

THE CONSTRUCTION OF SCALES FOR PREDICTING
ACADEMIC SUCCESS IN COLLEGE

A Thesis
Presented to
the Faculty of the Department of Psychology
University of Houston

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

by
Nancy Rainbolt King
August 1966

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AN ABSTRACT

The purpose of this study was to illustrate a procedure for constructing, and, to construct, scales for predicting success in first year freshman courses for full time students at Houston Baptist College from scores made on the Scholastic Aptitude Test of the College Entrance Examination Board and past academic performance in the sophomore and junior years of high school.

The predictor variables selected for use in "Scale A" of this study were as follows: the Scholastic Aptitude Test of the College Entrance Examination Board (Verbal, Mathematical, and Total scores) and high school grade point averages from the sophomore and junior years (Verbal, Quantitative, and Total).

The 256 subjects for this study were selected from among 573 freshmen entering Houston Baptist College in the Fall semesters 1963 and 1964. In addition, they met the following requirements: (a) had taken the Scholastic Aptitude Test of the College Entrance Examination Board; (b) entered as new freshmen attending college for the first time, or had completed no more than 6 hours in summer school; (c) had available transcripts of the sophomore and junior years in high school; and (d) had attempted and completed not less than 12, nor more than 40 semester hours for the year.

Frequency distributions were prepared for each variable in relation to a dichotomy of "successful" or "unsuccessful" performance. Successful performance was defined as an end of the year grade point average of 2.5 or higher. Unsuccessful performance was defined as an end of the year grade point average of 2.4 or less,

These frequency distributions were then arranged to afford relative percentages of success, by interval, varying directly with the magnitude of the scores achieved and were used to compile the distributions for the "score sheets."

The equivalent "per cent successful" score was computed for each student on each variable and applied toward the student's "total predictive score." "Total predictive scores" were then obtained on all 256 students, and placed into frequency distributions according to successful or unsuccessful performance. These distribution interval sizes were then arranged so that the most favorable increase in per cent successful was obtained ranging from the lowest to highest interval.

The validation sample consisted of 133 students who met the same criteria as the original sample except that they entered Houston Baptist College in the Fall semester 1965. The scores achieved by each of these students on each of the six variables were converted to "total predictive scores" with the use of the "score sheets" and located in the appropriate "total predictive score" intervals on the predictive scale. If the percentage of students within any given interval had been successful in 50 per cent or more of the cases it was predicted that the validation individual would be successful. If less than 50 per cent of the students within an interval were successful it was predicted that the validation individual would be unsuccessful. The grade a student actually received was then checked against the predictions

made. Accuracy of prediction was determined for each class interval by computing the percentages of correct predictions. The accuracy of predictions for the scale was 77 per cent. Predictions were also made based upon each of the six predictor variables. Accuracy of these predictions ranged from 62 per cent to 83 per cent.

This study, then, presents a method of constructing a scale for predicting academic success in college based on information which is readily available. This scale is accurate, easy to use and interpret, and may be useful in a program of selective admissions and as a counseling technique.

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CHAPTER I

THE PROBLEM

Introduction

Since Houston Baptist College is a rather new school - having opened for the first time in September, 1963 - its requirements for admission are somewhat different from the larger colleges and universities.

It is felt the admission proceedings are on an individual and personal basis, which it hopes to maintain, even with an increasing enrollment.

At Houston Baptist College there is no designated "cut-off" score for the college board tests. There is no stated high school grade-point average or rank which a prospective student must have.

Rather, admission is based on a number of other aspects. Very heavily weighted are recommendations from two previous teachers of the student's, who would know his potential as to classroom performance; his counselor, who has an overall view of the student, his school work, extra-curricular activities and motivation; and his pastor who would be aware of his outside environment, spiritual convictions and personal qualities. Along with this, consideration is given his scores on college board tests, and his previous academic record.

A person is considered in light of all this available information. If there is still some question as to admission, the student is normally called in for a personal interview with the admissions committee.

Many students are admitted, who graduated before the initiation of college board tests. In such a case, the student is admitted on a trial basis for one semester.

This individual and personal review of each admission request, is of great value to the student, in that his admission is based on not one factor alone, but a total view of his potential for academic success.

Statement of the Problem

The purpose of this study was to illustrate a procedure for constructing, and, to construct, scales for predicting success in first year freshman courses for full time students at Houston Baptist College from scores made on the Scholastic Aptitude Test of the College Entrance Examination Board and past academic performance in the sophomore and junior years of high school.

