (.030), "peaceful-ferocious" (.023), "cautious" (-.012), and "thick-thin" (-.077).

Three 26 x 26 correlation matrices representing the combined fall and winter trimester ratings for the three divisions were developed in the same manner as the matrix in Table 16. Examination of the data in the three division matrices revealed that variables showing highest intercorrelations and validity coefficients were in general the same as those identified in Table 16. The division matrices are presented in the Appendix rather than in the context of this chapter.

C. Reliability

The generalized reliability formula as reported by Horst[1] was used in computing item reliability of the ratings for the fall trimester administration. This formula was appropriate because it allows computation of reliability when the number of measures varies for each person. The formula is as follows:

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[1] Paul Horst, "A Generalized Expression for the Reliability of Measures," Psychometrika, XIV (March, 1949), 21-31.

$$r = 1 - \frac{\sum \frac{\sigma_i^2}{n_i - 1}}{\frac{N}{\sigma_M^2}}$$

N = number of persons (instructors)
n_i = number of measures for person (number of students rating each instructor)
M = mean of measures for one instructor for each item
σi = standard deviation of the above mean
σ_M = standard deviation of the means for all instructors on one item.

Item reliabilities by division computed from the fall trimester ratings are presented in Table 17. Because the fall trimester ratings represented consistently high reliabilities, it was considered unnecessary to compute item reliabilities for the combined fall and winter trimester ratings since any differences found would not be likely to justify the extensive computations involved. The high reliability values led to the inference that student ratings, collected by means of this particular rating scale are very stable. A comparison of the means and standard deviations of the ratings on the two occasions as presented in Table 15 and Appendix X led further support to the inference that the ratings were highly reliable.

D. Factor Analysis

A 26 x 6 matrix of factors was extracted from each of the 26 x 26 correlation matrices. The criterion for deciding how many factors to rotate was based on the size of the eigenvalue for each factor. If the eigenvalue, which is a form of variance, for each factor was larger than unity, the factor was retained for rotation.

TABLE 17

RELIABILITY COEFFICIENTS OF FALL TRIMESTER RATINGS

Item	Division		
	Humanities	Natural Science	Social Science
1. Peaceful-Ferocious	.919	.858	.957
2. Thick-Thin	.924	.942	.951
3. Clear-Hazy	.949	.973	.950
4. Good-Bad	.939	.970	.950
5. Loud-Soft	.939	.952	.958
6. Wet-Dry	.955	.964	.955
7. Near-Far	.932	.965	.946
8. Rough-Smooth	.922	.888	.942
9. Angular-Rounded	.937	.901	.949
10. Brave-Cowardly	.932	.952	.960
11. Valuable-Worthless	.928	.969	.955
12. Bass-Treble	.933	.932	.941
13. Egotistical	.930	.970	.962
14. Planful	.942	.950	.976
15. Rude	.941	.946	.946
16. Objective	.942	.953	.944
17. Cynical	.944	.978	.970
18. Rebellious	.942	.926	.973
19. Vague	.941	.981	.954
20. Pretentious	.936	.981	.948
21. Cautious	.905	.962	.952
22. Flexible	.944	.972	.944
23. Anxious	.925	.958	.947
24. Unconforming	.929	.923	.965
25. Stimulating	.945	.976	.963
26. Criterion Rating	.923	.976	.950

Factors whose eigenvalues were less than unity were dropped since they were contributing insignificant amounts to the variance. As a result, six factors were retained for rotation. Rotation was done using Kaiser's varimax procedure. The rotated factor loading matrix for the entire sample appears in Table 18.

Each variable has six factor loadings and a communality. The communality represents the sum of the squared factor loadings for that

TABLE 18

UNNORMALIZED ROTATED FACTOR LOADING MATRIX FOR ENTIRE SAMPLE

Variables	Factors						Communality
	I	II	III	IV	V	VI	
1. Peaceful-Ferocious	.473	-.302	.171	.002	-.358	.017	.688
2. Thick-Thin	-.075	-.010	-.546	-.423	-.229	-.099	.738
3. Clear-Hazy	.171	-.028	-.264	.772	-.046	-.097	.841
4. Good-Bad	.223	-.026	-.361	.759	-.044	.057	.873
5. Loud-Soft	-.239	.006	-.537	.187	.349	-.178	.731
6. Wet-Dry	-.013	.023	-.564	.121	-.231	-.013	.622
7. Near-Far	.190	-.045	-.352	.536	-.152	.062	.690
8. Rough-Smooth	-.201	.004	-.114	-.428	.584	-.015	.761
9. Angular-Rounded	-.086	-.057	.104	-.218	.691	.026	.740
10. Brave-Cowardly	.012	.055	-.446	.305	.068	.357	.653
11. Valuable-Worthless	.270	-.024	-.363	.693	-.020	.113	.836
12. Bass-Treble	-.056	.027	-.579	-.033	.157	.039	.605
13. Egotistical	-.764	-.025	.025	-.083	.010	-.082	.774
14. Planful	.092	-.229	-.096	.598	.015	-.108	.663
15. Rude	-.689	.038	.024	-.149	.048	-.149	.724
16. Objective	.180	-.225	-.067	.429	.125	.122	.549
17. Cynical	-.750	.070	.019	-.023	.026	.089	.760
18. Rebellious	-.607	.075	-.066	.106	.046	.486	.793
19. Vague	-.231	-.094	.211	-.726	-.010	.145	.809
20. Pretentious	-.623	-.200	.060	-.189	-.102	-.121	.702
21. Cautious	.133	-.734	.138	.019	-.087	-.146	.777
22. Flexible	.264	-.137	-.232	.359	-.133	.440	.694
23. Anxious	-.115	-.703	-.135	-.042	.099	.136	.745
24. Unconforming	-.399	-.003	-.061	.019	-.050	.687	.798
25. Stimulating	.119	-.044	-.354	.698	-.034	.230	.826
26. Criterion Rating	.098	-.021	-.311	.673	-.005	.074	.752
Proportion of total variance extracted	.2267	.0940	.1834	.3117	.0956	.0886	100.00
Eigenvalues	6.410	3.012	1.392	1.231	1.137	1.063	

variable. Values indicating the proportion of the total group variance extracted are entered in Table 18. The eigenvalues are also shown.

Factor IV of the rotated matrix contributed the greatest share of the total variance (.3117) extracted. Factor I contributed the second greatest share of the total (.2267) and Factor III contributed the third greatest share (.1834). The remaining three factors each contributed less than 10 per cent. The proportion of uniqueness represented in the total variance was unknown.

Examination of the communalities indicated that the variable "good-bad" had the highest communality value, .873; and "clear-hazy" had the second highest value, .841. The remaining variables showing highest communality values were in general those which had been identified as having highest intercorrelations and highest correlations with the criterion.

Rotated factor loading matrices for each of the three divisions, developed in the same manner as the matrix for the entire sample, are presented in the Appendix. A comparison of the data in the four matrices indicated such high similarity that only the matrix of the entire sample is presented in the context of this study.

Inspection of the six extracted factors indicated that the heaviest loadings in each factor were:

Factor I		Factor II		Factor III	
Egotistical	.764	Cautious	.734	Bass-Treble	.579
Cynical	.750	Anxious	.703	Wet-Dry	.564
Rude	.689			Thick-Thin	.546
Pretentious	.623			Loud-Soft	.537
Rebellious	.607				

Factor IV		Factor V		Factor VI	
Clear-Hazy	.772	Angular-Rounded	.691	Unconforming	.687
Good-Bad	.759	Rough-Smooth	.584		
Vague	-.726				
Stimulating	.698				
Valuable-Worthless	.693				
Criterion Rating	.673				
Planful	.598				
Near-Far	.536				

Because the loadings were suggestive of objectionable personal qualities, the structure of Factor I was interpreted as a measure of the impact of instructor objectionable qualities upon the student and was labeled an "Abrasive Impact" Factor.

Factor II appeared to be measuring the secure-insecure behavior of the instructor. The high relationship of the two variables to the factor suggested the instructor's secure or insecure behavior in the handling of people and led to the labeling of Factor II as a "Security Impact" Factor. The interpretation of this factor was doubtful.

The variables related to Factor III appeared to measure a combined sensory perception of the instructor. The particular clustering of these variables was difficult to interpret meaningfully. The factor was labeled a "Sensory Impact" Factor.

The clear structure of Factor IV plus its heavy contribution to the extracted variance (31 per cent) suggested that this factor was dominant in the matrix. Item 26, the criterion against which the ratings were validated, correlated higher with Factor IV than any other factor in the matrix (.673). The factor, suggestive of the instructor's ability to organize, to explain, and to inspire, was interpreted

as a measure of the instructor from a professorial view. It was labeled a "Professorial Impact" Factor.

Factor V suggested either the sense of touch or of vision, and was very difficult to interpret meaningfully.

Factor VI showed highest loadings in variables suggestive of the degree to which the instructor showed autonomous characteristics.

V. DISCUSSION OF FINDINGS

The specific hypothesis tested in this study was that college instructor behavior could be identified and measured by the use of a graphic rating scale when the rater responded to common bipolar adjectives. The behaviors would yield, when subjected to factor analysis, clusters of traits which would identify subgroups of college instructors.

Examination of the data in this study produced the following major findings.

A. Reliability

Item reliability coefficients revealed that instructor traits as evaluated by students were highly consistent among the three divisions of liberal arts. Ratings by 4,433 undergraduate students of 104 instructors during the fall trimester showed that out of the total of 78 reliabilities computed for the 26 items in the rating scale for the three divisions only two coefficients were below .90. These two coefficients, .858 and .888, were accounted for by an N of 2 and large standard deviations in one subsample. The remaining 76 reliability coefficients ranged from .981 to .901.

Because of the great similarity of the ratings for both trimesters as evidenced by the means and standard deviations, it was considered essential to compute item reliability coefficients for the fall trimester only.

The reliability coefficient of the criterion, Item 26 on the rating scale, was .923 for the Humanities Division, .950 for the Social

Science Division, and .976 for the Natural Science Division. This finding led to the inference that the criterion possessed a highly respectable reliability characteristic.

The finding in this study that student ratings were highly reliable is consistent with the findings of other investigators who have studied the problem.[1,2,3,4] The stability of student ratings of instructors appears to be well established.

B. Validity

Validity coefficients of the twelve sets of bipolar adjectives selected from the Osgood Semantic Differential on the basis of the factor analysis in the pilot study varied widely. Arranged in descending order, the magnitude of the coefficients of the entire two-trimester, three-division sample between the bipolar adjectives and the global rating item used as the criterion were:

Item	Validity	Item	Validity
Good-Bad	.647	Wet-Dry	.227
Valuable-Worthless	.610	Loud-Soft	.204
Clear-Hazy	.542	Angular-Rounded	-.172
Near-Far	.412	Bass-Treble	.134
Brave-Cowardly	.311	Thick-Thin	-.077
Rough-Smooth	-.244	Peaceful-Ferocious	.023

Coefficients of the three separate divisions were very similar to those of the entire sample.

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[1] Voeks and French, op. cit.

[2] Guthrie, op. cit.

[3] Snedeker, op. cit.

[4] Hayes, op. cit.

