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Appraisal of a scholastic ability test for selective university admission

John Walter Brown
The University of Montana

AN APPRAISAL OF A SCHOLASTIC ABILITY TEST FOR SELECTIVE UNIVERSITY ADMISSION

by

JOHN W. BROWN

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CHAPTER I

AN EXPLANATION OF THE PROBLEM

The purpose of this study is to appraise the use of a scholastic ability test as an admission requirement at The University of Texas. Following is a statement of the problem and an explanation of the importance and value of the study. This chapter is concluded with an explanation of the organizational plan of the study.

I. STATEMENT OF THE PROBLEM

The primary problem involved in this study is to appraise the admission test as a means of: (1) predicting future enrollment control, (2) eliminating only students with a low grade-point average potential and (3) predicting academic survival and achievement.

Through statistical analyses of the data, tables are developed for use in finding the probable scholastic achievement and survival related to the test scores. The tables, thus developed, may be useful in establishing future admission test policy at The University of Texas. This study, however, is a status study restricted to discovering and reporting factual test score and achievement data for a specific group of University of Texas students during a specific period of time. This study is restricted to a statistical interpretation of the factual data. Although the knowledge thus discovered may be useful for evaluating the current admission test policy, it is not the purpose of this study to evaluate the present policy.

II. IMPORTANCE OF THE STUDY

A satisfactory score on an admission test was added to the entrance requirements for entering freshmen at the University of Texas in September 1956. In preparation for this admission test policy, the admission test was administered on an experimental basis to all entering freshmen in September 1955 under the supervision of the Testing and Guidance Bureau director. From this experimental test administration, plans were refined to establish the admission test policy to be effective for the fall semester 1956.

The sample under current consideration is the first group of entering freshmen at the University of Texas to take the admission test. The sample involved in this study is, therefore, all of the entering freshmen at The University of Texas who took the admission test on an experimental basis in September 1955.

The current research project is one of the first to bring together the admission test score data and the achievement record data for the sample under consideration.

The data presented in this study are not readily available from any other source.

III. VALUE OF THE STUDY

This appraisal of the admission test as an entrance requirement at The University of Texas will provide factual data for evaluating the present admission test policy. The study will also produce factual evi-

dence for consideration as future admission policy is established. The tables which are produced as a result of this study may be of value in the future application of the admission test as an admission requirement at The University of Texas.

IV. ORGANIZATIONAL PLAN OF THE STUDY

The information gathered as a basis for this study is composed primarily of: (1) a review of the related literature, (2) an organization of the assembled data and (3) a statistical interpretation of the data. The review of the related literature is presented in Chapter II. An explanation of the data is presented in Chapter III. The statistical treatment of the data is presented in detail in four separate chapters. Chapter IV presents an appraisal of the admission test as a means of predicting future enrollment control. In Chapter V the admission test is appraised as a means of eliminating only students with low grade-point average potential. The admission test score is appraised as a means of predicting academic achievement in Chapter VI. In Chapter VII the admission test is appraised as a means of predicting academic survival. The final chapter, Chapter VIII, contains a summary of the research findings.

CHAPTER II

PREDICTION STUDIES RELATED TO SELECTIVE ADMISSION

The problem of appraising a scholastic ability test as a college admission requirement for the purpose of predicting future enrollment control, eliminating only students with a low grade-point average potential and predicting academic survival and achievement, is very closely related to the problem of predicting college achievement from test scores. The professional literature abounds with reports of studies concerning the prediction of college achievement from test scores. Some of the first studies of this type to appear in the literature were published in the years immediately following World War I. Various ability tests which were popular at that time, such as the Army Alpha Examination and the Otis Self-Administering Test of Mental Ability, were used as means of predicting college achievement. The tempo of prediction studies seems to have progressively increased each year since 1919 or 1920. Many prediction studies appear in the literature at the close of World War II as the use of test scores for predicting military achievement was reported and as the colleges prepared to meet the great influx of students under the "G. I. Bill." During the past decade, and particularly during the past five years, an increasing number of the studies of college achievement prediction seems to imply that other factors than ability as measured by tests must be taken into consideration in predicting college success and the tendency seems to be to relate prediction studies to the current problem of

selective admission in expectation of the impending increase in college enrollment.

In this chapter, a critical review of studies which propose to predict college achievement from test scores is presented as a factor of consideration in appraising prediction studies referred to in this chapter and as a factor of consideration in planning the present study.

Following the critical review, the early studies of predicting college achievement from ability test scores are briefly summarized to show how surprisingly consistent the results seem to be over a period of many years. The implication of this information for appraising a scholastic ability test as a college admission requirement is taken under consideration.

The more recent studies which have appeared during the past ten years are examined and summarized in an effort to record the most recent results of prediction studies and to set forth the recommended features of selective admission policies as expressed by current writers.

I. A CRITICAL REVIEW OF COLLEGE ACHIEVEMENT PREDICTION STUDIES

Ten years ago, in 1949, R. M. W. Travers wrote one of the most thought-provoking articles for researchers in the field of predicting college success from test scores. At that time he stated:

> During the past 15 years over 1000 studies have appeared which have attempted to evaluate one or more tests for the purpose of predicting some aspect of scholastic achievement. The present writer reviewed most of these studies recently and was led to the

> conclusion that the actual contribution to knowledge made by them is small in relation to the voluminousness.[1]

This is a disturbing thought for a researcher in the field of prediction and one that should provoke careful examination of any future research reports before publication to avoid perpetuating the above-mentioned situation. Travers points out the common weaknesses of many prediction studies as follows:

> First it should be noted that many published studies represent repetitions of studies previously carried out by numerous independent investigators, and many are original only in relatively minor details.
>
> Second it should be noted that a multitude of the studies under consideration are based on the belief that the main reason for the inadequacies of present prediction is that the tests do not adequately measure the factors within the individual which make for success. . . . The viewpoint behind these studies needs to be examined for it is based on the assumption that the individual's own characteristics are entirely responsible for his success or failure and that the person who has the right attitudes will inevitably succeed.[2]

The essence of the second criticism cited above is that test scores are often treated as though they are a true measure of all of the factors of prediction whereas the test scores actually fail to measure many of the contributing factors such as family circumstances, social influences, economic situation, motivation, interest and other rather intangible, personal characteristics and environmental influences.

Travers' criticism continues as follows:

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[1] Robert M. W. Travers, "Prediction of Achievement," School and Society, LXX (November, 1949), p. 293.

[2] Ibid.

> The third consideration which may help to explain why the proliferation of scholastic aptitude tests and studies of them has failed to produce major progress in the validity of such devices is that the nature of the criterion used is obscure. It is commonly assumed that in assigning grades teachers are all trying to measure some kind of common denominator, but this does not seem to be the case at all.[3]

Travers concludes his criticism of prediction studies by stating:

> The above discussion indicates that there is need of a new approach to the study of predicting achievement. First, there is need of knowledge on the extent to which commonly occuring variations in the students' environment affect the achievement of various outcomes that any program of teaching is designed to achieve, and valid measures must be developed for each of these outcomes.[4]

Ten years have passed since Travers wrote the above criticism. During that time many studies have appeared in the literature reporting the correlation or multiple correlation between test scores and college achievement. In recent years the need to include personal factors other than ability and high school achievement has been discussed in the literature but very few, if any, studies have been reported which test the use of prediction factors other than test scores and high school records.

II. A SUMMARY OF EARLY COLLEGE ACHIEVEMENT PREDICTION STUDIES

At infrequent intervals, a review of the literature regarding the prediction of college achievement from test scores is published. In each summary report, the coefficient of correlation for various

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[3] Ibid., p. 294.

[4] Ibid.

prediction tests and college achievement is generally presented in tabular form and the median correlation coefficient is given.

In 1943, Durflinger prepared a summary of the literature regarding the relationship between test scores and college achievement.[5] Durflinger found that Harl R. Douglass prepared a summary of the literature in 1931 which was published in booklet form by the University of Oregon Press, entitled, "The Relation of High School Preparation and Certain Other Factors Related to Academic Success at the University of Oregon." Durflinger reports that Douglass summarized the findings of about two hundred and fifty studies which appeared in the literature prior to 1931 and found that the median correlation coefficient between test scores and college achievement was .45.[6]

Durflinger also summarized the findings of L. B. Kenney, which was published by the University of Minnesota Press in 1932, entitled, "A Summary of the Literature on the Use of Intelligence Tests in Colleges and Universities." Durflinger reports the median correlation coefficient found by Kennedy was .455.[7]

According to Durflinger, another summary of the early literature regarding the relationship between test scores and college achievement was prepared by David Segel, published by the United States Office of

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[5]Glenn W. Durflinger, "The Prediction of College Success - A Summary of Recent Findings," American Association of Collegiate Registrars Journal, XIX (October, 1943), pp. 68-78.

[6]Ibid., p. 68.

[7]Ibid.

Education as bulletin number fifteen in 1934 and entitled, "Prediction of Success in College." Durflinger reports that Segel summarized the results of 100 studies and found that the median coefficient of correlation between test scores and college achievement was .44.[8]

Durflinger found that another summary study was published in 1934 by the University of Buffalo Press. This study, entitled "Prediction of College Performance," was prepared by Mazie E. Wagner. According to Durflinger, Wagner classified the previous studies by the tests which were in use at that time and reported a median correlation coefficient for each test classification. Durflinger reports that the median correlation coefficients found by Wagner ranged from .37 to .52.[9]

Durflinger found that there were not any summaries of the studies regarding the relationship between test scores and college achievement from 1934 to 1943. He, therefore, searched the literature published during that period for individual studies reporting correlations between intelligence tests and college achievement and summarized the results of the twenty-seven studies which he located. Durflinger found that the median coefficient of correlation for the twenty-seven studies was .52.[10]

In comparing his findings with earlier studies, Durflinger states:

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[8] Ibid.

[9] Ibid., p. 69.

[10] Ibid.

There is a significant difference between these two medians. The more recently reported studies find somewhat higher correlations between college grades and intelligence test results than did the earlier studies. These higher correlations may be accounted for by one or more of the following reasons:

1. The newer intelligence tests, being designed primarily for college students, may measure more of the factors present in scholastic grades than did the earlier tests.
2. College instructors may be using intelligence test results to assist them in arriving at the grades awarded students.
3. College marks may be based upon course examinations and requirements which have a closer relationship with intelligence than was the case a decade or more ago.[11]

After summarizing the prediction studies reported in the literature to 1943, Durflinger states:

> The conclusion may be drawn that intelligence tests are used in almost every attempt to predict college success whether alone or with other measures. In most schools the correlation between intelligence and college grades is between .40 and .50. Intelligence tests vary among themselves in their ability to predict college grades.[12]

In 1949 an extensive study by Garrett was published summarizing the findings of ninety-four published research reports prior to 1949, regarding the relationship between college achievement and various combinations of such variables as personality traits, standardized tests and high school records.[13] For summary purposes, Garrett classified the research studies which he reviewed according to the prediction variables. Among the large number of conclusions listed by Garrett,

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[11] Ibid.

[12] Ibid., p. 71.

[13] Harley F. Garrett, "A Review and Interpretation of Investigations of Factors Related to Scholastic Success in Colleges of Arts and Sciences and Teachers Colleges," Journal of Experimental Education, XVIII (December, 1949), pp. 91-138.

the following are most closely related to this study:

> A summary of 94 coefficients of correlation between intelligence and college grade average .46, a median of .47 and inter-quartile range of 14.59. This agrees closely with summaries previously reported. . . . It is estimated that the country-wide median correlation between this factor [test scores] and the criterion [college grades] is .45, or about 11% better than pure guess work.[14]

Garrett continues his conclusions by stating that the high school average proves to have the greatest predictive value for college grades with a correlation coefficient of .56; Garrett lists general achievement tests as the second best predictor of college grades with a correlation coefficient of .49; intelligence tests are listed as the third best predictor with a coefficient of .47.[15]

Garrett reports that two predictive factors used in multiple correlation with college grades ". . . usually result in a somewhat higher correlation with the criterion than did the factors singly."[16] "The addition of a third variable," according to Garrett, "adds very little to the predictive value of the combination, and adding a fourth variable has practically no value."[17]

The following conclusion by Garrett is referred to in many of the reports subsequent to his:

> . . . considering the time and expense involved, it is as well to use a good aptitude test to predict college success as to use a

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[14] Ibid., p. 110.

