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GRADUATE COLLEGE

THE RELATIONSHIP OF SELECTED FACTORS TO OCCUPATIONAL AND COLLEGE SUCCESS

A DISSERTATION

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FLOYD LEVON COPPEDGE

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THE RELATIONSHIP OF SELECTED FACTORS TO

OCCUPATIONAL AND COLLEGE SUCCESS

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THE RELATIONSHIP OF SELECTED FACTORS TO OCCUPATIONAL AND COLLEGE SUCCESS

CHAPTER I

THE PROBLEM

Background and Need for the Study

The history of American education reveals clearly the concern of the secondary schools in preparing students for institutions of higher education. This concern has also been evident in the many research efforts designed to identify factors which have significant relationship to college success. Early studies are available which demonstrate the use of certain factors for predicting college success as well as for college admission purposes.[1]

Though colleges have made use of various selected factors for college admission for a number of years,[2] it has

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[1]David Segel, Prediction of College Success, U.S. Office of Education Bulletin No. 15 (Washington, D.C.: U.S. Government Printing Office, 1934), pp. 1-89, citing P. Roy Brammell, Articulation of High School and College, U.S. Office of Education Bulletin No. 17, National Survey of Education Monograph No. 10 (Washington, D.C.: U.S. Government Printing Office, 1932), pp. 1-96.

[2]William Blannie Hight, Jr., "Patterns of Admission Requirements to Selected American Colleges and Universities," (A doctoral dissertation, University of North Carolina, Chapel Hill, 1962).

has been demonstrated that the appropriateness of the factors being used should be evaluated, because it is entirely possible that no significant relationship exists between what is being predicted and the factors being used for predictive purposes.[1] It is also well-known that the significance which has been attached to the use of test scores has often resulted in misuse of this data.[2] The literature is especially clear regarding the need for determining the appropriateness of the data used for prediction of college success.

Since a large number of high school graduates do not attend institutions of higher education, it is equally important that the relationship between data contained in the high school records and the degree of occupational success be ascertained as well. It is this group which will hit the labor market first. If test scores, grades, teacher ratings, etc., are an indication of the product being produced by the public schools then this type of information could prove very useful to the employer in selecting employees. More important, the school may be able to devise more appropriate records for the non-college bound student.

In view of the present difficulty experienced by young workers in obtaining employment, it is evident that our schools,

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[1]Fontella Thompson Kimbell, "The Use of Selected Standardized Tests as Predictors of Academic Success at Oklahoma College for Women," (Unpublished doctoral dissertation, University of Oklahoma, 1959).

[2]Glenn R. Snider, "The Secondary School and Testing Programs," Teachers College Record, LXV (October, 1963), No. 1, 62-63.

as well as society in general, must be concerned with the type of education which is provided for those who do not attend college and with its value in preparing them for life and for work. The young worker not only has difficulty in securing employment which is satisfactory and rewarding financially, but there is also evidence that job stability poses a tremendously acute problem for the young worker. As reported by the United States Rubber Company, "sixty-one of every one hundred recruits were lost during the first year of employment."[1] Time magazine reported that "three out of ten graduates will either quit or change their jobs within the first 12 months. The expense to the nation's employers: $336,640,000 for turnover, plus an additional $106,515,000 to find necessary replacements."[2]

Certainly, such facts as these add emphasis to the need for a more concerted effort on the part of employers to select well those they employ. The public schools must be equally concerned about those who do not go to college as an attempt is made to provide education for all American youth. This education should be as beneficial for the non-college bound student as it is for the college bound. It is evident that the educational programs of many of our public schools, the testing and evaluation programs, and the accumulation of

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[1]National Industrial Conference Board, "Employment Stability of the College Recruit," Management Record, XVI (1954), 380.

[2]"Report Card," Time, LXV (June 13, 1955), 53.

worthwhile information have been directed, almost totally, toward the college bound student. It may well be that the same kind of educational programs are equally beneficial to both the college bound and the non-college bound student; however, this is very doubtful. In any event the need for investigating the product (the student) which the school produces in relation to occupational effectiveness after graduation is equally as important as an investigation of the student in relation to college success. A second part of such an investigation would be that of determining whether or not the set of factors relate to occupational success to a degree which is comparable to their relationship to college success. If so, then these factors from the high school records would be valuable for employers in their search for the best employees.

It would be possible to arrive at a totally different set of factors for study in relation to occupational success from those used in relation to college success, but it is believed that there is value in looking at the same set of factors for both college and occupational success.

Though research has been unable to identify an absolute pattern of selected factors which will predict college success to a high degree, it has succeeded in identifying factors which have sufficiently high correlations with college success to render them valuable as predictors of college success.[1]

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[1]Everett F. Lindquist (ed.), Educational Measurements (Washington, D.C.: American Council on Education, 1951), pp. 92-93.

Present research efforts have not been nearly so effective, however, in identifying factors which have sufficiently high correlations with occupational success as to make them valuable as predictors of occupational success. It is in this area where additional research can be of special value.

Purpose of the Study

It was the purpose of this study to determine the relationships that exist between selected factors available in the high school records, and occupational or college success; and further, to examine whether or not the selected factors are comparably related to both occupational and college success. That is, do those factors which correlate with college success in the highest degree also correlate with occupational success in the highest degree?

It was believed that this would constitute valuable information to those who must make recommendations to employers and to the employers themselves as they select employees. Just as colleges use some of these factors for admission, employers could also use them for selection of workers if they prove to be significantly related. If not, then this too is valuable information.

Statement of the Problem

The problem of this study was to determine the relationship between selected factors and occupational and college success. More specifically, it was intended to:

1. Determine the relationship between occupational success and the factors of: (1) high school grade-point average (HSGPA), (2) composite score on the Iowa Test of Educational Development (ITED), (3) composite score on the California Test of Mental Maturity (CTMM), (4) industry, (5) initiative, (6) responsibility, and (7) teachers' prediction of college success.

2. Determine the relationship between college success and the factors of: (1) high school grade-point average, (2) composite score on the Iowa Test of Educational Development (ITED), (3) composite score on the American College Test (ACT), (4) composite score on the California Test of Mental Maturity (CTMM), (5) industry, (6) initiative, (7) responsibility, and (8) teachers' prediction of college success.

3. Determine whether or not the selected factors are related to occupational success in the same or comparable degree as they are related to college success.

Delimitations of the Study

This study was limited to include only the 1960-1961 graduating class of Midwest City High School, Midwest City, Oklahoma. The time period was limited to a four year study of this group of students. Females who were married and not gainfully employed were not included in this study except to note the number in the group.

The study was further limited to include only those students for whom the selected factors were available, and for whom follow-up addresses could be obtained.

Definition of Terms

1. College success--College success was determined by the college grade-point average (CGPA).

2. Occupational success--Occupational success was determined by: (1) rating by the employer or supervisor, and (2) salary.

3. College group--It was not necessary for a student to complete a degree to be considered in the college group, but in most cases only those who had completed two years of college work were included in the college group. In the event that a student had not completed two years of college work, some few exceptions were made when it was believed that the study could be improved by placing the student in the college group even though he had not completed two years of college work. Though a small number of students attended out of state institutions of higher education, the major portion attended Oklahoma institutions of higher education. Those who attended the University of Oklahoma comprised the largest number by far.

4. Occupational group--All students who were not included in the college group were considered for inclusion in this group. By the delimitations of this study, married females who were not gainfully employed were excluded from the study. All other students included in the study for whom follow-up data were received were included in the occupational group.

5. High school grade-point average--The high school grade-point average (HSGPA) was based on: A = 4, B = 3, C = 2, D = 1, and F = 0.

6. College grade-point average--The college grade-point average (CGPA) was based on: A = 4, B = 3, C = 2, D = 1, and F = 0.

7. Teachers' prediction of college success--A prediction made by teachers of the students at the end of their high school work based on the teachers' opinion of the students' chance of college success. These ratings were made for all students in both the college bound and occupational groups. The ratings used were: Excellent = 4, Good = 3, Fair = 2, and Poor = 1.

8. Initiative--The ability to originate projects or ideas whether it be performance in class or in extra-class activities. Obtained from the confidential folder in the high school records as recorded by teachers. Ratings used were: Superior = 6, Excellent = 5, Above Average = 4, Average = 3, Fair = 2, and Poor = 1.

9. Industry--Designates those personal qualities of the student which result in the putting forth of effort. Obtained from the confidential folder in the high school records as recorded by teachers. Ratings used were: Superior = 6, Excellent = 5, Above Average = 4, Average = 3, Fair = 2, and Poor = 1.

10. Responsibility--Designates those personal qualities of the student which resulted in his taking the lead with reference to individual tasks rather than needing to be coerced in the performance or completion of them.

Obtained from the confidential folder in the high school records as recorded by teachers. Ratings used were: Superior = 6, Excellent = 5, Above Average = 4, Average = 3, Fair = 2, and Poor = 1.

11. Employer Rating--A rating by the employer or supervisor for each student included in the occupational group. The ratings were made by using the Rating of Job Success instrument. The eight items were averaged to obtain the overall rating which was used as the employers' rating.

12. Salary--Annual salary of those students included in the occupational group as reported by the employer.

Population

The 1960-1961 graduating class of Midwest City High School, Midwest City, Oklahoma, was selected as the population for this study. The size of this class was 369 students. Of this number, 181 were females, and 188 were males.

Of the 369, there was a total of 66 students for whom current addresses could not be found and, therefore, a follow-up could not be accomplished. Two other students were deceased. In keeping with the delimitations of this study, the 68 students were excluded, leaving 301. This number was composed of 142 females and 159 males.

Hypotheses to Be Tested

HO_1 There is no statistically significant dependence between high school grade-point average and occupational

success as determined by employer rating and annual salary.

HO_2 There is no statistically significant dependence between the composite score on the ITED and occupational success as determined by employer rating and annual salary.

HO_3 There is no statistically significant dependence between the composite score on the CTMM and occupational success as determined by employer rating and annual salary.

HO_4 There is no statistically significant dependence between the rating of industry and occupational success as determined by employer rating and annual salary.

HO_5 There is no statistically significant dependence between the rating of initiative and occupational success as determined by employer rating and annual salary.

HO_6 There is no statistically significant dependence between the rating of responsibility and occupational success as determined by employer rating and annual salary.

HO_7 There is no statistically significant dependence between the teachers' prediction of college success and occupational success as determined by employer rating and annual salary.

HO_8 There is no statistically significant dependence between high school grade-point average and college success as determined by college grade-point average.

HO_9 There is no statistically significant dependence between the composite score of the ITED and college success as determined by college grade-point average.

HO_{10} There is no statistically significant dependence

between the composite score on the ACT and college success as determined by college grade-point average.

HO_{11} There is no statistically significant dependence between the composite score on the CTMM and college success as determined by college grade-point average.

HO_{12} There is no statistically significant dependence between the rating of industry and college success as determined by college grade-point average.

HO_{13} There is no statistically significant dependence between the rating of initiative and college success as determined by college grade-point average.

HO_{14} There is no statistically significant dependence between the rating of responsibility and college success as determined by college grade-point average.

HO_{15} There is no statistically significant dependence between the teachers' prediction of college success and college success as determined by college grade-point average.

Treatment of the Data

All the hypotheses were initially tested by the Chi-square technique for dependency of distributions. If dependence was demonstrated, the magnitude and vector were determined by use of the Spearman rank order correlation method.

Organization of the Study

The problem of this study is presented in Chapter I. Other major divisions of Chapter I are designed to describe

the study, its need, and its treatment.

A review of research related to the study is presented in Chapter II. Chapter III describes the design of the study and the procedure involved in its completion.

Presentation and analysis of the data is contained in Chapter IV. Analysis of data includes the results of the statistical treatment involved in the study and acceptance or rejection of the hypotheses which were tested. Chapter V contains a summary of the study, the conclusions based on the findings, and recommendations offered in view of the findings and conclusions.

CHAPTER II

REVIEW OF RELATED LITERATURE

Studies which seek relationship between selected factors and college success are rather numerous. According to Segel, "the earliest studies of prognosis of college success used the psychological tests developed by Wundt, Cattell, and others and were in general represented as to type by the cancellation test. Not much relationship was found between the results on these tests and college success."[1] Results of these and other studies emphasize the need for further investigation into the problem of selecting factors which can adequately predict success in college. The deviation of correlation coefficients from one study to the next, and the fact that the correlation coefficients seldom reach the .70 level is indicative that investigation into various combinations of selected factors is needed.

A review of the literature indicated that very little work had been done in the area of predicting occupational success from the selected factors normally available for high school students. In addition to this, some of the better studies were concerned not with factors from the high school

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[1]Segel, p. 57.

records, but with factors related to college work. However, because of their value to this study in terms of method, procedure and results, they were included.

