

THE CONSTRUCTION OF A SCALE FOR PREDICTING
ACADEMIC SUCCESS IN THE SIXTH GRADE

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
William M. Helton, Jr.

August, 1966

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AN ABSTRACT

There is a very definite, present need for counselors in the field of education to obtain a better understanding of those factors which can be used to predict academic success, since a large portion of their time is spent scheduling students into different classes. The author of this study took cognizance of this need and constructed a predictive scale which could be used to predict sixth-grade success on the basis of ten variables or factors from the fifth-grade.

Six of these variables came from raw scores received on the Iowa Test of Basic Skills. The total scores were used on the following five subtest: Vocabulary, Reading Comprehension, Language Skills, Work-Study Skills, and Arithmetic Skills. The sixth variable was the Composite Score on the Iowa Test of Basic Skills. The seventh variable was the IQ score received on the Otis-Beta, and the eighth, ninth, and tenth variables came from averages in five fifth-grade subjects. The eighth variable was the total average received in English, social studies, and reading. The ninth variable was the total average received in math and science, and the tenth variable was the total average received in all five previously-mentioned subjects.

The criterion for success was an "A" or "B" total average in English, social studies, reading, math, and science, in the sixth grade.

The fifth-grade scores and grades of the present eighth-grade class in one junior high were used so as to eliminate any possible delay because of incomplete grade averages. Within this class, 266 eighth-grade students were found who had been enrolled in this same school district since the fifth grade and who had complete records.

After selecting the group to be studied and the variables to be considered, the scores on all the variables were recorded for each of the 266 students. Next it was determined whether or not each student was "successful" in the sixth-grade. In the following step a frequency distribution was set up to determine the number of "successful" and "unsuccessful" students in each interval of each variable. When this was completed, the percentage of the subjects "successful" or "unsuccessful" in each interval of each of the ten variables was calculated, and these percentage figures constituted the "Score Sheet."

Each subject was then rated on the "Score Sheet" to ascertain the interval in which he fit in each of the ten variables. The resulting ten percentage figures for each student were summed, and this total became his "Total Predictive Score." A frequency distribution was set up using the "Total Predictive Scores" for all 266 students, and the number of successful students in each interval was calculated. The resulting figures constituted the "Predictive Scale."

The scale was validated on the fifth and sixth-grade scores of 113 randomly-selected seventh-grade students from the same junior high school who met the same qualifications as the original sample. Each subject was placed in a certain interval in the "Predictive Scale" on the basis of his "Total Predictive Score," and the prediction accuracy was calculated. The results showed that a better-than-chance prediction accuracy prevailed on all of the ten intervals. Considering the top four intervals as one group, the accuracy of prediction was 93 percent. Considering the bottom six intervals as one group, the accuracy of prediction was 100 percent. And considering the entire validation sample as one group, the accuracy of prediction was 94 percent.

With the full realization that it is difficult to predict for the individual, the apparent high degree of accuracy associated with this predictive scale should make it worth the sixth-grade counselor's consideration when concerned with the prediction of academic success in large groups whose qualifications meet those of the original and validation groups.

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CHAPTER I

THE PROBLEM

Statement of the Problem

The purpose of this study was to construct a predictive scale whereby it would be possible to predict academic success in grade six on the basis of the following ten variables: the total scores on the five subtest of the Iowa Test of Basic Skills; the composite score on the Iowa Test of Basic Skills; the IQ score obtained on the Otis Quick-Scoring Mental Ability Test; the average grade obtained in the fifth-grade of school in English, social studies, and reading; the average grade obtained in the fifth-grade of school in math and science; and the average grade obtained in the fifth-grade of school in all five previously-mentioned subjects, English, reading, social studies, math, and science.

The criterion for success was an "A" or "B" total average in the following subjects in the sixth-grade: English, reading, social studies, math, and science.

Importance of the Problem

In the public schools, the counselor finds that a very important part of his or her job is scheduling, or dividing the student body into many different classes. In many school

districts the counselor goes a step further in the scheduling process and attempts to divide the student body into classes for accelerated, average, and slow students. To aid him in making the right decisions, the counselor relies on many variables, such as standardized test scores and past grades.

Most counselors have learned from past experience and study that certain scores on certain standardized test are indicative of a certain amount of learning potential. These scores are then compared with past grades to see what use the student has made of his potential. With this information, the counselor usually can deduce a schedule which he believes will place each student in the best possible learning situation in relationship to his learning potential.