[15] Ibid., p. 128.

[16] Ibid., p. 130.

[17] Ibid.

battery of achievement tests. Especially is this true of long range predictions.[18]

III. RECENT TRENDS IN SELECTIVE COLLEGE ADMISSION

Three years prior to the time that Garrett reported the above conclusions, Borow wrote expressing concern over the nation-wide expansion of the colleges in 1946 with the thought that policies established to meet the post World War II college emergency would cast an influence over college policies and practices far into the future. Borow apparently considered the admission policy in this light and wrote philosophically as follows:

> At a moment when the flood of applications for entrance to college compels the adoption of a rigorous admissions policy on the part of numerous institutions, it would appear that the techniques and criteria employed in the selection of applicants merit careful re-evaluation.
>
> It should be borne in mind that when an admissions officer selects or rejects a student candidate on the basis of the high school record, the distribution of high school subject matter units, an interview, letters of recommendation, an entrance examination or some combination of these devices he is, in effect, using this information as a basis for prediction of the candidate's potential success or failure in academic work. He is acting upon the premise, which may or may not have been substantiated, that the applicant's standing in the selective medium foreshadows his performance in college work. Viewed in this light, the importance of subjecting the bases of student admission and student counseling to empirical study is clear enough.[19]

Borow maintains that, even with advancements which have been

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[18] Ibid., p. 129.

[19] Henry Borow, "Current Problems in the Prediction of College Performance," American Association of Collegiate Registrars Journal, XXII (October, 1946), p. 14.

made in testing and academic prognosis, no forecasting measure or combination of such measures can claim to accurately predict college achievement. He cites the fact that hundreds of studies report a correlation of about .40 or .50 which is about eleven per cent better than sheer guess work.[20]

Borow states the opinion, which is shared by others,

> . . . that the effectiveness of any forecasting instrument is limited by the unreliability of the index which is being predicted. Without question, then, defects in the grading process are one source of difficulty in making precise scholastic predictions.[21]

Borow also expressed the following opinion in 1946 which seems to be discussed progressively more each year in the recent literature.

> The academic achievement of any student is the result of the combined influence of a great many behavioral influences which, themselves, are intricately interwoven. To state it differently: the student, like any individual, is a complex organism, and a profusion of interdependent personal attributes and conditions, many of which are capable of prediction, contribute to his measured achievement. Yet most of these characteristics are not assessed by the typical college aptitude test or entrance examination in current use. In general, such a test provides only an index of the student's ability to comprehend and assimilate subject-matter on an advanced educational level. It reveals how much intellectual promise [italics in the original] is possessed by the student with reference to future academic attainment. It does not specify to what degree that student will utilize his promise. What a candidate for college is intellectually capable of accomplishing is hardly synonymous with what he later actually achieves.[22]

. . . . . .

In summary, it may be said that the heightened accuracy of

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[20] Ibid., p. 16.

[21] Ibid., p. 17.

[22] Ibid., p. 18.

> academic prognostic work rests upon continuing improvements in institutional grading methods, upon the development of even more searching ability tests and lastly, and I think most significantly, upon the introduction of carefully devised measures of the non-intellectual influences in college achievement. As advances in the use of these media are made, the more penetrating insight into student capabilities and weaknesses which follow will permit both student selection and student guidance to reach new levels of effectiveness.[23]

The above comments by Borow have been quoted in detail because he is one of the first writers to advocate that personal and environmental factors must be taken into consideration with ability test scores to improve scholastic prediction. As this review of the literature is continued, it will be shown that there is a growing current interest in promoting Borow's ideas by one group of researchers and that another group advocates statistical prediction from the use of ability tests.

In an article published in 1952, Sturgis traces the changes which have taken place in college admission requirements since the early college years in America and summarizes his findings as follows:

> The general practice in college admissions during recent years has been to admit those students who have graduated from accredited secondary schools and who have earned credit in specific patterns of secondary school subjects. The pattern of subjects required for admission has varied with the college, but the trend is toward permitting greater flexibility in the student's choice of subjects. Due to the recognized inadequacies of these criteria alone, the colleges have recently been placing more emphasis upon entrance examinations, the interview and personal data regarding the student.[24]

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[23] Ibid., p. 26.

[24] Horace W. Sturgis, "Trends and Problems in College Admissions," College and University, XXVIII (October, 1952), p. 15.

A review of the literature regarding admissions criteria was prepared by Cosand in 1953 in which he, too, reports a current tendency of moving away from rigid admission standards toward more flexible standards which take into consideration all of the characteristics of an applicant. He states that:

> Many say that we are not in need of a new plan, but that our present admissions criteria should be modified and improved. This is the method of attack of most colleges today. Through the improvement of tools used for the measurement of abilities, achievement, and interest; through the development of better ways for appraising and describing personal characteristics; through the substitution of qualitative measures of competence for the present too-frequent quantitative units or years of study; and through the establishment of a broader base of acceptable secondary school courses, we may be able to make our college admissions policies more applicable to those they so vitally concern, the individual student [italics in the original] desiring admission.[25]

Cosand predicts that in the future the evidence will continue to point in the direction of:

> 1. multiple predictors versus [italics in the original] the single utopian predictor;
> 2. the need for more [italics in the original] emphasis on individualized selection; and
> 3. the demand that secondary school and collegiate institutions develop and bring into closer working agreements the guidance programs.[26]

In 1955 Knutson reported the results of a survey concerning the admission requirements of seventy-one state universities and land grant colleges and reported that:

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[25] Joseph P. Cosand, "Admissions Criteria," College and University, XXVIII (April, 1953), p. 346.

[26] Ibid., p. 354.

The usual requirement pattern of the institutions could be summarized as follows:

1. A diploma or certificate of graduation from an accredited high school was a basic requirement.
2. The high school diploma was most frequently teamed with various subject matter requirements, the pattern of prerequisites varying among the several colleges or schools of the same institution.
3. The typical basic requirements were, then, graduation from an accredited high school together with certain subject matter requirements. If these requirements could not be met, most state institutions permitted entrance through other means or combination of means.[27]

According to Knutson's report, a satisfactory score on a scholastic ability test was not used by any institution as the sole admission requirement at the time of his writing and that a satisfactory test score was used as an admission requirement in combination with the certificate of high school graduation by only two of the seventy one institutions consulted.[28]

In relation to Knutson's report, just cited, it is interesting to notice that in 1955 a study by Jackson was published which appraised the use of an entrance examination battery for those applicants at Michigan State College who could not meet the normal admission requirements. Jackson states:

> To evaluate such a selection program, it is necessary to determine whether students who fail the examination could have succeeded in college. An administrative decision was made in the summer of 1949 to permit some of the students failing the battery to be admitted as regular students in the fall quarter 1949. . . . In the period covered by this study 209 individuals who passed the

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[27] Howard Knutson, "Admission Requirements of State Universities and Land Grant Colleges," College and University, XXX (April, 1955), p. 330.

[28] Ibid.

examinations, 123 who failed and 40 summer school trial students entered Michigan State College.[29]

In considering the following conclusions offered by Jackson, it must be remembered that the sample consists of students who did not meet the regular admission requirements at Michigan State College and were therefore allowed to take an entrance examination. Jackson's conclusions are as follows:

1. The entrance examination test battery adequately distinguishes between those students who demonstrated the ability to do college work and those who do not. The battery predicts correctly in about 80% of the cases.
2. The 14.8% of the students who passed the examination but failed to succeed in college is quite consistent with the general percentage of attrition in the college program.
3. Students failing entrance examinations but admitted to college do not succeed very well. Only 13% of the group did average work or better.
4. Students given a summer school trial will show the first term whether they are able to do college work.
5. It is possible to set up a formal entrance examination program which will result in the satisfactory selection of students for college.[30]

In a footnote in this article Jackson states that, "this group testing program was used at Michigan State College until recently. It has been replaced by a program of individual testing and counseling.[31]

Jackson acknowledges that the methods of admission may vary from a ". . . formal group testing situation . . . to an individual

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[29]Robert A. Jackson, "Admission by Examination," College and University, XXX (January, 1955), p. 183.

[30]Ibid., pp. 184-185.

[31]Ibid., p. 182.

counseling situation."[32] However, in another study by Jackson, the relationship between the freshmen test scores and 1952 fall term grade-point averages for 2983 students is investigated and Jackson cites evidence that an entrance test battery predicts college achievement by stating:

> In general, the percentage of an ability group failing to obtain at least a C average increases as the ability of the group decreases, but some students in the low ability group make satisfactory grade point averages. . . . Practically all of the individuals in the high-ability group obtain at least a C average; whereas approximately fifty per cent of those in the low ability group fail to obtain a C average.[33]

In a further discussion of the admission policy at the same college, Matteson introduces his explanation of the Michigan State College admission policy through testing and counseling as follows:

> Although possessing certain merits, such as practicality and objectivity, this impersonal manner [that is, admission by entrance examination only] of accepting or rejecting candidates for college appears to be giving way to a more personalized type of admission policy.[34]

Matteson states that each applicant for college admission at Michigan State College, who is authorized to attempt the entrance examination, is referred to the testing and counseling service. The admissions officer provides an admissions counselor with the applicant's credentials and an appointment is arranged for the applicant to meet

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[32] Ibid.

[33] Robert A. Jackson, "Prediction of the Academic Success of College Freshmen," Journal of Educational Psychology, XXXXVI (May, 1955), pp. 300-301.

[34] Ross W. Matteson, "Individual Admissions Through Testing and Counseling," College and University, XXIX (April, 1954), p. 330.

personally with the counselor. Through individual counseling and testing techniques, the counselor appraises the applicant and helps him establish his future educational plans. The counselor prepares a written summary of his findings and recommendations for the admissions officer.[35]

Matteson concludes his report of the Michigan State College admission policy as follows:

> It may be stated that a policy of individualized admissions through testing and counseling holds considerable promise as a solution to the entrance examination problem. In bringing into closer cooperative relationship the functions of such institutional divisions as the Admissions Office and the Counseling Center, we are making progress in the direction of actually accepting into college those best able to profit from college.[36]

The Michigan State College admission policy based on individual counseling as explained above is used only for those students who are ". . . authorized to attempt entrance examinations . . ." which means that they are students who did not meet the regular admission requirements.[37]

It is evident from the above studies regarding admission policy at Michigan State College, for example, that different opinions are held regarding the balance that should be maintained between college admission on the basis of test scores alone and admission on the basis of individual counseling.

Another writer, Benno G. Fricke, summarizes an enlightening

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[35] Ibid., pp. 390-391.

[36] Ibid., p. 395.

[37] Ibid., p. 390.

article with many concrete suggestions regarding admission policy which are quoted in considerable detail below, due to their particular value to the study at hand:

> The essence of this suggestion is that admission to college should be conditioned only by the quality of the record the student has demonstrated in high school and on academic ability tests.[38]

Fricke supports his statement by calling attention to the following facts:

> For over fifty years college achievement has been predicted from high school achievement and the correlation coefficients have consistently averaged about .55. For over 35 years college achievement has been predicted from standardized tests of academic ability and the coefficients have consistently averaged about .45. When college achievement is predicted from a combination of high school achievement and ability test scores the multiple correlation coefficients have consistently averaged about .64.[39]
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> . . . . . .
>
> The wide spread practice of selecting students on the basis of HSPR [high school percentile rank] and/or SAT [scholastic ability test] has probably surpressed their correlation coefficients much more than other predictors. Since all the commonly used grade predictors correlate substantially with each other the predictive value of each one is reduced by selecting students on the basis of any one of them. However, the predictor which suffers the greatest loss in predictive efficiency is the one used in selecting students.[40]
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> . . . . . .
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> This [the first semester or the first quarter] is the crucial period to be predicted by the standard grade predictors. After first semester (or quarter) G.A.'s are available these are the best

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[38] B. G. Fricke, "Prediction, Selection, Morality and Quality Control," College and University, XXXII (October, 1956), p. 50.