The review of literature as presented in this study was arranged in a chronological order based on two categories--that related to college success and that related to occupational success. This arrangement may be somewhat fragmented, but it does provide a clear perspective of the research activity in this area over the past few years.

Research Related to College Success

An early study[1] at the University of Syracuse obtained a correlation of .60 when an intelligence measure, high school grades, and college grade-point average for the first semester were used to predict college success. This study was based on a sample of 450 Liberal Arts freshmen. One conclusion reached was that if higher correlations are to be reached, it will be necessary to measure some of the character and personality traits in addition to those factors listed above.

Guiler[2] was interested in studying only group intelligence tests as to their value in predicting college success. To investigate this problem three widely used group intelligence tests were administered to eighty freshmen at Miami University and the results were studied in relation to the

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[1]Mark A. May, "Predicting Academic Success," Journal of Educational Psychology, XIV (1923), 429-40.

[2]W. S. Guiler, "The Predictive Value of Group Intelligence Tests," Journal of Educational Research, XVI (1927), 365-74.

grades of these students for the first two semesters of their college work. Results indicated that the tests were approximately equal in their use as predictors with correlations of .69.

Freeman[1] in writing about the use of group intelligence tests for predicting college success said that such a practice had been in existence for more than ten years. So the use of group intelligence tests in predicting academic achievement dates back some 40 years according to this report. Further discussion from this writer asserted that the value of these tests for predicting college success was by no means an absolute, but that they were useful even though inadequate if used as single factors for predicting college success. Such an assertion is supported by the fact that students who had been on probation or in some cases even dropped out for a semester could meet requirements for a degree if they were willing to put forth effort. This point seems to enforce a belief that some students do well simply because they are willing to put forth a considerable amount of effort.

In 1929 the problem of survival in college was studied.[2] Results indicated the correlation between general mental ability and college scholarship to be greater than the correlation between mental ability and survival in college.

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[1]Frank S. Freeman, "Predicting Academic Survival," Journal of Educational Research, XXIII (1931), 113-123.

[2]Harold A. Edgerton and Herbert A. Toops, Academic Progress (Columbus, Ohio: Ohio State University Press, 1929).

Segel, referring to the study above, wrote that "the correlation of the Ohio psychological examination using percentiles with point-hour-ratio of mark average .45 for the different departments, the correlation between persistence in college and the Ohio test is only .19."[1] The conclusion reached was that it seemed desirable to measure success in college by the grade achievement rather than persistence in college.

Rinsland[2] and Tiegs[3] provided comments on the variation of marks assigned by teachers to subjective examinations. It was not their purpose to study high school grades as they relate to college success, but their contributions are valuable to any researcher when high school grades are to be used as a factor in predicting college success. As other studies in this review will indicate, high school grades are very useful in predicting college success but again are not adequate when used as a single factor. The variation in marks assigned to subjective examinations may vary considerably from teacher to teacher. For that matter a wide difference exists when the same teachers re-mark the examinations after enough time has intervened for them to forget the first marks assigned.

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[1]Segel, p. 7.

[2]Henry D. Rinsland, Manual for Constructing Objective Tests and Improving Grading in Elementary and High School Subjects (Chicago: John S. Swift Co., Inc., 1935), pp. 98-101.

[3]Ernest W. Tiegs, Test and Measurements in the Improvement of Learning (Cambridge: Houghton Mifflin Co., 1939), pp. 9-10.

It is also quite common knowledge among educators that the value of a high school grade may vary considerably from school to school, subject to subject, or teacher to teacher. An "A" does not mean the same thing in all schools, under all teachers, and in all classes. Because of this it does not seem reasonable for institutions of higher learning to eliminate students from enrollment merely on the basis of previous grades without evaluating them first.

Monroe stated that, "unsatisfactory achievement in academic work may result from a variety of causes."[1] If this is true, then to base the future of a student on grades alone is to chance the possibility of a poor decision, if not entirely a detrimental one, to the student. Grades then, must be kept in proper perspective with other sources of data which indicate the ability of a student.

Rhum[2] investigated the relationship existing between 9th grade grade-point index, 9th grade ITED composite score, 12th grade grade-point index, 12th grade ITED composite score, over-all high school grade-point index, and percentile rank in high school graduating class; and college grades. The study was conducted using 1090 freshmen students from six colleges in Iowa during the summer of 1946. Further specialization of

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[1]Walter S. Monroe (ed.), Encyclopedia of Educational Research (New York: The Macmillan Co., 1941), pp. 277-78.

[2]Gordon J. Rhum, "A study of the Interrelationships Among the Iowa Tests of Educational Development and of their Relationship to College Grades and College Entrance," (A Doctoral Dissertation at State University of Iowa, 1949).

this study used a special sample of 282 students from the 1090 and only 3 institutions.

Results, using the specialized sample, indicated that of the six predictors the 12th grade ITED composite score yielded the highest validity coefficient (r = .62). Second to this was over-all high school grade-point index (r = .61). When using the larger sample of 1090 students the over-all high school grade-point index had the highest correlation (r = .66), with 12th grade grade-point and percentile rank in high school graduating class being second (r = .62). Even though the 12th grade data resulted in high correlations, the 9th grade ITED composite score (r = .56) and the 9th grade grade-point index (r = .57) were sufficiently high as to be almost as good for predictors of college success as the 12th grade data.

Super discussed the relationship between intelligence and educational achievement and then wrote:

> Despite the relationship between intelligence and educational achievement revealed by data such as the above, the correlation between intelligence tests and grades is not especially high. The numerous summaries of the subject show that in high school they tend to range from .30 to .80 and in college from .20 to .70, the modal r's being .40 and .50 in the former and between .30 and .50 in the latter.[1]

According to Lindquist[2] predictions of college success based on high school achievement have been fairly accurate.

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[1]Donald Super, Appraising Vocational Fitness (New York: Harper & Brothers, 1949), p. 90.

[2]Lindquist, pp. 87-88.

Predictions based on rank-in-class have been found superior to those based on grade-point average. This, he explains, is due to the minimization of differing standards which are so prominent in the grade-point average. It is likely that correlations between college achievement and rank-in-class may be around .55 or even better if certain correction factors are applied which take into consideration a particular college and the students' high school.

In reference to the use of aptitude and achievement tests in predicting college success, Lindquist wrote:

> From a battery of achievement measures we get about as good a prediction of freshman average or other general measure of college success as we would get from rank in high school class; a validity coefficient of about .55 would be typical.
>
> . . . . . .
>
> Those working in the field of predicting scholastic success in college have felt that there are definite limitations to the use of scholastic aptitude and achievement tests. It has been estimated by those who work under conditions as nearly ideal as we can expect that their highest potential predictive value is represented by a coefficient of around .75. And, in fact, even when the best of present achievement and aptitude tests, whose reliability is known to be high, are combined to predict grades, it is seldom possible consistently to attain validity coefficients of more than .70.[1]

In 1956 a series of studies[2] conducted at twelve colleges in Iowa, using 3,411 students, investigated the relationship between 12th grade ITED composite scores and freshman success in college as determined by grade-point.

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[1]Lindquist, pp. 89-92.

[2]R. Bauernfeind, and B. Masia, The Iowa Tests of Educational Development as Predictors of College Performance, A Research Report, B-5 (Chicago: Science Research Associates, Inc., 1956).

The correlation ranged from .47 to .72 with approximately one-half of the studies reporting correlations greater than .60.

A similar study[1] to that by Bauernfeind and Masia investigated the value of 12th grade ITED composite scores as predictors of freshmen success in college. The measure of success was college grades. Students, a total of 197, were selected from two Oklahoma colleges for participation in the study. Results gave a correlation of .52 for students of Central State College and .53 for students of the University of Oklahoma.

A study[2] designed to validate the Iowa Test of Educational Development (ITED) composite and individual test scores, investigated the relationship of the ITED to college freshman grades. The coefficients of correlation indicated that the Iowa Tests of Educational Development were relatively efficient predictors of college grades. The correlation of composite score and grades was .711, and the relationship of individual tests to college grades ranged from .492 to .631.

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[1]Mary D. Rootes, ITED Scores of Oklahoma Students Who Enter College, A Report to the Oklahoma Curriculum Improvement Commission (Mimeographed), (Chicago: Science Research Associates, Inc., 1957).

[2]Thomas W. Hansmeier, "The Iowa Tests of Educational Development as Predictors of College Achievement," Educational and Psychological Measurement, XX (1960), No. 4, pp. 843-45.

Staton[1] in a study of beginning freshmen at Oklahoma University, in the fall of 1961, took a look at a number of selected factors as they relate to college success. The factors used were: ACT area and composite scores, high school grades, sex, occupation of parents, size of high school from which graduated, and type of courses selected in high school. College success was represented by four levels: (1) Group I--grade-point average of at least 3.0; (2) Group II--grade-point average of 2.0 to 2.9; (3) Group III--grade-point average of 1.0 to 1.9; and (4) Group IV--grade-point average of less than 1.0.

The more significant findings of this study were: (1) that the scores obtained on the ACT and high school grade-point averages usually showed significant relationships to college grade-point average for Group I; (2) that the scores on the ACT showed no significant relationship to college grade-point average in Groups II, III, and IV; and (3) that high school grade-point average showed little relationship to college grade point average for Groups II and III, and no significant relationship for Group IV. Though the relationships of high school grade-point averages and scores on the ACT to college grade-point average were not significant for all Groups, it was found that high school grade-point averages were more closely related to college

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[1]Jon Tom Staton, "The Relationship of Selected Factors to Academic Success for Beginning Freshmen," (A Doctoral Dissertation at Oklahoma University, 1962).

grade-point averages than were the ACT scores. Other conclusions indicated that the better students seemed to choose a high school course of study which was more academic; students whose parents had occupations which required education and training beyond high school were more likely to go to college; a larger proportion of college students came from large high schools though the size of high school did not seem to affect their success in college, and parents occupation did not affect college success. On the basis of this study, the author concluded that there was not sufficient evidence to establish criteria for predicting different degrees of college success.

A similar[1] study of 400 Oklahoma University college freshmen in 1960 used the ACT composite score, ACT subtests, the number of credit hours completed in the fall of 1960-1961, college grade-point average, and high school grade-point average as possible factors for predicting college success. The results showed the high school grade-point average to have the highest correlation to college grade-point with an $r = .569$. Credit hours completed had the lowest correlation to college grade-point average. Other correlations with college grade-point average were: ACT composite score ($r = .524$), English subtest of the ACT

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[1]John Kiehlbauch, "Multivariate Analysis of Some Criteria of Academic Achievement and Aptitude as a Predictor of College Performance," (Master's Thesis, Oklahoma University, 1962).

(r = .500), math subtest of the ACT (r = .399), social studies subtest of the Act (r = .442), natural science subtest of the ACT (r = .412). These were all significant at the .01 level.

A study by Adkin[1] had as its specific purpose to find the best predictors of college success from the following set of eleven variables: (1) size of student's high school; (2) high school grade-point average; (3) size of students' home community; (4) father's primary occupation; (5) father's educational level; (6) number of siblings; (7) ACT English subtest; (8) ACT mathematics subtest; (9) ACT Social Studies subtest; (10) ACT Natural Sciences subtest; and (11) the Otis Self-Administering Tests of mental ability. The criterion of college success was grade-point average. Results were tested by zero-order correlations, multiple correlations, and multiple regression equations were used for interrelation of factors. Though significant correlations existed for other factors, high school grade-point was the best predictor of college success.

Aiken, citing studies conducted in Utah, Florida, Georgia, and elsewhere stated:

> The most valid predictors of achievement in college is the average grade in high school. . . . in spite of differences in computational procedure and varying

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[1]Arlie Andrew Adkins, "Prediction of College Success at Middle Tennessee State College," (A Doctoral Dissertation at The University of Florida, 1963), Dissertation Abstracts, Vol. XXV, p. 211.

> standards and size of high schools, the high school average grades forecast college grades better than aptitude tests, or any other college entrance requirement.[1]

A very recent study summarized three studies of the ACT which were carried out at Kansas State University.[2] The first of these studies was that of seeking multiple correlations between first semester grade-point average and selected ACT subtests alone and in combination with high school rank. The R's ranged from .601 to .775 for men, and from .681 to .810 for women.

The second study investigated the relationship between estimated and obtained first semester grades. Correlations ranged from .54 to .75 with some variability between male and female. The regression equation used to estimate grades made use of the ACT score as a variable.

The third study investigated the relationship between course grades and selected ACT subtests, and in some cases a combination of ACT subtests and high school grades was used. Correlations ranged from .42 to .55 for three courses and around .60 for six courses.

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[1]Lewis R. Aiken, Jr., "Rank in High School Graduating Classes of Various Sizes as A Predictor of College Grades," The Journal of Educational Research, LVIII, No. 3 (October, 1964), pp. 56-60.