Need for the Study

This study resulted from a two-fold need. First, there is a need to identify those students most likely to succeed academically at Houston Baptist College. Those applicants whose scores and high school record indicate little chance for academic success, should be conducted toward areas of achievement which are more commensurate and attainable.

Secondly, the method of presenting and interpreting test results needs to be done in a manner which will be more easily understood and more acceptable to prospective students.

Through this study then, an attempt is made to design scales which will be beneficial in screening prospective students by

predicting academic success for the freshman year, and by devising a method for presenting these scores which will be readily understood and accepted by the prospective student. This method will show the probability of success as compared to others with whom he would be competing.

Limitations of the Study

This study is not an attempt to predict general academic success in college. The scale developed, is an attempt only to predict academic success in first year college work initiated by freshmen entering Houston Baptist College for the first time in the Fall semesters 1963 and 1964 as determined by grades earned during the first year of enrollment.

The scale produced by this study, consisting of six variables, is based on the Scholastic Aptitude Test scores and academic success in the sophomore and junior years of high school. A second scale produced, consists of all six variables combined into a single predictive scale.

Although other test scores and measures of previous academic success are available, it is suggested that some of these variables might well be investigated in future studies of this nature.

It is hoped that counselors will find valuable, the information presented showing the relative predictive values of these scales, in presenting information to prospective students concerning the probability of success in first year academic work at Houston Baptist College.

Admittedly, this study is of limited value as to prediction of general academic success in work beyond the freshman year. Nor is it

intended to be of general value for predicting academic success
at any college other than Houston Baptist College.

CHAPTER II

SURVEY OF THE LITERATURE

There are many studies in the literature which attempt to predict academic success or failure at the college level. The following review, however, is limited to those studies in which the method of construction of the predictive scales were similar to the one used in this study.

Hammer (3) in his study based on 576 students, constructed three scales for predicting academic success in all first semester courses for full time students at the University of Houston. The predictor variables selected for use in the first scale of the study include: the Scholastic Aptitude Test of the College Entrance Examination Board (Verbal, Mathematics, and Total scores) and the High School Quarter in which the student graduated. For the second scale Hammer selected the following predictor variables: (a) the American Council on Education Psychological Examination for College Freshmen, 1947 Edition (Linguistic and Total scores); (b) the Cooperative Inter-American Tests, Test of Reading, Advanced Level, Form BE (part II, Reading Comprehension and Total scores); (c) the Cooperative English Test A: Mechanics of Expression, Form Z; and (d) the University of Houston Mathematics Placement Test. The four variables of the first scale and the six variables of the second scale were combined to create the third scale. The accuracy of predictions for the three scales ranged from 71 per cent to 77 per cent. Predictions were also made based upon each of the ten predictor variables. Accuracy of these predictions ranged from 54 per cent to 77 per cent.

Wihlborg (6) constructed a scale of eight variables in predicting academic success in the seventh grade of junior high school using 119 students. The predictor variables consisted of six scores obtained from: (a) An Intelligence Quotient derived from the Otis Quick-Scoring Mental Abilities Test Beta, Form FM; (b) six grade scores yielded by the six subtests of the Stanford Achievement Test, KM, Intermediate Form: Paragraph Meaning, Word Meaning, Language, Spelling, Arithmetic Reasoning, and Arithmetic Computation; and (c) a grade average of the basic subjects studied in the sixth grade; reading, arithmetic, language, spelling, science and geography. The scale was validated using 34 students, who met the same criteria as the original group. The accuracy of prediction for the scale as a whole ranged from 50 per cent to 100 per cent. The accuracy of predictions for each interval based on the expected was also obtained, and except for one interval of 50 per cent, all were 100 per cent.

Cone (1) developed a scale for predicting academic success in the first year of college at the University of Houston. The predictor variables consisted of seven scores obtained from three tests used in the freshman guidance battery. When the scale was validated, accuracy of predictions ranged from 30 per cent to 100 per cent, when predicted grossly. However when predicted on an individual interval, the accuracy was 66 per cent to 100 per cent. The sample group was composed of 801 students who first entered the University of Houston in the Fall of 1957 and met other criteria. The predictor variables were: (a) the American Council of Education Psychological Examination

for College, 1947 Edition; (b) the Cooperative English Test A: Mechanics of Expression, Form Z; and (c) the Cooperative Inter-American Tests, Test of Reading, Advanced Level, Form AE. The scale was validated on 172 randomly selected students entering the University of Houston in Fall 1958 and meeting the same criteria as the original group.

