A COMPARISON OF SELECTED ACADEMIC AND
PERSONAL CHARACTERISTICS OF REGULARLY
ENROLLED AND COMMUNITY-JUNIOR COLLEGE
TRANSFER STUDENTS AT
MICHIGAN STATE UNIVERSITY

Thesis for the Degree of Ed. D.
MICHIGAN STATE UNIVERSITY
Francis Joseph Hennessy
1960

This is to certify that the

thesis entitled

A COMPARISON OF SELECTED ACADEMIC AND PERSONAL CHARACTERISTICS
OF REGULARLY ENROLLED AND COMMUNITY-JUNIOR COLLEGE
TRANSFER STUDENTS AT MICHIGAN STATE UNIVERSITY

presented by

Francis Joseph Hennessy

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of the requirements for

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Walter F. Johnson
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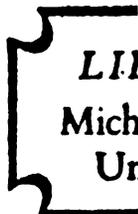
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A COMPARISON OF SELECTED ACADEMIC AND PERSONAL CHARACTERISTICS

OF REGULARLY ENROLLED AND COMMUNITY-JUNIOR COLLEGE

TRANSFER STUDENTS AT MICHIGAN STATE UNIVERSITY

By

Francis Joseph Hennessy

AN ABSTRACT

Submitted to the School for Advanced Graduate Studies of
Michigan State University of Agriculture and
Applied Science in partial fulfillment of
the requirements for the degree of

DOCTOR OF EDUCATION

Department of Administrative and Educational Services

1960

APPROVED *Walter F. Johnson*

Francis J. Hennessy   ·   Abstract

This study is concerned with a comparison between community-junior college transfer students and regularly enrolled students at Michigan State University. The primary objective of the study was to determine how these two groups of students compare with regard to selected academic and personal characteristics. In addition, the study investigated the predictive efficiency of selected educational variables for community-junior college transfer students.

The samples consisted of 173 community-junior college transfer students and 173 regularly enrolled students. Each group included 137 males and 36 females. The two groups had earned a comparable number of credits prior to the Fall term, 1958 and were enrolled for classes at the beginning of the Fall term 1958.

Data relative to the selected academic and personal variables were secured from permanent records in the Office of the Registrar, Michigan State University. The differences between the two groups were tested by application of Fisher's "t" test or chi-square technique as appropriate. The predictive value of the selected variables which either singly or in combination maximize predictive efficiency were tested by application of appropriate correlation techniques.

It was discovered that these two groups of students were quite similar in many respects but significantly different with regard to some of the variables. Community-junior college transfer students achieved grade-point-averages which were slightly lower than those achieved by the regularly enrolled students. Female community-junior college transfer students experience severe "grade-point-losses" during their first term at Michigan State University. A significantly greater number of

Francis J. Hennessy   Abstract

community-junior college transfer students than non-transfer students
fail to maintain passing (2.0) grade-point-averages. This is also true
for those enrolled in the College of Business and Public Service. A
significantly greater number of the community-junior college transfer
students than non-transfer students were married and/or veterans. A
significant difference was also found between the two groups with re-
spect to the occupational status of the fathers. The fathers of non-
transfer students generally possessed higher status positions than those
of the community-junior college transfer group. The best single pre-
dictor of academic success at Michigan State University for community-
junior college transfer students was found to be grade-point-average
earned previously at the community-junior college. None of the other
variables tested proved useful for predictive purposes.

The results of this study led to the conclusion that these two
groups of students were quite similar in many respects. However, there
would seem to be cause for reviewing orientation procedures as applied
to community-junior college transfer students. It would also seem
appropriate for the various Colleges at Michigan State University to
review their policies with regard to the advisement of the community-
junior college transfer student. It was further concluded that a com-
prehensive study of drop-outs should be made in the near future.

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Francis Joseph Hennessy

Candidate for the degree of

Doctor of Education

Final Examination: May 11, 1960, Room 427, College of Education

Dissertation: A Comparison of Selected Academic and Personal Charac-
teristics of Regularly Enrolled and Community-Junior
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CHAPTER I

INTRODUCTION

The community-junior college transfer student is fast becoming a proportionally larger segment of the new student population at Michigan State University. The future holds promise that ultimately a majority of new students in any given year will come from the community-junior colleges of Michigan.(36) At the present time these students are actually a small minority of the entering groups. This fact may in part explain the lack of any systematic institutional studies of this group of students and of their progress. However, they have not been totally neglected since the Office of Community-Junior College Cooperation and the Office of Evaluation Services have undertaken several analyses of the Michigan community-junior college transfer student. The exact nature of the studies undertaken by these offices will be reviewed in Chapter II.

There is general agreement among University officials that, in fact, very little is known about the community-junior college transfer student. For example, it has not been systematically determined at Michigan State University whether or not he differs in any significant way from his non-transfer counterpart even though differences might be expected between two such groups. The fact remains that if wide differences do separate these two groups there would be need to revise thinking with regard to present practices in admissions, orientation,

testing and counseling. These and other student personnel practices are expected to focus on the needs of the student body. However, the university must know the student in order to provide adequate and appropriate services to meet his particular needs. In this regard it would seem that several questions require answers. Who is the community-junior college transfer student? What are his distinguishing characteristics? How do these characteristics affect his university work? Specifically, what is the influence of certain educational and personal background factors on his university achievement? Finally, is there a need to develop new emphasis in student personnel practices as they relate to the community-junior college transfer student?

The literature as reviewed in Chapter II indicates the presence on the national scene of certain trends regarding these questions. It remains for this study to focus on these trends at Michigan State University and to investigate in greater detail certain selected variables that might be expected to influence the progress of community-junior college transfer students at this institution. For example, with one exception the studies reported in the literature did not investigate the possible influence of sex differences and/or other background factors.

The following general hypothesis are introduced in order to focus attention on the major objectives of this study. They were formulated with reference to the findings of studies of a similar nature accomplished outside the state of Michigan.

Statement of the Problem

The hypotheses The major hypotheses to be tested in this investigation are as follows:

HO: The community-junior college transfer student is different from his non-transfer counterpart in respect to a number of educational and personal characteristics.

HO: Previous grades from community-junior college are the most efficient forecasters of the achievement of community-junior college transfer student after they transfer to the university.

The Purpose of the Study It is the purpose of this study to provide a description of the community-junior college transfer student and to compare him with his non-transfer counterpart and in the process point out differences and similarities between the groups. The study will also endeavor to measure the degree of relationship between certain educational variables and the academic success of the community-junior college transfer student.

More, specifically, this study seeks to determine the differences between the two groups with respect to:

1. first term G.P.A.s

2. second term G.P.A.s

3. third term cumulative G.P.A.s

4. G.P.A.s for the first two years of college work

5. social studies G.P.A.s

6. natural science G.P.A.s

7. high school class rank

8. occupational level of the fathers

In order to develop a more complete description of the community-junior college transfer student, and compare him with the non-transfer student, the study further seeks to determine the ratio of:

1. success or failure within and between the two groups as a whole.

2. success or failure within and between the two groups by curricula.

3. veteran to non-veteran within and between the two groups.

4. married students to non-married students within and between the two groups.

5. drop-outs to non-drop-outs within and between the two groups.

The following data also contributes to the description and comparison.

1. The average number of term hours carried by the two groups each term.

2. Term hours earned previous to Fall term, 1958.

3. Total college credits earned up to and including spring term, 1959.

4. Age

In considering the advisability of academic load adjustment for community-junior college transfer students, the following analysis was undertaken: The effect of decreased course load from Fall to Winter terms on the academic performance of community-junior college transfer students.

In addition, this study seeks to determine the relationships between:

1. The college qualification test derived scores of the C.J.C. transfer students and their first term G.P.A.s at Michigan State University.

2. The college qualification test derived scores of the C.J.C. transfer students and their cumulative G.P.A.s at Michigan State University for three terms.[1]

3. The reading test derived scores of the C.J.C. transfer students and their cumulative G.P.A.s at Michigan State University for three terms.

4. The English test derived scores of the C.J.C. transfer students and their cumulative G.P.A.s at Michigan State University for three terms.

5. The high school class rank of the C.J.C. transfer students and their cumulative G.P.A.s at Michigan State University for three terms.

6. C.J.C. G.P.A.s and Michigan State University G.P.A.s.

7. Transfer students first term Michigan State University G.P.A.s and their third term cumulative G.P.A.s.

8. Test scores, high school class rank, C.J.C. social studies G.P.A., C.J.C. cumulative G.P.A. and social studies G.P.A. at Michigan State University.

9. Test scores, high school class rank, C.J.C. cumulative G.P.A., C.J.C. natural science G.P.A. and natural science G.P.A. at Michigan State University.

The non-transfer group will be analyzed in somewhat similar fashion with the following exceptions:

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[1]Throughout this study the three terms referred to are: Fall term, 1958; Winter term, 1959; Spring term, 1959.

a. The test data will differ as explained on p. 8 of this chapter.

b. Since community-junior college G.P.A.s are non existent for non-transfer students, their basic college G.P.A.s will be used.

Importance of the Problem

At the present time community-junior college transfer students are admitted to the University providing that they can present an acceptable community-junior college transcript. The criteria for admission include:

1. a minimum 2.0 grade point average.

2. an acceptable community-junior college course pattern to fit the curriculum to be followed.

3. Community-junior college courses certified for college credit. Terminal courses are not usually acceptable.

On the other hand, selection of students entering from high school is done in view of many factors which focus on the estimated capacity of a particular applicant to succeed in the academic program. This practice reflects institutional consideration for the applicant and works to reduce the rate of attrition. How adequate are the criteria for community-junior college transfer students, as compared with those for non-transfers in assisting the personnel worker in working with the transfer student?

There is a dearth of research in the literature which specifically analyzes the factors for the prediction of academic success of the community-junior college transfer student. A few such studies are reported

in Chapter II. A very small amount of general information regarding the differences and similarities between the community-junior college transfer and the non-transfer is available. No controlled studies have been undertaken which compare community-junior college transfers with a comparable group of regularly enrolled students. Thus this investigation was undertaken to ascertain the differences and similarities between two such groups, to investigate the predictive efficiency of selected educational variables and to indicate the need for the extension of orientation, testing and counseling programs to augment and facilitate the early adjustment of the community-junior college transfer student at Michigan State University.

Limitations of the Study

1. The study is limited to Michigan State University students. Thus the findings are more applicable to this institution than any other. Therefore the results should not be generalized beyond the boundaries of this institution and it would seem desirable to obtain similar findings from other institutions since it is not known whether or not significant differences exist between those who transfer to Michigan State University and those who transfer to other four year institutions.

2. The study is not directly concerned with the mechanics of admissions and does not attempt to evaluate or make recommendations in this area.

3. The study concerns itself only with Michigan community-junior college transfer students who accumulated at least 75 term hours of

community-junior college credits. It does not refer to those students who transferred with less than 75 hours.

4. Comparisons between the transfer students and the non-transfer students are limited insofar as aptitude, reading and English test scores are concerned because:

a. The orientation test battery was changed in the Fall of 1958, giving the transfer students an entirely different set of test scores.[1] The non-transfer group was tested in the Fall of 1956.

b. The non-transfer group was on the average three years younger at the time of testing in 1956 than the transfer group at the time of their testing in 1958.

c. The transfer group had the benefit of added educational experience and maturity before being tested. Therefore, test scores cannot be considered comparable in anything other than very general terms.

d. Community-junior college transfer students derived test scores are based on freshman norms.

5. It must be assumed that the information contained in the students' records is accurate.

6. The possibilities of errors inherent in the random selective process enters into the results obtained relative to the non-transfer sample.

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[1]The 1956 orientation test battery consisted of the ACE Psychological examination, a reading test and an English usage test. The 1958 orientation test battery consisted of the College Qualification test and new reading and English usage tests.

7. The follow-up of the two groups was limited to the first three years of college work.

8. No attempt was made to determine what happened to those who dropped out.

9. Certain data did not yield large enough N's to be useful for study and were not reported.

Definition of Terms

The Michigan Community-Junior College transfer student. For the purposes of this study, the student shall have attended one of thirteen community-junior colleges in Michigan and shall have accumulated 75 term hours of transferrable credit at that institution. They enrolled at Michigan State University in the Fall of 1958. They will be referred to in this study as C.J.C. transfer students.

The Non-transfer student. Students who enrolled at Michigan State University directly following their graduation from high school in 1956 and were still enrolled in the Fall of 1958.

College Qualification Test. A commonly used general academic aptitude test for college freshmen. The test gives verbal, numerical, information[1] and total scores. It is a measure of general college ability administered to transfer students in 1958.

The test of English Usage, 1958. It is designed to test the students capabilities in basic English skills. It is a measure of proficiency in grammar and expression administered to transfer students in

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[1]Includes social studies and natural science.

1958. This is a different form of the test administered to non-transfer students in 1956.

The Michigan State University Reading Test, 1958. furnishes a score in reading comprehension. It is a measure of general reading ability.

The American Council on Education Psychological Examination is a commonly used general academic aptitude test for college freshmen. The test gives measures of quantitive and linguistic abilities and a total score which is the sum of Q and L. It is a measure of general college ability which has given way to other tests in recent years, particularly the College Qualification Test mentioned earlier. It was administered to non-transfers in 1956.

The Michigan State University Reading Test, 1956. The test furnishes three scores: Vocabulary, comprehension and total score. It is a measure of general reading ability administered to non-transfers in 1956.

Derived Scores. Each of the tests mentioned above are reported in terms of derived scores. Derived scores are based upon a standard ten point scale ranging from 1 (the lowest) to 10 (the highest). The scale reduces the percent of students in the extremes and increases the percent in the middle of the scale. Under this system extreme scores become much more significant in indicating superior and inferior ability. The derived score distributions for tests, Fall 1956 and Fall 1958, as established by the Michigan State University Board of Examiners, were utilized in this study. These are not decile scores.

High School Rank. A derived score distribution was devised for high school ranks in order to provide standard score units to facilitate

analysis. The rank in class was divided by the number in the class giving a per cent. The table for proportions of area under the normal curve of distribution gave the number of observations per derived score unit. Fifteen derived score units represent high school rank from 1 (the lowest) to 15 (the highest). (Example: A student who ranked 1 in a class of 64 would be seen as .015 per cent. The derived score unit for this percentage in this distribution would be 13. At the same time a student who ranked 5 in a class of 328 would also be seen as .015 per cent. The derived score unit in this case would also be 13.)

Grade Point Average. The abbreviation G.P.A. refers to a sum calculated by dividing the number of honor points by the number of semester hours. The marking systems included in this study all utilize the point system ranging from 0.00 to 4.00. Thus honor points are calculated by multiplying the number value for the grade by the number of term hours granted for the specific course. The total honor points for all courses taken divided by the total term hours for all courses taken yields the G.P.A.

Cumulative Grade Point Average. Throughout this study the term Cumulative G.P.A. will refer to the average based on term hours and honor points earned during Fall, Winter and Spring terms, 1958-59.

Social Studies Grade Point Average. All grades in the list of courses shown in Appendix B were recorded from the students' records and a grade point average determined as explained above.[1]

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[1]Grade point averages were computed when the students' records indicated 6 or more term hours in the subject.