[39] Ibid., p. 34.

[40] Ibid., pp. 38-39.

> predictors of second semester and subsequent semester GPA's. . . . the correlation between first semester GPA and second semester GPA is about .80.[41]
>
> . . . . . .
>
> Some institutions and admissions officers have disregarded the selection variables they have been using because they no longer provide the high correlation with achievement that they formerly did. A more valid criterion for judging the usefulness of a selection variable than the correlation coefficient is the quality of the students [italics in the original] selected; this is probably most accurately revealed by the mean and standard deviation of the standard selection variables.[42]

The first criterion for appraising a selection policy, according to Fricke, is a low correlation between the prediction variable and college achievement. He points out that if only students who are predicted to be successful in college were admitted, the coefficient of correlation would be lowered; that is, ". . . high correlations will be obtained when no selection procedure is used, or when an ineffective one is used."[43]

Fricke advocates that the quality or level of students admitted to an institution is evidence of a second criterion for judging a selection policy. This does not necessarily mean that only superior or high ability students are admitted; it means that the students admitted to a particular college are ready to profitably attend that college.[44]

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[41] Ibid., p. 40.

[42] Ibid., p. 41.

[43] Ibid., p. 45.

[44] Ibid.

A third criterion advocated by Fricke is that a good selection procedure should select a rather homogeneous ability level group of students.[45] He maintains that the interests of individual students as well as the colleges would be served if all colleges did not strive to attract the high ability students but rather the type of students that each particular college can serve best.[46]

Fricke questions the advisability of admissions officers trying to appraise carefully each applicant's readiness for college by collecting personal information and/or personally interviewing the applicant.[47] He cites evidence to substantiate the opinion that predictions based on personal observations and opinions are proven to be consistently inferior to the statistical method of prediction based on reliable factual evidence.[48] Therefore, Fricke states:

> It appears on the basis of available evidence that a college desiring to select the best students should depend on the <u>student's demonstrated record</u> [italics in the original] (and/or what he can demonstrate on tests of established validity), and not on what he or anyone else <u>thinks</u> [italics in the original] about his college readiness. Human opinion and judgment should not be depended upon when something better is available.[49]

On the basis of this line of thought, Fricke suggests that colleges select their students on the basis of HSPR [high school per-

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[45] <u>Ibid.</u>

[46] <u>Ibid.</u>, p. 44.

[47] <u>Ibid.</u>

[48] <u>Ibid.</u>, p. 45.

[49] <u>Ibid.</u>

centile rank] and SAT [scholastic ability test] weighted as explained below:

> Until a better formula can be devised by each college the writer suggests that the HSPR be multiplied by two and added to the ability test percentile rank (norms established on all graduating senior high school students in the state); this sum divided by three would be the student's college qualification rank (CQR) [italics in the original].[50]

Fricke advocates that each college should clearly and concisely state in its catalogue the CQR minimum score required of students for admission or the CQR range from which students will be admitted. Fricke's defense of the CQR method of selecting students is stated in part as follows:

> There would be some students refused admission by the CQR criterion who would have been successful if they had been admitted. This criticism can be made of every method of admitting students [italics in the original]. All that can be said in defense of the CQR method is that fewer errors would be made, that it is relatively inexpensive, objective, fair to all applicants and potential applicants, and easily communicable; and finally that it permits the quality of the student body to be carefully controlled.[51]

The summary of a panel discussion during the forty-second annual meeting of the American Association of Collegiate Registrars and Admissions Officers, which was held in April 1956, seems to indicate a point of view that is more in favor of admission selection by individual counseling. In B. Alden Thresher's summary of the panel discussion, he suggests that there are the four following criteria with which an admission

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[50] Ibid., p. 47.

[51] Ibid., p. 50.

policy may be judged: arbitrary criteria, process criteria, capability criteria and personality criteria.[52] Arbitrary criteria is defined as certain social groups such as state residents, church members and national origin. An example of process criteria is admission based on the kind of an educational process to which the student has been exposed regardless of his individual merits. Thresher's explanation continues, an example of this criteria is basing college admission on a prescribed pattern of specific high school courses. Capability criteria are based on the actual and present capabilities of each applicant to successfully handle college work. College ability tests are the most commonly used methods of applying the capabilities criteria, according to Thresher. The personal criteria are concerned with factors such as motivation, interest, vital energy, adaptability, emotional health, ability to work harmoniously with others and other personal traits that may allow the applicant to effectively apply his capabilities.[53]

After the above criteria were identified and defined, the panel discussion is summarized by Thresher as follows:

> I would submit as a basic theorem the proposition that an enlightened admission policy should move, so far as practicable and feasible, . . . away from the arbitrary criteria toward those which look to the individual; away from the retrospective criteria to those denoting capability; and, when our knowledge permits, away from tests of solely intellectual capacity toward the area of energy

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[52] B. Alden Thresher, "Some Principles of Selective Admission," College and University, XXXI (Summer, 1956), p. 496.

[53] Ibid., pp. 496-498.

and motivation which go to the heart of the problem.[54]

Thresher admits that during the panel discussion ". . . there seemed to be a general inclination toward the belief that much of this selection [selective college admission in the future] will be accomplished by means of more rigorous and intelligent application of the basic criteria of high school performance and test scores".[55]

However, Thresher makes the following prediction regarding the future trend of selective admission:

> For the time being, most of us in our struggle with practical admission problems will be using a mixture of criteria from all these levels. We can, however, recognize that the evolution of college admissions has been and will continue to be in a direction away from the more primitive criteria which heads this list (and which, incidentally, are easier to apply) toward those further down the list which become progressively more complex and difficult to administer, but which increasingly recognize individual talents and individual promise. Such criteria point in the ultimate direction to which admission people should be looking--the development and the social effectiveness of the coming generation.[56]

After surveying the historical developments of college admission policy, Bowles summarized the college admission situation as follows in 1956:

> If we accept these propositions - that colleges in abandoning their rigorous entrance requirements stated in terms of units also abandoned a selective device that has served to hold down the number of applicants; that this abandonment encouraged mass application to college; that selection among the increased number of applicants was accomplished through tests, measurement and assessments; that the new form of selection produced results equal to

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[54] Ibid., p. 498.

[55] Ibid., p. 499.

[56] Ibid., p. 493.

> or better than the old and was preferred to it; and that candidate uncertainties as to selection, reasonably based on the fact that the selection criteria were not made known to the applicant, brought multiple applications as the only possible defense against uncertainty - then we have accomplished two things.
>
> First, we have established an explanation of multiple applications which can be supported on the basis that it takes into account all of the more obvious variables in the admission situation.
>
> Second, we have laid down lines which point to the next logical development in admission requirements.
>
> Let us state these lines in the form of two propositions, the first of which is as follows: our principle problem today is the enforcement of admission requirements in selection among candidates. . . . The second proposition is that the colleges, in ceasing to state subject requirements for admission, have ceased to provide guidance as to even broad outlines of their programs.[57]

Bowles offers the following suggestions for correcting the basic admission problems as he sees them. First, he suggests that a simpler, single, scholastic ability test be used as the primary admission requirement. He suggests that the test be interpreted for use by the college, the high school and the applicant and that prediction standards should be set forth so the candidate could use the test results in making his plans as well as the college in selective admission.[58] Secondly, Bowles suggests that colleges emphasize in their literature for applicants and high school officials, the nature of their academic programs and encourage prospective applicants to become adequately prepared in academic subjects for college work. Bowles suggests that academic admission

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[57]F. H. Bowles, "Past, Present and Future of Admission Requirements," College and University, XXXI (Summer, 1956), pp. 326-327.

[58]Ibid., p. 327.

requirements should be stated in general terms, however, to leave the secondary schools free from curricular control by colleges.[59]

In view of the controversy of opinions regarding college selective admission policy and prediction of college success, it is interesting to consider the admission policy employed at the United States Air Force Academy which was newly established in 1954 and seems to strike somewhat of a compromise between the two extreme viewpoints. Eligibility requirements for appointment to the Air Force Academy are set by statute and the demands of flight training; the eligibility requirements include age, citizenship, marital status, height, weight, health and similar factors.[60] In order to select cadets from among those applicants who are eligible for appointment, the admissions officials have developed a selection system ". . . designed to obtain those young men who can best accomplish three rather independent objectives of instruction: academic achievement, skill as an aerial navigator and pilot, and demonstration of effective leadership abilities."[61]

Reproduced below is a table from O'Connor's article which lists the measures that are used to select Air Force Academy appointees from among the eligible candidates:[62]

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[59] Ibid.

[60] V. J. O'Connor, "Selective Admission of Air Force Academy Cadets," College and University, XXXIII (January, 1958), p. 164.

[61] Ibid., p. 165.

[62] Ibid., p. 164.

MEASURES OF QUALIFICATION AND SELECTION

Measure	Used in Qualification	Used in Selection
College Entrance Examination Board Tests		
SAT (verbal)	X	X
SAT (quantitative)	X	X
English Composition	X	X
Intermediate Mathematics	X	X
High School Grade Rank		X
USAF Officer Qualifying Test	X	X
USAF Physical Aptitude Test	X	X
Activities Index		X
Aptitude for Commissioned Service		X
Selection Composite (weighted sum of all the above)		X

In reference to the above table, O'Connor explains that ". . . specific score qualification levels and weights of selective measures are not given . . ." because fixed weights would not allow changes to be made as each annual cycle of experience leads to refinement and changes.[63]

Observation of the items in the above table indicates that classification and selection at the Air Force Academy is based on a combination of selective factors including ability test scores, achievement test scores, high school rank, aptitude measures and an inventory of personal or social traits.

According to O'Connor, "Air Force policy demands that each candidate have a probability of success in completing the navigation training given during the four-year academic course and the pilot

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[63] Ibid., p. 163.

training given after graduation."[64] Air Force officials who share the responsibility for the administration of the selection policy would strive to base the policy on the best possible criterion available. O'Connor reports that:

> If there were a single measurable criterion of cadet success, it would be mathematically possible to determine exact weights to be given selection measures in arriving at a composite mean score that would have maximum relation to the criterion. Because the three objectives of cadet education - academic achievement, flying skill and leadership development - are rather independent of each other, we have no hope of defining a single or even an acceptable composite criterion. The weighting of selection measures must be depended partly upon judgment.[65]

> It is only within the area of educational objectives that we can determine optimum weights by statistical procedures. Even the statistically developed weights may need adjustment by some exercise of judgment if the basic data do not represent an ultimate criterion. . . . Here is a breakdown of the relative weights among the academic measures in the selection composite used in the 1957 competitions:

SAT (verbal)	28%
SAT (quantitative)	18%
English Composition	8%
Intermediate Math	18%
High School Graduation Rank	28%

[66]

The following lengthy quotation is added at this point to show how selection of appointees for the Air Force Academy is based on subjective ratings in combination with objective ability and achievement data:

> We find that the composite mean of the examination measures, the "examination composite," does not adequately discriminate at

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[64] Ibid., p. 166.

[65] Ibid., p. 168.

[66] Ibid., p. 169.