It is obvious that, with a few exceptions, the Semantic Differential items did not serve to distinguish levels of teaching effectiveness. The twelve sets of bipolar adjectives identified out of the original set of 50 as being most highly related to the three factors extracted in the pilot study failed to discriminate among the three groups of instructors in the current study. Only three bipolar adjectives out of the twelve showed respectable validity correlations with the criterion. The extensive sample size (7,060 ratings of 104 instructors) contributed additional evidence to the finding that the Semantic Differential did not function to identify differences in instructor measurements.

This finding describes the Osgood scale only as used for the purpose of the rating by observers of a sample of college instructors. Thus, in the present study the attempt to translate behavior into meaning overreached the potential of the scale. It may be that other studies which have made similar attempts have the same limitation.

Validity coefficients of the single adjectives for the entire two-trimester, three-division sample arranged in descending order of magnitude were:

Item	Validity	Item	Validity
Stimulating	.614	Rude	-.165
Vague	-.496	Cynical	-.111
Planful	.390	Rebellious	.050
Flexible	.344	Unconforming	.048
Objective	.280	Anxious	.030
Pretentious	-.194	Cautious	-.012
Egotistical	-.166		

The validity coefficients of the single adjectives representing each of the three divisions were very similar to the coefficients of

the entire sample indicating that the measurements differed little among the three divisions.

It is obvious that, with small exception, the single adjectives also did not function to discriminate levels of teaching effectiveness or different teaching profiles. The highest correlation with the criterion, associated with the adjective "stimulating" was an expected outcome since French[1] had demonstrated earlier that the instructor's ability to arouse interest and to motivate the student was a dominant criterion in students' ratings of effective instruction. The initial unspoken hope that it might be possible to use this scale to depict profiles of differences between the instructors of separate academic divisions was unfulfilled. Students do not appear to observe the traditional divisions of academia as they judge instructors.

One of the assumptions made in the early phases of the present study was that the use of common, bipolar adjectives rather than obvious items in a rating scale would aid in overcoming the halo effect by lowering the intercorrelations between items. An inspection of the correlation matrix, Table 16, Chapter IV, revealed that all those adjectives showing intercorrelations above a magnitude of .50 appeared with loadings above a magnitude of .50 in Factor IV, of the factor loading matrix, Table 18. All other adjectives showed intercorrelations below .50. On the basis of these findings, the assumption was accepted that the use of common, bipolar adjectives was effective in overcoming the "halo effect" bias. If adjectives showing high intercorrelations had appeared with high loadings in a varying, non-specific manner among

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[1] French, op. cit.

the factors, the findings would have indicated the presence of the "halo effect."

While the findings of this study cast doubt on the claim that the Semantic Differential is adaptable to the measurement of an almost infinite number of concepts, they apparently lend credibility to the statement that the instrument appears to lack "face validity" to the rater.[1] Within the limitations of this study, the instrument did not demonstrate its adaptability to measuring the concept "Approach to Teaching" as evidenced by the failure of the factor analysis to isolate a number of clear-cut dimensions which could be interpreted meaningfully. The generally low correlations of the bipolar adjectives with the criterion, an overall judgment of teaching effectiveness, may have been accounted for partially by the failure of students to associate the adjectives with a judgment of teaching.

The claim that the Semantic Differential yields highly reliable measures was supported by this study as reference to the reliability coefficients, Table 17, Chapter IV, will indicate.

As far as was known to the writer, previous studies using the Osgood Semantic Differential have selected adjectives representative of the three factors isolated by Osgood in the early experimentation with the instrument. Results of these studies have confirmed the existence of the three factors, evaluative, potency, and activity, isolated by Osgood as underlying semantic judgment. The approach used in this study was different from the previous ones in that bipolar adjectives were selected as adequately representing the three factors

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[1] Remmers, "Rating Methods in Research on Teaching."

extracted in the pilot study of this project. They were combined with single adjectives related to instructor behavior. The strength for the finding that no significant differences existed among the groups tested in the present study was confirmed by the discriminant analysis and F test results. An interesting situation arises when one questions whether the use of a similar approach would support or refute the findings of other studies using the Semantic Differential.

C. Discriminant Analysis

The findings of the discriminant analysis of the data demonstrating no significant differences among the groups on the measurements implied that students rated instructors without regard to the subject taught or the division represented by the instructor. Apparently student ideas of effective instruction are unrelated to subject matter but are based upon the instructor's ability to convey the subject, thus supporting the findings discussed in connection with validity.

D. Factor Analysis

Of the six factors extracted, Factor IV, labeled Professorial Impact, was the dominant one and was most closely related to findings of other studies.[1,2,3] This factor showed higher association with the

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[1]Solomon, Bezdek, and Rosenberg, op. cit.

[2]Solomon, op. cit.

[3]Taylor, op. cit.

criterion than any other factor extracted, leading to the inference that Factor IV was the most valid measurement of instructor behaviors.

Factor III, labeled a Sensory Impact factor, was most heavily loaded with negative associations to the bipolar adjectives, suggesting a combined sensory perception of the instructor. This factor ranked second in magnitude of correlation with the criterion (-.311) suggesting that there may be some underlying concept present even though it may be too elusive to interpret meaningfully at this stage.

Factors I and VI showed the next highest loadings on the criterion variable. The values were .098 and .074 respectively. Factors II and V showed almost negligible loadings on the criterion. The values were -.021 and -.005 respectively.

These findings suggested that Factor IV was the most powerful one in measuring the traits of the 104 instructors as rated by the 7,060 students of this study. The magnitude of the loadings on adjectives clearly descriptive of the instructor's professorial behavior appeared to indicate that these behaviors were the most fundamental ones measured.

A comparison of the present study with Osgood's[1] study of the Semantic Differential showed that four factors were extracted in his study using 50 sets of bipolar adjectives whereas six factors were extracted in this study using 12 sets of bipolar adjectives and 13 single adjectives. The first three factors of the Osgood study were labeled "evaluative," "potency," and "activity." Since the fourth factor accounted for less than 2 per cent of the variance extracted, it was dropped.

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[1]Osgood, Suci, and Tannenbaum, op. cit.

A comparison of the structure of Osgood's purest factor, the Evaluative Factor, with the purest factor of this study, Factor IV, the Professorial Impact Factor, revealed that the five sets of bipolar adjectives which were identified as having heaviest loadings on the Professorial Impact Factor also had heaviest loadings on the Evaluative Factor.

Osgood's second factor, Potency, appeared to be most closely related to Factor III, the Sensory Impact, of the present study. Three of the five sets of bipolar adjectives which had been identified as showing heaviest loadings in the Sensory Impact Factor also showed heaviest loadings in the Potency Factor. These three sets were: "bass-treble," "thick-thin," and "loud-soft." The remaining two sets of adjectives showing high loadings in the Sensory Impact Factor also appeared in the Potency Factor but their loadings in one of Osgood's remaining two factors were higher than their loadings in the Potency Factor.

Even though the relationship was not clear, Osgood's Activity Factor appeared to be related to Factor V of this study. "Angular-rounded" showed heavier loading on these two factors in both studies than on any other factors. The remaining sets of adjectives identified as showing correlations to Factor V also showed considerable correlations to the Activity Factor.

The percentages of variance extracted accounted for by Osgood's Evaluative Factor (68 per cent) and by the Professorial Impact Factor of this study (31 per cent) suggested that each of these factors was dominant in its respective situation. Somewhat surprising was the finding that these two student populations, evaluating concepts which were

thought to be completely unrelated, chose adjectives showing similarity in factor content.

An interesting observation was a comparison of Factor I, the Abrasive Impact Factor, to Ryans[1] TCS Pattern X_o Factor (kindly, understanding, friendly vs. aloof, egocentric, restricted teacher behavior). He found that teachers whose behavior was rated as warm and understanding rated high on Pattern X_o. Teachers rated high on Pattern X_o were judged as showing more positive attitudes toward pupils, as being more stimulating, and as showing more stable personal adjustment. Although Factor I of this study represented the negative pole of the dimension, the implication seemed to be an overlap in behavior measured. Consideration of the data compiled in this study, together with the findings from Ryans' study, gave substantial support to the assumption that the Abrasive Factor was related to a significant dimension of instructor behavior. Additional support for this assumption is provided when one considers that Ryans' sample represented the elementary and secondary school population while the sample in the current study represented the college population.

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[1]Ryans, Characteristics of Teachers.

VI. SUMMARY OF FINDINGS AND CONCLUSIONS

A. Summary of Findings

1. An attempt was made to develop a socially unbiased description of teaching which could provide inferences for the improvement of teaching behavior and which could serve as a possible contribution to a theory of college and university teaching behavior.

2. A rating scale, composed of 12 bipolar adjectives and 13 single adjectives, was administered to undergraduate liberal arts students enrolled in classes of undergraduate liberal arts instructors. The rating scale was administered a second time to students enrolled in classes of the original instructor sample. The total sample consisted of 7,060 students who rated 104 instructors.

3. The ratings, representing the entire sample and categorized into one each of three academic divisions, were subjected to a discriminant analysis. With 52 and 14,064 degrees of freedom, the obtained F was .0062 indicating that the three groups occupied the same area in the discriminant space. No significant differences were indicated among the groups on the measurements. Therefore, the null hypothesis that there were no significant differences among the three divisions on the 26 variables of the rating scale was not rejected. The assumption was accepted that the samples represented the same population, not three separate populations.

4. The combined ratings, categorized by Humanities, Natural Science, and Social Science divisions, were intercorrelated for the three divisions and a total, and the four correlation matrices were

subjected to factor analysis. Six factors emerged from the rotated matrices. The factors were interpreted as follows:

a. Factor I was interpreted as a description of the impact of the instructor's objectionable qualities upon the student and was labeled an "Abrasive Impact" Factor.

b. Factor II was interpreted as a description of the secure or insecure behavior of the instructor and was labeled a "Security Impact" Factor. The interpretation was doubtful.

c. Factor III, interpreted as a combined sensory perception of the instructor, was labeled a "Sensory Impact" Factor.

d. Factor IV was interpreted as the student's evaluation of the instructor from a professorial view. It was suggestive of the instructor's ability to organize, to explain, and to inspire and was labeled a "Professorial Impact" Factor.

e. Factor V was interpreted as a description of a sensory perception of the instructor.

f. Factor VI was interpreted as a suggestion of the degree to which the instructor showed autonomous characteristics.

5. One hypothesis was proposed: that college instructor behavior could be identified and measured by the use of a graphic rating scale when the rater responded to common bipolar adjectives. The behaviors would yield, when subjected to factor analysis, clusters of

traits which would identify subgroups of college instructors. The hypothesis was refuted. Though the bipolar adjectives did show high reliability and loadings on the factors, F test results revealed no significant differences among the three groups.

6. A comparison of the factors extracted in this study with the factors extracted by Osgood revealed similarity of the factor structures.

B. Conclusions

Analysis of the data warranted the following conclusions:

The results revealed that instructor behavior could not be identified and measured by the use of a graphic rating scale composed of common bipolar adjectives. Out of twelve sets of bipolar adjectives, only three sets showed respectable validity correlations with the criterion.

Results of the discriminant analysis which showed no significant differences when the measures were analyzed by division demonstrated that, within the limits of this study, instructors from the Humanities, Social Science, and Natural Science divisions were similar. The subject taught and the discipline represented by the instructor were not contributing appreciably to the measures studied. Wide differences among the individual instructors were observed but were not examined. Subsequent study will be made of these differences.