<u>Natural</u> <u>Science</u> <u>Grade</u> <u>Point</u> <u>Average</u>. All grades in the list of courses shown in appendix B were recorded from the students' records and a G.P.A. determined as explained above.

The Plan of the Dissertation

Chapter I   Introduction to the Problem, The Purpose of the Study, Importance of the Problem, Limitations of the Study, Definition of terms.

Chapter II   Review of the Literature on Academic characteristics of the C.J.C. transfer student and Studies of Prediction in Education Appropriate to this study.

Chapter III   Methods and Procedures

Chapter IV   Analysis of the Data on the Differences between the Groups

Chapter V   Analysis of the Data on the Relationship between Selected Variables and Academic Performance

Chapter VI   Summary, Conclusions and Suggestions for Further Research

CHAPTER II

REVIEW OF THE LITERATURE

The major purposes of this investigation are:

(1) to investigate the differences[1] and similarities between

C.J.C. transfer students and non-transfer students at Michigan State

University.

(2) to investigate the predictive efficiency of selected educa-

tional variables for C.J.C. transfer students at Michigan State

University.

The literature which has been reviewed was selected for its

pertinence to the particular aspects of this study as stated above. It

is the purpose of this review to bring together the important studies

which have appeared within the past 30 years concerned with the follow-

ing:

(1) the academic and personal characteristics of the junior

college transfer student.

(2) the prediction of academic success in four year colleges

for junior college transfer students.

The literature reviewed in this chapter might seem to cover the

subject of this study rather thoroughly. However, close examination

reveals several inadequacies in the research which has been completed to

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[1]primarily academic differences

date. First, comparisons of junior college transfer students and regularly enrolled students have not been accomplished by matching comparable groups of junior college transfer students and regularly enrolled students. Secondly, sex differences and other background factors have not been taken into account in the several analyses reported on in this chapter. Third, and most important for consideration, is the fact that the results of the studies reported here are mainly applicable to the institutions in which they were undertaken.

<div align="center">

The Academic Characteristics of the

Junior College Transfer Student

</div>

The Achievement Record of the Community-Junior College Transfer Student as Compared with that of Other Students.

Reeves (41:95), reporting on factors affecting scholarship in the transferred groups at the University of Chicago (1933), concluded that junior college transfer students made lower G.P.A.s after transfer than were made by the respective control students who had had all their work at the University. However, the difference was not statistically significant. He reported further that students transferring from junior colleges made the best records among the transferring groups. From his study it would seem that junior college transfer students achieve nearly as well as their non-transfer counterparts.

A prominent claim made by junior colleges is that they can offer two years of work acceptable to colleges and universities. Perhaps the best way to substantiate this claim would be to determine whether or not the junior college graduate has received a training which will qualify

him to pursue advanced college work in a four year degree-granting
insitution with a degree of proficiency equal to students who have re-
ceived their first two years of college training in standard four year
colleges and universities. Over the years since the study by Reeves
(41), several of our larger State Universities have conducted studies
which shed some light on the situation.

The University Examiner, University of Illinois (26:303) con-
ducted a study of the scholarship records for the junior and senior
years in the University of Illinois of those students who entered the
University with junior standing (60-72 semester hours) during a four
year period. The conclusions of this study indicate that the trans-
ferring group from junior colleges excelled the other groups from dif-
ferent types of institutions. The University Examiner goes on to state
that:

> From the facts presented in this report it may be said
> that without doubt junior college graduates are able to pursue
> advanced college courses in the junior and senior years at the
> University of Illinois with a degree of proficiency equal to and
> in some cases superior to that of students who have received
> their first two years of training in standard colleges and
> universities.

Although the University of Illinois findings are dated 1934, it
is significant to note that the findings are in close agreement with
other studies of a similar character which have been made since that time
in other universities where junior college graduates are received in
substantial numbers. Martorana (37:415), in a study of 251 transfer
students at the State College of Washington, concluded that:

> ....when students are considered in groups, there is no
> significant difference between the academic success of the students
> who come from the junior colleges and that achieved by students
> who begin as freshmen in the institution.

Of special note is the fact that in the subject areas of engineering and physical sciences, the transfer students, as a group, outdid their non-transfer counterparts.

The Office of Educational Research and Service at the Florida State University had been studying students who transfer from Florida Junior Colleges to the Florida State University. (2,3,21) Three studies have been completed, each covering a two year span of time. Each of the studies has given positive evidence that the junior college transfer student who transferred after completion of the junior college course of study (60 semester hours) did essentially the same quality of work in the University as did the native student.

The Office of Evaluation Services at Michigan State University reports several significant findings in their study of the transfer student there. (53) This study revealed that junior college transfer students are doing about as well as students who entered as freshmen. However, higher ability students seem less numerous among these junior college groups at Michigan State University. The junior college transfer students at Michigan State University generally rank in the upper half of their junior college class with a smaller than expected number ranking near the top. It is further reported that junior level transfers in Engineering had higher G.P.A.s than all Michigan State University Engineering juniors, but junior level transfers in Business and Public Service, Science and Arts, and Education are lower on these G.P.A. measures.

All of these findings seem to indicate that the junior college transfer student has kept pace with his non-transfer counterpart over

the years in many different institutions in many widely separated locations.

The Failure and Drop-out Record of the Junior College Transfer Student as Compared with Other Students.

Reeves (41:93) found a relatively higher failure rate among transferred students and attributed it in part to the differances in grading standards at the University of Chicago (and at the various other institutions attended). It was reported that most of the withdrawals took place relatively soon after matriculation and that a higher percentage of withdrawals come from the transfer group. Grossman (26:301) reported that a larger percentage of the entrants from junior colleges were placed on probation for low scholarship than other students at the University of Illinois. The number of students who dropped from school was also reported higher from the junior college transfer group. In the study conducted by Martorana (37:413) at the State College of Washington, the drop-out rate for junior college transfers was 34.7 per cent as compared with 23.9 per cent of the non-transfers. According to Martorana,

> The evidence, though not conclusive, shows that the percentages of drop-outs due to low scholarship were less among transfers than among non-transfers. Lower financial ability on the part of transfer students to meet the cost of education away from home may be a partial explanation.

The University Achievement Record of the Junior College Transfer Student as Compared with his Junior College Record.

The Office of Educational Research and Service, Florida State University (3:7) states that:

It seems safe to conclude that the student who transferred
to Florida State University were among the more able academically
of all the students in the respective junior colleges from which
they transferred.

It is reported further that transfers with 60 or more semester hours

of junior college credit did essentially the same quality of work in

the University as they did in junior college before transfer.

The Office of Evaluation Services, Michigan State University

(53:1) states that in the case of the C.J.C. transfer student:

College records rather than high school records must now
be evaluated. Where entrance test scores were previously a
convenient supplement to the school record, the test score for
transfer students with collegiate experience is less meaningful.
The evaluation of transcripts from previous colleges becomes a
particularly difficult and sensitive issue.

Other studies (38,40,46,50) reviewed point to the fact that

the quality of work done in junior college compares favorably with

that done subsequently in the University although G.P.A.s are some-

what lower in the University than they were in junior college. This

factor may be partially accounted for in terms of observations made at

Florida State University (2:2).

During their first semester of enrollment in the Florida
State University, junior college transfer students quite frequently
suffer substantial 'G.P.A. shocks'. There is good reason to
believe, however, that after the first semester of enrollment
these students rapidly recover from these G.P.A. losses and go
on to do University work comparable in quality to the junior
college work they did before transfer.

The Academic Abilities of the Junior College Transfer Student, As

Measured by Aptitude and Achievement Tests.

In a study by Kirk (34), a comparison was made of junior college

transfer students and students from other sources of origin on the

College Qualification test. In comparing the transfer students with

freshmen, Kirk found that both men and women score higher than do

entering freshmen students in total scores. It was also indicated that

junior transfers score about one half a standard deviation better than

freshmen and sophmore transfer students.

Seashore (44) compared junior college freshmen students classi-

fied as transfers with freshmen in senior colleges and universities on

the College qualification test. He found that the median score for

junior college transfer freshmen is near the 25th percentile for

senior college freshmen.

These findings are further indication that the better students

matriculate to the universities from junior colleges as suggested in

the Florida State University study. (21:4)

At Michigan State University, the Office of Evaluation Services

reports: (53:7)

It appears that transfer students entering Michigan State
University at more advanced levels receive progressively higher
median scores on the orientation tests. This is particularly
evident for the more verbal tests.

They state further that this may be a result of extended college

experience or the intrusion of a selective process which tends to elimi-

nate larger proportions of students at the lower ability levels. At

Florida State University (3:4-5), the junior college transfer students

equalled at the time of transfer the test norms for freshmen entering

four year colleges and exceeded norms of freshmen entering junior colleges.

Curriculum Choices of the Junior College Transfer Student.

The most popular schools selected by junior college transfer

students entering Florida State University seem to be Education, Science

and Arts, and Business. At the State College of Washington, the

choices seem to favor Engineering, Science and Arts, and Business.
These appear to be customary choices although the order may change in
some institutions as at Michigan State University (53) where prefer-
ence is highest for Business, Science and Arts, and Engineering in that
order. These are also the most popular choices of non-transfer fresh-
men.

Personal and background factors

Medsker (38:41) has summarized the literature dealing with per-
sonal background factors as they relate to junior college students. He
reports that:

Public junior colleges, being primarily local and inexpensive
to attend, draw heavily from the lower half of the socio-economic dis-
tribution, as shown by various studies......

An analysis of data procurred from six public junior colleges
reported the occupations of the parents of almost five thousand stu-
dents enrolled over a period of three years. Only one fourth of the
group came from the higher level in an arbitrary high-low classifica-
tion. The largest group of students (almost a third) came from a skilled
labor background. Only a tenth came from families in the professional
category.

An index of marital status is also available from this same
group of six public junior colleges. Of more than eight thousand
students enrolled in the six colleges, 23 per cent were married.

In 75 two year colleges studied by Medsker, the ratio of men to
women was three to one. A ratio of two men to one woman in junior
colleges was found in the study of college entrants in Minnesota. (13)

The Prediction of Academic Success

in Four Year Colleges

General Review of Prediction Studies in Education.

In order to provide perspective for viewing the prediction stu-
dies related to junior college transfer students, it would seem
appropriate to review some of the studies which have been made in gen-
eral in the field of education. A complete review is not necessary
since several authors (6,16,24) have summarized these studies making
such a procedure unnecessary.

The reliability of teacher grades. Grades or G.P.A.s are the
principal criteria of academic success used in this study. The ques-
tion is, how reliable are teacher grades? Bohan (5) points out that
it is practically impossible to make comparisons from teacher to
teacher. Williamson (55) found that there has been a failure to ad-
just grades to changes in aptitude or ability level of students in the
Arts College of the University of Minnesota. Generally speaking,
according to Johnson (32:23):

> The chief factors which tend to reduce the reliability of
> academic grades revolve, first of all, around the subjective elements
> contained within the instructors' estimation of performance or
> achievement, and secondly, the student's actual performance.

With respect to the first factor, Feder (20:108) states that:

> Most college instruction proceeds upon the tacit assumption
> that all students are equal in ability, approximately equally con-
> ditioned by past experiences, and therefore equally able to profit
> from the learning opportunities offered in higher education.

With respect to the second factor, Borow (6) points out that an impor-
tant part of scholastic performance can be accounted for by aspects of
student behavior which are not associated with intellectual aptitude for

college work. He has defined and described six adjustment categories which affect academic achievement: curricular adjustment; maturity of goals and level of aspiration; personal efficiency; planning and use of time; study skills and practices; mental health; personal relations (with faculty and associates). The conclusion, then, is that the same criticism that is leveled at other prediction studies which employ teacher grades as the criterion of academic success may be leveled at the present study.

Scholastic aptitude test scores as predictors of academic success in college. Johnson (32:21), reporting in 1950, indicates:

It may be said that the findings regarding the efficiency of intelligence of scholastic aptitude tests as predictors of college scholarship vary with such factors as the curricula in which the students are enrolled, the particular tests being studied, and the nature of the population groups being studied.

It can be further stated that conclusions reached by authors reviewing the literature periodically with respect to the efficiency of tests of this type for prediction of scholastic success were in close agreement (median correlation coefficients of approximately .44--.45).

High school rank as a predictor of scholastic success in college. High school rank is a widely used predictive device. Froehlich (23) reports an r of .62 between G.P.A. and high school rank. Borow (6) found that rank standing in the graduating class has yielded about (.55), a slightly higher correlation than individual tests. Garrett (24) concludes that high school rank yields a high correlation (.49) when compared with G.P.A. in college. Johnson (32) states that:

There seems to be rather consistent agreement that high school record or rank, in spite of factors of size of the school, pattern of courses, and variations in marking practices, is of considerable value for predicting subsequent scholastic achievement and still remains the best single index for prediction of academic success in college.

Combination of factors for general scholastic prediction. Most

investigators are in agreement that prediction should not be a matter of

selecting any single measure but rather of multiple-correlation or re-

gression line techniques. It is possible to determine by these methods,

combinations of factors that will prove most efficient for predictive

purposes. Johnston (33) reports that by use of a combination of

college aptitude test scores and high school rank it is possible to fix

a threshold which will select out students who are not likely to succeed

in college work.

The foregoing review indicates that the individual items con-

sidered in the prediction of success in college have value, and that

combined, their value becomes more pronounced. However, it is impor-

tant to recognize that their efficiency, either singly or in combination,

still falls far short of the ideal.

The studies referred to above were directly concerned with

predicting college success for those students enrolling immediately

upon completion of their high school course of study. Following is a

review of studies relating to the junior college transfer student.

Prediction studies directly related to junior college transfer students.

Aptitude and Achievement test scores as predictors. Rodes

(43:22) reports that the University of California is constantly re-

fining its method of admission to the junior year in Engineering. In

1949, a battery of tests lasting one full day was required of all appli-

cants for admission to upper division courses in Engineering. These

tests attempted to measure achievement in five subject fields---English,

Mathematics, Physics, Chemistry, and Engineering Drawing. Prediction

studies for transfer students admitted to the junior year in Engineering during 1947, revealed a correlation coefficient of .63 between the total scores on these tests and subsequent grades in Engineering courses.

In a recent study at Florida State University (21) total scores on the Florida State-Wide Twelfth Grade Testing Program (F.S.T.G.T.P.) battery of tests were correlated with grades earned at junior college and at Florida State University. The scores were as follows: F.S.T.G.T.P. scores and junior college G.P.A.s, .3188; F.S.T.G.T.P. scores and University G.P.A.s, .1092. The F.S.T.G.T.P. Scores seem useful in helping to predict achievement in junior college work but are much less useful as long range indicators for predicting the quality of work expected from the student after he transfers to the University.

Seashore (44:76) reports correlations between College Qualification Test -- total scores and first semester junior college transfer students' G.P.A.s ranging from .26 to .60. The Psychological corporation reports the total score has greater predictive efficiency of first semester college grades than any of the sub scores. Kirk (34:220) reported correlations between College Qualification Test -- total score and first term G.P.A.s for junior college transfer students at the University of California ranging from .31 to .44.