It was felt that if a scale were to be constructed, the accuracy of which could be demonstrated in the prediction of sixth-grade success, that many would benefit from its use. For example, sixth-grade counselors could place students in their respective classes with more confidence than before. This is in agreement with Bloom and Peter (1961) who discuss the real need for counselors to improve the academic prediction for students with whom they are directly concerned.

A second benefit would be that students would more likely be placed in classes which contained their academic equals. And a third benefit from the construction of such a prediction scale would be that the school or school district would have the advantage of an improved method of class scheduling.

It was obvious that Bloom and Peter (1961) also recognized the potential of accurate predictor scales when they wrote that the careful use of Academic Predictor Scales could move the general problem of predicting academic failure closer to the realm of calculated risk. They believed that the function of a good predictor was to provide evidence from which one could calculate the probabilities of success or failure. They cautioned, however, that "even the best predictor does not guarantee success."

Limitations

The utility of this study is limited because of the selectness of the group on which the study was conducted. The students in this study live, almost without exception, in an upper-middle class or higher economic area, and many of their parents are college graduates. The elementary schools which they have attended and the junior high school which they presently attend are located in a school district which has been rated by educational agencies as an outstanding school district in the state of Texas. Also these students are in junior high school in the sixth grade and thus are having their success in their first year of junior high school predicted on the basis of various scores obtained in the fifth grade, their last year in elementary school.

Therefore, this study would be of little direct benefit to schools in which these characteristics were not found.

CHAPTER II

REVIEW OF THE LITERATURE

Before discussing other studies which are similar in nature to this one, perhaps it would be appropriate to make some mention of the work done by the originators of this type of predictive scale, Sheldon and Eleanor Glueck. The Gluecks, (1959), have spent many years working with prediction scales based on the behavior of juvenile delinquents and adult criminals, and an example of the results of their efforts is a group of prediction tables which tend to designate young children who would probably become delinquent in the future if appropriate preventive steps were not taken. The Glueck method makes use of a few variables in a person's life which tend to predict future behavior. On the basis of these few factors (usually five), a total score is calculated for each person, and this total score is used to predict his probability of success or failure in the area with which the prediction is concerned. This same method of constructing prediction scales was followed in the present study and is explained in detail in chapter IV.

In 1945, William C. Ford published a study in which he devised seven predictive scales using the Glueck method. The predictive factors he used are as follows: Intelligence Quotient, Chronological Age, Average Marks, Number of

Siblings, Home Conditions, i.e. living with both parents or living in a broken home, and Socio-Economic Status. With the aid of these six factors, Ford was able to predict with a high degree of accuracy the probability of failure, the probability of obtaining a certain grade average, the probability of a student withdrawing or graduating from high-school, and the probability of a student entering college.

Using a select sample of the better students in a private high school, Hudson (1964), attempted to relate certain standardized test scores to academic success in high school. Most of the standardized test which were used were administered during the eighth or ninth grade such as the Otis-Beta, the SRA-PMA, the Cooperative Reading Test, and the Cooperative Algebra Test. Attention was also given to the National Merit Scholarship and the College Entrance Examination Boards, which were administered in the eleventh and twelfth grades, respectively. These test scores were related to the English, math, and total grade point averages in grades eight through twelve. Some of the findings were that "school marks in the eighth and ninth grades in English, math, and total grade point averages and Otis-Beta IQ scores derived in the eighth grade are good overall indicators of grades made in English, math, and total grade point averages in grades ten, eleven, and twelve." Hudson summed up the overall findings with the statement that "in short, intelligence test and numerical

test proved to be the best predictors of both grades earned and scores made on scholastic achievement test."

Progressing from senior high school predictive scales, attention is now focused on predictive scales on the college level. Newmeyer (1960), constructed a predictive scale on the basis of seven scores received on three standardized test administered to incoming freshmen in a guidance battery. The primary objective of the scale was to predict success in English 131 at the University of Houston. If a student earned an "A," "B," or "C," he was considered "successful." If he received a grade of "D," "F," "I," or "W," he was considered "unsuccessful." (This same dichotomy of successful and unsuccessful was used in the construction of the predictive scale which was the basis of this thesis.) When the predictive scale was validated, the accuracy of prediction was found to range from 55 percent to 75 percent.