Item reliability coefficients computed for the ratings showed high stability. Because the coefficients were above .90, with the exception of two subsample coefficients which were .85 and .88, it was

concluded that the instrument yielded stable assessment of instructor measures. This conclusion supports the conclusions of other investigators who have studied student rating reliability.

Future research might explore further the attempt to secure ratings by the use of items which attempt to mask the true purpose of the rating. Until this method, or a similar one, has been shown to be effective, the problem of measuring instructor behaviors by a process which does not allow the respondent to choose socially desirable responses, that is, responses not influenced by social desirability in measurement, remains unsolved.

The fundamental conclusion made on the basis of evidence presented in this study was that the Osgood Semantic Differential did not discriminate differences among the measures of the three groups tested. Thus, it was not possible to make predictions about distinguishing characteristics of the three groups tested.

The extensive data compiled in the present study significantly demonstrated that only three out of twelve bipolar adjectives, selected from the Semantic Differential to represent adequately each of three factors extracted from a pilot study, were respectably correlated with the criterion, a global judgment of overall teaching effectiveness. The discriminant analysis technique applied to the data yielded overwhelming evidence that no significant differences existed among the measures representing the three separate divisions of college instructors. Therefore, the results conclusively demonstrated that the instrument cannot be used appropriately as a measure of behavior.

The Semantic Differential was used in this study for the purpose of rating college instructors by student observers and the attempt was made to translate the ratings into meaningful behaviors after a factor analysis. This particular application overreached the potential of the device but is not to be interpreted as a criticism of the device. The Semantic Differential was designed to measure the meaning of concepts and this study demonstrated that it did not function outside of its original intention.

The implication of the current study is clearly one that restricts the use of the Osgood Semantic Differential to measuring the meaning of concepts. Use of the scale in a situation intending to measure behavior is a misapplication of the device, thus casting doubt on the findings of previous studies which have employed it to make behavioral inferences. Future experiments with the instrument will make greater contributions if the investigations limit its use to measuring the meaning of concepts rather than attempting to make behavioral inferences from data gathered through an incorrect procedure. The interpretation represents a challenge to look elsewhere for measuring instructor behaviors. The basic variables underlying complex behaviors, such as teaching, must be isolated and identified by a means other than the Semantic Differential.

The research reported in this study has been essentially an exploration into the complex area of teaching behavior. The study has demonstrated that certain aspects of the behavior yield themselves to measurement while other aspects are more elusive.

While the study showed no significant differences among the three divisions represented, differences among the instructors were

demonstrated by the individual ratings assigned. An investigation proposed as an outgrowth of the research already reported is a further analysis of the ratings given to the separate instructors. In order that individual differences among the instructors may be compared, it is intended to utilize profiles which represent the rating scores. The rating scores for the individual instructors will be transformed to a scale possessing comparable values. The obvious need for comparable values is seen when one considers that the scores in their present form do not represent equal increments. It is proposed to convert the criterion ratings of the tails of the sample into a single, common scale, such as the T scale. The resulting scales will allow meaningful profiles, representing the ratings assigned to individual instructors, to be drawn and interpreted. Instructor ratings may then be compared in a statistically accurate manner.

A second line of research proposed as a continuation of the current study is a further investigation of the demonstrated finding that the adjective "stimulating" is highly significant in describing teacher behavior. The collection of behavior characterizing the stimulating instructor could be accomplished through a method which samples student judgment. After categorizing student suggestions into discrete behavioral classes, an operational definition of "stimulating" would be determined and used as the criterion. Variables considered to be associated with stimulating behavior, such as achievement of knowledge, acquisition of skills, and assignment of grades, might be correlated with the criterion to determine whether any significant relationships exist. Once these relationships have been determined, the information

could be made available to institutions preparing students for entry into college teaching careers and to institutions who are interested in learning more about the complexities of teaching behavior.

APPENDICES

APPENDIX I

SAMPLE INSTRUMENT

The purpose of this study is to obtain a description of instructor characteristics. You are being asked to evaluate concepts against adjectives. Please make your evaluations on the basis of your reactions. Some of these adjectives may not be relevant to instructor characteristics. However, we would like to have you check as many as you feel are related. As you check these adjectives, keep in mind that you are evaluating the adjectives in terms of the concept listed at the top of each page. The task is to relate the adjective to the concept.

The first 4 pages contain lists of bipolar adjectives which are to be related to the concept listed at the top of each page. In all cases you will be evaluating one instructor. However, each page lists a separate dimension of his characteristics. On page 1 the dimension is "Approach to Authority," on page 2 the dimension is "Approach to Ideas," etc. The first 4 pages list bipolar adjectives which are to be used to evaluate the instructor's "Approach to Authority," "Approach to Ideas," etc. The scales are to be used as follows:

Page 1
Instructor "X"

APPROACH TO AUTHORITY:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	No. of Choice
1. Good	___:	___:	___:	___:	___:	___:	___:	Bad___

If you feel that Instructor "X" is extremely good, write the number "1" in the column headed "No. of Choice";
If you feel that Instructor "X" is quite good, write the number "2" in the column headed "No. of Choice";
If you feel that instructor "X" is slightly good, write the number "3" in the column headed "No. of Choice";
If you feel that Instructor "X" is neither good nor bad, write the number "4" in the column headed "No. of Choice";
If you feel that Instructor "X" is slightly bad, write the number "5" in the column headed "No. of Choice";
If you feel that Instructor "X" is quite bad, write the number "6" in the column headed "No. of Choice";
If you feel that Instructor "X" is extremely bad, write the number "7" in the column headed "No. of Choice".

Beginning with page 5, the situation is slightly different. Only one adjective is listed rather than bipolar adjectives. Please list the number of your choice in the column headed "No. of Choice."

Example: Page 5
Instructor "X"
APPROACH TO AUTHORITY:

	(1)	(2)	(3)	(4)	No. of Choice
1. Pretentious					

If you feel that Instructor "X" is extremely pretentious, write the number "1" in the column headed "No. of Choice";
If you feel that Instructor "X" is quite pretentious, write the number "2" in the column headed "No. of Choice";
If you feel that Instructor "X" is slightly pretentious, write the number "3" in the column headed "No. of Choice";
If you feel that Instructor "X" is not at all pretentious, write the number "4" in the column headed "No. of Choice."

DO NOT SIGN YOUR NAME.

(from Osgood, pp. 36-37) INSTRUCTOR_____

APPROACH TO AUTHORITY:

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	No. of Choice
1. Good	___	___	___	___	___	___	___	Bad___
2. Large	___	___	___	___	___	___	___	Small___
3. Beautiful	___	___	___	___	___	___	___	Ugly___
4. Yellow	___	___	___	___	___	___	___	Blue___
5. Hard	___	___	___	___	___	___	___	Soft___
6. Sweet	___	___	___	___	___	___	___	Sour___
7. Strong	___	___	___	___	___	___	___	Weak___
8. Clean	___	___	___	___	___	___	___	Dirty___
9. High	___	___	___	___	___	___	___	Low___
10. Calm	___	___	___	___	___	___	___	Agitated___
11. Tasty	___	___	___	___	___	___	___	Distasteful___
12. Valuable	___	___	___	___	___	___	___	Worthless___
13. Red	___	___	___	___	___	___	___	Green___
14. Young	___	___	___	___	___	___	___	Old___
15. Kind	___	___	___	___	___	___	___	Cruel___
16. Loud	___	___	___	___	___	___	___	Soft___
17. Deep	___	___	___	___	___	___	___	Shallow___
18. Pleasant	___	___	___	___	___	___	___	Unpleasant___
19. Black	___	___	___	___	___	___	___	White___
20. Bitter	___	___	___	___	___	___	___	Sweet___
21. Happy	___	___	___	___	___	___	___	Sad___
22. Sharp	___	___	___	___	___	___	___	Dull___
23. Empty	___	___	___	___	___	___	___	Full___
24. Ferocious	___	___	___	___	___	___	___	Peaceful___
25. Heavy	___	___	___	___	___	___	___	Light___
26. Wet	___	___	___	___	___	___	___	Dry___
27. Sacred	___	___	___	___	___	___	___	Profane___
28. Relaxed	___	___	___	___	___	___	___	Tense___
29. Brave	___	___	___	___	___	___	___	Cowardly___
30. Long	___	___	___	___	___	___	___	Short___
31. Rich	___	___	___	___	___	___	___	Poor___
32. Clear	___	___	___	___	___	___	___	Hazy___
33. Hot	___	___	___	___	___	___	___	Cold___
34. Thick	___	___	___	___	___	___	___	Thin___
35. Nice	___	___	___	___	___	___	___	Awful___
36. Bright	___	___	___	___	___	___	___	Dark___
37. Bass	___	___	___	___	___	___	___	Treble___
38. Angular	___	___	___	___	___	___	___	Rounded___
39. Fragrant	___	___	___	___	___	___	___	Foul___
40. Honest	___	___	___	___	___	___	___	Dishonest___
41. Active	___	___	___	___	___	___	___	Passive___
42. Rough	___	___	___	___	___	___	___	Smooth___
43. Fresh	___	___	___	___	___	___	___	Stale___
44. Fast	___	___	___	___	___	___	___	Slow___
45. Fair	___	___	___	___	___	___	___	Unfair___
46. Rugged	___	___	___	___	___	___	___	Delicate___
47. Near	___	___	___	___	___	___	___	Far___
48. Pungent	___	___	___	___	___	___	___	Bland___
49. Healthy	___	___	___	___	___	___	___	Sick___
50. Wide	___	___	___	___	___	___	___	Narrow___

(from Osgood, pp. 36-37) INSTRUCTOR_____

APPROACH TO IDEAS:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	No. of Choice
1. Good	___	___	___	___	___	___	___	Bad___
2. Large	___	___	___	___	___	___	___	Small___
3. Beautiful	___	___	___	___	___	___	___	Ugly___
4. Yellow	___	___	___	___	___	___	___	Blue___
5. Hard	___	___	___	___	___	___	___	Soft___
6. Sweet	___	___	___	___	___	___	___	Sour___
7. Strong	___	___	___	___	___	___	___	Weak___
8. Clean	___	___	___	___	___	___	___	Dirty___
9. High	___	___	___	___	___	___	___	Low___
10. Calm	___	___	___	___	___	___	___	Agitated___
11. Tasty	___	___	___	___	___	___	___	Distasteful___
12. Valuable	___	___	___	___	___	___	___	Worthless___
13. Red	___	___	___	___	___	___	___	Green___
14. Young	___	___	___	___	___	___	___	Old___
15. Kind	___	___	___	___	___	___	___	Cruel___
16. Loud	___	___	___	___	___	___	___	Soft___
17. Deep	___	___	___	___	___	___	___	Shallow___
18. Pleasant	___	___	___	___	___	___	___	Unpleasant___
19. Black	___	___	___	___	___	___	___	White___
20. Bitter	___	___	___	___	___	___	___	Sweet___
21. Happy	___	___	___	___	___	___	___	Sad___
22. Sharp	___	___	___	___	___	___	___	Dull___
23. Empty	___	___	___	___	___	___	___	Full___
24. Ferocious	___	___	___	___	___	___	___	Peaceful___
25. Heavy	___	___	___	___	___	___	___	Light___
26. Wet	___	___	___	___	___	___	___	Dry___
27. Sacred	___	___	___	___	___	___	___	Profane___
28. Relaxed	___	___	___	___	___	___	___	Tense___
29. Brave	___	___	___	___	___	___	___	Cowardly___
30. Long	___	___	___	___	___	___	___	Short___
31. Rich	___	___	___	___	___	___	___	Poor___
32. Clear	___	___	___	___	___	___	___	Hazy___
33. Hot	___	___	___	___	___	___	___	Cold___
34. Thick	___	___	___	___	___	___	___	Thin___
35. Nice	___	___	___	___	___	___	___	Awful___
36. Bright	___	___	___	___	___	___	___	Dark___
37. Bass	___	___	___	___	___	___	___	Treble___
38. Angular	___	___	___	___	___	___	___	Rounded___
39. Fragrant	___	___	___	___	___	___	___	Foul___
40. Honest	___	___	___	___	___	___	___	Dishonest___
41. Active	___	___	___	___	___	___	___	Passive___
42. Rough	___	___	___	___	___	___	___	Smooth___
43. Fresh	___	___	___	___	___	___	___	Stale___
44. Fast	___	___	___	___	___	___	___	Slow___
45. Fair	___	___	___	___	___	___	___	Unfair___
46. Rugged	___	___	___	___	___	___	___	Delicate___
47. Near	___	___	___	___	___	___	___	Far___
48. Pungent	___	___	___	___	___	___	___	Bland___
49. Healthy	___	___	___	___	___	___	___	Sick___
50. Wide	___	___	___	___	___	___	___	Narrow___

