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A Differential Weighting of the Undergraduate Grade Point Average as a Method of Improving the Procedure for Selecting Students for Dental School

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A DIFFERENTIAL WEIGHTING OF THE UNDERGRADUATE GRADE POINT AVERAGE AS A METHOD OF IMPROVING THE PROCEDURE FOR SELECTING STUDENTS FOR DENTAL SCHOOL

By

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

Appendix

CHAPTER I

NATURE AND SIGNIFICANCE OF THE PROBLEM

Introduction

Prediction studies that identify variables which can assist admissions committees in selecting students with outstanding academic potential are of significant interest to college administrators, students, professional associations, and government agencies. Students are interested in admission policies which evaluate their qualifications on an equal basis with other candidates; faculty, administrators and related agencies are concerned with utilizing human and physical resources to their full potential.

Dental college admissions committees, although always interested in identifying variables to predict student success, became increasingly concerned about the selection procedure during the terminal years of World War II.

According to Tocchini, Eudey, Thomassen and Reinke, the number of well-qualified candidates applying for a place in a dental school increased significantly during this period. Previously, dental schools were basically able to select their students on the basis of their having received a letter grade of C or better in pre-dental courses earned at an accredited undergraduate institution. The increased number of well qualified applicants required admissions committees to employ additional and more sophisticated methods of

selecting students.[1]

Correlation studies were initiated using various combinations of the predental grade point average, age of the applicant, marital status, place of legal residence, recommendations, the interview, and the undergraduate college attended as predictor variables. Success at the completion of the first year of dental school was the most common criterion variable selected.

The Council on Dental Education of the American Dental Association expressed its concern with the imbalance in the number of students graduating from dental school and the increasing demands by the public for dental health care. In 1946, the Council on Dental Education initiated a pilot study to identify academic qualities necessary for success in dental school. The result was the Dental Aptitude Test, which was developed to identify student qualities in the following areas:

1. Quantitative Reasoning
2. Verbal Reasoning
3. Mental Level
4. Reading Comprehension
5. Biology
6. Chemistry
7. Factual Science
8. Science Application
9. Carving Dexterity
10. Space Relations[2]

In 1950 the Dental Aptitude Testing Program became operational. Students

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[1]John J. Tocchini, Mark W. Eudley, Paul R. Thomassen, and Benjamin C. Reinke, "Correction Study Between Aptitude Testing and Dental School Performance", Journal of Dental Education, 25 (June 1961) p. 269.

[2]Dental Aptitude Testing Program", Division of Educational Measurements, Council on Dental Education, American Dental Association, Chicago, Illinois.

applying for the limited number of places available in dental colleges were tested, and the results of each individual's examination were submitted to the admissions committee at every school at which the candidate applied. Use of the test results varied from college to college. The validity and reliability of the test battery were challenged by some dental schools. Most admission committees agreed that the Dental Aptitude Test Battery, although a valuable instrument for counseling students, should not be the only variable considered when predicting success of potential candidates.

Due to the complex issues involved in the selection procedure, most dental educators encouraged additional research to help them identify variables which could be of maximum value in identifying those students who demonstrated the greatest potential for dental education.

Admission committees challenged researchers to design methods of identifying student motivation for the study of dentistry, individual initiative, stability and other psychological factors related to success in dental school and in the practice of dentistry. Research involving psychological variables provides interesting and challenging problems but was not the major concern of this study.

Most dental schools have initiated on-going correlation and multiple regression studies to identify variables which may be of value for predicting a candidate's academic success and to eliminate from consideration those variables which proved to be of minimal value.

Mann and Parkin expressed their concern for on-going research in this area by their statement:

> The quality and effectiveness of any form of higher education are dependent, ultimately, upon those attracted to it, and, in the instance of dental education, the services provided the public are determined by the educational levels of the dental schools and by the academic capabilities of persons entering the profession. Because these facts are true, it is important to all facets of dentistry and society that the intellectual and moral caliber of entering dental students be studied regularly and every effort be made to achieve continuous improvement in the quality of dental applicants. It is, therefore, necessary to learn as much as possible about backgrounds, attitudes, and motivations of those applying for admission to the dental schools of this country."[1]

Improved teaching methods and greater numbers of applicants for a limited number of places have provided admissions committees with a wide selection of persons who are academically qualified to study dentistry. Some committees express concern that the selection of students on the basis of prediction variables reduces diversity in the class. Considerable discussion centers on the need to identify basic minimum qualifications necessary for success in dental school and in practice, and to select the class on a random basis from those who meet the minimum requirements. From a philosophical viewpoint, this selection procedure may have merit. However, to this author's knowledge, no dental college has abandoned the traditional procedure and instituted a random selection system. The primary reason is the difficulty in defending the system to candidates who are better qualified academically than those who are offered places in the class. Therefore, admissions committees are challenged to initiate research to eliminate inequities in the selection process.

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[1]William R. Mann and Grace Parkin, "The Dental School Applicant", Commission on the Survey of Dentistry in the United States of the American Council on Education, (reprinted from Journal of Dental Education, March 1960), p. 16.

The methods of selecting students for dental school are of concern to this author because of his responsibilities to the admissions committee, University of Illinois College of Dentistry.

Although the University of Illinois College of Dentistry provided the data for this study, the implications are not intended to be limited to the selection of students for any particular college, but will hopefully be applicable to selecting the best qualified students for all colleges of dentistry.

Continuous contact with large numbers of applicants for a limited number of places available in the College of Dentistry, review of academic credentials from a variety of undergraduate institutions, variations in grading patterns, a review of current research in the area, and professional contact with administrators in similar positions have verified the need for continued research in this area.

The admissions committee of the University of Illinois College of Dentistry currently considers many variables to assist them in selecting students who they feel possess the greatest potential for academic success. These variables include the cumulative predental grade point average, the predental grade point average earned in science courses, and the student's scores on the Dental Aptitude Test. These variables are submitted to a multiple regression analysis, and assigned a weighting according to their value in predicting a student's potential for successfully meeting the academic requirements of the University of Illinois College of Dentistry. Based upon this analysis, a score is designated for each student and is reported on a stanine scale to the admissions committee for the use in selecting students for the

class.

Dental Aptitude Test data, Dental National Board examination results provided by the American Dental Association, and biographic data tabulated from transcripts provided by the Registrar, University of Illinois Medical Center, are the bases for collecting data for this research project.

Step-wise multiple regression techniques will be utilized to identify those variables which are significant to the selection process in a developmental group. The stability of the resulting regression equation will be checked in a cross-validation group.

To help a committee maintain consistency in it's selection process, all useful variables will ultimately be combined into one index. The committee may set minimum and maximum levels for acceptance or denial of applicants and select candidates for a place in the class who earn a score within the selected range and who meet additional subjective criteria.

It is the intent of this author to draw inferences from the data and hopefully make a contribution to the research which will encourage others to investigate this area.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

Selecting students who are most likely to successfully complete the prescribed professional curricula has been a goal of every admissions committee. Sherlock, Morris and Thomas state:

> While the student's strategy is to gain admission, the school's policy is to limit access to those who possess necessary qualifications and credentials. An interesting difference occurs here between policies of high and low selectivity. The higher the initial selectivity, the greater is the degree of commitment on the part of the school. Conversely, the lower the initial selectivity, the less the school will be committed to beginning students and the greater the likelihood of attrition.[1]

The literature contains several studies regarding various methods used to select candidates who might successfully master the academic requirements of the school. Several factors account for the increasing interest in prediction studies. Lavin, in reviewing over 300 prediction studies, concluded that the increased interest was due in part to the following:

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[1]Basil J. Sherlock, Richard T. Morris and Charles C. Thomas, Becoming a Dentist (Springfield, Illinois: Bannerstone House, 1972), p. 47.

1. Growth in student population outstripped university facilities to accommodate all students who would like to attend.

2. The number of highly qualified students has increased.

3. The college has a responsibility to be as certain as possible that students they select will do better than those they exclude.

4. If the students selected do not perform according to expectations, the nation's pool of trained manpower is drained.[1]

Principles of Selection Procedure

An unpublished report prepared for the Admissions Committee of the University of Illinois College of Dentistry by Dr. Dale E. Mattson, Director of Admissions at the University of Illinois Medical Center identified the following "Objectives and Responsibilities of an Admission Committee of a Public Professional College":

1. When the number of qualified candidates exceeds the number of places available, the "best" candidates are selected. Only two considerations are used to determine the "best" candidates. The first is probability of success in school, and the second is value to society. At the present time, we do not have acceptable methods of measuring a practicing dentist's value to society; therefore, we are forced to attempt to predict success in dental school.

2. All candidates for admission are treated alike unless the committee is willing to publicly state and defend differential treatment for certain groups of candidates.

3. In choosing variables to be used in making decisions, the only relevant factors are, first, whether the data are useful and, second whether it is practical to obtain the data for all candidates.

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[1] David E. Lavin, The Prediction of Academic Performance: A Theoretical Analysis and Review of Research (Hartford, Connecticut: Connecticut Printers, Inc., 1965), p. 11.

4. All decisions regarding applicants should be made deliberately and in an orderly manner to ensure equal consideration for all. The committee has a responsibility to avoid making a decision to accept a "qualified" candidate and as a result deny a "better" candidate.[1]

Many studies were identified in the literature which support the need to conduct continuous research in methods used to select candidates for admission to institutions of higher education. Mann and Parkin said, "In many schools efforts undoubtedly should be made to clarify the procedures followed in selecting students and to change the attitude of applicants toward admission policies."[2]

In support of this statement, it is evident that many students were suspicious of the criteria used to select candidates and were often confused, disappointed, and irritated when they were not offered a place in the school, even though they had met all minimum standards required.

Podshadley, Chen, and Shrock, reported that:

> The Commission on the Survey of Dentistry has viewed with concern the lack of a satisfactory system for the admission of applicants to the nation's dental schools. This concern is reflected in the commission's recommendation that the admissions standards of dental schools be reviewed for the purpose of improving the quality of students admitted.

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[1]Dale E. Mattson, "Objectives and Responsibilities of an Admissions Committee of a Public Professional College" (letter sent to Dental Admissions Committee by Director of Admission, University of Illinois, March 20, 1972).

[2]William R. Mann and Grace Parkin, "The Dental School Applicant" Special Studies Number 9 of Commission on Survey of Dentistry in the United States of the American Council on Education (reprinted from Journal of Dental Education, March, 1960), p. 21.

> That the admissions problem has been on the mind of dental educators is evident from the persistent searches some dental institutions have been conducting for better testing instruments to be used with dental applicants.[1]

Knoell indicated concern for admission procedures by stating:

> Earlier studies indicate that while the best predictors may change every few years, the admissions policies remain relatively stable. Predictors tend to vary in importance over time, once useful predictors can no longer be used, and once useless ones become valuable.[2]

Concerns expressed in this statement support the need for a continuous admissions research policy at each college to develop measures for determining which predictor variables were the most useful to the admissions committees in selecting students for the current class.

The quality and effectiveness of dental education and ultimately the practice of dentistry are dependent upon those admitted to it. Peterson stated:

> Whenever a college of dentistry has many more applicants for positions in its first year class than it has possible openings--and this is, and at least since the war has been a common experience, its staff is faced with a problem of selection. The particular problem is easy to state. It simply calls for identifying from among all applicants for a given first year class, those who will become the best dentists. But the solution is as difficult as the problem is easy to state. We cannot predict success as a practicing dentist but we can predict with greater than a random chance the success of an individual as a student of dentistry.[3]

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[1]Dale W. Podshadley, Martin K. Chen, and John G. Shrock, "A Factor Analytic Approach to the Prediction of Student Performance," Journal of Dental Education, 33 (March 1969), p. 105.

[2]Dorothy M. Knoell, "The Prediction of Grades in the School of Dentistry at the University of Pittsburg" (unpublished).

[3]Shailer Peterson, "Who Should Enter Dental School?" Journal of the American Dental Association, 33 (January, 1946), p. 58.

Review of Prediction Variables to Identify Success in Dental School

The basic method used by the majority of admissions committees consists primarily of selecting candidates who present the best record of scholastic achievements. This procedure, although often attacked, has proven useful.

Heller, in his study "Selection of Students for Dental School," indicated that pre-dental grades appear to be fairly good predictors of first year dental school basic science grades. Grades in pre-dental science courses correlate to a greater degree than did grades in non-science courses.[1]

Hood reported in the Journal of Dental Education that the variable with the highest correlation with the grade point average in dental school was the predental grade point average.[2]

In addition to the foregoing observation, Hood added an additional dimension to the research by suggesting that the pre-dental college attended and the types of pre-dental courses selected were significant in predicting success in dental school. Hood made a study involving prediction of achievement in dental school, at the University of Minnesota. He found a .55 correlation between the undergraduate grade point average and dental school performance for students who attended the University of Minnesota for their pre-dental education as compared to .48 for students who attended some other college for their

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[1]Brian D. Heller, Lawrence R. Carson, and Bruce L. Douglas, "Selection of Students for Dental School", Journal of Dental Education, 29 (June 1956), p. 203.

[2]Albert B. Hood, "Prediction Achievement in Dental School", Journal of Dental Education, 27 (June 1963), p. 149.

pre-dental education.[1]

The need for additional research of the grade point average as a variable to be used in predicting success in dental school was emphasized by Dworkin:

> It is possible, indeed likely, that distribution of the grade point average for the whole sample is not identical to the distribution of the preprofessional grade point average from any single college. Institutions, each with different grading systems, could claim some correlation between their grade and ability, but when different systems are pooled, the resulting distribution of grades may no longer reflect the pooled distribution of student abilities, and correlation between preprofessional and performance in dental school would be lower than it deserves to be.[2]

Podshadley, Chen, and Shrock in their study "A Factor Analytic Approach to the Prediction of Student Performance" reported that the grade point average, when used as the sole variable for predicting success in a professional school, was an unsatisfactory criterion. Many factors which enter into the computation of the grade point average were not objectively derived, and as such they reflect, in large measures, the instructor's personal prejudices rather than the student's true achievement.[3]

Hill reported, in a study to assess the students' intellectual promise for medical education, that grading patterns vary from college to college. In

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[1]Ibid., p. 151.

[2]Samuel F. Dworkin, "Dental Aptitude Test as Performance Predictor Over Four Years of Dental School: Analyses & Interpretation", Journal of Dental Education, 34 (March 1970), p. 28-29.

[3]Dale W. Podshadley, Martin K. Chen and John G. Shrock, "A Factor Analysis Approach to the Prediction of Student Performance", Journal of Dental Education, 33 (March 1969), p. 108.

addition, some students earn their highest grades in subjects that do not necessarily relate to preparation necessary for first year medical school.[1]

Dental Aptitude Test as a Prediction Instrument

Although the grade point average was a useful predictor of a student's potential for success in dental school, most admission committees have searched for additional variables which may be combined with the grade point average to help them assess each student's qualifications for dental school.

The American Dental Association's Division of Educational Research initiated the Dental Aptitude Testing program in 1946-47 by testing freshmen students as they entered dental school. A primary objective of the program was to prepare a test to predict a student's probable success in the study of dentistry. Success was defined to include success in theory subjects and in technic courses.[2]

In the first year of testing, it was found that:

1. Scores on the intelligence, reading, English, word dexterity and science vocabulary can predict the freshman dental student's grades in theory courses.