Another predictive scale in the area of higher education was constructed by Richards (1961), in which an attempt was made to predict the success of a student in nursing school. Six factors were selected which "yielded the best discrimination from high to low and which were relatively independent of each other." Following the Glueck method, Richards obtained "Total Predictive Scores" for each of the freshman student nurses being studied and from these scores computed a "Predictive Scale." The scale was validated with scores

of a later freshman class in the same nursing school, and the predictions were found to be accurate for 82 percent of the validation group.

Thus it can be seen that the Glueck method of constructing prediction scales has been successfully used in the construction of scales which generally have demonstrated better-than-chance predictions of success in many areas and levels of education. With this thought in mind, it was felt that this same method of constructing predictive scales would be appropriate to use in the construction of a scale for predicting sixth-grade success.

CHAPTER III

SAMPLE GROUP, VARIABLES USED, AND CRITERION

Sample Group

In this study attention was focused on the fifth and sixth grade school record of 266 eighth-grade students who attended the same junior high school and who had been in the same school district since September, 1962, when they were enrolled in the fifth grade. Actually there were 301 eighth grade students in this junior high school who fell into this category, but the 35 students not considered in this study were those who for various reasons did not have scores for all ten variables considered. For example, some had been absent when certain standardized tests had been given. It should also be mentioned that 109 of the 265 subjects were boys, and all subjects came from upper middle class or higher economic level families.

The advantage of considering the fifth and sixth-grade scores of the present eighth-grade class was that all fifth and sixth grade scores were readily available without having to wait for a group to finish the present school year. Therefore there was no loss of time in this study because of incomplete data on the population being studied.

Variables Used

Ten variables were considered in the construction of this prediction scale. Six of these variables came from raw scores received on the Iowa Test of Basic Skills, which was administered during the fifth grade. The five subtest considered were Vocabulary; Reading Comprehension; Language Skills, which included spelling, capitalization, punctuation, and usage; Work-Study Skills, which included map reading, reading graphs and tables, and knowledge and use of reference materials; and Arithmetic Skill, which included arithmetic concepts and arithmetic problem solving. The sixth and last variable to be considered from the Iowa Test of Basic Skill was the Composite Score.

The seventh variable was the IQ score received on the Beta test of the Otis Quick-Scoring Mental Ability Test.

The eighth, ninth, and tenth variables came from a consideration of the following fifth grade subjects: English, math, science, social studies, and reading. The English, social studies, and reading grades earned in the fifth-grade were averaged together for the eighth variable. The math and science grades earned during the fifth-grade were averaged together for the ninth variable. And the grades earned in all five courses, English, social studies, reading, math and science, were averaged together for the tenth variable.

Criterion

Since the purpose of this scale was to predict sixth-grade success, attention was turned to those grades earned in five sixth-grade subjects as a criterion for success. The five sixth-grade subjects were English, social studies, reading, math, and science. If a student had obtained an overall "A" or "B" average in the five subjects considered in the sixth-grade, he was rated "successful." If a student had obtained an overall "C" or lower average in these five subjects, he was rated "unsuccessful." This meant that as a quantitative scale, success was really defined as acquiring a grade-point average of 4.00, or above, based on the following scale: A is 5.00, B is 4.00, C is 3.00, D is 2.00, and F is 1.00.

CHAPTER IV

CONSTRUCTION OF PREDICTIVE SCALE

In the process of constructing a scale for predicting the "success" of a student in the sixth-grade, three broad steps were followed. The first step was the construction of a "Score Sheet," the second step was the computation of "Total Predictive Scores" from the "Score Sheet," and finally, the construction of the "Predictive Scale."

The first step in the construction of the "Score Sheet" was to list the scores of the ten variables being considered for each student in the study. Next it was determined whether each student was "successful" or "unsuccessful" in the sixth-grade, i.e. did the student have a total "A" or "B" average in English, social studies, reading, math, and science in the sixth-grade. In the following step each variable was considered individually, and a frequency distribution was made to determine the number of "successful" and "unsuccessful" students in each interval of each variable. Finally, from the information obtained in the last step, the percentage of the subjects "successful" or "unsuccessful" in each interval of each of the ten variables was calculated. These final figures constituted the "Score Sheet" which is shown in Table I. For clarification purposes, the first