INSTRUCTOR_____

APPROACH TO COMMUNICATION:

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	No. of Choice
1. Good								Bad
2. Large								Small
3. Beautiful								Ugly
4. Yellow								Blue
5. Hard								Soft
6. Sweet								Sour
7. Strong								Weak
8. Clean								Dirty
9. High								Low
10. Calm								Agitated
11. Tasty								Distasteful
12. Valuable								Worthless
13. Red								Green
14. Young								Old
15. Kind								Cruel
16. Loud								Soft
17. Deep								Shallow
18. Pleasant								Unpleasant
19. Black								White
20. Bitter								Sweet
21. Happy								Sad
22. Sharp								Dull
23. Empty								Full
24. Ferocious								Peaceful
25. Heavy								Light
26. Wet								Dry
27. Sacred								Profane
28. Relaxed								Tense
29. Brave								Cowardly
30. Long								Short
31. Rich								Poor
32. Clear								Hazy
33. Hot								Cold
34. Thick								Thin
35. Nice								Awful
36. Bright								Dark
37. Bass								Treble
38. Angular								Rounded
39. Fragrant								Foul
40. Honest								Dishonest
41. Active								Passive
42. Rough								Smooth
43. Fresh								Stale
44. Fast								Slow
45. Fair								Unfair
46. Rugged								Delicate
47. Near								Far
48. Pungent								Bland
49. Healthy								Sick
50. Wide								Narrow

INSTRUCTOR_____

APPROACH TO STUDENTS:

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	No. of Choice
1. Good	___	___	___	___	___	___	___	Bad___
2. Large	___	___	___	___	___	___	___	Small___
3. Beautiful	___	___	___	___	___	___	___	Ugly___
4. Yellow	___	___	___	___	___	___	___	Blue___
5. Hard	___	___	___	___	___	___	___	Soft___
6. Sweet	___	___	___	___	___	___	___	Sour___
7. Strong	___	___	___	___	___	___	___	Weak___
8. Clean	___	___	___	___	___	___	___	Dirty___
9. High	___	___	___	___	___	___	___	Low___
10. Calm	___	___	___	___	___	___	___	Agitated___
11. Tasty	___	___	___	___	___	___	___	Distasteful___
12. Valuable	___	___	___	___	___	___	___	Worthless___
13. Red	___	___	___	___	___	___	___	Green___
14. Young	___	___	___	___	___	___	___	Old___
15. Kind	___	___	___	___	___	___	___	Cruel___
16. Loud	___	___	___	___	___	___	___	Soft___
17. Deep	___	___	___	___	___	___	___	Shallow___
18. Pleasant	___	___	___	___	___	___	___	Unpleasant___
19. Black	___	___	___	___	___	___	___	White___
20. Bitter	___	___	___	___	___	___	___	Sweet___
21. Happy	___	___	___	___	___	___	___	Sad___
22. Sharp	___	___	___	___	___	___	___	Dull___
23. Empty	___	___	___	___	___	___	___	Full___
24. Ferocious	___	___	___	___	___	___	___	Peaceful___
25. Heavy	___	___	___	___	___	___	___	Light___
26. Wet	___	___	___	___	___	___	___	Dry___
27. Sacred	___	___	___	___	___	___	___	Profane___
28. Relaxed	___	___	___	___	___	___	___	Tense___
29. Brave	___	___	___	___	___	___	___	Cowardly___
30. Long	___	___	___	___	___	___	___	Short___
31. Rich	___	___	___	___	___	___	___	Poor___
32. Clear	___	___	___	___	___	___	___	Hazy___
33. Hot	___	___	___	___	___	___	___	Cold___
34. Thick	___	___	___	___	___	___	___	Thin___
35. Nice	___	___	___	___	___	___	___	Awful___
36. Bright	___	___	___	___	___	___	___	Dark___
37. Bass	___	___	___	___	___	___	___	Treble___
38. Angular	___	___	___	___	___	___	___	Rounded___
39. Fragrant	___	___	___	___	___	___	___	Foul___
40. Honest	___	___	___	___	___	___	___	Dishonest___
41. Active	___	___	___	___	___	___	___	Passive___
42. Rough	___	___	___	___	___	___	___	Smooth___
43. Fresh	___	___	___	___	___	___	___	Stale___
44. Fast	___	___	___	___	___	___	___	Slow___
45. Fair	___	___	___	___	___	___	___	Unfair___
46. Rugged	___	___	___	___	___	___	___	Delicate___
47. Near	___	___	___	___	___	___	___	Far___
48. Pungent	___	___	___	___	___	___	___	Bland___
49. Healthy	___	___	___	___	___	___	___	Sick___
50. Wide	___	___	___	___	___	___	___	Narrow___

Please rate in accordance with the following situation:

(1) extremely
(2) quite
(3) slightly
(4) not at all

INSTRUCTOR_____

APPROACH TO AUTHORITY:	(1)	(2)	(3)	(4)	No. of Choice
1. Pretentious					
2. Omniscient					
3. Cynical					
4. Egotistical					
5. Crusading					
6. Hypochondrical					
7. Masculine					
8. Abasive					
9. Anxious					
10. Planful					
11. Lethargic					
12. Meandering					
13. Cautious					
14. Meticulous					
15. Compulsive					
16. Dogmatic					
17. Uncertain					
18. Inconspicuous					
19. Deferent					
20. Rebellious					
21. Pragmatic					
22. Ethereal					
23. Objective					
24. Hypercritical					
25. Isolated					
26. Unconforming					
27. Flexible					
28. Dry					
29. Flamboyant					
30. Voluble					
31. Lucid					
32. Vague					
33. Protective					
34. Threatening					
35. Aloof					
36. Intimate					
37. Rude					
38. Courteous					
39. Perceptive					
40. Evaluative Skill					

Please rate in accordance with the following situation:

(1) extremely
(2) quite
(3) slightly
(4) not at all

INSTRUCTOR_____

APPROACH TO IDEAS:	(1)	(2)	(3)	(4)	No. of Choice
1. Pretentious					
2. Omniscient					
3. Cynical					
4. Egotistical					
5. Crusading					
6. Hypochondrical					
7. Masculine					
8. Abasive					
9. Anxious					
10. Planful					
11. Lethargic					
12. Meandering					
13. Cautious					
14. Meticulous					
15. Compulsive					
16. Dogmatic					
17. Uncertain					
18. Inconspicuous					
19. Deferent					
20. Rebellious					
21. Pragmatic					
22. Ethereal					
23. Objective					
24. Hypercritical					
25. Isolated					
26. Unconforming					
27. Flexible					
28. Dry					
29. Flamboyant					
30. Voluble					
31. Lucid					
32. Vague					
33. Protective					
34. Threatening					
35. Aloof					
36. Intimate					
37. Rude					
38. Courteous					
39. Perceptive					
40. Evaluative Skill					

Please rate in accordance with the following situation:

(1) extremely
(2) quite
(3) slightly
(4) not at all

INSTRUCTOR_____

APPROACH TO COMMUNICATION:	(1)	(2)	(3)	(4)	No. of Choice
1. Pretentious					
2. Omniscient					
3. Cynical					
4. Egotistical					
5. Crusading					
6. Hypochondrical					
7. Masculine					
8. Abasive					
9. Anxious					
10. Planful					
11. Lethargic					
12. Meandering					
13. Cautious					
14. Meticulous					
15. Compulsive					
16. Dogmatic					
17. Uncertain					
18. Inconspicuous					
19. Deferent					
20. Rebellious					
21. Pregmatic					
22. Ethereal					
23. Objective					
24. Hypercritical					
25. Isolated					
26. Unconforming					
27. Flexible					
28. Dry					
29. Flamboyant					
30. Voluble					
31. Lucid					
32. Vague					
33. Protective					
34. Threatening					
35. Aloof					
36. Intimate					
37. Rude					
38. Courteous					
39. Perceptive					
40. Evaluative Skill					

Please rate in accordance with the following situation:

(1) extremely
(2) quite
(3) slightly
(4) not at all

INSTRUCTOR_____

APPROACH TO STUDENTS:	(1)	(2)	(3)	(4)	No. of Choice
1. Pretentious					
2. Omniscient					
3. Cynical					
4. Egotistical					
5. Crusading					
6. Hypochondrical					
7. Masculine					
8. Abasive					
9. Anxious					
10. Planful					
11. Lethargic					
12. Meandering					
13. Cautious					
14. Meticulous					
15. Compulsive					
16. Dogmatic					
17. Uncertain					
18. Inconspicuous					
19. Deferent					
20. Rebellious					
21. Pragmatic					
22. Ethereal					
23. Objective					
24. Hypercritical					
25. Isolated					
26. Unconforming					
27. Flexible					
28. Dry					
29. Flamboyant					
30. Voluble					
31. Lucid					
32. Vague					
33. Protective					
34. Threatening					
35. Aloof					
36. Intimate					
37. Rude					
38. Courteous					
39. Perceptive					
40. Evaluative Skill					

APPENDIX II

REVISED INSTRUMENT

UNIVERSITY OF PITTSBURGH, PITTSBURGH, PENNSYLVANIA 15213

Dear Student:

As one step in the continuous process of improving classroom instruction, students are being asked to describe their instructor's teaching behavior. The sole purpose of asking you to rate your instructor is to allow him to find out from the students what their reactions are to his teaching. All results are confidential and will be shown only to the instructor involved after the trimester is completed. Your grade will not be affected since you are asked not to sign your name. Please complete the entire scale according to your immediate reaction. The task should take no more than 20 minutes.

Part I of the scale is a list of adjectives and their opposites which are separated by the numbers 1 through 7. Above each number is an adverb quantifier which indicates the degree of intensity associated with the number. You are to encircle the number which you feel best describes your instructor.