High school and Junior College grade point averages as Predictors. It is almost an axion that the best index of a student's probable record in college is a record which he has previously made in college. Reeves (41:121), utilizing grades of junior college transfer students from high school records and from previous college records to predict

University of Chicago G.P.A., obtained a coefficient of multiple corre-
lation of .685. He indicates that if the high school records and
previous college records are known, individual University of Chicago
records could be predicted with an accuracy such that 50 per cent of the
predicted G.P.A.s would be within approximately half a grade point.
Similarly, Siemens (46:27) indicates that the best factors for pre-
dicting success after transfer were found to be the G.P.A. in all lower
division work and G.P.A. of the first semester work after transfer. It
is further stated that through the use of prediction equations it was
found possible to forecast upper division academic success for trans-
fers such that the predicted G.P.A. would not vary on the average from
the actual G.P.A. by more than about .25 of a grade point unit. Rodes
(43:126) found that the correlation between grades in lower division
Engineering courses and subsequent grades in upper division courses for
junior college transfers was .64. He combined previous grades and the
total score of the junior status engineering test[1] to obtain a co-
efficient of multiple correlation of .702.

The coefficient of correlation between junior college G.P.A.s
and University G.P.A.s (.47) reported at Florida State University (21:5)
would seem to indicate that junior college grades are probably the best
measure for predicting success, all other factors considered.

Summary

Since the emergence of the junior colleges in American Education

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[1]See page 23.

periodic studies have been made to ascertain whether the junior colleges are adequately preparing students for further study in higher institutions. The general conclusions of these studies has been that junior colleges have been successful in this regard. Almost invariably, the group of junior college transfers considered has been found to do at least as well academically in the latter years at a higher institution as do students in the same fields who have spent all four years at the same insitution.

The literature reviewed on the preceding pages tends to support this fact. Junior college transfer students seem to achieve slightly below the level of the non-transfer students but not to any significant degree. The research indicates that junior college transfer students did essentially the same quality of work in the universities as did the non-transfer students. However, most studies on the subject reveal higher failure and drop-out rates for junior college transfer students than for non-transfers.

Among other significant findings in the research is the fact that junior college transfer students go on to do University work comparable in quality to the junior college work they did before transfer.

The research concerning the academic abilities of the junior college transfer student indicates that the better students matriculate to the universities from junior colleges. The best comparisons that can be made between test scores of junior college transfer students and non-transfer students indicates that only small differences exist in favor of the non-transfer group.

The most popular curriculum choices among junior college trans-

fer students appear to be Business, Science and Arts, Engineering and Education. (Not necessarily in that order.)

The literature seems to assign limited value to aptitude and achievement tests as predictors of academic success for junior college transfer students after they have transferred to the University. According to the literature, a coefficient of multiple correlation utilizing high school record and junior college record and certain test scores seems to offer the best predictive indices. Junior college record was regarded in all studies as the best single predictor of the achievement of the junior college transfer student after transfer.

CHAPTER III

METHODS AND PROCEDURES

This study involves two groups of students: (1) the community-
junior college transfer students and (2) the control group consisting
of non-transfer students. This chapter describes the procedures used
for selecting the samples, collecting and organizing the data, and
techniques for analysis.

The Samples

The total on-campus Michigan State University population for
the Fall term, 1958, included 19,516 students. There were 13,139 men
and 6.377 women. The junior class consisted of 3,663 students. Data
are not available on the total number of transfer students. However,
334 students enrolled from Michigan Community-Junior colleges. The
C.J.C. transfer sample was drawn from this group. The non-transfer sam-
ple was drawn from the group of 3,663 juniors. The criteria used in
selecting the sample are set forth below.

The Community-junior college transfer student sample. The Regis-
trar's list of new students for the Fall term, 1958 provided the C.J.C.
transfer student sample. This list was coded to indicate "transfer"
and "non-transfer" and number of hours transferred. C.J.C. transfer
students were selected from this list providing that they had transferred
75 or more term hours. The 1958 group was the largest group of C.J.C.

transfer students to enter in a given year. A total of 173 students met the 75 hour requirement, including 137 male and 36 femal students.

The control sample. The control group involved sampling the non-transfer population since it would hardly seem feasible to utilize the entire population. The criteria for selection included:

(1) admission to the University for the Fall term, 1956.

(2) being enrolled in a University program for the Fall term, 1958.

(3) no transfer credits from other institutions of higher learning.

(4) the same sex ratio as the community-junior college transfer group.[1]

The Registrar's alphabetical list of students enrolled for the Fall term, 1958, was utilized in selecting the control sample. This list provided the names of all students in school for the Fall term, 1958. Student numbers identified those who had originally entered the University for the Fall term, 1956. The list was coded to enable elimination of those with transfer credits. Separate lists for male and female students were constructed from the total listing of students enrolled for the Fall term, 1958. The samples were randomly selected utilizing random numbers to allow each individual on the composite lists an equal opportunity to enter the sample.

A total of 173 students was selected, including 137 male and 36 female students. The control sample was selected in this manner and in

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[1]Community-junior college sex ratio favors the male to a greater degree than the native ratio.

accord with the above listed criteria in order to make it comparable to the C.J.C. transfer student sample, first in terms of total college experience and secondly, in terms of sex differences that are known to exist. An unequal sex ratio between groups would seriously distort any comparisons and greatly affect measures of differences. For example, as reported in the literature, grade point averages and test scores are likely to be significantly higher fod female students. It should also be pointed out that the statistical analysis will not utilize the entire samples since drop-outs give incomplete data in some cases.

Procedures Used in Collecting and Tabulating the Data

Sources for collection of the data. Permission was granted by the Registrar for the use of records needed in gathering the data, providing the information was to be handled in a confidential manner. Two sources were required for gathering the information pertinent to this study.

(1) the permanent record cards on file in the main records office.[1]

(2) the record folder containing the application blank and previous school records on file in the records vault.

Method used in tabulating. A work sheet was developed for transferring data from the records. Each individual work sheet was identified by student number. Data for each student were recorded on these

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[1]The permanent record cards are the source of the official transcript of grades

individual work sheets. Each item on the work sheet was then coded[1] and transferred to an IBM master tabulating form. The data for each individual were then key punched on IBM cards. All items were checked to insure accurate recording of data on the work sheets and all tabulations were verified by machine by two different key punch operators. A visual spot check was also made.

The specific information and its source. The permanent record cards provided the following information:

1. test scores (derived)
2. hours carried each term
3. grade point averages by term and cumulatively
4. Michigan State University social studies grades
5. Michigan State University natural science grades
6. military status
7. curriculum
8. drop-out
9. number of transfer credits

The record folders and the application blank, in particular, provided the following information:

1. age
2. marital status
3. father's occupation
4. high school rank

Previous school and college records provided the following information:

1. community-junior college G.P.A.s
2. community-junior college grades in social studies
3. community-junior college grades in natural science
4. identification of the community-junior college of origin

Classification of fathers' occupation and University curriculum. It was necessary to classify certain data for analysis.

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[2]Appendix A

Father's occupation: The classification used here was adapted from the Edwards Occupational Index. (4:172) Certain modifications were made to render the instrument more sensitive to differences, particularly in the upper portion of the index. However, the number of classifications was reduced in the statistical analysis because of the nature of the tabulations. The application blank asks for a statement of father's occupation. However, several students indicated no knowledge of father's occupation or did not clearly define the position. These and others who indicated "retired" or "deceased" were placed in a separate class. The classification can be found in Appendix G.

Michigan State University Curriculum. Assignments were made to major college programs only. In general the classification follows college boundaries with a breakdown for Science and Arts into Linguistic and Scientific-Computational. A further breakdown is provided for Science and Arts, Home Economics and Agriculture students working for teaching certificates.[1] The classification can be found in Appendix C. Facsimiles of data sheets and IBM cards are included in the Appendix A. Coding procedures can also be found in Appendix A.

Techniques of Analysis

Those variables given as continuous data are analyzed by use of the "t" test. Variables given as non-continuous data are analyzed by use of chi-square.

Comparison of the two groups by "t" test. The primary objective

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[1]Certain of these classifications were combined for statistical analysis because of the nature of the tabulations.
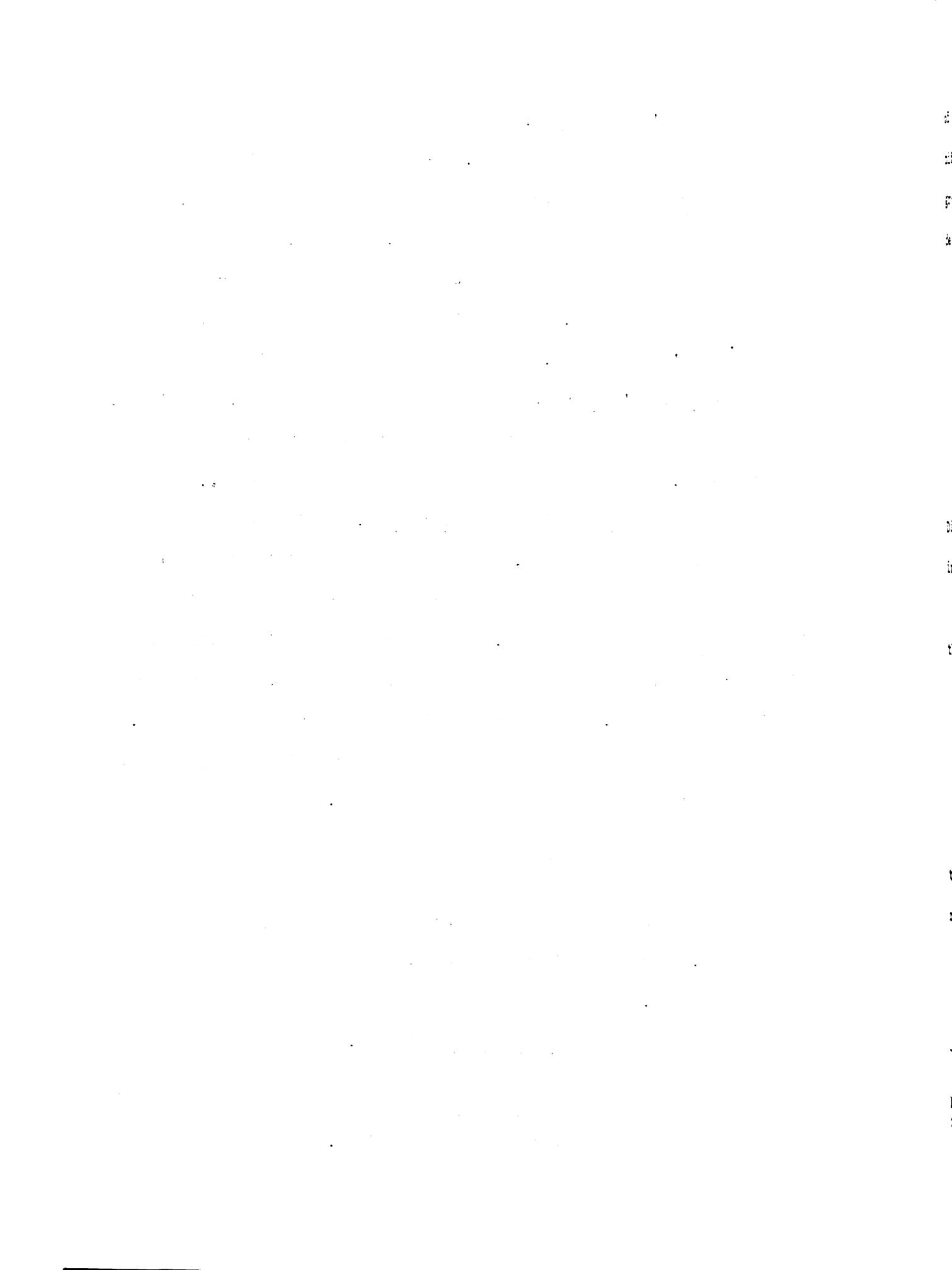
of this study is to determine whether or not the two groups differ significantly with respect to any of the educational variables and background information. The C.J.C. transfer students and non-transfer students were compared by "t" test on the following variables:

1. grade point averages
   a. Fall
   b. Winter
   c. Spring
   d. Cumulative
2. high school ranks
3. G.P.A.s previous to Fall term, 1958[1]
4. Michigan State University social studies G.P.A.s
5. Michigan State University natural science G.P.A.s

The ratio of differences between the two groups by chi-square.

Differences between the two groups with respect to certain background information were obtained by the application of chi-square.

Transfers and non-transfer students were compared relative to the following information:

1. success or failure[2]
2. success or failure according to curriculum
3. drop-out
4. veteran--non-veteran
5. married--single
6. father's occupation

The same chi-square technique was applied to comparisons within the groups themselves. This part of the analysis is a study of the relationships between:

1. number of credit hours transferred and academic success
2. decrease in course load from Fall to Winter terms and academic success Winter term.

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[1]Community junior college grade point average for transfers. Michigan State University grade point average for first two years for non-transfers

[2]Success: 2.0 G.P.A. or better. Failure: Less than 2.0 G.P.A.

<u>Analysis</u> <u>of</u> <u>the</u> <u>Relationship</u> between <u>certain</u> <u>educational</u>

<u>variables</u> <u>and</u> <u>academic</u> <u>performance</u>. The study is also concerned with

the relationship between certain background factors in the college and

university life of the C.J.C. transfer student and his academic success

at Michigan State University. The following variables have been analy-

zed by use of Pearson's Product-Moment Correlation technique.[1]

1. the orientation test battery scores with Michigan State University G.P.A.s
2. high school rank with Michigan State University G.P.A.
3. community-junior college G.P.A. with Michigan State University G.P.A.
4. Michigan State University G.P.A. for the first two years of college of the control group[2] with cumulative Michigan State University G.P.A.
5. Michigan State University first, second and third term G.P.A.s with cumulative Michigan State University G.P.A. for the 1958-59 school year.
6. Community-junior college social studies and natural science G.P.A.s with Michigan State University social studies and natural science G.P.A.s for males only.

All results will be presented in tabular form in Chapter V. Levels of

confidence were derived from tables by Wallace and Snedecor.[3]

<u>Analysis</u> <u>of</u> <u>variables</u> <u>in</u> <u>combination</u>. It seemed advisable to also

analyze the predictive value of certain of these variables in combina-

tion. The calculation of the multiple correlation coefficient was

accomplished through the application of the Doolittle Technique.[4] This

technique asks what regression weights best predict the criterion from

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[1]Michigan State University intergral computer operated by the Michigan State University computer laboratory was employed.

[2]Averages prior to Fall term, 1958.

[3]See Guilford (27:538-9).

the other variables combined and what the correlation of those predic-
tions with obtained criterian values would be. The unknowns are the
Beta coefficients and there are as many equations as unknowns. The
problem in this study involves the following five variables:

x_2 Michigan State University Reading test--total score
x_3 A.C.E. or C.Q.T.--total score
x_4 high school rank
x_5 previous G.P.A.
x_1 cumulative G.P.A.

These variables were selected for study because they appeared to be
the most significant factors in this study and are also reported as
such in the literature. The statistics are presented in tabular form
in Chapter V.