2. Scores on the visualization and carving tests can predict the freshman dental student's grades in technic courses.

3. Correlations of plus .30 to plus .45 constitute the range found in most aptitude testing studies; while these are not high correlations in themselves, when several factors having such correlations were combined, useful forecasting can be accomplished.[3]

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[1]Joseph K. Hill, "Assessments of Intellectual Promise for Medical School", Journal of Medical Education, (October 1959), p. 962.

[2]Shailer Peterson, "Forecasting the Success of Freshmen Dental Students Through the Aptitude Testing Program," Journal of the American Dental Association, 37 (September 1948), p. 259-260.

[3]Ibid., p. 260-261.

Since each college of dentistry was individualized, and each admissions committee determined which variables were significant for its selection procedure, each committee must decide on the amount of weight to give each section of the Dental Aptitude Test.

Although many studies support the value of the Dental Aptitude Test as an aid in the selection of students for dental school, some studies questioned the efficacy of the test as a predictive instrument. Manhold and Manhold, in an eight year study of prognosticative factors for four year performance in the Seton Hall dental school concluded that:

1. The academic sections of the Dental Aptitude Test were efficacious for forecasting accomplishment in basic science studies but had no such value for other areas.

2. The mechanical portion of the examination was useful for predicting basic performance in the preclinical and clinical areas; however, inconsistencies were apparent from class to class.

3. The total academic aptitude portion of the Dental Aptitude Test appears to be a better prognosticator of performance in the basic science studies in dental school than any individual component of the examination.[1]

The majority of the Dental Aptitude Test scores had no value in predicting student achievement for students in the 1962 and 1963 classes at the University of Pennsylvania College of Dentistry, as reported in a study by Ship and Laster.[2]

Travers and Wallace found that the value of the Dental Aptitude Test

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[1]John H. Manhold Dr. and Beverly S. Manhold, "Predictive Value for Four Year Performance of Individual Parts of Dental Aptitude Test", Journal of Dental Education, 31 (May 1967), p. 62.

[2]Irwin K. Ship and Larry Laster, "Aptitude and Achievement in Dental Education", Journal of Dental Education, 31 (March 1967), p. 47.

Battery as a predictor of achievement varied in value from one class to another.[1]

In reviewing selection criteria in terms of their ability to predict academic success in dental schools, Sherlock and Morris indicate that the present Dental Aptitude Test Battery does not seem to be particularly useful as a device to predict long-range performance in dental school. They believe there was sufficient evidence to question as gratuitous the assumption that the Dental Aptitude Tests predict with a high degree of accuracy the probable success of students in dental school.[2]

Weighted Variables

Typically, according to Phillips and Reitz, admissions committees consider biographic data, predental grade point average, and Dental Aptitude Test scores when selecting students for their school. Each dental school admissions committee considers how the predictor variables enter into the evaluation of each candidate's application and what weight should be assigned to each.[3]

Assigning a weighted value to predental grades has been the subject of considerable discussion. Bendig found great diversity in grading patterns from college to college as a result of different types of examinations and criteria used in assigning grades. In addition, students who apply for dental school

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[1]Robert M. W. Travers and Wimburn L. Wallace, "Inconsistency in the Predictive Value of a Battery of Tests", Journal of Applied Psychology, 34 (Aug., 1950), 237-239.

[2]Basil J. Sherlock, Richard T. Morris and Charles C. Thomas, Becoming a Dentist, (Springfield, Illinois: Bannerstone House, 1972), p. 54.

[3]Joseph P. Phillip and William Reitz, "Statistical Models for Selection of Applicants for the D.D.S. Program", Journal of Dental Education, 35 (March, 1971), p. 151.

matriculate with a variety of majors.[1]

Conger and Fitz reported, "It is common knowledge among admission officers that a grade of "B" at a highly competitive undergraduate college may indicate a greater degree of accomplishment that the same grade or perhaps even an "A", at a less selective institution".[2]

"Very little effort has been devoted to controlling these sources of variation and as a result, student grades lack a high degree of comparability" according to Bendig".[3]

Fishman suggests that the problem of controls with regard to grades has not been totally neglected. The use of standardized achievement tests have been a means of overcoming error associated with grades received from different faculty members and different institutions.[4]

Due to the variability in grading patterns, it has been important to use every method available to standardize the grades earned at each institution in an effort to provide equal admission consideration for every applicant and to eliminate discrimination against candidates who attend institutions with difficult grading requirements.

Burnham and Hewitt reviewed different types of marking systems used by high schools which students had attended prior to their matriculation to Yale

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[1]Albert W. Bendig, "The Reliability of Letter Grades", Educational and Psychological Measurement, 13 (1953), p. 318-320.

[2]John J. Conger and Reginald H. Fitz, "Prediction of Success In Medical School", Journal of Medical Education, 38 (November 1963), p. 943.

[3]Ibid., p. 318-320.

[4]Joshua A. Fishman, "Unsolved Criterion Problems in the Selection of College Students,"Harvard Educational Review, 28 (1958), p. 340-341.

University. Their study introduced school grade adjustment factors which had been developed from the records of previous Yale classes.[1]

In their study to predict success in medical school, Conger and Fitz designed a method of adjusting the undergraduate grade point average. The Medical College Aptitude Test score for all recent students of the applicants college or university was computed and converted to a percent (+ or -) from the 50th percentile of all students, using norms available in the Confidential Statistical Summary published biannually by the Psychological Corporation. The applicant's actual grade was then corrected upward or downward by the percent deviation to obtain his adjusted grade point average.[2]

Tocchini, Eudey, Thomassen and Reinke considered a rating of the undergraduate college as a variable in predicting academic success in dental school for 148 students enrolled in the 1955, 1956, and 1957 classes. Due to the great diversity in the colleges, it was difficult to compile ratings on a logical basis. It was found that although there were differences in the colleges, they were not statistically significant in predicting success in dental school for this study.[3]

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[1]Paul S. Burnham and Benjamin A. Hewitt, "Secondary School Grades and Other Data as Predictors of Academic Achievement in College," College and University 48 (Fall 1972), p. 21-22.

[2]John J. Conger and Reginald H. Fitz, "Prediction of Success in Medical School", Journal of Medical Education, 38 (November 1963), p. 944.

[3]John J. Tocchini, Mark W. Eudey, Paul R. Thomassen and Benjamin C. Reinke, "Correlation Study Between Aptitude Testing & Dental Student Performance", Journal of Dental Education, 25 (June 1961), p. 269-272.

Summary

A review of the literature identified a number of studies designed to increase success in predicting academic achievement at almost every level of the educational experience. However, the literature did not reveal any study utilizing the methods proposed by this author to study a differential weighting of the undergraduate grade point average as one of the multivariate predictors in the selection of students for dental school. The following characteristics are unique to this prediction study:

1. The use of selected sections of the Medical College Aptitude Test and the Dental Aptitude Test Battery to develop a method of differentially weighting the grade point average for undergraduate institutions.

2. The prediction of academic success of dental students for each year of their professional education.

3. The prediction of the students' potential for success on the National Dental Board Examinations.

4. The designing of a simplified method for admissions committees to consider the pertinent predicator variables of value in offering every student equal consideration of his application.

Lavin reports the need for longitudinal research in his book which reviews over 300 prediction studies. According to Lavin, most studies of academic performance are static. Longitudinal studies seem essential to assess the consistency of academic performance throughout the educational experience. College admissions officers and guidance personnel express interest in predicting more than a student's grades during his entering year.[1]

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[1]David E. Lavin, The Prediction of Academic Performance: A Theoretical Analysis & Review of Research, (Hartford, Connecticut: Connecticut Printers, Inc., 1965), p. 44-45.

CHAPTER III

THE EXPERIMENTAL DESIGN

General Information

Professional Colleges at the University of Illinois Medical Center continually conduct research to improve their methods of selecting students for admission. The author reviewed the variables currently used to select students for admission to the College of Dentistry. It appeared from the data that inclusion of additional information about the source of each student's undergraduate grade point average could conceivably enhance the committee's ability to select those candidates for a place in the class who were most likely to successfully meet the dental college graduation requirements and pass Parts I and II of the National Board Examinations.

This conclusion was based on the fact that most prediction studies include the student's pre-professional college grade point average without giving any consideration to the relative difficulty of the educational program and grading system in which it was earned. Educators who criticize the use of this variable claim that since a great number of candidates are vying for a limited number of places available in colleges of dentistry, a form of discrimination exists against candidates (for a place in the class) who attend a pre-professional college with higher scholastic entrance requirements and a highly competitive grading system. A way to minimize this inequity was to develop a method of differentially weighting the undergraduate grade point average.

Through this procedure, applications from all candidates would be reviewed on a more equitable basis.

Developing a method of differentially weighting the undergraduate grade point average was discussed with Dr. Seymour Yale, Dean of the University of Illinois College of Dentistry and Dr. Dale E. Mattson, Director of Admissions, University of Illinois Medical Center. These experts in the field agreed that additional research in the area was desirable. The author received their permission to use the resources of the College of Dentistry and the Admissions and Records Office to collect data pertinent to this study.

Minimum Entrance Requirements

Students who were admitted to the University of Illinois College of Dentistry presented at least sixty semester hours of college credit with a 3.25 (5 point scale) minimum grade point average. A candidate's opportunity for admission was increased if he presented additional predental college preparation and a higher grade point average. Every candidate was required to present a minimum of fourteen semester hours of chemistry, including at least four hours of organic chemistry, six semester hours in physics, biology, and English. All students were required to take the Dental Aptitude Test sponsored by the Council on Dental Education of the American Dental Association and the American Association of Dental Schools.

The Committee on Admissions was guided in the selection of students by a systematic appraisal of objective academic qualifications and other criteria,

including letters of recommendation primarily from science professors, and an acceptable health record.[1]

Problem

This dissertation, "Differential Weighting of the Undergraduate Grade Point Average as a Method of Improving the Procedure for Selecting Students for Dental School," is designed to:

1. explore variables used to predict academic excellence in dental school on a longitudinal basis.
2. introduce a method of differentially weighting the grade point average earned at various undergraduate institutions
3. determine the value of this procedure, in a longitudinal study, to predict academic performance in dental school and on the National Dental Board Examinations
4. reduce attrition and utilize human and institutional resources to capacity

Hypothesis

A hypothesis was developed and stated in null form:

A differentially weighted undergraduate grade point average will not significantly improve the ability of the admissions committee to select students for the study of dentistry who will successfully complete the academic requirements and perform at a higher level on the National Board Examinations.

Population Selected for the Study

Three hundred and eighty-one students were offered a place in the

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[1] "College of Dentistry Catalog," University of Illinois at the Medical Center, Chicago (1969-1971), p. 15-17.

University of Illinois College of Dentistry from 1965-1968. Of these, forty-one students failed to complete the graduation requirements, either for personal or academic reasons, and were eliminated from the analyses. Advanced placement credit was given to three students who had previously attended a dental school in a foreign university, and they were eliminated from this study.

Data was collected and analyzed for the 337 students who completed the requirements for graduation and who took Part I and Part II of the National Board Dental Examinations.

Table one contains a classification of the students who entered the University of Illinois College of Dentistry 1965 through 1968.

Sources of the Data

The information for this study was collected from the following sources:

1. A selective canvass of the literature
2. Recommendations from experts who are active in professional college admissions procedures
3. Application forms used at the University of Illinois College of Dentistry for students entering the school between 1965-1968
4. An examination of transcripts submitted from the undergraduate institutions attended by the students
5. An examination of the students' academic record earned during dental school
6. The "Predental School Analysis of 1968 Dental Aptitude Testing Program Participants"[1]

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[1]"Predental School Analysis of 1968 Dental Aptitude Testing Program Participants." Division of Educational Measurements, Council on Dental Education, American Dental Association, Chicago, 1969.

TABLE 1

STUDENTS SELECTED FOR DENTAL PREDICTION STUDY, UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY, CHICAGO, ILLINOIS 1965 THROUGH 1968

Year of Admission	Students Who Graduated on Schedule	Students Who Graduated in More Than 4 Years
Developmental Group		
1965	71	6
1966	81	1
Cross Validation Group		
1967	89	2
1968	87	0
Total Population	328	9

7. An examination of the Dental Aptitude Test results for each student who entered the University of Illinois Dental School during 1965-1968

8. The mean score reported in the science and verbal sections on the "Medical College Admission Test, Summary of Scores by Undergraduate College Attended May 1968-October 1971" for the major undergraduate institutions attended by the student[1]

9. Cumulative scores on Part I and II of the National Dental Board Examinations, reported by the American Dental Association for every student graduating from the University of Illinois College of Dentistry during the years selected for the study

Criteria for Selecting Variables

Best, Diekema, Fisher and Smith identified the following methods for selecting variables in their prediction study:

1. Include only variables which are realistically useful in prediction

2. Use a large enough number of variables to approach realistic limits of predictability

3. Do not include variables which might be construed as discriminatory, e.g., sex or race

4. Include a variety of predictor variables so that persons with imbalanced credentials would not be either aided or handicapped through chance relationships between his particular imbalance with the variables included in the equation

5. Coefficients must be of such signs as to reward applicants for superior performance[2]

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[1]"Medical College Admission Test, Summary of Scores by Undergraduate College Attended May, 1968 to October, 1971" Prepared for the Association of Medical Colleges, New York: The Psychological Corporation, 1972.

[2]William R. Best, Anthony J. Diekema, Lawrence A. Fisher, and Nat E. Smith, "Multivariate Predictors in the Selection of Medical Students," OAR Research and Statistical Report, University of Illinois at the Medical Center Office of Admissions and Records, January 1970, unpublished.

Predictor Variables

The author selected a combination of biographic data and academic records which were available for each student as predictor variables for this study. A definition of each variable, and its identifying initials, may be found in appendix A. In order to keep from repeating definitions, each variable will be identified by its initials for the remainder of this study.

Since the differentially weighted undergraduate grade point average was basic to this study, a weighting was assigned to selected predictor variables. These variables were developed by multiplying each student's cumulative predental grade point average times the mean score reported on:

1. The Science Section of the Medical College Admission Test for the predental college attended by each student[1]
2. The Verbal Section of the Medical College Admission Test for the predental college attended by each student[2]
3. The Academic Average on the Dental Aptitude Test for the predental college attended by each student[3]
4. The Manual Average on the Dental Aptitude Test for the predental college attended by each student[4]

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[1]"Medical College Admission Test, Summary of Scores by Undergraduate College Attended May 1968 to October 1971," (1972).

[2]Ibid.

[3]"Predental School Analysis of 1968 Dental Aptitude Testing Program Participant," (1969).

[4]Ibid.

A second set of differentially weighted variables was developed by multiplying each student's pre-dental science grade point average times these same sections of the Medical College Admission Test and the Dental Aptitude Test.

Since the author decided that a minimum of ten scores from each school was necessary to maintain validity, this procedure of differentially weighting the undergraduate grade point average was impossible for candidates who attended pre-dental colleges from which fewer than ten scores, on the Medical College Admission Test and fewer than ten scores on the Dental Aptitude Test, were reported.

Therefore, for these students, it was necessary to assign an arbitrary score to their pre-dental college. The initial analysis was performed by assigning the fiftieth percentile, or mean, of all schools reporting data for this study. However, since it was felt that many students who attended colleges not reporting sufficient data on these tests might receive an inflated weighting of their pre-dental grade point average by using this mean score, an additional analysis was performed, assigning each student a weighting at the thirty-third percentile.