[2]James M. Foster and David G. Danskin, "The American College Test (ACT) Tested Three Ways," Personnel and Guidance Journal, XLIII (May, 1965) No. 9, pp. 904-09.

Research Related to Occupational Success

Though the literature is replete with studies related to college success, there is a definite lack in the number of studies related to occupational success. In addition to this, most of the studies which are available in this area have sought relationships between scores on certain vocational aptitude tests and occupational success rather than the relationship between a set of selected factors such as those used in this study and occupational success. This is not a suggestion that the previous studies are without value, but rather that there is a paucity of research data on occupational success as related to the common factors of high school grades, test scores (achievement and intelligence), and teacher ratings.

An early study by Thorndike[1] of over two thousand youngsters was designed to carry on a follow-up over a period of eight years. School records and special vocational aptitude tests were used as factors for correlating with occupational success. Results indicated that some factors such as intelligence tests, achievement tests, and marks in school were useful in predicting what grade would be reached in school, but the correlations between scores on vocational tests taken at the age of fourteen and criteria for judging occupational success four to eight years later did not yield

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[1]Edward L. Thorndike, et al. Prediction of Vocational Success (New York: The Commonwealth Fund, 1934).

any results of practical value.[1] For this study occupational success was based on salary, level of the occupation, and interest of the employee in the occupation.

Lattin[2] studied success in hotel administration as related to factors associated with the areas of personal data, interests, and values. Success was defined as the progress made toward an executive position in hotel administration. Results important to this study indicate, first of all, a tendency for successful hotel men to make average or better grades in college. Age at entrance, number of extracurricular activities, number of subjects failed, number of siblings, and parental education were not related to vocational success. There was evidence that successful hotel men showed signs of leadership even in their college days. A final result was a strong suggestion that failures in hotel work were not a result of lack of ability, but rather a lack of personality characteristics or value pattern consistent with the way of life of a hotel man. Statistical treatment given to this study involved the use of means and standard deviations.

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[1]Leona E. Tyler, The Work of the Counselor (New York: Appleton-Century-Crofts, Inc., 1961), p. 118, citing Edward L. Thorndike et al., Prediction of Vocational Success (New York: The Commonwealth Fund, 1934).

[2]Gerald W. Lattin, "Factors Associated with Success in Hotel Administration," Occupations, XXIX (October, 1950), No. 1, pp. 36-39.

In a related study a number of years later, Latham[1] gave a battery of twenty-seven aptitude tests to 1600 high school seniors and made a follow-up of these students one year after graduation. The test scores were weighted so that a quantitative index of job suitability was given for each individual who undertook any given job. Criteria for job success was based on employer rating and expressed satisfaction of the worker. Statistical treatment made use of correlational methods. In reference to this study, Tyler wrote:

> The most striking finding is that the correlations of both success and satisfaction with job suitability indices is practically zero. There seems to be no evidence whatever that individuals going into work which a counselor would have considered suitable on the basis of test scores get along better than those who go into unsuitable work.[2]

A study of value to the present research was that by Jepsen,[3] even though it concerned college graduates rather than high school graduates. In the cited study the writer was interested in studying the relationship of extracurricular activities and academic grades to occupational success as determined by salary. Measures of extracurricular activities and academic grades were determined, and correlations

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[1]A. J. Latham, "Job Appropriateness: A One-Year Follow-up of High School Graduates," Journal of Social Psychology, XXXIV (1951), 55-68.

[2]Leona E. Tyler, The Work of the Counselor (New York: Appleton-Century-Crofts, Inc., 1961), p. 118.

[3]Victor L. Jepsen, "College Activities and Vocational Success," Occupations XXIX (February, 1951), No. 5, pp. 345-47.

were derived between these measures and salary. A correlation of 0.27 was found between extracurricular activities and annual earnings. In contrast to this a correlation of 0.0 was found between grades and earnings. In addition to this, the study showed a large number of low earnings received by graduates with no extracurricular activities and consistently high incomes by those who ranked highest in the extracurricular activities.

Ghiselli,[1] discussing validity information on vocational aptitude tests, indicated that the correlations between tests and criteria are normally low and have a wide degree of variance from study to study. A similar study by Berdie[2] made a follow-up of 1500 students ten years after they had been given a battery of aptitude, achievement, interest, and personality tests. Correlations between scores on these tests which were administered when the students entered college and grades in the courses chosen were low, however, it was possible to distinguish the curricula groups by the patterns of scores on the tests.

Thorndike[3] sent questionnaires to about 17,000 men in 1955 and 1956 who had been given the comprehensive Air

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[1]Edwin E. Ghiselli, The Measurement of Occupational Aptitude (Berkeley: University of California Press, 1955).

[2]Ralph F. Berdie, "Aptitude, Achievement, Interest, and Personality Tests: A Longitudinal Comparison," Journal of Applied Psychology, XXXIX (1955), 103-14.

[3]Robert L. Thorndike and Everett Hagen, 10,000 Careers (New York: Wiley, 1959).

Force battery of tests in 1943. The questionnaire sought information relative to the career success of these men. From a return of over 10,000 the results showed almost no correlation between the test scores and career success as determined in this study.

A recent study at the college level made a search for undergraduate college performance records which might be useful for the purpose of predicting job success of college graduates.[1] The relationship between college academic grades, activities participation, and job success was determined using salary and supervisor ratings as measures of job success. The conclusions reached indicated that academic grades and cocurricular activities have only limited usefulness as predictors of job success though grades are more useful in the technical fields, and activities are more helpful in such fields as teaching and public relations.

Though research has demonstrated that various selected factors have significant correlations to college success, it has not been very effective in isolating factors which relate to occupational success. For this reason additional research seeking the relationship of various selected factors and occupational success is needed. A second need is that the selected factors be taken from the high school records and

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[1]John Daniel Lawson, "The Relationship Between Job Success and Undergraduate Curricular and Cocurricula Attainment," (A Doctoral Dissertation at Stanford University, 1963).

their relationship to occupational success be investigated for students who enter the employment world without the advantage of higher education.

CHAPTER III

DESIGN AND PROCEDURE

Design of the Study

This study was designed to determine the relationship between selected factors from the high school records and college or occupational success, and then make a comparison of the relationships for college or occupational success when a significant relationship existed.

The most critical area of concern in the design was that of establishing criterion for college and occupational success with the latter posing the greater problem. The literature is replete with studies which use grade-point average as criterion of college success, so the decision to base college success on grade-point average merely followed precedence, and was not particularly crucial. However, as indicated by Lawson:

> One of the most difficult decisions to be made in a study of employment success is the selection of an adequate criterion. Many have been used and even more suggested. Salary is perhaps the most common, but supervisor ratings, peer and subordinate ratings, self-assessment, self-satisfaction, performance records, measurements of deviation from group norms, tests of knowledge and skill,

number of promotions, and number of individuals supervised have also been proposed and used.[1]

A determination of the criterion to be used from all the possible combinations is principally dependent on the frame of reference used to view job success. If the employee's frame of reference is used it would be likely that self-assessment would become a part of the criterion variable. If, however, job success is viewed from the employer's frame of reference the employee's self-assessment would not likely be included. In view of this thought, it was necessary to determine the frame of reference to be used to view job success. That is, would job success be viewed from the frame of reference of the employee, the employer, other employees, or possibly persons or groups external to the job itself such as labor unions and testmakers? The employer's frame of reference was adopted for this study. Such a frame of reference logically led to the use of salary and employer rating as measures of job success.

Though it may not hold true in all cases there is reason to expect that the rating an employer gives an employee and the salary he is willing to pay for the services rendered by the employee are valid measures of job success when viewed from the employees frame of reference.[2] Of course it is evident that salaries very for reasons other than the employers' estimate of the value of the employee to his business.

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[1]Lawson, p. 8.

[2]Lawson, p. 21.

Such things as geographic area, supply and demand of workers, the type of occupational field, and others may be identified as being contributive to the salary an employer is willing to pay. However, since the major portion of the students in the occupational group were employed in or near central Oklahoma, it was felt that the factor of geographical area was minimized. It was not too difficult to argue that such factors as the type of occupation chosen, and the effect of supply and demand on the worker are related to the personality, training and ability of the worker. The higher unemployment rate among the high school dropout than the high school graduate,[1] the unemployment rates of those in the poverty areas, and the nature of the jobs that the less able or uneducated must fill are evidences that there is a positive relationship between gainful employment and training or ability.[2] No attempt, therefore, was made to adjust for the many factors which contribute to salary, but rather to view the salary from the standpoint of what the employer was willing to pay for the services of the employee.

The decision to use college grade-point average (CGPA) as a measure of college success, and employer rating and salary as measures of occupational success necessitated

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[1]Oklahoma Public School Holding Power Project, "Summary Information on Dropouts," (an unpublished pamphlet of the Oklahoma Public School Holding Power Project), p. 1.

[2]U.S. Office of Education, Digest of Educational Statistics, U. S. Office of Education Bulletin, No. 15 (Washington: U. S. Government Printing Office, 1963), p. 121.

the design of instruments to obtain such information. Therefore, a Follow-Up Questionnaire (Appendix A) was developed to provide the data needed to form the two basic groups of the study--the college group, and the occupational group. Other than the general considerations which should be given to the use of any type of data gathering instrument, it was particularly important to make sure that the Follow-Up Auestionnaire provided the necessary information for obtaining other data related to the study. Other than this consideration it was not necessary to be overly concerned about the design of the questionnaire.

However, to design an instrument to be used for the purpose of obtaining a rating from employers of job success is much more critical. In addition to being an area of critical concern the development of an instrument for rating employees would involve both a degree of sophistication and an involvement of time which extend beyond the purpose of this study if the task were attempted as an original contribution. Realizing this, it appeared appropriate to resort to the use of previous research as an aid in designing an instrument for obtaining employer rating, as well as salary.

In a recent study, Lawson undertook the task of developing an instrument for obtaining ratings of job success from employers. The following statement which accompanied the rating form when sent to the employer is definitive of its development and purpose:

> The items on our confidential rating forms represent a logical composite of items included on many job performance rating instruments currently in use. We believe they will give you an adequate opportunity to appraise an employee in most kinds of work.[1]

Of course it would be pointless to argue that the items which make up the above mentioned rating sheet are the only possible items which would be valuable items to include on such a rating sheet. It is important, however, to note that they were justified as a result of what appeared to be suitable research rather than mere chance. In view of the research effort to develop a valid instrument for obtaining employer ratings of job success, it appeared justifiable to use the same items in whole or in part in designing the employer rating for this study.

The items of "job knowledge" and "originality" were not used in this study. It was felt that the first one was not as applicable for high school graduates as for college graduates, and that the second was covered fairly well by the items of initiative, intellectual competence, and vision, thus making it somewhat redundant. The eight items included were: (1) job performance, (2) judgment, (3) initiative, (4) intellectual competence, (5) personal relations, (6) vision, (7) leadership, and (8) communications. A continuous scale with values ranging from one to ten was used rather than the

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[1]Lawson, p. 134.

categorical scale proposed by Lawson.[1] In addition to this, the definitions of the items were altered as seemed appropriate for improving the rating sheet. The result was an eight item "Rating of Job Success" which was presented as Appendix B.

A second study verified that a number of the items included on the rating sheet were valid items. In this study, Sullivan showed that the selection criteria of twenty-one companies used during twenty-minute interviews included: (1) evidence of strong academic record, (2) drive, (3) initiative, and (4) leadership.[2] It further illustrated the use of such characteristics as judgment and attitude.

The selected factors from the high school record are: (1) high school grade-point average (HSGPA), (2) composite score on the Iowa Test of Educational Development (ITED), (3) composite score on the American College Test (ACT), (4) composite score on the California Test of Mental Maturity (CTMM), (5) teachers prediction of college success, (6) initiative, (7) industry, and (8) responsibility. The inclusion of these eight factors is in no way to be construed as an attempt to isolate the set of factors which will predict college or

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[1]Lawson, p. 126.

[2]Daniel Joseph Sullivan, "Selection Procedures for Specific Management Trainers Programs in Twenty-one Companies," (Unpublished Ed. D. Dissertation, Rutgers University, 1960) Dissertation Abstracts XXI, 2200.

occupational success. The design of the study did not reflect an attempt to validate these factors as such an ideal set, but rather sought to determine the relationship of these factors to college or occupational success.

The selection of the students to be used in the study was an arbitrary one in many respects. It was important, however, to select a group of students who had been out of high school for a period of time which was long enough to provide those who entered the occupational field an opportunity to establish themselves. This also permitted a study of those who entered college for an interval of time which extended beyond the first semester of their freshmen year in college. A further consideration in the selection of the students for study was that the large majority of those who entered college would either be near graduation this year, have graduated only a semester or two before, or possibly still lack only a few semesters to graduate. In any event, the major consideration was that most of them could be contacted for follow-up purposes at this time, whereas, to have selected a class who had graduated, say ten years before, could have posed a very difficult task of follow-up. A final consideration in the selection of the 1960-1961 class of Midwest City High School for study was the knowledge that this class would provide the two groups needed for the study in numbers large enough to draw logical conclusions.