> a point in the selection roster where a line may be drawn between selectees and alternates. The measures even in combination are not accurate enough to base selection on a difference of a few score points. The Academy Selection Board has wisely added a measure of judgment, a rating of each candidate on Aptitude for Commissioned Service made by at least three senior officers. The rating is based upon a complete review of all available data on the candidate: his personal statement of reasons for seeking an Academy appointment, recommendations of the high school principal and teachers, degree of motivation indicated by previous school records, outstanding achievements, anything that may be a clue to personality.
>
> The Selection Board rating is made on the same scale as that which is used for the measures included in the examination composite. Then one-tenth of the rating is added to the examination composite. Final rank on the selection roster for each competition is based upon the extended composite, the "selection composite" . . . . Selection Board ratings have demonstrated a significant relationship to later cadet peer ratings and have provided a measure of motivation which is lacking in other selective measures.[67]

It appears that the Academy selective admission policy is successfully handling the difficult problem of identifying and selecting the best appointees from among the eligible candidates.[68]

As a result of this carefully controlled selective admission policy and continual follow-up and evaluation, O'Connor is able to report:

> The experience of three years [with the Academy selective admission policy] shows that of approximately 6000 candidates who may be nominated to participate in competition each year -
>
> | | | | |
> |---|---|---|---|
> | 30.5% | or | 1830 | will be medically ineligible |
> | 15. % | or | 900 | will withdraw from the competition |
> | 15.5% | or | 930 | will be disqualified for minimum flying training aptitude |
> | 19. % | or | 1140 | will not meet College Board Test minimums |
> | 1.5% | or | 90 | will not meet physical aptitude minimums |

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[67] Ibid., pp. 169-170.

[68] Ibid., p. 171.

13.5% or 1110 will be fully qualified for consideration in the competitions.[69]

"The Academy academic curriculum," according to O'Connor, "is not greatly different from a science-oriented liberal arts program."[70] Candidates are selected at the Academy and achievement is predicted ". . . largely by the use of aptitude and achievement measures . . ." which are also used by a large number of regular colleges and universities throughout the nation.[71] It seems that the selective admission policy at the newly created United States Air Force Academy is worthy of consideration in establishing or appraising a university selective admission policy.

An examination of the literature of the most recent prediction studies does not reveal any studies which differ greatly from the earlier studies previously cited. There are undoubtedly many original and successful grade prediction and selective admission practices currently employed which have not been explained in the literature and have, therefore, escaped the attention of this writer. There may also be valuable published reports of successful programs which have not been located and consulted or which are not currently available to the writer. In full knowledge of these limitations, an attempt will, nevertheless, be made to summarize some of the major considerations for appraising selective

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[69] Ibid., p. 170

[70] Ibid., p. 165.

[71] Ibid.

admission procedures as revealed by this review of the literature.

IV. SUMMARY OF THE RELATED LITERATURE

A critical preview of the literature related to predicting college grades from test scores indicates that during the past fifty years there has been a great deal of duplication of effort.[72] However, as a result of this tendency toward duplication and the large number of studies involved, a comprehensive survey of the relationship between ability test scores and college achievement has been conducted over an extended period of time. One writer has certified that studies predicting college achievement have been conducted for over fifty years and that the correlation between high school achievement and college achievement has consistently averaged about .55; during the last thirty-five years, repeated studies have shown that the coefficient of correlation between ability test scores and college achievement has consistently averaged .45; the correlation coefficient between college achievement and the prediction factor composed of a combination of test scores and high school achievement has consistently averaged about .64.[73]

Another writer, after reviewing the studies reporting the relationship between test scores and college achievement which were published prior to 1943, concludes that, "in most schools the correlation

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[72]Robert M. W. Travers, "Prediction of Achievement," School and Society, LXX (November, 1949), p. 293.

[73]B. C. Fricke, "Prediction, Selection, Morality and Quality Control," College and University, XXXIII (October, 1956), p. 34.

between intelligence and college grades is between .40 and .50."[74]

In summarizing the results of a survey concerning ninety-four studies in which the relationship between test scores and college achievement was investigated, a third writer asserts that the average correlation coefficient is .46; the interquartile range is 14.59; the estimated country-wide median coefficient of correlation is .45.[75]

From these reports, and the similar reports cited earlier, it is concluded that, according to the reported research, the probable correlation coefficient to be expected between ability test scores and college achievement is .45 plus or minus .05.

It appears that efforts to improve the ability tests to more nearly measure college ability have not resulted in any appreciable increase in the correlation. Neither does it appear that objective test scores plus other objective prediction factors such as high school achievement will render multiple correlations much better than .64.[76]

It appears also that the problem of selective admission is gaining more attention in recent years due, probably, to the anticipated nation-wide increase in college enrollment. Current grade prediction

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[74]Glenn W. Durflinger, "The Prediction of College Success - A Summary of Recent Findings," American Association of Collegiate Registrars Journal, XIX (October, 1943), p. 71.

[75]Harley F. Garrett, "A Review and Interpretation of Investigations of Factors Related to Scholastic Success in Colleges of Arts and Sciences and Teachers Colleges," Journal of Experimental Education, XVII (December, 1949), p. 110.

[76]Fricke, loc. cit.

studies are frequently related to the problem of selective admission.

There seems to be a difference of opinion among current writers regarding the optimum balance that should be maintained between objective test data and subjective personal data as factors of selective admission or grade prediction. There is not any conclusive evidence to support either of the extreme beliefs as the ultimate perfection in selective admission or grade prediction. The research which has been reported seems to support objective data such as test scores and high school achievement records as the best proven prediction factors. It seems to be commonly believed that these objective prediction factors are inadequate in spite of the fact that they may be the best prediction factors available. Strong claims are made that prediction accuracy can be increased by including such factors as morale, interest, motivation and similar personal characteristics although objective evidence to support such claims is very limited.

In the final analysis, each institution must establish and develop its own grade prediction and/or selective admission policy rather than attempt to adopt a ready-made policy. The philosophy governing the institution and the practical administrative problems confronting the institution will dictate, to a certain extent, the type of admission policy which it will develop. An institution should probably establish a selective admission policy that will fit harmoniously into the institution's administrative and philosophical framework and, from that type of beginning, seek to gradually develop and improve the program based on the best criterion that seems to fit the institution's

particular problems. It appears that the evolutionary development of the selective admission policy at a given college will result in establishing closer cooperation among admissions officers, college and high school counselors and high school administrators.

As a final thought regarding selective admission, the comment of John Black Johnston, written in 1924 is offered:

> An institution . . . whose resources are limited only by the wealth of a state and the goodwill of its people, and whose aim is to give those people the greatest educational returns possible for the support they furnish . . . must make the most of capable young people, rejecting none by a hard rule insufficiently proven. If it can be shown that the performance of the applicant gives ground for predicting with only negligible error those individuals who will fail in college work, the state university can act on such information and would not be justified in neglecting this means of improving its services to society.[77]

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[77] John Black Johnston, "Predicting Success or Failure in College at the Time of Entrance," School and Society, XX (July, 1924), p. 32.

CHAPTER III

AN EXPLANATION OF THE DATA

Collecting, recording and organizing the data contained in this report is explained in detail in this chapter. The following explanation also includes a description of the sample, a description of the data collected and a description of the organization of the data.

I. NATURE OF THE SAMPLE

A test battery was administered to all entering freshmen at The University of Texas, fall semester, 1955 under the supervision of the director of the Testing and Guidance Bureau. The test battery included, among other tests, two tests which were administered experimentally to explore the possibility of using them as a future admission test. A satisfactory score on an admission test was added to the entrance requirements for entering freshmen effective September 1956 and the two experimental tests were adopted as the admission test.

The sample in this study included all of the entering freshmen at The University of Texas who took the two experimental admission tests in the fall of 1955. The total number of students included in this study was 1748. There were 961 men and 787 women.

All of the entering engineering students were excluded from this study because they took a special engineering ability test battery which did not include the experimental admission test.

The students who did not take both of the experimental tests

were also excluded from the study. (N = less than 50)

II. SOURCES OF THE DATA

The data were secured from records on file in the following University of Texas offices: the Testing and Guidance Bureau and the Office of the Registrar.

The test scores from the aptitude test battery administered to the entering freshmen in September 1955 were secured from the Testing and Guidance Bureau. From this test battery the admission test score was calculated, converted in scale score units and recorded.

The achievement record of each student tested was secured from the Office of the Registrar for the 1955 fall semester and 1956 spring semester, 1956 fall semester and the 1957 spring semester. Each student's achievement record was recorded as follows for each semester and for the total period of attendance: (1) number of semester-hours passed, (2) number of semester-hours completed, (3) number of semester-hours failed and (4) number of grade-points earned.

The grade-point average for each student's entire period of attendance was calculated and recorded.

III. DESCRIPTION AND ORGANIZATION OF THE TEST SCORE DATA

A confidential mimeographed report was secured from the Director of the Testing and Guidance Bureau which listed the placement test battery scores for each student tested in September 1955. The placement test battery included the following two scholastic ability tests

which were later combined and used as the admission test: (1) the College Ability Test published by Educational Testing Service[1] and (2) the Word-Number Test published by the Steck Company in Austin, Texas.[2] Hereafter, the College Ability Test will be referred to as the "C.A.T."; the Word-Number Test will be referred to as the "W-N Test."

Each total score for the C.A.T. was converted to a "U.T. scale score" by means of a conversion table which was furnished by the Testing and Guidance Bureau and based on the following formula:

$$\text{C.A.T. "U.T. scale score"} = 80 + 20\left(\frac{X - M}{S.D.}\right)$$

where: X = C.A.T. score
M = C.A.T. mean
S.D. = C.A.T. standard deviation

Each total score for the W-N Test was also converted to a "U.T. scale score" by means of a conversion table which was also furnished by the Testing and Guidance Bureau and based on the formula:

$$\text{W-N "U.T. scale score"} = 80 + 20\left(\frac{X - M}{S.D.}\right)$$

where: X = W-N test score
M = W-N test mean
S.D. = W-N standard deviation

The Testing and Guidance Bureau's method of calculating the composite admission test score was employed to find the composite admission test score for each student as follows:

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[1] School and College Ability Test, Form 1A, 1955, pre-publication edition (Princeton, New Jersey: Cooperative Test Division, Educational Testing Service).

[2] H. T. Manuel and others, Test of Word-Number Ability, Forms K and L, 1955 (Austin, Texas: Steck Company).

$$\frac{X + Y}{2} = A$$

where: X = C.A.T. "U.T. scale score"
Y = M-N Test "U.T. scale score"
A = Composite admission test score

The admission test score as calculated in the fall of 1955 and the fall of 1956 is actually composed of two tests, the C.A.T. and the M-N Test. The composite admission test score is an arithmetic average of the "U.T. scale scores" of the two tests.

Each composite admission test score, thus secured, was recorded in an I.B.M. Card with the student's name, his fall 1955 alphabetic control number, his sex and the college he entered, by means of an I.B.M. key punch.

IV. DESCRIPTION AND ORGANIZATION OF THE ACHIEVEMENT DATA

In the Machine Records and Statistical Division of the Registrar's Office at The University of Texas, a summary card was prepared for each entering freshman, fall 1955, containing the following information for each semester of the 1955-1956 school year:

Alphabetic control number
Semester-hours passed
Semester-hours failed
Semester-hours completed
Grade-points earned

By use of the alphabetic control number, each student's name was machine-punched in the summary card and interpreted on the card. The test score cards and the achievement summary cards were then matched and merged mechanically.

Achievement cards, for which a test score was not available, were discarded. Test score cards for individuals who did not enroll as students were discarded. After the two sets of cards were accurately matched and merged and hand checked, the achievement summary data was off-set gang-punched into the test score set of cards.