If a student attended more than one college prior to his admission to dental school, he was assigned scores for the above procedure at the school in which he received the majority of his pre-dental college credits, or at the school he most recently attended, if the number of semester hours was equal.

A unique feature of differentially weighting the student's undergraduate grade point average used in this dental prediction study was the use of Medical College Admission Test data as one method of assigning weights to various undergraduate institutions attended by the applicants.

In addition to the various combinations of differentially weighted variables, the following types of predictor variables were included in the analysis for each student.

Each student's score on the Verbal, Space Relations, Manual, Total Science Section, and Academic Average Section of the Dental Aptitude Test served as predictor variables. These variables were selected for the study on the basis that various combinations of an individual's Dental Aptitude test scores have proven valuable in previous studies to select students for dental school.

The cumulative pre-dental grade point average and pre-dental science grade point average were variables selected as indicative of the quality of each student's academic achievement in pre-dental education.

The number of semester hours of pre-dental education a student received was selected as a predictor variable to determine its value in predicting success in dental school.

In order to determine if the type of college a candidate attended for his pre-dental education was a significant variable in predicting potential for success in dental school, a variable was included in the study to identify which students attended a juniro college and which students attended a four year institution.

An important issue to consider in this study was how to identify which predictor variables were most valuable to the admissions committee on a longitudinal basis for selecting students for the study of dentistry.

In order to resolve this problem, the author selected ten criteria variables which were significant in identifying a student's progress throughout his dental school education and submitted each predictor variable to a step-wise

multiple regression analysis with each criterion variable.

Predictor variables which appeared to be significant in each analysis for the developmental group were evaluated. A new predictor variable combining variables from the ten analyses which were of the greatest value was developed. This variable was added to the list of predictor variables submitted to the final regression analysis for the cross validation group.

A cross validation analysis using all predictor variables was initiated with students who entered the University of Illinois College of Dentistry during 1967 and 1968.

Criterion Variables

Criterion variables were selected for this study which permitted a review of the data on a longitudinal basis. Each student's cumulative grade point average was included in the analysis for each of the four years he attended dental school. The grade point average included the student's course work in didactic and technical areas.

The student's percentile rank in class for each year of dental school was selected as a criterion variable to predict his standing in relation to his peers.

Part I and Part II of the National Board Dental Examinations were selected as criterion variables to predict which students selected for this study were most likely to successfully pass these standardized national examinations, when compared with students from other dental schools.

Appendix B contains a definition of the criterion variables.

Method of Analysis

Data for each of the predictor and criterion variables was collected, numerically coded, and key punched on an I.B.M. card for the 337 students selected for this study. These cards were then separated into two groups, with two classes identified as the developmental group and two classes as a cross-validation group.

The U.C.L.A. Biomedical Computer Program BMD02R was selected to compute a step-wise multiple regression analysis on the data. This program, in a series of steps, computes multiple linear regression equations for a selected criterion variable. At the first step, the program selects, as the first variable, that variable which correlates highest with the criterion, then at each successive step, adds a variable which contributes most to the prediction, until the optimum set is produced. This process continues until either a designated number of predictor variables have been included or until no remaining variables make a significant contribution to the multiple correlation. The program provides, as a by-product, the mean and standard deviation for each variable and a multiple correlation matrix.[1]

Developmental Group

One hundred fifty-nine students who entered the University of Illinois

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[1]W. J. Dixon, ed., BMD Biomedical Computer Programs, Berkeley, Los Angeles, London: University of California Press, 1970, p. 233-239.

College of Dentistry during 1965 and 1966 were chosen as the developmental group.

A step-wise multiple regression analysis using all predictor variables was performed on each criterion variable. Each analysis resulted in the selection of six predictor variables which provided the greatest multiple correlation with each criterion variable. An analysis was made of these correlations in relation to all criteria variables and a composite criterion was developed. Criterion variables selected to form the composite variable were equally weighted by converting them to standard scores and adding them together. The composite variable was given a mean of ten and a standard deviation of two.

The step-wise multiple regression program was repeated using all predictor variables and limiting the analysis to the composite criterion variable.

Predictor variables which contribute the most to the multiple correlations with the composite criterion variable were selected. The correlations for these variables were tested at the .005 level of confidence.[1]

From these, a prediction formula was designed to develop a single index for Prediction of Success in Dental School (PSD) for each student in the developmental group.

Cross Validation Group

The cross-validation group consisted of 178 students who entered the University of Illinois College of Dentistry during 1967 and 1968.

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[1]Helen M. Walker, Joseph Lev, Statistics, An Intuitive Approach, (Belmont, Calif: Wadsworth Publishing Co., Inc., 1962) p. 272.

The composite predictor variable prepared from the analysis of the developmental group were added to the total list of predictor variables for this study. These variables were submitted to a step-wise multiple regression analysis. The statistical procedure limited the regression equation to selecting the single most valuable variable to predict which students were most likely to meet the requirements for dental school as evidenced by the composite criterion variable.

The .005 level of confidence for a coefficient correlation was tested to either accept or reject the null hypothesis:

> A differentially weighted undergraduate grade point average will not significantly improve the ability of an admissions committee to select students for the study of dentistry who will successfully complete the academic requirements and perform at a higher level on the National Board Examination.[1]

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[1]Helen M. Walker, Joseph Lev, Statistics, An Intuitive Approach, (Belmont, Calif: Wadsworth Publishing Co., Inc., 1962), p. 272.

CHAPTER IV

AN ANALYSIS OF THE DATA

As a first step in the analysis, a step-wise regression analysis was performed, using as criterion variables each student's grade point average in dental school, his percentile rank in class, and his ability to pass Part I and II of the National Board Dental Examinations.

Grade Point Average In Dental School

Tables 2-5 show the predictor variables selected by the step-wise regression program which appear in the regression equation to predict the student's grade point average in dental school.

The first variable selected to predict a student's grade point average during the freshman, sophomore and junior year in dental school was, in each case, a differentially weighted grade point average. Variable SWMST with a correlation of .2846 at the freshman level and .2953 at the sophomore level, was a product of the student's pre-dental science grade point average and a measure of the competitiveness of the science department of his pre-dental college.

This weighting appears to be valuable in predicting a student's potential for success in the basic science courses taught during dental school.

Predictor variable CWMST with a correlation of .2889 was most significantly related to the student's cumulative grade point average earned through the

junior year in dental school. The grade point average which was weighted in this case, was the student's cumulative undergraduate grade point average of all courses taken with the exception of physical education and R.O.T.C.

Both variables SWMST and CWMST resulted from multiplying the designated grade point average by the mean score on the science section of the Medical College Admission Test reported for the pre-dental college attended by the student. Students who attended a college which was not represented by a minimum of ten students who had taken the Medical College Admission Test were assigned two arbitrary weightings. The first at the thirty-third percentile and the second at the fiftieth percentile of all pre-dental colleges reporting data for this study. The analysis demonstrated that assigning the thirty-third percentile value in cases of missing data was most effective.

A non-differentially weighted variable, PDCGPA, showed the greatest relationship with the cumulative grade point average through the senior year in dental school. This variable combined the student's pre-dental grade point average in all courses except physical education and R.O.T.C.

DATMAN was the second predictor variable selected by the regression program for each level of the student's dental school experiences. This variable was related to the student's ability on the Manual Dexterity section of the Dental Aptitude Examination.

Percentile Rank in Dental School

The criterion variable, percentile rank in class, indicates the student's progress in dental school in relation to his peers. The predictor variables in Tables 6-9 were selected by the multiple regression program as providing the most

TABLE 2

THE RELATIONSHIP BETWEEN PREDICTOR VARIABLES AND THE FRESHMAN YEAR GRADE POINT AVERAGE IN DENTAL SCHOOL FOR THE DEVELOPMENTAL GROUP AS COMPUTED BY THE STEP WISE MULTIPLE REGRESSION PROGRAM

Regression Step	Predictor Variables	Step-wise Multiple Correlations with Freshman Grade Point Average in Dental School
1	SWMST*	.2846
2	DATMAN	.4022
3	DATSCI	.4272
4	VMCATF*	.4460
5	HRSPRD	.4643
6	CWMST*	.4800

*Indicates a differentially weighted variable

TABLE 3

THE RELATIONSHIP BETWEEN PREDICTOR VARIABLES AND THE SOPHOMORE YEAR GRADE POINT AVERAGE IN DENTAL SCHOOL FOR THE DEVELOPMENTAL GROUP AS COMPUTED BY TEH STEP-WISE MULTIPLE REGRESSION PROGRAM

Regression Step	Predictor Variables	Step-wise Multiple Correlations with Sophomore Grade Point Average in Dental School
1	SWMST*	.2953
2	DATMAN	.4007
3	DATACD	.4424
4	HRSPRD	.4617
5	VMCATF	.4808
6	DATSPR	.4918

*Indicates a differentially weighted variable

TABLE 4

THE RELATIONSHIP BETWEEN PREDICTOR VARIABLES AND THE JUNIOR YEAR GRADE POINT AVERAGE IN DENTAL SCHOOL FOR THE DEVELOPMENTAL GROUP AS COMPUTED BY THE STEP WISE-MULTIPLE REGRESSION PROGRAM

Regression Step	Predictor Variables	Step-wise Multiple Correlations with Junior Grade Point Average in Dental School
1	CWMST*	.2889
2	DATMAN	.3904
3	HRSPRD	.4061
4	SMCATF*	.4190
5	DATSCI	.4259
6	DATSPR	.4359

*Indicates a differentially weighted variable

TABLE 5

THE RELATIONSHIP BETWEEN PREDICTOR VARIABLES AND THE SENIOR YEAR GRADE POINT AVERAGE IN DENTAL SCHOOL FOR THE DEVELOPMENTAL GROUP AS COMPUTED BY THE STEP-WISE MULTIPLE REGRESSION PROGRAM

Regression Step	Predictor Variables	Step-wise Multiple Correlations with Senior Grade Point Average in Dental School
1	PDCGPA	.2575
2	DATMAN	.3617
3	DATSPR	.3787
4	DATACD	.3880
5	DATVER	.4055
6	TYPCOL	.4128

significant contribution to predicting a student's percentile rank in class at each level of his dental school education.

A differentially weighted variable at the thirty-third percentile was selected first at each level of the dental school experience. SWMST, with a correlation of .2682, was selected as the most significant variable in predicting a student's percentile rank in the freshman class. Variable CWMST was the single best predictor at the sophomore, junior and senior levels of dental school.

Each of these variables was differentially weighted by combining either the student's pre-dental science grade point average or his cumulative pre-dental grade point average times a weighting of his pre-dental college's science department, as determined by the score reported for it in the "Medical College Admission Test, Summary of Scores."[1]

A predictor variable, differentially weighted by combining some aspects of a student's pre-dental grade point average with a score on some section of the Dental Aptitude Test reported for his pre-dental college in the "Predental School Analysis of 1968 Dental Aptitude Testing Program Participants," was not selected as being significant in predicting a student's percentile rank in dental school until the third step of the regression program during the junior

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[1]"Medical College Admission Test, Summary of Scores by Undergraduate College Attended, May 1968 to October 1971," (1972).

TABLE 6

THE RELATIONSHIP BETWEEN PREDICTOR VARIABLES AND THE PERCENTILE RANK IN THE FRESHMAN YEAR IN DENTAL SCHOOL FOR THE DEVELOPMENTAL GROUP AS COMPUTED BY THE STEP-WISE MULTIPLE REGRESSION PROGRAM

Regression Step	Predictor Variables	Step-wise Multiple Correlations with Percentile Rank in Freshman Year in Dental School
1	SWMST*	.2682
2	DATMAN	.3960
3	SWMVF*	.4200
4	DATSCI	.4446
5	HRSPRD	.4637
6	PDCGPA	.4836

*Indicates a differentially weighted variable

TABLE 7

THE RELATIONSHIP BETWEEN PREDICTOR VARIABLES AND THE PERCENTILE RANK IN THE SOPHOMORE YEAR IN DENTAL SCHOOL FOR THE DEVELOPMENTAL GROUP AS COMPUTED BY THE STEP-WISE MULTIPLE REGRESSION PROGRAM

Regression Step	Predictor Variables	Step-wise Multiple Correlations with Percentile Rank in Sophomore Year in Dental School
1	CWMST*	.2773
2	DATMAN	.3963
3	DATSCI	.4335
4	DATMT*	.4485
5	HRSPRD	.4646
6	CWMVT*	.4697

* Indicates a differentially weighted variable

TABLE 8

THE RELATIONSHIP BETWEEN PREDICTOR VARIABLES AND THE PERCENTILE RANK IN THE JUNIOR YEAR IN DENTAL SCHOOL FOR THE DEVELOPMENTAL GROUP AS COMPUTED BY THE STEP-WISE MULTIPLE REGRESSION PROGRAM

Regression Step	Predictor Variables	Step-wise Multiple Correlations with Percentile Rank in Junior Year in Dental School
1	CWMST*	.2573
2	DATMAN	.3441
3	DATMT*	.3564
4	DATACD	.3682
5	DATSPR	.3824
6	SWDAMF*	.3903

* Indicates a differentially weighted variable

TABLE 9

THE RELATIONSHIP BETWEEN PREDICTOR VARIABLES AND THE PERCENTILE RANK IN THE SENIOR YEAR IN DENTAL SCHOOL FOR THE DEVELOPMENTAL GROUP AS COMPUTED BY THE STEP-WISE MULTIPLE REGRESSION PROGRAM

Regression Step	Predictor Variables	Step-wise Multiple Correlations with Percentile Rank in Senior Year in Dental School
1	CWMST*	.2508
2	DATMAN	.3364
3	DATSPR	.3481
4	DATMT*	.3553
5	DATMF*	.3594
6	DATVER	.3613

* Indicates a differentially weighted variable

year.[1]

Part I and Part II National Board Dental Examinations

An objective of every dental school was to educate students who could pass Part I and Part II of the National Board Dental Examinations, which are prerequisites for licensure in many states.

Part I National Board Dental Examination

At the conclusion of the sophomore year in dental school, each of the participants in this study took Part I of the National Board Dental Examinations. These examinations covered gross anatomy, microbiology, physiology, general pathology, histology, bio-chemistry, and dental anatomy. A composite score, averaging the student's score on each section of the examination, was used as a criterion variable for this study. It appeared essential to determine if a method of selecting students who would succeed in the University of Illinois College of Dentistry would be valuable in predicting their success on the National Board Dental Examinations when they were in competition with peers from dental schools in every section of the country.

Table 10 presents six predictor variables selected by the step-wise multiple regression program.

Since Part I of the National Board Dental Examination tests the student's knowledge of the basic science courses taken during the first two years of dental school, it was reasonable that predictor variables closely related to the

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[1]"Predental School Analysis of 1968 Dental Aptitude Testing Program Participants," (1969).

student's abilities in pre-dental science courses were those which showed the greatest relationship to the criterion variables.

The students' score on the DATSCI indicated the greatest relationship to the criterion, .4327. The addition of the differentially weighted CWMST increased the correlation to .4803, and the addition of HRSPRD improved the relationship to .5114.

Part II National Board Dental Examination

Part II of the National Board Dental Examination, which was taken at the conclusion of the senior year in dental school, tests the student's knowledge in the clinical aspects of his career.