Taulbee (5) also developed a scale for predicting academic success in the College of Optometry at the University of Houston. The eight predictor variables used were from the Optometry Test Battery administered at the time of admission to the College. The accuracy of prediction was 96 per cent. However, when computed for each separate predictor variable, accuracy was a little lower, ranging from 83 per cent to 89 per cent.

Gillespie (2) constructed and validated scales for the prediction of academic success at the college level in Freshman English, Freshman Mathematics and American History at Arlington State College. For this study, students enrolled in the Fall of 1958 for the first time were used as follows: 860 for English; 679 for Mathematics; and 533 for History. The predictive factors used were: (a) Cooperative English Tests, Test A: Mechanics of Expression, Form Z; (b) the Cooperative Elementary Algebra Test, Form I, and (c) raw scores on the "Quantitative," "Linguistic," and "Total" sections of the American Council of Education Psychological Examination for College Freshmen, 1947 Edition. The accuracy of predictions for two validation groups of 250 each, ranged from 81 per cent to 92.4 per cent.

Neumeyer (4) constructed a scale for predicting academic success at the University of Houston in English 131. The predictions were

based upon the results of scores earned by 692 students on three tests included in the freshman guidance battery. The scale was validated on 100 students who entered the University of Houston in the Spring of 1957. The predictor variables used were (a) the Cooperative English Test A: Mechanics of Expression, Form A; (b) the Cooperative Inter-American Tests, Test of Reading, Advanced Level, Form AE; and (c) the American Council on Education Psychological Examination for College Freshmen, 1947 Edition. The percentages of accuracy ranged from 55 per cent to 75 per cent.

The studies reviewed, each represent an effort to update available data, in an attempt to be of more service to students in choosing and following educational goals.

This study was done in the hope that it will aid and facilitate the staff at Houston Baptist College. Not only may it serve as an aid in the screening and direction of entering freshmen, but eventually, that it will serve as a basis for further studies beyond the first year of college work, and for studies within the individual subject areas at Houston Baptist College.

CHAPTER III

THE SAMPLE GROUP, PREDICTOR VARIABLES AND PROCEDURES USED

The Sample Group

The subjects for this study were selected from among 191 freshmen entering college during the Fall Semester, 1963, and 382 freshmen during the Fall Semester, 1964, at Houston Baptist College. The sample group also met the following requirements: (a) had taken the Scholastic Aptitude Test of the College Entrance Examination Board; (b) entered as new freshmen attending college for the first time, or had completed no more than 6 hours in summer school; (c) had available transcripts of the sophomore and junior years in high school; and (d) had attempted and completed not less than 12, or more than 40 semester hours for the year. The number who met this criteria was 256.

Predictor Variables

The predictive variables used in constructing "Scale A" were the Scholastic Aptitude Test (Verbal, Mathematical, and Total scores), and high school grade point averages (Verbal, Quantitative, and Total).

The Scholastic Aptitude Test (SAT) of the College Entrance Examination Board consists of two parts which yield three scores. It is designed to measure the basic skills and abilities that a student employs in his school work and his reasoning ability. The verbal part emphasizes comprehension, reasoning ability, and perception. The mathematical section measures the students ability to comprehend mathematical relationships and solve problems. The first part of the test yields a verbal score (SAT-V), and the second part a

mathematical score (SAT-M). These two scores are combined to obtain a total score (SAT-T). All of these scores are expressed as standard scores.

The academic record of the sophomore and junior years of high school was used as a predictor variable without regard as to the type of high school curriculum followed or to the size, location, or reputation of the school which reported this information on the high school transcript. The symbols used for high school academic progress are as follows: (a) High School - Quantitative (HS-Q), represents the grade point average of grades earned in mathematical and science courses during the sophomore and junior years of high school; (b) High School - Verbal (HS-V), represents the grade point average of grades earned in English, Social Studies, and Language courses during the sophomore and junior years of high school. In addition, (c) High School - Total (HS-T), represents the High School - Verbal average plus the High School - Quantitative average. In averaging these grades, the following grade point scale was employed: 92-100=A=4; 84-91=B=3; 76-83=C=2; 70-75=D=1; and, 69 and below=F=0.