Procedure of the Study

The Graduates of 1960-1961 of Midwest City High School comprised the population for this study. Originally the number was 369, 181 females and 188 males. However, two members of the class were deceased and, therefore, not included in the study.

School records, telephone directories, teachers and administrators, and some members of the class under study were consulted in an attempt to locate the students of this study. Though a considerable amount of time and effort were expended, even to the point of phoning or writing old addresses, contacts could not be made on 66 students of the 367, so this reduced the number to be studied to 301, 142 females and 159 males.

The eight selected factors as defined in Chapter I were obtained from the records of the Midwest City High School from which the students graduated. Some factors were obtained from the school records in the administrative office and others from the records in the school counselor's office. Though this involved a number of hours of data gathering, it was a rather direct task, not involving contact with the students under study.

Obtaining the criterion variables was a more difficult task, for though most of the possible sources for correct addresses had been consulted beforehand, it soon became

evident that as a result of mobility, some addresses had changed. Of course the largest difficulty faced was that of getting questionnaires returned. This is a problem confronted by most researchers who rely on the questionnaire for obtaining data. As noted by Selltiz:

> There are many factors that influence the percentage of the returns to a questionnaire. Among the most important are: (1) the sponsorship of the questionnaire; (2) the attractiveness of the questionnaire format; (3) the length of the questionnaire; (4) the nature of the accompanying letter requesting cooperation; (5) the ease of filling out the questionnaire and mailing it back; (6) the inducements offered to reply; (7) the nature of the people to whom the questionnaire is sent. Attractively designed questionnaires that are short, easy to fill out, simple to return, sponsored by a group with prestige, and presented in a context that motivates the respondent to cooperate are most likely to be returned. However, even under the best circumstances a sizable proportion do not return questionnaires. The people who do return them are usually the less mobile (and thus the more likely actually to receive the questionnaire), the more interested, the more literate, and the more partisan section of the population.[1]

In order to secure the highest possible return, the Follow-Up Questionnaire (Appendix A) was mailed with particular consideration being given to the above points. The questionnaire was accompanied by a letter signed by Mr. J. E. Sutton, presently Deputy Superintendent of Schools at Midwest City, but the principal of the high school at the time the students graduated. The letter (Appendix C) contained a greeting from Mr. Sutton, as well as directing the graduates' attention to the study and the possibility that it would be

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[1]Claire Selltiz et al., Research Methods in Social Relations (New York: Holt, Rinehart, & Winston, Inc., 1961), pp. 241-42.

helpful to their alma mater if they cooperated with the study. This letter was mailed on May 4, 1965.

Further considerations given to the preparation and mailing of the questionnaire were that it was easy to complete, self-addressed, stamped, and commercially printed to assure attractiveness. An identification number was assigned to each student and an explanation of its use appeared in the accompanying letter. This permitted the students to respond without disclosing their identity. This would not have been necessary had the questionnaire been developed to be returned under cover, but it was believed that a card form would make it easier to return, and thereby increase the percentage of returns.

About two weeks after mailing the questionnaire a phone call was placed to almost all who had not returned the questionnaire asking if they had received it and offering to send another if they had not or had misplaced it. As a result of this contact it was necessary to send a second questionnaire to many who had misplaced the first one.

Two weeks later, on June 5, 1965, a second letter, (Appendix D) accompanied by another copy of the questionnaire was mailed to all those who had not responded to the first correspondence or the personal phone call. This letter emphasized the need for returning the questionnaire so that as near 100 per cent as possible of the class might be included in the study. It further explained that the study was being delayed

until a larger number of returns was received.

The personal phone call and the second letter proved most beneficial to the study in terms of an increased percentage of returned questionnaires. As a result the percentage of returns increased from about fifty per cent to eighty-six per cent or 261 returns of the 301 students included in the study. Of the 261, 136 were females and 125 were males.

The data received from the Follow-Up Questionnaire served as the basis for identifying those students who would be placed in the two groups with which this study was concerned--the college group, and the occupational group. On the basis of the data received, there was a total of 108 students in the college group and 100 in the occupational group. Of the college group 37 were females and 71 males with 51 females and 49 males comprising the occupational group.

In addition to those in the college and occupational groups, there were 47 females whose major concern was that of a housewife and in most cases a mother. Since there was no way to judge success for this group of students in terms of the criterion for college or occupational success they were not included in the study. There was a total of six others who were either unwilling to participate in the study by completing the questionnaire or who refused permission to contact their employers. These too, were not included in the study.

No further correspondence with the college group was

needed, but it was necessary to obtain employer ratings for those who were included in the occupational group. To do this the Rating of Job Success (Appendix B) was mailed to the employers of all those students in the occupational group. The first mailing of these rating sheets was May 20, 1965. Thereafter, mailing was accomplished as returns came back from the students and as they were placed in the occupational group.

Each rating sheet was accompanied by a letter (Appendix E) which explained the purpose of the study and how the employer could participate in its completion. A return self-addressed, stamped envelope was included in each mailing to the employer so as to minimize the time and effort required to return the rating sheet. About fifty per cent of the employers responded immediately, but for others it was necessary to send them a reminder. Therefore, on June 11, 1965, a second letter (Appendix F) was mailed to those employers who had not returned the rating sheet. Each letter was accompanied by an additional copy of the Rating of Job Success sheet and another self-addressed, stamped envelope. As a result of this letter, the total number of returns on employer ratings of job success was increased to 80 of the 100 or eighty per cent.

Two things in particular seemed to be important in the procedure used to obtain employer ratings of job success and salary. Permission had been obtained from each student in the occupational group to write their employer for a rating

of job performance. This made it possible to inform the employer that the employee was aware of and approved the solicitation of the employer rating. Secondly, it was emphasized that only the employer could provide this type of data, and of course without their help the study could not be completed. The employers were interested in being of service in this respect and responded very well.

When the data gathering process was completed the data were prepared and punched on IBM cards. Much of the statistical calculation involved in the treatment of the data was accomplished by use of the equipment in the University of Oklahoma computer laboratory. Other statistical treatment was facilitated greatly by using the equipment in the statistics laboratory of the College of Education, University of Oklahoma.

The statistical treatment provided for the data consisted of performing the Chi-square technique for dependency of distributions and when appropriate, the Spearman rank order correlation coefficient was computed to determine the magnitude and vector of the relationship.

CHAPTER IV

ANALYSIS OF THE DATA

The data which comprised the selected factors of this study were collected from the high school records and arranged so that the statistical treatment could be performed. The criterion variables for both occupational and college success were also collected and arranged for treatment. A listing of the variables of this study is presented in Table 1, indicating the type of variable and the group to which it applies.

It was originally intended to study the relationship of all of the selected factors for each group, but as the data were compiled it became evident that composite scores for the ACT were available for only a very limited number of the occupational group. Because of this the ACT score was not studied in relation to the criterion variables of the occupational group.

The selected factors from the high school records and the criterion variables for occupational success are presented in Tables 6 through 14. (See Appendix G). The selected factors from the high school records and the criterion variable for college success are shown in Tables

TABLE 1

LIST OF VARIABLES USED IN THE STUDY

Variables	Type of Variable		Group to Which Applicable	
	Selected	Criterion	Occupational	College
High School Grade-point Average	X		X	X
ITED	X		X	X
ACT	X			X
CTMM	X		X	X
Industry	X		X	X
Initiative	X		X	X
Responsibility	X		X	X
Teacher Prediction	X		X	X
College Grade-point Average		X		X
Employer Rating		X	X	
Salary		X	X	

15 through 23. (See Appendix H).

Identification numbers were assigned to the students of each group, that is, the occupational group and the college group. These numbers were used during the process of the study so that the data could be identified with a given student as it was collected, and at the same time the data could be kept confidential. The identification numbers appear on the tables as student numbers, therefore, the data from each table may be appropriately identified.

Grade-point averages were reported to the nearest tenth; salaries to the nearest dollar; ITED and ACT composite scores by percentile; CTMM composite score as an intelligence quotient; and all other variables were reported to the nearest tenth of one point.

The total number of students in the occupational group was 100. Of this number, employer ratings were received from eighty employers for a return of eighty per cent. However, seven could not be used because of insufficient data; therefore, Tables 6 through 14 show data for only 73 students. The total number in the college group was 108, but again seven of these were not reported because of insufficient data; therefore, data were reported for 101 students in the college group, Tables 15 through 23.

As stated in the section on treatment of the data in Chapter I, all hypotheses were originally tested by the Chi-square technique for dependency of distributions. Only when

the Chi-square technique yielded values which were significant at the .05 level of confidence was any further treatment of data considered. That is, if the Chi-square values indicated that the association between the criterion variables and the selected variables (factors) was not significantly different from that which would be expected by chance, then no further attempt was made to establish relationship.[1] In those cases where dependence was demonstrated, the magnitude and vector of the relationship was computed by the Spearman rank correlation coefficient.[2] This was a necessary procedure because even though the Chi-square technique is suitable for testing dependence of distributions, it is not to be considered as a measure of association per se.[3]

Before computation of the Chi-square values could be made it was necessary to categorize the variables of the study so that they would lend themselves to such a technique. A breakdown of the categories as used for this purpose is presented in Table 2. Four categories were used for each variable, thus resulting in four by four contingency tables for the computation of Chi-square values. It did not seem appropriate or necessary to present the contingency tables

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[1]Sidney Siegel, Nonparametric Statistics (New York: McGraw-Hill Book Co., Inc., 1956), pp. 195-201.

[2]Merle W. Tate, Nonparametric and Shortcut Statistics (Danville, Illinois: Interstate Printers and Publishers, Inc., 1957), pp. 13-14.

[3]Quinn McNemar, Psychological Statistics (New York: John Wiley & Sons, Inc., 1962), pp. 209-39.

TABLE 2

CATEGORIES FOR EACH VARIABLE AS USED FOR CHI-SQUARE COMPUTATION

Variables	Categories			
	1	2	3	4
High School Grade-point Average	0-1.4	1.5-2.4	2.5-3.4	3.5-4.0
ITED*	0-25	26-50	51-75	76-99
ACT*	0-25	26-50	51-75	76-99
CTMM*	0-25	26-50	51-75	76-99
Industry	1-1.5	1.6-3.0	3.1-4.5	4.6-6.0
Initiative	1-1.5	1.6-3.0	3.1-4.5	4.6-6.0
Responsibility	1-1.5	1.6-3.0	3.1-4.5	4.6-6.0
Teacher Prediction	1-1.4	1.5-2.4	2.5-3.4	3.5-4.0
College Grade-point Average	0-1.4	1.5-2.4	2.5-3.4	3.5-4.0
Employer Rating	1-2.5	2.6-5.0	5.1-7.5	7.6-10.0
Salary	Below $3000	$3000-4500	$4501-6000	Above $6000

*Categories represent 1st, 2nd, 3rd, and 4th Quartile ranges.

in this study because they would have occupied a considerable amount of space while adding nothing of particular value to the analysis of the data.

The presentation of the results of the Chi-square and correlational techniques was separated into two major sections of this chapter. One section treats the occupational group and the other treats the college group.

Results of Testing the Hypotheses Related to Occupational Success

Hypotheses 1 through 7 all concerned the relationship of the selected factors to occupational success as determined by the criterion variables of employer rating and salary. The results of the application of the Chi-square technique for dependence of distributions is presented in Table 3.

Hypothesis 1 was: There is no statistically significant dependence between high school grade-point average and occupational success as determined by employer rating and annual salary. The Chi-square value between high school grade-point average and employer rating was 2.968. The value found between high school grade-point average and salary was 12.745. Since the required value for significance at the .05 level of confidence was 12.59 for six degrees of freedom and 16.92 for nine degrees of freedom, the computed values of Chi-square did not justify rejection of the hypothesis; therefore, the hypothesis was accepted.

Hypothesis 2 was: There is no statistically significant

TABLE 3

CHI-SQUARE VALUES FOR OCCUPATIONAL SUCCESS CRITERION VARIABLES AND THE SELECTED FACTORS

Selected Factors	Occupational Success Criterion Variables			
	Employer Rating		Salary	
	χ^2	df	χ^2	df
High School Grade-point Average	2.968	6	12.745	9
ITED	4.979	6	6.575	9
CTMM	5.298	6	15.768	9
Industry	5.637	6	6.571	9
Initiative	1.498	6	6.330	9
Responsibility	2.987	6	16.372	9
Teacher Prediction	7.030	6	14.287	9

*Significant at the .05 level of confidence.
df: Degrees of freedom.

dependence between the composite score on the ITED and occupational success as determined by employer rating and annual salary. The Chi-square value between the composite score of the ITED and employer rating was 4.979, and that between the composite score of the ITED and salary was 6.575. The required value for significance at the .05 level was 12.59 and 16.92 for six and nine degrees of freedom respectively. The hypothesis was, therefore, accepted.