Table II presents predictor variables selected by the step-wise regression program. DATACD was the first variable selected. This variable combined the student's scores on all academic sections of the Dental Aptitude Test, which includes his knowledge in both science and non-science areas. The additional variables selected increased the correlation only from .3887 to .4469. The student's age at the time he entered dental school was the only non-differentially weighted variable among these.

Analysis of Predictor Variables Which Correlate Most Significantly With Ten Criteria Variables for Developmental Group

An analysis was made of the six variables selected as being most significant in the prediction of each criterion. Although the data was of interest to an admissions committee, it was of minimal value in its current form to help select students for dental school. For example, a student might present the best credentials on one variable, the second best credentials on a second

TABLE 10

THE RELATIONSHIP BETWEEN PREDICTOR VARIABLES AND THE STUDENTS AVERAGE SCORE ON PART I NATIONAL BOARD DENTAL EXAMINATIONS FOR THE DEVELOPMENTAL GROUP AS COMPUTED BY THE STEP-WISE MULTIPLE REGRESSION PROGRAM

Regression Step	Predictor Variables	Step-wise Multiple Correlations with Part I National Board Dental Examination
1	DATSCI	.4327
2	CWMST*	.4803
3	HRSPRD	.5114
4	DATACD	.5229
5	CWDAAF*	.5331
6	DATVER	.5365

* Indicates a differentially weighted variable

TABLE 11

THE RELATIONSHIP BETWEEN PREDICTOR VARIABLES AND THE STUDENT'S AVERAGE SCORE ON PART II NATIONAL BOARD DENTAL EXAMINATIONS FOR THE DEVELOPMENTAL GROUP AS COMPUTED BY THE STEP-WISE MULTIPLE REGRESSION PROGRAM

Regression Step	Predictor Variables	Step-wise Multiple Correlations with Part II National Board Dental Examination
1	DATACD	.3887
2	CWMST*	.4061
3	AGE	.4220
4	SWMVF*	.4337
5	SMCATT*	.4391
6	DATAT*	.4469

* Indicates a differentially weighted variable

variable and the least credentials on another variable. Viewing the correlations in their current form did not provide an admissions committee with a convenient method to rate the potential of one student over another.

A method of combining all of the predictor variables into a weighted composite which could be used as a Predictor of Success in Dental School (PSD) was needed. To arrive at such an optimally-weighted composite variable using multiple regression techniques, it was necessary first to choose a single criterion. An equal weighting of the grade point average at the end of the sophomore year in dental school and the student's score on Part I of the National Board Dental Examinations was selected as the new combined criterion to be predicted. The sophomore grade point average was selected as one of the criterion variables since it combined the student's academic ability in dental school with his ability in selected technical areas for approximately one half of his dental school education. Part I of the National Board Dental Examination was chosen since this variable provided a comparison of the student's ability to compete with students from other dental schools on the sciences, which are basic to successfully fulfilling the requirements necessary for a license to practice dentistry.

To equally weight the sophomore grade point average and Part I of the National Board Dental Examination prior to submitting this new criterion to the step-wise regression analysis, both the sophomore grade point average and Part I of the National Board Dental Examination were converted to standard scores. These two standard scores were then added. As might be expected, these combined criterion scores had a mean near zero (.0015). The standard deviation of 1.88 was not unexpected in view of the significant correlation .604 between

sophomore grade point average and Part I of the National Board Dental Examination.

The use of this new measure as the criterion in a regression analysis resulted in a formula which provided scores difficult for an admissions committee to interpret. Accordingly, the combined criteria scores were transformed through coding, so as to have a mean of ten and a standard deviation of two.

Predictor variables, which were consistently selected by the step-wise multiple regression program for their correlations with the ten criterion variables, were identified and stipulated as predictor variables for a step-wise regression equation with the newly-formed combined criterion. The multiple correlation between the six variables and the composite criterion was .5098. The first variable selected was DATACD with a correlation of .3872. The second variable selected was the differentially weighted SWMST. The addition of this variable, improved the correlation to .4653. By adding HRSPRD and DATMAN, the correlation increased to .4862 and .4931 respectively. Adding the fifth and sixth variables, DATSPR and DATSCI, only increased the multiple correlation .0167 from the .4931 arrived at after the fourth step of the regression equation.

Table 12 lists the correlations between the six predictor variables and the combined criterion.

Before deriving a final multiple regression equation for the developmental group, each of the six variables submitted to the step-wise multiple regression analysis with the combined criterion was reviewed to determine its value. It was decided that variables DATSPR and DATSCI could be eliminated from the final regression equation since the addition of these two variables increased the multiple correlation only .0167 from the .4931 of the first four variables selected by the step-wise multiple regression statistical procedure.

TABLE 12

RELATIONSHIP BETWEEN SELECTED PREDICTOR VARIABLES AND THE COMBINED CRITERION VARIABLES SOPHOMORE GRADE POINT AVERAGE AND PART I NATIONAL BOARD DENTAL EXAMINATIONS FOR THE DEVELOPMENTAL GROUP

Regression Step	Predictor Variables	Step-wise Correlations with Combined Criterion Variable
1	DATACD	.3872
2	SWMST*	.4653
3	HRSPRD	.4862
4	DATMAN	.4931
5	DATSPR	.5022
6	DATSCI	.5098

* Indicates a differentially weighted Predictor Variable

The four variables which contributed the most to the multiple correlation were selected as predictors for the combined criterion of Sophomore Grade Point Average in Dental School and Part I of the National Board Dental Examination for the Developmental group which entered the University of Illinois Dental School during 1965 and 1966. The .4931 multiple correlation was significant at the .005 level of confidence for Predicting Success in Dental School for the developmental group (PSD), based upon the combined criterion.[1]

The multiple regression prediction equation which resulted from this analysis was:

$$Y = a + b_1 (X_1) + b_2 (X_2) + b_3 (X_3) + b_4 (X_4)$$

where $a = -.74945$, $b_1 = .40589$, $b_2 = .54798$, $b_3 = .11285$, $b_4 = .30515$ and X_1 = HRSPRD, X_2 = DATACD, X_3 = DATMAN, X_4 = SWMST

This equation was designated as a new predictor variable to be included with all other predictor variables in the cross validation study.

Cross Validation Analysis

The weights from the multiple regression equation which were developed for use in predicting the success of students in dental school were optimal for the group which entered the college of dentistry during 1965 and 1966. The

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[1]Helen M. Walker, Joseph Lev, Elementary Statistical Methods (Belmont, Calif: Wadsworth Publishing Co., Inc., 1962), p. 272. (New York: Holt, Rinehart and Winston, 1958), p. 470.

question was how they would stand up when validated by means of a cross validation group.

> The test of how well a regression equation predicts a particular dependent variable is determined by using the beta weights obtained on one group to predict the dependent variable for a totally different group, not that from which the beta weights were obtained.[1]

The dependent variable for the cross validation study was the same combined criterion variable which had been developed for the final analysis of the developmental group.

All predictor variables used in the original analysis of the developmental group, plus the combined predictor variable developed from the final step-wise regression analysis of the developmental group, were submitted to the step-wise multiple regression analysis for the 178 students who entered the University of Illinois College of Dentistry during 1967 and 1968. The analysis in the cross validation study was restricted to selecting the single variable most significant in predicting potential success in dental school.

The single predictor variable selected as most significant in the cross-validation analysis was the Composite Variable which proved most successful in predicting how a student will perform in dental school and on the National Board Examinations for the developmental group. This variable, which combined a student's score on selected sections of the Dental Aptitude Test with the differentially weighted SWMST, produced a multiple correlation of .5331. The correlation was significant at the .005 level of confidence for the 178 students reviewed in the cross-validation analysis.

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[1]Albert B. Hood, "Predicting Achievement in Dental School," Journal of Dental Education, No. 27 (June 1963), p. 151.

The Composite Variable demonstrated its stability for predicting how students perform in completing the requirements for graduation from the University of Illinois College of Dentistry and in taking Part I and Part II of the National Board Dental Examinations. Although it is generally expected that the correlation with the criterion will decline somewhat on cross-validation analysis, the hope was that the decrease would be minor. In this case the correlation actually increased, which must be attributed either to chance or to increased reliability of the criterion.

CHAPTER VI

SUMMARY

This study, "Differentially Weighting of the Undergraduate Grade Point Average as a Method of Improving the Procedure for Selecting Students for Dental School", was designed to:

1. Explore variables which are used to predict academic excellence in dental school on a longitudinal basis

2. Introduce a method of differentially weighting the grade point average earned at various undergraduate institutions

3. Determine the value of this procedure in a longitudinal study in order to predict academic performance in dental school and on Part I and II of the National Board Dental Examinations

The null hypothesis of this study was that a differentially weighted undergraduate grade point average would not significantly improve the ability of the admissions committee to select students for the study of dentistry who would successfully complete academic requirements and perform at a higher level on the National Board Examinations. The statistical analyses of the data rejected the hypothesis. This study has shown that the inclusion of a predictor variable, which includes a differentially weighted undergraduate grade point average, was significant in improving the ability of an admissions committee to select students for the study of dentistry.

The population selected for this study was students who entered the University of Illinois College of Dentistry between September 1965 and

September 1968. The 159 students who entered the school during 1965 and 1966 were designated as the developmental group. The cross-validation analysis was performed on the 178 students who entered the college of dentistry during 1967 and 1968.

A review of each student's academic and biographic data was conducted and variables in Appendix A were selected as predictors. A method was developed to differentially weight the student's undergraduate grade point average so that students attending undergraduate institutions with highly competitive selection criteria would not be penalized in their attempts to gain admission to dental school, when compared with students who attended less selective institutions. Each predictor variable was used in a step-wise multiple regression procedure with each of ten criterion variables. Criterion variables included the student's cumulative grade point average for each of his four years in dental school, his percentile rank for each of the four years, his average score on Part I of the National Board Dental Examination, which was given at the conclusion of the sophomore year in dental school, and his average score on Part II of the National Boards, which was administered upon graduation.

The U.C.L.A. Biomedical Computer Program BMDO2R was selected to compute a six-step multiple regression analysis for each criterion variable.

Predictor variables which appeared to be significant in the analysis of each criterion for the developmental group were identified. Knowing that certain variables were related to success in dental school would be useful to those making admissions decisions. This information alone would not, however, lend itself to a convenient, consistent method of evaluating each student's potential for success in dental school. Instead, a method was needed which

would permit the admissions committee to rank students on the basis of a combination of relevant predictor variables.

A single criterion was developed by combining factors which appeared to be essential in predicting which students would be successful on a longitudinal basis. The criterion selected combined, on an equal weighting, the sophomore cumulative grade point average and the student's average score on Part I of the National Board Dental Examinations.

The step-wise regression analysis was repeated for the developmental group, using as a criterion, this combined criterion, and as predictors, the six predictor variables which had been identified in the analysis of the ten separate criterion variables. Analysis of the data indicated a multiple correlation of .5098 between the six variables and the combined criterion. This relationship was significant at the .005 level of confidence. A review of the variables indicated that the fifth (DATSPR) and sixth (DATSCI) variables selected, increased the correlation only .0167. The remaining four variables selected from the regression analysis produced a combined multiple correlation of .4931. These variables, DATACD, SWMST, HRSPRD, DATMAN were selected as predictors of success in dental school for this study. A multiple regression equation was developed assigning weights to each variable according to its value. The following formula was designated as the combined predictor variable:

$$Y = -.74945 + .40589\ (HRSPRD) + .54798\ (DATACD) + .11285\ (DATMAN$$

$$+ 30505\ (SWMST)$$

The stability of this formula was tested in a cross-validation analysis with the 178 students who entered the University of Illinois College of Dentistry

during 1967 and 1968.

The step-wise multiple regression program was limited to selecting the single most important variable for predicting the combined criterion. The composite predictor prepared from the analysis of the developmental group was selected. The multiple correlation of .5331 proved significant at the .005 level of confidence for the cross-validation group.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The null hypothesis of this study was that a differentially weighted undergraduate grade point average would not significantly improve the ability of the admissions committee to select students for the study of dentistry who would successfully complete academic requirements and perform at a higher level on the National Board Examinations.

This hypothesis was developed as a result of theoretical views received from students, educators, and admissions office personnel concerning the relative difficulty of grading systems at various colleges and its effects on a student's potnetial for admission to the University of Illinois College of Dentistry.

Variables pertinent to the hypothesis were investigated through a step-wise multiple regression analysis. A review of the statistical data supported the rejection of the null hypothesis.

A predictor variable which included a differentially weighted under-graduate grade point average was a significant factor in predicting grade point averages of dental students for their freshman, sophomore, and junior years for the developmental group.

A differentially weighted undergraduate grade point average was the first predictor variable selected by the step-wise multiple regression program for predicting the percentile rank for dental students at each level of the dental

school experience for the developmental group.

A predictor variable which differentially weighted the undergraduate grade point average was the second most significant variable selected to predict a student's success on Part I and Part II of the National Board Dental Examinations for the developmental group.

The differentially weighted variable (SWMST) was included in the optimum prediction formula used to select students for the study of dentistry who will successfully complete academic requirements and perform at a higher level on the National Board Examinations. The resulting formula, with a multiple correlation of .4931 was significant at the .005 level of confidence for the 159 students in the developmental group who entered the University of Illinois College of Dentistry during 1965 and 1966.

The stability of this formula, which predicted how applicants would perform in dental school and on the National Board Examinations, was tested in a cross-validation analysis with the 178 students who entered the University of Illinois College of Dentistry during 1967 and 1968. The rejection of the null hypothesis was substantiated. The prediction formula produced a multiple correlation of .5331, which was significant at the .005 level of confidence.

The ultimate conclusion of this study was that the optimum predictor variable would be immediately useful to the University of Illinois College of Dentistry Admissions Committee.

In order to review the application of each candidate for a place in the class, on an objective and consistent basis with every other applicant, an admissions committee must establish procedures which guarantee that places in the class will be available throughout the selection period. In order to meet

this criterion, the committee must be provided with a convenient method of assessing the academic potential for each student in relation to every other applicant for a place in the class.

A method to accomplish this goal was to collect data on the four variables, HRSPRD, DATACD, DATMAN, and SWMST for each student. The variables were weighted according to the formula:

$$Y = .74945 + .40589\ (HRSPRD) + .54798\ (DATACD) + .11285\ (DATMAN) + .30515\ (SWMST).$$

A single index entitled Prediction of Success in Dental School (PSD), can be computed for each applicant. Students can be ranked according to their PSD. The admissions committee may be provided with the range and the mean PSD of all applicants who were offered a place in the preceeding class. The committee may use this data to guide their deliberations in determining what PSD will be necessary to receive an immediate offer for a place in the class, which candidates should be immediately informed that they will not be offered a place, and which candidates' applications should be retained for further review.

Recommendations

Based upon the analyses of the data, the following recommendations are proposed:

1. That admissions committees of Colleges of Dentistry include the composite predictor variable, Prediction of Success in Dental School (PSD), in their procedure for selecting students.

2. A parallel analysis should be conducted between current methods to select students and the PSD method.

3. That appropriate persons at each undergraduate institution, which

provides applicants to the Colleges of Dentistry, be supplied with the reasons why admissions committees include a differential weighting of the grade point average.

4. That as the PSD method of selecting students for dental school is adopted, appropriate persons at each undergraduate college by given the current weightings assigned to their science department for use by their faculty in curriculum studies and in counseling students.

5. That an annual evaluation be made of the weighting procedure, and proper adjustments made if indicated.

6. That dental school admissions committees be encouraged to implement continuous research of their admission procedures in order to provide the most equitable system possible.