Procedures Used in Preparing the "Score Sheet"

Frequency distributions were prepared for each of the six variables of the first scale (Scale A): SAT-V, SAT-M, SAT-T, HS-V, HS-Q, and HS-T. The test scores within each of the first three distribution intervals were recorded in relation to a dichotomy of "successful" and "unsuccessful" performance. "Successful" performance was defined

as a one year grade point average of 2.5 or above.

The interval size for these frequency distributions were then arranged in such a manner that the most favorable increase in per cent successful for low intervals to high would be obtained on each variable. After each score had been tabulated in it's proper frequency interval - and located according to either "successful" or "unsuccessful" performance - the number of "successful" scores within each interval was divided by the total number of scores within that interval, producting a "per cent successful" score. The "per cent successful" scores were determined for each interval on each of the six variables included in Scale A and were used to compile the distrivutions for the "score sheet" shown in Table I.

This score sheet is interpreted in the following manner. Of the students with standard scores on the SAT-V located within the interval "600-659", 86 per cent were "successful". On the other hand, on the same variable in the interval "440-559" only 39 per cent of the students whose scores are included in this interval were "successful." Therefore, for any student of a comparable group whose SAT-V score places him in the interval "600-659" the odds are 86 in 100 that he would be successful as defined here, and, for any student whose SAT-V score lies in the interval "440-559", the odds are only 39 in 100 for him to be successful. This means then that students with higher SAT-V scores have a greater number of chances in 100 for success. The same interpretation would be made for the other "per cents successful" figures for each of the other intervals on this, and the five remaining variables.

TABLE I
SCORE SHEET FOR SCALE A FOR PREDICTING SUCCESS FOR
FIRST YEAR COURSES AT HOUSTON BAPTIST COLLEGE

PREDICTIVE FACTORS AND SUB-CATEGORIES		PER CENT SUCCESSFUL
I. SAT-V (Standard Score)		
660 and Above		100
600-659		86
560-599		77
440-559		39
340-439		22
339 and Below		00
2. SAT-M (Standard Score)		
710 and Above		100
685-709		80
600-684		69
540-599		63
452-539		46
346-451		28
345 and Below		00
3. SAT-T (Standard Score)		
1280 and Above.		100
1200-1279		86
1100-1199		65
900-1099.		44
800-399.		25
699-799		14
698 and Below		00
4. HS-Q		
4.0		100
3.5 - 3.9		83
3.1 - 3.4		58
2.7 - 3.0		45
2.0 - 2.6		37
1.0 - 1.9		13
.99 and Below		00

5. HS-V

4.0	99
3.5 - 3.9	74
3.1 - 3.4	66
2.7 - 3.0	46
2.2 - 2.6	29
1.5 - 2.1	13
1.4 and Below	00

6. HS-T

7.8 and Above	100
7.0 - 7.7	85
6.2 - 6.9	57
5.4 - 6.1	53
5.0 - 5.3	42
3.0 - 4.9	20
2.9 and Below	00

Procedures Used in Constructing the Predictive Scale

After the completion of the "score sheet", the next step in the construction of the predictive scale was the computation of the "total predictive score" for each of the 256 students in the original sample.

With the use of Table I, the score made by a student on each predictive factor was used to obtain the student's "total predictive score." An example may best illustrate this procedure. A student obtained these scores on the six variables of Scale A: (a) SAT-V 635; (b) SAT-M 530; (c) SAT-T 1215; (d) HS-V 2.9; (e) HS-Q 2.9; and (f) HS-T 5.6. The SAT-V standard score of 635 is located in the interval "600-659" in which 86 per cent were "successful", giving the student 86 points toward his "total predictive score". Points earned by this student toward his "total predictive score" on the other variables are found to be 63, 86, 46, 45, and 53. The sum of these points 86, 63, 86, 46, 45, and 53 earned by the student in this example is 379, the student's "total predictive score." In a similar manner, Table I was used for computing the "total predictive scores" for all 256 students. These 256 "total predictive scores" provide the data for the final step in constructing the predictive scale.

These scores were then tabulated into another frequency distribution according to "successful" or "unsuccessful" performance as determined by the end of year grades. The resulting distributions shown in Table II become the predictive scale by means of which predictions may be made for other comparable students. For convenience, the columns in Table II labeled "per cent unsuccessful"

and "per cent successful" were added.