Hypothesis 3 was: There is no statistically significant dependence between the composite score on the CTMM and occupational success as determined by employer rating and annual salary. The Chi-square value between the CTMM composite score and employer rating was 5.298. The Chi-square value between the CTMM composite score and annual salary was 15.768. Again, the required values of Chi-square for significance at the .05 level was 12.59 for six degrees of freedom and 16.92 for nine degrees of freedom, so the hypothesis was accepted. It is worthy of note, however, that the part of the hypothesis which concerns salary could have been rejected in this case if the .10 level of confidence had been selected rather than the .05. This, however, is not in keeping with the level of confidence accepted for this study, nor with common practice of accepting either the .01 or .05 levels of confidence.

Hypothesis 4 was: There is no statistically significant dependence between the rating of industry and occupational success as determined by employer rating and annual salary.

Chi-square values of 5.637 between the rating of industry and employer rating, and 6.571 between the rating of industry and salary were not significant at the .05 level. Hypothesis 4 was accepted on the basis that the Chi-square values were not significant at the .05 level of confidence.

Hypothesis 5 was: There is no statistically significant dependence between the rating of initiative and occupational success as determined by employer rating and annual salary. The Chi-square value between initiative and employer rating was 1.498, and between initiative and salary 6.330. Neither of these were significant at the .05 level of confidence; therefore, the hypothesis was accepted.

Hypothesis 6 was: There is no statistically significant dependence between the rating of responsibility and occupational success as determined by employer rating and annual salary. The Chi-square value between employer rating and responsibility was 2.987. This was far below the 12.59 value needed to reject the hypothesis for this factor at the .05 level with six degrees of freedom. The value of 16.372 between salary and the rating of responsibility approached very closely the value of 16.92 necessary for rejecting the hypothesis at the .05 level with nine degrees of freedom. Though the hypothesis could have been rejected for salary at the .10 level of confidence, again this would not be consistent with the acceptance of the .05 level as the maximum chance which would be tolerated for rejecting a true hypothesis. The hypothesis

was, therefore, accepted.

Hypothesis 7 was: There is no statistically significant dependence between the teachers' predictions of college success and occupational success as determined by employer rating and annual salary. A Chi-square value of 7.030 was obtained between this factor and employer rating. The value of Chi-square between the teachers' predictions of college success and annual salary was 14.287. The hypothesis was accepted since values of 12.59 and 16.92 for the respective variables with given degrees of freedom were required for rejection at the .05 level of confidence. Though there may have been some doubt as to the use of the selected factor of teachers' predictions of college success for study in relation to occupational success, it should be noted that this factor fared as well or better than most of the selected factors.

Results of Testing the Hypotheses Related to College Success

Hypotheses 8 through 15 were all directed toward an investigation of the relationship of the selected factors to college success. The criterion variable for college success was college grade-point average. Results of the Chi-square technique are presented in Table 4.

Testing of hypotheses 8 through 15 also involved computation of the magnitude and vector of the correlation between the selected factors and college grade-point average in a number

TABLE 4

CHI-SQUARE VALUES FOR COLLEGE GRADE-POINT AVERAGE AND THE SELECTED FACTORS

Selected Factors	College Grade-point Average	
	χ^2	df
High School Grade-point Average	50.268**	6
ITED	14.475	9
ACT	17.066*	9
CTMM	12.163	9
Industry	32.693**	6
Initiative	29.698**	6
Responsibility	33.409**	9
Teacher Prediction	36.081**	9

*Significant at the .05 level of confidence.
**Significant at the .01 level of confidence.
df: Degrees of freedom.

of cases. When this was the case, the Spearman rank correlation coefficient was used as the means for determining the correlation coefficient. In each case the significance of the correlation coefficient was tested at the .01 level of confidence. The obtained correlation coefficients are presented in Table 5, and referred to as needed in the discussion of the hypotheses.

TABLE 5

CORRELATIONS FOUND BETWEEN SELECTED FACTORS AND COLLEGE GRADE-POINT AVERAGE

Selected Factors	College Grade-Point Average
High School Grade-point Average	.698*
ACT	.398*
Industry	.629*
Initiative	.610*
Responsibility	.614*
Teacher Prediction	.620*

*Significant at the .01 level of confidence.

Hypothesis 8 was: There is no statistically significant dependence between high school grade-point average and college success as determined by college grade-point average. The Chi-square value between high school grade-point average and college grade-point average was 50.268. Since the required value for significance at the .01 level was 16.8, the hypothesis was rejected.

A rejection of the hypothesis demonstrated that a degree of dependence or association existed between the two variables and, therefore, constituted the need for a determination of the magnitude and vector of the association. The correlation as determined by the Spearman rank correlational method was .698, and was significant at the .01 level of confidence. This coefficient possessed the largest magnitude of all the coefficients of correlation in this study.

Hypothesis 9 was: There is no statistically significant dependence between the composite score of the ITED and college success as determined by college grade-point average. A Chi-square value of 14.475 between the ITED composite score and college grade-point average was not significant at the .05 level of confidence. The required value for rejection of the hypothesis at the .05 level for nine degrees of freedom was 16.92, therefore, the hypothesis was accepted. Dependence was not demonstrated at the desired level of confidence and, therefore, no correlation coefficient was computed for this variable.

Hypothesis 10 was: There is no statistically significant dependence between the composite score on the ACT and college success as determined by college grade-point average. The Chi-square value for the variables of this hypothesis was computed to be 17.066. Since the required value at the .05 level of confidence was 16.92, the hypothesis was rejected.

The Spearman rank correlation coefficient between the

composite score on the ACT and college grade-point average was .398. This value was significant at the .01 level of confidence.

Hypothesis 11 was: There is no statistically significant dependence between the composite score on the CTMM and college success as determined by college grade-point average. The Chi-square value of 12.163 between the composite score of the CTMM and college grade-point average was not significant at the .05 level. The value required for significance and rejection of the hypothesis was 16.92. In view of this the hypothesis was accepted.

Since dependence of distributions was not demonstrated by the Chi-square technique, no attempt was made to establish the degree or direction of whatever association might exist at some other less significant level.

Hypothesis 12 was: There is no statistically significant dependence between the rating of industry and college success as determined by college grade-point average. The obtained Chi-square value between the rating of industry and college grade-point average was 32.693. This value was considerably greater than the value of 16.8 required for significance at the .01 level; therefore, the hypothesis was rejected.

Computation of the degree and direction of the relationship by the Spearman rank correlation method found the direction (vector) to be positive, and the degree (magnitude) of the coefficient to be .629. This value met the significance

requirements at the .01 level of confidence.

Hypothesis 13 was: There is no statistically significant dependence between the rating of initiative and college success as determined by college grade-point average. The result of testing this hypothesis by the Chi-square technique resulted in a significant value of 29.698. The value required for significance and rejection of the hypothesis was 16.8 at the .01 level of confidence.

Rejection of the hypothesis demonstrated a dependence of distributions existed; therefore, the degree and direction of this relationship was calculated. The Spearman rank correlation coefficient was .610, and significant at the .01 level of confidence.

Hypothesis 14 was: There is no statistically significant dependence between the rating of responsibility and college success as determined by college grade-point average. The Chi-square value of 33.409, significant at the .01 level, was evidence that the association between the two distributions of variables of this hypothesis was greater than that which would have resulted by chance. The required value for rejection of the hypothesis at the .01 level of confidence was 21.7 for nine degrees of freedom; therefore, the hypothesis was rejected.

The degree of correlation was determined to be .614 by the Spearman rank correlation method. This degree of correlation was significant at the .01 level of confidence.

Hypothesis 15 was: There is no statistically significant dependence between the teachers' predictions of college success and college success as determined by college grade-point average. Application of the Chi-square technique yielded the second highest value of all those obtained in this study. The value of 36.081 was significant at the .01 level of confidence and the hypothesis was rejected since a value of only 21.7 was required before the hypothesis could be rejected.

The result of computing the degree of correlation between the teachers' predictions of college success and college success was a positive .620. This value was significant at the .01 level of confidence.

Summary

As demonstrated by the Chi-square technique for dependence of distributions, the association between the selected factors and the criterion variables for occupational success was weak. This was especially true for the criterion variable of employer rating in all cases. As a result, all hypotheses were accepted which related to occupational success.

Though the Chi-square technique is not a measure of the degree of association between distributions, it is capable of determining when a significant association exists. The greater the difference in the observed and expected frequencies, the larger the Chi-square value will be; therefore, larger values of Chi-square indicate greater degrees of association but not the direction of the association.

Since there were no significant Chi-square values at the .05 level, it was not considered necessary or advisable to compute the degree of correlation, however small, by some other method. Though this could be done, it would not provide data anymore useful than that provided by the Chi-square values.

The results of the application of the Chi-square technique for dependence of distributions, indicated that the selected factors were not very efficient as indicators of occupational success based on employer rating and salary. This should not be grounds for discounting their use altogether, but rather should indicate the need for being cautious relative to making decisions which influence the occupational welfare and choice of students merely on the basis of these factors.

On the basis of the values obtained by the Chi-square technique the hypotheses which related to college success were all rejected with the exception of numbers 9 and 11. In those two cases the obtained Chi-square values were less than that which was required for rejection of the hypotheses at either .01 or .05 levels of confidence. Hypothesis number 10 could not be rejected at the .01 level, but could be rejected at the .05 level which is still within the level of confidence which the writer selected for this study.

In all cases where the Chi-square technique demonstrated dependence of distributions, the magnitude and vector

of the correlation coefficients as determined by the Spearman rank correlational technique were positive and significant at the .01 level of confidence. In those cases where dependence was not demonstrated, no attempt was made to compute the magnitude and vector of the correlation, assuming one did exist at some level.

As stated in part three of the statement of the problem, one concern of this study was that of investigating whether or not the selected factors were related to occupational success in the same or comparable degree as they were to college success. Though no hypothesis was stated for the purpose of studying this part of the problem, it was the intent of the writer to study the question by testing the significance of difference in the correlations for the selected factors and occupational success with those of the selected factors and college success. However, the results of the Chi-square technique demonstrated rather conclusively that no further attention was called for on this part of the problem. Since no significant values were found between the occupational criterion variables and the selected factors, even at the .05 level of confidence, while on the other hand, practically all of the values were significant at the .01 level for the college success criterion variable and the selected factors, the answer to part three of the problem was obvious.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

This problem was an investigation of the relationship between a number of rather common factors selected from the high school records of high school graduates and later success in college or on the job. It was apparent that numerous studies had dealt with the relationship of selected factors to college success, therefore, a major concern of the problem was to investigate the question of whether or not the selected factors would be as useful as indicators of occupational success.

To investigate the proposed problem it was necessary to use a statistical treatment which would determine the dependence of the selected factors and the criterion variables. Therefore, fifteen hypotheses were tested by the Chi-square technique for dependency of distributions. Those which related to occupational success indicated that the association between the selected factors and the criterion variables for occupational success was not significant. These findings were much like those found by other researchers in their search for factors related to occupational success. However, the

association of the selected factors to college success proved significant for all factors except the composite scores of the ITED and CTMM. Though the review of related literature reported studies where the achievement and mental tests fared better than did the ITED and CTMM in this study, other results were very much in harmony with previous research.

Specific findings of the study were:

That there was no statistically significant dependence at the .05 level between occupational success as determined by employer rating and salary, and the following selected factors: (1) high school grade-point average, (2) ITED composite score, (3) CTMM composite score, (4) rating of industry, (5) rating of initiative, (6) rating of responsibility, and (7) teachers' predictions of college success.

That there was no statistically significant dependence at the .05 level between college success as determined by college grade-point average, and the following selected factors: (1) ITED composite score, and (2) CTMM composite score.

That there was evidence of significant dependence and positive correlations between the college grade-point average, and the following factors: (1) high school grade-point average, (2) ACT composite score, (3) rating of industry, (4) rating of initiative, (5) rating of responsibility, and (6) teachers' predictions of college success.

That there was no evidence to support the notion that the relationship of the selected factors to occupational success was comparable to their relationship to college success.

This finding is supported by the fact that the relationships were significant for most of the variables as related to college success, but not significant for any of them in relation to occupational success.

Conclusions

From the findings of this study it was concluded that a dichotomy exists between the educational system and the world of work, because those factors from the high school record which are indicative of college success are not indicative of occupational success. If this is the case there is certainly cause to doubt that an educational program designed for preparing students for college is the most appropriate educational program for those who will not undertake further education in an institution of higher learning. Instead it seems logical to conclude that the student who expects to enter an occupation upon graduation from high school should be given a program which has objectives that are more in line with the set of conditions he will face when he enters the employment phase of life.