The use of this procedure by an admissions committee confronted with a large number of applications for a limited number of places in the college may improve its consistency and equity in selecting students.

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APPENDIX A

DEFINITIONS OF PREDICTOR VARIABLES

These variables are numbered according to various groupings rather than in numberial sequence.

Number of Variables	Abbrev-iation	Predictor Variable	Description For Coding
1	AGE	Age	Age of student at his last birthday
2	HRSPRD	Semester Hours of Predental College Education	Total Predental hours of credit, exclusive of physical education and/or R.O.T.C. 1. 30-60 semester hours 2. 61-90 semester hours 3. 91-128 semester hours 4. 129 semester hours and above
3	TYPCOL	Type of College where applicant earned the majority of predental credits	1. Junior or Community Coll. 2. Four year degree granting institution recognized by the appropriate regional accrediting agency
4	SMCATC	Science Score MCAT College	The science score reported for the undergraduate college attended by the applicant in the "Medical College Admission Test, Summary of Scores by Undergraduate College Attended."[1]

[1] "Medical College Admission Test, Summary of Scores by Undergraduate College Attended May, 1968 to October, 1971." Prepared for the Association of Medical Colleges, New York: The Psychological Corporation (1972).

Number of Variable	Abbrev-iation	Predictor Variable	Description For Coding
5	VMCATC	Verbal Score MCAT College	The verbal score reported for the undergraduate college attended by the applicant in the "Medical College Admission Test, Summary of Scores by Undergraduate College Attended."[1]
6	ADATCO	Academic Average on DAT for Predental College	The academic average score reported for the undergraduate college attended by the applicant in the "Predental School Analysis of 1968, Dental Aptitude Testing Program Participants."[2]
7	MDATCO	Manual Average on DAT for Predental College	The Manual average score reported for the undergraduate college attended by the applicant in the "Predental School Analysis of 1968, Dental Aptitude Testing Program Participants."[2]
8	PDCGPA	Predental Grade Point Average	The student's cumulative grade point average earned in all courses taken during his predental college education exclusive of physical education and R.O.T.C.
9	PDSGPA	Predental Science Grade Point Average	The student's cumulative grade point average earned in biology, zoology, physics, inorganic and organic chemistry

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[1] Ibid.

[2] "Predental School Analysis of 1968 Dental Aptitude Testing Program Participants." Division of Educational Measurements, Council on Dental Education, American Dental Association, Chicago, (1969).

Number of Variable	Abbrev-iation	Predictor Variable	Description For Coding
10	DATVER	Dental Aptitude Testing Program Verbal Reasoning Score	The student's score on the total verbal reasoning section of the Dental Aptitude Test
11	DATSCI	Dental Aptitude Testing Program Total Science Score	The student's score on the total science section of the Dental Aptitude Test
12	DATSPR	Dental Aptitude Testing Program Space Relations Score	The student's score on the space relations section of the Dental Aptitude Test
13	DATACD	Dental Aptitude Testing Program Academic Average	The student's cumulative average on the academic sections of the Dental Aptitude Test
14	DATMAN	Dental Aptitude Testing Program Manual Average	The student's cumulative average of the space relations and manual dexterity sections of the Dental Aptitude Test
30	SMCATT	Science MCAT College Thirty-Third percentile	An arbitrary science score based upon the thirty-third percentile of all scores reported for the undergraduate colleges attended by applicant was assigned to candidates who attended colleges without sufficient data on the MCAT examination.[1]

[1]"Medical College Admission Test, Summary of Scores by Undergraduate College Attended May, 1968 to October, 1971," (1972).

Number of Variable	Abbrev-iation	Predictor Variable	Description For Coding
33	SMCATF	Science MCAT College Fiftieth Percentile	An arbitrary science score based upon the fiftieth percentile of all scores reported for the undergraduate colleges attended by applicants was assigned to candidates who attended colleges without sufficient data on the MCAT examination.[1]
36	VMCATT	Verbal MCAT College Thirty-third Percentile	An arbitrary verbal score based upon the thirty-third percentile of all scores reported for the undergraduate colleges attended by applicants was assigned to candidates who attended colleges without sufficient data on the MCAT examination.[2]
39	VMCATF	Verbal MCAT College Fiftieth Percentile	An arbitrary verbal score based upon the fiftieth percentile of all scores reported for the undergraduate colleges attended by the applicants was assigned to candidates who attended colleges without sufficient data on the MCAT examination.[3]

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[1]"Medical College Admission Test, Summary of Scores by Undergraduate College Attended May, 1968 to October, 1971," (1972).

[2]Ibid.

[3]Ibid.

Number of Variable	Abbrev-iation	Predictor Variable	Description For Coding
42	DATAT	Academic Average on DAT for Predental College Thirty-third Percentile	An arbitrary score on the academic section of the DAT, based upon the thirty-third percentile of all scores reported for the undergraduate colleges attended by applicants was assigned to candidates who attended colleges without sufficient data on the DAT examination.[1]
45	DATAF	Academic Average on DAT for Predental College Fiftieth Percentile	An arbitrary score on the academic section of the DAT, based upon the fiftieth percentile of all scores reported for the undergraduate colleges attended by applicants, was assigned to candidates who attended colleges without sufficient data on the DAT examination.[2]
48	DATMT	Manual Average on DAT for Predental College Thirty-third Percentile	An arbitrary score on the manual section of the DAT, based upon the thirty-third percentile of all scores reported for the undergraduate colleges attended by applicants, was assigned to candidates who attended colleges without sufficient data on the DAT examination.[3]

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[1]"Predental School Analysis of 1968 Dental Aptitude Testing Program Participants," (1969).

[2]Ibid.

[3]Ibid.

Number of Variable	Abbrev-iation	Predictor Variable	Description For Coding
51	DATMF	Manual Average on DAT for Predental College Fiftieth Percentile	An arbitrary score on the manual section of the DAT, based upon the fiftieth percentile of all scores reported for the undergraduate colleges attended by applicants, was assigned to candidates who attended colleges without sufficient data on the DAT examination[1]

Summary:

Science Score Weighting — Differentially Weighted Variables

A weighting was applied to the science program at the predental college attended by the student.

The formula that was developed multiplied either the cumulative predental grade point average (C), or the predental science grade point average (S), times the science score reported for the college in the "Medical College Admission Test, Summary of Scores by Undergraduate College Attended."[2]

Applicants who attended a predental college for which there was insufficient Medical College Admission Test data available, were assigned two differential weightings:

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[1]"Predental School Analysis of 1968 Dental Aptitude Testing Program Participants," (1969).

[2]"Medical College Admission Test, Summary of Scores by Undergraduate College Attended May, 1968 to October, 1971," (1972).

1. A weighting at the thirty-third percentile (T) of all schools reporting data for this study

2. A weighting at the mean (F) for all schools reporting data for the study

Weighted G.P.A. = Cumulative predental G.P.A. x the science score reported for the students' predental college on the Medical College Admission Test.[1]

Number of Variable	Abbreviation	Definition for Coding
31	CWMST	1. The thirty-third percentile was computed for colleges without sufficient data
34	CWMSF	2. The fiftieth percentile was computed for colleges without sufficient data

Weighted G.P.A. = Predental science G.P.A. x the science score reported for the students predental college on the Medical College Admission Test.[2]

32	SWMST	1. The thirty-third percentile was computed for colleges without sufficient data
35	SWMSF	2. The fiftieth percentile was computed for colleges without sufficient data

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[1]"Medical College Admission Test, Summary of Scores by Undergraduate College Attended May, 1968 to October, 1971," (1972).

[2]Ibid.

Summary:

Verbal Score Weighting

A weighting was applied to the verbal scores earned by students at the predental college attended by each student.

The formula for this weighting multiplied either the cumulative predental grade point average (C) or the predental science grade point average (S) times the verbal score reported for the college in the "Medical College Admission Test, Summary of Scores by Undergraduate College Attended."[1]

Applicants who attended a predental college for which there was insufficient Medical College Admission Test data available were assigned two differential weightings:

1. A weighting at the thirty-third percentile (T) of all schools reporting data for this study

2. A weighting at the mean (F) for all schools reporting data for the study

Weighted G.P.A. = Cumulative predental G.P.A. x the Verbal score reported for the student's predental college on the Medical College Admission Test[2]

37	CWVMST	1. The thirty-third percentile was computed for colleges without sufficient data
40	CWVMSF	2. The fiftieth percentile was computed for colleges without sufficient data

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[1]"Medical College Admission Test, Summary of Scores by Undergraduate College Attended May, 1968 to October, 1971," (1972).

[2]Ibid.

Weighted G.P.A. = Predental science G.P.A. x the Verbal score reported for the student's predental college on the Medical College Admission Test.[1]

38	SWVMST	1. The thirty-third percentile was computed for colleges without sufficient data 2. The fiftieth percentile was computed for colleges without sufficient data

Summary:

Academic Score

A weighting was applied to the academic program by the predental college attended by each student by multiplying either the cumulative predental grade point average (C) or the predental science grade point average (S) times the academic score on the Dental Aptitude Test as reported for the predental college attended by each student in the "Predental School Analysis of 1968 Dental Aptitude Testing Program Participants."[2]

Applicants who attended a predental college for which there was insufficient Dental Aptitude Test data were assigned two differential weightings.

1. A weighting at the thirty-third percentile (T), of all schools reporting data for this study
2. A weighting at the mean (F), of all schools reporting data for the study

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[1]"Medical College Admission Test, Summary of Scores by Undergraduate College Attended May, 1968 to October, 1971," (1972).

[2]"Predental School Analysis of 1968 Dental Aptitude Testing Program Participants," (1969).

Weighted G.P.A. = Cumulative predental G.P.A. x the Academic score reported for the student's predental college on the Dental Aptitude Test.[1]

43	CWDAST	1. The thirty-third percentile was computed for the colleges without sufficient data
46	CWDASF	2. The fiftieth percentile was computed for the colleges without sufficient data

Weighted G.P.A. = Predental science G.P.A. x the Academic score reported for the student's predental college on the Dental Aptitude Test.[2]

44	SWDAST	1. The thirty-third percentile was computed for colleges without sufficient data
47	SDWASF	2. The fiftieth percentile was computed for colleges without sufficient data

Summary:
Manual Dexterity Score Weighting

A weighting was applied to the manual dexterity portion of the Dental Aptitude Test reported for the undergraduate college attended by each applicant in the "Predental School Analysis of 1968, Dental Aptitude Testing Program Participants." The weighting was assigned by multiplying either the cumulative predental grade point average (C) or the predental science grade point average (S) times the manual score on the Dental Aptitude Test reported for the college.

Applicants who attended a college for which there was insufficient Dental Aptitude Test data were assigned two differential weightings.

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[1]"Predental School Analysis of 1968 Dental Aptitude Testing Program Participants," (1969).

[2]Ibid.

1. A weighting of the thirty-third percentile (T) of all schools reporting data for the study

2. A weighting at the fiftieth percentile (F) of all schools reporting data for the study

Weighted G.P.A. = Cumulative predental G.P.A. x the score reported on the Manual Dexterity section of the Dental Aptitude Test for the student's predental college[1]

49	CWDAMT	1. The thirty-third percentile was computed for colleges without sufficient data
52	CWDAMF	2. The fiftieth percentile was computed for colleges without sufficient data

Weighted G.P.A. = Predental science G.P.A. x the score reported on the Manual Dexterity section of the Dental Aptitude Test for the student's predental college[2]

50	SWDAMT	1. The thirty-third percentile was computed for colleges without sufficient data
53	SDWAMF	2. The fiftieth percentile was computed for colleges without sufficient data

Summary:

Combined Predictor Variable	Weighted predictor variable used in the cross-validation analysis as prepared from a review of all predictor variables used in the step-wise multiple regression analyses of criteria variables for the developmental group

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[1]"Predental School Analysis of 1968 Dental Aptitude Testing Program Participants," (1969).

[2]Ibid.

58	COMB	Y = - .74945 + .40589 (HRSPRD) + .54798 (DATACD) + .11285 (DATMAN) + .30515 (SWMST)

APPENDIX B

DEFINITIONS OF CRITERION VARIABLES

Number of Variables	Abbrev-iation	Criterion Variable	Description For Coding
15	FREGPA	Freshman Grade Point Average	Cumulative Grade Point Average in Dental School
16	FRERANK	Freshman Rank in Class	The student's numerical rank in class
17	FRMODR	Freshman Percentile Rank	The student's percentile rank in class
18	SOPGPA	Sophomore Grade Point Average	Cumulative Grade Point Average in Dental School
19	SORANK	Sophomore Rank in Class	The student's numerical rank in class
20	SOMODR	Sophomore Percentile Rank	The student's percentile rank in class
21	JUNGPA	Junior Grade Point Average	Cumulative Grade Point Average in Dental School
22	JRRANK	Junior Rank in Class	The student's numerical rank in class
23	JRMODR	Junior Percentile Rank	The student's percentile rank in class
24	SENGPA	Senior Grade Point Average	Cumulative grade point average in Dental School

25	SRRANK	Senior Rank in Class	The student's numerical rank in class
26	SRMODR	Senior Percentile Rank	The student's percentile rank in class
27	NATBDI	Part I National Board Dental Examination	The student's average score on Part I of the National Board Dental Examination taken at the completion of the sophomore year in dental school
28	NATBDII	Part II National Board Dental Examination	The student's average score on Part II of the National Board Dental Examination taken at the completion of graduation requirements
29	ACPROG	Academic Progress in Dental School	Three categories are included in this variable: 1. The student meets all graduation requirements within four academic years 2. The student graduates in more than four years. 3. The student fails to graduate

54	SOGPAZ	Standard Score For Sophomore Grade Point Average Criteria	A standard score assigned to the sophomore grade point average criterion in order to give it an equal weighting for developing a combined criterion
55	NATBIZ	Standard Score For Part I of The National Board Dental Examination	A standard score assigned to Part I of the National Board Dental Examination in order to give it an equal weighting for developing a combined criterion
56	COMBIZ	Combined Criterion Variable	A combined criterion variable developed by giving an equal weighting to SOGPAZ and NATBIZ. This variable was used as the final criterion for the developmental group and for the cross-validation analysis

TABLE 13

MEAN AND STANDARD DEVIATION OF PREDICTOR VARIABLES, DEVELOPMENTAL GROUP STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY DURING 1965 AND 1966

Predictor Variable	Mean	Standard Deviation
ACE	2.15406	0.23296
HRSPRD	2.59748	0.71263
TYPCOL	1.93711	0.24354
SMCATC	4.95644	1.37467
VMCATC	4.78267	1.33247
ADATCO	2.79218	1.86532
MDATCO	2.56707	1.68209
PDCGPA	3.85150	0.34127
PDSGPA	3.92402	0.35355
DATVER	4.92453	1.74131
DATSCI	5.24528	1.64476

TABLE 13

MEAN AND STANDARD DEVIATION OF PREDICTOR VARIABLES, DEVELOPMENTAL GROUP STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY DURING 1965 AND 1966

Predictor Variable	Mean	Standard Deviation
DATSPR	5.16981	1.98475
DATACD	5.06289	1.25125
DATMAN	5.14465	1.50876
SMCATT	5.29889	0.24771
CWMST	20.39449	1.88996
SWMST	20.78223	1.99706
SMCATF	5.31600	0.23087
CWMSF	20.46359	1.89881
SWMSF	20.85228	2.00293
VMCATT	5.11819	0.26452
CWVMST	19.69464	1.83274