During the 1956-1957 school year, machine control of the samples' achievement records was lost because each student is assigned a new alphabetic control number at the beginning of each school year. A permanent student identification number is not used at The University of Texas. Therefore, locating and recording the achievement record of each student for the 1956-1957 school year could not be accomplished by machines. This feature of the machine records procedure in the Registrar's Office at The University of Texas hinders follow-up studies of more than one school year in length. The laborious hand operation of locating and recording the second year's achievement record for each student was handled in the following manner. An achievement summary card was prepared by machines for each second year student enrolled during the 1956-1957 school year containing the following data for each semester:

Alphabetic control number
Semester-hours passed
Semester-hours failed
Semester-hours completed
Grade-points earned

The achievement summary cards were then merged and matched with an alphabetic master name deck and the student's name was gang-punched in each summary card. The achievement summary set of cards thus

produced provided the second year achievement record for most of the population being studied in addition to a large number of others not included in the study.

The 1956-1957 achievement summary set of cards was hand matched and merged with the original test score set of cards. After these two sets of cards were carefully hand matched and merged, and all discrepancies corrected, the second year achievement summary data was off-set gang-punched into the test card deck.

IV. TREATMENT OF THE DATA

With a record of each semester's achievement for each student and his admission test score recorded in an I.B.M. card, it was possible to record the following information in each student's card by use of the I.B.M. calculating machine punch:

total semester-hours passed,
total semester-hours failed,
total semester-hours completed and
total grade-points earned.

With this information in the card by using the calculating machine punch again, the overall grade-point average for each student was calculated and recorded in his I.B.M. card.

In this manner, the admission test score and the entire four-semester achievement record of each student was recorded in an I.B.M. card to facilitate rapid sorting and tabulating. Table I on page 42 lists the information which is recorded in the I.B.M. card for each student.

TABLE I

DATA RECORDED IN EACH I.B.M. CARD

Card columns	Data recorded
1 - 5	code number for student name
6	code for college entered
7	sex of student
8 - 10	admission test score
11 - 22	fall 1955 achievement
23 - 34	spring 1956 achievement
35	blank column
36 - 47	fall 1956 achievement
48 - 59	spring 1957 achievement
60	blank column
61 - 63	total hours passed
64 - 66	total hours failed
67 - 69	total hours completed
70 - 72	total grade points
73 - 76	grade point average
77 - 80	blank columns

In an effort to secure factual information to appraise the use of a single scholastic aptitude test score as a college admission requirement, various distribution and correlation tabulations were prepared with the above set of cards. The following chapters are devoted to the statistical treatment and interpretation of the data tabulations. The data was assembled and organized as explained in this chapter to make the following tabulations and interpretations possible.

CHAPTER IV

USE OF THE ADMISSION TEST FOR PREDICTING FUTURE ENROLLMENT CONTROL

Charts are presented and explained in this chapter to show the test score distribution for the sample, to show the per cent of the sample with test scores below various admission test scores and to show the per cent of the sample included between various admission test score limits.

I. TEST SCORE DISTRIBUTION

The admission test score distribution for the total sample is shown in Table II on page 45. From the distribution, the following values have been calculated:

$$M = 79.69$$

$$SD = 18.02$$

$$Q_1 = 66.52$$

$$Q_3 = 92.20$$

II. TEST SCORE PERCENTILE RANK

Test score data for the sample is presented in Table III on page 46 to show the number and per cent of the students with test scores below various admission test scores. For example, if 55 is set as the minimum admission test score, Table III shows that 145 students or 8.3 per cent of the 1748 students have test scores below

TABLE II

ADMISSION TEST SCORE DISTRIBUTION, FALL 1955

Test Score	Number of Students
140 - 149	1
130 - 139	8
120 - 129	26
110 - 119	55
100 - 109	150
90 - 99	270
80 - 89	331
70 - 79	386
60 - 69	222
50 - 59	181
40 - 49	58
Total	1748

TABLE III

NUMBER AND PERCENT OF STUDENTS WITH ADMISSION TEST SCORES BELOW ASSUMED MINIMUM ADMISSION TEST SCORES

Assumed Minimum Admission Test Score	Total Students With Test Scores Below Assumed Admission Test Score	
	Number	Percent
50	58	3.3%
52	88	5.0
55	145	8.3
57	180	10.3
60	239	13.7
61	260	14.8
65	365	20.9
67	429	24.5
70	521	29.8
75	711	40.7
80	907	51.9
90	1238	70.8
100	1508	86.3
110	1658	94.9
120	1713	98.0
130	1739	99.5
140	1747	99.9
150	1748	100.0

55. The table shows that 20.9 per cent of the 1748 sample have test scores below 65. Table III is simply a modification of a common percentile rank table.

With the aid of Table III, or an elaboration of Table III based on the percentile rank of various test scores, the per cent of students with test scores below a given test score can be readily found.

III. TEST SCORE DISPERSION

Table IV, page 48, has been prepared from information contained in the preceding tables to conveniently show the number and per cent of students included between consecutive, five-point class limits. Table IV, for example, shows that 190 students or 10.9 per cent of the sample are included in the test score class 70 to 74. Table IV shows at a glance the number of students and the per cent of the total sample that are included between various test score limits.

IV. PREDICTING FUTURE ENROLLMENT CONTROL

Data concerning the admission test score distribution has been presented in this chapter to appraise the admission test for predicting future enrollment control. If applicants for admission each year at The University of Texas since 1955 constitute a population similar to the sample involved in this study, the percentile rank tables prepared in this chapter can be used to predict the per cent of applicants who will be denied admission by any given admission test score, assuming, of course, that the same admission test is used. In this manner, the admission test can be used as a means of predicting future enrollment

TABLE IV

NUMBER AND PERCENT OF STUDENTS WITH ADMISSION TEST SCORES INCLUDED BETWEEN VARIOUS ADMISSION TEST SCORE LIMITS

Admission Test Score Limits	Total Students With Test Scores Included Between Test Score Limits	
	Number	Percent
40-44	5	.3
45-49	53	3.0
50-54	87	5.0
55-59	94	5.4
60-64	126	7.2
65-69	156	8.9
70-74	190	10.9
75-79	196	11.2
80-84	176	10.1
85-89	155	8.9
90-94	154	8.8
95-99	116	6.6
100-109	150	8.6
110-119	55	3.1
120-129	26	1.5
130-139	8	.5
140-149	1	.1
Totals	1748	100.0

CHAPTER V

USE OF THE ADMISSION TEST FOR ELIMINATING STUDENTS WITH LOW GRADE-POINT AVERAGE POTENTIAL

Data are presented in this chapter to show the portion of students falling below certain admission test scores who earn an overall "C" average (grade-point average of 1.000) or better during their entire period of attendance. The discriminating power of the admission test to identify potentially successful and potentially unsuccessful students as measured by grade-point average achievement will be appraised in the light of the data presented.

The grade-point average for each student which is used as a basis for the following discussion is the quotient found by dividing the total number of grade-points earned by the total number of credits completed (including all courses completed with grades of A, B, C, D or F) by each student for the entire four-semester period. For example, a student who attended only fall semester 1955, earned 30 grade-points and completed 15 credits, has a grade-point average of 2.000. A student who completed all four semesters with a total of 60 credits and 72 grade-points, has a grade-point average of 1.200. A student who attended only the first semester and failed all of his courses has a grade-point average of 0.000. A "B" average is represented by 2.000; an "A" average is represented by 3.000; a "C" average is represented by 1.000. In calculating the grade-point average, each credit of A grade is awarded three grade-points; each credit of B grade is awarded two grade-points;

each credit of C grade is awarded one grade-point; each credit of D grade or F grade is assigned zero grade-points.

I. GPA ACHIEVEMENT BELOW CERTAIN ADMISSION TEST SCORES

Table V on page 51 shows the grade-point average achievement record in relation to various assumed minimum admission test scores. For example, Table V indicates that 58 students have a test score below 50. Fifteen (15) of the 58 students or 25.9 per cent of them earned a grade-point average of 1.000 or better during the first four-semester period of attendance.

Seventy-four per cent of the 58 students or 43 students failed to earn a grade-point average of 1.000 or better. This fact is shown in Table VI, page 52, which supplements Table V by listing the number and per cent of students with test scores below given admission test scores who earn a grade-point average of less than 1.000.

Tables V and VI show that 1057 students or 60.5 per cent of the total sample of 1748 earned a grade-point average of 1.000 or better; 691 or 39.5 per cent earned a grade-point average of less than 1.000. These two tables also show that a higher portion of students earned a grade-point average of 1.000 or better as the admission test score is raised. Admission test scores from 55 and below eliminate groups of students of which about 75 per cent fail to earn a "C" average. As the admission test score is increased from 55 to 67, about 70 per cent of the total group eliminated earned a grade-point average below 1.000. As the admission test score is raised to 75, a score near the mean

TABLE V

NUMBER AND PERCENT OF STUDENTS WITH ADMISSION TEST SCORES BELOW ASSUMED MINIMUM ADMISSION TEST SCORES WHO EARNED AN OVERALL GRADE-POINT AVERAGE OF 1.000 OR BETTER

Assumed Minimum Admission Test Score	Students With Test Scores Below Assumed Minimum Admission Test Score		
	Total Number of Students	Number of Students Who Earned G.P.A. of 1.000 or Better	Percent of Students Who Earned G.P.A. of 1.000 or Better
50	58	15	25.9%
52	88	22	25.0
55	145	37	25.5
57	180	51	28.3
60	239	70	29.3
61	260	75	28.8
65	365	109	29.9
67	429	134	31.2
70	521	179	34.4
75	711	273	38.4
80	907	393	43.3
90	1238	627	50.6
100	1508	840	55.7
110	1658	972	58.6
120	1713	1024	59.8
130	1739	1048	60.3
140	1747	1056	60.4
150	1748	1057	60.5

TABLE VI

NUMBER AND PERCENT OF STUDENTS WITH ADMISSION TEST SCORES BELOW ASSUMED MINIMUM ADMISSION TEST SCORES WHO EARNED AN OVERALL GRADE-POINT AVERAGE OF LESS THAN 1.000 DURING FOUR SEMESTERS

Assumed Minimum Admission Test Score	Students With Test Scores Below Assumed Minimum Admission Test Score		
	Total Number of Students	Number of Students Who Earned G.P.A. of Less Than 1.000	Percent of Students Who Earned G.P.A. of Less Than 1.000
50	58	43	74.1%
52	88	66	75.0
55	145	108	74.5
57	180	129	71.7
60	239	169	70.7
61	260	185	71.2
65	365	256	70.1
67	429	295	68.8
70	521	342	65.6
75	711	438	61.6
80	907	514	56.7
90	1238	611	49.4
100	1508	668	44.3
110	1658	686	41.4
120	1713	689	40.2
130	1739	691	39.7
140	1747	691	39.6
150	1748	691	39.5

(Mx = 79.69), 61.6 per cent of the total group eliminated earned a grade-point average below 1.000. As the admission test score is increased to the maximum limit of 140 about 40 per cent of the total group eliminated earned a grade-point average below 1.000.

The admission test scores eliminate low grade-point average potential students with the following approximate limits:

(1) 75 per cent of the total number of students eliminated by scores below 55 earn a GPA of less then 1.000.

(2) 70 per cent of the total number of students eliminated by scores from 55 to 65 earn a GPA of less than 1.000.

(3) As test scores are raised above 65, a steadily decreasing per cent of the total number of students eliminated fail to earn a GPA of 1.000 or better.

(4) The per cent of students with low grade-point average potential eliminated by admission test scores varies from 75 per cent to 40 per cent as the admission test score is raised from the lowest limits to the highest limits.

(5) The lowest admission test scores discriminate between potentially successful and potentially unsuccessful students with about 75 per cent accuracy; that is, among 100 students identified as potentially unsuccessful, 75 will fail to earn a GPA of 1.000 or better during the first four-semester period; 25 of the students will earn a grade-point average of 1.000 or better.