Table II may now be used for predicting success for students other than the 256 included in the original sample. One may, from a knowledge of a student's scores on the six predictive variables obtain the student's "total predictive score" from the "score sheet", Table I. Suppose the "total predictive score" for such a student is 379. This student then is located in Table II in the interval labeled "350-399", and interval in which 78 per cent of the 18 students of the original sample were successful. The odds then are 78 in 100 for our student in this example to be successful. A student whose "total predictive score" is located in the interval "150-199" will have 37 chances out of 100, or his probability of success is 37 per cent. The same method of interpretation is applied to scores located in other intervals of the predictive scale.

TABLE II
 SCALE A - TOTAL PREDICTIVE SCORE
 FOR PREDICTING SUCCESS IN FIRST YEAR
 FRESHMAN COURSES AT HOUSTON BAPTIST COLLEGE

TOTAL PREDICTIVE SCORE INTERVALS	N	GRADE POINT AVERAGE EARNED			
		UNSUCCESSFUL		SUCCESSFUL	
		No.	%	No.	%
450 and Above	26	0	0	26	100
400-449	13	1	8	12	92
350-399	18	4	22	14	78
300-349	33	11	33	22	67
250-299	38	23	61	15	39
200-249	35	22	63	13	37
150-199	40	34	85	6	15
100-149	35	32	91	3	9
99 and Below	18	18	100	0	0
TOTALS	256	145		111	

CHAPTER IV

VALIDATION OF THE PREDICTIVE SCALE

The type of predictive scale produced in this study (Table II) is easily and accurately validated. A second group of students is selected on whom data are available for the six variables and who meet the criteria of the original sample group. The "total predictive scores" are obtained by converting the achieved scores using the "score sheet" and tabulating these scores, predicting success or lack of success, and then checking the accuracy of the predictions against the actual grade point average earned.

The validation group consists of 133 students from among 354 freshmen entering Houston Baptist College during the Fall semester, 1965, for whom all data on the six variables are available, and who meet the same criteria as the original sample group. It may be said, these 133 students are a comparable group but who entered in the Fall of 1965 instead of 1963 and 1964.

Each of the scores achieved by each of the 133 students on the six variables of Scale A are used to obtain "total predictive scores" with the use of Table I. These "total predictive scores" for each student are then located in the appropriate frequency distribution class intervals in Table II.

Prediction of success with all three scales is determined on the basis of the percentage who are successful within the class interval. If 50 per cent or more of the students of the sample group whose scores are contained within an interval are successful, it is predicted that all of the students of the validation group

within that interval will be successful in first year freshman courses at Houston Baptist College. If 49 per cent or less of the students within an interval are successful, the prediction is made that all of the students of the validation group within that interval will be unsuccessful. Predictions for individuals is on an "all or none" basis, and, on Scale A it is predicted that all students with a "total predictive score" of 300 or above will be successful (Table II).

This procedure can best be illustrated by an example. A student achieves the following scores on the six predictor variables: SAT-V 635; SAT-M 580; SAT-T 1215; HS-V 2.9; HS-Q 2.9; and HS-T 5.6. By locating these scores on the "score sheet" (Table I), these scores can be converted to points earned toward the students' "total predictive score". The points earned by this student are: 86, 63, 86, 46, 45, and 53 respectively. The sum of these points is 379. The frequency interval of "Scale A - Total Predictive Score" (Table II) within which the score 379 is located is "300-349." The percentage of students, of the sample group, within this interval who are successful in first year work at Houston Baptist College is 67 per cent. It is predicted that this student will be successful since his score is above the 50 per cent "cutoff" point and that he has 67 chances out of 100 of success in his first year's work.

The grade point average a student actually received, is then checked against the predictions made on the basis of his placement within class intervals according to the scale. The percentage of correct predictions for each class interval is computed to determine the accuracy of the predictions. This is computed by dividing the

number of correct predictions by the total number in the validation group. The results of this validation study for the scale are presented in Table III. Accuracy of prediction was computed to be 77 per cent. This is to say the predictions are correct, on a whole, in 77 per cent of the cases.