TABLE 13

MEAN AND STANDARD DEVIATION OF PREDICTOR VARIABLES, DEVELOPMENTAL GROUP STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY DURING 1965 AND 1966

Predictor Variable	Mean	Standard Deviation
SWVMST	20.06650	1.90561
VMCATF	5.13497	0.25441
CWVMSF	19.76234	1.85212
SWVMSF	20.13513	1.92217
DATAT	3.80475	0.56896
CWDAST	14.63000	2.43291
SWDAST	14.91743	2.57054
DATAF	3.85535	0.54680
CWDASF	14.82524	2.36953
SWDASF	15.11538	2.50111
DATMT	3.65771	0.36740

TABLE 13

MEAN AND STANDARD DEVIATION OF PREDICTOR VARIABLES, DEVELOPMENTAL GROUP STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY DURING 1965 AND 1966

Predictor Variable	Mean	Standard Deviation
CWDAMT	14.06372	1.70719
SWDAMT	14.33128	1.76500
DATMF	3.74499	0.41654
CWDAMF	14.40020	1.89828
SWDAMF	14.67243	1.93989

TABLE 14

MEAN AND STANDARD DEVIATION OF CRITERIA VARIABLES, DEVELOPMENTAL GROUP STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY DURING 1965 AND 1966

Predictor Variable	Mean	Standard Deviation
FREGPA	3.60390	0.50356
FRRANK	4.76028	2.40893
FRMODR	0.54710	0.27714
SOPGPA	3.54516	0.42588
SORANK	4.52317	2.28813
SOMODR	0.53748	0.27137
JUNGPA	3.58213	0.35704
JRRANK	4.27601	2.33029
JRMODR	0.52132	0.28140
SENGPA	3.66138	0.33403
SRRANK	4.43009	2.22865

TABLE 14

MEAN AND STANDARD DEVIATION OF CRITERIA VARIABLES, DEVELOPMENTAL GROUP STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY DURING 1965 AND 1966

Predictor Variable	Mean	Standard Deviation
SRMODR	0.53810	0.26786
NATBDI	0.85672	0.03333
NATBII	0.85389	0.03436
ACPROG	1.04402	0.20580
COMBINED CRITERION	10.00148	2.00007

TABLE 15

MEAN AND STANDARD DEVIATION OF PREDICTOR VARIABLES, CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
DURING 1967 AND 1968

Predictor Variable	Mean	Standard Deviation
ACE	2.20503	0.22954
HRSPRD	2.78652	0.81610
TYPCOL	1.91573	0.27857
SMCATC	4.57312	1.86590
VMCATC	4.43294	1.81292
ADATCO	2.41677	1.99491
MDATCO	2.29120	1.88268
PDCCPA	3.85223	0.36062
PDSGPA	3.90509	0.40887
DATVER	4.21348	1.98849
DATSCI	4.87079	1.81646

TABLE 15

MEAN AND STANDARD DEVIATION OF PREDICTOR VARIABLES, CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
DURING 1967 AND 1968

Predictor Variable	Mean	Standard Deviation
DATSPR	4.35393	1.81439
DATACD	4.69101	1.31054
DATMAN	4.67416	1.51283
SMCATT	5.26833	0.24834
CWMST	20.28436	2.01835
SWMST	20.55791	2.21824
SMCATF	5.30307	0.21645
CWMSF	20.42480	2.04372
SWMSF	20.70372	2.27566
VMCATT	5.11410	0.26273
CWVMST	19.69244	2.01360

TABLE 15

MEAN AND STANDARD DEVIATION OF PREDICTOR VARIABLES, CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
DURING 1967 AND 1968

Predictor Variable	Mean	Standard Deviation
SWVMST	19.95522	2.17748
VMCATF	5.14815	0.24098
CWVMSF	19.83005	2.05034
SWVMSF	20.09808	2.24566
DATAT	3.79317	0.47813
CWDAST	14.60911	2.29332
SWDAST	14.80905	2.41253
DATAF	3.86194	0.44201
CWDASF	14.87519	2.20650
SWDASF	15.08220	2.35222
DATMT	3.77371	0.35032

TABLE 15

MEAN AND STANDARD DEVIATION OF PREDICTOR VARIABLES, CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
DURING 1967 AND 1968

Predictor Variable	Mean	Standard Deviation
CWDAMT	14.53331	1.88136
SWDAMT	14.72713	1.97850
DATMF	3.89236	0.37900
CWDAMF	14.99189	2.01196
SWDAMF	15.19792	2.16148
COMPOSITE PREDICTOR	9.75275	1.06791

TABLE 16

MEAN AND STANDARD DEVIATION OF CRITERIA VARIABLES, CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
DURING 1967 AND 1968

Predictor Variable	Mean	Standard Deviation
FREGPA	3.62835	0.49052
FRRANK	4.89484	2.67209
FRMODR	0.52350	0.28568
SOPGPA	3.54397	0.43678
SORANK	4.77349	2.67164
SOMODR	0.51325	0.28726
JUNGPA	3.65240	0.38532
JRRANK	4.69034	2.58983
JRMODR	0.51513	0.28431
SENGPA	3.78138	0.35161
SRRANK	4.72124	2.57969

TABLE 16

MEAN AND STANDARD DEVIATION OF CRITERIA VARIABLES, CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
DURING 1967 AND 1968

Predictor Variable	Mean	Standard Deviation
SRMODR	0.52160	0.28415
NATBDI	0.85157	0.03220
NATBII	0.84685	0.03848
ACPROG	1.01124	0.10570
COMBINED CRITERION	9.99908	2.00002

TABLE 17

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES, DEVELOPMENTAL GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1965 AND 1966

Variable Number	1	2	3	4	5	6	7	8	9	10
1	1.000	0.475	-0.074	-0.164	-0.164	-0.302	-0.291	-0.073	0.078	-0.152
2		1.000	0.181	0.115	0.122	-0.112	-0.112	-0.223	-0.170	0.077
3			1.000	0.835	0.833	0.343	0.325	-0.137	-0.107	0.123
4				1.000	0.993	0.484	0.479	-0.168	-0.142	0.097
5					1.000	0.473	0.470	-0.179	-0.159	0.108
6						1.000	0.980	-0.046	0.003	0.160
7							1.000	-0.052	-0.011	0.139
8								1.000	0.804	0.085
9									1.000	-0.072
10										1.000

TABLE 17

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES, DEVELOPMENTAL GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1965 AND 1966

Variable Number	11	12	13	14	15	16	17	18	19	20
1	-0.152	-0.131	-0.198	-0.021	-0.048	-0.073	-0.072	0.050	-0.090	-0.083
2	-0.083	-0.032	0.007	0.025	0.064	0.078	0.079	0.083	0.023	0.030
.3	-0.024	-0.096	0.096	-0.061	0.089	0.077	0.079	0.083	0.044	0.050
4	-0.003	0.008	0.098	0.030	0.092	0.091	0.093	0.086	0.064	0.072
5	-0.002	0.005	0.103	0.026	0.073	0.068	0.070	0.073	0.051	0.058
6	0.202	0.077	0.241	-0.070	0.045	0.063	0.062	0.016	0.070	0.068
7	0.188	0.086	0.216	-0.055	0.035	0.055	0.054	0.002	0.059	0.058
8	0.108	-0.330	0.092	-0.331	0.211	0.189	0.18	0.229	0.233	0.226
9	0.121	-0.290	-0.025	-0.264	0.245	0.232	0.229	0.262	0.239	0.231
10	0.457	0.187	0.720	0.108	0.091	0.048	0.048	0.157	0.172	0.170

TABLE 17

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES DEVELOPMENTAL GROUP*
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1965 AND 1966

Variable Number	11	12	13	14	15	16	17	18	19	20
11	1.000	0.121	0.771	0.003	0.222	0.210	0.209	0.226	0.258	0.253
12		1.000	0.230	0.791	0.121	0.126	0.129	0.089	0.094	0.103
13			1.000	0.112	0.211	0.171	0.171	0.256	0.277	0.276
14				1.000	0.211	0.219	0.222	0.195	0.178	0.188
15					1.000	0.961	0.961	0.918	0.911	0.918
16						1.000	1.000	0.841	0.885	0.891
17							1.000	0.841	0.882	0.890
18								1.000.	0.937	0.943
19									1.000	0.997
20										1.000

TABLE 17

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-DEVELOPMENTAL GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1965 AND 1966

Variable Number	21	22	23	24	25	26	27	28	29	30
1	-0.000	-0.045	-0.043	0.013	-0.047	-0.046	-0.033	0.012	0.346	-0.312
2	0.036	-0.006	0.008	0.002	-0.041	-0.026	0.093	0.044	-0.008	0.002
3	0.071	0.037	0.049	0.024	-0.003	0.010	0.021	0.067	-0.071	0.319
4	0.060	0.023	0.039	0.025	0.000	0.015	0.076	0.096	-0.096	0.533
5	0.053	0.017	0.032	0.018	-0.008	0.007	0.069	0.098	-0.078	0.517
6	0.004	0.013	0.008	-0.048	0.008	0.002	0.108	0.036	-0.198	0.601
7	-0.011	-0.009	-0.012	-0.060	-0.009	-0.011	0.105	0.025	-0.216	0.537
8	0.266	0.250	0.237	0.257	0.243	0.229	0.216	0.128	0.086	-0.177
9	0.244	0.218	0.202	0.230	0.214	0.197	0.168	0.029	0.074	-0.131
10	0.090	0.109	0.105	0.013	0.040	0.036	0.267	0.280	-0.061	0.238

TABLE 17

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES, DEVELOPMENTAL GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1965 AND 1966

Variable Number	21	22	23	24	25	26	27	28	29	30
11	0.132	0.136	0.131	0.086	0.076	0.067	0.433	0.302	0.144	0.237
12	0.052	0.025	0.040	0.030	0.022	0.039	-0.060	0.004	-0.080	0.051
13	0.171	0.180	0.181	0.114	0.096	0.095	0.428	0.389	-0.085	0.271
14	0.165	0.122	0.141	0.155	0.118	0.139	-0.077	-0.012	-0.061	0.033
15	0.856	0.809	0.828	0.794	0.770	0.786	0.524	0.352	0.204	0.107
16	0.768	0.755	0.774	0.705	0.706	0.722	0.463	0.257	-0.284	0.100
17	0.768	0.750	0.772	0.703	0.702	0.721	0.464	0.261	-0.283	0.103
18	0.947	0.883	0.902	0.882	0.835	0.851	0.604	0.485	-0.097	0.093
19	0.908	0.927	0.932	0.843	0.866	0.868	0.592	0.432	-0.243	0.102
20	0.912	0.916	0.932	0.842	0.857	0.869	0.599	0.444	-0.026	0.112

TABLE 17

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES - DEVELOPMENTAL GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1965 AND 1966

Variable Number	21	22	23	24	25	26	27	28	29	30
21	1.000	0.939	0.956	0.956	0.914	0.927	0.562	0.463	-0.120	0.057
22		1.000	0.990	0.903	0.943	0.930	0.529	0.435	-0.107	0.030
23			1.000	0.912	0.936	0.942	0.547	0.460	-0.127	0.050
24				1.000	0.919	0.925	0.504	0.425	-0.079	0.006
25					1.000	0.991	0.478	0.379	-0.100	0.038
26						1.000	0.492	0.400	-0.118	0.056
27							1.000	0.659	-0.117	0.180
28								1.000	0.065	0.154
29									1.000	-0.214
30										1.000

TABLE 17

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-DEVELOPMENTAL GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1965 AND 1966

Variable Number										
1	-0.230	-0.089	-0.303	-0.210	-0.070	-0.278	-0.225	-0.087	-0.261	-0.203
2	-0.216	-0.165	-0.032	-0.232	-0.180	0.034	-0.196	-0.148	0.005	-0.211
3	0.038	0.063	0.111	-0.077	-0.048	0.238	0.007	0.032	0.042	-0.109
4	0.116	0.132	0.303	-0.017	0.005	0.400	0.067	0.087	0.176	-0.066
5	0.098	0.110	0.287	-0.034	-0.017	0.456	0.088	0.102	0.235	-0.045
6	0.265	0.301	0.533	0.209	0.247	0.470	0.225	0.265	0.389	0.167
7	0.226	0.256	0.462	0.169	0.202	0.420	0.190	0.223	0.336	0.132
8	0.866	0.666	-0.149	0.885	0.687	-0.209	0.834	0.646	-0.181	0.850
9	0.701	0.874	-0.105	0.719	0.892	-0.194	0.654	0.841	-0.170	0.669
10	0.204	0.051	0.239	0.195	0.042	0.267	0.233	0.081	0.263	0.222

TABLE 17

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-DEVELOPMENTAL GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1965 AND 1966

Variable Number	31	32	33	34	35	36	37	38	39	40
11	0.222	0.230	0.268	0.228	0.236	0.221	0.226	0.238	0.242	0.231
12	-0.288	-0.244	0.055	-0.289	-0.245	0.035	-0.291	-0.250	0.037	-0.289
13	0.225	0.111	0.277	0.217	0.103	0.271	0.242	0.127	0.268	0.232
14	-0.298	-0.230	0.028	-0.302	-0.235	0.006	-0.307	-0.243	0.000	-0.310
15	0.260	0.285	0.093	0.247	0.273	-0.002	0.202	0.231	-0.022	0.189
16	0.235	0.270	0.086	0.222	0.259	-0.027	0.168	0.207	-0.047	0.155
17	0.234	0.268	0.088	0.221	0.256	-0.025	0.166	0.204	-0.046	0.153
18	0.272	0.295	0.079	0.260	0.285	0.015	0.232	0.259	-0.003	0.219
19	0.279	0.278	0.096	0.271	0.271	0.025	0.242	0.244	0.014	0.233
20	0.277	0.275	0.105	0.268	0.267	0.032	0.239	0.240	0.019	0.229

TABLE 17

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-DEVELOPMENTAL GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1965 AND 1966

Variable Number	31	32	33	34	35	36	37	38	39	40
21	0.289	0.261	0.046	0.280	0.253	0.011	0.265	0.240	-0.002	0.256
22	0.260	0.224	0.027	0.255	0.221	-0.006	0.243	0.209	-0.011	0.238
23	0.257	0.219	0.044	0.251	0.214	0.008	0.238	0.202	0.000	0.231
24	0.253	0.222	-0.001	0.248	0.218	-0.035	0.231	0.202	0.042	0.225
25	0.256	0.222	0.043	0.255	0.223	-0.004	0.237	0.205	-0.003	0.235
26	0.251	0.216	0.058	0.248	0.214	0.007	0.229	0.196	0.006	0.225
27	0.299	0.244	0.180	0.291	0.236	0.124	0.278	0.226	0.117	0.268
28	0.202	0.102	0.145	0.191	0.092	0.149	0.208	0.108	0.136	0.196
29	-0.028	-0.040	-0.213	-0.018	-0.029	-0.014	0.020	0.004	-0.093	0.030
30	0.338	0.366	0.968	0.285	0.315	0.807	0.285	0.320	0.746	0.230

TABLE 17

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES DEVELOPMENTAL GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1965 AND 1966