II. GPA ACHIEVEMENT WITHIN CERTAIN ADMISSION TEST SCORE LIMITS

Table VII, page 55, shows the number and per cent of students included between various admission test score limits who earned a grade-point average of 1.000 or better. Table VII eliminates the effect of the cumulative number and cumulative per cent of students below a given admission test score and therefore emphasizes the fact that as the test score limits are raised, a greater portion of the students included within the test score limits earn a grade-point average of 1.000 or better. The per cent of students who earned a grade-point average of 1.000 or better varies from 20.0 per cent to 100 per cent as the test score limits are raised. Table VII supports the previous observation that the admission test score will eliminate students with low grade-point average potential and discriminate between the grade-point average potential of students within certain limits.

III. DISCRIMINATING VALUE OF ADMISSION TEST FOR PREDICTING GPA POTENTIAL

The data presented in this chapter indicate that, within certain limits, the admission test does discriminate between the potentially successful and potentially unsuccessful students as measured by grade-point average achievement. It has been found that as the admission test score is lowered, a higher per cent of the students eliminated will fail to earn a 1.000 grade-point average or better. The lowest admission test scores will identify the potentially low GPA achievement students with 75 per cent accuracy.

TABLE VII

NUMBER AND PERCENT OF STUDENTS WITH ADMISSION TEST SCORES INCLUDED BETWEEN VARIOUS ADMISSION TEST SCORE LIMITS WHO EARNED AN OVERALL GRADE-POINT AVERAGE OF 1.000 OR BETTER DURING FOUR SEMESTERS

Admission Test Score Limits	Students With Test Scores Included Between Test Score Limits		
	Total Number of Students	Number of Students Who Earned G.P.A. of 1.000 or Better	Percent of Students Who Earned G.P.A. of 1.000 or Better
40-44	5	1	20.0%
45-49	53	14	26.4
50-54	87	22	25.3
55-59	94	33	35.1
60-64	126	39	31.0
65-69	156	70	44.9
70-74	190	94	49.5
75-79	196	120	61.2
80-84	176	114	64.8
85-89	155	120	77.4
90-94	154	120	77.9
95-99	116	93	80.2
100-109	150	132	88.0
110-119	55	52	94.5
120-129	26	24	92.3
130-139	8	8	100.0
140-149	1	1	100.0
Totals	1748	1057	60.5

CHAPTER VI

USE OF THE ADMISSION TEST FOR PREDICTING SCHOLASTIC ACHIEVEMENT

The relationship between the admission test scores and the overall grade-point average achievement records is investigated in this chapter. The coefficient of correlation and the regression equation is presented for consideration in appraising the admission test for predicting scholastic achievement.

I. GPA - TEST SCORE DISTRIBUTION

Figure 1, page 57, shows the test score distribution in relation to the grade-point average distribution for the entire populations' four-semester achievement record. From this set of data, the correlation coefficient is found to be .52; the mean test score is 79.7; the mean grade-point average is 1.213; the test score standard deviation is 13.02; the grade-point average standard deviation is .696.

II. REGRESSION EQUATION FOR PREDICTING GPA

From the above data, the equation for the line of regression is found by using the following formula:

$$X - Mx = m\,(Y - My)$$

where: Y = test score
X = grade-point average

$$m = r\,\frac{\sigma x}{\sigma y}$$

Test Scores	Grade-Point Averages													f
	0.000-0.249	0.250-0.499	0.500-0.749	0.750-0.999	1.000-1.249	1.250-1.499	1.500-1.749	1.750-1.999	2.000-2.249	2.250-2.499	2.500-2.749	2.750-2.999	3.000	
140-149	0	0	0	0	0	0	0	0	0	0	1	0	0	1
130-139	0	0	0	0	0	1	0	0	1	1	2	1	2	8
120-129	0	1	1	0	2	0	2	0	6	5	2	7	0	26
110-119	1	0	0	2	5	8	6	7	5	11	7	3	0	55
100-109	2	4	4	8	16	17	19	18	27	20	8	5	2	150
90- 99	10	8	13	26	40	47	41	22	27	19	14	2	1	270
80- 89	20	17	26	34	38	62	46	44	21	14	6	1	:	331
70- 79	44	30	48	50	72	58	34	24	22	4	0	0	0	386
60- 69	48	25	48	52	46	26	19	10	8	0	0	0	0	282
50- 59	47	20	27	32	20	17	8	4	5	1	0	0	0	181
40- 49	19	8	8	8	8	4	2	0	1	0	0	0	0	58
f	191	113	175	212	247	240	177	129	123	75	40	19	7	1748

FIGURE 1

DISTRIBUTION OF ADMISSION TEST SCORES IN RELATION TO FOUR-SEMESTER GRADE-POINT AVERAGES

substituting known values in the above equation and solving for Y, the equation becomes: $X = .02Y - .381$.

The standard error of estimate for the above distribution is found by the following formula:

$$\sigma x = \sigma x \sqrt{1 - r^2}$$

Using this equation the standard error of estimate is calculated to be .594.

The coefficient of correlation of .52 indicates that there is not a close, positive correlation between the admission test scores and grade-point average achievement. Therefore, the admission test can be used to predict grade-point average achievement only within certain broad limits. The limits of prediction can be shown by use of the regression equation and the standard error of estimate. For example, by substituting a test score of 80 in the above mentioned regression equation the value of X, the grade-point average, is calculated to be 1.219. With the standard error of estimate of .594, the grade-point average for a test score of 80 is estimated to be 1.219 plus or minus .594 or .625 to 1.813. Two-thirds of the students with a test score of 80 will earn a grade-point average from .625 to 1.813. In other words, the chances are 2 to 1 that the grade-point average earned by a student with a test score of 80 will fall between .625 or 1.813.

Table VII, page 59, shows the computed grade-point averages for various given test scores. The regression equation can be used to predict the probable mean grade-point average achievement for any given test score within the limits of prediction set forth above.

TABLE VII

GRADE-POINT AVERAGES COMPUTED BY REGRESSION EQUATION

Test Score	Grade-Point Average	
	Computed Mean (X = .02Y - .381)	Computed Range Including 2/3 N (X = Y ± 0.594)
50	0.619	0.025 - 1.213
55	0.719	0.125 - 1.313
60	0.819	0.225 - 1.413
65	0.919	0.325 - 1.513
70	1.019	0.425 - 1.613
75	1.119	0.525 - 1.713
80	1.219	0.625 - 1.813
85	1.319	0.725 - 1.913
90	1.419	0.825 - 2.013
100	1.619	1.025 - 2.213
110	1.819	1.225 - 2.413
120	2.019	1.425 - 2.613
130	2.219	1.625 - 2.813
140	2.419	1.825 - 3.000

In order to compare the computed grade-point average for the test score of 80 with the observed data, the following raw score data is presented:

1. 29 students received a test score of 80
2. their grade-point average range is from .000 to 2.000
3. the total sum of their grade-point averages is 32.013
4. the mean GPA = 32.013/29 or 1.104
5. the standard deviation is .595

By comparing the above raw grade-point average data for a test score of 80 with the calculated data shown in Table VII for the same test score, it can be seen that the calculated grade-point average is near the observed values.

Figure 2, page 61, is a graph on which the test scores and the corresponding calculated GPA values in Table VII have been plotted. Figure 2 shows graphically the wide variation in the predicted grade-point averages for any given test score. The graph in Figure 2 can be used to find the predicted grade-point average value for any test score.

III. GPA PREDICTION VALUE OF TEST SCORE

From the evidence presented in this chapter, the correlation coefficient between the admission tests and the grade-point average achievement is found to be .52; the standard error of estimate is .594. Therefore, grade-point average achievement cannot be accurately predicted from the admission test score. It can be predicted that two-thirds of the students with a given test score will fall within a GPA range of plus or minus .594 from the estimated, mean GPA. With

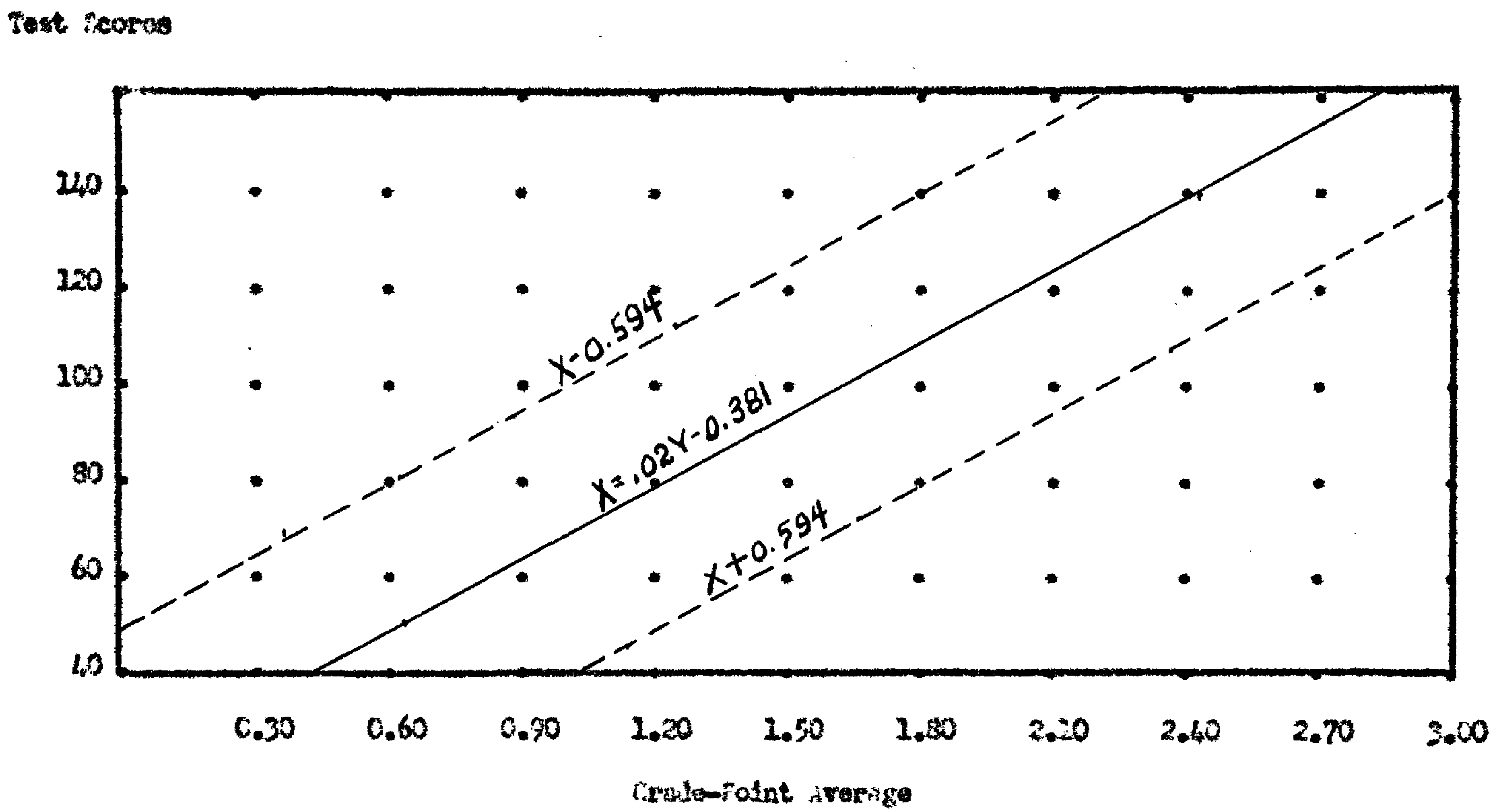

FIGURE 2

TH[illegible] RELATI[illegible] [illegible] T[illegible] [illegible] GR[illegible]-POINT [illegible] [illegible]
[illegible] CALCULAT[illegible]D BY THE [illegible]

this much variation, grade-point average achievement cannot be concisely predicted by the admission test scores.