TABLE I

SCORE SHEET FOR PREDICTING SUCCESS
OF A STUDENT IN THE SIXTH GRADE

PREDICTIVE FACTORS	PERCENT RATED "SUCCESSFUL"
<u>ITBS-VOCABULARY</u>	
89 and above	84
81-88	75
73-80	44
65-72	29
57-64	20
56 and below	10
<u>ITBS-READING COMPREHENSION</u>	
100 and above	100
92-99	84
85-91	67
73-84	59
65-72	37
57-64	20
56 and below	12
<u>ITBS-LANGUAGE SKILLS</u>	
100 and above	96
92-99	88
84-91	60
76-83	40
60-75	12
59 and below	0
<u>ITBS-WORK-STUDY HABITS</u>	
85 and above	100
80-84	94
75-79	78
70-74	57
65-69	23
60-64	20
59 and below	4

TABLE I (continued)

SCORE SHEET FOR PREDICTING SUCCESS
OF A STUDENT IN THE SIXTH GRADE

PREDICTIVE FACTORS PERCENT RATED "SUCCESSFUL"

ITBS-ARITHMETIC SKILL

75 and above	85
70-74	73
65-69	35
60-64	10
59 and below	3

ITBS-COMPOSITE SCORE

85 and above	98
80-84	83
75-79	76
70-74	25
65-69	21
64 and below	8

OTIS IQ

130 and above	88
120-129	74
110-119	30
100-109	16
99 and below	0

FIFTH-GRADE AVERAGE

ENGLISH, READING, SOCIAL STUDIES

5.00 (A)	98
4.00-4.99 (B)	66
3.00-3.99 (C)	11
2.99 and below (D,F)	5

FIFTH-GRADE AVERAGE

MATH, SCIENCE

5.00	98
4.00-4.99	62
3.00-3.99	10
2.99 and below	0

TABLE I (continued)

SCORE SHEET FOR PREDICTING SUCCESS
OF A STUDENT IN THE SIXTH GRADE

PREDICTIVE FACTORS	PERCENT RATED "SUCCESSFUL"
--------------------	----------------------------

<u>FIFTH-GRADE AVERAGE</u>	
<u>ENGLISH, READING, SOCIAL STUDIES</u>	
<u>MATH, SCIENCE</u>	

5.00	100
4.00-4.99	71
3.00-3.99	13
2.99 and below	4

variable, the vocabulary score on the Iowa Test of Basic Skills, will be explained as an example.

On this subtest, forty-three students made raw scores of eighty-nine or higher. Of these forty-three, thirty-six were "successful" in the sixth-grade, i.e., eighty-four percent of the forty-three students were successful in the sixth-grade. The eighty-four was entered as the value earned by those students in the 89-and-above interval. In the same manner, it was determined that seventy-five percent of the students who made scores in the 81-88 interval were "successful," and seventy-five was entered as the value earned on this interval of this particular subtest. This same procedure was followed to determine the value to be given for scores in each interval of the remaining variables.

The first step in computing the "Total Predictive Scores" for each student was to consult the "Score Sheet" to ascertain the interval in which each student's score falls in each of the ten variables used in this study. Then the "Score Sheet" was consulted to determine the value assigned to each of these scores obtained in the ten variables, i.e., the percent of students in the intervals of each variable who were "successful." Finally, the ten "values," or percent numerals, which were obtained were totaled, and the sum was the "Total Predictive Score" for each individual student.

As in the earlier explanation of the "Score Sheet," an example will be used to clarify this explanation.

The first subject, or student A had a score of eighty-one on the vocabulary subtest of the Iowa Test of Basic Skills. Referring to the "Score Sheet," Table I, it could be seen that seventy-five percent of the students who scored in the 81-88 interval of that variable were "successful." Thus seventy-five was the value assigned to a score in the 81-88 interval, and the seventy-five became the first of ten numbers which were totaled to obtain the "Total Predictive Score" for student A. The student's score on the reading comprehension subtest of the Iowa Test of Basic Skills was eighty-six, and sixty-seven percent of the students who scored in the 85-91 interval of the reading comprehension variable were "successful." Therefore, the second "value" toward the "Total Predictive Score" was sixty-seven. The remaining eight variables were treated in the same manner, and the ten resulting "values" or scores were totaled to obtain the "Total Predictive Score" for student A.