Part II of the scale is slightly different. Only single adjectives are listed rather than sets of opposites. Please encircle the number which you feel best describes your instructor

APPROACH TO TEACHING

PART I

INSTRUCTOR_____COURSE AND NUMBER_____

ENCIRCLE YOUR CHOICE

	Extremely		Quite		Slightly		Neither		Slightly		Quite		Extremely	
1. Peaceful...	1	....	2	....	3	....	4	....	5	....	6	....	7	..Ferocious
2. Thick	1	....	2	....	3	....	4	....	5	....	6	....	7	..Thin
3. Clear.....	1	....	2	....	3	....	4	....	5	....	6	....	7	..Hazy
4. Good.....	1	....	2	....	3	....	4	....	5	....	6	....	7	..Bad
5. Loud.....	1	....	2	....	3	....	4	....	5	....	6	....	7	..Soft
6. Wet.....	1	....	2	....	3	....	4	....	5	....	6	....	7	..Dry
7. Near.....	1	....	2	....	3	....	4	....	5	....	6	....	7	..Far
8. Rough.....	1	....	2	....	3	....	4	....	5	....	6	....	7	..Smooth
9. Angular....	1	....	2	....	3	....	4	....	5	....	6	....	7	..Rounded
10. Brave.....	1	....	2	....	3	....	4	....	5	....	6	....	7	..Cowardly
11. Valuable...	1	....	2	....	3	....	4	....	5	....	6	....	7	..Worthless
12. Bass.....	1	....	2	....	3	....	4	....	5	....	6	....	7	..Treble

PART II

ENCIRCLE YOUR CHOICE

	Extremely	Quite	Slightly	Not at all
13. Egotistical	1	2	3	4
14. Planful	1	2	3	4
15. Rude	1	2	3	4
16. Objective	1	2	3	4
17. Cynical	1	2	3	4
18. Rebellious	1	2	3	4
19. Vague	1	2	3	4
20. Pretentious	1	2	3	4
21. Cautious	1	2	3	4
22. Flexible	1	2	3	4
23. Anxious	1	2	3	4
24. Unconforming	1	2	3	4
25. Stimulating	1	2	3	4

PART III

Please indicate your age_____; your sex_____; your year in college_____.

In my opinion, this teacher is: 1. outstanding; 2. superior; 3. competent; 4. only fair; 5. of doubtful value compared to other teachers (Encircle one choice).

What three things about this instructor have been most helpful to you?

1.

2.

3.

Is there anything about this class that you feel could be improved?

APPENDIX III

LETTER SENT TO FACULTY MEMBERS

TO: Faculty Members, School of the Liberal Arts

FROM: George L. Fahey, Professor, Psychology and Education

DATE:

This is a request for your cooperation in a research study of student ratings of college teaching effectiveness. If you are willing to have one or more of your classes used in this study, please complete the questions on the enclosed card and return it by University mail.

This study is for research purposes. It is approved in principle by the Deans associated with the School of Liberal Arts, but the results will be entirely confidential and any findings involving any teacher will not be reported to the Deans or Chairmen. If you participate and wish to know the results, you will receive a confidential report of your own ratings contrasted with mean ratings in the School of Liberal Arts. This study is not related to any undertaken by Student Government.

Our plan of action includes administration of the scale during the latter third of the current trimester and again during the winter trimester to the classes of the same instructors. The total time required for each evaluation should be no more than approximately 20 minutes of class time. In order to keep the procedure standardized, a graduate student will handle all details of administration and collection of ratings. It is essential that instructors refrain from announcing the plan to their classes because all information must be standardized.

- -

We approve the conditions of this research study:

/s/ James A. Kehl
Dean
School of Liberal Arts

/s/ Frank W. Wadsworth
Dean
Division of Humanities

/s/ David Holliday
Dean
Division of Natural Science

/s/ Richard L. Park
Dean
Division of Social Science

1. Name_____ Univ. phone _____

2. I would like to participate_____; I prefer not to_____

3. Academic rank_____; Sex_____

4. Total years of college and/or univ. teaching_____

5. Course(s) teaching now, day, time, and classroom number:

_____

_____

6. Day and time you prefer to set aside for this study:

_____

_____

7. University department _____

APPENDIX IV

INSTRUCTIONS READ TO STUDENTS

SHEET OF INSTRUCTIONS TO BE READ TO STUDENTS WHEN ADMINISTERING THE SCALE:

We are requesting your cooperation in a research study of student ratings of college teaching. The study is for research purposes and all results are confidential to the instructor.

Please read the instructions carefully and answer as quickly and accurately as you can.

Since this is an anonymous rating, your instructor will not know how you as an individual rated him.

APPENDIX V

CONFIDENTIAL LETTER TO FACULTY

Confidential

DATE:

TO:

FROM: George L. Fahey, Professor, Psychology and Education,
460 Langley Hall

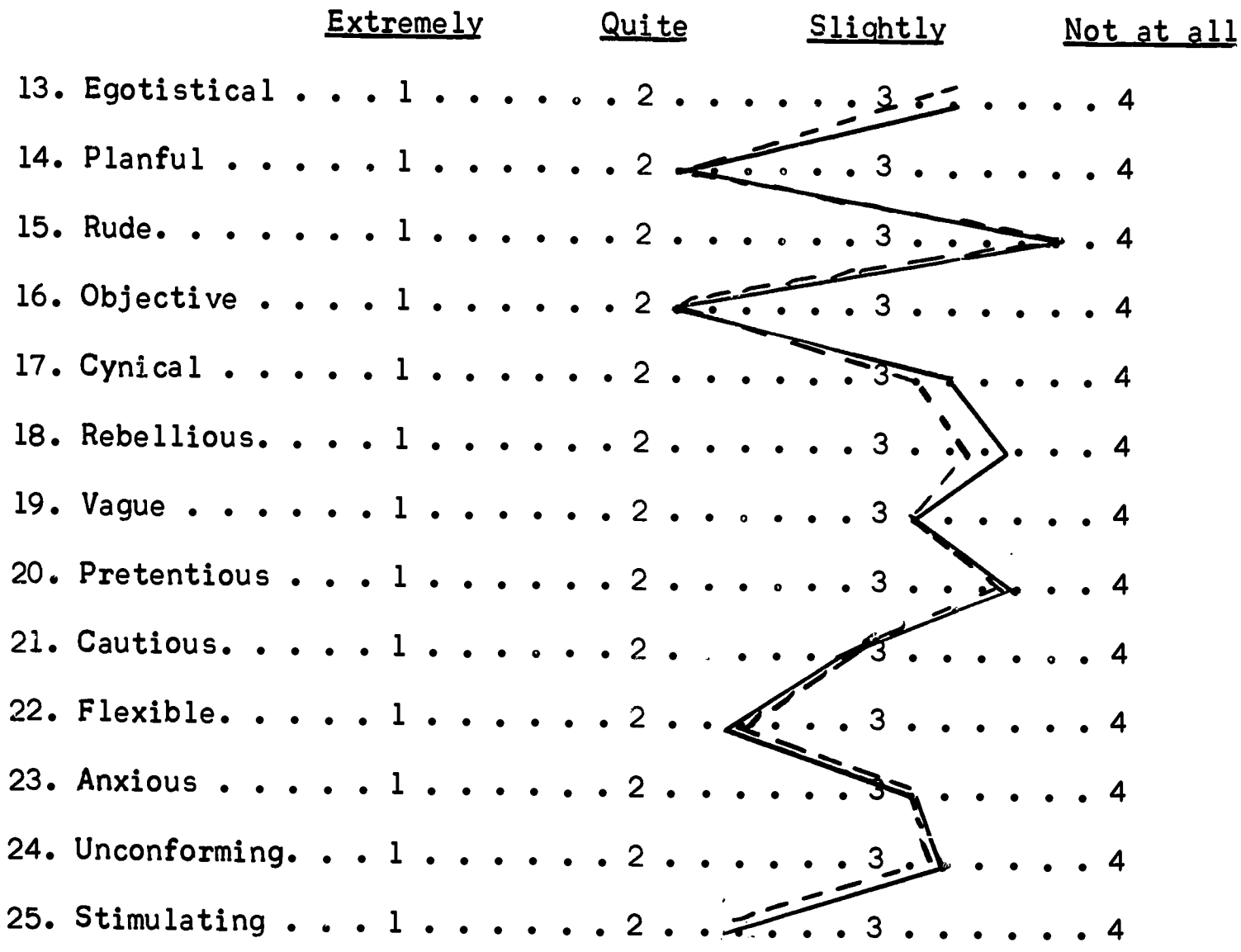
SUBJECT: Result of student ratings

We thank you for the cooperation you gave us last trimester in helping us to carry out the first phase of our research concerned with teaching evaluation. Results of the student rating scale which was administered to your _____ class are furnished in this letter.

We shall be contacting you soon in reference to administering the rating scale to your class(es) during the latter part of the current trimester.

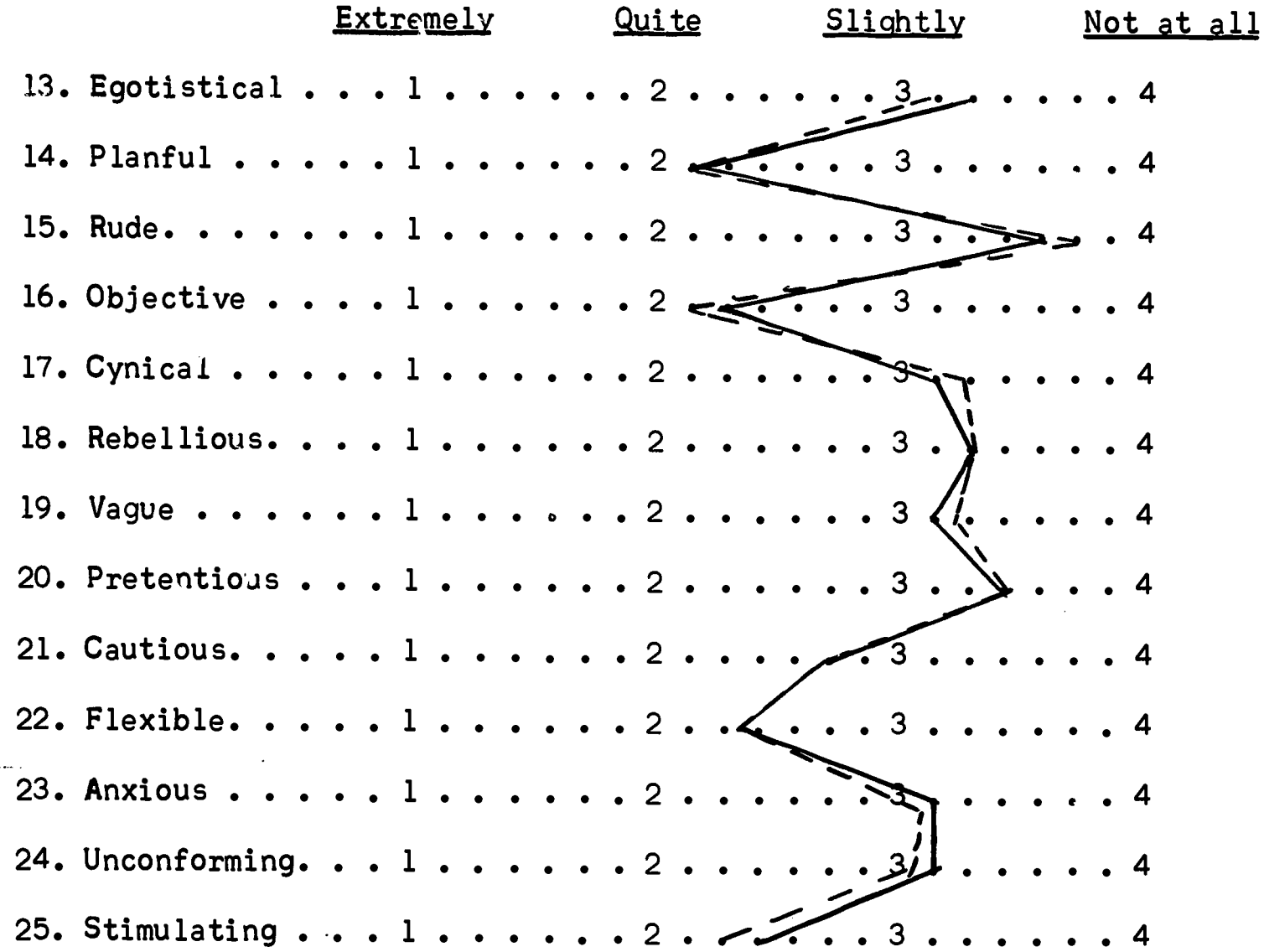
Part I of the rating scale, which instructed students to encircle a choice of adverb quantifiers from among bipolar adjectives such as "good-bad," "thick-thin," and "brave-cowardly," is being subjected to a factor analysis. These results will be available in a final report to be prepared later.