It is expected that the percentage of accuracy of prediction for each of the intervals in the validation study, will be the same as the percentage of those who were successful above the "cutting" point and unsuccessful below the "cutting" point. For example, on Scale A (Table II), 67 per cent of the students whose score was within the interval "300-349" are successful in first year freshman work at Houston Baptist College. Eighteen students in the validation study obtained a "total predictive score" within this interval, all of which are predicted to be successful. Of these eighteen students, twelve were actually successful, making the accuracy of prediction 67 per cent. The validation group within this interval range is in complete agreement with the number expected to be successful as predicted for this interval by Table II, both being 67 per cent. At the lower end of the same scale, within the interval "100-149", the predictive scale shows that 91 per cent of the students whose "total predictive scores" are within this interval are unsuccessful. Of these twenty, nineteen were actually unsuccessful, making the accuracy of the prediction 95 per cent. For this interval there is an error of 4 per cent in predicting for individuals on an "all or none" basis.

Information concerning the predictive efficiency of each of the

six single variables when used alone is presented in Tables IV through IX. Predictions in this case are made directly from the "score sheet." The same validation group of 133 is used. The predictor variables presented in order of predictive efficiency, are as follows:

HS-T 83%, HS-V 82%, HS-Q 73%, SAT-M 68%, SAT-T 67% and SAT-V 62%.

TABLE III

THE DISTRIBUTION OF THE VALIDATION GROUP COMPARING
 PREDICTIONS ON SCALE A BASED ON THE SIX VARIABLES:
 SAT-V, SAT-M, SAT-T, HS-V, HS-Q and HS-T,
 TO GRADES EARNED IN FIRST YEAR COURSES AT
 HOUSTON BAPTIST COLLEGE

TOTAL PREDICTIVE SCORE INTERVALS	N	GRADE POINT AVERAGE EARNED				ACCURACY OF PRE- DICTION %
		UNSUCCESSFUL		SUCCESSFUL		
		Predicted	Actual	Predicted	Actual	
450 and Above	16	-	0	16	16	100
400-449	6	-	0	6	6	100
350-399	14	-	3	14	11	79
300-349	18	-	6	18	12	67
250-299	20	20	6	-	14	30
200-249	15	15	11	-	4	73
150-199	20	20	19	-	1	95
100-149	20	20	19	-	1	95
99 and Below	4	4	3	-	1	75
TOTALS	133		67		66	

TABLE IV
THE DISTRIBUTION OF THE VALIDATION GROUP COMPARING
PREDICTIONS BASED ON THE SAT-V TO GRADES EARNED
IN FIRST YEAR COURSES AT
HOUSTON BAPTIST COLLEGE

SAT-V STANDARD SCORE CLASS- INTERVALS	N	<u>GRADE POINT AVERAGE EARNED</u>				ACCURACY OF PRE- DICTION %
		UNSUCCESSFUL		SUCCESSFUL		
		Predicted	Actual	Predicted	Actual	
660 and Above	6	-	2	6	4	67
600-659	17	-	3	17	14	82
560-599	11	-	4	11	7	64
440-559	56	56	24	-	32	44
340-439	34	34	25	-	9	74
339 and Below	9	9	8	-	1	89
TOTALS	133	66	66		67	

TABLE V
THE DISTRIBUTION OF THE VALIDATION GROUP COMPARING
PREDICTIONS BASED ON THE SAT-M TO GRADES EARNED
IN FIRST YEAR COURSES AT
HOUSTON BAPTIST COLLEGE

SAT-M STANDARD SCORE CLASS- INTERVALS	N	GRADE POINT AVERAGE EARNED				ACCURACY OF PRE- DICTION %
		<u>Unsuccessful</u>		<u>Successful</u>		
		Predicted	Actual	Predicted	Actual	
710 & Above	3	-	0	3	3	100
685-709	5	-	0	5	5	100
600-684	16	-	4	16	12	75
540-599	25	-	8	25	17	68
452-539	50	50	29	-	21	59
346-451	24	24	17	-	7	74
345 & Below	10	10	8	-	2	80
TOTALS	133		66		67	

TABLE VI
THE DISTRIBUTION OF THE VALIDATION GROUP COMPARING
PREDICTIONS BASED ON THE SAT-T TO GRADES EARNED
IN FIRST YEAR COURSES AT
HOUSTON BAPTIST COLLEGE

SAT-T STANDARD SCORE CLASS- INTERVALS	N	<u>GRADE POINT AVERAGE EARNED</u>				ACCURACY OF PRE- DICTION · %
		<u>Unsuccessful</u>		<u>Successful</u>		
		Predicted	Actual	Predicted	Actual	
1280 & Above	12	-	2	12	10	83
1200-1279	6	-	1	6	5	83
1100-1199	23	-	6	23	17	74
900-1099	53	53	25	-	28	49
800-899	25	25	20	-	5	80
699-799	6	6	5	-	1	83
698 & Below	8	8	7	-	1	88
TOTALS	133		66		67	