It was concluded that colleges are justified in using such things as high school grades, teacher predictions, teacher ratings, and appropriate standardized test scores for college admission purposes. The high correlations between most of the selected factors and college success seemed to indicate that the major objectives of higher education as demonstrated by the curriculum and expected standards of achievement are not

too dissimilar to those of the public secondary schools. High school grade-point average correlated more highly with college grades than any other factor. Second to this was the teachers' predictions of college success. This finding is logical because the expected standards of students in college are usually extensions of what they have been familiar with in high school.

It was concluded that a real need exists for the improvement of the guidance services which are provided for that segment of the student body which is not college bound. The information which is often found in records of high school students is insufficient for predicting occupational success. It is very likely that this condition is due, in part, to the material having been placed in the records by personnel who were thinking in terms of the student's future in college, rather than his future in the world of work. There is every reason to believe that the data which is placed in the records of those who are destined for the world of work upon graduation from high school should be placed there for the purpose of being useful for employment purposes rather than for predicting college success. At the present time it is rather obvious that much of the data which is commonly included in the student records of the non-college bound student is not very valuable in terms of his future employment.

In view of the findings which indicated that the selected factors were not significant indicators of occupational success it was concluded that school personnel should involve

themselves in selecting other factors which are more useful as indicators of occupational success, and that the present practice of using factors such as those in this study for making references to employers and predicting occupational success should either be discontinued or engaged in with considerable caution. Teachers must become aware of the fact that those things which indicate academic success do not necessarily indicate occupational success.

Significant Considerations of the Study for Further Research in this Area

Though the use of salary and employer rating as measures of occupational success has been justified previously, it appears that some seemingly important aspects of occupational success may not be accounted for by salary and employer rating. First, the job satisfaction of the individual though not completely denied consideration in this study was not given explicit attention. Secondly, such employment benefits as retirement, insurance, sick leave, paid vacations, etc., were not considered in the criterion of salary as used in the study. Thirdly, some correction factors for geographical area, living standards and costs, and size of family to support might have proven useful to the study in terms of the salary variable.

It may well be that the instrument for obtaining the employer rating needs validation beyond that which was present. It is altogether possible that the heterogeneity of the occupational areas in which the students were engaged is entirely too

broad to expect that the employers could properly rate the student's job performance on a single instrument. It appears logical, however, to reject this possibility because there was evidence of a considerable amount of commonality in the way the employers marked the rating instrument.

Recommendations

1. It is recommended that public school officials cooperate with employers in initiating projects designed to identify areas where public education could be useful in preparing students for the employment phase of their future lives. Certainly, such a project should first concern itself with the welfare of the student rather than the welfare of the employer or his business.

2. It is recommended that future research in the area of selecting criteria for occupational success should seek such criteria from employers also rather than to rely totally on the factors that have been used in previous research efforts.

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APPENDIX A

FOLLOW-UP QUESTIONNAIRE

GENERAL INFORMATION

Your Correct Address (Where you may be reached again if necessary.) _____

Marital Status _____ Number of Chidren _____

COLLEGE INFORMATION (Complete if you attended college at all.)

College or Univ. Attended	Address	Dates Attended	Hrs. Credit

Total College Hours to Date _____ Overall College Grade-point Average _____
(Give to the nearest tenth)

Date Degree Was Earned or Is Expected _____

OCCUPATIONAL INFORMATION (Give only your most recent job.)

Name of Employer or Supervisor	Address of Employer or Supervisor	Approximate Annual Salary	Dates of Employment

Type of Work _____ Average Hrs. Worked Per Week _____

May we have your permission to write your employer or supervisor for a performance rating? .....

APPENDIX B

RATING OF JOB SUCCESS

Name of Employee to be Rated_____
Type of Work Performed by Employee_____
Number of Months Employed by You____ Approximate Annual Salary_____

Instructions for Completing This Rating Form

1. Place an X on the scaled line which appears to the right of each item such that the position of the X describes your estimate of the employee's rating for that item. Do this for all eight items of the rating form. One is the lowest rating and ten the highest.
2. Be sure to read the description of each item before making your rating.

ITEMS TO BE RATED

Low ... High

1. JOB PERFORMANCE (Level of work standards maintained.)
   1 2 3 4 5 6 7 8 9 10
2. JUDGMENT (Makes sound decisions and uses common sense.)
   1 2 3 4 5 6 7 8 9 10
3. INITIATIVE (Is willing to originate projects or ideas of value to the performance of his job, and has the desire to do things on his own.)
   1 2 3 4 5 6 7 8 9 10
4. INTELLECTUAL COMPETENCE (Has the intellectual capacity necessary to perform acceptably on the job.)
   1 2 3 4 5 6 7 8 9 10
5. PERSONAL RELATIONS (Able to get along acceptably with others.)
   1 2 3 4 5 6 7 8 9 10
6. VISION (Has the ability to see his job as it relates to overall objectives and to other jobs.)
   1 2 3 4 5 6 7 8 9 10
7. LEADERSHIP (Accepts responsibility and is effective in getting others to perform to the best of their ability.)
   1 2 3 4 5 6 7 8 9 10
8. COMMUNICATIONS (Communicates acceptably with others either verbally or in writing; especially as it relates to understanding or interpreting instructions, making reports, etc.)
   1 2 3 4 5 6 7 8 9 10

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APPENDIX C

MIDWEST CITY SCHOOLS

OSCAR V. ROSE

SUPERINTENDENT

MIDWEST CITY, OKLAHOMA

PHONES

OFFICE PE 7-4461
PE 7-4462

May 4, 1965

Dear Graduate of 1960-61:

We are always happy to communicate with our former students and to extend to them our best wishes. Certainly we like to know of your progress, achievements, joys and sorrows; and occasionally we need your help. This is such a time.

We are presently conducting a follow-up study of the 1960-61 graduates of Midwest City High School. Your participation in this study will provide us with information which we think will be of value to us in meeting the needs of future graduates of Midwest City.

We wish to stress that only by getting a good return on the questionnaires can we draw any conclusions which will be of definite value to us. We urge you, therefore, to cooperate by completing and returning the enclosed questionnaire immediately. You may rest assured that the information you provide will remain confidential. In keeping with this a number has been used to identify your return so you need not identify it with your name.

To provide us with the needed information please do the following:

1. Complete all portions of the enclosed questionnaire which apply to you. Be specific in your response. Only you can provide us with the correct information we need; therefore be sure that all responses are clear, accurate, and complete.

2. When you have completed all portions of the questionnaire that apply to you, mail immediately. Your prompt attention will facilitate a completion of this study in the very near future, but a delay will hold up its' completion. You will note that the questionnaire is already stamped and addressed so that it will not require an excessive amount of your time which we know is valuable to you.

Sincerely,

J. E. Sutton

J. E. Sutton
Deputy Supt. of Schools
Midwest City, Oklahoma

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APPENDIX D

MIDWEST CITY SCHOOLS
OSCAR V. ROSE
SUPERINTENDENT
MIDWEST CITY, OKLAHOMA

PHONES
OFFICE PE 7-4461
PE 7-4462

June 5, 1965

Dear Graduate of 1960-61:

As you know we are in the process of conducting a follow-up study of your graduating class. A large percentage of your classmates have responded well to the questionnaire which was mailed to them recently. However, to date we have not received the questionnaire which was mailed to you.

Realizing that there are many things which occupy your mind and demand your time it is understandable that you have neglected to complete and return the questionnaire. However, we are hoping to include as near 100% as possible of your class in the study so we take this opportunity to remind you that it is not too late for you to be included. We are delaying the completion of the study until we hear from you because we don't want to leave you out. It is important, however, that we have your questionnaire returned immediately so that the study may be completed very soon.

If there is any assistance we may render you in completing the questionnaire, feel free to contact us relative to this matter. In the event you have misplaced the questionnaire which we sent you, another copy is being included with this letter so that you may complete it rather than search for the one that has been misplaced.

Sincerely,

J. E. Sutton

J. E. Sutton
Deputy Supt. of Schools
Midwest City, Oklahoma

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APPENDIX E

MIDWEST CITY SCHOOLS
OSCAR V. ROSE
SUPERINTENDENT
MIDWEST CITY, OKLAHOMA

PHONES
OFFICE PE 7-4461
PE 7-4462

May 20, 1965

Dear Sir:

A follow-up of the 1960-61 graduates of Midwest City High School is being conducted at this time. We are interested in determining the success which our graduates have experienced either in college or in the occupational field.

So that we may make an estimate of success for those who entered the world of work it is necessary that we obtain a rating of job success from the employer or supervisor. With this brief explanation of our purpose in conducting this study, we request your support in our effort to complete a follow-up of our 1960-61 graduates. We believe this study will provide us with information which will be valuable to us as we serve our students in the future.

Knowing that your time is at a premium the rating form has been purposely kept as brief as possible. I trust that it is brief enough to facilitate a ready return, thus allowing a swift completion of this study. We have corresponded with the employee and obtained permission to write you for a rating.

To provide us with the information we need please follow the steps listed below:

1. Complete the enclosed Rating of Job Success form for the employee whose name and type of work appear at the top of the rating form. Be sure to follow the instructions given on the rating sheet and complete all items. Only you can provide us with this information so we emphasize the importance of completing the rating form.

2. Return the rating sheet in the stamped, self-addressed envelope as soon as possible.

Sincerely,

J. E. Sutton

J. E. Sutton
Deputy Supt. of Schools
Midwest City, Oklahoma

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APPENDIX F

MIDWEST CITY SCHOOLS
OSCAR V. ROSE
SUPERINTENDENT
MIDWEST CITY, OKLAHOMA

PHONES
OFFICE PE 7-4461
PE 7-4462

June 11, 1965

Dear Sir:

In conjunction with a follow-up study of the 1960-61 graduates of Midwest City High School, we recently mailed a rating of job success form to the employers of our graduates and requested that they rate them on their job success. A large percentage of the employers have responded to our need, and as a result, employer ratings have been received on many of our graduates. However, to date we have not received a rating for the graduate whom you employ.

Realizing the magnitude of the responsibilities you face in the performance of your work from day to day it is understandable that you have neglected to complete and return the rating we requested. However, it is important that we have as near 100% as possible of our graduates represented in this study, so we are delaying its' completion in order to provide time for you to complete and return the rating of job success form. In the event you have misplaced the one we mailed to you, another is included with this letter so that it will not be necessary to waste your time trying to find the one mailed previously.

The name of the person to be rated and the type of work performed appear at the top of the rating form. If we may be of additional assistance to you in completing the rating please feel free to contact us relative to this matter.

Sincerely,

J. E. Sutton

J. E. Sutton
Deputy Supt. of Schools
Midwest City, Oklahoma

Encl

APPENDIX G

TABLE 6

HIGH SCHOOL GRADE-POINT FOR THE OCCUPATIONAL GROUP

Student Number	Grade-Point	Student Number	Grade-Point
1	1.8	38	3.2
2	1.9	39	2.3
3	1.8	40	2.1
4	2.0	41	2.8
5	2.3	42	2.8
6	1.7	43	2.8
7	2.1	44	2.0
8	2.8	45	1.8
9	2.6	46	3.1
10	2.8	47	2.0
11	2.3	48	2.7
12	2.1	49	2.2
13	2.1	50	3.0
14	2.3	51	1.2
15	2.7	52	2.8
16	1.5	53	2.8
17	2.6	54	2.9
18	1.7	55	2.0
19	2.8	56	2.9
20	2.6	57	2.0
21	1.5	58	3.5
22	3.4	59	2.2
23	2.4	60	3.1
24	2.0	61	2.5
25	2.9	62	1.4
26	4.0	63	1.6
27	1.8	64	2.7
28	2.5	65	1.5
29	2.1	66	2.2
30	1.9	67	3.4
31	1.4	68	2.0
32	1.7	69	1.3
33	1.2	70	3.3
34	2.1	71	2.5
35	2.1	72	2.1
36	2.2	73	4.0
37	1.9		

TABLE 7

ITED COMPOSITE SCORE FOR THE OCCUPATIONAL GROUP

Student Number	ITED %-ile	Student Number	ITED %-ile
1	88	38	50
2	20	39	15
3	57	40	27
4	80	41	25
5	84	42	64
6	57	43	64
7	57	44	57
8	80	45	11
9	50	46	84
10	30	47	30
11	91	48	64
12	50	49	93
13	91	50	63
14	50	51	64
15	75	52	57
16	20	53	64
17	54	54	84
18	15	55	70
19	80	56	50
20	57	57	70
21	25	58	50
22	83	59	57
23	36	60	50
24	70	61	95
25	96	62	57
26	88	63	57
27	30	64	84
28	75	65	88
29	50	66	30
30	75	67	97
31	36	68	70
32	67	69	45
33	44	70	70
34	75	71	43
35	20	72	80
36	43	73	97
37	70		