Part II of the scale, which instructed students to encircle a choice of adverb quantifiers from among single adjectives, is reproduced below. The profiles drawn represent the mean ratings of students' reactions. Your individual profile, representing the mean reactions of students in your class, is drawn in RED INK. The profile of participating instructors in your division, representing the mean reactions of students in your division, is drawn with a solid line. The profile of participating instructors in the School of Liberal Arts, representing the mean reactions of students in the School of Liberal Arts, is drawn with a broken line. Only undergraduate reactions are included in the profiles.



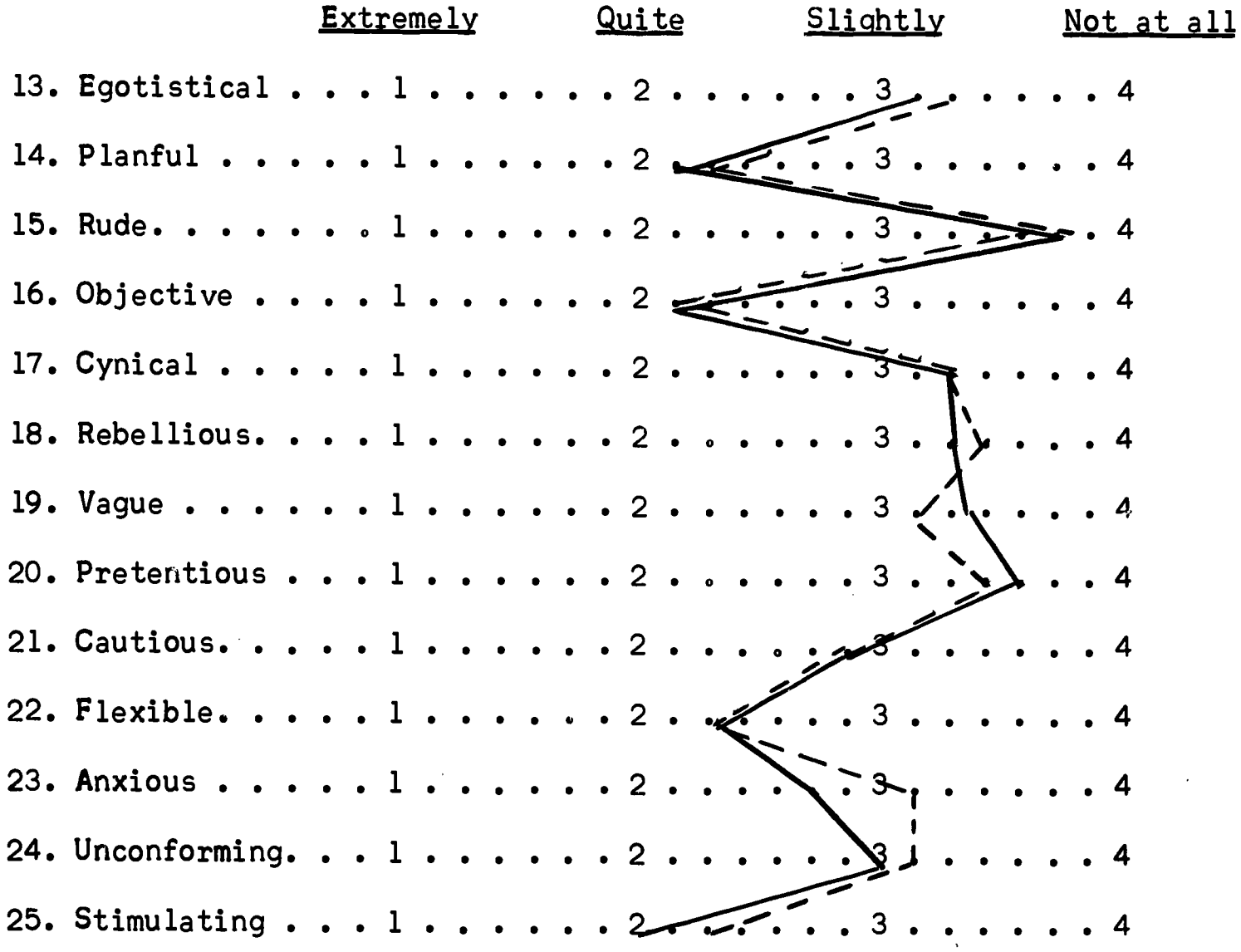
CODE: Your individual profile is represented by the RED INK line.
Your division (Natural Science, Social Science, or Humanities) profile is represented by the solid line.
School of Liberal Arts profile is represented by the broken line.

Part II of the scale, which instructed students to encircle a choice of adverb quantifiers from among single adjectives, is reproduced below. The profiles drawn represent the mean ratings of students' reactions. Your individual profile, representing the mean reactions of students in your class, is drawn in RED INK. The profile of participating instructors in your division, representing the mean reactions of students in your division, is drawn with a solid line. The profile of participating instructors in the School of Liberal Arts, representing the mean reactions of students in the School of Liberal Arts, is drawn with a broken line. Only undergraduate reactions are included in the profiles.



CODE: Your individual profile is represented by the RED INK line.
Your division (Natural Science, Social Science, or Humanities) profile is represented by the solid line.
School of Liberal Arts profile is represented by the broken line.

Part II of the scale, which instructed students to encircle a choice of adverb quantifiers from among single adjectives, is reproduced below. The profiles drawn represent the mean ratings of students' reactions. Your individual profile, representing the mean reactions of students in your class, is drawn in RED INK. The profile of participating instructors in your division, representing the mean reactions of students in your division, is drawn with a solid line. The profile of participating instructors in the School of Liberal Arts, representing the mean reactions of students in the School of Liberal Arts, is drawn with a broken line. Only undergraduate reactions are included in the profiles.



CODE: Your individual profile is represented by the RED INK line.
Your division (Natural Science, Social Science, or Humanities) profile is represented by the solid line.
School of Liberal Arts profile is represented by the broken line.

The results of Part III are summarized below:

Number of undergraduate ratings: _____

Number of graduate ratings: _____

Number of students rating you as:

Outstanding: _____

Superior: _____

Competent: _____

Only fair: _____

Of doubtful value compared to other teachers: _____

The things mentioned as being most helpful by your students were:

The students in your class felt that the class could be improved:

APPENDIX VI

NOTE OF ACKNOWLEDGMENT

TO:

FROM: George L. Fahey

DATE:

We thank you for your response to our recent letter related to a research study of student ratings.

Your interest in the project is appreciated.

APPENDIX VII

SECOND TRIMESTER LETTER TO FACULTY

DATE:

TO:

FROM: George L. Fahey, Professor, Psychology and Education, 460 Langley Hall

SUBJECT: Second administration of student rating scales to undergraduate Liberal Arts classes

We are making final plans for the second administration of our student rating scales to students in undergraduate Liberal Arts classes. Since you participated last trimester in the first phase of this research project, we are again requesting your participation during the current trimester.

We are administering the rating scale during the latter third of this trimester to gather data on scale reliability.

The results of the evaluation will be confidential to the instructor and will be sent in a sealed envelope as last trimester.

Will you please complete the second page of this letter and return it to us via campus mail?

Thank you very much.

1. Name_____ Univ. phone_____

2. Academic rank_____

3. Total years of college and/or university teaching_____

4. I will be able to participate again this trimester:Yes____No_____

5. Please check the categories which describe your teaching this trimester:

   Am teaching the same course(s) as last trimester: Yes_____No_____

   Am teaching in a similar manner (e.g., you taught English I last trimester using the lecture approach and you are currently teaching the same subject using the same approach) as last trimester:
   Yes_____ No_____

   Am teaching same students as last trimester but different course:
   Yes_____ No_____

   Am teaching different course(s) from last trimester:
   Yes_____ No_____

   Am teaching in a different manner from last trimester:
   Yes_____ No_____

   Am teaching different students this trimester: Yes____No_____

6. If you choose to participate in the study this trimester, please complete the following:

   Course(s) teaching now, day, time, classroom number, and building:

   _____

   _____

   Number of students enrolled in each course: _____

   Day and time you prefer to set aside for the study: _____

   _____

7. University department _____

PLEASE MAIL TO:

Dr. George L. Fahey, Psychology Department, 460 Langley Hall, Campus.

APPENDIX VIII

SECOND TRIMESTER CONFIDENTIAL LETTER TO FACULTY

Confidential

DATE:

TO:

FROM: George L. Fahey, Professor, Psychology and Education,
460 Langley Hall

SUBJECT: Results of student ratings

We thank you for the cooperation you gave us last trimester in helping us to carry out the second phase of our research concerned with teaching evaluation. Results of the student rating scale which was administered to your _____ class are furnished in this letter.

Part I of the rating scale, which instructed students to encircle a choice of adverb quantifiers from among bipolar adjectives such as "good-bad," "thick-thin," and "brave-cowardly," is being subjected to a factor analysis. These results will be available in a final report which will be sent to you later.

APPENDIX IX

ABSTRACT

A MEASUREMENT OF COLLEGE INSTRUCTOR BEHAVIOR

This study was designed to provide evidence which could serve two functions: (1) the possible contribution to a theory of college and university teaching behavior by an improved description of teaching, and (2) the provision of inferences for the improvement of teaching behavior.

In an attempt to overcome a criticism of student ratings which holds that the terms used may be ambiguous and subjective, the present study obtained student ratings of college instructor behavior through the use of a scale composed of twelve bipolar adjectives from the Osgood Semantic Differential and thirteen single adjectives from other research studies.

The hypothesis tested was that college instructor behavior could be identified and measured by the use of a graphic rating scale when the rater responded to common, bipolar adjectives. The behaviors would yield, when subjected to factor analysis, clusters of traits which would identify subgroups of college instructors.