Variable Number	31	32	33	34	35	36	37	38	39	40
31	1.000	0.822	0.347	0.991	0.815	0.211	0.944	0.781	0.205	0.930
32		1.000	0.373	0.812	0.992	0.215	0.754	0.948	0.206	0.740
33			1.000	0.326	0.354	0.790	0.301	0.335	0.787	0.279
34				1.000	0.823	0.173	0.941	0.776	0.198	0.945
35					1.000	0.179	0.753	0.945	0.199	0.756
36						1.000	0.362	0.366	0.972	0.321
37							1.000	0.820	0.372	0.991
38								1.000	0.373	0.811
39									1.000	0.362
40										1.000

TABLE 17

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-DEVELOPMENTAL GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1965 AND 1966

Variable Number	41	42	43	44	45	46	47	48	49	50
1	-0.067	-0.187	-0.208	-0.129	-0.153	-0.176	-0.094	0.010	-0.041	0.069
2	-0.163	-0.046	-0.158	-0.134	-0.029	-0.148	-0.122	0.080	-0.094	-0.060
3	-0.081	0.148	0.063	0.075	0.104	0.016	0.030	-0.142	-0.221	-0.194
4	-0.044	0.263	0.153	0.160	0.205	0.092	0.102	-0.012	-0.138	-0.119
5	-0.028	0.245	0.132	0.137	0.187	0.071	0.079	-0.023	-0.155	-0.140
6	0.209	0.598	0.513	0.522	0.482	0.403	0.418	0.015	-0.024	0.014
7	0.166	0.480	0.402	0.411	0.357	0.287	0.301	0.019	-0.030	0.001
8	0.633	-0.126	0.411	0.300	-0.130	0.431	0.315	-0.196	0.565	0.441
9	0.855	-0.064	0.360	0.460	-0.070	0.372	0.476	-0.171	0.438	0.586
10	0.071	0.179	0.209	0.120	0.168	0.198	0.106	0.057	0.106	-0.011

TABLE 17

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-DEVELOPMENTAL GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1965 AND 1966

Variable Number										
11	0.242	0.229	0.263	0.265	0.216	0.251	0.254	0.139	0.188	0.198
12	-0.250	0.137	-0.045	-0.023	0.137	-0.054	-0.031	0.202	-0.074	-0.050
13	0.118	0.264	0.285	0.217	0.247	0.268	0.199	0.133	0.153	0.067
14	-0.246	0.013	-0.151	-0.113	0.026	-0.148	-0.108	0.149	-0.114	-0.072
15	0.218	0.049	0.164	0.176	0.046	0.164	0.177	-0.006	0.151	0.171
16	0.194	0.050	0.152	0.169	0.044	0.148	0.166	-0.009	0.131	0.156
17	0.191	0.048	0.148	0.165	0.042	0.145	0.162	-0.009	0.129	0.153
18	0.246	0.051	0.179	0.192	0.052	0.184	0.197	0.007	0.176	0.197
19	0.235	0.039	0.168	0.168	0.031	0.164	0.164	-0.047	0.132	0.133
20	0.230	0.035	0.160	0.158	0.026	0.155	0.154	-0.046	0.128	0.128

TABLE 17

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-DEVELOPMENTAL GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1965 AND 1966

Variable Number	41	42	43	44	45	46	47	48	49	50
21	0.231	0.034	0.185	0.169	0.036	0.191	0.175	-0.019	0.184	0.165
22	0.205	0.032	0.174	0.155	0.033	0.178	0.159	-0.063	0.136	0.112
23	0.195	0.024	0.159	0.138	0.025	0.163	0.142	-0.057	0.131	0.105
24	0.197	-0.012	0.137	0.121	-0.005	0.148	0.132	-0.034	0.166	0.145
25	0.204	0.018	0.156	0.139	0.018	0.160	0.143	-0.053	0.138	0.116
26	0.193	0.010	0.140	0.122	0.010	0.145	0.126	-0.048	0.132	0.108
27	0.217	0.074	0.182	0.150	0.063	0.174	0.141	0.015	0.165	0.124
28	0.097	0.074	0.134	0.080	0.074	0.136	0.080	0.041	0.128	0.052
29	0.015	-0.086	-0.034	-0.039	-0.060	-0.006	-0.012	-0.051	0.029	0.022
30	0.267	0.714	0.561	01564	0.677	0.515	0.521	0.360	0.176	0.203

TABLE 17

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-DEVELOPMENTAL GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1965 AND 1966

Variable Number	41	42	43	44	45	46	47	48	49	50
31	0.770	0.247	0.684	0.578	0.224	0.680	0.571	-0.002	0.632	0.507
32	0.934	0.294	0.617	0.714	0.270	0.606	0.708	0.017	0.498	0.651
33	0.314	0.726	0.586	0.587	0.702	0.553	0.557	0.409	0.239	0.264
34	0.783	0.226	0.675	0.569	0.211	0.679	0.569	0.009	0.657	0.531
35	0.948	0.275	0.610	0.706	0.258	0.607	0.707	0.028	0.523	0.674
36	0.327	0.552	0.401	0.394	0.523	0.364	0.359	0.275	0.081	0.089
37	0.815	0.197	0.625	0.514	0.177	0.623	0.508	-0.030	0.586	0.452
38	0.991	0.250	0.570	0.661	0.228	0.561	0.657	-0.009	0.461	0.607
39	0.364	0.538	0.404	0.394	0.521	0.379	0.371	0.306	0.129	0.133
40	0.823	0.175	0.613	0.502	0.163	0.618	0.504	-0.019	0.607	0.473

TABLE 17

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-DEVELOPMENTAL GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1965 AND 1966

Variable Number	41	42	43	44	45	46	47	48	49	50
41	1.000	0.229	0.560	0.649	0.214	0.558	0.652	0.002	0.485	0.627
42		1.000	0.849	0.853	0.991	0.827	0.834	0.595	0.420	0.459
43			1.000	0.942	0.840	0.992	0.934	0.451	0.694	0.649
44				1.000	0.843	0.930	0.993	0.448	0.606	0.720
45					1.000	0.835	0.840	0.648	0.463	0.499
46						1.000	0.937	0.489	0.741	0.690
47							1.000	0.485	0.649	0.763
48								1.000	0.695	0.694
49									1.000	0.890
50										1.000

TABLE 17

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-DEVELOPMENTAL GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1965 AND 1966

Variable Number	51	52	53	54	55	56
1	0.103	0.043	0.149	0.050	-0.035	0.005
2	0.112	-0.054	-0.021	0.084	0.093	0.099
3	-0.240	-0.304	-0.281	0.083	0.021	0.056
4	-0.166	-0.264	-0.247	0.086	0.076	0.090
5	-0.174	-0.278	-0.264	0.073	0.069	0.079
6	-0.303	-0.288	-0.253	0.016	0.108	0.072
7	-0.305	-0.299	-0.269	0.002	0.105	0.063
8	-0.170	0.528	0.398	0.229	0.216	0.248
9	-0.160	0.399	0.540	0.262	0.168	0.237
10	-0.109	0.060	0.048	0.157	0.267	0.240

TABLE 17

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-DEVELOPMENTAL GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1965 AND 1966

Variable Number	51	52	53	54	55	56
11	0.072	0.128	0.139	0.226	0.433	0.374
12	0.165	-0.083	-0.062	0.089	-0.060	0.011
13	0.037	0.086	0.006	0.256	0.428	0.387
14	0.160	-0.086	-0.048	0.195	-0.077	0.057
15	-0.017	0.126	0.146	0.918	0.524	0.792
16	-0.027	0.101	0.126	0.841	0.463	0.715
17	-0.027	0.100	0.123	0.841	0.464	0.716
18	0.006	0.158	0.180	1.000	0.604	0.883
19	-0.064	0.099	0.102	0.937	0.592	0.843
20	-0.063	0.096	0.097	0.943	0.599	0.849

TABLE 17

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-DEVELOPMENTAL GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1965 AND 1966

Variable Number	51	52	53	54	55	56
21	-0.015	0.169	0.154	0.947	0.562	0.830
22	-0.057	0.122	0.101	0.883	0.529	0.776
23	-0.050	0.119	0.095	0.902	0.547	0.798
24	-0.013	0.166	0.148	0.882	0.504	0.761
25	-0.048	0.124	0.106	0.835	0.478	0.721
26	-0.042	0.119	0.099	0.851	0.492	0.738
27	-0.020	0.121	0.085	0.604	1.000	0.908
28	0.031	0.111	0.042	0.485	0.659	0.644
29	0.021	0.087	0.082	-0.097	-0.117	-0.120
30	0.170	0.028	0.056	0.093	0.180	0.155

TABLE 17

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-DEVELOPMENTAL GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1965 AND 1966

Variable Number	51	52	53	54	55	56
31	-0.075	0.520	0.410	0.272	0.299	0.320
32	-0.066	0.388	0.535	0.295	0.244	0.299
33	0.241	0.110	0.136	0.079	0.180	0.148
34	-0.046	0.560	0.448	0.260	0.291	0.308
35	-0.038	0.427	0.573	0.285	0.236	0.289
36	0.126	-0.032	-0.022	0.015	0.124	0.081
37	-0.090	0.486	0.367	0.232	0.278	0.287
38	-0.080	0.362	0.502	0.259	0.226	0.269
39	0.183	0.038	0.045	-0.003	0.117	0.067
40	-0.061	0.523	0.404	0.219	0.268	0.274

TABLE 17

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-DEVELOPMENTAL GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1965 AND 1966

Variable Number	51	52	53	54	55	56
41	-0.052	0.401	0.538	0.246	0.217	0.257
42	0.412	0.282	0.323	0.051	0.074	0.070
43	0.300	0.549	0.515	0.179	0.182	0.202
44	0.294	0.465	0.577	0.192	0.150	0.189
45	0.502	0.357	0.396	0.052	0.063	0.065
46	0.373	0.627	0.586	0.184	0.174	0.199
47	0.364	0.537	0.649	0.197	0.141	0.187
48	0.946	0.679	0.686	0.007	0.015	0.013
49	0.671	0.962	0.869	0.176	0.165	0.190
50	0.661	0.852	0.962	0.197	0.124	0.177

TABLE 17

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-DEVELOPMENTAL GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1965 AND 1966

Variable Number	51	52	53	54	55	56
51	1.000	0.743	0.740	0.006	-0.020	-0.008
52		1.000	0.906	0.158	0.121	0.155
53			1.000	0.180	0.085	0.145
54				1.000	0.604	0.883
55					1.000	0.908
56						1.000

TABLE 18

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1967 AND 1968

Variable Number	1	2	3	4	5	6	7	8	9	10
1	1.000	0.425	-0.099	-0.078	-0.076	-0.127	-0.084	-0.156	-0.149	-0.084
2		1.000	0.194	0.125	0.129	-0.199	-0.156	-0.330	-0.336	-0.073
3			1.000	0.746	0.744	0.369	0.370	-0.214	-0.232	0.053
4				1.000	0.996	0.498	0.479	-0.212	-0.287	0.136
5					1.000	0.482	0.469	-0.210	-0.290	0.139
6						1.000	0.972	-0.032	-0.114	0.124
7							1.000	-0.037	-0.137	0.095
8								1.000	0.875	0.123
9									1.000	0.042
10										1.000

TABLE 18

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1967 AND 1968

Variable Number	11	12	13	14	15	16	17	18	19	20
1	-0.110	-0.036	-0.184	0.163	-0.012	-0.035	-0.037	-0.009	-0.044	-0.040
2	-0.049	-0.220	-0.141	-0.134	-0.142	-0.137	-0.138	-0.119	-0.138	-0.135
3	0.168	-0.052	0.145	-0.052	0.016	0.019	0.020	0.044	0.053	0.052
4	0.142	-0.120	0.205	-0.125	0.006	0.010	0.012	0.043	0.051	0.049
5	0.135	-0.133	0.200	-0.125	0.003	0.006	0.007	0.037	0.046	0.044
6	0.159	-0.047	0.206	-0.018	0.065	0.071	0.073	0.070	0.087	0.085
7	0.117	-0.053	0.155	0.009	0.068	0.083	0.084	0.068	0.094	0.092
8	0.162	-0.075	0.166	-0.143	0.359	0.330	0.329	0.386	0.363	0.367
9	0.183	-0.039	0.136	-0.110	0.340	0.309	0.308	0.351	0.326	0.329
10	0.444	0.085	0.769	-0.012	0.096	0.122	0.123	0.135	0.170	0.168

TABLE 18

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1967 AND 1968

Variable Number	11	12	13	14	15	16	17	18	19	20
11	1.000	0.036	0.771	0.024	0.300	0.317	0.317	0.305	0.329	0.328
12		1.000	0.148	0.785	0.203	0.250	0.253	0.156	0.212	0.207
13			1.000	0.037	0.269	0.284	0.285	0.296	0.329	0.326
14				1.000	0.242	0.257	0.259	0.180	0.215	0.212
15					1.000	0.965	0.963	0.939	0.896	0.901
16						1.000	1.000	0.898	0.923	0.925
17							1.000	0.896	0.924	0.925
18								1.000	0.951	0.955
19									1.000	1.000
20										1.000

TABLE 18

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1967 AND 1968

Variable Number										
1	0.016	-0.065	-0.062	0.015	-0.047	-0.057	-0.053	-0.116	0.044	-0.206
2	-0.152	-0.227	-0.225	-0.162	-0.207	-0.216	-0.112	-0.198	0.093	-0.121
3	0.028	0.033	0.031	0.022	0.023	0.029	0.053	0.001	0.032	0.390
4	0.047	0.048	0.046	0.035	0.035	0.045	0.112	0.096	0.031	0.614
5	0.047	0.046	0.044	0.034	0.033	0.042	0.100	0.096	0.023	0.597
6	0.056	0.062	0.061	0.043	0.042	0.051	0.211	0.103	-0.130	0.548
7	0.063	0.070	0.068	0.056	0.059	0.069	0.179	0.103	-0.130	0.456
8	0.439	0.399	0.404	0.417	0.394	0.383	0.328	0.271	-0.061	-0.125
9	0.376	0.354	0.358	0.359	0.338	0.327	0.330	0.225	-0.030	-0.159
10	0.056	0.092	0.090	0.016	0.015	0.026	0.331	0.297	-0.146	0.267

TABLE 18

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1967 AND 1968

Variable Number	21	22	23	24	25	26	27	28	29	30
11	0.209	0.239	0.238	0.154	0.169	0.173	0.425	0.359	-0.169	0.278
12	0.040	0.138	0.133	0.024	0.068	0.088	0.025	0.022	0.038	-0.025
13	0.188	0.239	0.237	0.124	0.135	0.147	0.473	0.403	-0.179	0.403
14	0.079	0.151	0.148	0.063	0.094	0.109	-0.007	0.042	0.058	-0.032
15	0.832	0.802	0.806	0.772	0.745	0.734	0.571	0.439	-0.133	0.043
16	0.780	0.808	0.810	0.722	0.731	0.731	0.553	0.420	-0.152	0.029
17	0.777	0.809	0.810	0.719	0.730	0.731	0.553	0.420	-0.152	0.030
18	0.902	0.865	0.869	0.840	0.805	0.796	0.657	0.522	-0.059	0.082
19	0.854	0.899	0.899	0.799	0.811	0.816	0.636	0.516	-0.055	0.078
20	0.859	0.899	0.899	0.803	0.813	0.817	0.637	0.516	-0.055	0.077