Summary

1. The population consists of two groups of students:
1) the C.J.C. transfer student and 2) the non-transfer student

   a) the C.J.C. transfer student sample consists of all those
who enrolled at Michigan State University for the Fall term, 1958, and
were at the same time granted 75 or more term hours of transfer credit.

   b) the non-transfer student sample was selected at random from
the Registrar's alphabetical list of students enrolled for the Fall term,
1958. Only those who originally enrolled for the Fall term, 1956 were
included. Thus, the two groups have been engaged in a college program
over a comparable period of time.

   c) Each sample included 137 males and 36 females. Normal sex
differences in connection with educational variables dictated separate
analysis by sex.

2. Data were gathered from the permanent record cards and the records folders in the office of the Registrar.

3. All of the data were key punched on IBM cards and prepared for machine analysis.

4. The following points concern the statistical procedures employed in this study.

a) Basic statistical tabulations were made by use of IBM equipment.

b) "t" tests were used to test the differences between the groups on these same variables.

c) The ratio of differences between the two groups and within the groups relative to specific background information were analyzed by application of chi-square.

d) The zero order correlations were computed to measure the degree of relationship between a number of educational variables[1] and overall academic success. Zero-order ocrrelations were also computed to measure the degree of relationship between the educational variables and academic success in social studies and natural science. Means and variances were computed for all of the variables. Appropriate tables were consulted to determine significance of r. The standard error of r was derived from the appropriate formula.

e) Further statistical analysis involves computation of multiple correlation coefficients, beta weights and the multiple regression equation for predicting individual G.P.A.s

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[1]test scores, high school rank, community-junior college Fall, Winter, Spring and Cumulative G.P.A.s, social studies G.P.A.s, natural science G.P.A.s, Basic College G.P.A.s.

CHAPTER IV

ANALYSIS OF THE DATA ON THE

DIFFERENCES BETWEEN THE GROUPS

It has been hypothesized in Chapter I (p.3) that the C.J.C. transfer student is different from his non-transfer counterpart in respect to a number of educational and personal characteristics. This chapter is concerned with the analysis of the differences between the C.J.C. transfer student and the non-transfer student relative to certain educational variables and background factors.

The Differences Between the Groups

Fisher's "t" test

Fisher's "t" test was applied to determine whether or not the two groups differed significantly with regard to the following:

(1) G.P.A.s for Fall, Winter and Spring terms, 1958-59.

(2) cumulative G.P.A.s for the three terms under study.

(3) high school rank

(4) college G.P.A.s for work done prior to Fall term, 1958.

(5) Michigan State University social studies G.P.A.s

(For male only)

(6) Michigan State University natural science G.P.A.s.

(For male only)

Results of this analysis are summarized for the male and female

students, respectively, in Tables I-A and I-B.

TABLE I-A

Means, Standard Deviations and t Values on
Selected Variables for Male Students

	Transfer			Non-Transfer			t^1
	N	$\bar{X}$	σ	N	$\bar{X}$	σ	
M.S.U. Fall G.P.A.	123	2.38	.71	127	2.44	.71	1.78
M.S.U. Winter G.P.A.	123	2.54	.65	127	2.52	.65	-
M.S.U. Spring G.P.A.	123	2.51	.71	127	2.54	.66	-
M.S.U. Cumulative G.P.A.	123	2.48	.53	127	2.49	.50	-
High School Rank	123	7.58	2.67	127	8.15	2.32	1.81
College G.P.A. Prior to Fall, 1958	123	2.54	.44	127	2.53	.47	-
Social Studies G.P.A.	60	2.38	.69	50	2.37	.68	-
Natural Science G.P.A.	51	2.35	.75	551	2.18	.78	1.13

[1]Values less than 1 are not reported.

*5 per cent Level of Significance
** 1 per cent Level of Significance

Results of the "t" tests. Table I-A indicates that none of the "t" tests were significant for males, although some were of a borderline nature. The "t" test value of 1.78 between the Fall term G.P.A.s of the two groups borders on significance and may be interpreted as an indi-

None of the other "t" tests were found to be significant. However, the same trends which were found for the males appear to be operating in the case of the females.

The "t" tests would seem to infer the existance of certain similarities between the two groups. These results tend to support the findings of other studies reported in Chapter II which indicate that junior college transfer students achieve at approximately the same level as the non-transfer student. However, the significant difference between the Fall term G.P.A.s of the two female groups will require further comment in Chapter VI.

Chi-square Analysis

Chi-square technique was applied to determine whether or not the two groups differed significantly with regard to the following variables:

(1) The number of students who fell below a 2.0 G.P.A. for the three terms under study (All University).

(2) The number of students in the College of Business and Public Service who fell below a 2.0 G.P.A. for the three terms under study.

(3) The number of students in the College of Engineering who fell below a 2.0 G.P.A. for the three terms under study.

(4) The number of students in the College of Education who fell below a 2.0 G.P.A. for the three terms under study.

(5) The number of students in the College of Science and Arts who fell below a 2.0 G.P.A. for the three terms under study.

(6) The number of drop-outs.

(7) Military status

(8) Marital status

(9) Father's occupation

The tables that follow make it possible to present the actual frequency distributions of the students used in the study in each of the variables listed above.

Explanation of the chi-square tables. The chi-square tables were constructed as follows: For example, in Table II, the factors success-failure are listed in the first column one above the other, (above 2,0, below 2.0). The second column presents the actual or observed frequencies of the transfers. The third column is identical to the second except that these data are for the non-transfer group. The third column gives the total number of frequencies found in the sample.

Indication of significance levels. Chi-square totals bearing a double asterisk (**) indicate that the result is significant at or beyond the one per cent level of confidence. A single asterisk (*) indicates the five per cent level of confidence. Throughout the study only the 1 and 5 per cent levels of confidence were considered. Tables without asterisks present factors that cannot be considered significant for use in describing differences between the two groups. Levels of significancewere taken from Table III of Fisher's "Statistical Methods for Research Workers".[1]

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[1]See Guilford (27:540).

Results of the Chi-square Analysis

While all evidence points to difference in performance between male and female, the sexes were treated as a group in the chi-square analysis. Separate chi-square analysis was made to determine the influence of sex differences on the success-failure ratio of the two groups. These analyses indicated that sex differences had little bearing on the success-failure ratio of the two groups. It must also be remembered that there is an equal proportion of male to female in the samples. The frequency data for the above may be found in Appendix E.

It is also known that veterans and married students generally achieve higher than other students. Chi-square analysis indicated that there was little or no influence on the part of these variables in so far as the success-failure ratio is concerned for these groups. It is possible that with larger samples some differences might be found with respect to these variables. In view of these findings the following chi-square analyses treats male and female as a group and will not control marital or military status.

The ratio of success-failure in the university program between C.J.C. transfer students and non-transfer students. The chi-square total, presented in Table II, of 8.163 indicates that this factor was significant beyond the one per cent level of confidence. The data indicate that C.J.C. transfer students had a significantly higher incidence of failure than the non-transfer student. This fact would seem to contradict earlier findings of no significant differences in achievement between the two groups.

TABLE II

The Success-Failure Ratio Between C.J.C. Transfer
Students and Non-Transfer Students
Regardless of Curriculum or College

	Transfer	Non-Transfer	Totals
G.P.A. Above 2.0	129	150	279
G.P.A. Below 2.0	44	23	67
Totals	173	173	346

$$\chi^2 = 8.163**$$

The ratio of success-failure in the college of Business and Public Service between C.J.C. transfer students and non-transfer students. The chi-square total, presented in Table III, of 6.703 indicates this factor is significant beyond the one per cent level of confidence. The data indicate that C.J.C. transfer students have a significantly higher incidence of failure in the College of Business and Public Service than do the non-transfer students.

TABLE III

The Success-Failure Ratio Between C.J.C. Transfer
Students and Non-Transfer Students
in the College of Business and Public Service

	Transfer	Non-Transfer	Totals
G.P.A. Above 2.0	30	40	70
G.P.A. Below 2.0	18	6	24
Totals	48	46	94

$$\chi^2 = 6.703**$$

The ratio of success-failure in the College of Engineering

between C.J.C. transfer students and non-transfer students. The chi-

square total, presented in Table IV, of 1.621 indicates that this

value should not be used to describe difference between the two groups.

The data indicate a slightly greater incidence of failure in the College

of Engineering for the non-transfer group. Interpretation is limited

considerably because of the small sample involved.

TABLE IV

The Success-Failure Ratio Between C.J.C. Transfer
Students and Non-Transfer Students
in the College of Engineering

	Transfer	Non-Transfer	Totals
G.P.A. Above 2.0	25	13	38
G.P.A. Below 2.0	5	5	10
Totals	30	18	48

$$\chi^2 = 1.621^1$$

[1]Yates correction used in the computation of χ^2. (27)

The ratio of success-failure in the College of Education between

the C.J.C. transfer students and non-transfer students. The chi-square

total, presented in Table V, of 1983 indicates that this value should

not be used to describe difference between the two groups. The data

indicate a slightly greater incidence of failure in the College of Educa-

tion for the C.J.C. transfer student. Interpretation is again restricted

by the small sample.

TABLE V

The Success-Failure Ratio Between C.J.C. Transfer
Students and Non-Transfer Students
in the College of Education

	Transfer	Non-Transfer	Totals
G.P.A. Above 2.0	34	46	80
G.P.A. Below 2.0	6	2	8
Totals	40	48	88

$$X^2 = 1.983[1]$$

[1]Yates correction used in the computation of X^2. (27)

The ratio of success-failure in the College of Science and Arts between C.J.C. transfer students and non-transfer students. The chi-square total, presented in Table VI, of 3.120 indicates that this value should be interpreted with caution. The data indicate a somewhat higher incidence of failure in the College of Science and Arts for the C.J.C. transfer group.

TABLE VI

The Success-Failure Ratio Between C.J.C. Transfer
Students and Non-Transfer Students in
the College of Science and Arts

	Transfer	Non-Transfer	Totals
G.P.A. Above 2.0	40	45	85
G.P.A. Below 2.0	15	7	22
Totals	55	52	107

$$\chi^2 = 3.120$$

The ratio of drop-outs between C.J.C. transfer students and non-transfer students. The data in Table VII indicate that there is a slightly higher drop-out rate for C.J.C. transfer students than for non-transfer students. However, the chi-square total of 2.694 is not significant and the data should be interpreted accordingly.

TABLE VII

The Drop-out Ratio Between
C.J.C. Transfer Students and Non-Transfer Students

	Transfer	Non-Transfer	Totals
Drop-outs	32	21	53
Non-drop-outs	141	152	296
Totals	173	173	346

$$\chi^2 = 2.694$$

The ratio of married and single students between the C.J.C. transfer students and the non-transfer students. The chi-square total of 14.89 in Table VIII is significant beyond the one per cent level of confidence. The data indicate a much greater proportion of married students in the C.J.C. transfer group. In view of earlier findings (p.42), this difference, while requiring interpretation, does not greatly influence the other variables being studied. Further discussion of this factor will be included in Chapter VI.

TABLE VIII

The Married-Single Ratio Between C.J.C.
Transfer Students and the Non-Transfer Students

	Transfer	Non-Transfer	Totals
Married	29	7	36
Single	144	166	310
Totals	173	173	346

$$\chi^2 = 14.89**$$

The ratio of veteran and non-veteran students between the C.J.C. transfer students and non-transfer students. It was anticipated that the non-transfer group would have a greater ratio of veterans to non-veterans. However, the exact opposite seems to be true. The chi-square total of 15.04 in Table IX is significant beyond the one per cent level of confidence. The data indicate a much larger proportion of veterans in the C.J.C. transfer group. Further, this factor does not appear to influence the success-failure ratio. This factor will be

discussed further in Chapter VI.

TABLE IX

The Veteran-Non-Veteran Ratio Between
the C.J.C. Students and the Non-Transfer Students

	Transfer	Non-Transfer	Totals
Veteran	46	18	64
Non-Veteran	127	155	282
Totals	173	173	346

$$\chi^2 = 15.04**$$

The ratio of fathers in six different occupational classifications between the C.J.C. transfer students and the non-transfer students. The choice of a community-junior college for the first two years is often a matter of financial necessity. For this reason a difference would be expected between the socio-economic status of the two groups. The chi-square total in Table X of 32.85 is significant beyond the one per cent level of confidence. The data indicate a significantly higher occupational ranking for the fathers of the non-transfer students. The table is influenced in favor of the non-transfer group partly because of the 20-2 ratio in category VII (Unknown). However, there is reason to believe that these unknowns would not reduce the chi-square value by any significant degree, if known. Indications are that most would fall in categories III to VI. This would tend to increase the value of Chi-square.

TABLE X

The Ratio and Percent of Fathers in Six Different
Occupational Classifications Between the C.J.C.[1]
Transfer Students and the Non-Transfer Students[1]

		Transfer		Non-Transfer		Totals
		N	Per Cent	N	Per Cent	
I	Professional	21	12	52	30	73
II	Managerial & Farm	43	25	53	31	96
III	White Collar	22	13	17	10	39
IV	Skilled Labor	35	20	22	13	57
V	Semi-Skilled Labor	10	6	12	7	22
VI	Unskilled Labor	22	13	15	8	37
VII	Unknown	20	11	2	1	22
Totals		173	100	173	100	346

$$\chi^2 = 32.854**$$

In addition to the foregoing analysis, certain other data was deemed important to the study. Therefore, the following information is included to aid in the description of the population.

Age. The age of each student was computed as of October 1, 1958, utilizing the date of birth which was recorded on the application form.

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[1]Classifications I and II from the original data were combined for purposes of analysis since the "N" for classification I was quite small. The same procedure holds for classification III and IV from the original data.

The average age for the male C.J.C. transfer student was twenty-two years, two months. The average for the male non-transfer student was twenty years, seven months. The average age for the female C.J.C. transfer students was twenty years, three months. The average for the female non-transfer student was twenty years, one month. The data indicate a one year and five months difference between the males and a two month difference between the females.

Term hours carried. Table XI indicates the average number of term hours taken by term and total term hours earned for the three terms. The data indicate the two groups carried approximately the same number of term hours per term and earned the same number through the third term.

TABLE XI

The Average Number of
Term Hours Taken

	C.J.C. Transfers	Non-Transfers
Fall	15.7	15.3
Winter	15.3	15.1
Spring	15.6	15.9
Cumulative	44.4	44.9

Term hours earned previous to Fall term, 1958. The C.J.C. transfer student transferred an average of 93.9 term hours of credit from the community-junior college. The non-transfer student earned an average of 97.5 term hours of credit previous to the Fall term, 1958. The two

groups seem comparable with regard to college credits earned previous to Fall term, 1958.

Total college credits at the end of Spring term, 1959. The C.J.C. transfer student completed the third year with an average of 138.5 term hours to his credit. The non-transfer student completed the third year with an average of 142.7 term hours to his credit. The two groups seem to be comparable in this respect.

Summary

The differences between C.J.C. students and non-transfer students were tested and summarized. The testing of the differences involved the application of Fisher's "t" and chi-square techniques.

The "t" tests were computed on six variables with one set of computations for males and a separate set for females. The "t" tests between the means of Fall term G.P.A.s for females (2.32) was found to be significant at the 5 per cent level of confidence. No other differences were found to be significant by this method.

Further analysis of the differences between the groups was accomplished by application of the chi-square technique. Several of the chi-square ratios were found to be significant beyond the one per cent level of confidence. The differences revealed by this method are as follows:

(1) A significantly greater number of C.J.C. transfer students than non-transfer students fell below 2.0 G.P.A.s for the three terms under study.

