THE CONSTRUCTION OF A SIMPLE INSTRUMENT TO PREDICT JUNIOR COLLEGE FRESHMEN ATTRITION

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CHAPTER I

THE PROBLEM

Statement of the Problem

In the past few years educators and laymen alike have been justifiably concerned with freshman attrition throughout colleges and universities. Each year large numbers of freshmen enroll in public junior colleges and subsequently withdraw without completing their two year program.

This study purports to identify and evaluate selected variables that may influence student withdrawal. Following the identification and evaluation of these factors, the researcher will investigate patterns of persistence and withdrawal and subsequently prepare an instrument of prediction.

Significance of the Study

The welfare of a democratic society is dependent to a great extent upon the understandings and insightful judgments of the individuals who comprise the society. The education of each individual to the fullest of his ability is, therefore, singularly important. This is true not only for each individual's optimal development and performance but also for the continued development of the democratic society as a whole.

There is a growing realization that America's waste of human talent must not continue. The conservation of human resources has come to be recognized as a major concern of our time.

The failure of large numbers of freshmen to continue in junior college programs is intimately related to the problems of development and utilization of human resources. Few studies dealing with persistence of students in public junior colleges are reported. If the public junior college is to meet effectively its objectives, every effort should be made to insure the continuance of students who can profitably pursue an educational program beyond the high school.

The factors involved in freshman attrition and "withdrawal predictors" are not new in the field of higher education. However, the prevalence of such instruments and the apparent increase in attrition leads one to speculate: (1) the factors leading to attrition are difficult to measure, or (2) perhaps the measuring instrument does not use all the information available, or (3) the measuring instrument is so difficult to use they are avoided by counselors, or (4) a combination of the above is true.

Since the mid-fifties and the demise of the bulge of veteran enrollments, American educators and more recently the American public have been increasingly aware of a greater wave of enrollments. Conservative estimates expect the approaching college generation to double by 1975. The wave of new students could well reach tidal proportions.

The public junior college is probably the fastest-growing segment of American higher education. For this reason the influences which cause attrition in these institutions merit increasing attention. There is reason to believe that a "practical" instrument of prediction,

one not built around the complicated statistical formula of multiple regression, would materially aid the junior college student personnel office.

The increasing college enrollments, the increasing operational costs of colleges, the apparent constant rate of freshmen withdrawal, and the seeming success of few college orientation programs emphasizes the need, and possible success, of a positive program aimed at reducing freshman attrition. It is the researcher's estimate that the first step in such a program is the preparation of a "simple" instrument that would maximally distinguish between potential "withdrawals" and "persistors". Such an instrument would allow the orientation program to be geared to the needs of this relatively small sub-group of potential "withdrawals".

A program constructed from these principles may allow the small college or junior college to meet the challenge of increasing costs and enrollments, and more important, prolong the college attendance of the potential dropout.

Assumptions Upon Which the Study Was Based

The following assumptions were made under which this study was conducted:

1. The findings of this study would lend themselves to generalizations about graduates from Joplin High School, Joplin, Missouri, who enroll full-time in Jasper County Junior College, Joplin, Missouri.
2. The implications of this study could be applied to other high school graduates who enroll in Jasper County Junior College.

3. If a simple predictor can be constructed, it would prove valuable to a junior college counselor.

Delimitation of the Study

The study was limited to the investigation of May, 1963, Joplin High School Graduates who enrolled for twelve or more credit hours in Jasper County Junior College in September, 1963. The study was further limited to the investigation of these students covering the period September, 1963, through September, 1964. The evaluation group, however, consisted of 1964 Joplin High School graduates who enrolled for twelve or more credit hours in Jasper County Junior College in September, 1964, and either persisted or withdrew by September, 1965.

The study was further limited to materials that could be obtained in the official records of Joplin High School and the official records of Jasper County Junior College.[1]

Definitions of Terms Used

Persistence

Throughout the report of this investigation, the term "persistence" shall be interpreted as meaning the enrollment in twelve or more credit hours each semester in attendance. The term shall further be interpreted as meaning that the student remain in attendance for both semesters during the 1963-64 academic year and re-enrolled in either Jasper County Junior College or another institution of higher learning for twelve or more credit hours in September, 1964. The term "continued" will be used interchangeably with "persistence" throughout this study.

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[1]Please note the materials available in no way would allow an estimate of the aspiration level of the student.

Withdrawal

Throughout the report of this investigation, the term "withdrawal" shall be interpreted as meaning the enrollment in twelve or more credit hours in September, 1963, and the termination of attendance at any time between September, 1963, and September, 1964. The terms "dropout," "attrition," and "student mortality," will be used interchangeably with "withdrawal" throughout this study.

Full-time

Throughout the report of this investigation, the term "full-time" shall be interpreted as meaning the enrollment in twelve or more credit hours.

Statistical Tools Used in the Study

Mann-Whitney U Test

Although the level of measurement for many of the tests in this study was interval or better, the heterogeneous variances between the persisters and withdrawals would not allow either the "t" test or the "F" test to be used. According to Siegel:

> When at least ordinal measurement has been achieved the Mann-Whitney U test may be used to test whether two independent groups have been drawn from the same population. This is one of the most powerful of the nonparametric tests, and it is a most useful alternative to the parametric "t" test when the researcher wishes to avoid the "t" test's assumptions, or when the measurement in the research is weaker than interval scaling.
>
> If the Mann-Whitney test is applied to data which might properly be analyzed by the most powerful parametric test, the "t" test, its power-efficiency approaches 95.5 percent.[2]

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[2]Sidney Siegel, Nonparametric Statistics for the Behavioral Sciences, (New York, 1956), p. 116.

Since this study consisted of a " large" population (larger than twenty), the alternate formula was used to arrive at a "z" score; hence, the level of confidence was derived from the normal curve distribution. It should be noted that the tie ranks within this population are also considered in this formula.

The Chi-square Test

Several variables within this study were measured by a scale less than interval. When the data consist of frequencies in discrete categories, the chi-square test may be used to determine the significance of differences between two independent groups. Both the two-by-two table and the multiple cell formulas were used. The Yates correction factor was used in the two-by-two tables. Seigel states, "When the chi-square test is used there is usually no clear alternative and thus the exact power of the test is difficult to compute."[3]

Point Biserial Correlation

The researcher found it desirable to find the relationship between persistence-withdrawal and the several tests measured by interval scale. The point biserial correlation provides a measure of relationship between a continuous variable and a two-categoried, or dichotomous, variable. It should be noted that correlation is not unitary. Ferguson says:

> The maximum value of point biserial correlation never reaches plus one; the minimum value never reaches negative one. In predicting a two-categoried variable from a continuous variable, perfect prediction is possible and occurs when the two frequency distributions do not overlap. Perfect prediction of

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[3]Ibid., p. 110.

> a continuous variable from a two-categoried variable is obviously impossible. Some error in prediction must always occur in predicting a variable which may take a wide range of values from a variable which may take two values only. The point biserial correlation coefficient reflects this fact.[4]

Contingency Coefficient

The contingency coefficient is a descriptive measure of the association between nominal variables. A contingency coefficient was determined for all variables measured by chi-square. The author again would note the limitations of this correlation measure. Ferguson states:

> The minimum value of contingency coefficient (C) is zero. C is zero when the two variables are independent. C cannot take negative values. The maximum value of the C depends on the number of categories of the variables. For example, when the number of categories for both variables are two, the maximum C is .707; when the number of categories for both variables is ten, the maximum C is .949.[5]

Kolmogorov-Smirnov Test

This test is a measurement of ordinal ranked data. The test is built around the chi-square theory; however, in preparing data for the formula a technique is employed to measure agreement between the distribution of two sets of sample values.[6] The researcher found this technique could be used with considerable value in this study.

Hypotheses to be Investigated

The hypotheses to be investigated in this study were generated from the researcher's subjective speculations as to withdrawal causation

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[4]George A. Ferguson, Statistical Analysis in Psychology and Education, (New York, 1959), p. 199.

[5]Ibid., p. 194.

[6]Seigel, p. 127.

and from supportive, contradictory, or the lack of empirical findings reported in the literature and the researcher's estimate of a genuine need within the field for a simple prediction instrument.

Hypothesis I

Significant differences exist between full-time freshmen who continued and full-time freshmen who withdrew during the period studied in the following variables:

1. Sex of the student,
2. Scholastic rank in high school,
3. Grade point average in high school,
4. Scores from the Otis Quick-Scoring Mental Ability Test given in high school,[7]
5. Scores from the Iowa Tests of Educational Development given during the junior year in high school,[8]
6. Scores from the Ohio State University Psychological Test given during the senior year in high school,[9]
7. The high school curriculum completed by the student,
8. The college curriculum pursued by the student,
9. The student's age at matriculation in college,
10. Scores from the Cooperative School and College Ability Test,

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[7]Examiner's Manual, Otis Quick-Scoring Mental Ability Test, (New York: Harcourt, Brace and World), 1938.

[8]Examiner's Manual, Iowa Tests of Educational Development, (Chicago: Science Research Associates), 1954.

[9]Examiner's Manual, Ohio State University Psychological Test, Form 26, (Athens, Ohio: Ohio Testing Services), 1958.

Form 1A, given prior to college enrollment,[10]

11. Scores from the University of Missouri English Placement Test, given prior to college enrollment,[11]
12. Head of the household's occupation,
13. Father's education,
14. Mother's education,
15. Father's age at the time of the student's matriculation,
16. Mother's age at the time of the student's matriculation,
17. Number of siblings in the family.

Hypothesis II

A proper combination of the significant variables in this study will allow the construction and subsequent validation of an instrument that will be reasonably accurate in predicting freshman attrition.

Possible Outcomes

Speculation as to possible causative factors in junior college freshman persistence is deemed appropriate to this study. The researcher, therefore, submits the following possibilities, developed on a subjective basis, to be substantiated or refuted upon the basis of research reported in the literature and/or upon the basis of the findings of this study. It is recognized that other equally plausible or important possibilities may well exist. In the opinion of the researcher the

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[10] Examiner's Manual, Cooperative School and College Ability Tests, Second Supplement, (Princeton: Educational Testing Service), 1956.

[11] Examiner's Manual, University of Missouri English Placement Test, (Columbia, Missouri), 1956.

possibilities presented here serve as a logical point of departure for investigation into freshman persistence in the junior college.

Freshmen persistence may be a function of the high school from which the student graduated, the high school course of study pursued, or academic performance in the high school.

Family influences may play a major role in the freshman's decision to continue in or withdraw from the junior college. The number of children in the family, parents' education, parents' age, parents' occupation may serve to stimulate or retard continuance in a junior college program.

Freshmen who withdraw may possess less academic ability as measured by a standardized test battery, or they may withdraw in one or more curricula to a greater extent than freshmen who persist.

It is possible that variables not considered in this study do have a greater significance in withdrawal than is the estimate of the author. Should this be true, it is obvious that the predictive value of the designed instrument will be negligible.

CHAPTER II

REVIEW OF RELATED RESEARCH

Much is known about the quantitative aspects of college attrition in four year institutions both on a national and an individual institutional level. In the literature there is abundant evidence to indicate a recognition of this problem within our four year colleges and universities. However, there is a notable absence of research on student persistence in junior colleges. Although more studies have undoubtedly been made than is suggested by the literature, the extent of knowledge concerning junior college attrition and factors contributing to it is limited.

The researcher feels obligated to point out to the reader certain pitfalls in a digest of the literature. There are certain shortcomings in this data.

> First, colleges do not readily publish figures on students who have withdrawn or failed, and statistical surveys in this area are sometimes inadequate in their sampling procedures.
>
> Secondly, "attrition rate" has been variously defined: for example, as the percentage of students lost to each of the separate academic divisions of a college; as the percentage of students lost to the college as a whole (disregarding transfers within the college); as the percentage of students lost to higher education as a whole. Furthermore, attrition rates have been computed on a graduated-in-four-years basis; or a graduated-in-four-year-or-still-enrolled basis; on a graduated-eventually basis. To ensure complexity, not to mention tedium, there is a jargon running through the literature with such terms as "holding power," "student mortality," "involuntary vs. voluntary withdrawal," "net vs. gross attrition," and so forth.[1]

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[1] John Summerskill, "Dropouts from College," Chapter 16 in The American College, (Edited by Nevitt Sandford), New York, 1963, p. 629.

The construction and use of an instrument to predict college success is a quite prevalent practice in four year higher education institutions. However, this facet of education has received little attention in junior colleges.

It was not the purpose of this study to supplement the already vast amount of information in the college and university area, but an investigation was attempted which would result in material that will be useful on a junior college level.

The review of related research on freshman attrition was grouped into six broad areas: (1) magnitude of student attrition, (2) relationships between selected variables and withdrawal, (3) prediction instruments, (4) areas of general agreement, and (5) areas of disagreement.

Magnitude of Student Attrition

There are at least three major studies that give a fairly clear picture of how much attrition takes place in colleges and universities. The earlier of these three studies of student mortality was published by McNeeley in 1937. McNeeley's study indicated a net loss of 45.2 per cent of the students who registered for a degree in 1931. In this study the dismissal for failure in work was the principal known cause of student attrition. This factor accounted for 18.4 per cent of the withdrawals. The second most prominent cause was financial difficulty.[2]

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[2]John H. McNeeley, College Student Mortality, United States Department of Interior, Office of Education, Bulletin 1937, Number 11 (Washington, 1937), p. 105.

One of the most comprehensive studies of student persistence in higher education was reported in a United States government document in 1957.

Iffert reported:

> For a long time educators have been aware of the principal factors which govern the retention, transfer, and withdrawal of students, but no systematic and comprehensive analysis has here-to-fore been available to show the impact of these factors in combination. Casualties usually do not occur solely because of a poor admissions policy, and unsuitable curriculum, inadequate counseling, indifferent instruction, or poor physical facilities. Neither is the failure of students usually due alone to low scholastic aptitude, lack of individual and family motivation, or insufficient funds to pay the costs of attending college. Remedial measures require the skillful management of this complex of interacting factors.[3]

The above study was conducted by the Office of Education and involved full-time, unmarried, native, non-veteran freshmen who entered in the fall of 1950 in 147 colleges. Approximately 13,700 undergraduates were involved in the study. The study covered universities, technological institutions, liberal arts colleges, teachers colleges, and junior colleges. There is some question as to the representativeness of the junior college data since only eighteen schools were included in the study.

The central findings indicate that the schools of this study lost approximately half their students in the succeeding four years and graduated only 39.5 per cent in four years. By extrapolation, Iffert arrives at a rough estimate of "59 per cent as the probable maximum percentage eventually graduating."[4]

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[3]Robert E. Iffert, Retention and Withdrawal of College Students, Unites States Department of Health, Education, and Welfare, Office of Education, Bulletin 1958, Number 1 (Washington, 1958), p. iii.

[4]Ibid., p. 16.

The third major study in this field was made by John Summerskill in 1962. This work was sponsored by a grant from the Ford Foundation to the Department of Clinical and Preventive Medicine, Cornell University. Summerskill reviewed 35 different studies that cited attrition rates for classes entering hundreds of varied colleges and universities from 1913 to the present. Median values were computed for the aggregate of these studies with results as follows: median loss in four years -- 50 per cent; median per cent graduated in four years -- 37 per cent.[5]

Summerskill says, "Apparently the attrition rate has not changed appreciably in the past forty years. Four studies conducted at different colleges in the 1920's showed a loss of 54 per cent of entering students after four years. The equivalent figure for six other studies in the 1930's was 50 per cent; for eight studies in the 1940's -- 49 per cent; and for five studies in the 1950's -- 51 per cent."[6]

In summarizing these three studies a researcher might report, American colleges and universities, on the average, lose approximately half their students in the four years after matriculation.

Though the present inquiry is to deal primarily with junior college freshman attrition, it is the author's belief that much is to be gained by a view of these studies. The remaining portion of the "review of literature" will deal more specifically with junior college attrition.

With due consideration to the "representativeness" of junior college data, in Iffert's study 28.3 per cent of the junior college students had left by the beginning of the second year.[7]

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[5]Summerskill, p. 630.

[6]Ibid., p. 630.

[7]Iffert, p. 17.

Reynolds, in discussing the freshman-sophomore ratio in junior college, states:

> Of interest, also, is the fairly static condition of the percentage of sophomores in public junior colleges in 1931-32 and in 1949-50. This leads to the possibility that 35 per cent may be an acceptable criterion for measuring the percentage which the sophomores should be in the total freshman-sophomore enrollment.[8]

Reynolds found that in public junior colleges in 1931 the sophomores equaled 34.1 per cent of the freshman enrollment and in 1949 the ratio was approximately the same (34.2 per cent).