CHAPTER VII

USE OF THE ADMISSION TEST FOR PREDICTING ACADEMIC SURVIVAL

The enrollment record by semesters in relation to the admission test scores is presented in this chapter to appraise the admission test as a means of predicting academic survival.

I. ENROLLMENT BY SEMESTERS

The data reveals that there is a steady decline in the number of students enrolled each semester. As shown in Table VIII, page 64, 1055 students or 60.4 per cent of the original population of 1748 completed the fourth semester. This means that 693 students or 39.6 per cent of the original 1748 did not complete the fourth semester of enrollment.

II. TEST SCORE DISTRIBUTION BY PERIODS OF ENROLLMENT

Table IX, page 65, shows the test score distribution of the students for each period of enrollment. By observation, it can be seen that there are withdrawals within each test score class but the greatest number of withdrawals occur among the low test score classes. For example, in the test score class, 110-119, there were originally 55 students which dropped to 53 students in the second semester and dropped to 45 students in the third and fourth semesters. This shows that 10 students or about 20 per cent in the test score bracket of 110-119 withdrew during the four-semester period.

TABLE VIII

ENROLLMENT RECORD BY SEMESTERS

Semester	Number of students enrolled	Percent of original population enrolled
Fall 1955		
Registered	1748	100.0%
Completed	1683	96.3
Spring 1956		
Registered	1523	87.1
Completed	1475	84.4
Fall 1956		
Registered	1207	69.1
Completed	1163	66.5
Spring 1957		
Registered	1076	61.6
Completed	1055	60.4

TABLE IX

ADMISSION TEST SCORE
DISTRIBUTION BY SEMESTERS

Test Score	Semester			
	Fall 1955	Spring 1956	Fall 1956	Spring 1957
140-149	1	1	1	1
130-139	8	8	7	7
120-129	26	26	21	22
110-119	55	53	45	45
100-109	150	141	124	118
90-99	270	254	220	196
80-89	331	292	243	220
70-79	386	330	255	223
60-69	282	237	174	154
50-59	181	138	96	72
40-49	58	43	21	18
Totals	1748	1523	1207	1076

In contrast, Table IX indicates that there were 386 students in the test class 70-79 enrolled the first semester. During the fourth semester there were 223 students in the 70-79 class enrolled. There were, therefore, 163 withdrawals (42.2 per cent) from class 70-79 during the four-semester period. This data reveals that there were withdrawals among the high test score score groups as well as among the low test score groups but the withdrawal rate among the low test score group is higher.

The mean, standard deviation, first quartile and third quartile for each semester's test score distribution are recorded in Table X, page 67. Since the greatest number of withdrawals occur among the low test score classes, the mean score increases each consecutive semester. The standard deviation decreases slightly after the first two semesters indicating that the test scores are less dispersed.

Table X shows that the Fall 1955 mean score is 79.69 and that the Spring 1957 mean score is 83.36. The mean score has increased 3.67 units. The standard error of the difference between the two means is .691. Since the computed difference of 3.67 is 5.31 times the standard error, it can be concluded that the two distributions are statistically different and the mean difference is significant.

It is assumed that the explanation for this significant difference in mean scores is that proportionately more students with low test scores withdraw during the four-semester period. This indicates that students with higher admission test scores tend to remain enrolled longer than students with lower admission test scores.

TABLE X

ADMISSION TEST SCORE MEAN, STANDARD DEVIATION, FIRST QUARTILE AND THIRD QUARTILE BY SEMESTERS

Semester	Mean	Standard Deviation	First Quartile	Third Quartile
Fall 1955	79.69	18.02	66.52	92.20
Spring 1956	80.92	18.03	67.93	93.53
Fall 1956	82.45	17.67	69.92	94.78
Spring 1957	83.36	17.76	70.62	95.62

III. TEST SCORE DISTRIBUTION OF WITHDRAWALS

Table XI, page 69, shows the total number of students with certain test score classes who withdrew during the four-semester period. The distribution of the withdrawals shown in Table XI tend to cluster about the low test score classes. There were a total of 672 students who withdrew prior to the beginning of the fourth semester. The mean test score for the 672 withdrawals is 73.83; the standard deviation is 16.90. The difference between the mean score of the students who dropped out (73.83) and the mean score of the students who entered the spring semester 1957 (83.36) is 9.53 which is a significant difference and the distributions are statistically different.

Table XII, page 70, converts the information in Table XI from total number of students to the per cent of students within certain test score classes who withdrew during the four-semester period.

This table shows that the students with low test scores constitute the largest portion of the withdrawals. For example, 60.2 per cent of the students with test scores from 50-59 withdrew prior to the fourth semester. On the other hand, only 21.3 per cent of the students with test scores from 100-109 withdrew before the fourth semester. From Table XII the probability of a student with a given test score withdrawing before the second, third or fourth semester starts can be predicted within limits.

For example, about 6 out of 10 students with test scores below 50 will withdraw prior to the fourth semester. About 4 out of 10 stu-

TABLE XI

TEST SCORE DISTRIBUTION OF STUDENTS WHO WITHDREW

Test Score	Total Number Enrolled Fall 1955	Total Number of Students Who Withdrew		
		Prior to Spring 1956	Prior to Fall 1956	Prior to Spring 1957
140 - 149	1	0	0	0
130 - 139	8	0	1	1
120 - 129	26	0	5	4
110 - 119	55	2	10	10
100 - 109	150	9	26	32
90 - 99	270	16	50	74
80 - 89	331	39	83	111
70 - 79	386	56	131	163
60 - 69	282	45	108	128
50 - 59	181	43	85	109
40 - 49	58	15	37	40
Totals	1748	225	541	672

TABLE XII

PERCENT OF STUDENTS WITHIN EACH TEST SCORE CLASS WHO WITHDREW

Test Score	Total Number Enrolled Fall 1955	Percent of Students Who Withdrew		
		Prior to Spring 1956	Prior to Fall 1956	Prior to Spring 1957
140 - 149	1	0.0	0.0	0.0
130 - 139	8	0.0	12.5	12.5
120 - 129	26	0.0	19.2	15.4
110 - 119	55	0.4	18.2	18.2
100 - 109	150	0.6	17.3	21.3
90 - 99	270	0.6	18.5	27.4
80 - 89	331	11.8	26.6	33.5
70 - 79	386	14.5	33.9	42.2
60 - 69	282	15.9	38.3	45.4
50 - 59	181	23.7	47.0	60.2
40 - 49	58	25.9	63.8	69.0
	N = 1748			

dents with test scores within the class 70-79 will withdraw before the fourth semester. Less than 2 out of 10 students with test scores over 100 will withdraw before the fourth semester.

IV. SURVIVAL PREDICTION VALUE OF TEST SCORES

As admission test score limits are lowered, the portion of students who withdraw before the fourth semester increases. Within certain limits, the academic survival of students can be predicted from the admission test scores. These limits are shown in Table XII, page 70.

CHAPTER VIII

SUMMARY AND CONCLUSIONS

An appraisal of a scholastic ability test as a college admission requirement for the following purposes is summarized in this chapter: (1) predicting future enrollment control, (2) eliminating students with low grade-point average potential, (3) predicting academic achievement and (4) predicting academic survival.

The presentation of this chapter is introduced by briefly restating the problem and the circumstances surrounding the problem. Findings from the literature are used to set forth a basis for appraising a scholastic aptitude test as an admission requirement. The appraisal standards, thus developed, are used to evaluate the statistical interpretations of the data assembled from the sample under consideration. Finally, certain conclusions are stated regarding selective admission principles resulting from this study.

I. BRIEF RE-STATEMENT OF THE PROBLEM

The purpose of this study is to appraise the use of a scholastic ability test as an admission requirement at The University of Texas. The primary problem involved in this study is to appraise the admission test as a means of predicting future enrollment control, eliminating students with low grade-point average potential, predicting academic survival and academic achievement. This is a status study restricted to presenting and interpreting data regarding the relationship between

admission test scores and the survival and achievement record of a specific group of students during a specific period of time. The sample was composed of 1748 students who entered The University of Texas in September 1955 as freshmen and who took the first experimental admission test to be administered by The University of Texas. The achievement record considered in this study was the overall grade-point average earned by each student during the four-semester period included in the 1955-1956 school year and the 1956-1957 school year. The grade-point average for each student was calculated by dividing the total number of grade-points earned by the total number of credits completed during the four-semester period. Credits completed include all course work completed with a grade of A, B, C, D or F. Grade-points were assigned on the basis of each credit at A grade equals three grade-points, each credit at B grade equals two grade-points, each credit at C grade equals one grade-point; D and F grades were assigned zero grade-points. The admission test score used in this study was an arithmetic average of the two scale scores received by each student on the following scholastic ability tests: the Word-Number Test (Steck Company, Austin, Texas) and the School and College Ability Test (Educational Testing Service, Princeton, New Jersey).

II. APPRAISAL STANDARDS FOR SELECTIVE ADMISSION

The primary purpose of selective admission at a university is to control the quality and quantity of the students accepted for admission. Actually, the traditional university entrance requirements have served as a device for a certain degree of selective admission. The fact that

a certificate of high school graduation is required for college admission is a means of controlling the quantity and, presumably the quality, of the students admitted. Gradually, for a variety of reasons, the traditional admission requirements have become more flexible, more liberal and less discriminating. As a result, universities have experimented with establishing other supplemental methods of establishing student quantity and student quality control. At the present time, there does not appear to be any method of student quantity and student quality control that is generally accepted and used universally. In fact, there appears to be considerable differences of opinion regarding the most accurate method of gaining student quantity and quality control.

Within the near future, it appears that the population trend, plus the liberal academic admission requirements, plus the apparent faith and value that society currently places in higher education, will combine to swell the college enrollment in this country. As this development occurs, many colleges may find it necessary to strengthen the admission requirements to control the size of the enrollment; that is, selective admission devices will need to be installed to control student quantity. This student quantity control will be based on student academic quality control.

The primary problem in controlling student academic quality is finding a means of accurately measuring academic quality or academic promise at the time that an applicant applies for admission to use as a reliable predictor of academic success. Herein lies the primary problem of selective college admission. At the present time, it appears

that the following suggestions for handling the selective admission problem may merit consideration.

1. A university's selective admission policy should take cognizance of each applicant's high school record. Acknowledging the fact that the high school record is subject to considerable question as far as objective measure is concerned, it has been consistently proven to be the best available single predictor of college success and it is generally agreed that the best basis for predicting future success in a given activity is to observe and/or measure the subject's degree of success in a similar activity.

2. To further refine the analysis of each applicant's academic ability, a university selective admission policy should include a scholastic ability test of proven merit. This is the best present means of objectively measuring the academic ability of applicants. The fact that students may or may not effectively apply their academic abilities in the future is not of immediate importance at the time of admission. Selective admission is a screening process which attempts to discriminate between those students with the greatest probability for academic success and those with the least probability of academic success.

3. A university's selective admission policy should be reasonably simple to facilitate practical administrative application. The selective admission policy must strike an optimum balance between elaborate methods of assessing each student's potential academic ability and the administrative feasibility of managing the policy. For example, it is doubtful that detailed and involved individual counseling and testing would be an

administratively feasible selective admission practice for all applicants at a large university even if it proved to be the most reliable means of accurately predicting academic success. The size of the institution and the complexity of its administrative organization will influence the institution's selective admission policy.

4. A university's selective admission policy should, within the closest limits possible, deny admission only to those applicants who are least likely to be academically successful and accept only those applicants who are most likely to be academically successful. The selective admission policy must discriminate fairly between the potentially successful and the potentially unsuccessful university students with a minimum of error.

5. A university's selective admission policy should be continually evaluated in a search to refine and improve the discriminating power of the selective admission standards. This important phase of university administration is worthy of elaborate, but practical useful and original research attention and support. It is only through such research that enlightened improvements can be made.