(2) A significantly greater number of C.J.C. transfer students than non-transfer students in the College of Business and Public Service

fell below 2.0 G.P.A.s for the three terms under study.

(3) There is a significantly greater ratio of veterans in the C.J.C. transfer group than in the non-transfer group.

(4) There is a significantly greater ratio of married students in the C.J.C. transfer group than in the non-transfer group.

(5) The fathers of the non-transfers as a group have higher occupational status than the fathers of the C.J.C. transfer students.

Some of the chi-square ratios revealed differences which are not to be considered significant. The following differences are not significant:

(1) The number of C.J.C. transfer students who fell below 2.0 in the College of Engineering is not significantly different from the number of non-transfer students who fell below 2.0.

(2) The number of C.J.C. students who fell below 2.0 in the College of Education is not significantly different from the number of non-transfer students who fell below 2.0.

(3) The number of C.J.C. transfer students who fell below 2.0 in the College of Science and Arts is not significantly different from the number of non-transfer students who fell below 2.0.

(4) The number of C.J.C. transfer students who drop out of the University is not significantly different from the number of non-transfer students who drop out.

(5) Sex, marital status and military status do not appear to affect the success-failure ratios of the two groups.

The male C.J.C. transfer students are on the average one year and five months older than the male non-transfer students. The female students show a slight variation in age between the two groups.
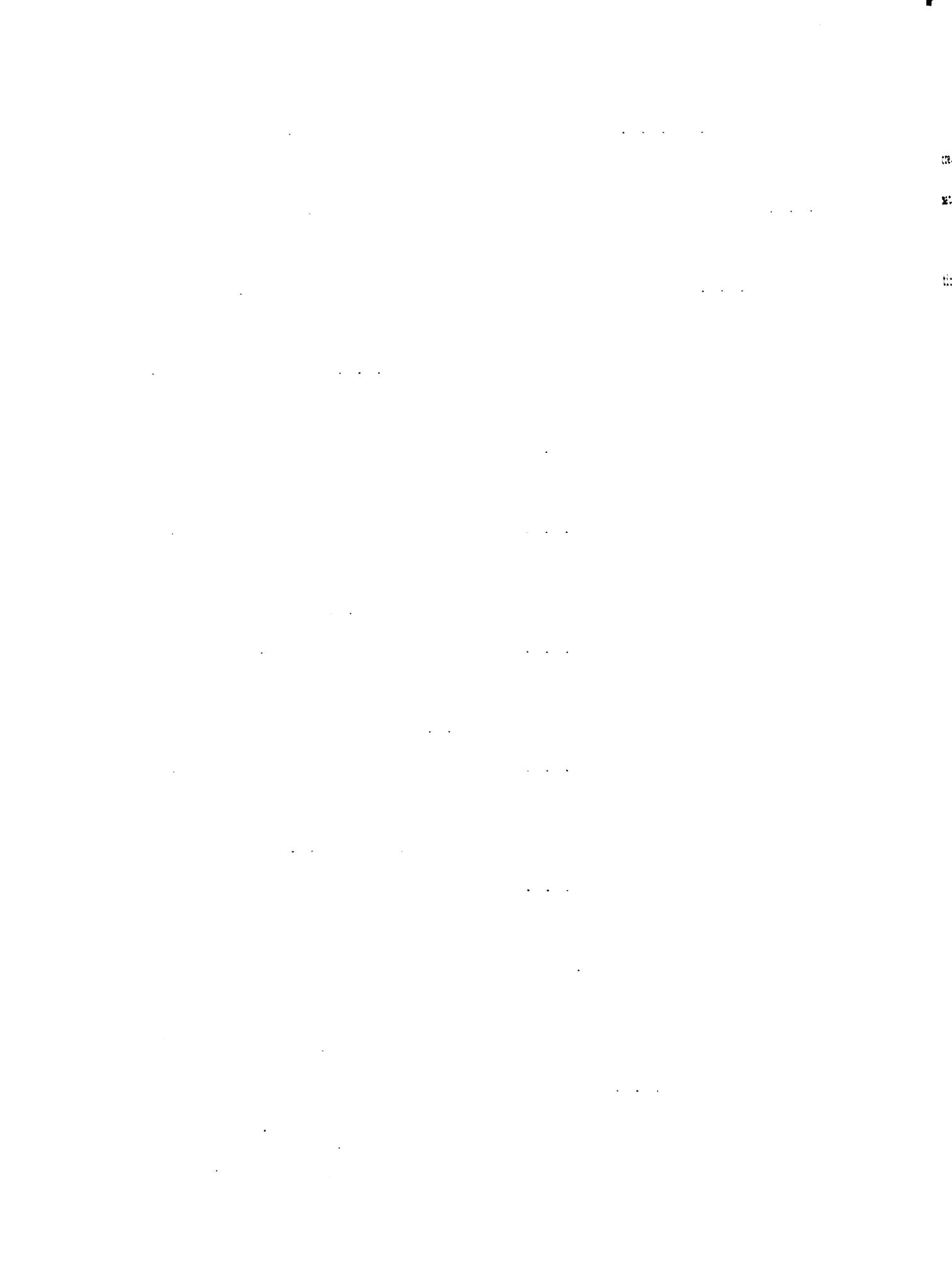
The two groups earned approximately the same number of term hour credits during the period under study and had also accumulated approximately the same number of term hour credits previous to Fall term, 1958.

Small differences are seen in the comparison of curriculum elections between the two groups.

CHAPTER V

ANALYSIS OF THE DATA ON THE RELATIONSHIP BETWEEN

SELECTED EDUCATIONAL VARIABLES AND ACADEMIC SUCCESS

The Procedure

The secondary objective of this study was to measure the
degree of relationship between selected educational variables and the
academic success of the C.J.C. transfer student.[1] The procedures
utilized here for determining the predictive value of the selected
variables which, either singly or in combination, maximize predictive
efficiency are:

(1) calculations of zero-order coefficients of correlation

(2) calculation of standard partial regression coefficients

    (Beta weights)

(3) calculation of the multiple correlation coefficient

(4) setting up of the multiple regression equation which

    predicts the G.P.A.

This chapter will present the results of these computations in
an effort to shed some light on the predictive value of certain
variables where C.J.C. transfer students are concerned.

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[1]Parallel study accomplished for non-transfer sample.

The Zero-order Correlation Coefficients for

Selected Variables Related to Academic Success for

All Courses Taken

The variables

As stated previously, the independent variables that were
considered in comparison with the Michigan State University cumulative
G.P.A. are:

   (1) derived scores on the college Qualification test--

       V score, I score, N score and Total score.[1]

   (2) derived scores on the American Council on Education

       Psychological Examination--Q score, L score and Total

       score.[2]

   (3) derived score on the Michigan State University Reading

       Test.[3]

   (4) derived score on the Michigan State University Test of

       English Usage.[4]

   (5) high school rank

   (6) previously acquired G.P.A.s[5]

   (7) Fall, Winter and Spring term G.P.A.s.

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[1] C.J.C. transfers only.

[2] Non-transfers only.

[3] Different form used for C.J.C. transfer students

[4] C.J.C. transfers only

[5] C.J.C. G.P.A. or Basic College G.P.A.

<u>The</u> <u>Zero-Order</u> <u>Correlation</u> <u>Coefficients.</u>

Means, standard deviations and zero-order correlation coefficients for all courses taken are presented in Tables XII-A, XII-B, XIII-A and XIII-B. Male and female were treated separately since differences in performance might be expected between the sexes, particularly with respect to test scores.

Before considering the findings, these correlations should be considered in light of other studies, reviewed in Chapter II, which have dealt with the relationship to college academic achievement of the variables being considered here. Care should be taken to remember that in this instance the dependent variable, cumulative G.P.A., is the average for the three terms of the junior year.

The significance of the correlation coefficients found in this study were determined from Snedecor's table, "Correlation Coefficients at the 5 per cent and 1 per cent Levels of Significance";[1] utilizing degrees of freedom as indicated by "N" in each table. Correlation coefficients followed by "a" are not considered significant at either 1 per cent level or the 5 per cent level. Correlation coefficients followed by "b" are significant at the 5 per cent level but not at the 1 per cent level. All others are significant at or beyond the one per cent level. The standard errors of the zero-order coefficients of correlation are listed in Appendix D.

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[1]See Guilford (27:538-9).

TABLE XII-A

MEANS, STANDARD DEVIATIONS AND ZERO-ORDER CORRELATION MATRIX FOR SAMPLE
OF 123 MALE COMMUNITY-JUNIOR COLLEGE TRANSFER STUDENTS

	$\bar{X}$	S.D.	1	2	3	4	5	6	7	8	9	10	11
1 English Test	5.17	1.64	-										
2 Reading Test	6.29	1.58	.55	-									
3 CQT-V	6.02	1.79	.56	.48	-								
4 CQT-I	6.33	1.33	.37	.51	.41	-							
5 CQT-N	6.35	2.05	.13[a]	.25	.00[a]	.43	-						
6 CQT-T	6.37	1.50	.50	.55	.71	.75	.62	-					
7 HSR	7.58	2.67	.33	.37	.25	.35	.32	.43	-				
8 C.J.C. G.P.A.	2.54	.44	.19[b]	.30	.20[a]	.27	.01[a]	.18[b]	.44	-			
9 Fall G.P.A.	2.38	.71	.31	.37	.30	.28	.17[a]	.35	.27	.49	-		
10 Winter G.P.A.	2.54	.65	.23	.36	.21[a]	.27	.28	.21[a]	.26	.38	.26	-	
11 Spring G.P.A.	2.51	.71	.14[a]	.24	.10[a]	.17[a]	.02[a]	.12[a]	.17[b]	.35	.52	.36	-
12 Cumulative G.P.A.	2.48	.53	.28	.39	.18[b]	.28	.16[a]	.26	.29	.53	.77	.63	.78

[a]Correlation coefficient is not significant at the 5 per cent level.
[b]Correlation coefficient is significant at the 5 per cent but not at the 1 per cent level.
All others are significant beyond the 1 per cent level.

TABLE XII-B

MEANS, STANDARD DEVIATIONS AND ZERO-ORDER CORRELATION MATRIX FOR SAMPLE OF 128 MALE NON-TRANSFER STUDENTS

Variables	X	S.D.	1	2	3	4	5	6	7	8	9	10	11
1 ACE-Q	5.74	1.64	-										
2 ACE-L	5.63	1.46	.49	-									
3 ACE-T	5.73	1.59	.77	.89	-								
4 Reading-V	5.43	1.69	.43	.70	.68	-							
5 Reading-C	5.70	1.57	.41	.63	.60	.67	-						
6 Reading-T	5.55	1.69	.46	.73	.72	.90	.87	-					
7 HSR	8.15	2.32	.28	.30	.35	.30	.41	.39	-				
8 MSU G.P.A. 1st 2 yrs.	2.53	.46	.33	.30	.40	.49	.42	.51	.56	-			
9 Fall G.P.A.	2.44	.71	.10[a]	.12[a]	.12[a]	.24	.24	.25	.23	.45	-		
10 Winter G.P.A.	2.52	.65	.17[a]	.19[b]	.18[b]	.25	.25	.30	.31	.39	.33	-	
11 Spring G.P.A.	2.54	.66	.20[b]	.21[b]	.24	.27	.25	.31	.29	.52	.50	.40	-
12 Cumulative G.P.A.	2.49	.50	.19[b]	.21[b]	.23	.32	.32	.37	.36	.61	.76	.70	.80

[a]Correlation coefficient is not significant at the 5 per cent level.
[b]Correlation coefficient is significant at the 5 per cent but not at the 1 per cent level.
All others are significant beyond the 1 per cent level.

The relationship between selected variables and academic success of male students.

Means, standard deviations and zero-order correlation coefficients based upon a sample of 123 male C.J.C. transfer students[1] who met all criteria previously specified (p.28), are shown in Table XII-A. Table XII-B is similar in all respects except that it is based on a sample of 128[2] male non-transfer students.

The zero-order correlation coefficients contained in Tables XII-A and XII-B include several relationships found to be significant beyond the 1 per cent level of confidence. However, with one notable exception, the relationships are relatively small. One relationship, that between cumulative G.P.A. and previous G.P.A. (.51, .61), can be considered as high. This result indicates that previous college record is a good indication of how a student will perform in subsequent college work.

Most of the correlations are low, being between .20-.40. These relationships are best described as low correlations with definite but small relationships. For example, the relationships between cumulative G.P.A. and high school rank (.29, .36) and between cumulative G.P.A. and derived test scores, ranging from .16 to .28 can be best described in this way. These findings indicate that high school rank and the derived test

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[1] 14 of the original sample of 137 were excluded because of incomplete data resulting from drop-out.

[2] 9 of the original sample of 137 were excluded because of incomplete data resulting from drop-out.

scores posses limited predictive value for this level of college

achievement. The findings are in general agreement with the results

of similar studies conducted by the Office of Evaluation Services at

Michigan State University concerning the long range predictive value of

these instruments (52).

The relationship between selected variables and academic success of

female students.

        Means, standard deviations and zero-order correlation coefficients

based upon a sample of 32 female C.J.C. transfer students who met all

criteria previously specified,[1] are shown in Table XIII-A. Table XIII-B

is similar in all respects except that it is based on a sample of 32[1]

female non-transfer students. Before considering this data further it

should be pointed out that the small sample size places limitation upon

interpretation.

        The zero-order correlation coefficients contained in Tables

XIII-A and XIII-B include several relationships found to be significant

beyond the 1 per cent level of confidence. However, the results are pre-

sented only to give some indication of trends since the N's of the

female samples are extremely small. The relationships in the case of the

C.J.C. transfer students are relatively high. On the other hand the

relationships in the case of the non-transfer students are small and

similar to the results obtained for the male samples. These findings

indicate that previous record is a good indication of how a student will

_____

        [1]Four individuals from each group (original samples 36) were
excluded because of incomplete data resulting from drop-out.

TABLE XIII-A

MEANS, STANDARD DEVIATIONS AND ZERO-ORDER CORRELATION MATRIX FOR SAMPLE
OF 32 FEMALE COMMUNITY-JUNIOR COLLEGE TRANSFER STUDENTS

Variables	$\bar{X}$	S.D.	1	2	3	4	5	6	7	8	9	10	11
1 English Test	6.25	1.89	-										
2 Reading Test	5.88	1.60	.62	-									
3 CQT-V-	5.75	1.52	.51	.59	-								
4 CQT-I	5.06	1.62	.47	.62	.63	-							
5 CQT-N	4.19	1.69	.57	.55	.43[b]	.47	-						
6 CQT-T	5.06	1.82	.62	.70	.88	.83	.69	-					
7 HSR	8.50	2.80	.56	.64	.65	.62	.58	.74	-				
8 C.J.C.G.P.A.	2.69	.46	.55	.62	.67	.59	.67	.81	.64	-			
9 Fall G.P.A.	2.18	.85	.33[a]	.53	.43[b]	.42[b]	.28[a]	.48	.44[b]	.51	-		
10 Winter G.P.A.	2.44	.60	.56	.51	.37[b]	.44[b]	.44[b]	.54	.56	.54	.52	-	
11 Spring G.P.A.	2.59	.63	.39[a]	.38[a]	.42[a]	.27[a]	.26[a]	.40[a]	.30[a]	.55	.34[a]	.44[b]	-
12 Cumulative G.P.A.	2.41	.55	.55	.60	.55	.46	.45	.62	.59	.72	.73	.82	.73

[a]Correlation coefficient is not significant at the 5 percent level.
[b]Correlation coefficient is significant at the 5 per cent level but not at the 1 per cent level.
All others are significant beyond the 1 per cent level.