In a 1955 study of 508 accredited junior colleges, Eells found a mortality of 45.4 per cent of the freshmen when a census was taken at the beginning of the sophomore year. Sophomore enrollment was 42.7 per cent in public junior colleges and 57 per cent in private junior colleges. Missouri junior colleges had 56.4 percent, Kansas, 53.1 per cent, and Oklahoma 46.6 per cent as many sophomores as freshmen.[9]

Henninger, in his comprehensive study of technical institutes, found a median dropout of 50 per cent. He feels that the dropout rate is greatly affected by students' accepting jobs after completing the technical phase of the curriculum without completing the general education requirements.[10]

Thornton notes that nationally more than 218,000 students were classified as freshmen in the public junior colleges in the fall of 1955, but that only approximately 111,000 were classified as sophomores

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[8]James W. Reynolds, "Responsibility for Drop Outs," Junior College Journal, XXI (1951), pp. 323-24.

[9]Walter Crosby Eells, "Student Mortality in Junior College," Junior College Journal, XXVII (1956), pp. 132-37.

[10]Ross G. Henninger, The Technical Institute in America, (New York, 1959), p. 124.

one year later in the fall of 1956. Only 51.3 per cent of the total in the fall of 1956 and 52.1 per cent in the fall of 1957 were listed as sophomores.[11]

Lynch analyzed the dropouts of Palm Beach, Pensacola, and St. Petersburg Junior Colleges during the 1957-58 academic year. He found an average dropout rate of 38 per cent for the three schools with freshmen accounting for 86 per cent of the dropouts.[12]

Clark studied the withdrawal rate over a four-year period at San Jose Junior College. He noted by the beginning of the second semester nearly one-third of the students who had enrolled in the fall had withdrawn, and that over one-half had withdrawn between the end of the second semester and the beginning of the following year.[13]

Hartig found in a study of persistence in the Community College of Evansville, Indiana, that approximately 40 per cent of the junior college students did not return after one term. Work conflict and lack of time to attend class were the two primary reasons for dropouts and withdrawals.[14]

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[11]James W. Thornton, Jr., The Community Junior College, (New York, 1960), p. 156.

[12]Donald Fryman Lynch, "An Analysis of Dropouts in Selected Public Junior Colleges of Florida," Unpublished Doctor's dissertation, 1960. As found in Dissertation Abstracts, XX, number 8, pp. 3156-7.

[13]Burton R. Clark, The Open Door College: A Case Study, (New York, 1960), p. 187.

[14]Marvin E. Hartig, "An Analysis of Selected Factors of Interruption of Persistency in Attendance in the Community College at Evansville College," Unpublished Doctor's dissertation, 1962. As found in Dissertation Abstracts, XXIII, part 5, p. 3755.

Greenfield found in a 1964 study of 512 University of Wisconsin freshmen Engineering students an attrition rate of 22 per cent.[15]

In a University of Iowa study done by Heilburn in February, 1964, the attrition rate for 2149 freshmen was 27 per cent for the men and 30 per cent for the females.[16]

In summary, an analysis of the studies reviewed would seem to indicate an attrition rate that is higher in junior colleges than in colleges and universities. If one accepts the premise of increasing enrollments in higher education, of the growing significance of junior colleges, of the "open door" policy of junior colleges, then one must accept the need for additional study of student attrition in the junior college.

Relationship Between Selected Variables and Withdrawal

What information is available concerning the potential college student will best serve in identifying the "dropout prone" individual? Studies have looked at the value of high school rank, high school grades, aptitude and subject matter test scores, personality tests, and data on interests and socio-economic background of students to see whether better predictions for college success can be made. Since the national attrition is still high in both colleges and universities and junior colleges, additional research is perforced.

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[15]Lois B. Greenfield, "Attrition Among First Semester Engineering Freshmen," Personnel and Guidance Journal, XLII, (1964), p. 1003.

[16]Alfred B. Heilburn, "Personality Factors in College Dropouts," Journal of Applied Psychology, XLIX, (1965), p. 3.

Academic Factors

High School Rank. A commonly used single predictor of college success is high school rank. Iffert found that the attrition rate for men attending twenty colleges and universities would have been reduced from 61.2 per cent to 43.9 per cent if admissions had been confined to the top fifth of high school graduating classes. He also concluded:

> The percentages . . . seem to show that standing in high school graduating class was a much better indicator of the probability of graduation than standing in placement tests.[17]

Butsch found correlations ranging from .47 to .60 between rank in high school class and first semester marks in college. There seems to have been no significant increase in the correlation in the years since his findings.[18] Garrett[19] found an average correlation of .55 while Travers[20] found correlations between .50 and .70. In a more recent study, Fleisher found that college grades correlated .59 with high school rank.[21]

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[17]Iffert, p. 78.

[18]R.L.C. Butsch, "Improving the Prediction of Academic Success Through Differential Weighting," Journal of Educational Psychology, XXX, (1939), p. 401-20.

[19]Harley F. Garrett, "A Review and Interpretation of Investigations of Factors Related to Scholastic Success in Colleges of Arts and Sciences and Teachers Colleges," Journal of Experimental Education, XVIII, (1949), p. 128-30.

[20]Robert M. Travers, "Significant Research on the Prediction of Academic Success," The Measurement of Student Adjustment and Achievement, (Edited by W.T. Donahue, C.H. Coombs, and R.W.M. Travers) (Ann Arbor, 1949), p. 147-190.

[21]Robert D. Fleisher, "High School Graduates and College Admittance," Bulletin of National Association of Secondary School Principals, XLV, (1961), p. 94-97.

However, it must be pointed out that rank means different things for different high schools. To use rank without discriminating for the particular high school is unfair to those students from large, competitive schools, according to Fritzmeier.[22] Scannell found high school rank was not highly predictive for small high schools. If rank in class is to be used as a criterion, it should be adjusted for each school as far as possible.[23]

High School Grades. In many colleges the actual grade average achieved in high school is used as one criterion for admittance. Garrett found in a review of more than 100 studies an average correlation of .56 between high school average and average college grades.[24] Schmitz found high school grades as the most efficient single instrument for predicting college success.[25] Segal and Proffitt supported this thesis in their study of thirteen institutions.[26] Kerr found that the higher the grades in high school, the better the chances for good accomplishment in college. However, he points out that his study found no single

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[22]L.H. Fitzneier, "The Schools' Reaction to Admission Requirements," College Entrance Examination Board, College Admissions, III, (1956), p. 71-79.

[23]Dale P. Scannell, "Prediction of College Success from Elementary and Secondary School Performance," Journal of Educational Psychology, LI, (1960), 130-134.

[24]Garrett, p. 129.

[25]Sylester B. Schmitz, "Predicting Success in College: A Study of Various Criteria," Journal of Educational Psychology, XXVIII, (1937), p. 645-675.

[26]David Segal and Maris M. Proffitt, Some Factors in the Adjustment of College Students, United States Office of Education, Bulletin 1937, Number 12 (Washington, 1938).

criterion significant enough for selective admission which would not do justice to a large number of applicants.[27]

High School Curriculum. High Schools have questioned the restrictions placed upon their curricular programs by college course requirements. Travers found but little relationship between the sequence of courses taken in high school and success in college.[28] Darley found that the patterns of high school subjects were less valid as predictors than high school achievement and basic measures of ability.[29]

Garrett found little relation between high school subjects and college success.[30] In the study by Sturgis it was found that the pattern of courses in high school does not influence success in college, but it further pointed out grades in secondary school are not a perfect basis for prediction either.[31]

Scholastic Aptitude. Use of aptitude tests for predicting academic achievement is not new. Summerskill reported at least nineteen investigations of scholastic aptitude tests scores in relation to subsequent attrition. Average scholastic aptitude scores were found to be lower

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[27]Fred L. Kerr, "Studies on the Freshman Class at the University of Arkansas," College and University, XXXIV, (1959), p. 186-199.

[28]Travers, p. 180.

[29]John G. Darley, "A Study of Clinical Predictions of Student Success or Failure in Professional Training," Journal of Educational Psychology, XXIX, (1938), p. 335-354.

[30]Garrett, p. 130.

[31]Horace W. Sturgis, "Trends and Problems in College Admissions," College and University, XXVIII, (1953), p. 5-16.

for dropouts than for graduates in sixteen of these investigations.[32] The use of aptitude tests for predicting college success has increased with the wide use of the tests developed by the College Entrance Examination Board. Fricke found the average correlation over the past 35 years of college achievement with standardized tests of ability was .45.[33] In studying the extent to which tests alone correlate with college success, Keys[34] found a correlation of .35, while Garrett[35] found a range of .41 to .49.

Three studies also demonstrated that dropouts had significantly lower reading test scores.[36, 37, 38] Another study by Hanks found results in the same direction.[39]

However, the use of tests as a single criterion for prediction of college success would seem hazardous. Smith found that if tests had been used as a cutting score for rejection, large numbers of successful

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[32]Summerskill, p. 630.

[33]Benno G. Fricke, "Prediction, Selection, Mortality, and Quality Control," College and University, XXXII, (1956), p. 34-51.

[34]Noel Keys, "The Value of Group Test I.Q.'s for Prediction of Progress Beyond High School," Journal of Educational Psychology, XXXI, (1940), p. 81-93.

[35]Garrett, p. 129.

[36]M.F. Freehill, "The Cooperative English Test in Academic Counseling," College and University, XXIX, (1954), p. 244-252.

[37]J.B. Johnson, "Predicting Success in College at Time of Entrance," School and Society, XXIII, (1926), p. 82-88.

[38]E.G. Pattishall and F.W. Banghart, "A Comparative Analysis of School of Education Graduates and Withdrawals," Educational Research Bulletin, (University of Virginia, 1957).

[39]C.J. Hanks, "A Comparative Study of Factors Related to Retention and Withdrawal of Freshmen Students at the University of Arkansas," Unpublished Doctor's dissertation, 1954. As found in Dissertation Abstracts, XIV, p. 1171.

professional persons would have been eliminated from the University of Kansas.[40] In a study of a teachers college, Beard and Madden found 39 per cent of the students who entered as freshmen and scored in the upper half of the American Psychological Examination withdrew before graduation.[41]

Biological and Social Factors

Age. There have been a number of studies relating age at matriculation to subsequent success or failure at college. Summerskill reviewed seven studies and concluded: "age per se does not affect attrition although older undergraduates may encounter more obstacles to graduation."[42]

Sex. Iffert found little difference between the percentages of men and women students who dropped out of the institution of first enrollment by the end of the year. However, by the end of the second year more women had dropped out than men (39.6 per cent of men and 46.1 per cent of women).[43] In 1955 Matson studied 144 students who withdrew at East Conta Costa Junior College. She compared them with 217 students who did not withdraw. She found no significant differences between the two groups regarding sex.[44]

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[40]George B. Smith, "Who Would Be Eliminated? A Study of Selective Admission to College," Kansas Studies in Education, VII, (Lawrence, Kansas, 1956).

[41]Ralph B. Beard and Richard Madden, "Note on the Relation Between Retention and Intelligence Tests Scores in A Teachers College," Educational Administration and Supervision, XXVI, (1940), p. 152-153.

[42]Summerskill, p. 631.

[43]Iffert, p. 17.

[44]Jane E. Matson, "Characteristics of Students Who Withdrew from a Public Junior College," Unpublished Doctor's dissertation, 1955. As found in Dissertation Abstracts, XV, p. 1787-88.

The fact that men and women withdraw at similar rates does not mean that they withdraw for similar reasons. Iffert feels there is evidence that the withdrawal rate for women equals that of men because more women withdraw for non-academic reasons, primarily for marriage.[45]

Socio-economic Factors. Counseling experience suggests that a student's social and economic background affects his adjustment to the college environment.

A study by Brown was associated with the amount of parents' education in student withdrawal. He found, "Over-achievement is more likely to be found when the students' fathers had studied beyond the baccalaureate level or the mothers had attended high school or beyond."[46] Farnsworth produced evidence that the success of students admitted to college was closely related to the parents' educational level. He said, "If a student comes from a family where educational and intellectual matters are highly prized, and if the student is not blocked in his identification with his parents, he takes on these educational values."[47]

A study by Summerskill at a large university showed more dropouts among students whose fathers were in skilled, semi-skilled, or service occupations.[48]

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[45]Iffert, p. 17.

[46]Donald R. Brown, "Personality, College, Environment, and Academic Productivity," Chapter 16 in The American College, (Edited by Nevitt Sandford), New York, 1963, p. 536.

[47]D. S. Farnsworth, "Some Non-academic Causes of Success and Failure in College Students," College Admissions, II, (1955), p. 72-78.

[48]Summerskill, p. 631.

Prediction Instruments

Junior college and college admissions officers are in need of more valid and reliable measures for prediction of success. Counselors and admissions officers have a responsibility to these students and to their parents. Attempts to further refine and re-examine our measures must be made so that we can with a higher degree of reliability make recommendations that will help them answer their questions about the transition to college and the possibilities of success.

The use of entrance examination scores in the prediction of success in two-year colleges is a topic that is of considerable interest both to junior colleges and four-year colleges. In theory, if measures of scholastic aptitude are available, the counselor or guidance worker will have an index of the student's probability of success.

In a review of the literature one will find a notable absence of material of this nature on the junior college level. However, Seashore made the following statement about the use of tests for the prediction of achievement:

> The standard academic predictors which are useful in colleges generally will be useful in junior colleges with similar student bodies or in academic sections of multi-purpose institutions. But experience has shown that the validity of tests is specific to the situation.[49]

The author would note one of the purposes of this study was to predict student withdrawal. Few studies exist in this area. In contrast there are a number of predicting instruments that use college grade point average as the dependent variable in the use of the multiple regression technique.

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[49]Harold Seashore, "Tests as Aids to Administration and Counseling in Junior Colleges," Junior College Journal, XXVI, (1955), p. 507.

Cosand reviewed seventy-seven studies that derived correlations between predictors and collegiate success which were of significance, either because of a particularly high figure, a low figure, or a series of consistent figures. Of special interest is his chart giving the multiple correlations, which points out strongly the advantage of several predictors over a single predictor.[50] A study by Vick and Hornaday reveals twelve additional studies of this type.[51]

Despite the many studies in prediction and despite the apparent value of these predictors, there is considerable evidence that they are not being used. Hills states,

> The typical regression formula seems complicated. Most laymen . . . and even counselors are unable and unwilling to use these admission research data in this form.[52]

One has only to imagine working through three prediction equations for 15 different colleges in the presence of a counselee to realize that computation time itself militates against the use of typical regression equations in the counseling situation.

The value of actuarial predictors is verified by the provocative book by Meehl. The results are astonishing: in only one of twenty studies was the clinical (human) method superior to a simple statistical method of prediction. In half of the studies the latter method was clearly superior.[53]

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[50]Joseph P. Cosand, "Admissions Criteria," College and University, XXVIII, (1953), p. 338-364.

[51]Mary Catharine Vick and John A. Hornaday, "Predicting Grade Point Average at a Small Southern College," Education and Psychological Measurement, XXII, (1962), p. 795-799.

[52]John R. Hills, "College Expectency Tables of High School Counselors," Personnel and Guidance Journal, XLII, (1964), p. 479-483.

[53]Paul E. Meehl, Clinical Versus Statistical Prediction: A Theoretical Analysis and a Review of the Evidence, (Minneapolis, 1954).

It was the author's estimate that the literature reviewed indicated the need and value of mechanical predictors. However, the literature also seems to indicate that the present "complicated" instruments are not used to a great extent. The author reasoned that if these estimates were correct, perhaps a study was justified in attempting to construct a simple instrument to predict withdrawal in junior college.

Summary of the Literature

Areas of General Agreement

The magnitude of college attrition in both two and four-year institutions is a matter demanding a high priority in the considerations and decisions of collegiate institutions. Sophomore enrollment in four-year institutions is approximately 65 to 70 per cent of the original freshman class. Attrition in junior colleges is slightly higher than the rate in four-year institutions.

The critical period in withdrawal in the first year for both two and four-year schools. The vast majority of withdrawals have taken place by the end of the first year in junior college and by the end of the second year in four-year colleges.

Reasons lying behind withdrawal are complex and are intimately entwined with students', parents', and peers' values, backgrounds, goals, finances, interests, perceptions, and other non-intellective factors as well as academic performance. The stated reasons may not actually be the real causes of withdrawal.

There is a great deal of overlap in academic aptitude, as measured by tests and rank in high school, of students who persist and who withdraw in both two and four-year institutions. It has also been repeatedly demonstrated that many capable students withdraw.

There are no significant sex differences in academic aptitude, although women as a group tend to perform at a higher level of achievement in high school.

There seems to be general agreement as to the need for instruments of prediction. Although the usefulness of present instruments has been demonstrated, many counselors seem to reject the use of these instruments.

Areas of Disagreement

Several studies have shown no significant differences between dropouts and persistors in academic aptitude while other studies do demonstrate such a difference on a group basis.