6. A university's selective admission policy should encourage original and practical experimentation in the area of identifying and measuring personal factors which contribute to academic success and which escape evaluation to a large extent at the present time. This will involve a cooperative effort on the part of the admissions office and the counseling office.

7. A university's selective admission policy should provide a

well organized and deliberately planned admission counseling service for those potential applicants (and their parents) who seek personal advice about their educational plans and information about the educational opportunities and requirements at the university. The admission counselors should also be charged with the responsibility of keeping the high school counselors and principals adequately informed about the university. In this way, the high school officials can help high school students make realistic future plans in line with their abilities and thereby assist in selective university admission.

8. A university selective admission policy should be supplemented with a strong counseling service to help those students who have been admitted, presumably with academic promise, to effectively apply their abilities to the successful completion of an educational objective, to the extent that the students appear to need help.

III. APPRAISAL OF A SCHOLASTIC ABILITY TEST TO PREDICT FUTURE ENROLLMENT CONTROL

It appears that a scholastic ability test is one of the best methods, currently available, for identifying those students with the greatest probability for academic success in a university. The results secured from a scholastic ability test lend themselves to statistical interpretation, thereby making it possible to calculate the probable number of future applicants who will receive test scores below any given score. Therefore, a scholastic ability test can be used to predict future enrollment control. Table III, page 46, presented in Chapter IV

shows the probable per cent of future University of Texas applicants who will be denied admission on the basis of various admission test scores, assuming that the future applicants will compose a population statistically similar to the sample in this study and assuming that the same admission test is used. For example, Table III indicates that 13.7 per cent of the future applicants will probably be denied admission if the admission test score is set at 60.

A scholastic ability test is one of the best objective measures of potential scholastic success, it is administratively feasible for practical use and it can be employed as a basis for accurately predicting future enrollment control.

IV. APPRAISAL OF A SCHOLASTIC ABILITY TEST AS A MEANS OF ELIMINATING STUDENTS WITH LOW GPA POTENTIAL

A scholastic ability test, when used as an admission requirement, will eliminate students who, for the most part, will not earn a grade-point average of 1.000 or better during the first four semesters of attendance. As the admission test score is lowered, the per cent of potentially successful students below the test score decreases. However, at the lowest test score limits, approximately 25 per cent of the students will earn a grade-point average of 1.000 or better. For example, Table V, page 51, shows that, according to the sample involved in this study, 25.9 per cent of the students included below an admission test score of 50 will succeed in earning a grade-point average of 1.000 during the first four-semester period of attendance; 25 per cent of the

students included below a test score of 52 will succeed in earning a grade-point average of 1.000; 25.5 per cent of the students included below a test score of 55 will succeed in earning a grade-point average of 1.000 or better; 43.3 per cent of the students included below a test score of 60 will succeed in earning a grade-point average of 1.000 or better.

This evidence indicates that a scholastic ability test can be used to eliminate only low grade-point average potential students with a maximum discrimination value of about 75 per cent. In other words, about 25 per cent of the students included below the lowest test score limits would probably succeed in earning a grade-point average of 1.000 or better during the first four-semester period of attendance. On the other hand, three-fourths of the students denied admission by a test score below 55 would have failed to earn a grade-point average of 1.000 during the first four semesters. Some students refused admission by a scholastic ability admission test would be successful if they were admitted. (As previously stated, this criticism can be made of every method of selective admission.) In spite of this objection, it appears that a scholastic ability test may be used to eliminate low grade-point average potential students with a maximum discrimination value of 75 per cent.

V. APPRAISAL OF A SCHOLASTIC ABILITY TEST FOR PREDICTING ACADEMIC ACHIEVEMENT

The coefficient of correlation between the scholastic ability admission test and the overall four-semester grade-point average for the sample under consideration proves to be .52 with a standard error

of estimate of .594. Therefore, the scholastic ability test is not a highly accurate means of predicting grade-point average. As shown in Table VII, page 59, for a given test score of 70, the predicted grade-point average is 1.019 plus or minus .594; two-thirds of the students with test scores of 70 will probably earn four-semester grade-point averages between .425 and 1.613. From the evidence presented in Chapter VI, it is readily seen that the admission test can be used to predict future grade-point average only within broad limits.

VI. APPRAISAL OF A SCHOLASTIC ABILITY TEST FOR PREDICTING ACADEMIC SURVIVAL

The scholastic ability test can be used to predict academic survival within certain limits. According to the data presented in Chapter VII, as the admission test score is lowered there is a steady increase in the percent of student who withdrew during the four-semester period. Table XII, page 70, shows that 69 per cent of the students with test scores between 40 and 49 withdrew prior to the fourth semester; 60.2 per cent of the students with test scores between 50 and 59 withdrew prior to the fourth semester; 45.4 per cent of the students with test scores between 60 and 69 withdrew prior to the fourth semester; only 15.4 per cent of the students with test scores between 120 and 129 withdrew prior to the fourth semester.

The scholastic aptitude test can be used to predict academic survival within certain limits. The probability limits for ten point test score class limits are given in Table XII. The probability that

a student will withdraw prior to the fourth semester varies from 69 per cent for the lowest test score class to zero (or less than 10 per cent) for the highest test score class.

VII. CONCLUSIONS

If a university, which has extended to the limit of its facilities, is confronted with a large number of applicants for admission in relation to the number that can be accepted, a scholastic ability test can be used as an admission requirement to control enrollment. The scholastic ability test, used as an admission requirement, will admit those applicants who have the greatest possibility for academic survival and achievement; the discrimination between applicants will be made objectively and impartially by relying on the applicants' demonstrated performance on the objective test.

A scholastic ability test is administratively feasible to fit into a selective admission program and administer efficiently and effectively.

If an institution is adequately staffed for the number of students and applicants involved or if it is desirable from the institution's point of view to deny admission to the minimum number of applicants or to only those applicants who will very probably fail, a more sophisticated and refined selective admission policy could be established to more accurately discriminate between the potentially successful students and the potentially unsuccessful students. The maximum selectivity would probably be secured through individual testing and counseling

techniques. The practical problems of administrative application frequently prohibits such an elaborate selective admission procedure; some institutions, however, may find such a policy feasible.

As The University of Texas enrollment swelled beyond 18,000 in 1955, which taxed the facilities to the maximum limit, an administrative decision was made to limit future enrollment on the main University campus in Austin to a maximum of 20,000 students. This development was caused by the fact that the number of applicants who successfully met the regular admission requirements of a certificate of graduation from high school with a prescribed pattern of preparatory courses exceeded the University facilities. In an effort to place a control on the enrollment, a scholastic ability test was added to the regular admission requirements.

The current study is an attempt to appraise the scholastic ability test as an admission requirement. The appraisal has been made in the light of a careful review of the literature regarding the prediction of college success from test scores and literature regarding admission practices as well as the relationship between admission test data and the four-semester achievement and survival records of the 1743 students who entered the University of Texas in September 1955 as freshmen and took the admission test on an experimental basis.

The results of the appraisal are listed below:

1. A scholastic ability test can be used as a selective admission requirement to accurately predict future enrollment control.

2. A scholastic ability test can be used as a selective admission

requirement to eliminate only low grade-point average potential students within certain limits which are defined in Chapter V.

3. The correlation between admission test scores and four-semester grade-point average achievement for the sample under consideration is .52 with a probable error of .594. A scholastic ability test used as an admission requirement can be used to predict probable grade-point average achievement within only broad limits; in two chances out of three the predicted grade-point average will fall within a grade-point average class of 1.188 grade-point average units in size.

4. A scholastic ability test can be used to predict academic survival within limits. Sixty nine per cent of the students with test scores in the lowest class, that is 40 to 49, will probably withdraw prior to the fourth semester. As test scores limits are increased, the percent of the students who withdraw prior to the fourth semester decreases. Twelve and five-tenths per cent of the students included between the test score limits of 130 to 139 withdrew prior to the fourth semester. A scholastic ability test can be used to predict scholastic survival within certain limits as set forth in Chapter VII.

Considering the large number of students and applicants involved at The University of Texas, the size of the institution, the complexity of its administrative organization, the wide geographical area that it serves and the urgency of establishing a more selective admission policy, this writer concludes that the scholastic ability test as an admission requirement is the best available means of meeting the current problem of controlling enrollment at the University of Texas.

In light of the fact that the decisions reached in the admissions office are of utmost importance and in light of the fact that the admission policy should be subjected to continual evaluation, certain suggestions are set forth below which may merit consideration.

Continued research should be deliberately planned, conducted and supported to provide factual evidence for evaluating and improving the selective admission policy.

The admissions office and the counseling office should work in close cooperation and exchange data and information freely in an effort to establish better methods of measuring potential academic qualities and thereby discover a method to increase the accuracy of predicting academic success.

Admissions counselors, working either in the admissions office or the counseling office, should be employed for the purpose of meeting prospective students (and their parents) to answer questions about the University, explain educational opportunities available at the University and help prospective students establish their educational plans. Admissions counselors should also be responsible for keeping high school officials informed and provided with information regarding University requirements and expectations so the high school officials can help students make realistic plans in line with the level of their abilities and the University's requirements.

The admission counselors should also be responsible for collecting data and conducting follow-up research to evaluate the selective admission practices.

The primary purpose of selective admission is to control the academic quality of the students who are admitted to a university. By applying the student academic quality control, student quantity, or the university enrollment can also be controlled. A selective admission policy carries with it the responsibility to fairly and objectively discriminate by reliable proven methods between the acceptable candidates and the unacceptable candidates. This responsibility dictates that the best possible method of selection shall be used and a continual effort shall be devoted to refining and improving the selection method.

BIBLIOGRAPHY

BIBLIOGRAPHY

Borow, Henry. "Current Problems in the Prediction of College Performance," American Association of Collegiate Registrars Journal, XXII (October, 1946), 14-26.

Bowles, F. H. "Past, Present and Future of Admission Requirements," College and University, XXXI (Summer, 1956), 309-327.

Cosand, Joseph P. "Admissions Criteria," College and University, XXVIII (April, 1953), 338-364.

Durflinger, Glenn W. "The Prediction of College Success - A Summary of Recent Findings," American Association of Collegiate Registrars Journal, XIX (October, 1943), 68-76.

Fricke, B. G. "Prediction, Selection, Morality and Quality Control," College and University, XXXII (October, 1956), 34-52.

Garrett, Harley F. "A Review and Interpretation of Investigations of Factors Related to Scholastic Success in Colleges of Arts and Sciences and Teachers Colleges," Journal of Experimental Education, XVIII (December, 1949), 91-138.

Jackson, Robert A. "Admission by Examination," College and University, XXX (January, 1955), 182-185.

Jackson, Robert A. "Prediction of the Academic Success of Freshmen," Journal of Educational Psychology, XXXXVI (May, 1955), 296-301.

Johnston, John Black. "Predicting Success or Failure in College at the Time of Entrance," School and Society, XX (July, 1924), 27-32.

Knutson, Howard. "Admission Requirements of State Universities and Land Grant Colleges," College and University, XXX (April, 1955), 334-343.

Manuel, H. T., and others. Test of Word-Number Ability, Forms K and L, 1955. Austin, Texas: Steck Company.

Matteson, Ross W. "Individual Admissions Through Testing and Counseling," College and University, XXIX (April, 1954), 390-396.

O'Connor, V. J. "Selective Admission of Air Force Academy Cadets," College and University, XXX (Winter, 1953), 163-171.

School and College Ability Test, Form 1A, 1955, pre-publication edition. Princeton, New Jersey: Cooperative Test Division, Educational Testing Service.

Sturgis, Horace W. "Trends and Problems in College Admissions," College and University, XXVIII (October, 1952), 5-16.

Thresher, B. Alden. "Some Principles of Selective Admission," College and University, XXXI (Summer, 1956), 495-499.

Travers, Robert M. W. "The Prediction of Achievement," School and Society, LXX (November, 1949), 293-294.