TABLE XIII-B

MEANS, STANDARD DEVIATIONS AND ZERO-ORDER CORRELATION MATRIX FOR SAMPLE OF 32 FEMALE NON-TRANSFER STUDENTS

Variables	$\bar{X}$	S.D.	1	2	3	4	5	6	7	8	9	10	11
1 ACE-Q	5.22	1.58	–										
2 ACE-L	5.66	1.83	.52	–									
3 ACE-T	5.47	1.73	.78	.91	–								
4 Reading-V	5.72	1.26	.38[b]	.80	.72	–							
5 Reading-C	5.72	1.86	.28[a]	.62	.56	.60	–						
6 Reading-T	5.72	1.68	.33[a]	.78	.69	.85	.89	–					
7 HSR	9.13	2.04	.20[a]	.30[a]	.35[a]	.21[a]	.16[a]	.15[a]	–				
8 MSU G.P.A. 1st 2 yrs.	2.50	.43	.02[a]	.56	.42[b]	.51	.46	.51	.49	–			
9 Fall G.P.A.	2.63	.70	.02[a]	.27[a]	.13[a]	.37[b]	.20[a]	.28[a]	.12[a]	.49	–		
10 Winter G.P.A.	2.59	.48	.02	.11[a]	.05[a]	.06[a]	.05[a]	.07[a]	.39[b]	.49	.30[a]	–	
11 Spring G.P.A.	2.66	.54	.12[a]	.43[b]	.42[b]	.45	.40[b]	.46	.24[a]	.55	.48	.28[a]	–
12 Cumulative G.P.A.	2.61	.44	.02[a]	.31[a]	.23[a]	.36[b]	.25[a]	.32[b]	.19[a]	.65	.81	.67	.77	–

[a] Correlation coefficient is not significant at the 5 per cent level.
[b] Correlation coefficient is significant at the 5 per cent level but not at the 1 per cent level.
All others are significant beyond the 1 per cent level.

perform in subsequent college work. The correlations between cumulative G.P.A. and previous G.P.A. (.72, .65) are high enough to be considered as a good predictive measure. The zero-order correlation coefficients between cumulative G.P.A., high school rank and derived test scores show trends which indicate somewhat better predictive value for these variables when applied to female students than for male students. It must be remembered that the small samples place definite restrictions on the interpretation.

<div align="center">The Relationship Between Selected Variables</div>

<div align="center">and Social Studies Grade Point Averages</div>

The zero-order correlation coefficients.

The following analysis is restricted to samples of 60 male C.J.C. transfer students and 50 male non-transfer students (G.P.A.s were computed only for students who had earned a minimum of 6 term hours in Social Studies). Tables XIV-A and XIV-B present means, standard deviations and zero-order correlation coefficients for these samples. The data are presented for the purpose of determining the relationship between selected variables and future achievement of students in social studies. The small sample size places definite restrictions on the interpretation. The analysis was accomplished for the purpose of indicating trends.

These results indicate that previous grades are the most efficient forecasters of future achievement. The relationship between C.J.C. social studies G.P.A. and University social studies G.P.A. (.49) and between previous G.P.A. for all courses taken and University social studies G.P.A. (.64, .73) seem to bear this out. The zero-order correla-

TABLE XIV-A

MEANS, STANDARD DEVIATIONS AND ZERO-ORDER CORRELATION MATRIX FOR SAMPLE
OF 60 MALE COMMUNITY-JUNIOR COLLEGE TRANSFER STUDENTS IN SOCIAL STUDIES

Variables	X̄	S.D.	1	2	3	4	5	6	7	8	9	10	11	12
1 English Test	5.32	1.41	-											
2 Reading Test	6.43	1.49	.55	-										
3 CQT-V-	6.30	1.60	.65	.57	-									
4 CQT-I	6.07	1.21	.41	.60	.49	-								
5 CQT-N	5.67	1.89	.13[a]	.24[a]	.04[a]	.44	-							
6 CQT-T	6.15	1.36	.51	.59	.68	.79	.67	-						
7 HSR	7.40	2.63	.29[b]	.54	.36	.48	.36	.52	-					
8 C.J.C. G.P.A.	2.55	.50	.21[a]	.39	.25[b]	.24[a]	.08[a]	.14[a]	.51	-				
9 Fall G.P.A.	2.33	.65	.31[b]	.31[b]	.24[a]	.11[a]	.16[a]	.23[a]	.29[b]	.53	-			
10 Winter G.P.A.	2.50	.66	.30[b]	.50	.21[a]	.27[b]	.22[a]	.31[a]	.31[b]	.51	.46	-		
11 Spring G.P.A.	2.60	.69	.12[a]	.18[a]	.05[a]	.09[a]	.11[a]	.10[a]	.23[a]	.48	.63	.43	-	
12 C.J.C. Social Studies G.P.A.	2.59	.51	.31[b]	.53	.41	.41	.17[a]	.38	.56	.71	.41	.40	.33	-
13 MSU Social Studies G.P.A.	2.38	.69	.27[b]	.33	.26[b]	.28[b]	.05[a]	.18[a]	.27[b]	.64	.57	.60	.56	.59

[a]Correlation coefficient is not significant at the 5 per cent level.
[b]Correlation coefficient is significant at the 5 per cent but not at the 1 per cent level.
All others are significant beyond the 1 per cent level.

TABLE XIV-B

MEANS, STANDARD DEVIATIONS AND ZERO-ORDER CORRELATION MATRIX FOR SAMPLE OF 50 NON-TRANSFER STUDENTS IN SOCIAL STUDIES

Variables	X̄	S.D.	1	2	3	4	5	6	7	8	9	10	11
1 ACE-Q	5.92	1.81	-										
2 ACE-L	5.78	1.47	.56	-									
3 ACE-T	5.92	1.74	.82	.90	-								
4 Reading-V	5.50	1.62	.53	.68	.73	-							
5 Reading-C	5.92	1.35	.45	.55	.57	.70	-						
6 Reading-T	5.76	1.52	.52	.67	.70	.92	.85	-					
7 HSR	7.68	2.32	.33[b]	.35	.35[b]	.44	.49	.52	-				
8 MSU GPA 1st 2 yrs.	2.40	.44	.40	.42	.41	.51	.45	.52	.57	-			
9 Fall G.P.A.	2.48	.63	.20[a]	.01[a]	.04[a]	.08[a]	.21[a]	.11[a]	.23[a]		-		
10 Winter G.P.A.	2.52	.69	.23[a]	.13[a]	.15[a]	.25[a]	.27[a]	.28[b]	.27[a]	.36	.27[b]	-	
11 Spring G.P.A.	2.47	.64	.36	.35[b]	.39	.38	.31[b]	.37	.20[a]	.70	.32[b]	.24[a]	-
12 MSU Social Studies GPA	2.37	.68	.10[a]	.24[a]	.18[a]	.45	.33[b]	.45	.37	.73	.48	.29[b]	.50

[a]Correlation coefficient is not significant at the 5 per cent level.
[b]Correlation coefficient is significant at the 5 per cent but not the 1 per cent level.
All others are significant beyond the 1 per cent level.

tion coefficients between University social studies G.P.A. and derived test scores are relatively low and difficult to interpret in terms of the small samples involved. The Michigan State University reading test scores with r's of .33 and .45 would seem to be of greatest value. In general the test scores seem to have limited predictive value for this level of achievement.

The Relationship Between Selected Variables
and Natural Science Grade Point Average

The zero-order correlation coefficients.

The following analysis is restricted to sample of 51 C.J.C. transfer students and 51 non-transfer students. G.P.A.s were computed only for students who had earned a minimum of 6 term hours in natural science. Tables XV-A and XV-B present means, standard deviations and zero-order correlation coefficients for these samples. These data are presented for this purpose of determining the relationship between selected variables and future achievement in natural science. The small sample size again places definite restrictions on the interpretation. The analysis was accomplished for the purpose of indicating trends.

These results indicate further that previous grades are the most efficient forecasters of future achievement. The relationship between C.J.C. natural science G.P.A. (.42) and between previous G.P.A. for all courses taken and University natural science G.P.A. (.51, .48) are considerably higher than for any other variables included in the analysis. For example, the derived test scores provided low relationships with zero-order correlation coefficients, ranging from .18 to .28.

TABLE XV-A

MEANS, STANDARD DEVIATIONS AND ZERO-ORDER CORRELATION MATRIX FOR SAMPLE
OF 51 COMMUNITY-JUNIOR COLLEGE TRANSFER STUDENTS IN NATURAL SCIENCE

Variables	X̄	S.D.	1	2	3	4	5	6	7	8	9	10	11	12
1 English Test	5.14	1.75	-											
2 Reading Test	6.51	1.67	.51	-										
3 CQT-V	5.67	2.00	.47	.49	-									
4 CQT-I	6.75	1.36	.37	.52	.56	-								
5 CQT-N	7.47	1.68	.20[a]	.23[a]	.19[a]	.23[a]	-							
6 CQT-T	6.77	1.59	.47	.52	.88	.71	.53	-						
7 HSR	7.73	2.91	.38	.18[a]	.19[a]	.17[a]	.32[b]	.32[b]	-					
8 C.J.C. G.P.A.	2.51	.35	.31[b]	.27[b]	.28[b]	.38	.22[a]	.37	.44	-				
9 Fall G.P.A.	2.37	.79	.38	.33	.35	.33	.18[a]	.38	.23[a]	.51	-			
10 Winter G.P.A.	2.71	.62	.13[a]	.25[a]	.08[a]	.22[a]	.16[a]	.03[a]	.19[a]	.19[a]	.11[a]	-		
11 Spring G.P.A.	2.47	.69	.02[a]	.10[a]	.02[a]	.18[a]	.13[a]	.01[a]	.15[a]	.37	.48	.31[b]	-	
12 CJC Nat'l Science GPA	2.45	.50	.31[b]	.09[a]	.24[a]	.47	.25[a]	.36	.41	.65	.38	.11[a]	.19[a]	-
13 MSU Nat'l	2.35	.75	.37	.26[a]	.17[a]	.28[b]	.07[a]	.19[a]	.23[a]	.51	.84	.25[a]	.56	.42

[a] Correlation coefficient is not significant at the 5 per cent level.
[b] Correlation coefficient is significant at the 5 per cent but not the 1 per cent level.
All others are significant beyond the 1 per cent level.

TABLE XV-B

MEANS, STANDARD DEVIATIONS AND ZERO-ORDER CORRELATION MATRIX FOR SAMPLE OF 51 NON-TRANSFER STUDENTS IN NATURAL SCIENCE

Variables	$\bar{X}$	S.D.	1	2	3	4	5	6	7	8	9	10	11
1 ACE-Q	5.78	1.39	-										
2 ACE-L	5.55	1.35	.55	-									
3 ACE-T	5.65	1.48	.76	.90	-								
4 Reading-V	5.57	1.73	.45	.73	.70	-							
5 Reading-C	5.65	1.70	.51	.82	.75	.75	-						
6 Reading-T	5.45	1.86	.51	.82	.70	.92	.91	-					
7 HSR	8.78	2.18	.37	.41	.50	.28[b]	.36	.35[b]	-				
8 MSU GPA 1st 2 yrs.	2.63	.47	.35[b]	.39	.46	.43	.41	.48	.61	-			
9 Fall GPA	2.40	.86	.17[a]	.18[a]	.20[a]	.27[a]	.18[a]	.23[a]	.24[a]	.49	-		
10 Winter GPA	2.43	.71	.25[a]	.23[a]	.24[a]	.19[a]	.18[a]	.21[a]	.36	.40	.35	-	
11 Spring GPA	2.52	.66	.12[a]	.08[a]	.12[a]	.18[a]	.10[a]	.19[a]	.30[b]	.42	.59	.40	-
12 MSU Nat'l Science GPA	2.18	.78	.20[a]	.17[a]	.20[a]	.10[a]	.15[a]	.14[a]	.40	.48	.83	.44	.71

[a] Correlation coefficient is not significant at the 5 per cent level.

[b] Correlation coefficient is significant at the 5 per cent but not the 1 per cent level.

All others are significant beyond the 1 per cent level.

The Multiple Correlation Coefficient For

Predicting Cumulative Grade Point Average

The multiple correlation coefficient (R) has been computed for males only since the female sample does not have a sufficient "N" to utilize this technique.

The variables. The variables used in the solution of "R" are as follows:

X_2 -- Michigan State University Reading test--total score

X_3 -- College Qualification Test--total score or ACE Psychological Examination -- total score

X_4 -- High School Rank

X_5 -- Previous G.P.A.

X_1 -- Michigan State University cumulative G.P.A.

Computation of "R". The Doolittle method was utilized in deriving the Beta weights shown in Table XVI.[1] The coefficient of multiple correlation is expressed as: $R^2 = \beta 12\ ^r12 + \beta 13 + \beta 14\ ^r14 + \beta 15\ ^r15$

R^2 is therefore the sum of the products of Beta times its corresponding r. The multiple correlation coefficient for C.J.C. transfer students (.583) indicates a small amount of contribution from variables X_2, X_3 and X_4. The difference between $r_{1.5}$ (.526) and $r_{1.2345}$ (.583) being .057. The multiple correlation coefficient for non-transfer students (.621) also indicates a small amount of contribution from variables X_2, X_3 and X_4. The difference between $r_{1.5}$ (.612) and $r_{1.2345}$ (.621) is .009.

The data indicate that previous grades have the highest degree

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[1]See Guilford (27:406-10).

of relationship with cumulative G.P.A. and that the addition of other variables did not change the magnitude of the correlation greatly.

<u>The contribution of each of the selected variables.</u>

(1) Comparison of the Beta weights, or standard partial regression coefficients, in Table XVI reveals that weighting attached to previous G.P.A. (.46 and .56) is large and considerably greater than for the other independent variables.

(2) The weighting attached to the Michigan State University Reading Test (.23 and .16) is relatively small and contributes little to the equation.

(3) The weighting attached to the College Qualification test and the American Council on Education Psychological Examination (.06 and -.11) is extremely small and contributes very little to the equation.

(4) The weighting attached to high school rank (-.03 and .03) is extremely small and does not contribute to the equation.

This study of values in Table XVI indicates clearly that the weighting to be attached to the previous G.P.A. (.46 and .56) for predicting cumulative G.P.A. in all courses taken is much greater than for the other three variables, reading test scores, CQT-T scores or ACE-T scores or high school rank.

<u>Estimation of the cumulative G.P.A. of individual students: The General equation</u>

Estimating the cumulative G.P.A. of individual students is made possible through the construction of regression equations utilizing the basic data provided in Table XVI.