TABLE VII
THE DISTRIBUTION OF THE VALIDATION GROUP COMPARING
PREDICTIONS BASED ON THE HS-V TO GRADES EARNED
IN FIRST YEAR COURSES AT
HOUSTON BAPTIST COLLEGE

HS-V STANDARD SCORE CLASS- INTERVALS	N	GRADE POINT AVERAGE EARNED				ACCURACY OF PRE- DICTION %
		<u>Unsuccessful</u>		<u>Successful</u>		
		Predicted	Actual	Predicted	Actual	
4.0	11	-	0	11	11	100
3.5 - 3.9	21	-	1	21	20	95
3.1 - 3.4	27	-	7	27	20	74
2.7 - 3.0	22	22	12	-	10	55
2.2 - 2.6	16	16	13	-	3	81
1.5 - 2.1	24	24	22	-	2	92
0 - 1.4	12	12	11	-	1	92
TOTALS	133		66		67	

TABLE VIII
 THE DISTRIBUTION OF THE VALIDATION GROUP COMPARING
 PREDICTIONS BASED ON THE HS-Q TO GRADES EARNED
 IN FIRST YEAR COURSES AT
 HOUSTON BAPTIST COLLEGE

HS-Q STANDARD SCORE CLASS INTERVALS	N	<u>GRADE POINT AVERAGE EARNED</u>				ACCURACY OF PRE- DICTION %
		<u>UNSUCCESSFUL</u>		<u>SUCCESSFUL</u>		
		Predicted	Actual	Predicted	Actual	
4.0	10	-	0	10	10	100
3.5 - 3.9	19	-	2	19	17	89
3.1 - 3.4	10	-	2	8	8	80
2.7 - 3.0	21	21	7	-	14	33
2.0 - 2.6	40	40	25	-	15	63
1.0 - 1.9	28	28	25	-	3	89
.99 and Below	5	5	5	-	0	100
TOTALS	133		66		67	

TABLE IX
THE DISTRIBUTION OF THE VALIDATION GROUP COMPARING
PREDICTIONS BASED ON THE HS-T TO GRADES EARNED
IN FIRST YEAR COURSES AT
HOUSTON BAPTIST COLLEGE

HS-T STANDARD SCORE CLASS- INTERVALS	N	<u>GRADE POINT AVERAGE EARNED</u>				ACCURACY OF PRE- DICTION %
		<u>Unsuccessful</u>		<u>Successful</u>		
		Predicted	Actual	Predicted	Actual	
7.8 & Above	9	-	0	9	9	100
7.0 - 7.7	17	-	0	17	17	100
6.2 - 6.9	20	-	5	20	15	75
5.4 - 6.1	24	-	8	24	16	67
5.0 - 5.3	14	14	7	-	7	50
3.0 - 4.9	38	38	36	-	2	95
2.9 & Below	11	11	10	-	1	91
TOTALS	133		66		67	

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The purpose of this study was to construct and demonstrate a method for constructing a scale for predicting academic success in first year freshman courses at Houston Baptist College from scores made on the Scholastic Aptitude Test of the College Entrance Examination Board and past academic performance in the sophomore and junior years of high school.

The predictive variables used in constructing "Scale A" were the Scholastic Aptitude Test (Verbal, Mathematical, and Total scores), and high school grade point averages (Verbal, Quantitative, and Total). These produced a scale of six variables.

The 256 subjects for this study were selected from among 191 freshmen entering college during the Fall semester, 1963, and 382 freshmen during the Fall semester, 1964, at Houston Baptist College. In addition, they met the following requirements: (a) had taken the Scholastic Aptitude Test of the College Entrance Examination Board; (b) entered as new freshmen attending college for the first time, or had completed no more than 6 hours in summer school; (c) had available transcripts of the sophomore and junior years in high school; and (d) had attempted and completed not less than 12, or more than 40 semester hours for the year.

Frequency distributions were prepared for each of the six variables in relation to a dichotomy of "successful" or "unsuccessful" performance. Successful performance was defined as an end of

year grade point average of 2.5 or better. Unsuccessful performance was defined as an end of semester grade point average of 2.4 or less.

These frequency distributions were then arranged to afford relative percentages of success varying directly with the magnitude of the scores achieved and were used to compile the distributions for the "score sheets."