The third step in the construction of the "Predictive Scale" was that of tabulating the 266 "Total Predictive Scores" into a frequency distribution with the frequency in two columns, the "Successful" and the "Unsuccessful." The resulting distribution is shown in Table II. In order to complete the table and make the predictive scale more

meaningful, the percent "successful" and "unsuccessful" in each interval was provided as shown. In fact, the column labeled "Percent" "Successful" becomes the most crucial for the whole scale. If, for example, a student's "Total Predictive Score" places him in the interval 650-749 (where ninety-five percent were successful in the original group), the chances or odds for this student to be successful as defined here are ninety-five in a hundred. If, on the other hand, another student's "Total Predictive Score" places him in the interval 250-349, the odds for this student to attain success as defined here are only ten in a hundred.

TABLE II

SCALE FOR PREDICTING SUCCESS OF A
STUDENT IN THE SIXTH GRADE

<u>TOTAL PREDICTIVE SCORE INTERVALS</u>	<u>N</u>	<u>UNSUCCESSFUL</u>		<u>SUCCESSFUL</u>	
		<u>NUMBER</u>	<u>PERCENT</u>	<u>NUMBER</u>	<u>PERCENT</u>
850 and above	16	0	0	16	100
750-849	37	1	3	36	97
650-749	38	2	5	36	95
550-649	28	9	32	19	68
450-549	26	14	54	12	46
350-449	33	28	85	5	15
250-349	31	28	90	3	10
150-249	32	29	91	3	9
149 and below	<u>25</u>	<u>25</u>	100	<u>0</u>	0
TOTALS	266	136		130	

CHAPTER V

VALIDATION OF PREDICTIVE SCALE

After the construction of the "Predictive Scale," attention was focused on the validation of that scale. The scale was validated on the fifth and sixth-grade records of 113 students who attended the same junior high school attended by the 266 students who made up the original sample. These 113 students were randomly selected from the present seventh-grade class and had attended schools in this same "outstanding" school district at least since the fifth-grade. Therefore, as in the case of the original group, the families of the validation sample were upper-middle class or higher economic level, and many of the parents were college graduates. The advantage of using the fifth and sixth-grade scores of the present seventh-grade class was that all test scores and grades were readily available without waiting for a class to finish a semester in order to obtain their yearly averages.

A "Total Predictive Score" was obtained for each of the 113 students with the aid of the "Score Sheet," Table I. To accomplish this, the scores for each of the ten variables for each student were given a certain "value" according to Table I. When the ten "values" for each student were known, they were totaled, and their sum constituted the "Total

Predictive Score" for that student. This same procedure was followed for each of the 113 students making up the validation sample.

The next step was to determine which individuals of the validation sample were "successful." This was done in the same manner as in the original sample. If a student had an "A" or "B" average in five sixth-grade subjects, he was considered "successful." The five subjects were the same English, social studies, reading, math, and science used in the original sample.

Considering the "Total Predictive Score" and the "success" or "lack of success" of each student, the students were placed into the same intervals used in the "Predictive Scale." It was interesting to note that when the percent "successful" in each interval of the validation group was calculated, that definite "breaks" were found between the 650-749 and the 550-649 intervals and between the 550-649 and the 450-549 intervals just as in the original group. These results are shown in Table III. Also in Table III it can be seen that two "reversals" occurred in the validation group as compared to none in the original group. The percent "successful" progressively decreased until the 350-449 interval when it increased from 31 percent "successful" to 40 percent "successful." The second reversal took place between the next-to-the-last and the last interval.

TABLE III

RECORD OF SUCCESS WITHIN VALIDATION SAMPLE

<u>TOTAL PREDICTIVE SCORE INTERVAL</u>	<u>N</u>	<u>UNSUCCESSFUL</u>		<u>SUCCESSFUL</u>	
		<u>NUMBER</u>	<u>PERCENT</u>	<u>NUMBER</u>	<u>PERCENT</u>
850 and up	6	0	0	6	100
750-849	19	0	0	19	100
650-749	10	0	0	10	100
550-649	11	3	27	8	73
450-549	13	9	69	4	31
350-449	10	6	60	4	40
250-349	15	12	80	3	20
150-249	17	17	100	0	0
149 and below	<u>12</u>	<u>11</u>	92	<u>1</u>	8
TOTALS	113	58		55	

With the previous steps completed, attention was turned to the computation of the accuracy of the "Predictive Scale" with the aid of the scores of the validation sample on the "Predictive Scale." First, each interval was considered, as is illustrated in Table IV. For example, in the validation group six students had "Total Predictive Scores" of 850 or higher. According to the "Predictive Scale," one would predict 100 percent or all six of these students would be "successful," i.e., have "A" or "B" averages in the five subjects considered in the sixth-grade. Since all six students who scored in that interval were "successful," the far right column in Table IV reads 100 percent for accuracy of prediction. The "Total Predictive Scores" of nineteen students placed them in the next interval, 750-849, and it was predicted that 97 percent or eighteen would be "successful." In the validation sample all nineteen were "successful," an accuracy of prediction of 95 percent. The next two intervals, the 650-749 and the 550-649 intervals, were treated in the same manner with resulting prediction accuracies of 100 percent and 88 percent, respectively.