TABLE XVI

Summary Data Used in the Prediction of Cumulative
Grade Point Average for All Courses Taken by 123 Male
Community-Junior College Transfer Students and 128 Male
Non-Transfer Students

Statistic	M.S.U. Reading Test	CQT Total	High School Rank	Previous G.P.A.	Cumulative G.P.A.
(A)	X_2	X_3	X_4	X_5	X_1
Mean	6.29	6.37	7.58	2.54	2.48
S.D.	1.58	1.50	2.67	.44	.53
β	.2326	.0628	-.0291	.4574	
b	.0781	.0222	-.0057	.5520	
r	.3941	.2617	.2873	.5258	
$R_{1.2345}$ = .583*			a = .4899		
(B)					
Mean	5.55	5.73	8.15	2.53	2.49
S.D.	1.69	1.59	2.32	.47	.50
β	.1557	-.1138	.0299	.5612	
b	.0464	-.0359	.0065	.6099	
r	.3695	.2305	.3625	.6115	
$R_{1.2345}$ = .621*			a = .8416		

(A) Community-junior College transfer

(B) Non-transfer

"a" constant a in the multiple regression equation or the mean of the X_1 values minus the products of other means times their corresponding b weights as, a = $M_1 - b_{12} M_2 - b_{13} M_3 - b_{14} M_4 - b_{15} M_5$

* "R" significant beyond the one per cent level of confidence.
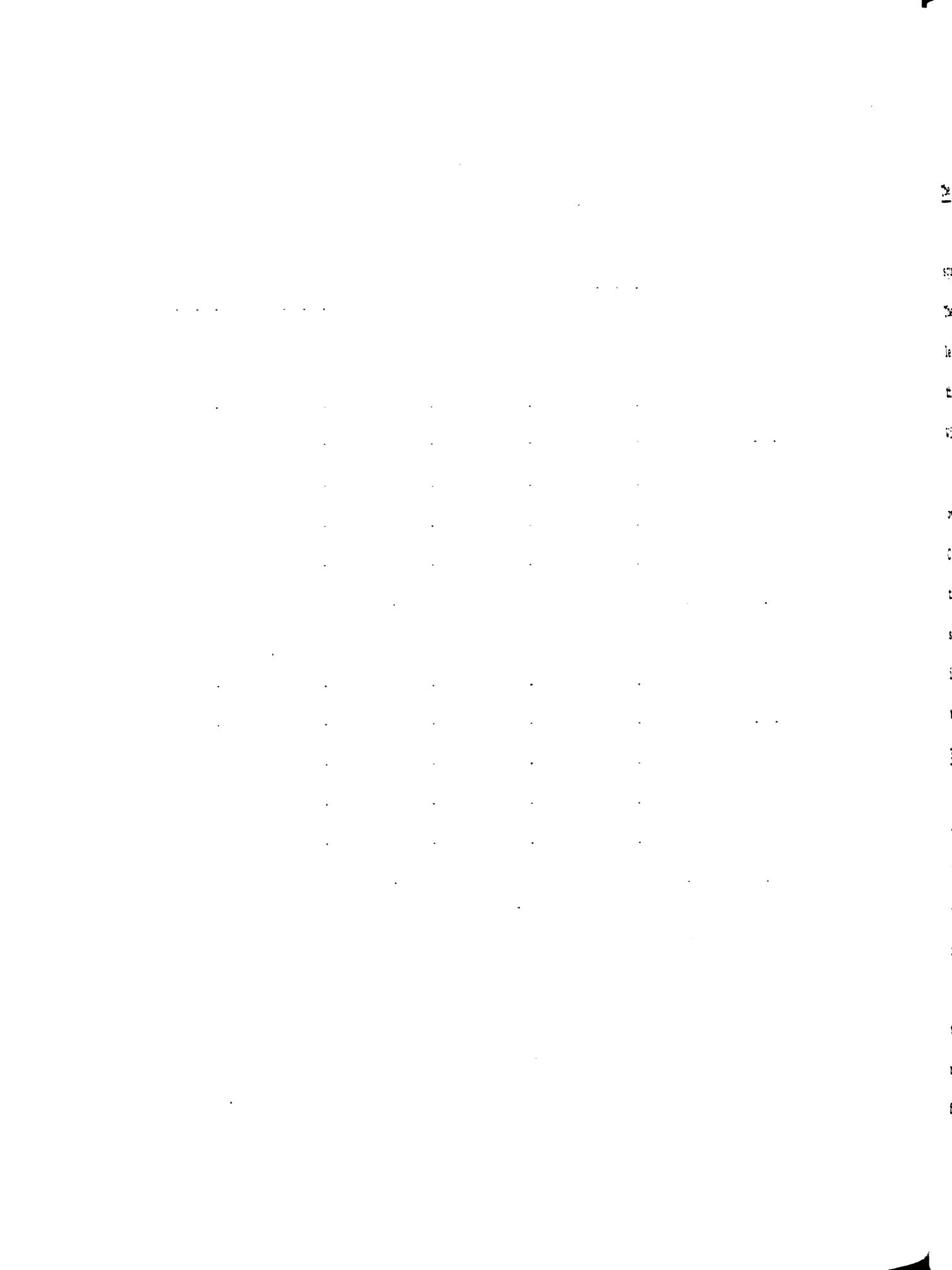
Effect of Reduced Course Load on G.P.A.

The Chi-square analysis

The analysis of this factor was accomplished by use of chi-square technique since the data seemed most adaptable to that method. The chi-square ratio of G.P.A. fluctuations between students who took at least three fewer term hours in the Winter term than they had taken in the Fall and students who took the same number or more term hours in the Winter than they took in the Fall is presented in Tables XVII and XVIII.

Column 1 describes the trend for G.P.A.s (increased in Winter over Fall, remained the same or decreased in Winter over Fall.) Column 2 presents the number of actual or observed frequencies for those taking less hours in Winter than in Fall term. Column 3 is the same except that it deals with those who took the same or more hours in Winter term than they did in the Fall term. Column 4 gives the totals of the observed frequencies.

The results of the chi-square analysis.

Table XVII indicates a chi-square total of 13.72 for the C.J.C. transfer student. The data indicate a significant chi-square value between reduction of course load and increased G.P.A. The chi-square total was found to be significant beyond the 1 per cent level of confidence.

Table XVIII indicates a chi-square total of 13.68 for the non-transfer student. The data indicates a significant relationship between reduction of course load and increased G.P.A. The chi-square total was found to be signficant beyond the 1 per cent level of confidence.

TABLE XVII

The Relationship Between Reduction
of Course Load and G.P.A.
for C.J.C. Students

	Less hours in Winter term than in Fall term	Same or more hours in Winter term as in Fall Term	Totals
Increase in G.P.A. Fall-Winter	31	59	90
No Change or Decrease in G.P.A. Fall-Winter	8	70	78
Totals	39	129	168

$$\chi^2 = 13.72**$$

TABLE XVIII

The Relationship Between Reduction
Reduction of Course
Load and G.P.A. For Non-Transfer Students

	Less hours in Winter term than in Fall term	Same or more hours in Winter term as in Fall term	Totals
Increase in G.P.A. Fall-Winter	21	53	74
No Change or Decrease in G.P.A. Fall-Winter	6	83	89
Totals	27	136	163

$$\chi^2 = 13.68**$$

Summary

The material in this chapter has been presented in an effort to study the predictive efficiency for students included in this study of the following variables, individually and in combination: orientation test derived scores, high school rank, previously acquired G.P.A.s and Fall term G.P.A. The dependent variable was cumulative G.P.A. for all courses taken during the 1958-59 school year.

Analysis of the zero-order correlations for males revealed that previous G.P.A.s and Fall term G.P.A.s correlated higher with the dependent variable than did any of the other single independent variables. When selected independent variables were combined into multiple regression equations, the weighting attached to previous G.P.A. was greater than for any of the other independent variables included. The Michigan State University Reading test total score, the College Qualification test total score of the American Council on Education Psychological Examination total score and high school rank made only negligible contributions to the multiple correlation coefficients.

Analysis of the zero-order correlations for females revealed larger and more significant relationships between variables for the C.J.C. transfer female students. Previous G.P.A.s correlated higher with the dependent variable than did any other single independent variable. The data for females must be carefully interpreted because of the small "N" involved.

Among other findings in this chapter is the fact that previous G.P.A.s show a higher relationship to achievement in social studies and natural science than any of the other variables considered.

The effect of reducing the students' course load on his academic achievement was also noted in this chapter. It is evident that reduced course load influences the improvement of G.P.A. to some degree.

CHAPTER VI

SUMMARY, CONCLUSIONS AND SUGGESTIONS

FOR FURTHER RESEARCH

The Problem

Community-junior college students are transferring to Michigan

State University each year in ever-increasing numbers. In the near

future these students will constitute a large portion of each entering

class. However, it is generally agreed that knowledge of the charac-

teristics and needs of this relatively important group of students is

limited.

Several institutions have undertaken studies of the junior

college transfer student in order that they might better comprehend

and provide for his needs. In this regard, the present study investi-

gates the distinguishing characteristics of the C.J.C. transfer student

and the effect of these characteristics on his University work. The

study considers the following questions:

(1) Are community-junior college transfer students different and

therefore distinguishable from non-transfer students?

(2) To what extent can existing criteria be used as efficient

tools for prediction of academic success for these students after trans-

fer to the University?

The present investigation is concerned with the differences and

similarities between a group of 173 C.J.C. transfer students and a comparable group of 173 non-transfer students at Michigan State University. The differences and similarities revealed by this comparison provide the perspective required to identify and explore the areas of need of the C.J.C. transfer student at Michigan State University. In addition, this investigation considers the predictive efficiency of selected educational variables now available for the C.J.C. transfer student after transfer to the University.

Methodology

This study involves two groups of students: the C.J.C. transfer students and the non-transfer students at Michigan State University. The 173 C.J.C. transfer students were selected from the total transfer population according to the criteria mentioned earlier (p 28). The non-transfer students are a random sampling of students who were admitted as freshmen for Fall term, 1956 and were enrolled for Fall term, 1958. Both groups include 137 males and 36 females. Therefore the two groups can be considered comparable in terms of sex ratio and amount of previous college experience.

The data were gathered from the permanent record cards, application blanks and record folders in the Registrar's office. The pertinent information was assembled on individual work sheets and punched on IBM cards. Summary data used in statistical calculations were secured by IBM tabulating equipment.

Three major objectives were involved in the statistical calculations. The first was to test the differences between the groups; the

second, to determine the relationship of selected independent variables
with the cumulative G.P.A. for the respective terms of the junior year;
and the third, to investigate the predictive efficiency of certain
variables, singly and in combination.

The analyses of the data could be criticized in certain respects.
First, derived scores were utilized on the orientation tests instead
of raw scores. However, derived scores were used by the personnel
workers who worked with these students and the statistical error has
been found to be slight---the r between derived scores and raw scores
has been reported by the Michigan State University Board of Examiners
to be in excess of .96. Second, the fallibility of teacher grades and
resulting G.P.A.s has been shown in the literature. However, the G.P.A.
is the only measure available of the student's achievement. Third, the
probabilities and frequencies presented are based on group performances
and do not necessarily hold for individual prediction. Fourth, the
measure of high school rank was reported as a derived score and is at
best a rough estimate which can be considered useful in terms of group
analysis. Fifth, two assumptions underlying the use of "r", homo-
scedasticity and linearity of regression, were not tested, but merely
assumed to be operative. Sixth, small N's in some instances affect the
interpretation of particular statistical results.

Derived scores, such as were used in this study, become most
meaningful at the extremes---1, 2, and 3 on the lower end of the scale
and 8, 9 and 10 on the upper end of the scale.

Zero-order coefficients of correlation were computed by the
Michigan State University Integral Computer. (MISTIC)

Findings

On the basis of the analyses presented in Chapters IV and V the following findings are listed:

(1) The "t" tables and findings reported in Chapter IV (concerning G.P.A.s and high school rank) generally point up the similarities rather than any significant differences between the two groups. The most significant difference between the groups was found to be Fall term G.P.A. for females. The "t" (2.32) in this instance was found to be significant beyond the five per cent level of confidence. The mean Fall G.P.A. for C.J.C. female transfer students was 2.18 as compared with 2.63 for female non-transfer students, a difference of .45 of a grade point. The Fall term G.P.A.s for female transfers (2.18) also constitutes a rather large decrease from their previous G.P.A. which was 2.69, a difference of .51 of a grade point. The "t" test did not reveal significant differences on any of the other variables. However, in the case of high school rank, the non-transfer students seem to rank somewhat higher. No significant differences were found between groups with regard to social studies and natural science G.P.A.s.

(2) The chi-square analyses point up a number of differences and similarities between the two groups:

A. A significantly greater number of C.J.C. transfer students than non-transfer students received cumulative G.P.A.s below 2.0.

B. A significantly greater number of C.J.C. transfer students than non-transfer students in the College of Business and Public Service received G.P.A.s below 2.0.

C. No significant differences exist between the ratio
of students receiving G.P.A.s below 2.0 in the Colleges
of Engineering, Science and Arts, and Education for the
two groups. However, C.J.C. transfer students appear to
achieve at a slightly higher level in Engineering than
the non-transfer students. Non-transfer students appear
to achieve at a slightly higher level that C.J.C. transfer
students in Science and Arts and Education.

D. The drop-out rate is not significantly different
between the two groups. It may be noted, however, that
a greater percentage of C.J.C. transfer students dropped
out than did non-transfer student.

E. A significantly greater number of the C.J.C. transfer
students than non-transfer students were married.

F. A significantly greater number of the C.J.C. transfer
students than non-transfer students are veterans.

G. There is a highly significant difference between the
occupational status of the fathers of the two groups, the
non-transfer group generally having higher status than
the C.J.C. group.

(3) The computation of the zero-order correlation coefficients
revealed that G.P.A. earned previously at a C.J.C. or at Michigan State
University is the best indicator of how a student will perform in the
future. High school rank and orientation test derived scores generally
provided low correlations with cumulative G.P.A. and therefore do not
appear to have significant predictive value for these students. However, the orientation test battery derived scores can be useful in

working with individuals who have scored at the extremes of the derived score scale. The correlations obtained for females indicated the same general trends as those for males. The small sample size of the female groups seriously restricts interpretation of the zero-order correlation coefficients.

The zero-order ocrrelation coefficients between social studies G.P.A. and selected variables again indicates that previous grades are the most efficient predictors of future academic achievement. The Michigan State University Reading test derived score also shows some limited predictive value in relationship to social studies G.P.A. In the case of natural science G.P.A. correlations were generally low and therefore of limited predictive value. Previous grades again appear to be the most useful measure. The small N's utilized in the foregoing analysis seriously restrict interpretation.

(4) The multiple correlation coefficients (.583, .612) for the male groups, utilizing five variables, (Michigan State University Reading test--total score, College Qualification Test--total score[1] or A.C.E. Psychological Examination--total score[2], previous G.P.A. and Michigan State University cumulative G.P.A.) indicates that the greatest contribution to the coefficient of multiple correlation (R) is made by previous G.P.A. and that the contribution of the other variables is small. That is, the magnitude of the correlation is not changed greatly by additional variables. The r's between cumulative G.P.A. and

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[1]Community-junior college transfer students.

[2]Non-transfer students.

previous G.P.A. were .53 and .61 respectively. The R's were .58 and
.62 respectively. Weighting seems to favor previous G.P.A. as the
most efficient predictive measure. All other variables considered
here would seem to have extremely limited predictive value.