Although a number of studies have revealed that high school rank is significant as a predictor of college success, there are at least two studies that point out problems encountered with small high schools.

Author after author claims the validity of his prediction instrument, yet within the field no such device has gained acceptance.

There is no doubt considerable validity in the contention that different results were obtained because the designs of the studies varied. It would also seem appropriate to consider differences as feasible due to variations in type of institutions and student bodies involved.

Such conflicting results suggest the need for more comprehensive studies in these areas to determine whether universal patterns exist, whether there are patterns for particular types of institutions, or whether these areas do in fact vary as dictated by the peculiarities of individual institutions.

CHAPTER III

METHODOLOGY

Sources of Data

The data upon which this study was based were obtained from three sources: (1) official Joplin High School records; (2) official Jasper County Junior College records; and (3) the admission application, Jasper County Junior College of Joplin, Missouri.[1]

The Population

The Study Sample

A total of two hundred and two students from the 1963 graduating class of Joplin High School enrolled in at least 12 credit hours in September, 1963, in Jasper County Junior College. This report will survey this sample.

The Validation Sample

A total of two hundred and seventy-four students from the 1964 graduating class of Joplin High School enrolled in at least 12 credit hours in September, 1964, in Jasper County Junior College. From this total population, a sample of one hundred students was drawn randomly

[1] See Appendix A, p. 103.

as described by Huntsberger.[2] This group shall be known as the validation sample.

Data Collection Procedures

The investigator visited the offices of Jasper County Junior college and Joplin High School three times during the 1965-66 school year in order to collect data for this study. In August of 1965 and January of 1966 data were secured for the study sample. During these two sessions the investigator recorded data from the official transcripts of these institutions to specially prepared data cards. The third visit in March, 1966, allowed the recording of information for the validation sample.

Experimental Design

In its most rudimentary form, this study attempted to identify the variables related to persistence and withdrawal that were available from the above sources. The researcher checked the significance of these variables as they related to withdrawal. The .05 level of confidence was used to determine significance. These variables were then scrutinized for a pattern that might point toward withdrawal. Several such patterns were thought to be desirable. A prediction instrument was then constructed from the data obtained from the pattern. This instrument was then evaluated through its use with a sample of the 1964 Jasper County Junior College freshmen who had graduated from Joplin High School the previous spring.

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[2]David V. Huntsberger, Elements of Statistical Inference (Boston: Allyn and Bacon, 1961), p. 16.

Variables

The author would note one of the delimitations of this study. The variables reviewed in this study were limited to those found within the official records of both the Joplin High School and the Jasper County Junior College. It was recognized that other variables related to withdrawal must exist. A review of the literature suggested such variables.

A review of the "official records" revealed seventeen major variables and five minor sub-variables suitable for this study. The selected variables and their derivation follows.[3]

Sex

The sex of the student appear on the Joplin High School transcript, the Jasper County Junior College transcript, and the Application for Admission blank supplied by the junior college.

Grade Point Average in High School

The Grade Point Average was found on the high school transcript of the student. This average was derived arithmetically by the high school office staff. This high school has a marking code that allows 97 points for an E, 93 points for an S, 85 points for an M, 75 points for an I, and 69 points for an F. These points for grades 9, 10, 11, and 12 are totaled. This total divided by the original number of grades equals the grade point average of the student.

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[3]See Appendix A, p. 103.

Rank in High School

The high school scholarship rank was found on the high school transcript. This was derived by ranking the grade point average of the four hundred and twenty-eight students in this graduating class.

Scores from the Otis Quick-Scoring Mental Ability Test

This score appears on the high school transcript. The I.Q. score was used to rank the student in preparation for the use of the Mann-Whitney U Test. Four students in the total population failed to have the I.Q. score recorded on their transcripts. Therefore, the N with this variable was 198.

Scores from the Iowa Tests of Educational Development

The scores from the Reading in Literature, Reading in Social Science, Reading in Natural Science, and the composite score appeared on the high school transcript. These scores were reported in both percentiles and raw score. The raw score was used in the statistical analysis. For some reason that could not be explained by the high school guidance office, one student failed to take any of these tests, and nine students had scores recorded in the composite area but the three sub-test areas were blank. Therefore, N for the composite score on the test was 201 and the N for the three sub-tests was 192.

Scores from the Ohio State University Psychological Test

These scores were found on the high school transcript. These scores were reported in percentiles. It was necessary to transfer these percentiles to some standard score before treated statistically.

The "T" score was chosen. Twelve students evidently failed to take this test. Thus, N for this variable became 190.

Curriculum in High School

This information appears on the high school transcript. Joplin High School has four curricular areas: a College Curriculum, a General Curriculum, a Commercial Curriculum, and a Vocational Curriculum. With this variable it was the researcher's purpose to compare those students who were preparing specifically for college with those who chose one of the other three curricula. In the statistical treatment of this data the categories were called "college preparatory" and "non-college preparatory".

Curriculum in Junior College

This information was supplied from the Application for Admission, Jasper County Junior College. The curricula offered by the junior college was listed on page two. The researcher tallied the choices of the study population and found all but seventeen had chosen the following five areas: Engineering, Teacher Training, Business, and Arts and Sciences. In preparing this data for the chi-square test of independence, the researcher grouped these seventeen students into an area called "other". This "other" category contained students who enrolled in the following curricula: Vocational, Distributive Education, Social Work, Home Economics, Journalism, Law, Music, and Chemistry.

The Student's Age at Matriculation

The student's age appears on the high school and junior college transcripts and the admission blank supplied by the college. After reviewing the data the researcher transformed the students age into months and placed them into four groups. The chi-square test of independence was then applied to these groups.

Scores from the Cooperative School and College Ability Test

The scores from the SCAT were found on the junior college transcript. These scores were reported in both percentiles and raw score. The raw scores were used in the statistical analysis that followed. Since one student failed to take this test the N for this variable was 201.

Scores from the University of Missouri English Placement Test

The results of this test were found on the junior college transcript. These scores were reported in both percentiles and "T" score. The "T" score was used in the statistical analysis. Since two students failed to take this test the "N" for this variable was 200.

Head of the Household's Occupation

The Application for Admission form requested by the junior college asked for the occupation of the head of the household. The occupations listed by the student were validated by the researcher thru the use of the city directory. In cases of discrepancy, the city directory was considered as the final authority. The unclassified category used in the study contains those families with no visible means of support.

Several national studies have been conducted which placed people into status groups as a result of their occupations. The National Opinion Research Center conducted a survey in 1947 which resulted in the North-Hatt scale of prestige of occupations.[4] This study produced a list of numerical scores which were converted into a rank order. No attempt was made to divide the list of 90 occupations into classes or groups. It was the researcher's estimate that the 90 occupational listings were not broad enough to adequately classify the population of this study. As occupational prestige is generally regarded as the most satisfactory and probably the most valid index of social status, the original North-Hatt scale was expanded by Reiss to a total of 497 occupations.[5]

The expanded North-Hatt scale was selected as the instrument best suited for the purpose of this study. The 497 occupations were divided into quartiles. The following are examples of occupations falling into these quartiles:

Quartile 4: Bankers, lawyers, physicians, and proprietors of large businesses.

Quartile 3: Engineers, teachers, governmental administrators, owners of medium size businesses, contractors, wholesale salesmen, and managers of large businesses.

Quartile 2: Minor governmental employees, mechanic, welder, carpenter, electrician, printer, machinist, and owners and managers of small businesses.

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[4]Cecil K. North, "Jobs and Occupations: A Popular Evaluation," Class, Status and Power, ed. Reinhard Bendix and Seymour Martin Lipset, (New York, 1953), p. 411.

[5]Albert J. Reiss, Jr., Occupations and Social Status, (New York, 1961), p. 263.

Quartile 1: Service station worker, painter, truck driver, maintenance, and custodian.

Father's Education

The father's education was found on the Application for Admission requested by the junior college. The information was asked for in such a manner that only three categories were possible. The three categories used were: less than high school diploma, high school diploma but less than college degree, and college degree. In order to use the entire population a fourth category was added later. Since four students failed to record this information, an "unclassified" area was added.

Mother's Education

The mother's education was found on the Application for Admission requested by the junior college. The same categories noted above under father's education were used with this variable. Again four students were placed in an "unclassified" category for failing to record this information.

Father's Age

The father's age appeared on the Application for Admission requested by the junior college. The two categories used in the study, less than 53 years of age and 53 or more years of age, were determined through trial and error. It was at this point the researcher found a significant difference related to withdrawal of the father's son or daughter. Twenty students failed to record their father's age. They were placed in an "unclassified" category.

Mother's Age

The mother's age appeared on the Application for Admission requested by the junior college. The categories used with this variable were again determined by trial and error. Thirteen students failed to record their mother's age. They were placed in an "unclassified" category.

Siblings in the Family

This information was asked for by the Application for Admission requested by the junior college. The categories selected for the study were: only child, 1 sibling, 2 siblings, and 3 or more siblings.

The Prediction Instrument

Attempts in the past and present to predict persistence or withdrawal in college have been largely based upon statistical procedures. The author deviated from this method and with the aid of statistical data sought patterns that might point to withdrawal. It is through these patterns that the prediction instrument was constructed.

Validation of the Instrument

A sample of one hundred students was drawn from the 1964 Jasper County Junior College freshman class who had graduated the previous spring from Joplin High School. These students were then evaluated (persistor or dropout) by the instrument constructed by the researcher. The data obtained from this sample was then statistically compared with the data obtained from the study sample. (Please note the prediction instrument was constructed from data secured from this study sample.)

The researcher reasoned that if no significant difference was found between the two samples, that they may very well be from the same population, that what is said about one should apply to the other.

If there is no significant difference between these samples, this instrument (with specified qualifications) predicts persistence or withdrawal.

CHAPTER IV

FINDINGS OF THE STUDY

The findings reported in this chapter were derived from three sources of data: (1) official records of the Joplin High School, (2) official records of Jasper County Junior College, and (3) the entrance application to Jasper County Junior College.

The findings are presented in the following order: (1) a discussion of the magnitude of withdrawal in the sample studied; (2) variables statistically significantly related to persistence at Jasper County Junior College; (3) variables statistically non-significantly related to persistence at Jasper County Junior College; (4) construction of a prediction instrument; and (5) the validation of the prediction instrument.

Magnitude of Withdrawal

The research findings cited in Chapter II indicated that the first year was the critical period during which the majority of junior college withdrawals took place. The researcher was interested in determining the extent of freshman withdrawal from Jasper County Junior College.

Of the 202 students enrolled, a total of sixty-one students, 30.2 per cent of the total sample, withdrew during or at the end of their freshman year. These findings indicate that, for the sample studied, they compare positively with the studies of Iffert with 28.3 per cent

and Reynolds with 34.1 per cent withdrawals.[1] The findings are in disagreement with those of Hartig with 40 per cent, Eells with 45.4 per cent, Clark with 50 percent, and Thornton with 51.3 per cent drop-outs.[2]

TABLE I

THE STUDY POPULATION

Unit	Continued	Withdrawals	Totals
Study Sample	141	61	202
Validation Sample	72	28	100

Variables Related to Persistence

The researcher was further interested in determining whether the selected variables in high school preparation, family influences, and pre Jasper County Junior College performance were significantly related to withdrawal. No empirical investigations into the withdrawal problem had been previously conducted at Jasper County Junior College. In addition, the review of the literature revealed that little empirical research on junior college withdrawal had been carried out by other investigators.

Ten variables were found to be statistically significant in relation to persistence of full-time freshmen: (1) grade point average;

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[1]See reference to Iffert, p. 14; Reynolds, p. 14.

[2]See reference to Hartig, p. 16; Eells, p. 15; Clark, p. 16; and Thornton, p. 16.

(2) scores from the SCAT Test; (3) scores from the ITED Test; (4) scores from the Ohio Psychological Test; (5) rank in high school; (6) curriculum completed in high school; (7) the father's education; (8) junior college curriculum enrolled in September, 1963; (9) the mother's education; and (10) the fathers age.

TABLE II

HIGH SCHOOL RANK OF STUDY SAMPLE FRESHMEN WHO CONTINUED FULL-TIME IN HIGHER EDUCATION IN SEPTEMBER, 1964, AND WHO WITHDREW DURING OR AT THE END OF THE FRESHMAN YEAR

Quartile	Continued	Withdrawals	Total
4	52	4	56
3	51	23	74
2	32	24	56
1	6	10	16
Total	141	61	202

Chi-square = 26.039 C = .338

The chi-square was significant at the .001 level of confidence. In the persistence group, in quartile one, the observed frequencies were greater than the theoretical frequencies. The students who ranked high in their graduating class tended to persist at a greater rate than theoretically expected. In quartiles two, three, and four, students withdrew more often than theoretically expected. The contingency coefficient of this variable was .338. This would seem to indicate that high school rank is one of the better single predictors of junior college persistence within the scope of this study.

Although the studies of Iffert, Butsch, Garrett, and Travers relate high school rank to college grade point average, they essentially agree with the significance noted.[3]

TABLE III

HIGH SCHOOL GRADE POINT AVERAGE OF STUDY SAMPLE FRESHMEN WHO CONTINUED FULL-TIME IN HIGHER EDUCATION IN SEPTEMBER, 1964, AND WHO WITHDREW DURING OR AT THE END OF THE FRESHMAN YEAR

	Continued	Withdrawals	Totals
Number	141	61	202
Sum of X	16294	4209	20503
Mean	88.46	84.31	
Sum of X^2			1541224
Standard deviation			4.97
z score			5.064
Significance			p = .00003
Point biserial correlation			.382

The z score derived from the Mann-Whitney U test indicates significance well beyond the one per cent level of confidence. The studies of Garrett, Schmitz, Segal and Proffitt, and Kerr seem to support the statistics shown above.[4] The point biserial correlation of .382 between high school rank and persistence placed this variable in rank number one in perdicting persistence when related to the other variables considered within this study.

[3]See reference to Iffert and Butsch, p. 18; Garrett and Travers, p. 19.

[4]See reference to Garrett, Schmitz, Segal and Proffitt, and Kerr, p. 20.

TABLE IV

CURRICULUM COMPLETED IN HIGH SCHOOL OF STUDY SAMPLE FRESHMEN WHO CONTINUED FULL-TIME IN HIGHER EDUCATION IN SEPTEMBER, 1964, AND WHO WITHDREW DURING OR AT THE END OF THE FRESHMAN YEAR

	Continued	Withdrawals	Totals
College preparatory	47	4	51
Non-college preparatory	94	57	151
Total	141	61	202

Chi-square = 14.787 C = .261

The chi-square is significant at the .001 level of confidence. College preparatory students failed to dropout in as great numbers as expected, and the non-college preparatory students withdrew at a greater rate than the theoretical frequency indicated.

These findings are corroborated by Matson who found fewer college preparatory students in the withdrawal group.[5] However, the studies of Darley, Travers, Garrett, and Sturgis found little relationship between high school subjects and college success.[6] With a contingency coefficient of .261 this variable would occupy a probable rank of fifth with the ten variables found significant in this study.

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[5]See reference to Matson, p. 23

[6]See reference to Darley, p. 20; Travers, p. 20; Garrett, p. 21; and Sturgis, p. 21.

TABLE V

EDUCATIONAL ATTAINMENT OF FATHER OF STUDY SAMPLE FRESHMEN WHO CONTINUED FULL-TIME IN HIGHER EDUCATION IN SEPTEMBER, 1964, AND WHO WITHDREW DURING OR AT THE END OF THE FRESHMAN YEAR

Education	Continued	Withdrawals	Total
Less than high school degree	34	31	65
High school degree	76	24	100
College degree	28	5	33
Unclassified	3	1	4
Total	141	61	202

Chi-square = 14.380 C = .258

The chi-square is significant at the one per cent level of confidence. Students whose fathers attained a college education were fewer in number than the theoretical chi-square frequency. Students whose fathers received less than a high school education dropped out at a rate that exceeded the expected frequency. These results tend to correspond with those of Brown and Farnsworth.[7] The contingency coefficient of .258 ranks this variable sixth among the significant variables within this study.

[7]See reference to Brown, p. 24; Farnsworth, p. 24.

TABLE VI

CURRICULUM ENROLLED IN SEPTEMBER, 1963, OF STUDY SAMPLE FRESHMEN WHO CONTINUED FULL-TIME IN HIGHER EDUCATION IN SEPTEMBER, 1964, AND WHO WITHDREW DURING OR AT THE END OF THE FRESHMAN YEAR

Curriculum	Continued	Withdrawals	Total
Arts and sciences	32	14	46
Teachers training	26	9	35
Business	33	20	53
Medicine	11	6	17
Engineering	31	3	34
Other	8	9	17
Total	141	61	202

Chi-square = 13.699 C = .252

The chi-square is significant at the .05 level of confidence. The observed frequencies match very closely with the theoretical frequencies in the various curricula other than Engineering. The engineering students exceeded persistence expenctancy, and they dropped out less frequently than anticipated. The researcher would note the lack of research with this variable with which the above results may be compared. The contingency coefficient of .252 allows this variable to rank seventh with the ten variables found significant in this study.