TABLE 8

CTMM COMPOSITE SCORE FOR THE OCCUPATIONAL GROUP

Student Number	CTMM IQ	Student Number	CTMM IQ
1	108	38	84
2	93	39	100
3	98	40	92
4	98	41	94
5	112	42	104
6	96	43	108
7	98	44	105
8	108	45	102
9	103	46	101
10	85	47	100
11	113	48	110
12	107	49	121
13	104	50	103
14	104	51	109
15	109	52	91
16	95	53	113
17	109	54	110
18	82	55	112
19	104	56	94
20	82	57	108
21	81	58	109
22	113	59	103
23	106	60	92
24	123	61	110
25	105	62	109
26	126	63	100
27	95	64	95
28	106	65	127
29	95	66	104
30	112	67	111
31	81	68	95
32	102	69	92
33	91	70	104
34	115	71	94
35	97	72	125
36	102	73	115
37	104		

TABLE 9

INDUSTRY RATING FOR THE OCCUPATIONAL GROUP

Student Number	Industry	Student Number	Industry
1	2.5	38	4.0
2	3.7	39	3.3
3	3.0	40	3.3
4	3.0	41	5.0
5	2.3	42	4.0
6	3.3	43	3.7
7	2.7	44	2.0
8	3.5	45	2.0
9	3.5	46	3.8
10	3.8	47	2.5
11	3.5	48	4.7
12	3.8	49	2.5
13	3.5	50	3.7
14	4.0	51	1.5
15	4.0	52	4.3
16	2.8	53	3.0
17	3.7	54	4.7
18	2.6	55	3.2
19	4.5	56	4.0
20	4.3	57	3.8
21	1.3	58	3.8
22	4.3	59	3.0
23	3.0	60	3.7
24	3.5	61	2.3
25	4.0	62	3.0
26	4.3	63	3.5
27	3.3	64	3.7
28	3.8	65	2.3
29	3.5	66	4.3
30	2.5	67	4.7
31	1.0	68	3.0
32	3.8	69	2.3
33	2.0	70	3.0
34	3.3	71	3.0
35	4.5	72	3.3
36	3.0	73	4.8
37	2.5		

TABLE 10

INITIATIVE RATING FOR THE OCCUPATIONAL GROUP

Student Number	Initiative	Student Number	Initiative
1	2.5	38	4.0
2	3.7	39	3.3
3	3.7	40	3.3
4	3.3	41	4.5
5	2.7	42	4.3
6	3.3	43	3.3
7	3.0	44	2.0
8	3.5	45	2.0
9	3.0	46	3.8
10	3.7	47	2.0
11	3.5	48	4.7
12	3.8	49	3.0
13	4.0	50	3.7
14	4.0	51	2.0
15	4.0	52	4.0
16	2.0	53	3.0
17	3.7	54	4.3
18	2.6	55	3.2
19	4.5	56	4.3
20	4.3	57	3.8
21	1.3	58	4.0
22	4.3	59	3.0
23	3.0	60	3.7
24	4.0	61	3.0
25	3.8	62	3.0
26	4.5	63	4.0
27	3.3	64	3.3
28	3.8	65	2.5
29	3.5	66	3.5
30	2.3	67	4.0
31	1.3	68	3.0
32	3.6	69	1.7
33	2.0	70	3.0
34	3.3	71	3.0
35	4.5	72	3.8
36	3.0	73	4.0
37	2.5		

TABLE 11

RESPONSIBILITY RATING FOR THE OCCUPATIONAL GROUP

Student Number	Responsibility	Student Number	Responsibility
1	3.0	38	4.0
2	3.7	39	3.8
3	4.0	40	3.3
4	3.7	41	5.0
5	2.3	42	4.3
6	3.7	43	3.7
7	3.3	44	3.0
8	3.5	45	2.7
9	3.3	46	4.5
10	3.8	47	2.5
11	3.5	48	4.7
12	3.8	49	4.0
13	4.0	50	4.3
14	4.3	51	1.5
15	4.6	52	4.3
16	3.0	53	3.3
17	3.7	54	5.0
18	2.6	55	3.4
19	4.8	56	4.0
20	4.7	57	3.0
21	1.3	58	4.5
22	4.7	59	3.7
23	3.5	60	4.7
24	4.3	61	2.7
25	4.2	62	3.5
26	5.3	63	4.0
27	3.3	64	3.3
28	4.3	65	2.3
29	3.8	66	4.7
30	2.8	67	5.0
31	1.5	68	3.3
32	3.8	69	2.3
33	2.5	70	3.3
34	3.5	71	4.0
35	4.5	72	4.0
36	3.5	73	5.0
37	3.0		

TABLE 12

TEACHER PREDICTION FOR THE OCCUPATIONAL GROUP

Student Number	Teacher Prediction	Student Number	Teacher Prediction
1	2.1	38	3.5
2	1.7	39	1.5
3	1.2	40	1.5
4	1.9	41	2.4
5	2.0	42	2.1
6	1.8	43	2.6
7	1.0	44	1.8
8	2.8	45	1.3
9	2.2	46	2.6
10	2.0	47	1.6
11	2.3	48	1.9
12	2.3	49	2.4
13	1.7	50	2.2
14	2.8	51	1.3
15	2.5	52	3.1
16	1.1	53	2.9
17	2.5	54	3.1
18	1.6	55	2.2
19	3.1	56	2.4
20	2.1	57	2.5
21	1.1	58	3.1
22	3.6	59	1.4
23	2.1	60	2.5
24	2.8	61	2.4
25	3.0	62	1.6
26	3.7	63	1.5
27	2.3	64	2.0
28	2.2	65	2.1
29	2.2	66	2.8
30	1.8	67	2.9
31	1.3	68	2.1
32	2.5	69	1.3
33	1.0	70	2.3
34	2.4	71	1.9
35	2.1	72	2.1
36	1.8	73	4.0
37	1.6		

TABLE 13

EMPLOYER RATING FOR THE OCCUPATIONAL GROUP

Student Number	Employer Rating	Student Number	Employer Rating
1	9.8	38	9.4
2	6.6	39	9.8
3	6.8	40	5.1
4	7.8	41	7.9
5	4.4	42	9.9
6	7.5	43	9.6
7	9.4	44	9.9
8	9.9	45	9.9
9	4.1	46	9.5
10	6.5	47	8.5
11	8.5	48	8.6
12	5.3	49	8.0
13	6.1	50	7.5
14	9.3	51	5.8
15	4.9	52	8.4
16	5.1	53	8.5
17	7.1	54	9.6
18	5.4	55	8.8
19	7.5	56	7.8
20	7.4	57	8.4
21	6.3	58	9.5
22	9.0	59	9.1
23	5.4	60	7.3
24	8.0	61	7.6
25	9.7	62	7.6
26	9.3	63	9.1
27	8.3	64	7.5
28	6.0	65	9.0
29	2.8	66	9.0
30	8.5	67	8.9
31	8.3	68	9.9
32	8.6	69	9.9
33	5.1	70	6.6
34	6.0	71	5.9
35	9.1	72	7.9
36	9.9	73	9.6
37	7.8		

TABLE 14

SALARY FOR THE OCCUPATIONAL GROUP

Student Number	Salary (Dollars)	Student Number	Salary (Dollars)
1	1900	38	4440
2	4500	39	5000
3	5668	40	5800
4	5034	41	3120
5	2800	42	5500
6	4200	43	4780
7	4700	44	3500
8	3000	45	5000
9	3780	46	2820
10	3640	47	2600
11	4950	48	4000
12	6500	49	6000
13	4000	50	3133
14	4200	51	5200
15	3400	52	3960
16	3000	53	3700
17	3150	54	4000
18	2400	55	6200
19	4630	56	3500
20	2080	57	3700
21	2000	58	4780
22	3500	59	5000
23	3276	60	3800
24	5500	61	1200
25	4800	62	6500
26	3960	63	7000
27	6000	64	4200
28	2880	65	3100
29	3430	66	2600
30	3120	67	4680
31	4900	68	4056
32	4000	69	6000
33	2340	70	3200
34	4000	71	4389
35	5000	72	5900
36	4000	73	4930
37	4000		

APPENDIX H

TABLE 15

HIGH SCHOOL GRADE-POINT AVERAGE FOR THE COLLEGE GROUP

Student Number	Grade-Point	Student Number	Grade-Point	Student Number	Grade-Point
1	3.5	35	2.7	69	3.9
2	2.5	36	2.6	70	3.2
3	2.5	37	3.0	71	3.7
4	3.9	38	2.4	72	3.3
5	2.4	39	2.4	73	2.7
6	3.6	40	2.0	74	2.9
7	2.5	41	3.4	75	3.1
8	2.5	42	2.4	76	2.3
9	1.6	43	2.9	77	4.0
10	2.4	44	2.3	78	3.4
11	3.4	45	3.9	79	2.6
12	2.7	46	3.9	80	2.2
13	2.4	47	2.0	81	4.0
14	3.8	48	3.5	82	2.9
15	3.8	49	3.2	83	2.2
16	3.3	50	2.6	84	1.7
17	3.6	51	3.3	85	3.0
18	2.4	52	1.6	86	1.7
19	3.5	53	4.0	87	1.9
20	3.3	54	3.1	88	3.1
21	3.7	55	4.0	89	3.7
22	1.8	56	2.9	90	3.4
23	3.3	57	2.5	91	1.9
24	2.8	58	3.4	92	2.6
25	3.9	59	2.1	93	2.4
26	2.7	60	4.0	94	2.9
27	2.2	61	2.2	95	2.1
28	1.8	62	2.6	96	2.7
29	3.4	63	3.0	97	2.3
30	2.8	64	2.8	98	3.2
31	2.2	65	4.0	99	1.8
32	3.4	66	2.9	100	2.9
33	3.4	67	2.1	101	2.0
34	3.7	68	2.0		

TABLE 16

ITED COMPOSITE SCORE FOR THE COLLEGE GROUP

Student Number	ITED %-ile	Student Number	ITED %-ile	Student Number	ITED %-ile
1	84	35	48	69	95
2	75	36	54	70	64
3	70	37	55	71	64
4	95	38	54	72	98
5	70	39	45	73	88
6	91	40	48	74	80
7	36	41	70	75	57
8	75	42	54	76	98
9	80	43	64	77	75
10	88	44	54	78	91
11	84	45	64	79	91
12	30	46	69	80	75
13	36	47	47	81	97
14	91	48	60	82	84
15	97	49	72	83	20
16	58	50	52	84	30
17	64	51	66	85	76
18	57	52	62	86	30
19	65	53	72	87	71
20	50	54	65	88	45
21	66	55	70	89	84
22	64	56	54	90	80
23	64	57	66	91	20
24	66	58	66	92	40
25	65	59	45	93	98
26	57	60	69	94	91
27	50	61	75	95	45
28	52	62	50	96	64
29	60	63	75	97	85
30	42	64	84	98	64
31	54	65	99	99	95
32	64	66	75	100	25
33	66	67	57	101	80
34	70	68	50		

TABLE 17

ACT COMPOSITE SCORE FOR THE COLLEGE GROUP

Student Number	ACT %-ile	Student Number	ACT %-ile	Student Number	ACT %-ile
1	92	35	57	69	96
2	75	36	64	70	80
3	64	37	64	71	75
4	99	38	42	72	92
5	80	39	49	73	92
6	89	40	49	74	57
7	28	41	99	75	57
8	64	42	70	76	95
9	95	43	92	77	92
10	95	44	70	78	80
11	85	45	96	79	85
12	28	46	95	80	80
13	22	47	80	81	99
14	80	48	92	82	89
15	95	49	99	83	22
16	75	50	64	84	17
17	75	51	64	85	49
18	49	52	85	86	12
19	92	53	98	87	64
20	49	54	97	88	42
21	95	55	99	89	85
22	75	56	49	90	80
23	97	57	92	91	12
24	92	58	98	92	35
25	96	59	42	93	97
26	64	60	99	94	80
27	70	61	75	95	49
28	35	62	42	96	70
29	80	63	80	97	85
30	17	64	80	98	42
31	57	65	98	99	96
32	97	66	80	100	96
33	89	67	70	101	57
34	98	68	4		