The prediction accuracies of the remaining five intervals were calculated by considering the number of students in each interval who were "unsuccessful." The reason for the change in emphasis from "successful" to "unsuccessful" was that, according to the "Predictive Scale," the chances or odds for

"success" for those students possessing "Total Predictive Scores" below 550 were less than fifty in a hundred. On the other hand, however, the odds that these same students would be "unsuccessful," i.e., possess total academic averages of "C" or below in the five sixth-grade subjects considered, were greater than chance. For example, one would predict that seven of the thirteen students who possessed "Total Predictive Scores" in the 450-549 interval would be "unsuccessful." Actually nine were "unsuccessful," an accuracy of prediction of 78 percent. The 350-449 interval contained ten students, and it was predicted that eight would be "unsuccessful." Actually six were "unsuccessful," an accuracy of prediction of 75 percent. The remaining three intervals were treated in the same manner, and the prediction accuracies were 86 percent, 89 percent, and 92 percent, respectively.

As a more complete check on the accuracy of prediction of this scale, three other calculations were made. One was to check the accuracy of prediction for that group of students whose "Total Predictive Scores" were 550 and above. The second was to check the accuracy of prediction for that group of students whose "Total Predictive Scores" were below 550. The third calculation was to check the accuracy of prediction of the total validation group of 113 students. The results of these three calculations are shown in Table V.

TABLE IV

ACCURACY OF PREDICTION OF SUCCESS OF STUDENTS IN THE SIXTH GRADE

<u>TOTAL PREDICTIVE SCORE INTERVAL</u>	<u>N</u>	<u>UNSUCCESSFUL</u>		<u>SUCCESSFUL</u>		<u>ACCURACY OF PREDICTION (percent)</u>
		<u>PREDICTION</u>	<u>ACTUAL</u>	<u>PREDICTION</u>	<u>ACTUAL</u>	
850 and up	6	0	0	6	6	100
750-849	19	1	0	18	19	95
650-749	10	0	0	10	10	100
550-649	11	4	3	7	8	88
450-549	13	7	9	6	4	78
350-449	10	8	6	2	4	75
250-349	15	14	12	2	3	86
150-249	17	15	17	2	0	89
149 and below	<u>12</u>	<u>12</u>	<u>11</u>	<u>0</u>	<u>1</u>	92
TOTALS	113	61	58	52	55	

TABLE V

ACCURACY OF PREDICTION OF SUCCESS OF
STUDENTS IN THE SIXTH GRADE

<u>TOTAL PREDICTIVE SCORE</u>	<u>N</u>	<u>UNSUCCESSFUL PREDICTION</u>	<u>ACTUAL</u>	<u>SUCCESSFUL PREDICTION</u>	<u>ACTUAL</u>	<u>ACCURACY OF PREDICTION (percent)</u>
550 and above	46	5	3	40	43	93
549 and below	<u>67</u>	<u>56</u>	<u>55</u>	<u>12</u>	<u>12</u>	100
TOTALS	113	61	58	52	55	94

It can be seen that "success" was predicted for forty of the students who had "Total Predictive Scores" of 550 or above. Actually forty-three of the forty-six were "successful," and the accuracy of prediction was 93 percent. Sixty-seven students had "Total Predictive Scores" below 550, and "success" was predicted for twelve of them. Twelve were "successful," an accuracy of prediction of 100 percent. Of the total 113 students, "success" was predicted for fifty-two. Fifty-five were "successful," an accuracy of prediction of 94 percent.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

There is a very definite need for counselors in the field of education to obtain a better understanding of those factors which can be used to predict academic success, since a large portion of their time is spent scheduling students into different classes. The purpose of this study was to construct a "Predictive Scale" which could be used to predict academic success in the sixth-grade on the basis of ten variables or factors from the fifth-grade.