TABLE VII

EDUCATIONAL ATTAINMENT OF MOTHER OF STUDY SAMPLE FRESHMEN WHO CONTINUED FULL-TIME IN HIGHER EDUCATION IN SEPTEMBER, 1964, AND WHO WITHDREW DURING OR AT THE END OF THE FRESHMAN YEAR

Education	Continued	Withdrawals	Total
Less than high school diploma	31	25	56
High school diploma	84	32	116
College degree	23	3	26
Unclassified	3	1	4
Total	141	61	202

Chi-square = 10.264 C = .221

The chi-square is significant at the five per cent level of confidence. Students whose mothers attained a college education persisted in greater numbers than the theoretically expected and dropped out in fewer numbers than theoretically expected. Students whose mothers education was less than a high school diploma tended to persist less frequently and drop out more often than theoretically expected. These findings are similar to those of Brown and those of Farnsworth.[8] With a contingency coefficient of .261 this variable would occupy a probable rank of eighth with the ten variables found significant in this study.

[8]See reference to Brown, p. 24; Farnsworth, p. 24.

TABLE VIII

FATHER'S AGE WHEN STUDENT ENTERS COLLEGE OF STUDY SAMPLE FRESHMEN WHO CONTINUED FULL-TIME IN HIGHER EDUCATION IN SEPTEMBER, 1964, AND WHO WITHDREW DURING OR AT THE END OF THE FRESHMAN YEAR

	Continued	Withdrawals	Total
Less than 53 years of age	109	36	145
53 or more years of age	18	19	37
Unclassified	14	6	20
Total	141	61	202

Chi-square = 9.780 C = .215

The chi-square is significant at the one per cent level of confidence. Students who had "older" fathers tended to persist at a lesser rate and drop out at a greater rate than the theoretical frequency expected. Studies are not available to compare with these results. This variable, however, is the only one within the study in which the withdrawal students out number the continued students. The contingency coefficient was .215. This variable would rank ninth among the ten significant studies within this study.

TABLE IX

ITED TEST RESULTS OF STUDY SAMPLE FRESHMEN WHO CONTINUED FULL-TIME IN HIGHER EDUCATION IN SEPTEMBER, 1964, AND WHO WITHDREW DURING OR AT THE END OF THE FRESHMAN YEAR

	Continued	Withdrawals	Total
Number	138	58	196
Sum of ranks	18035	1271	19306
z score			5.009
Significance			p = .00003
Mean	20.52	17.28	
Sum of X	2932	982	
Sum of X^2			85318
Standard deviation			5.70
Point biserial correlation			.345

The z score derived from the Mann-Whitney U test indicated significance well beyond the .01 level of confidence. These results tend to correspond with the findings of the studies of Summerskill, Fricke, Keys, and Garrett.[9]

A z score was found for the three reading subtests. The results of the subtests were not significant. This would disagree somewhat with the findings of Freehill, Johnson, Pattishall and Banghard, and Hanks.[10]

The point biserial correlation of .345 allowed this variable to rank second among the significant variables found in this study.

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[9]See reference to Summerskill, p. 21; Fricke, p. 21; Keys, p. 22; and Garrett, p. 22.

[10]See reference to Freehill, p. 22; Johnson, p. 22; Keys, p. 22; and Garrett, p. 22.

TABLE X

SCAT TEST RESULTS OF STUDY SAMPLE FRESHMEN WHO CONTINUED FULL-TIME IN HIGHER EDUCATION IN SEPTEMBER, 1964, AND WHO WITHDREW DURING OR AT THE END OF THE FRESHMAN YEAR

	Continued	Withdrawals	Total
Number	141	60	201
Sum of ranks	16549	3752	20301
z score			7.868
Significance			p = .00003
Mean	300.40	289.05	
Sum of X	42357	17343	59700
Sum of X^2			17770976
Standard deviation			13.99
Point biserial correlation			.371

The z score derived from the Mann-Whitney U test indicated significance well beyond the .0001 level of confidence. These results tend to be similar to those of Summerskill, Fricke, Keys, and Garrett.[11] The point biserial correlation of .371 allowed this test to rank second as a single predictor among the ten significant variables studied.

A z score was found for both subtests. Although the z scores of the SCAT Quantative and the SCAT Verbal were significant, and the point biserial correlations were high, both indices were exceeded by the parent test. Since this was true, they were not considered further in the study.

[11]See reference to Summerskill, p. 21; Fricke, p. 21; Keys, p. 22; and Garrett, p. 22.

TABLE XI

OHIO PSYCHOLOGICAL TEST RESULTS OF STUDY SAMPLE FRESHMEN WHO CONTINUED FULL-TIME IN HIGHER EDUCATION IN SEPTEMBER, 1964, AND WHO WITHDREW DURING OR AT THE END OF THE FRESHMAN YEAR

	Continued	Withdrawals	Total
Number	134	56	190
Sum of ranks	14285	3860	18145
z score			3.534
Significance			p = .00023
Mean	54.9	50.0	
Sum of X	7364	2850	10214
Sum of X^2			58176
Standard deviation			7.94
Point biserial correlation			.283

The z score derived from the Mann-Whitney U test indicated significance at the .00023 level of confidence. The point biserial correlation of .283 allows this variable to rank fifth among the significant variables in this study.

Summary of Variables Related to Persistence

The following table gives a brief summary of the ten variables found significantly related to persistence. An accurate ranking of these variables was prohibited due to the several types of correlation used; the researcher would call attention to the "estimated rank".

TABLE XII

A CONSOLIDATION OF SIGNIFICANT VARIABLE RESULTS INDICATING SIGNIFICANCE, CORRELATION, AND ESTIMATED RANK

a	Variable	b	c	d
1	High school GPA	5.064	.00003	.382
2	SCAT test scores	7.868	.00003	.371
3	ITED test scores	5.009	.00003	.360
4	High school rank	26.039	.001	.339
5	Ohio Psych. test scores	3.534	.00023	.283
6	Curriculum (H.S.)	14.787	.001	.261
7	Father's education	14.380	.01	.258
8	Curriculum (college)	13.699	.05	.252
9	Mother's education	10.364	.05	.221
10	Father's age	9.780	.01	.215

a = estimated rank.

b = z score or chi-square.

c = table significance.

d = contingency coefficient or point biserial correlation.

Variables Not Related to Persistence

The results of this study demonstrated the lack of relationship between a number of variables and freshman persistence. These variables are grouped together in one section for discussion purposes.

If the three reading subtests of the ITED are included, ten variables were found to be statistically non-significant in relation to withdrawal of full-time freshmen. The data for each of these variables are presented in Tables XIII through XX. The chi-square test of independence was utilized in Tables XVI, XVII, XVIII, XIX, and XX. The Mann-Whitney U test was used in Tables XIII, XIV, and XV.

Those variables not related to persistence at Jasper County Junior College were:

(1) scores from the ITED Reading of Literature

(2) scores from the ITED Reading of Social Science

(3) scores from the ITED Reading of Natural Science

(4) scores from the Otis I.Q. Test

(5) scores from the Missouri English Test

(6) the head of the household's occupation

(7) the mother's age when student entered college

(8) the student's age when he entered college

(9) the number of siblings in the family

(10) the sex of the student

TABLE XIII

ITED READING SUBTEST RESULTS OF STUDY SAMPLE FRESHMEN WHO CONTINUED FULL-TIME IN HIGHER EDUCATION IN SEPTEMBER, 1964, AND WHO WITHDREW DURING OR AT THE END OF THE FRESHMAN YEAR

	Continued	Withdrawals	Totals
	ITED Reading (Literature)		
Number	136	56	192
Sum of ranks	14186.5	4341.5	18528
U			4870.5
Sum of T			2681
z score			1.242
Significance			p = .1075
	ITED Reading (Social Science)		
Number	136	56	192
Sum of ranks	14436.5	4091.5	18528
U			5120.5
Sum of T			1541.5
z score			1.533
Significance			p = .0630
	ITED Reading (Natural Science)		
Number	136	56	192
Sum of ranks	14272	4256	18528
U			4956
Sum of T			1992
z score			1.341
Significance			p = .0901

The researcher would note the Social Science test with a significance at the six per cent level of confidence is the most applicable of the three subtests. Since the author had previously set the five per cent level of confidence for the study, these tests were rejected.

TABLE XIV

OTIS IQ TEST RESULTS OF STUDY SAMPLE FRESHMEN WHO CONTINUED FULL-TIME IN HIGHER EDUCATION IN SEPTEMBER, 1964, AND WHO WITHDREW DURING OR AT THE END OF THE FRESHMAN YEAR

	Continued	Withdrawals	Totals
Number	140	58	198
Sum of ranks	14926	4875	19801
U			4956
Sum of T			769
z score			.997
Significance			p = .1611

This variable is significant only at the sixteen per cent level. The I.Q. of the student was not significantly related to persistence in this study.

TABLE XV

MISSOURI ENGLISH TEST RESULTS OF STUDY SAMPLE FRESHMEN WHO CONTINUED FULL-TIME IN HIGHER EDUCATION IN SEPTEMBER, 1964, AND WHO WITHDREW DURING OR AT THE END OF THE FRESHMAN YEAR

	Continued	Withdrawals	Totals
Number	141	59	200
Sum of ranks	15191	4909	20100
U			5180
Sum of T			1248
z score			1.116
Significance			p = .1335

This variable was significant at the thirteen per cent level. This variable was not related to student persistence in this study.

TABLE XVI

OCCUPATION OF HEAD OF THE HOUSEHOLD OF STUDY SAMPLE FRESHMEN WHO CONTINUED FULL-TIME IN HIGHER EDUCATION IN SEPTEMBER, 1964, AND WHO WITHDREW DURING OR AT THE END OF THE FRESHMAN YEAR

Occupational Level[12]	Continued	Withdrawals	Totals
Quartile 4	3	1	4
Quartile 3	56	19	75
Quartile 2	57	25	82
Quartile 1	13	11	24
Unclassified	12	5	17
Total	141	61	202

Chi-square = 3.686

The chi-square was not significant at the five per cent level of confidence. The occupation of the student's father as classified above is not related to persistence within the scope of this study. These findings tend to disagree with those found by Summerskill.[13]

[12]Cecil K. North, "Jobs and Occupations: A Popular Evaluation," Class, Status and Power, ed. Reinhard Bendix and Seymour Martin Lipset, (New York, 1953), p. 411.

[13]See reference to Summerskill, p. 15.

TABLE XVII

MOTHER'S AGE WHEN STUDENT ENTERED COLLEGE OF STUDY SAMPLE FRESHMEN WHO CONTINUED FULL-TIME IN HIGHER EDUCATION IN SEPTEMBER, 1964, AND WHO WITHDREW DURING OR AT THE END OF THE FRESHMAN YEAR

Age	Continued	Withdrawals	Totals
Less than 53 years of age	123	45	168
53 or more years of age	11	10	21
Unclassified	7	6	13
Total	141	61	202

Chi-square = 5.466

The chi-square is not significant at the five per cent level of confidence. The mother's age at the time the student matriculated in college is not significantly related to college persistence within this study.

TABLE XVIII

AGE WHEN STUDENT ENTERED COLLEGE OF STUDY SAMPLE FRESHMEN WHO CONTINUED FULL-TIME IN HIGHER EDUCATION IN SEPTEMBER, 1964, AND WHO WITHDREW DURING OR AT THE END OF THE FRESHMAN YEAR

Age in Months	Continued	Withdrawals	Totals
Above 228	6	6	12
228-223	14	6	20
222-217	59	28	87
Below 217	62	21	83
Total	141	61	202

Chi-square = 3.403

The chi-square is not significant at the five per cent level of confidence. The student's age seems to have little to do with persistence in college within the scope of this study.

TABLE XIX

NUMBER OF SIBLINGS IN THE FAMILY OF STUDY SAMPLE FRESHMEN WHO CONTINUED FULL-TIME IN HIGHER EDUCATION IN SEPTEMBER, 1964, AND WHO WITHDREW DURING OR AT THE END OF THE FRESHMAN YEAR

Number	Continued	Withdrawals	Totals
Only child	21	11	32
1 sibling	44	13	57
2 siblings	35	19	54
3 or more siblings	41	18	59
Total	141	61	202

Chi-square = 2.329

The chi-square is not significant at the five per cent level of confidence. The presence of one or more (or the lack of) other children in the family did not affect continuance or withdrawal from the junior college within the scope of this study.

TABLE XX

SEX OF THE STUDY SAMPLE FRESHMEN WHO CONTINUED FULL-TIME IN HIGHER EDUCATION IN SEPTEMBER, 1964, AND WHO WITHDREW DURING OR AT THE END OF THE FRESHMAN YEAR

	Continued	Withdrawals	Totals
Male	87	32	119
Female	54	29	83
Total	141	61	202

Chi-square = 1.145

The chi-square is not significant at the five per cent level of confidence. This finding is supported by those obtained by Iffert for four-year institutions and by Matson in a junior college study.[14]

[14]See reference to Iffert, p. 23; Matson, p. 23.

A Summary of Variables Not Related to Persistence

The table below indicates a brief summary of the ten variables found not significantly related to persistence.

TABLE XXI

A CONSOLIDATION OF NON-SIGNIFICANT VARIABLES INDICATING CONFIDENCE LEVEL

Variable	Level of Confidence
Mother's age	Approx .0600
ITED reading (SS) scores	.0630
ITED reading (NS) scores	.0901
ITED reading (Lit) scores	.1075
Missouri English test scores	.1335
Otis I.Q. test scores	.1611
Sex of student	Approx .2500
Student's age	Approx .3500
Occupation of head of household	Approx .4000
Siblings in family	Approx .5000

The Prediction Instruments

The researcher evaluated two hypothetical "patterns" that were thought to be characteristic of the dropout. The variables used to construct these "patterns" were those found to be statistically significant in the study. The construction of each "pattern" and subsequent development of "sub-patterns" is described in the following section.

Multiple Variable Predictors

Pattern Number One. The basic thesis of this "pattern" was that the variable existed on a continuum, and that at some point on this continuum one could maximally discriminate between persistence and withdrawal. Assuming this basic tenet as true, the following procedures allowed the construction of "sub-patterns".

Step 1. All variables that were measured by at least interval scale were placed in a frequency distribution chart. Through the use of the Kolmogorov-Smirnov technique described in Siegel[15] a "cutoff point" on the scale was determined to allow the researcher to discriminate maximally between dropouts and non-dropouts.

Step 2. Variables measured by nominal or ordinal scales allowed the researcher to assign positive and negative values according to the evaluation of the particular student.

Step 3. The variable "college curriculum" was placed in three classifications by the researcher. In the examination of the chi-square table the researcher found a positive relationship between engineering and persistence, a negative relationship between "other" curricula and persistence, and a neutral relationship between Arts and Sciences, Teachers Training, Business Education, Pre-Medicine, and persistence. The researcher assigned values for this variable as indicated previously.

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[15] See reference to Siegel, p. 8.

Step 4. A score sheet was prepared that allowed a rapid method of recording pass or fail for each variable with each student.

Step 5. Each student received a positive or negative evaluation for each variable.

Step 6. A master distribution chart was then prepared from the total positive and negative values scored by the population. From this master chart "sub-patterns" were constructed.