With the use of the "score sheets," the achieved scores on each variable for each student were converted to "score values" toward a "total predictive score." The summation of the converted scores on the scale, constitutes the "total predictive score." The "total predictive scores" were then placed into frequency distributions according to successful or unsuccessful performance. These distribution interval sizes were arranged so that the most favorable increase in per cent successful was obtained from the low interval to the high interval for the scale.

The validation sample consisted of 133 students who met the same criteria as the original sample except that they entered Houston Baptist College in the Fall semester 1965. The scores achieved by each of these individuals on each of the six variables were converted to "total predictive scores" with the use of the "score sheet" and located in the appropriate "total predictive score" intervals in the predictive scale. If the percentage of students within any given interval had been successful in 50 per cent or more of the cases it was predicted that the validation individual would be successful. If less than 50 per cent of the individuals within an interval were successful it was predicted that the validation individual would be unsuccessful. The predictions of

the scale were accurate in 77 per cent of the cases.

Predictions were also made based upon each of the six individual variables for predicting successful or unsuccessful performance for the same validation group. Accuracy of these predictions ranged from 62 per cent to 83 per cent. These variables are listed in the order of the accuracy of prediction as follows: HS-T 83%, HS-V 82%, HS-Q 73%, SAT-M 63%, SAT-T 67% and SAT-V 62%.

Conclusions

The predictive scale presented in this study demonstrates a method of predicting academic success in first year freshman courses at Houston Baptist College by combining the predictive power of a number of variables into a single prediction. This scale was constructed from information which is readily available on most entering freshmen and presents it in a form which lends itself well to interpretation and understanding through the use of terms of probability.

These terms of probability may be interpreted to an individual in terms of his chances of success out of 100 by using the data for the interval within which the score was located.

The "all or none" method of prediction which makes use of the 50 per cent "cutting" point was selected for use in this study because of the ease with which it lends itself to interpretation of individual success.

The factors involved in the construction of the predictive scale of this study seem to indicate that the following conclusions may be drawn:

- (1) A high school average from the sophomore and junior years

seems to be a more efficient predictor of success than the Scholastic Attitude Test: HS-T 83%, HS-V 82%, HS-Q 73% as compared to SAT-M 68%, SAT-V 62% and SAT-T 67%.

(2) Combining the predictive power of the six variables increased the accuracy of prediction of the Scholastic Attitude Test: 77% (SAT-M 68%, SAT-V 62% and SAT-T 67%).

(3) Some single predictors may be as or more efficient in accuracy of prediction as the combination of the variables: (Scale A - 77%, HS-T 83% and HS-V 82%).

(4) The most efficient single variable predictor was the HS-T 83%, and the least efficient was the SAT-V 62%.

Recommendations

It is evident that the grade point average from the sophomore and junior years in high school are better predictors of success than the Scholastic Attitude Test. However, since more time would be involved in computing these predictors, it is recommended that the scale be used in its entirety, with the possibility of further study along this line.

It is also recommended that individual predictions be made on the basis of the location of the individual's score within its appropriate class interval. This procedure makes it possible to state the probability in terms of the number of chances out of 100. This would be more realistic, more accurate, and, in all probability, more easily understood.

In a study of this type there are a number of variables, which might well affect the results, that are left uncontrolled. There is always the possibility that the size, type and location of the high

school from which the student graduated varies. Also in this realm consideration should be given as to the instructor and his standards of grading. Also, the extend to which 6 hours or less in summer school, prior to entrance as a Freshman in the Fall, affects the student is not known.

Other factors which might be considered for further study would include the major field pursued, whether the student is living at home or in the dormitories, extend of extra-curricular activities, and whether or not he is a full-time or part-time student and working full or part time. Also of possible significance would be whether the student is married or single, and his financial position.

It is recommended that this type of study be continued in order to consider some of the above variables. It is further recommended that this type of study be pursued because of the possibility of course content changes, instructor or textbook changes, and the initiation of a freshman orientation testing session, all of which tend to limit the reliability of this study for future prediction.

Since Houston Baptist College will become a four year school with the addition of a senior class in the Fall semester 1966, it deserves consideration to study the possible relationships which might develop in this four year period using other variables. Also here might be considered the inclusion of a guidance and counseling service to the students.

However, the method presented in this study is an example of developing a predictive tool from information that is readily available, and a device which could be of great value to both Houston Baptist College and the prospective student in evaluating the probability of success in first year college work.

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