Pilot study experimentation with the instrument resulted in the extraction of three factors from Osgood's original list of fifty bipolar adjectives. The four bipolar adjectives which showed highest loadings on one of the three factors, making a total of twelve adjectives, plus the thirteen single adjectives, selected from an original list of forty, along with an overall global rating of instruction used as the criterion

were organized into a rating scale. The scale was administered to undergraduate liberal arts classes of the same instructors on two occasions separated by a time interval of approximately fifteen weeks. The total sample consisted of 7,060 students who rated 104 instructors representing the Humanities, Natural Science, and Social Science Divisions of the School of Liberal Arts, University of Pittsburgh.

Ratings, punched on computer cards, were subjected to a multiple discriminant analysis. Results showed that the three Divisions of instructors occupied the same area in the 26-dimensional space.

With 52 and 14,064 degrees of freedom, the obtained F was .0062, indicating no significant differences among the means. Therefore, the null hypothesis that there were no significant differences among the three Divisions was not rejected. The assumption was accepted that the samples represented the same population, not three separate populations.

Item reliability coefficients revealed that the ratings were highly consistent. With the exception of two subsamples showing coefficients of .858 and .888, the remaining 76 coefficients ranged from .981 to .901.

With few exceptions, the Semantic Differential items did not serve to distinguish levels of teaching behavior. Only three bipolar adjectives out of the twelve showed respectable validity with the criterion. Only one of the single adjectives from the thirteen selected showed respectable validity with the criterion.

A rotated factor analysis of the ratings resulted in the extraction of six factors. The three strongest factors were labeled Professorial Impact, Abrasive Impact, and Sensory Impact. The fourth

factor was doubtful and the two remaining factors were not labeled. A comparison between the factors extracted in this study and other studies was made.

The fundamental conclusion made on the basis of evidence presented in this study was that students distributed their judgments of instructors in a markedly reliable manner but the variance observed did not significantly discriminate between instructors according to academic division nor did it relate in any appreciable degree to global estimates of effectiveness. It was concluded that the discriminations expected are not within the competence of the Osgood scale or of the single adjectives listed.

APPENDIX X

MEANS, STANDARD DEVIATIONS, AND NUMBER OF RATERS FOR EACH RATED VARIABLE BY DIVISION, FALL TRIMESTER

Variables	Humanities			Natural Science			Social Science		
	Mean	Standard Deviation	Number of Raters	Mean	Standard Deviation	Number of Raters	Mean	Standard Deviation	Number of Raters
1. Peaceful-Ferocious	2.72	1.40	1251	2.67	1.33	2374	2.76	1.46	790
2. Thick-Thin	4.11	1.22	1234	3.83	1.14	2332	3.72	1.26	772
3. Clear-Hazy	2.39	1.58	1251	2.95	1.83	2363	3.14	1.77	789
4. Good-Bad	2.12	1.40	1252	2.50	1.53	2371	2.48	1.50	790
5. Loud-Soft	3.70	1.34	1252	3.71	1.41	2372	3.96	1.44	789
6. Wet-Dry	3.78	1.22	1248	3.98	1.23	2350	3.99	1.40	782
7. Near-Far	3.07	1.53	1252	3.61	1.57	2363	3.47	1.60	781
8. Rough-Smooth	4.82	1.56	1247	4.52	1.52	2365	4.43	1.56	785
9. Angular-Rounded	4.22	1.51	1241	4.19	1.33	2348	4.36	1.53	775
10. Brave-Cowardly	2.96	1.33	1248	3.24	1.28	2359	2.93	1.32	786
11. Valuable-Worthless	2.17	1.34	1250	2.37	1.41	2373	2.35	1.39	790
12. Bass-Treble	3.71	1.25	1248	3.78	1.26	2366	3.63	1.24	781
13. Egotistical	3.27	.94	1258	3.36	.83	2382	3.38	.88	793
14. Planful	1.96	.85	1257	1.99	.88	2381	2.21	.91	793
15. Rude	3.74	.61	1257	3.78	.56	2381	3.72	.61	793
16. Objective	2.15	.91	1258	2.08	.85	2381	2.11	.89	792
17. Cynical	3.24	.87	1258	3.40	.82	2382	3.06	.99	793
18. Rebellious	3.31	.86	1258	3.62	.69	2381	3.23	.88	793
19. Vague	3.46	.76	1258	3.18	.90	2381	3.10	.87	793
20. Pretentious	3.56	.73	1258	3.57	.69	2379	3.56	.72	793
21. Cautious	2.96	.84	1258	2.82	.82	2382	2.97	.83	792
22. Flexible	2.30	.93	1258	2.47	.88	2381	2.32	.87	793
23. Anxious	2.93	1.01	1258	2.97	.95	2382	3.13	.92	793
24. Unconforming	2.94	.95	1258	3.16	.85	2382	2.89	.94	793
25. Stimulating	2.01	.98	1258	2.41	1.02	2382	2.26	.99	793
26. Criterion Rating	2.13	1.08	1143	2.40	1.06	2227	2.44	1.07	789

APPENDIX XI

CORRELATION MATRIX REPRESENTING RATINGS FOR HUMANITIES DIVISION

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1. Peaceful-Ferocious																										
2. Thick-Thin	-.017																									
3. Clear-Hazy	.108	-.062																								
4. Good-Bad	.089	-.042	.684																							
5. Loud-Soft	-.314	.024	.141	.171																						
6. Wet-Dry	-.054	.087	.152	.242	.176																					
7. Near-Far	.064	-.059	.486	.528	.160	.262																				
8. Rough-Smooth	-.268	.061	-.259	-.250	.187	-.063	-.210																			
9. Angular-Rounded	-.153	-.021	-.171	-.223	.098	-.073	-.210	.360																		
10. Brave-Cowardly	-.071	.023	.340	.421	.192	.195	.366	-.161	-.141																	
11. Valuable-Worthless	.065	-.035	.580	.752	.145	.223	.485	-.229	-.210	.452																
12. Bass-Treble	-.044	.077	.147	.166	.226	.064	.121	.053	.021	.180	.196															
13. Egotistical	-.290	.053	-.228	-.273	.126	-.013	-.226	.121	.163	-.012	-.252	.033														
14. Planful	.089	-.090	.395	.344	.061	.018	.286	-.203	-.142	.223	.362	.045	-.125													
15. Rude	-.198	.118	-.243	-.261	.198	.005	-.206	.215	.170	-.073	-.254	.102	.381	-.248												
16. Objective	.074	-.081	.316	.306	.029	.038	.242	-.180	-.140	.210	.332	.019	-.164	.345	-.251											
17. Cynical	-.221	.022	-.177	-.192	.135	-.007	-.147	.124	.151	-.042	-.185	.075	.453	-.164	.400	-.148										
18. Rebellious	-.349	-.006	-.025	.029	.211	.106	.042	.112	.102	.223	.009	.110	.337	-.057	.271	-.054	.399									
19. Vague	-.028	.085	-.614	-.528	-.117	-.115	-.399	.207	.175	-.271	-.503	-.084	.270	-.312	.226	-.260	.209	.082								
20. Pretentious	-.176	.096	-.266	-.337	.088	-.040	-.232	.148	.115	-.096	-.337	-.003	.474	-.141	.348	-.168	.360	.235	.323							
21. Cautious	.206	-.038	-.024	-.066	-.171	-.097	-.031	-.062	-.037	-.126	-.062	-.122	-.071	.064	-.074	.079	-.115	-.164	.092	.030						
22. Flexible	.106	-.041	.343	.432	.026	.170	.358	-.250	-.208	.288	.416	.053	-.210	.228	-.246	.314	-.148	.015	-.272	-.199	.009					
23. Anxious	-.016	-.015	.024	.028	.096	.054	.080	.021	.001	.024	-.003	.011	.022	.065	.031	.046	-.011	.099	.033	.074	.208	.060				
24. Unconforming	-.185	.016	-.006	.047	.124	.058	.063	.002	.028	.191	.037	.107	.205	-.040	.187	.002	.212	.434	.056	.154	-.138	.108	.109			
25. Stimulating	-.034	-.051	.538	.687	.155	.240	.463	-.214	-.168	.452	.681	.159	-.150	.313	-.184	.312	-.112	.151	-.429	-.210	-.086	.452	.058	.174		
26. Criterion Rating	-.001	-.042	.507	.626	.215	.202	.434	-.162	-.174	.349	.615	.190	-.192	.315	-.113	.227	-.090	.090	-.433	-.211	-.088	.349	.042	.086	.613	

N = 2080.

APPENDIX XII

CORRELATION MATRIX REPRESENTING RATINGS FOR NATURAL SCIENCE DIVISION

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1. Peaceful-Ferocious																										
2. Thick-Thin	-.090																									
3. Clear-Hazy	.175	-.178																								
4. Good-Bad	.170	-.156	.780																							
5. Loud-Soft	-.235	.052	.207	.214																						
6. Wet-Dry	.019	.053	.237	.255	.138																					
7. Near-Far	.170	-.141	.549	.540	.131	.289																				
8. Rough-Smooth	-.265	.172	-.348	-.357	.092	-.085	-.288																			
9. Angular-Rounded	-.117	.069	-.222	-.236	.028	-.098	-.210	.342																		
10. Brave-Cowardly	-.054	-.003	.264	.342	.271	.159	.250	-.087	-.052																	
11. Valuable-Worthless	.161	-.127	.651	.778	.171	.225	.504	-.319	-.215	.384																
12. Bass-Treble	-.132	.120	.104	.132	.284	.112	.090	.104	.017	.238	.130															
13. Egotistical	-.308	.134	-.240	-.255	.088	-.072	-.265	.210	.140	-.064	-.273	.065														
14. Planful	.105	-.114	.476	.491	.160	.133	.376	-.263	-.161	.252	.464	.093	-.123													
15. Rude	-.308	.096	-.272	-.335	.038	-.092	-.283	.270	.148	-.103	-.349	-.019	.428	-.178												
16. Objective	.057	-.093	.350	.377	.110	.088	.248	-.169	-.112	.206	.376	.087	-.119	.353	-.152											
17. Cynical	-.320	.097	-.216	-.231	.102	-.063	-.218	.219	.158	-.035	-.250	.101	.494	-.118	.463	-.084										
18. Rebellious	-.272	.034	-.091	-.096	.114	.022	-.088	.175	.095	.087	-.123	.062	.363	-.055	.321	-.030	.427									
19. Vague	-.100	.185	-.714	-.669	-.164	-.208	-.489	.323	.217	-.242	-.611	-.096	.280	-.427	.295	-.321	.247	.149								
20. Pretentious	-.134	.093	-.265	-.292	.009	-.065	-.240	.203	.139	-.116	-.312	-.021	.395	-.166	.336	-.170	.357	.222	.335							
21. Cautious	.234	-.058	.098	.097	-.061	.003	.121	-.107	-.056	-.051	.098	-.090	-.084	.134	-.085	.087	-.101	-.107	-.054	-.008						
22. Flexible	.156	-.097	.383	.423	.095	.161	.380	-.242	-.194	.253	.429	.107	-.238	.261	-.258	.293	-.192	-.028	-.333	-.184	.091					
23. Anxious	.022	.006	-.014	.014	.091	.011	.016	.063	.009	.011	.013	.001	.083	.041	.044	.010	.063	.089	.056	.083	.189	.058				
24. Unconforming	-.113	.032	-.097	-.065	.039	.024	-.062	.100	.049	.089	-.069	.065	.221	-.029	.169	-.009	.277	.382	.155	.166	-.075	.037	.081			
25. Stimulating	.119	-.133	.627	.683	.180	.263	.501	-.293	-.201	.324	.661	.128	-.194	.447	-.287	.371	-.180	.011	-.564	-.243	.081	.482	.033	.030		
26. Criterion Rating	.078	-.106	.552	.644	.174	.212	.400	-.279	-.180	.294	.609	.113	-.179	.440	-.215	.331	-.157	-.021	-.519	-.203	.059	.353	.017	-.005	.591	

N = 3780.