Step 1

SCHOOL AND COLLEGE ABILITY TEST

Withdrawals	Converted Scores	Continued
	330 - 326	2
	325 - 321	5
1	320 - 316	8
1	315 - 311	14
1	310 - 306	21
4	305 - 301	31
1	300	2
3	299	8
	298	3
5	297	7
3	296	1
14	295 - 291	9
7	290 - 286	11
6	285 - 281	10
2	280 - 276	4
8	275 - 271	2
3	270 - 266	1
	265 - 261	
2	260 - 255	2
60		141

Point determined by Kolmogorov-Smirnov technique

Step 1 (Continued)

GRADE POINT AVERAGE

Withdrawals	Converted Scores	Continued
	97 - 95	15
1	94 - 92	19
3	91	16
5	90	10
2	89	19
6	88	10
4	87	8
2	86	4
9	85	10
6	84	8
2	83	7
5	82	3
2	81	3
4	80	2
2	79	3
2	78	1
4	77 - 75	3
2	74 - 72	
61		141

Point determined by Kolmogorov-Smirnov technique

IOWA TESTS OF EDUCATIONAL DEVELOPMENT

Withdrawals	Raw Scores	Continued
	36 - 34	1
	33 - 31	6
2	30 - 28	13
2	27 - 25	16
1	24	7
3	23	11
3	22	11
4	21	12
3	20	13
4	19	8
5	18	10
5	17	6
7	16	3
3	15	4
5	14	6
3	13	3
5	12 - 10	5
2	9 - 7	3
1	6 - 4	
58		138

Point determined by Kolmogorov-Smirnov technique

Step 1 (Continued)

OHIO PSYCHOLOGICAL TEST

Withdrawals	"T" Scores	Continued
	73	
	72	1
	71	
	70	
	69	5
	68	1
	67	2
	66	3
	65	3
1	64	2
1	63	6
	62	5
1	61	7
1	60	5
1	59	7
1	58	6
	57	8
4	56	3
3	55	8
3	54	2
6	53	11
2	52	6
3	51	8
3	50	8
5	49	7
2	48	1
3	47	2
3	46	3
2	45	3
4	44	2
1	43	1
	42	
1	41	2
	40	
2	39	1
2	38	
1	37	1
	36	
	35	
	34	
	33	
	32	1
	31	3
	30	
56		134

Point determined by Kolmogorov-Smirnov technique

Step 1 (Continued)

HIGH SCHOOL RANK

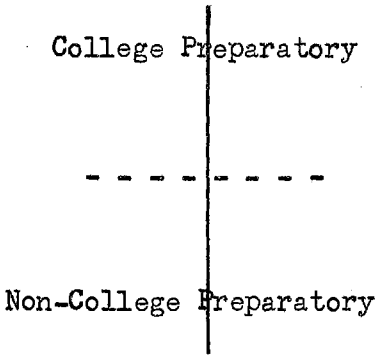
Withdrawals	Grouped Ranks	Continued
	1 - 10	4
	11 - 20	5
	21 - 30	7
	31 - 40	2
	41 - 50	4
1	51 - 60	3
	61 - 70	4
	71 - 80	5
1	81 - 90	10
1	91 - 100	6
2	101 - 110	6
3	111 - 120	6
2	121 - 130	6
1	131 - 140	6
4	141 - 150	6
	151 - 160	4
2	161 - 170	3
1	171 - 180	6
3	181 - 190	4
1	191 - 200	5
1	201 - 210	1
5	211 - 220	4
1	221 - 230	3
5	231 - 240	3
2	241 - 250	4
3	251 - 260	2
	261 - 270	5
	271 - 280	1
1	281 - 290	1
5	291 - 300	3
1	301 - 310	1
2	311 - 320	2
3	321 - 330	2
2	331 - 340	1
1	341 - 350	1
	351 - 360	1
1	361 - 370	
1	371 - 380	1
2	381 - 390	
	391 - 400	2
2	401 - 410	
	411 - 420	1
1	421 - 430	
61		141

Point determined by Kolmogorov-Smirnov technique

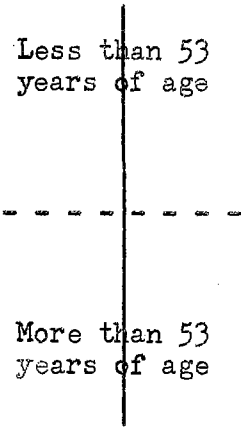
Step 2

The five previous variables presented well defined scales. The Kolmogorov-Smirnov technique adequately provided the method necessary to find the point on the scale where persistence and withdrawal could be maximally distinguished. The level of measurement of the next five variables was at best ordinal. The differentiation between persistence and withdrawal was done by mere classification. The significance of this classification was determined by chi-square.

CURRICULUM COMPLETED IN HIGH SCHOOL

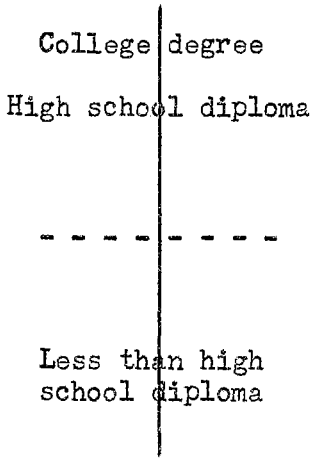


FATHER'S AGE WHEN STUDENT ENTERED COLLEGE

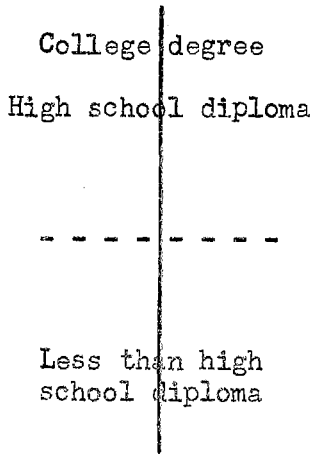


Step 2 (Continued)

EDUCATIONAL ATTAINMENT OF MOTHER



EDUCATIONAL ATTAINMENT OF FATHER

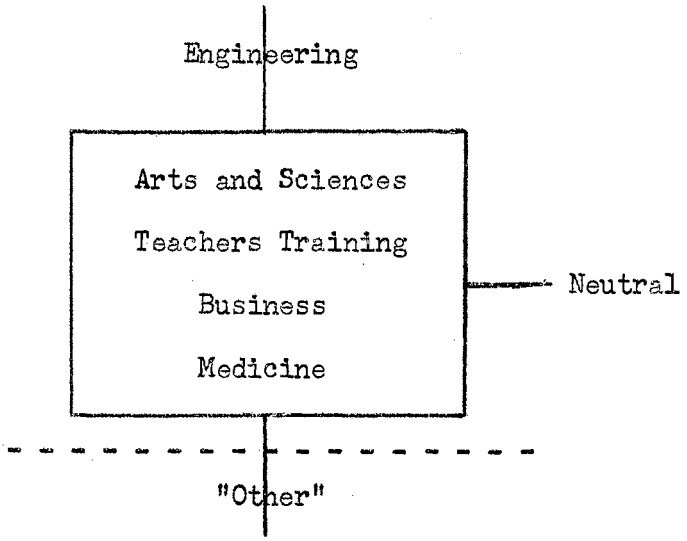


Step 3

In determining the significance of this variable it was necessary to use the chi-square test for k independent samples. As the researcher viewed each of the cells it was noted that those students enrolled in engineering dropped out at a lesser rate than the theoretical frequency. The students in Arts and Sciences, Teachers Training, Business, and Medicine nearly matched the expected frequencies. Those students in "other" curricula dropped out at a greater rate than theoretically expected.

With these facts in mind, the researcher modified the division of this continuum. Engineering was viewed as persistence; Arts and Sciences, Teachers Training, Business, and Medicine were viewed as neutral; and "other" was viewed as dropout.

COLLEGE CURRICULUM ENROLLMENT



Step 4

A score sheet was prepared for each student to provide a rapid method of recording pass or fail for each variable. A sample follows:

JASPER COUNTY JUNIOR COLLEGE

Persistence Prediction Score Sheet

Variable	Score	Point of Differentiation	Evaluation
H.S. GPA	89	88 - 87	Plus
SCAT	294	298 - 297	Zero
ITED	21	20 - 19	Plus
H.S. rank	240	180 - 181	Zero
Ohio Psych.	47	50 - 49	Zero
H.S. curr.	CP	Coll. prep. - Non-coll. prep.	Plus
Father's ed.	Less	- Less H.S.	Zero
Coll. curr.	Eng.	Eng. - "other"	Plus
Mother's ed.	More	- Less H.S.	Plus
Father's age	Less	Less - 53 or more	Plus
TOTAL: Plus 6	Zero 4		

Step 5

Following the preparation of the above score sheet the researcher evaluated each student within the study sample. Note the evaluation merely indicated by plus or zero the position of the score in relation to the point of differentiation.

Step 6

A master distribution chart was prepared for the various combinations of variables that the researcher wished to investigate. In the preparation of this chart the pluses were disregarded with only the zeroes considered.

Sub-pattern One. The author chose first a combination of all ten significant variables as an instrument of prediction. The following was the first distribution chart:

	Continued	Number of Zeroes	Withdrawal
	0	10	1
	1	9	2
	4	8	7
	6	7	9
	10	6	13
	12	5	10
	8	4	6
K-S technique			
	12	3	1
	23	2	2
	23	1	2
	23	0	0
	122		53

The researcher posed the following statement: all students who have a score of four or more zeroes are considered potential dropouts. With what degree of accuracy could this statement be made? Viewing the "continued" group this statement would correctly describe eighty-one students. The statement would accurately classify forty-eight students of the "withdrawal" group. If the above pattern plus the posed statement were used as a prediction instrument, the researcher could correctly catagorize 73.71 per cent of the 175 students in this population.[16]

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[16]Lack of complete information on twenty-seven students of the total population prevented their inclusion in this pattern. The twenty-seven students consisted of nineteen persisters and eight withdrawals.

The significance of this pattern rests not only with the high percentage of accurate predictions but also with the large percentage of withdrawals within this prediction. If a positive program of orientation were constructed for these potential withdrawals, only five students of this population would go undetected.

Sub-pattern Two. The second sub-pattern considered was a combination of the five top ranked significant variables within the study. The scores from the School and College Ability Test, high school rank, high school grade point average, the scores from the Ohio Psychological Test, and the scores from the Iowa Tests of Educational Development were combined. The following distribution chart was constructed:

	Continued	Number of Zeroes	Withdrawal
	15	5	20
	12	4	13
	9	3	7
K-S technique			
	16	2	5
	16	1	7
	66	0	3
	134		55

The researcher posed the following statement: all students who have a score of three or more zeroes are considered potential dropouts. With what degree of accuracy could this statement be made: Ninety-eight "continued" students and forty "withdrawal" students would be correctly classified. These figures constitute 73.01 per cent of the total population. If this pattern were to be used as a prediction instrument fifteen potential withdrawals would go unrecognized.

Sub-pattern Three. The third sub-pattern was a combination of the five significant variables ranked six through ten. The curriculum in high school, father's education, the college curriculum, mother's education, and father's age were combined. The following distribution chart was constructed:

	Continued	Number of Zeroes	Withdrawal
		5	2
	10	4	10
	9	3	16
K-S technique	25	2	12
	53	1	15
	30	0	1
	127		56

The researcher posed the following statement: all students who have a score of three or more zeroes are considered potential dropouts. With what degree of accuracy could this statement be made? One hundred-eight "continued" students and twenty-eight "withdrawal" students would be correctly classified. These figures constitute 74.32 per cent of this population. If this pattern were used as a prediction instrument, twenty-eight potential withdrawals would go unrecognized.

Sub-pattern Four. The grade point average, the School and College Ability Test, the high school curriculum, and the father's education were included in the fourth sub-pattern considered. It was the researcher's wish to combine the two highest ranking variables evaluated by interval measurement with the two highest ranking variables evaluated by ordinal or nominal measurement. The following distribution chart was constructed.

	Continued	Number of Zeroes	Withdrawal
	8	4	20
	29	3	24
K-S technique	23	2	9
	46	1	3
	32	0	2
	138		58

The researcher posed the following statement: all students who have a score of three or more zeroes are considered potential dropouts. With what degree of accuracy could this statement be made? One hundred-one "continued" students and forty-four "withdrawal" students would be correctly classified. These figures constitute 73.98 per cent of the population. If this pattern were to be used as a prediction instrument, fourteen withdrawals would go unrecognized.

Pattern Number One Summary. The table below indicates the predictive accuracy of these sub-patterns rests not only with the percentage of correct predictions but also with the number of potential withdrawals recognized. The sub-patterns just described are not the only ones examined by the researcher. Additional sub-patterns derived from pattern number one appear in Appendix B, page 110.

TABLE XXII

A SUMMARY OF SUB-PATTERNS DERIVED FROM PATTERN NUMBER ONE SHOWING AN ESTIMATED RANK, THE PREDICTION ACCURACY PERCENTAGE, AND THE WITHDRAWALS NOT PREDICTED

Estimated Rank	Sub-Pattern Number	Accuracy Percentage	Withdrawal Not Predicted
1	1	73.71	5
2	4	73.98	14
3	2	73.01	15
4	3	74.32	28

If it is a junior college's purpose to establish a positive program to aid the potential dropout, it becomes obvious that not only must the prediction instrument have a high "accuracy percentage" but it must also identify a large number of potential dropouts. Sub-pattern number one seems to fulfill these criteria most efficiently.

Pattern Number Two. These patterns are based upon the quartile ranking of the student in each of the ten significant variables. The following procedures were used in the construction of the patterns.

Step 1. Those variables that produced an interval scale were divided into quartiles. The students were then categorized into these quartiles. If a student fell within the fourth quartile of a particular variable, he was awarded four points; the third quartile allowed three points; the second quartile granted two points; and the first quartile received an evaluation of one point. Each student received such an evaluation for each of the five variables thus classified.

Step 2. There were four variables that produced a dichotomy. This forced the researcher to alter the procedure described in step one. The researcher reasoned that quartiles one and two fell in the lower classification and that quartiles three and four fell in the upper classification. Through interpolation the author assigned a value of 3.5 to the upper classification and a value of 1.5 to the lower classification.

Step 3. The variable "college curriculum" was placed in three classifications by the researcher. In the examination of the chi-square table the researcher found a positive relationship between engineering and persistence, a negative relationship between "other" curricula and persistence, and a neutral relationship between Arts and Sciences, Teachers Training, Business Education, Pre-Medicine, and persistence. Through interpolation the researcher assigned a value of 2.5 to the neutral classification, four points were awarded to the upper classification, and one point to the lower classification.

Step 4. Each student was evaluated in each variable in the manner described above. A score was awarded for each variable. The scores were then totaled.

Step 5. A master distribution chart was prepared. The researcher then used the Kolmogorov-Smirnov technique of differentiate

maximally between those who persisted and those who withdrew.

Step 6. This chart became the prediction instrument.

Sub-pattern Number One. The researcher chose first a combination of all ten significant variables as an instrument of prediction. The following was the distribution chart:

Continued	Scores	Withdrawal
3	38	
2	37	
7	36	
5	35	
7	34	
6	33	
14	32	
5	31	
2	30	1
7	29	1
9	28	1
7	27	
K-S technique		
4	26	2
3	25	2
8	24	4
10	23	4
4	22	7
3	21	9
2	20	5
7	19	4
1	18	
2	17	2
1	16	4
1	15	6
1	14	
	13	
	12	1
122		53

The researcher posed the following statement: all students who have a score of twenty-six or less are considered potential dropouts. With what degree of accuracy could this statement be made? Viewing the "continued" group this statement would accurately describe seventy-four students. The statement would correctly classify fifty students

of the "withdrawal" group. If the above pattern plus the posed statement were used as a prediction instrument, the researcher could correctly categorize 70.86 per cent of the 175 students in this population.[17]

The predictive accuracy of this pattern rests not only with the high percentage of accurate predictions but also with the large percentage of withdrawals within this prediction. If a positive program of orientation were constructed for these potential withdrawals, only three students of this population would go unrecognized.

Sub-pattern Number Two. The second sub-pattern considered was a combination of the five top ranked significant variables within the study. The School and College Ability Test, high school rank, high school grade point average, the Ohio Psychological Test, and the Iowa Tests of Educational Development were combined. The following distribution chart was constructed:

	Continued	Scores	Withdrawal
	24	20	
	9	19	
	7	18	
	7	17	1
	7	16	1
	9	15	3
	12	14	3
	7	13	2
	5	12	5
K-S technique	13	11	1
	6	10	9
	8	9	5
	4	8	7
	6	7	5
	1	6	3
	9	5	10
	134		55

[17]The lack of complete information on twenty-seven students of the total population prevented their inclusion in this pattern. The twenty-seven students consisted of nineteen persisters and eight withdrawals.

The researcher posed the following statement: all students who have a score of ten or less are considered potential dropouts. With what degree of accuracy could this statement be made? One hundred "continued" students and thirty-nine "withdrawal" students would be correctly classified. These figures constitute 73.54 per cent of the total population. If this sub-pattern were to be used as a prediction instrument, sixteen potential withdrawals would go unrecognized.

Sub-pattern Number Three. The third sub-pattern was a combination of the five significant variables ranked six through ten. The curriculum in high school, father's education, the college curriculum, mother's education, and father's age were combined. The following distribution chart was constructed:

	Continued	Scores	Withdrawal
	10	18	
		17	
	30	16	1
	3	15	
	45	14	17
	5	13	1
K-S technique	21	12	8
		11	
	7	10	17
		9	4
	6	8	6
		7	2
	127		56

The researcher posed the following statement: all students who have a score of eleven or less are considered potential dropouts. With what degree of accuracy could this statement be made? One hundred-fourteen "continued" students and twenty-nine "withdrawal" students would be correctly classified. These figures constitute 78.19 per

cent of this population. If this pattern were to be used as a prediction instrument, twenty-seven withdrawals would be inaccurately predicted.