Six of these variables came from raw scores received on the Iowa Test of Basic Skills. The total scores were used on the following five subtest: Vocabulary, Reading Comprehension, Language Skills, Work-Study Skills, and Arithmetic Skills. The sixth variable was the Composite Score on the Iowa Test of Basic Skills. The seventh variable was the IQ score received on the Otis-Beta, and the eighth, ninth, and tenth variables came from averages in five fifth-grade subjects. The eighth variable was the total average received in English, social studies, and reading. The ninth variable was the total average received in math and science, and the tenth variable was the total average received in all five previously-mentioned subjects.

The criterion for "success" was an "A" or "B" total average in English, social studies, reading, math, and science, in the sixth-grade.

The fifth-grade scores and grades of the present eighth-grade class in one junior high were used so as to eliminate any possible delay because of incomplete grade averages. Within this class, 266 eighth-grade students were found who had been enrolled in this same school district since the fifth grade and who had complete records.

After selecting the group to be studied and the variables to be considered, the scores on all the variables were recorded for each of the 266 students. Next it was determined whether or not each student was "successful" in the sixth-grade. In the following step a frequency distribution was set up to determine the number of "successful" and "unsuccessful" students in each interval of each variable. When this was completed, the percentage of the subjects "successful" or "unsuccessful" in each interval of each of the ten variables was calculated, and these percentage figures constituted the "Score Sheet."

Each subject was then rated on the "Score Sheet" to ascertain the interval in which he fit in each of the ten variables. The resulting ten percentage figures for each student were summed, and this total became his "Total Predictive Score." A frequency distribution was set up

using the "Total Predictive Scores" for all 266 students, and the number of successful students in each interval was calculated. The resulting figures constituted the "Predictive Scale."

The scale was validated on the fifth and sixth-grade scores of 113 randomly-selected seventh-grade students from the same junior high school who met the same qualifications as the original sample. Each subject was placed in a certain interval in the "Predictive Scale" on the basis of his "Total Predictive Score," and the prediction accuracy was calculated. The results showed that a better-than-chance prediction-accuracy prevailed on all of the ten intervals. Considering the top four intervals as one group, the accuracy of prediction was 93 percent. Considering the bottom six intervals as one group, the accuracy of prediction was 100 percent. And considering the entire validation sample as one group, the accuracy of prediction was 94 percent.

Conclusions

With the completion of this study, it would seem appropriate at this time to draw the following conclusions:

1. Students possessing "Total Predictive Scores" of 650 or higher possess the highest probability of achieving "success." The number 650 was chosen as the base "Total Predictive Score" because of the obvious "breaks" which occurred in

both the original and validation groups between the 650-749 and the 550-649 "Predictive Score" intervals.

2. The odds that students, with "Total Predictive Scores" of 550 or greater will achieve "success" are better-than-chance.

3. Any student obtaining a "Total Predictive Score" lower than 550 has a low probability of "success," i.e., less than chance. In the "Predictive Scale" the percent successful in each interval decreased as the "Total Predictive Score" decreased. This also held true in the validation scale with the exception of two reversals. It would be hoped that a larger validation sample would remove these reversals.

4. This scale can be used to predict "success" or "lack of success" with a better-than-chance probability in all intervals.

Recommendations

Although the 113 students in the validation group comprised a fairly large sample, with an apparent high degree of accuracy in most intervals of the scale, it would appear worthwhile to validate this scale on a much larger number of students. A larger validation group might remove the two reversals which occurred. If the prediction accuracy remained the same or improved with future use of this "Predictive Scale," this would serve as an indication of the potential

that this scale holds in the area of class scheduling. The sixth-grade counselors in the school which was studied and in other schools which possess all the characteristics of the original and validation groups should feel confident in using this scale as a strong indicator of a student's future academic success. However, the reminder must be made that although the prediction accuracy for the group was very high, there were many individuals who were exceptions to the predictions. Therefore the counselors should never hesitate to use their own judgement over the "Predictive Scale" when they have strong reasons to doubt the validity of the scale for any individual student.

This demonstrates the need for a similar study in which the sixth-grade counselors would predict the success of their sixth-grade students without the aid of the "Predictive Scale," and then compare their predictions with the scale's predictions. Also, since this type of "Predictive Scale" has demonstrated its evident success, other schools or school districts could use it as a model to construct their own "Predictive Scale."

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