TABLE 18

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1967 AND 1968

Variable Number	21	22	23	24	25	26	27	28	29	30
21	1.000	0.928	0.934	0.979	0.931	0.916	0.584	0.542	-0.069	0.058
22		1.000	1.000	0.912	0.949	0.956	0.567	0.529	-0.076	0.066
23			1.000	0.917	0.952	0.957	0.568	0.530	-0.075	0.066
24				1.000	0.956	0.942	0.514	0.515	-0.063	0.050
25					1.000	0.997	0.482	0.488	-0.061	0.046
26						1.000	0.482	0.492	-0.066	0.052
27							1.000	0.648	-0.038	0.212
28								1.000	-0.075	0.159
29									1.000	-0.066
30										1.000

TABLE 18

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1967 AND 1968

Variable Number	31	32	33	34	35	36	37	38	39	40
1	-0.240	-0.233	-0.214	-0.233	-0.224	-0.174	-0.229	-0.226	-0.171	-0.222
2	-0.367	-0.381	-0.199	-0.392	-0.398	-0.086	-0.346	-0.366	-0.147	-0.368
3	-0.006	-0.044	0.149	-0.136	-0.163	0.306	-0.033	-0.070	0.070	-0.160
4	0.102	0.004	0.308	-0.069	-0.154	0.480	0.056	-0.038	0.175	-0.111
5	0.095	-0.007	0.290	-0.075	-0.164	0.525	0.079	-0.021	0.225	-0.087
6	0.240	0.141	0.446	0.158	0.064	0.366	0.164	0.074	0.237	0.084
7	0.190	0.078	0.343	0.110	0.003	0.324	0.138	0.032	0.195	0.060
8	0.878	0.791	-0.059	0.911	0.811	-0.095	0.862	0.790	-0.029	0.890
9	0.744	0.897	-0.068	0.790	0.927	-0.155	0.718	0.883	-0.068	0.760
10	0.241	0.158	0.263	0.221	0.138	0.261	0.243	0.162	0.247	0.223

TABLE 18

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1967 AND 1968

Variable Number	31	32	33	34	35	36	37	38	39	40
11	0.285	0.300	0.274	0.263	0.275	0.201	0.249	0.269	0.179	0.226
12	-0.087	-0.052	0.022	-0.064	-0.031	-0.107	-0.131	-0.093	-0.073	-0.107
13	0.345	0.309	0.397	0.315	0.277	0.327	0.313	0.282	0.299	0.283
14	-0.151	-0.124	0.015	-0.129	-0.101	-0.028	-0.149	-0.122	0.015	-0.126
15	0.355	0.345	0.049	0.354	0.340	0.013	0.327	0.326	0.014	0.325
16	0.322	0.309	0.031	0.321	0.304	-0.004	0.293	0.289	-0.007	0.290
17	0.320	0.308	0.031	0.319	0.303	-0.004	0.291	0.288	-0.007	0.289
18	0.399	0.373	0.081	0.392	0.361	0.034	0.363	0.347	0.025	0.355
19	0.375	0.347	0.072	0.367	0.335	0.037	0.344	0.325	0.025	0.335
20	0.378	0.349	0.072	0.370	0.337	0.036	0.347	0.328	0.025	0.338

TABLE 18

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1967 AND 1968

Variable Number	31	32	33	34	35	36	37	38	39	40
21	0.437	0.388	0.049	0.429	0.375	0.048	0.420	0.380	0.038	0.409
22	0.404	0.370	0.059	0.396	0.357	0.047	0.384	0.359	0.036	0.374
23	0.408	0.373	0.059	0.401	0.361	0.047	0.388	0.363	0.037	0.378
24	0.412	0.367	0.045	0.406	0.356	0.040	0.396	0.361	0.033	0.388
25	0.389	0.345	0.040	0.383	0.335	0.025	0.368	0.334	0.016	0.360
26	0.381	0.338	0.044	0.374	0.326	0.030	0.360	0.326	0.019	0.351
27	0.407	0.411	0.207	0.389	0.389	0.110	0.353	0.367	0.089	0.334
28	0.328	0.286	0.150	0.312	0.268	0.142	0.318	0.282	0.127	0.301
29	-0.091	-0.062	-0.093	-0.097	-0.067	-0.122	-0.115	-0.085	-0.148	-0.120
30	0.364	0.292	0.940	0.270	0.202	0.744	0.282	0.220	0.661	0.191

TABLE 18

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1967 AND 1968

Variable Number	31	32	33	34	35	36	37	38	39	40
31	1.000	0.883	0.394	0.985	0.858	0.284	0.947	0.849	0.290	0.927
32		1.000	0.350	0.885	0.987	0.196	0.823	0.954	0.227	0.820
33			1.000	0.356	0.310	0.725	0.316	0.282	0.722	0.277
34				1.000	0.887	0.211	0.939	0.857	0.270	0.948
35					1.000	0.126	0.805	0.948	0.206	0.829
36						1.000	0.421	0.325	0.947	0.345
37							1.000	0.087	0.452	0.986
38								1.000	0.380	0.889
39									1.000	0.428
40										1.000

TABLE 18

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1967 AND 1968

Validation Number	41	42	43	44	45	46	47	48	49	50
1	-0.216	-0.234	-0.280	-0.282	-0.237	-0.283	-0.280	-0.015	-0.134	-0.141
2	-0.381	-0.276	-0.419	-0.435	-0.269	-0.417	-0.428	-0.022	-0.262	-0.290
3	-0.187	0.187	0.032	0.006	0.129	-0.030	-0.054	0.003	-0.153	-0.180
4	-0.193	0.304	0.129	0.006	0.233	0.053	-0.011	-0.034	-0.176	-0.247
5	-0.176	0.278	0.109	0.044	0.207	0.035	-0.032	-0.026	-0.169	-0.244
6	-0.002	0.665	0.518	0.447	0.530	0.391	0.317	0.066	0.025	-0.046
7	-0.041	0.531	0.406	0.328	0.384	0.274	0.194	0.195	0.109	0.019
8	0.806	-0.020	0.580	0.545	-0.015	0.621	0.577	-0.036	0.703	0.666
9	0.908	-0.020	0.504	0.625	0.003	0.555	0.674	-0.071	0.589	0.742
10	0.141	0.124	0.171	0.122	0.112	0.163	0.110	-0.066	0.044	-0.010

TABLE 18

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1967 AND 1968

Variable Number	41	42	43	44	45	46	47	48	49	50
11	0.244	0.207	0.269	0.284	0.199	0.262	0.275	-0.041	0.091	0.118
12	-0.071	0.014	-0.036	-0.016	0.027	-0.028	-0.007	0.023	-0.039	-0.013
13	0.250	0.282	0.329	0.312	0.273	0.320	0.298	-0.022	0.108	0.095
14	-0.099	-0.027	-0.112	-0.098	-0.027	-0.115	-0.098	0.121	-0.024	-0.009
15	0.320	0.064	0.260	0.262	0.058	0.268	0.267	0.061	0.299	0.302
16	0.283	0.057	0.239	0.239	0.049	0.244	0.241	0.091	0.300	0.299
17	0.282	0.059	0.239	0.240	0.050	0.244	0.241	0.092	0.299	0.299
18	0.344	0.067	0.277	0.271	0.060	0.285	0.274	0.033	0.298	0.290
19	0.312	0.071	0.268	0.260	0.061	0.272	0.259	0.072	0.311	0.299
20	0.315	0.068	0.268	0.259	0.058	0.272	0.259	0.070	0.312	0.300

TABLE 18

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1967 AND 1968

Variable Number	41	42	43	44	45	46	47	48	49	50
21	0.366	0.017	0.266	0.248	0.006	0.274	0.25	0.015	0.323	0.300
22	0.345	0.056	0.277	0.268	0.050	0.285	0.271	0.077	0.340	0.327
23	0.349	0.054	0.278	0.268	0.047	0.286	0.271	0.074	0.341	0.327
24	0.348	-0.005	0.235	0.221	-0.015	0.242	0.224	0.026	0.317	0.297
25	0.322	0.014	0.239	0.224	0.007	0.247	0.228	0.083	0.343	0.321
26	0.313	0.025	0.241	0.226	0.017	0.248	0.229	0.096	0.344	0.321
27	0.344	0.199	0.351	0.362	0.178	0.341	0.349	-0.037	0.211	0.235
28	0.262	0.065	0.209	0.191	0.051	0.205	0.183	0.017	0.209	0.187
29	-0.090	-0.066	-0.086	-0.068	-0.045	-0.072	-0.052	-0.001	-0.045	-0.024
30	0.132	0.631	0.445	0.399	0.593	0.389	0.338	0.014	-0.074	-0.108

TABLE 18

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1967 AND 1968

Variable Number	41	42	43	44	45	46	47	48	49	50
31	0.820	0.288	0.763	0.708	0.273	0.773	0.707	-0.023	0.626	0.575
32	0.938	0.264	0.689	0.787	0.268	0.712	0.805	-0.059	0.539	0.673
33	0.242	0.629	0.481	0.453	0.613	0.446	0.412	0.032	-0.014	-0.024
34	0.855	0.244	0.745	0.700	0.241	0.768	0.712	-0.017	0.655	0.615
35	0.957	0.219	0.663	0.769	0.234	0.698	0.799	-0.052	0.599	0.701
36	0.251	0.388	0.267	0.213	0.358	0.227	0.168	0.071	-0.010	-0.067
37	0.862	0.185	0.670	0.611	0.173	0.685	0.615	0.009	0.639	0.576
38	0.987	0.171	0.614	0.705	0.177	0.642	0.729	-0.032	0.560	0.680
39	0.353	0.339	0.265	0.227	0.332	0.247	0.205	0.091	0.052	0.015
40	0.891	0.142	0.650	0.601	0.142	0.677	0.618	0.014	0.663	0.612

TABLE 18

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1967 AND 1968

Variable Number	41	42	43	44	45	46	47	48	49	50
41	1.000	0.128	0.587	0.685	0.145	0.626	0.727	-0.026	0.576	0.704
42		1.000	0.800	0.764	0.986	0.757	0.712	0.246	0.168	0.156
43			1.000	0.949	0.792	0.990	0.926	0.182	0.559	0.526
44				1.000	0.767	0.948	0.990	0.147	0.509	0.599
45					1.000	0.772	0.737	0.264	0.185	0.188
46						1.000	0.944	0.188	0.594	0.571
47							1.000	0.149	0.534	0.640
48								1.000	0.683	0.613
49									1.000	0.924
50										1.000

TABLE 18

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1967 AND 1968

Variable Number	51	52	53	54	55	56	57	58
1	0.018	-0.109	-0.113	-0.010	-0.053	-0.034	-0.233	-0.114
2	0.040	-0.211	-0.232	-0.119	-0.112	-0.127	-0.381	-0.048
3	-0.144	-0.261	-0.278	0.044	0.053	0.053	-0.044	0.122
4	-0.224	-0.316	-0.373	0.043	0.112	0.085	0.004	0.159
5	-0.212	-0.306	-0.368	0.037	0.100	0.075	-0.007	0.151
6	-0.320	-0.255	-0.307	0.070	0.211	0.154	0.141	0.164
7	-0.203	-0.177	-0.249	0.068	0.179	0.136	0.078	0.106
8	-0.021	0.692	0.642	0.386	0.328	0.392	0.791	0.487
9	-0.017	0.609	0.741	0.351	0.330	0.374	0.897	0.538
10	-0.104	0.014	-0.038	0.135	0.331	0.256	0.158	0.593

TABLE 18

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1967 AND 1968

Variable Number	51	52	53	54	55	56	57	58
11	-0.087	0.052	0.077	0.306	0.425	0.401	0.30	0.697
12	0.044	-0.018	0.006	0.156	0.025	0.100	-0.052	0.124
13	-0.083	0.059	0.046	0.296	0.473	0.423	0.309	0.830
14	0.117	-0.019	-0.004	0.180	-0.007	0.095	-0.124	0.065
15	0.033	0.274	0.271	0.939	0.571	0.829	0.345	0.394
16	0.058	0.271	0.265	0.898	0.553	0.797	0.309	0.385
17	0.058	0.271	0.264	0.896	0.553	0.796	0.308	0.386
18	0.006	0.272	0.259	1.000	0.657	0.910	0.373	0.427
19	0.035	0.277	0.261	0.951	0.636	0.872	0.347	0.433
20	0.034	0.279	0.262	0.955	0.637	0.874	0.349	0.433

TABLE 18

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1967 AND 1968

Variable Number	51	52	53	54	55	56	57	58
21	-0.010	0.296	0.268	0.902	0.584	0.816	0.363	0.337
22	0.049	0.312	0.292	0.865	0.567	0.787	0.370	0.349
23	0.047	0.314	0.293	0.869	0.568	0.789	0.373	0.350
24	0.004	0.293	0.267	0.840	0.514	0.744	0.367	0.276
25	0.060	0.318	0.289	0.805	0.482	0.707	0.345	0.261
26	0.068	0.316	0.287	0.796	0.482	0.702	0.338	0.263
27	-0.109	0.153	0.173	0.657	1.000	0.910	0.411	0.543
28	-0.024	0.172	0.149	0.522	0.648	0.643	0.286	0.398
29	0.051	-0.008	0.012	-0.059	-0.038	-0.053	-0.062	-0.121
30	-0.167	-0.208	-0.233	0.082	0.212	0.162	0.292	0.414

TABLE 18

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERSITY OF ILLINOIS COLLEGE OF DENTISTRY
1967 AND 1968

Variable Number	51	52	53	54	55	56	57	58
31	-0.099	0.549	0.490	0.399	0.407	0.443	0.883	0.654
32	-0.090	0.497	0.613	0.373	0.411	0.431	1.000	0.704
33	-0.104	-0.115	-0.119	0.081	0.207	0.158	0.350	0.430
34	-0.061	0.601	0.552	0.392	0.389	0.429	0.885	0.630
35	-0.053	0.538	0.662	0.361	0.389	0.412	0.987	0.673
36	-0.058	-0.106	-0.156	0.034	0.110	0.079	0.196	0.313
37	-0.046	0.577	0.507	0.363	0.353	0.393	0.823	0.601
38	-0.045	0.531	0.634	0.347	0.367	0.392	0.954	0.662
39	0.013	-0.006	-0.040	0.025	0.089	0.063	0.227	0.301
40	-0.009	0.625	0.564	0.355	0.334	0.378	0.820	0.576

TABLE 18

CORRELATION MATRIX OF PREDICTOR AND CRITERIA VARIABLES-CROSS VALIDATION GROUP
STUDENTS ENTERING THE UNIVERISTY OF ILLINOIS COLLEGE OF DENTISTRY
1967 AND 1968

Variable Number	51	52	53	54	55	56	57	58
51	1.000	0.706	0.656	0.006	-0.109	-0.057	-0.090	-0.082
52		1.000	0.931	0.272	0.153	0.233	0.497	0.286
53			1.000	0.259	0.173	0.237	0.613	0.347
54				1.000	0.657	0.910	0.373	0.427
55					1.000	0.910	0.411	0.543
56						1.000	0.431	0.533
57							1.000	0.704
58								1.000

APPROVAL SHEET

The dissertation submitted by Thomas William Beckham has been read and approved by three members of the School of Education.

The final copies have been examined by the Director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and the dissertation is now given final approval with reference to content, form, and mechanical accuracy.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Education.

5-25-73
Date

Barney McBeckham
Signature of Advisor