Sub-pattern Number Four. The grade point average, the School and College Ability Test, the high school curriculum, and the father's education were included in the fourth pattern considered. It was the researcher's wish to combine the two highest ranking variables evaluated by interval measurement with the two highest ranking variables evaluated by ordinal or nominal measurement. The following distribution chart was constructed:

	Continued	Scores	Withdrawal
	18	15	
	7	14	1
	17	13	1
	16	12	1
	26	11	3
K-S technique			
	7	10	4
	16	9	9
	11	8	11
	13	7	11
	2	6	6
	5	5	11
	138		58

The researcher posed the following statement: all students who have a score of ten or less are considered potential dropouts. With what degree of accuracy could this statement be made? Eighty-four "continued" students and fifty-three "withdrawal" students would be correctly classified. These figures constitute 69.89 per cent of this population. If this pattern were to be used as a prediction instrument, five withdrawals would go unrecognized.

Pattern Number Two Summary. The sub-patterns just described are not the only ones examined by the researcher. Additional patterns derived from assumption number one appear in Appendix B, page 110. The following table summarized the patterns described above:

TABLE XXIII

A SUMMARY OF SUB-PATTERNS DERIVED FROM PATTERN NUMBER TWO SHOWING AN ESTIMATED RANK, THE PREDICTION ACCURACY PERCENTAGE, AND THE WITHDRAWALS NOT PREDICTED

Estimated Rank	Sub-Pattern Number	Accuracy Percentage	Withdrawal Not Predicted
1	1	70.86	3
2	4	69.89	5
3	2	73.54	16
4	3	78.19	27

The researcher would note pattern number one maintained a high prediction accuracy and yet identified all but three of the potential drop-outs.

Single Variable Predictors

In reviewing the literature, there has been a continuing search for correlates of college success. Both multiple variable predictors and single variable predictors have been investigated. The search continues. Within the scope of this study, the following table will summarize the significant variables as single predictors:

TABLE XXIV

A SUMMARY OF SINGLE VARIABLES WHEN USED AS PREDICTORS OF WITHDRAWAL WITHIN THE SCOPE OF THIS STUDY

Estimated Rank	Variable	Accuracy Percentage	Withdrawal Not Predicted
1	SCAT	71.14	11
2	GPA	65.84	17
3	H.S. Rank	67.33	18
4	ITED	66.33	18
5	Ohio Psych.	70.00	30
6	Father's educ.	70.22	29
7	Mother's educ.	66.78	35
8	Father's age	70.72	36
9	College curr.	70.29	52
10	H.S. curr.	51.48	4

Choice of Instrument

One of the major purposes of this study was to seek an instrument that might predict the persistence of freshman junior college students. Through statistical procedures the researcher has identified ten variables that within the scope of this study were related to persistence. In the estimating of the value of each instrument the researcher recognized two factors to be considered:

1. the percentage of correct predictions within the entire sample, and
2. the percentage of withdrawals predicted correctly.

In estimating the value of these instruments the researcher found it valuable to stabilize factor number one above and use the second factor for ranking purposes. In stabilizing factor number one, the researcher assumed the prediction instrument would be of little value if less than sixty-five per cent of the population could be correctly identified. Within the scope of this limitation, "high school curriculum" was eliminated. This instrument correctly identified only 51.48 per cent of the population.

The value of each variable as a single predictor as well as the multiple-variable predictors was estimated. The table below was the considered estimate of the researcher of the relative value of the eighteen prediction instruments prepared within this study.

TABLE XXV

A RANKED EVALUATION OF THE EIGHTEEN PREDICTION INSTRUMENTS FOUND WITHIN THIS STUDY

Estimated Rank	Prediction Instrument (Variable)	a	b
1	Pattern #2: Sub. #1	70.9 %	94.4 %
2	Pattern #2: Sub. #4	69.9 %	91.4 %
3	Pattern #1: Sub. #1	73.7 %	90.4 %
4	SCAT	71.1 %	81.7 %
5	Pattern #1: Sub. #4	74.0 %	75.9 %
6	Pattern #1: Sub. #2	73.0 %	72.7 %
7	GPA	71.1 %	72.2 %
8	Rank	67.3 %	70.5 %
9	Pattern #2: Sub. #2	73.5 %	70.1 %
10	ITED	66.3 %	69.0 %
11	Pattern #2: Sub. #3	78.2 %	51.8 %
12	Father's education	70.2 %	51.7 %
13	Pattern #1: Sub. #3	74.3 %	49.1 %
14	Ohio Psychological Test	70.0 %	46.4 %
15	Mother's education	66.8 %	42.6 %
16	Father's age	70.7 %	34.5 %
17	College curriculum	70.3 %	14.8 %
18	High school curriculum	51.5 %	(Eliminated)

a The percentage of correct predictions within the entire population.

b The percentage of withdrawals predicted correctly.

Validation of the Prediction Instruments

The validation sample consisted of one hundred students randomly selected (as described by Huntsberger[18]) from the 1964 Joplin High School graduates who enrolled for twelve or more hours in Jasper County Junior College in the fall of 1964. The criteria for differentiation between "persistor" and "withdrawal" were the same for this sample as for the original study population.

The percentage of withdrawals in the validation sample compared favorably with that of the study population. The study population had 30.2 per cent as compared to 28.0 per cent in the validation sample.

After the selection of this sample, the researcher applied each of the previously mentioned prediction instruments to the one hundred students. The following table compares the results found in both the study population and the validation sample.

In evaluating the prediction instruments the researcher statistically compared the scores derived from each predictor of the original study sample with the scores derived from each predictor of the validation sample. See Table XXVI. The investigator reasoned that if no significant difference existed between the original study sample and the validation sample what could be said of one group could in truth be said of the other group. Thus, if a prediction is made on the basis of data secured from the original study sample this prediction would be applicable to the validation sample.

The researcher transferred the percentages shown in Table XXVI to "T" scores and compared the two groups by a "t" test. A "t" of

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[18]Huntsberger, p. 16.

TABLE XXVI

A COMPARISON OF PREDICTION RESULTS OF THE ORIGINAL STUDY POPULATION AND THE VALIDATION SAMPLE

Prediction Instrument (Variable)	Original Study Population	Validation Sample
Pattern #2: Sub. #1	94.4 %	85.7 %
Pattern #2: Sub. #4	91.4 %	85.7 %
Pattern #1: Sub. #1	90.4 %	85.7 %
SCAT	81.7 %	75.0 %
Pattern #1: Sub. #4	75.9 %	78.6 %
Pattern #1: Sub. #2	72.7 %	75.0 %
GPA	72.2 %	64.3 %
Rank	70.5 %	75.0 %
Pattern #2: Sub. #2	70.1 %	60.7 %
ITED	69.0 %	71.1 %
Pattern #2: Sub. #3	51.8 %	42.9 %
Father's education	51.7 %	57.2 %
Pattern #1: Sub. #3	49.1 %	53.6 %
Ohio Psych. Test	46.4 %	42.9 %
Mother's education	42.6 %	29.3 %
Father's age	34.5 %	50.0 %
College curriculum	14.8 %	7.1 %
High school curriculum	(Eliminated)	

.357 was derived from the test. At the .05 level the table indicated 2.120. No significant difference was found between these two groups.

Since statistical methodology might question the transfer of the per cent to "T" scores, the researcher ranked these percentages and used the Mann-Whitney U Test to verify non-significance. The "z" score derived was -.0029. This score was so small it could not be evaluated by the table. There was no significant difference between these two groups. This verified the results found with the "t" test.

In an effort to further compare the original study sample with the validation sample, the researcher obtained a Pearson product-moment correlation coefficient. The correlation was .935. This result was further verified by the non-parametric Spearman rank order correlation. The Rho coefficient was .942.

The statistical analysis related above indicates that what is said about one group can be said about the other; that these two groups might very well come from the same population. Thus, within the scope of this study, the prediction instruments prepared from data secured from the original study sample will also make similar predictions within the validation population.

Testing of Hypotheses

Hypothesis I

Significant differences exist between full-time freshmen who continued and full-time freshmen who withdrew during the period studied in the following variables: (1) rank in high school; large numbers of freshmen who withdrew ranked low in their high school graduating class; (2) grade point average in high school; high school students who made

good grades in high school generally had a high rate of persistence in junior college; (3) ITED given in high school; those who achieve well in high school as measured by the ITED test tended to persist in junior college; (4) Ohio Psychological Test given in high school; students who achieved well in high school as measured by the Ohio Psychological Test tended to persist in junior college; (5) curriculum completed in high school; freshmen who completed a non-college preparatory curriculum withdrew to a greater extent then freshmen who completed the college preparatory curriculum; (6) curriculum in junior college; freshmen who enrolled in engineering tended to persist at a greater rate than theoretically expected and freshmen who enrolled in less standard or "other" courses tended to withdraw at a greater rate then expected; (7) SCAT given in junior college; students who possess high scholastic ability as measured by the SCAT tended to persist in junior college; (8) father's education; those students whose father possessed an education of less than a high school degree withdrew at a greater rate then theoretically expected; (9) mother's education; those students whose mother possessed an education of less than a high school degree withdrew at a greater rate than theoretically expected; (10) father's age; students whose father was 53 years of age or older at the time of the student's matriculation in college tended to withdraw at a greater rate than expected.

The study findings further revealed that significant differences did not exist in: (1) sex, (2) the ITED sub-test in Reading of Literature, (3) the ITED sub-test in Reading of Social Science, (4) the ITED sub-test in Reading of Natural Science, (5) the student's age at matriculation, (6) the Missouri English Test given in junior college, (7) the

head of the household's occupation, (8) the Otis Quick-Scoring Intelligence Test, (9) the mother's age when the student matriculated, (10) the lack of or number of siblings in the family.

Hypothesis II. A proper combination of the significant variables in this study allowed the construction and subsequent validation of an instrument that predicted freshmen attrition. Multiple variable predictors appeared to be most valuable in predicting withdrawal. Prediction was most efficient when a combination of all the variables was used and each variable was stratified by quartiles. The instrument ranked second was constructed in a similar manner using only the top five significant variables.

CHAPTER V

SUMMARY, CONCLUSIONS, AND IMPLICATIONS FOR FURTHER RESEARCH

The Problem

It was the purpose of this study to identify and evaluate selected variables related to junior college persistence. Following the identification and evaluation of these variables, the researcher sought patterns of persistence and withdrawal and subsequently prepared several instruments of prediction.

Delimitation of the Study

The study was limited to the investigation of May, 1963, Joplin High School graduates who enrolled for twelve or more credit hours in Jasper County Junior College in September, 1963. The evaluation group, however, consisted of 1964 Joplin High School graduates who enrolled for twelve or more credit hours in Jasper County Junior College in September, 1964.

The study was further limited to materials that could be obtained in the official records of Joplin High School and the official records of Jasper County Junior College.

Methodology

The data upon which this study was based were obtained from the official files of the Joplin High School and the official files of the

Jasper County Junior College.

A total of two-hundred two freshmen who enrolled full-time in September, 1963, comprised the study population. A total of one-hundred randomly chosen freshmen who enrolled full-time in September, 1964, comprised the validation sample.

In its most rudimentary form, this study attempted to identify the variables related to persistence and withdrawal that were available from the above sources. The researcher checked the significance of these variables as they related to withdrawal. These variables were then scrutinized for a pattern that might point toward withdrawal. Several such patterns were sought. A prediction instrument was then constructed from the data obtained from the pattern. These instruments were then evaluated through their use with a sample of the 1964 Jasper County Junior College freshmen.

Chi-square with Yates' correction for continuity, the Mann-Whitney U test, the "t" test, the Kolmogorov-Smirnov test, the contingency coefficient, the point biserial correlation, the Pearson product-moment correlation, and the Spearman rank order correlation were applied as appropriate. The five per cent level of confidence was set for the statistical tests of significance.

Findings

Magnitude of Withdrawal

A total of 30.2 per cent withdrew during or at the end of the freshman year; 28.0 per cent of the validation sample withdrew.

Variables Significantly Related to Persistence

Ten of the variables studied were found to be statistically significant at or beyond the five per cent level of confidence. These variables were: (1) grade point average, (2) the SCAT Test, (3) the ITED Test, (4) the Ohio Psychological Test; (5) rank in high school, (6) curriculum completed in high school, (7) the father's education, (8) junior college curriculum enrolled in September, 1963, (9) the mother's education, and (10) the father's age.

The study indicated: (1) junior college freshmen who had a superior grade point average in high school tended to persist in greater numbers than those students who had inferior grade point averages; the correlation of this variable with persistence was .338; (2) junior college freshmen scoring low on the SCAT Test tended to withdraw at a greater rate than those that scored high; the correlation of this test with persistence was .371; (3) students whose achievements were high as measured by the ITED Test persisted at a high rate; the correlation between this test and persistence was .360; (4) scores obtained from the Ohio Psychological Test differentiated between persistors and withdrawals; the correlation was .283; (5) students who ranked high in their graduating class tended to persist at a greater rate than theoretically expected; students in quartiles one, two, and three withdrew more often than theoretically expected; the correlation of this variable with persistence was .338; (6) students who had enrolled in a college preparatory course in high school failed to drop out in as great numbers as expected, and the non-college preparatory students withdrew at a greater rate than the theoretical frequency indicated; the correlation was .261; (7) withdrawal students whose fathers attained

a college education were fewer in number than the theoretical frequency; students whose father received less than a high school education dropped out at a rate that exceeded the expected frequency; the correlation was .258; (8) students who enrolled in engineering tended to drop out less frequently than expected; there seemed to be little difference between the persistor and withdrawal who were enrolled in other curricula; the contingency coefficient was .252; (9) students whose mothers attained a college education persisted in greater numbers than theoretically expected and dropped out in fewer numbers than theoretically expected; students whose mother's education was less than a high school degree tended to persist less frequently and drop out more often than theoretically expected; the contingency coefficient was .221; (10) freshmen who had "older" fathers tended to persist at a lesser rate and drop out at a greater rate than the theoretical frequency expected; the contingency coefficient for this variable was .215.

Variables Not Significantly Related to Persistence

Ten of the variables studied were found to be statistically non-significant at the five per cent level of confidence. These variables were: (1) the ITED Reading of Literature, (2) the ITED Reading of Social Science, (3) the ITED Reading of Natural Science, (4) the Otis Quick-Scoring Mental Ability Test, (5) the Missouri English Test, (6) the head of the household's occupation, (7) the mother's age when the student entered college, (8) the student's age when he entered college, (9) the number of siblings in the family, and (10) the sex of the student.

The Prediction Instruments

Multiple Predictors

Pattern Number One. Of the four sub-patterns investigated number one appeared to be most significant. It was the researcher's estimate that this instrument of prediction was one of the three most efficient found in this study. Sub-patterns two, three, and four were found to be less significant.

Pattern Number Two. This pattern seemed to be superior to pattern number one and all the single predictors. Sub-patterns one and four ranked one and two respectively in the final evaluation of instruments. However, sub-patterns two and three were ranked ninth and eleventh.

Single Predictors

Standardized Tests. The SCAT, ITED, and Ohio Psychological tests were inferior to several multiple predictors. The SCAT Test, which ranked fourth among the instruments, appeared to be superior to the ITED and Ohio Psychological Test as an instrument of prediction.

Other Variables. The GPA, rank, father's education, mother's education, father's age, and college curriculum appear to be of questionable value as prediction instruments. They ranked seventh, eighth, twelfth, fifteenth, sixteenth, and seventeenth among all the prediction instruments within this study.

Choice of Instrument

The researcher found the multiple variable predictors identified as pattern #2, sub-pattern #1; pattern #2, sub-pattern #4, and pattern

#1, sub-pattern #1 as most valuable in recognizing the potential drop-out.

Conclusions

Magnitude of Attrition

Less than one-third of the sample studied had withdrawal from the junior college by the beginning of the sophomore year. The researcher found a comparable rate with the validation sample. A fifty per cent attrition rate, so commonly attributed to public junior colleges, was not experienced with these samples.

The withdrawal rate was not unduly high particularly when one considers the non-selective, "open-door", admission policy under which the Jasper County Junior College operated.

Variables Found Significant

Although ten of the twenty variables were statistically significant, no one factor correlated high with junior college persistence. Of the ten statistically significant variables, the high school grade point average, the School and College Ability Test, the Iowa Tests of Educational Development, the high school rank, and the Ohio Psychological Test proved most valuable in differentiating between freshmen persistence and withdrawal.

Since high school curriculum, college curriculum, father's education, and mother's education were found to be statistically significant, the researcher would suggest that personal factors such as values, attitudes, and aspirations might be important in persistence.

Although the father's age when the student matriculated in college was found statistically significant, the finding could not be corroborated by other research.