TABLE 18

CTMM COMPOSITE SCORE FOR THE COLLEGE GROUP

Student Number	CTMM IQ	Student Number	CTMM IQ	Student Number	CTMM IQ
1	107	35	85	69	121
2	112	36	102	70	115
3	99	37	106	71	97
4	115	38	100	72	117
5	96	39	93	73	127
6	118	40	112	74	108
7	97	41	121	75	113
8	99	42	105	76	97
9	117	43	117	77	95
10	109	44	109	78	111
11	119	45	111	79	102
12	103	46	115	80	106
13	89	47	106	81	119
14	115	48	117	82	106
15	130	49	128	83	117
16	115	50	104	84	95
17	103	51	123	85	99
18	109	52	123	86	104
19	103	53	132	87	101
20	94	54	108	88	90
21	111	55	85	89	115
22	90	56	111	90	114
23	120	57	115	91	85
24	91	58	107	92	93
25	141	59	94	92	110
26	112	60	117	94	109
27	105	61	102	95	98
28	103	62	102	96	109
29	122	63	91	97	115
30	98	64	101	98	97
31	115	65	120	99	125
32	112	66	107	100	93
33	110	67	120	101	121
34	109	68	96		

TABLE 19

INDUSTRY RATING FOR THE COLLEGE GROUP

Student Number	Industry	Student Number	Industry	Student Number	Industry
1	4.5	35	4.0	69	5.3
2	3.4	36	3.4	70	4.2
3	4.3	37	3.7	71	4.8
4	5.4	38	3.8	72	4.0
5	2.7	39	3.0	73	4.0
6	5.2	40	3.5	74	4.0
7	4.0	41	4.6	75	4.5
8	3.5	42	3.2	76	4.0
9	2.4	43	3.3	77	5.8
10	2.2	44	3.8	78	5.0
11	4.0	45	5.6	79	4.3
12	4.3	46	4.8	80	3.0
13	4.0	47	2.8	81	5.4
14	4.8	48	4.4	82	3.2
15	5.0	49	4.0	83	3.5
16	4.3	50	3.8	84	3.5
17	4.3	51	4.4	85	4.6
18	4.3	52	1.8	86	3.0
19	4.7	53	6.0	87	3.2
20	5.3	54	4.3	88	4.3
21	5.3	55	5.6	89	4.4
22	2.4	56	3.0	90	4.7
23	4.3	57	5.3	91	3.0
24	4.5	58	5.0	92	4.5
25	4.8	59	3.3	93	3.6
26	3.2	60	5.6	94	2.8
27	3.4	61	3.5	95	3.0
28	2.8	62	4.0	96	4.4
29	4.0	63	5.0	97	2.5
30	4.0	64	4.0	98	4.0
31	2.6	65	5.7	99	2.5
32	4.5	66	4.0	100	4.4
33	4.3	67	3.2	101	3.3
34	4.8	68	3.3		

TABLE 20

INITIATIVE RATING FOR THE COLLEGE GROUP

Student Number	Initiative	Student Number	Initiative	Student Number	Initiative
1	4.5	35	4.0	69	5.3
2	3.4	36	3.4	70	5.0
3	4.3	37	3.7	71	4.5
4	5.3	38	3.0	72	4.0
5	2.7	39	3.0	73	4.0
6	5.0	40	3.5	74	4.0
7	4.3	41	4.6	75	4.8
8	3.5	42	3.0	76	3.0
9	3.2	43	3.1	77	5.8
10	2.6	44	3.8	78	3.8
11	3.5	45	5.6	79	4.3
12	4.4	46	4.8	80	3.0
13	4.0	47	3.0	81	5.4
14	5.0	48	4.4	82	2.4
15	5.0	49	4.2	83	3.5
16	4.3	50	3.8	84	3.3
17	4.0	51	4.4	85	4.6
18	4.3	52	1.8	86	3.0
19	4.6	53	6.0	87	3.2
20	5.3	54	4.7	88	4.0
21	5.3	55	5.8	89	4.6
22	3.0	56	3.0	90	4.7
23	4.3	57	5.3	91	3.3
24	4.5	58	5.0	92	4.3
25	4.8	59	3.3	93	3.6
26	3.2	60	5.2	94	2.8
27	3.4	61	3.8	95	3.2
28	3.4	62	4.3	96	4.0
29	4.0	63	5.0	97	2.5
30	4.3	64	3.8	98	3.5
31	2.6	65	5.8	99	2.5
32	4.5	66	4.5	100	4.4
33	4.3	67	3.2	101	3.5
34	4.8	68	3.0		

TABLE 21

RESPONSIBILITY RATING FOR THE COLLEGE GROUP

Student Number	Responsibility	Student Number	Responsibility	Student Number	Responsibility
1	4.5	35	4.6	69	5.3
2	3.8	36	4.8	70	4.4
3	4.3	37	3.7	71	4.8
4	5.3	38	4.0	72	4.0
5	3.0	39	3.5	73	4.3
6	5.7	40	4.0	74	4.3
7	4.0	41	4.4	75	4.5
8	3.5	42	3.8	76	3.3
9	3.4	43	4.1	77	5.8
10	3.6	44	4.0	78	3.8
11	4.0	45	5.6	79	4.5
12	4.4	46	5.0	80	3.0
13	4.3	47	3.4	81	5.2
14	5.0	48	4.8	82	4.6
15	5.2	49	4.4	83	3.8
16	4.3	50	4.0	84	3.8
17	4.5	51	4.6	85	4.4
18	4.3	52	1.4	86	3.5
19	4.6	53	6.0	87	3.6
20	5.5	54	4.3	88	4.3
21	6.0	55	5.6	89	4.8
22	2.4	56	3.4	90	5.0
23	4.3	57	5.3	91	3.8
24	4.8	58	5.2	92	4.5
25	5.0	59	3.0	93	3.8
26	3.6	60	5.4	94	2.6
27	4.6	61	4.3	95	3.6
28	3.0	62	4.7	96	4.0
29	4.0	63	4.3	97	3.3
30	4.8	64	4.3	98	3.0
31	3.2	65	5.8	99	2.5
32	4.3	66	4.8	100	4.6
33	4.3	67	3.4	101	3.5
34	4.8	68	3.7		

TABLE 22

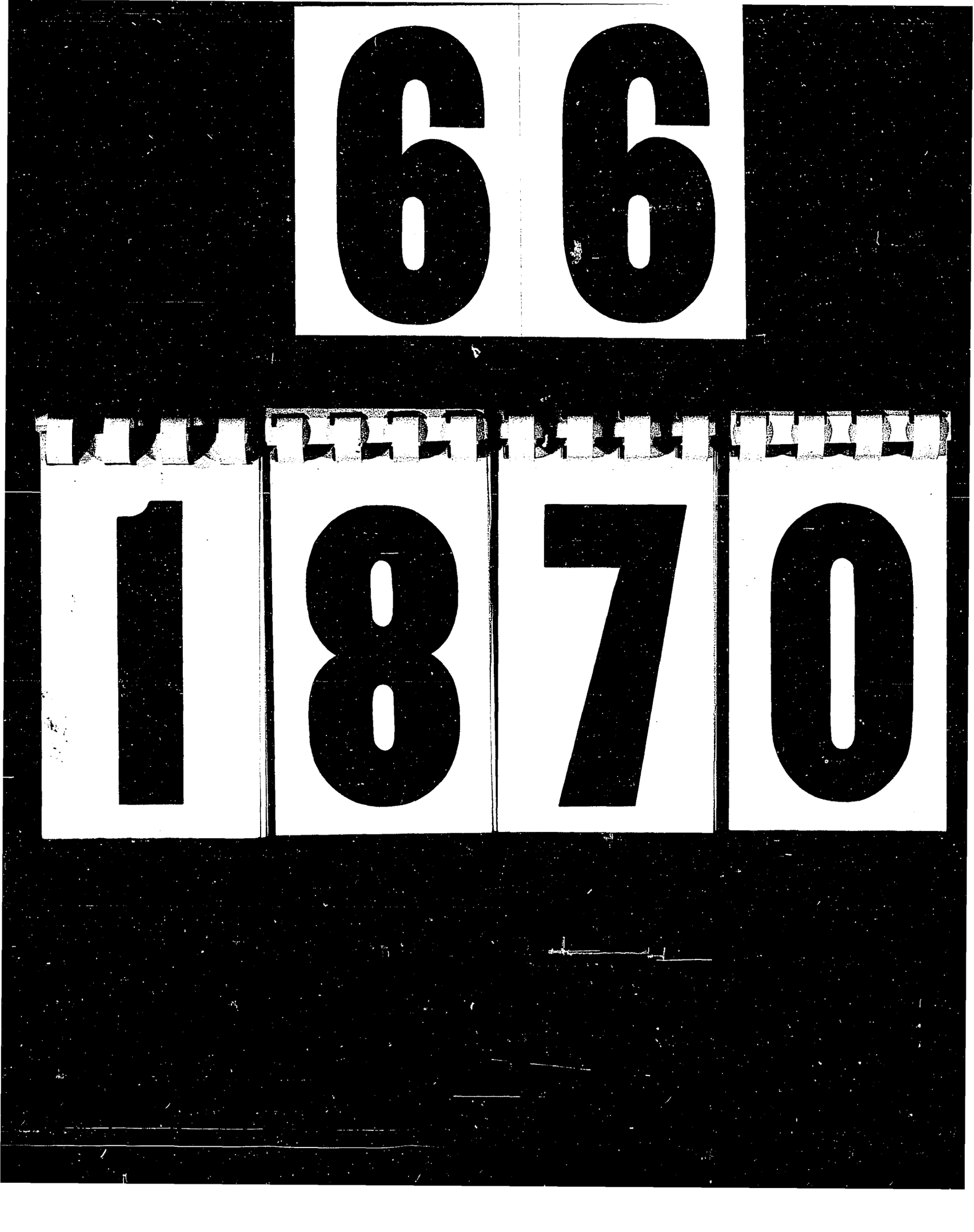
TEACHER PREDICTION FOR THE COLLEGE GROUP

Student Number	Teacher Prediction	Student Number	Teacher Prediction	Student Number	Teacher Prediction
1	3.3	35	2.3	69	3.8
2	2.5	36	2.6	70	3.4
3	2.2	37	2.8	71	3.4
4	4.0	38	2.4	72	3.6
5	2.1	39	1.8	73	2.9
6	3.7	40	2.3	74	2.5
7	2.8	41	3.5	75	3.5
8	2.6	42	2.0	76	2.8
9	2.3	43	3.0	77	3.9
10	2.5	44	2.8	78	3.2
11	3.2	45	3.7	79	2.9
12	2.3	46	3.6	80	1.6
13	2.8	47	2.3	81	4.0
14	3.5	48	2.9	82	3.0
15	3.7	49	2.7	83	2.0
16	3.2	50	2.8	84	2.0
17	3.2	51	3.2	85	2.8
18	2.8	52	1.3	86	1.5
19	3.4	53	4.0	87	2.3
20	3.2	54	3.3	88	2.9
21	3.4	55	4.0	89	3.6
22	2.4	56	2.4	90	3.8
23	3.2	57	2.9	91	1.9
24	2.4	58	3.0	92	2.7
25	3.7	59	2.0	93	3.1
26	2.9	60	3.9	94	2.8
27	1.9	61	2.7	95	2.4
28	2.0	62	2.3	96	3.0
29	3.2	63	3.3	97	2.0
30	2.9	64	2.9	98	2.7
31	2.1	65	4.0	99	1.6
32	3.5	66	2.7	100	3.2
33	3.2	67	2.3	101	2.5
34	3.7	68	1.6		

TABLE 23

COLLEGE GRADE-POINT AVERAGE
FOR THE COLLEGE GROUP

Student Number	Grade-Point	Student Number	Grade-Point	Student Number	Grade-Point
1	2.8	35	2.6	69	2.4
2	2.1	36	2.2	70	2.8
3	3.3	37	2.5	71	2.9
4	3.7	38	2.2	72	2.6
5	1.9	39	3.1	73	2.0
6	3.0	40	2.0	74	2.3
7	2.2	41	3.0	75	2.9
8	2.3	42	2.5	76	2.5
9	2.0	43	2.2	77	3.7
10	1.8	44	1.7	78	2.4
11	2.7	45	3.5	79	2.5
12	2.2	46	3.2	80	1.8
13	2.5	47	1.4	81	3.1
14	2.7	48	3.3	82	2.6
15	3.0	49	2.1	83	2.0
16	3.2	50	2.7	84	1.6
17	3.3	51	2.5	85	2.0
18	2.0	52	2.7	86	2.0
19	3.1	53	3.5	87	2.0
20	3.1	54	3.0	88	2.4
21	3.6	55	3.7	89	2.9
22	2.4	56	2.5	90	3.1
23	3.1	57	2.5	91	2.0
24	2.6	58	2.3	92	3.0
25	3.7	59	2.4	93	2.0
26	2.4	60	3.7	94	2.2
27	2.0	61	2.3	95	2.4
28	1.8	62	3.0	96	2.4
29	2.9	63	2.4	97	2.0
30	2.5	64	2.7	98	2.7
31	2.5	65	3.7	99	2.6
32	2.5	66	3.5	100	3.0
33	3.2	67	2.0	101	2.2
34	1.8	68	2.0		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