APPENDIX XIII

CORRELATION MATRIX REPRESENTING RATINGS FOR SOCIAL SCIENCE DIVISION

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1. Peaceful-Ferocious																										
2. Thick-Thin	-.093																									
3. Clear-Hazy	-.028	.009																								
4. Good-Bad	-.062	.037	.629																							
5. Loud-Soft	-.345	.172	.239	.311																						
6. Wet-Dry	-.178	.190	.270	.360	.338																					
7. Near-Far	-.036	.068	.525	.478	.272	.394																				
8. Rough-Smooth	-.235	.091	-.275	-.297	.109	-.056	-.238																			
9. Angular-Rounded	.014	-.105	-.182	-.160	-.046	-.126	-.204	.265																		
10. Brave-Cowardly	-.153	.102	.237	.391	.259	.255	.294	-.091	-.065																	
11. Valuable-Worthless	-.046	.016	.543	.758	.246	.336	.454	-.320	-.173	.429																
12. Bass-Treble	-.045	.203	.146	.122	.227	.191	.184	.018	-.046	.207	.127															
13. Egotistical	-.292	.124	-.143	-.170	.168	.032	-.118	.211	.021	.045	-.202	.089														
14. Planful	.094	-.001	.400	.374	.078	.092	.283	-.256	-.084	.165	.356	.037	-.108													
15. Rude	-.329	.138	-.107	-.161	.192	.025	-.086	.229	.051	.013	-.214	.068	.527	-.089												
16. Objective	.080	-.024	.254	.254	.053	.101	.199	-.151	.020	.143	.283	.027	-.174	.262	-.161											
17. Cynical	-.362	.113	-.036	-.052	.181	.043	.010	.192	-.021	.107	-.093	.164	.469	-.096	.456	-.115										
18. Rebellious	-.305	.095	.099	.120	.150	.148	.073	.051	-.059	.258	.088	.107	.317	-.001	.262	-.067	.520									
19. Vague	.045	.043	-.660	-.566	-.216	-.300	-.477	.267	.151	-.241	-.556	-.067	.156	-.394	.139	-.231	.070	-.037								
20. Pretentious	-.133	.095	-.154	-.198	.083	-.009	-.114	.179	.060	-.026	-.236	.043	.410	-.129	.316	-.094	.304	.194	.250							
21. Cautious	.285	-.123	-.048	-.098	-.186	-.158	-.084	-.045	.067	-.132	-.055	-.089	-.139	.066	-.162	.093	-.216	-.196	.080	-.015						
22. Flexible	.031	.011	.225	.307	.055	.131	.230	-.207	-.120	.194	.316	.078	-.184	.158	-.192	.234	-.038	.031	-.220	-.161	-.011					
23. Anxious	-.034	.032	-.027	.029	.050	.073	-.007	.081	.056	.064	.017	-.013	.062	.024	.045	.047	-.006	.074	.067	.062	.135	.033				
24. Unconforming	-.194	.114	.030	.093	.089	.112	.010	.058	-.071	.204	.080	.077	.259	.002	.170	-.030	.352	.513	.030	.142	-.136	.082	.074			
25. Stimulating	-.140	.066	.560	.729	.337	.377	.497	-.226	-.163	.417	.694	.134	-.089	.380	-.098	.262	.026	.168	-.519	-.131	-.116	.328	.067	.186		
26. Criterion Rating	-.084	.016	.495	.667	.255	.286	.365	-.242	-.150	.291	.601	.107	-.111	.342	-.094	.243	-.029	.129	-.470	-.149	-.082	.286	.016	.111	.672	

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APPENDIX XIV

UNNORMALIZED ROTATED FACTOR LOADING MATRIX FOR HUMANITIES DIVISION

Variables	Factors						Communality
	I	II	III	IV	V	VI	
1. Peaceful-Ferocious	.374	.103	-.043	-.164	-.234	.500	.695
2. Thick-Thin	-.093	.699	-.038	-.033	-.132	.084	.724
3. Clear-Hazy	.232	-.073	.745	.007	-.191	.014	.807
4. Good-Bad	.269	.043	.816	.027	.014	.000	.861
5. Loud-Soft	-.244	.163	.333	-.034	-.072	-.563	.721
6. Wet-Dry	.048	.484	.290	-.062	.360	-.070	.677
7. Near-Far	.213	.081	.635	-.073	.139	.011	.693
8. Rough-Smooth	-.105	.054	-.300	-.021	-.017	-.707	.778
9. Angular-Rounded	-.131	-.153	-.256	-.002	-.052	-.586	.672
10. Brave-Cowardly	-.088	.072	.612	.056	.186	.037	.653
11. Valuable-Worthless	.255	.030	.797	.047	-.007	-.000	.838
12. Bass-Treble	-.176	.326	.322	.066	-.308	-.204	.618
13. Egotistical	-.764	-.048	-.106	.017	-.069	.010	.776
14. Planful	.110	-.332	.500	-.189	-.309	.091	.715
15. Rude	-.614	.256	-.147	.022	-.112	-.156	.709
16. Objective	.157	-.343	.426	-.200	-.068	.111	.617
17. Cynical	-.723	-.032	-.036	.120	-.031	-.007	.735
18. Rebellious	-.615	-.079	.220	.040	.410	-.154	.791
19. Vague	-.314	.107	-.611	-.155	.164	.060	.734
20. Pretentious	-.679	.049	-.199	-.176	-.124	.069	.745
21. Cautious	.113	-.102	-.131	-.696	-.198	.183	.773
22. Flexible	.202	-.034	.510	-.127	.306	.208	.675
23. Anxious	-.065	.036	.070	-.779	.189	-.160	.824
24. Unconforming	-.451	-.049	.206	-.012	.519	.016	.720
25. Stimulating	.095	-.022	.794	-.001	.165	-.004	.816
26. Criterion Rating	.113	.052	.740	.021	-.016	-.079	.755
Proportion of total variance extracted	.2264	.1006	.3772	.0827	.0899	.1231	100.00
Eigenvalues	6.141	3.107	1.456	1.252	1.161	1.052	

APPENDIX XV

UNNORMALIZED ROTATED FACTOR LOADING MATRIX FOR NATURAL SCIENCE DIVISION

Variables	Factors						Communality
	I	II	III	IV	V	VI	
1. Peaceful-Ferocious	.104	-.485	.136	.353	-.264	-.224	.714
2. Thick-Thin	-.260	.044	-.021	.045	.555	-.319	.694
3. Clear-Hazy	.839	-.072	-.116	-.025	-.020	-.076	.854
4. Good-Bad	.875	-.101	-.017	-.013	.033	-.063	.884
5. Loud-Soft	.300	.239	-.129	-.021	.550	.194	.710
6. Wet-Dry	.268	.012	.093	-.025	.373	-.520	.701
7. Near-Far	.634	-.162	.074	.043	.063	-.211	.696
8. Rough-Smooth	-.415	.185	.030	.040	.379	.414	.724
9. Angular-Rounded	-.272	.071	.017	.068	.178	.600	.690
10. Brave-Cowardly	.428	.023	.298	-.120	.357	.128	.657
11. Valuable-Worthless	.820	-.160	.046	-.009	.064	-.018	.839
12. Bass-Treble	.163	.080	.078	-.055	.625	.087	.664
13. Egotistical	-.221	.727	-.104	.043	.041	-.027	.769
14. Planful	.654	.037	-.112	.122	-.039	.050	.678
15. Rude	-.294	.655	-.162	-.014	-.031	.033	.738
16. Objective	.529	-.009	.062	.063	-.052	.214	.579
17. Cynical	-.178	.752	.013	-.015	.024	.044	.775
18. Rebellious	-.025	.653	.396	-.061	-.020	.049	.769
19. Vague	-.775	.148	.182	.132	.018	.024	.821
20. Pretentious	-.303	.531	-.063	.221	-.013	-.117	.664
21. Cautious	.129	-.104	-.127	.744	-.102	-.053	.781
22. Flexible	.514	-.178	.424	.095	.036	-.073	.701
23. Anxious	.036	.135	.124	.699	.119	.082	.738
24. Unconforming	-.044	.410	.711	-.005	-.047	-.002	.823
25. Stimulating	.797	-.033	.172	.005	.033	-.061	.819
26. Criterion Rating	.747	.010	.022	-.028	.019	-.030	.749
Proportion of total variance extracted	.4174	.1988	.0763	.0894	.1257	.0922	100.00
Eigenvalues	6.822	2.742	1.449	1.221	1.092	1.022	

APPENDIX XVI

UNNORMALIZED ROTATED FACTOR LOADING MATRIX FOR SOCIAL SCIENCE DIVISION

Variables	Factors						Communality
	I	II	III	IV	V	VI	
1. Peaceful-Ferocious	-.456	-.140	-.019	-.288	.016	.504	.752
2. Thick-Thin	.151	.001	.098	.026	.694	.033	.718
3. Clear-Hazy	-.052	.786	-.135	.052	-.013	.125	.811
4. Good-Bad	-.128	.841	.124	.046	.007	-.065	.864
5. Loud-Soft	.256	.413	-.158	.077	.347	-.420	.751
6. Wet-Dry	.049	.445	.049	.095	.445	-.208	.673
7. Near-Far	-.055	.654	-.076	.089	.252	.090	.718
8. Rough-Smooth	.251	-.346	-.090	-.106	.083	-.592	.748
9. Angular-Rounded	-.012	-.196	-.124	-.361	-.236	-.529	.722
10. Brave-Cowardly	.097	.453	.369	-.013	.181	-.178	.645
11. Valuable-Worthless	-.197	.794	.186	.035	.011	-.048	.841
12. Bass-Treble	.121	.158	.060	.000	.621	.030	.655
13. Egotistical	.778	-.089	-.096	-.032	.052	.005	.791
14. Planful	-.034	.566	-.151	-.242	-.120	.277	.703
15. Rude	.729	-.067	-.227	.021	.041	-.083	.773
16. Objective	-.188	.381	.050	-.388	-.028	.004	.578
17. Cynical	.750	.024	.166	.149	-.010	-.024	.783
18. Rebellious	.610	.181	.483	.117	-.096	-.003	.813
19. Vague	.130	-.757	.174	-.140	.089	-.038	.806
20. Pretentious	.597	-.158	-.121	-.243	.117	.099	.692
21. Cautious	-.190	-.095	-.085	-.637	-.079	.261	.730
22. Flexible	-.243	.328	.470	-.030	.063	.045	.629
23. Anxious	.084	.029	.228	-.606	.097	-.199	.690
24. Unconforming	.466	.105	.631	.039	-.068	.031	.796
25. Stimulating	-.019	.826	.188	.006	.032	-.103	.854
26. Criterion Rating	-.061	.744	.129	.022	-.061	-.055	.762
Proportion of total variance extracted	.2150	.3657	.0990	.1075	.1136	.0992	
Eigenvalues	5.591	3.582	1.358	1.285	1.192	1.132	

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