Variables Found Non-Significant

Of the ten variables the researcher found non significant (sex, the ITED sub-test in Reading of Literature, the ITED sub-test in Reading of Social Science, the ITED sub-test in Reading of Natural Science, the student's age at matriculation, the Missouri English Test given in junior college, the head of the household's occupation, the Otis Quick-Scoring Intelligence Test, the mother's age when the student matriculated, and the lack of or number of siblings in the family) the results of "the head of the household's occupation" or "socio-economic status" most questionable. Although the most thorough and exacting research methods were used with this variable, the author would suggest these findings be considered less than conclusive.

Prediction Instruments

In the rationale under which these instruments were constructed by the researcher two factors were found of importance in predicting freshman attrition. Not only was it important to know the percentage of correct predictions from the sample tested, but it was of utmost interest to know the percentage of correct predictions with the withdrawals. If either factor possessed a low percentage, the prediction instrument lost its value.

When each variable was used as a single predictor their value was found to be questionable. The School and College Ability Test, the

high school grade point average, and high school rank were most valuable as single predictors.

The use of multiple variable predictors was clearly superior to the use of single variable predictors within this study. Prediction was most efficient when a combination of all the variables was used and each variable was stratified by quartiles. The instruments evaluated number one and number two were constructed in this manner.

The use of this instrument in a clinical, counselor-student situation for the prediction of persistence or withdrawal is of questionable value. It is the estimate of the researcher the true value of this instrument rests with the group situation; a situation in which all students scoring below a minimum level would be required to experience a comprehensive orientation program designed especially for these junior college students. The results of this study demonstrate the need for increased guidance and counseling on an individual basis in high school as vocational and educational decisions are being made after enrollment in the junior college. A comprehensive orientation to the junior college, to the world of work, and to adult life is indicated. The type of orientation program suggested here would of necessity require a continuous program which might well last during the entire freshman year. It is the estimate of the researcher that this instrument would perform well in identifying participants for such a program. This instrument would identify those students most likely to withdraw and considerable attention could be focused toward them.

General Statement

As a result of this investigator's inquiry into some of the quantitative and qualitative aspects of freshman withdrawal from

a public junior college, several overriding conclusions appear warranted.

Students who have had a poor academic record in high school should be given the opportunity to repair deficiencies and to demonstrate the ability and desire to do college-level academic work before being placed in a formal transfer or terminal curriculum.

And finally, since the freshman year is the most critical period when students' decisions are made to continue or terminate formal education, the total instructional and student personnel programs should be so constructed as to provide the climate for and stimulation to optimal development of each student. This necessitates excellent instruction, comprehensive counseling and guidance, and relating the curricular and co-curricular programs to the interests and needs which are of paramount importance to freshmen junior college students.

Implications for Further Research

The findings of this study and limited or non-existent published materials on problems related to it suggest the following areas for further research:

1. This study suggests a need for further research that would yield additional information on the quantitative aspects of the withdrawal problem in junior colleges. Certainly as important, and considerably more difficult, is the need for a study of the non-intellective dynamics involved in the decision to withdraw from the junior college and terminate their formal education. This type of motivational research study should include investigation of such individual's emotional needs, levels of aspiration, goals, and willingness to divert immediate

want satisfaction in order to achieve long-range goals. The findings of a study of this nature could be of major assistance in the guidance and counseling program and curriculum planning in the junior college.

2. In research concerned with the magnitude or prediction of student withdrawal institutional variables have been taken for granted or treated as constants. The implication here is that the values, attitudes, and social norms established by the institution are a necessary part of each student's education. Is it not conceiveable that environmental pressures, both formal and informal, could contribute to student attrition? Is there a relationship between the dropout rates and environmental factors present at our institutions of higher learning? Is it possible that the attrition rate is more related to certain conditions in the college than with factors within the student himself?

3. Future research must be carefully structured in the light of what is now known and not known about the attrition process. Prior research indicates that colleges and universities have taken little interest in the dropout problem. Few institutions have accurate information on student withdrawal. The future researcher must recognize the definition of withdrawal by the institution, prior research, and himself will differ considerably.

4. In considering future research the tabulation of reasons into categories (X% academic reasons, plus Y% social reasons, plus Z% financial reasons, equals dropout) does not cope with the realities of college dropouts and are of questionable value. It has been well established that the typical dropout is due to a "complex of causes".

5. Since financial problems of junior college freshmen apparently are not of the magnitude of freshmen in four year institutions, an

investigation of the effect of working part-time upon academic performance would be of interest.

6. An investigation of the magnitude, on both a local basis at the Jasper County Junior College and a nationwide basis, of withdrawals' subsequent re-enrollment in an institution of higher education should prove useful.

7. How will attrition be affected by the number of college applicants?

8. How will attrition be affected by the apparent intellectual and cultural renaissance among our young people?

9. And last, in considering future research, we should not assume that the outcomes (jobs, marriage, etc.) and causes of attrition are equivalent. If the researcher automatically assumes that withdrawal from college must represent failure or maladjustment, his research procedures may miss causal factors important in many dropouts.

Due to the number of pertinent questions left unanswered by this study and the apparent lack of improvement of the rate of attrition of college freshmen during the last three decades, this investigator is forced to conclude that although much has been accomplished in the past, considerable research lies ahead. America can ill-afford the loss of these students.

A SELECTED BIBLIOGRAPHY

Beard, Ralph B. and Madden, Richard. "Note on the Relation Between Retention and Intelligence Tests Scores in a Teachers College." Educational Administration and Supervision, XXVI (February, 1940), 152-53.

Bendix, Reinhard and Lipset, Seymour Martin. Class, Status and Power. New York: Free Press, 1953.

Brown, Donald R. "Personality, College, Environment, and Academic Productivity." The American College. Chapter 16. Ed. Nevitt Sanford. New York: John Wiley and Sons, 1963.

Butsch, R. L. C. "Improving the Prediction of Academic Success Through Differential Weighting." Journal of Educational Psychology, XXX (September, 1939), 401-20.

Clark, Burton R. The Open Door College: A Case Study. New York: McGraw-Hill, 1960.

Cosand, Joseph R. "Admissions Criteria." College and University, XXVIII (April, 1953), 338-64.

Darley, John G. "A Study of Clinical Predictions of Student Success or Failure in Professional Training." Journal of Educational Psychology, XXIX (May, 1938), 335-54.

Eells, Walter C. "Student Mortality in Junior Colleges." Junior College Journal, (November, 1956), XXVII, 132-37.

Egermeier, John C. "The Construction and Validation of a College Drop-out Predictor Scale for the Minnesota Counseling Inventory." (Unpublished Doctor's Dissertation, 1963). Dissertation Abstracts, XXV, 1000.

Examiner's Manual, Cooperative School and College Ability Tests, Second Supplement. Princeton, New Jersey: Educational Testing Service, 1956.

Examiner's Manual, Iowa Tests of Educational Development. Chicago, Illinois: Science Research Associates, 1954.

Examiner's Manual, Ohio State University Psychological Test, Form 26. Athens, Ohio: Ohio Testing Services, 1958.

Examiner's Manual, Otis Quick-Scoring Mental Ability Tests, Beta Form. New York: Harcourt, Brace and World, 1938.

Farnsworth, D. S. "Some Non-academic Causes of Success and Failure in College Students." College Admissions, II (Fall, 1955), 72-8.

Ferguson, George A. Statistical Analysis in Psychology and Education. New York: McGraw-Hill, 1959.

Fishman, J. A. and Panasella, A. K. "College Admission-Selection Studies." Review of Educational Research, XXX (October, 1960), 298-310.

Fleischer, Robert D. "High School Graduates and College Admittance." Bulletin of National Association of Secondary School Principals, XLV (May, 1961), 94-97.

Freehill, M. F. "The Cooperative English Test in Academic Counseling." College and University, XXIX (Fall, 1954), 244-252.

Fricke, Benno G. "Prediction, Selection, Mortality, and Quality Control." College and University, XXXII (Fall, 1956), 34-51.

Fritzmeier, L. H. "The Schools' Reaction to Admission Requirements." College Entrance Examination Board, College Admissions, III (1956), 71-79.

Fults, Dan A. and Taylor, Bob L. "The Staying Power of College Students." Bulletin of National Association of Secondary School Principals, XLIII (October, 1959), 111-20.

Garrett, Harley F. "A Review and Interpretation of Investigations of Factors Related to Scholastic Success in Colleges of Arts and Sciences and Teachers Colleges." Journal of Experimental Education, XVIII (December, 1949), 128-130.

Greenfield, Lois B. "Attrition Among First Semester Engineering Freshmen." Personnel and Guidance Journal, XLII (June, 1964), 1003.

Gustafson, Monty C. "Relationships Between Scholastic Aptitude Scores and Achievement of Junior College Freshmen." Junior College Journal, XXXII (October, 1961), 147.

Hanks, C. J. "A Comparative Study of Factors Related to Retention and Withdrawal of Freshmen Students at the University of Arkansas." (Unpublished Doctor's Dissertation, 1954). Dissertation Abstracts, XIV, 1171.

Hartig, Marvin E. "An Analysis of Selected Factors of Interruption of Persistency in Attendance in the Community College at Evansville College." (Unpublished Doctor's Dissertation, 1962). Dissertation Abstracts, XXIII, 3755.

Heilbrun, Alfred B. "Personality Factors in College Dropout." Journal of Applied Psychology, XLIX (February, 1965), 3.

Henninger, Ross G. The Technical Institute in America. New York: McGraw-Hill, 1959.

Hills, John R. "College Expectancy Tables of High School Counselors." Personnel and Guidance Journal, XLII (January, 1964), 479-83.

Huntsberger, David V. Elements of Statistical Inference. Boston: Allyn and Bacon, 1961.

Iffert, Robert. Retention and Withdrawal of College Students. United States Department of Health, Education, and Welfare, Office of Education, Bulletin 1958, Number 1. Washington: Government Printing Office, 1958.

Johnson, J. B. "Predicting Success in College at Time of Entrance." School and Society, XXIII (1926), 82-88.

Kerr, Fred L. "Studies on the Freshman Class at the University of Arkansas." College and University, XXXIV (Winter, 1959), 186-199.

Keys, Noel. "The Value of Group Test I.Q.'s for Predicting of Progress Beyond High School." Journal of Educational Psychology, XXXI (February, 1940), 81-93.

Lynch, Donald Fryman. "An Analysis of Dropouts in Selected Public Junior Colleges of Florida." (Unpublished Doctor's Dissertation, 1960). Dissertation Abstracts, XX, 3156-3157.

Matson, Jane E. "Characteristics of Students Who Withdrew from a Public Junior College." (Unpublished Doctor's Dissertation, 1955). Dissertation Abstracts, XV, 1787-1788.

McNeeley, John H. College Student Mortality. United States Department of Interior, Office of Education, Bulletin, 1937, Number 11. Washington: Government Printing Office, 1937.

Meehl, Paul E. Clinical Versus Statistical Prediction: A Theoretical Analysis and a Review of the Evidence. Minneapolis: University of Minnesota Press, 1954.

Pattishall, E. G. and Banghart, F. W. "A Comparative Analysis of School of Education Graduates and Withdrawals." Educational Research Bulletin, University of Virginia, (April, 1957).

Rand Corporation. A Million Random Digits. Glencoe, Illinois: Free Press, 1955.

Reiss, Albert J. Occupations and Social Status. New York: Free Press of Glencoe, 1961.

Reymolds, James W. "Responsibility for Dropouts." Junior College Journal, XXI (February, 1951), 323-4.

Scannell, Dale P. "Prediction of College Success from Elementary and Secondary School Performance." Journal of Educational Psychology, LI (June, 1960), 130-34.

Schenz, Robert F. "What Is Done for Low Ability Students." Junior College Journal, XXXIV (May, 1964), 22.

Schmitz, Sylester B. "Predicting Success in College: A Study of Various Criteria." Journal of Educational Psychology, XXVIII (September, 1937), 645-75.

Seashore, Harold. "Tests as Aids to Administration and Counseling in Junior Colleges." Junior College Journal, XXVI (November, 1955), 507.

Segal, David and Proffitt, Maris M. Some Factors in the Adjustment of College Students. United States Department of Interior, Office of Education, Bulletin 1937, Number 12. Washington: Government Printing Office, 1938.

Siegel, Sidney. Non-parametric Statistics for the Behavior Sciences. New York: McGraw-Hill, 1956.

Smith, George B. "Who Would be Eliminated? A Study of Selective Admission to College." Kansas Studies in Education, VII, Number 1. Lawrence, Kansas: University of Kansas Publication, 1956.

Sturgis, Horace W. "Trends and Problems in College Admissions." College and University, XXVIII (October, 1953), 5-16.

Summerskill, John. "Dropouts from College." The American College. Chapter 19. Ed. Nevitt Sanford. New York: John Wiley and Sons, 1963.

Thornton, James W., Jr. The Community Junior College. New York: McGraw-Hill, 1959.

Travers, Robert M. "Significant Research on the Prediction of Academic Success." The Measurement of Student Adjustment and Achievement. Ann Arbor, Michigan: University of Michigan Press, 1949.

Vick, Mary Catharine and Hornaday, John A. "Predicting Grade Point Average at a Small Southern College." Educational and Psychological Measurement, XXII (1962), 795-99.

A P P E N D I X A

FORM 49

SENIOR HIGH SCHOOL - JOPLIN, MISSOURI

CERTIFICATE OF HIGH SCHOOL CREDITS - OFFICIAL WHEN SCHOOL SEAL IS SHOWN

Male _____ Female _____

This is to Certify that _____ (LAST) _____ (FIRST) _____ (MIDDLE)

Date of Birth _____ (MONTH) _____ (DAY) _____ (YEAR)

Address _____ (STREET AND NUMBER) _____ (CITY) _____ (STATE)

Birthplace _____ Religious preference _____

Parent or Guardian _____ (FIRST) _____ (MIDDLE) _____ (LAST)

Entered from _____ (SCHOOL OR CITY) and Attended Joplin Senior H. S. from _____ (MONTH) _____ (DAY) TO _____ (WITHDRAWAL DATE)

Ranked _____ in Class of _____ _____ (CURRICULUM)

Grade Point Average _____

Re-entry Date _____ (MONTH) _____ (DAY) _____ (YEAR)

_____ (SIGNATURE OF SCHOOL OFFICIAL)

Was Graduated _____ (MONTH) (DAY) (YEAR)

Date of this Certificate _____ (MONTH) _____ (DAY) _____ (YEAR)

MARKING CODE: E—Excellent (96-100) S—Superior (90-95) M—Average (80-89) I—Inferior (70-79) F—Failure (69 & Below) Class Periods—60 minutes

JOPLIN SENIOR HIGH SCHOOL IS ACCREDITED BY THE STATE OF MISSOURI AND THE NORTH CENTRAL ASSOCIATION OF COLLEGES AND SECONDARY SCHOOLS

	1 SEM.	2 SEM.	UNITS	DATE COMP.		1 SEM.	2 SEM.	UNITS	DATE COMP.		1 SEM.	2 SEM.	UNITS	DATE COMP.		1 SEM.	2 SEM.	UNITS	DATE COMP.
LANGUAGE ARTS I					FUNCTIONAL MATH I					CLOTHING I (9TH GRADE)					BAND 9TH				
LANGUAGE ARTS II					FUNCTIONAL MATH II					CLOTHING II					BAND 10TH				
LANGUAGE ARTS III					ALGEBRA I					CLOTHING III					BAND 11TH				
LANGUAGE ARTS IV					GEOMETRY					FOODS I (9TH GRADE)					BAND 12TH				
					ALGEBRA II					FOODS II					ORCHESTRA 9TH				
JOURNALISM					TRIGONOMETRY					FOODS III					ORCHESTRA 10TH				
SPEECH (9TH GRADE)					MATH ANALYSIS										ORCHESTRA 11TH				
SPEECH FUNDAMENTALS										DRIVER EDUCATION					ORCHESTRA 12TH				
DEBATE					GENERAL SCIENCE					COOP. DISTRIBUTIVE ED. I					GLEE CLUB 9TH				
RADIO & TELEVISION					PHYSICAL SCIENCE					COOP. DISTRIBUTIVE ED. II					GLEE CLUB 10TH				
DRAMATICS					GENERAL BIOLOGY					GENERAL SHOP					GLEE CLUB 11TH				
					CHEMISTRY					GENERAL DRAFTING					GLEE CLUB 12TH				
FRENCH I					PHYSICS					SHOP DRAWING					MIXED CHORUS 9TH				
FRENCH II					ART I (9TH GRADE)					SHOP MATHEMATICS					MIXED CHORUS 10TH				
SPANISH I					ART II					AUTO MECHANICS I					MIXED CHORUS 11TH				
SPANISH II					ART III					AUTO MECHANICS II					MIXED CHORUS 12TH				
SPANISH III					ART IV					AUTO MECHANICS III					R.O.T.C. 10TH				
LATIN I					CRAFTS					CABINET I					R.O.T.C. 11TH				
LATIN II					MUSIC FUNDAMENTALS					CABINET II					R.O.T.C. 12TH				
LATIN III					THEORY & HARMONY					CABINET III					GYM 9TH				
LATIN IV					BUSINESS MATHEMATICS					MACHINE SHOP I					GYM 10TH				
					BASIC BUSINESS PRACTICE					MACHINE SHOP II					GYM 11TH				
CONTEMPORARY ISSUES					BOOKKEEPING I					MACHINE SHOP III					GYM 12TH				
H. S. GEOGRAPHY					BOOKKEEPING II					SHEET METAL I									
AMERICAN GOV'T					BUSINESS ENGLISH					SHEET METAL II									
CITIZENSHIP					BUSINESS LAW					SHEET METAL III					TOTAL UNITS OF CREDIT				
WORLD HISTORY					CLERICAL PRACTICE					WELDING I									
AMERICAN HISTORY					SECRETARIAL PRACTICE					WELDING II									
ECONOMICS					SHORTHAND I					WELDING III									
SOCIOLOGY					TYPING I					SUMMER SCHOOL AND OTHER COURSES									
					PERSONAL TYPING														

ATTENDANCE RECORD			
	1	2	TOTAL
9TH			
10TH			
11TH			
12TH			

HEALTH RECORD		
DISEASE		YEAR
MEASLES		
WHOOPING COUGH		
SMALL POX		
MUMPS		
CHICKEN POX		
TYPHOID		
IMMUNIZATION		YEAR
MANTOUX		
POLIO		
TETANUS		
SCARLET FEVER		
DIPTHERIA		
ANTI-TOXIN		
DICK		
SCHICK		
SMALLPOX		

SENIOR HIGH SCHOOL, JOPLIN, MISSOURI

EDUCATIONAL TEST DATA & SCORES

OTIS QS MA FM_____ DATE_____ SCORE_____ IQ_____

OHIO STATE UNIV. PSYCHO FM_____ SCORE_____ %ILE_____ DATE_____

CTMM FM_____ DATE_____ LANG IQ_____ ; NON-LANG IQ_____ ; TOTAL IQ_____

DAT FM_____ DATE_____ %ILES VERBAL_____ ; NUMER_____ ; ABST_____ ;

SPACE_____ ; MECH_____ ; CLER_____ ; SPELL_____ ; SENT_____ ;

V + N_____

RECORD OF TESTS

NAME OF STUDENT

GRADE	1-BACKGR SOC. STUD		2-BACKGR NAT. SCI.		3-CORR. OF EXPRESSION		4-QUANT. THINKING		5-READING SOC. STUD.		6-READING NAT. SCI.		7-READING LIT.		8-GEN'L VOCAB.		COMPOSITE 1 & 8		9-USE OF SOURCES	
	STD.	%ILE	STD.	%ILE	STD.	%ILE	STD.	%ILE	STD.	%ILE	STD.	%ILE	STD.	%ILE	STD.	%ILE	STD.	%ILE	STD.	%ILE

IOWA TESTS OF EDUCATIONAL DEVELOPMENT – SRA *PRESSCORE*

TRANSCRIPTS

REMARKS

ACTIVITIES

Jasper County Junior College

OFFICE OF REGISTRAR
JOPLIN, MISSOURI

(NAME OF STUDENT) (PARENT OR GUARDIAN)

(PERMANENT ADDRESS) (ADDRESS)

ENTRANCE CREDITS

ADMITTED TO DATE

CREDITS FROM GRAD.

ENGLISH		LATIN		GEN. BIOL.		AGRI.		SOCIOLOGY	
SPEECH		WORLD HIST.		GEN. SCI.		ART		ECONOMICS	
ALGEBRA		AM. HIST.		BOTANY		DRAWING		COM. LAW	
PL. GEOM.		AM. GOVT.		HYGIENE		MUSIC		COM. ARITH.	
SOL. GEOM.		CIVICS		CHEM.				BOOKKEEP.	
TRIG.				PHYSICS				STEN. & TYP.	
MATH.				GEO.				PH. ED.	
FRENCH								MILITARY	
SPANISH								DRIVER ED.	

RANK IN HIGH SCHOOL CLASS

BIRTH DATE:
BIRTH PLACE:

COLLEGE SUMMARY

SELECTIVE SERV. RANK

CLASS STANDING

CLASS STANDING

GRADUATED

DEGREE

JUNIOR COLLEGE CREDITS

COURSE	COURSE NO.	YEAR	FIRST SEMESTER: HOURS CREDIT	GRADE	GRADE POINTS		SECOND SEMESTER: HOURS CREDIT	GRADE	GRADE POINTS	

DEGREES AND CERTIFICATES

DATE OF GRADUATION

SCHOLARSHIP WARNINGS

OTIS I.Q. _____

NO. ENGLISH ____%ile

SCAT:
Verb _____%ile

Quant _____%ile

Total _____%ile

CREDITS SENT TO	DATE SENT

CHARACTERISTICS

Semester	Initiative	Promptness	Courtesy	Industry	Neatness	Dependability
1						
2						
3						
4						
5						
6						

HONORS

PARTICIPATION IN SCHOOL ACTIVITIES

PERSONAL RECORD

ENTERED COLLEGE

LEFT COLLEGE

RE-ENTERED COLLEGE

REMARKS:

HIGH SCHOOL — WHEN ATTENDED — DATE OF GRADUATION

Application For Admission

Jasper County Junior College

310 West 8th Street -:- MAyfair 4-8100
JOPLIN, MISSOURI 64801

Date _____

Name in Full (Please print) (Mr. (Miss (Mrs. _____

Present Address _____ Phone _____
(STREET ADDRESS) (CITY) (STATE)

How long have you lived at the above address? _____

Date of Birth _____
(MONTH) (DAY) (YEAR)

Place of Birth _____

Are you married? _____ Divorced? _____ Husband's or Wife's Name _____

Number of Children? _____ Present Home Address of Wife or Husband _____

Father's Name in Full: _____ Mother's Name in Full: _____
(MAIDEN NAME)

Address _____	Address _____
Living _____ Age in years _____	Living _____ Age in years _____
Place of Birth _____	Place of Birth _____
Occupation _____	Occupation _____
Business Address _____	Business Address _____
Graduate of High School? _____ College? _____	Graduate of High School? _____ College? _____

List names of brothers and sisters	Age	Present Address

(Use separate page, if necessary)

If parents are deceased, give name, address, relationship and occupation of your guardian: _____

Names of High Schools Attended	Location	Dates of Attendance	Graduated (Year)

Names of Colleges Attended	Location	Dates of Attendance	Degree or No. of Hrs.

Are you eligible to return? _____ Why are you transferring? _____

Check the curriculum you wish to enter:

Agriculture	Music
Arts and Science	Optometry
Business Administration	Pharmacy
General Business (secretarial)	Physical Education
Dental	Physical Therapy
Engineering	Social Work
Journalism	Elementary Education
Law	Electronic Technology
Medical	Mechanical Technology
Medical Technologist	Other

Have you decided your vocation definitely? _____ What is it? _____

If undecided, give preferences: (1) _____

(2) _____

Were you employed during your high school course? _____

Do you plan to work while attending Missouri Southern College? _____

Are you employed at present? _____ By whom? _____

How many hours per week? _____

Check your extra-curricular activities in high school, adding any not mentioned and indicating any office you held:

Athletics _____	Music: Vocal _____
Debate _____	Instrumental _____
Dramatics _____	School Annual _____
Honor Society _____	School Paper _____
	Social _____
	Other _____

What are your special hobbies? _____

Rate your general health (Very good, Good, Fair, Poor) _____

(Your hearing) _____ (Your Speech) _____ (Your eyesight) _____

A complete copy of all high school and/or college credits must be filed with the Registrar by two weeks before the semester begins.

Date _____ Please return this application sheet to:

Office of the Registrar
Jasper County Junior College
310 West 8th Street -:- MAyfair 4-8100
JOPLIN, MISSOURI 64801

Psychological Evaluations: (To be filled in by the College)

A P P E N D I X B

ADDITIONAL PREDICTION INSTRUMENTS

Pattern Number One

Sub-pattern Number 5. The fifth pattern considered was a combination of the three top ranked significant variables within the study. The high school grade point average, the School and College Ability Test, and the Iowa Tests of Educational Development were combined. The following distribution chart was constructed:

	Continued	Number of Zeroes	Withdrawal
K-S technique	26	3	32
	17	2	12
	25	1	7
	73	0	7
	141		58

The researcher posed the following statement: all students who have a score of three zeroes are considered potential dropouts. With what degree of accuracy could this statement be made? One hundred-fifteen "continued" students and thirty-two "withdrawal" students would be correctly classified. These figures constitute 72.77 per cent of the total population and 55.2 per cent withdrawals.

Sub-pattern Number 6. The high school curriculum, father's education, and college curriculum were included in the sixth pattern considered. These variables ranked high among those that were measured by only ordinal measurement. The following distribution chart was constructed:

	Continued	Number of Zeroes	Withdrawal
K-S technique	0	3	5
	31	2	28
	65	1	24
	40	0	3
	136		60

The researcher posed the following statement: all students who have a score of three zeroes are considered potential dropouts. With what degree of accuracy could this statement be made? One hundred-five "continued" students and thirty-three "withdrawal" students would be correctly classified. These figures constitute 70.41 per cent of the total population and 55 per cent withdrawals.

Sub-pattern Number 7. The high school grade point average and the School and College Ability Test were included in this pattern. The following distribution chart was constructed:

	Continued	Number of Zeroes	Withdrawal
K-S technique	32	2	35
	26	1	14
	83	0	12
	141		61

The researcher posed the following statement: all students who have a score of two zeroes are considered potential dropouts. With what degree of accuracy could this statement be made? One hundred-nine "continued" students and thirty-five "withdrawal" students would be correctly classified. These figures constitute 71.26 per cent of the total population and 57.4 per cent withdrawals.

Sub-pattern Number 8. The researcher included within pattern eight the high school curriculum and father's education. The following

distribution chart was constructed:

	Continued	Number of Zeroes	Withdrawal
K-S technique	27	2	30
	71	1	27
	40	0	3
	138		60

The researcher posed the following statement: all students who have a score of two zeroes are considered potential dropouts. With what degree of accuracy could this statement be made? One hundred-eleven "continued" students and thirty "withdrawal" students would be correctly classified. These figures constitute 71.21 per cent of the total population and 50 per cent withdrawals.

Sub-pattern Number 9. The researcher included within this group those variables considered in sub-patterns seven and eight. They were the high school grade point average, the School and College Ability Test, the high school curriculum, and father's education. The following distribution chart was constructed:

	Continued	Number of Zeroes	Withdrawal
K-S technique	10	4	20
	28	3	24
	24	2	11
	47	1	3
	32	0	3
	141		61

The researcher posed the following statement: all students who have a score of three or more zeroes are considered potential dropouts. With what degree of accuracy could this statement be made? One hundred-three "continued" students and forty-four "withdrawal" students would

be correctly classified. These figures constitute 72.77 per cent of the total population and 78.7 per cent of the withdrawals.

Sub-pattern Number 10. The researcher included within this pattern the variables one, two and six within the study. This allows a view of the top ranked variables measured by interval scale plus the top ranked variable measured by nominal data. The following distribution chart was constructed:

	Continued	Number of Zeroes	Withdrawal
K-S technique	10	3	20
	30	2	25
	35	1	20
	66	0	6
	141		61

The researcher posed the following statement: all students who have a score of two or more zeroes are considered potential dropouts. With what degree of accuracy could this statement be made? One hundred-one "continued" students and forty-five "withdrawal" students would be correctly classified. These figures constitute 72.28 per cent of the total population and 73.8 per cent of the withdrawals.

Pattern Number Two

Sub-pattern Number 5. The fifth sub-pattern considered was a combination of the top three ranked significant variables within the study. The School and College Ability Test, high school rank, and high school grade point average were combined. The following distribution chart was constructed:

	Continued	Scores	Withdrawal
	31	12	0
	10	11	1
	10	10	1
	19	9	7
	15	8	2
K-S technique	13	7	6
	17	6	9
	11	5	10
	4	4	10
	11	3	11
	141		57

The researcher posed the following statement: all students who have a score of seven or less are considered potential dropouts. With what degree of accuracy could this statement be made? Eighty-five "continued" students and forty-six "withdrawal" students would be correctly classified. These figures constitute 66.16 per cent of the total population and 80.7 per cent of the withdrawals.

Sub-pattern Number 6. The sixth sub-pattern considered was a combination of the high school curriculum, father's education, and college curriculum. The following distribution chart was constructed:

	Continued	Scores	Withdrawal
	10	11	0
	42	9	4
	2	8	0
	63	7	26
K-S technique	3	6	3
	21	5	23
	0	4	5
	141		61

The researcher posed the following statement: all students who have a score of six or less are considered potential dropouts. With what degree of accuracy could this statement be made? One hundred-

seventeen "continued" students and thirty-one "withdrawal" students would be accurately classified. These figures constitute 73.27 per cent of the total population and 49.2 per cent of the withdrawals.

Sub-pattern Number 7. The seventh sub-pattern considered was a combination of the top two ranked significant variables within the study. The School and College Ability Test and the high school rank were combined. The following distribution chart was constructed:

	Continued	Scores	Withdrawal
K-S technique	34	8	
	20	7	3
	27	6	7
	16	5	7
	22	4	12
	10	3	13
	12	2	16
	141		58

The researcher posed the following statement: all students who have a score of five or less are considered potential dropouts. With what degree of accuracy could this statement be made? Eighty-one "continued" students and forty-eight "withdrawal" students would be correctly classified. The figures constitute 64.92 per cent of the total population and 82.8 per cent of the withdrawals.

Sub-pattern Number 8. The eighth sub-pattern considered was a combination of the high school curriculum, and the father's education. The following distribution chart was constructed:

	Continued	Scores	Withdrawal
K-S technique	40	7	3
	74	5	28
	27	3	30
	141		61

The researcher posed the following statement: all students who have a score of three are considered potential dropouts. With what degree of accuracy could this statement be made? One hundred-fourteen "continued" students and thirty "withdrawal" students would be correctly classified. These figures constitute 71.29 per cent of the total population and 49.2 per cent of the withdrawals.

Sub-pattern Number 9. The ninth sub-pattern considered was a combination of the School and College Ability Test, the high school rank, the high school curriculum, and the father's education. The following distribution chart was constructed:

	Continued	Scores	Withdrawal
K-S technique	18	15	
	7	14	1
	17	13	1
	17	12	1
	26	11	3
	7	10	4
	17	9	9
	12	8	11
	13	7	12
	2	6	6
	5	5	10
	141		58

The researcher posed the following statement: all students who have a score of ten or less are considered potential dropouts. With what degree of accuracy could this statement be made? Eighty-five

"continued" students and fifty-two "withdrawal" students would be correctly classified. These figures constitute 68.84 per cent of the total population and 89.6 per cent of the withdrawals.

Sub-pattern Number 10. The tenth sub-pattern considered was a combination of the School and College Ability Test, the high school rank, and the high school curriculum. The following distribution chart was constructed:

	Continued	Scores	Withdrawal
	25	11	
	7	10	1
	16	9	1
	19	8	3
	23	7	6
K-S technique	10	6	6
	19	5	12
	9	4	13
	13	3	16
	141		58

The researcher posed the following statement: all students who have a score of six or less are considered potential dropouts. With what degree of accuracy could this statement be made? Ninty "continued" students and forty-seven "withdrawal" students would be correctly classified. These figures constitute 68.84 per cent of the total population and 81.0 per cent of the withdrawals.

VITA

Floyd Edmond Belk

Candidate for the Degree of

Doctor of Education

Thesis: THE CONSTRUCTION OF A SIMPLE INSTRUMENT TO PREDICT JUNIOR COLLEGE FRESHMEN ATTRITION

Major Field: Educational Administration

Biographical:

Personal Data: Born at Joplin, Missouri, April 17, 1925, the son of Floyd and Leho Z. Belk.

Education: Attended grade school in Joplin, Missouri; graduated from Joplin High School in 1943; attended Joplin Junior College from 1946 through 1948; received the Bachelor of Science degree from Kansas State Teachers College, Pittsburg, Kansas, with a major in Physical Education, in June, 1950; received the Master of Science degree from Kansas State Teachers College, Pittsburg, Kansas, with a major in Educational Administration, in June, 1951; completed requirements for the Doctor of Education degree from Oklahoma State University in July, 1966.

Professional Experience: Served in the United States Army from 1943 through 1946; appointed classroom teacher of American Government and football coach at Joplin High School, Joplin, Missouri, in 1951; served in this capacity until 1962; appointed to central office staff, Joplin Public Schools, as Director of Physical Education, in 1962; appointed graduate assistant at Oklahoma State University, September, 1965.