(5) Chi-square analysis indicated that the reduction of class
load, by three or more hours, between the Fall and Winter terms
results in increased G.P.A.s for a significant number of students.
It would appear that students who reduce their class load have greater
success in raising their G.P.A.s than students who maintain the same
load or increase the number of term hours.

(6) It was further noted that: The male C.J.C. transfer
student is, on the average, approximately one year and five months
older than his non-transfer counterpart. The female C.J.C. transfer
student is, on the average, approximately two months older than her
non-transfer counterpart. The two groups carry approximately the
same number of hours per term. They also earned approximately the
same number of term hours previous to Fall term, 1958, and completed
the Spring term, 1959, with approximately the same number of term hours
to their credit and seem to favor the same curricula as reported in
Chapter II.

<div align="center">

Conclusions and

Implications for Further Research

</div>

This investigation has endeavored to study the characteristics
of the C.J.C. transfer student at Michigan State University by comparing
him with the non-transfer student. The findings indicate that these two
groups of students are quite similar in certain respects and quite differ-

ent in other respects. On the basis of these findings, certain con-

clusions can be drawn.

(1) One of the most significant findings of this study is the

fact that female C.J.C. transfer students suffer extreme "grade point

average shock" during their first term at Michigan State University. Male

C.J.C. transfer students suffered very mild "G.P.A. shocks" during

the same period. Since the female group presented a superior

achievement record and ability level (as measured by the orientation

test battery), the conclusion would seem to rest on some non-academic

factor such as difficulty in making the "living adjustment" to campus

life. Further research into this matter is indicated since greater

expectations should be required of the female C.J.C. transfer student.

If such research were undertaken, it should probably involve "case

study" procedures.

(2) Fisher's "t" test indicated that the two groups did not

differ significantly in over-all achievement. However, it is impor-

tant to note that a significantly greater number of C.J.C. transfer

students than non-transfer students failed to maintain 2.0 cumulative

G.P.A.s. Similarly, a significantly greater number of C.J.C. transfer

students than non-transfer students in the College of Business and

Public Service failed to maintain 2.0 cumulative G.P.A.s. It must be

remembered that the non-transfer students maintain some superiority in

general ability and achievement. However, it would not seem unreasonable

to hold higher expectations for the C.J.C. transfer group. More inten-

sive study of "failing" C.J.C. transfer students is indicated. What are

the factors which contribute to the failure on the part of these

students to maintain 2.0 G.P.A.s in selected curricula? The "case study"

approach would seem appropriate in this case also. The apparently

excessive failure rate of C.J.C. transfer students in the College of

Business and Public Service may possibly be the result of higher

grading standards in the University Business program than in the C.J.C.

Business programs. On the other hand, a more serious implication

might be basic differences in the instructional programs. Further

research is indicated to determine cause in this case. Intensive

communications between the staff of the college of Business and Public

Service and community-junior college personnel is indicated.

(3) While the drop-out rate is not significantly greater for

C.J.C. transfer students than for non-transfer students, it amounted

to 24 per cent of the C.J.C. transfer group. No attempt has been

made in this study to determine the causes of drop-out. Further

research is indicated in this area, particularly when the findings

of Martorana (37) are considered. It may well be that a significant

percentage of the total number of drop-outs result from factors other

than academic failure.

(4) It may be noted that a significantly greater number of

C.J.C. transfer students than non-transfer students were married. It

is also noted that a significantly greater number of C.J.C. transfer

students than non-transfer students were veterans. The number of

veterans in college will decrease rapidly in the next few years, which

would render this factor of small consequence for future study. How-

ever, the increasing trend toward early marriage dictates that serious

thought be given to this factor. Young people who marry at the con-

clusion of their high school careers are quite likely to utilize the

low cost advantages of the community-junior college for the first two years of their college training. Implications for further research are quite evident in this area.

(5) The fathers of non-transfer students, as a group, seem to occupy higher occupational and/or socio-economic status. This fact confirms the general feeling that community-junior college attendance is to some degree influenced by economic need on the part of individual students and their families. This fact, as well as others revealed here, indicates that community-junior colleges serve a variety of students with a variety of educational and personal needs.

(6) In general, the C.J.C. transfer student seems to compare favorably in terms of the achievement measures utilized in this study. It is apparent that the non-transfer is slightly superior in terms of ability as measured by common scholastic aptitude tests. These findings would tend to indicate the presence of certain selective factors where the C.J.C. transfer student is concerned. That is, the students with poor high school and community-junior college records are not likely to continue on in a four year program. It seems to follow that the C.J.C. transfer group is actually comparable in ability and achievement to the non-transfer students. It must be remembered, however, that there is a much greater percentage of higher ability students in the non-transfer group.

This investigation has endeavored to study academic prediction by using G.P.A. for all courses taken and for classes belonging to two subject areas (i.e. social studies and natural science). The findings indicate that prediction does not vary greatly between the two groups

except in the case of certain variables for the female groups.

(1) The findings indicate that one variable stands out above all others as a relatively efficient predictor of academic success. Previous college G.P.A. seems to have a high degree of relationship with subsequent G.P.A. As far as the C.J.C. transfer student is concerned, the C.J.C. grade point average is the best single indicator of his expected success in the University program. Other factors such as high school rank, reading test scores, and scholastic aptitude test scores did not contribute greatly to the multiple regression equation. This fact indicates that community-junior college records should probably receive greatest weight in considering probabilities of success where C.J.C. transfer students are concerned.

(2) It is apparent that A.C.E. test scores have limited predictive value for junior level non-transfer students. It may be noted that very few test devices of this type serve well as long range predictors. Consequently, it would not be expected that they would predict well for C.J.C. transfer students. As noted throughout these conclusions, many educational and non-educational factors may be operating singly or in combination to reduce the predictive value of the test scores for these students. Further research might possibly assist in planning and developing an appropriate orientation testing program for C.J.C. transfer students. A series of achievement tests in specific subject matter fields might prove more useful to personnel workers where the C.J.C. transfer student is concerned.

(3) The high verbal content of course work taken by most of the students studied here probably accounts for the relatively high correlations between G.P.A. and the Michigan State University Reading test

scores. The Reading test score would be useful in working with individual students.

(4) All of the derived test scores can be utilized effectively in selecting out the very low and very high ability students from these groups.

(5) The time interval since high school graduation for these students has reduced the usual predictive value of high school rank.

(6) Previous grades and Reading Test scores stand out as the only variables which would seem to relate to social studies and natural science G.P.A.s Again, in the case of specific subject matter, the community-junior college record seems to be the best single predictor. In the highly verbal social studies, the Michigan State University Reading Test seems to have considerable relationship to the G.P.A. Further study of these test devices is indicated.

(7) All of the correlation coefficients derived for the female samples must be considered carefully since the N's for these groups were very small. No definite conclusions can be drawn from these correlations. It is recommended that further study be made of female C.J.C. transfer students utilizing larger samples.

(8) The data for non-transfers compares favorably with the results of studies conducted by the Michigan State University Office of Evaluation Services. (52, 53) The patterns of the correlation analyses are similar but less significant due to the small sample size.

(9) Reduction of class load could be an effective means of assisting C.J.C. transfer students to recover from G.P.A. shock.

The following specific recommendations for further research and action seem appropriate in view of the findings.

(1) A "Case Study" approach to the academic problems of the Michigan C.J.C. transfer student. (At Michigan State University and possibly in other Michigan colleges and Universities.)

(2) A study of drop-outs: Comparison of the characteristics of community-junior college drop-outs with non-transfer drop-outs.

(3) A study of the non-academic adjustment problems of the C.J.C. transfer student.

(4) Development of test norms for the C.J.C. transfer student.

(5) A study of academic prediction (utilizing larger samples than the present study).

(6) A comparative study of transfer students from the various Michigan community-junior colleges.

(7) A study of the influence of selected orientation practices on the early adjustment of C.J.C. transfer students at Michigan State University.

(8) A study of the effect of personal background factors, such as marital status and socio-economic status on the academic achievement record.

(9) A comparison between programs of study at Michigan State University and the various Michigan Community-Junior Colleges.

(10) A comparison of C.J.C. Transfer students at the various four year colleges and universities in Michigan.

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APPENDIX A

PROCEDURES FOR PREPARING

DATA FOR MACHINE ANALYSIS

Data from the individual records and transcripts were trans-
ferred to a "Data Sheet" prepared for each student and recorded in
black pencil. Code numbers were then recorded in red pencil. The
numbers recorded in red pencil were then transferred to IBM master
worksheets. The numbers from the master worksheets were then punched
directly on IBM cards by the key punch operator. The coded figures
were used for all subsequent analyses performed. A sample "Data
Sheet" is found on the following page. Following the sample data
sheet, the coding procedure is described in greater detail. A sample
punched card completes Appendix A.

DATA SHEET

#	Field
1	Name
2	Student Number
3	Sex
4	Date of Birth
5	Military Status
6	ACE-L or English Test
7	ACE-Q or Reading Test
8	ACE-T or CQT-V
9	Reading-V or CQT-I
10	Reading-C or CQT-N
11	Reading-T or CQT-T
12	GPA Fall '58
13	GPA Winter '59
14	GPA Spring '59
15	Cumulative GPA (F,W & S)
16	Term Hours Fall '58
17	Term Hours Winter '59
18	Term Hours Spring '59
19	Total Term Hours (F,W & S)
20	Basic Course Hours
21	Drop-out (by term)
22	University Curriculum Changes
23	Curriculum
24	MSU Social Studies GPA
25	MSU Natural Science GPA
26	MSU Math GPA
27	MSU English Speech & Lit. GPA
28	CJC Social Studies GPA
29	CJC Natural Science GPA
30	CJC Math GPA
31	CJC English Speech & Lit. GPA
32	Community Junior College
33	Number of hours transferred
34	CJC or MSU GPA
35	CJC Curriculum
36	Fathers Occupation
37	Vocational Goal
38	Marital Status
39	High School Rank
40	Total College Credits
41	Group Designation

PROCEDURE FOR CODING AND RECORDING INFORMATION

ON THE DATA SHEET

Figures listed under the word, columns, indicate the column num-
bers on the IBM cards to be used for recording the corresponding vari-
ables. The information given under the column entitled, Place, indicates
the block where the variables are found on the Data Sheet. An asterisk
(*) following an entry indicates that the data were not included in
the present study.

C.J.C. TRANSFER STUDENTS

Columns	Variable	Code	Place (Block No.)
Card I			
1 - 6	Student Number		2
7	Group Designation	1. Transfer-	41
8	Control 1. Complete data 2. Incomplete data	2. Non-Transfer	
9 - 10	English Test or ACE-L	(derived score) 1-10	6
11 - 12	Reading Test or ACE-Q	" "	7
13 - 14	CQT-V or ACE-T	" "	8
15 - 16	CQT-I or Reading-V	" "	9
17 - 18	CQT-N or Reading-C	" "	10
19 - 20	CQT-T or Reading-T	" "	11
21 - 22	High School Rank	(15 point scale)	39
23 - 25	Community-Junior College GPA	(All GPS's com- puted to 2	34
26 - 28	GPA Fall 1958	decimal places)	12
29 - 31	GPA Winter 1959		13
32 - 34	GPA Spring 1959		14

35 - 37	MSU Social Studies GPA		24
38 - 40	MSU Natural Science GPA		25
41 - 43	MSU Mathematics GPA		26*
44 - 46	MSU English, Speech & Literature GPA		27*
47 - 49	CJC Social Studies GPA		28
50 - 52	CJC Natural Science GPA		29
53 - 55	CJC Mathematics GPA		30*
56 - 58	CJC English, Speech & Literature GPA		31*
59 - 61	Cumulative GPA Fall, Winter & Spring		15
62	Sex	1. Male 2. Female	3
63	Marital Status	1. Single 2. Married	38
64	Military Status	1. Non-Veteran 2. Veteran	5
65 - 66	Age to the Nearest Year, as of October 1, 1958		4
67	Fathers Occupation	1. Executive 2. Professional 3. Proprietors 4. Sem-Prof. 5. White Collar 6. Skilled Labor 7. Semi-Skilled 8. Unskilled 0. Unknown	36
68	Vocational Goal	1. Executive 2. Professional 3. Proprietors 4. Sem-Prof. 5. White Collar 6. Skilled Labor 7. Semi-Skilled 8. Unskilled 0. Unknown	37*

69-70	MSU – Curriculum	0. Unknown or other 22
		1. Busines & Pub. Service
		2. Engineering
		3. Education (Ele. & Phy.)
		4. Science & Arts-L (Ed)
		5. Science & Arts-S & C (Ed.)
		6. Science & Arts-S & C
		7. Science & Arts-L
		8. Communications Arts
		9. Home Economics
		10. Agriculture
		11. Agriculture (Ed)
71	Curriculum Changes	23*
72	Drop-out	0. in school 21
		1. Fall
		2. Winter
		3. Spring
73 - 74	Ter hours-Fall	16
75 - 76	Term hours-Winter	17
77 - 78	Term hours-Spring	18
79 - 80	Total hours-Fall, Winter & Spring	19
1 - 6	Student Number	2
7 - 9	Term hours transferred	33
10 - 12	Total College Credits	40
13 - 14	Basic College Credits	20*
15 - 16	Community-Junior College	1. Alpena 32
		2. Battle Creek
		3. Bay City
		4. Benton Harbor
		5. Flint
		6. Grand Rapids
		7. Gogebic
		8. Henry Ford
		9. Highland Park
		10. Jackson
		11. Muskegon
		12. Northwestern
		13. Port Huron

| 17 | Reduced Class Load
Winter term | 1. Reduced
2. Same or More | 16-17 |
| 18 | Increased GPA | 1. Increased
2. Same or Less | 12-13 |

NON-TRANSFER STUDENTS

Columns	Variable	Code	Place (Block No)
1 - 6	Student Number		2
7	Group Designation	1. MCJC Transfer 2. Non-Transfer	41
8	Control 1. Complete data 2. Incomplete data		
9 - 10	ACE-Q	(derived scores 1-10)	6
11 - 12	ACE-L	" "	7
13 - 14	ACE-T	" "	8
15 - 16	Reading-V	" "	9
17 - 18	Reading-C	" "	10
19 - 20	Reading-T	" "	11
21 - 22	High School Rank	(15 point scale)	39
23 - 25	MSU GPA up to Fall '58	(GPA's computed to 2 decimal places)	34
26 - 28	MSU Fall '58 GPA		12
29 - 31	MSU Winter '59 GPA		13
32 - 34	MSU Spring ' 59 GPA		14
35 - 37	MSU Social Studies GPA		24
38 - 40	MSU Natural Science GPA		25*
41 - 43	MSU Mathematics GPA		26*
44 - 46	MSU Humanities GPA		27
47 - 49	MSU Cumulative GPA		28
50	Sex	1. Male 2. Female	3
51	Marital Status	1. Single 2. Married	38

| 52 | Military Status | 1. Non-veteran | 5 |
| | | 2. Veteran | |

53 - 54   Age to the nearest year as   4
           of October 1, 1958

55   Fathers Occupation

1. Executive   36
2. Professional
3. Proprietors
4. Semi-Prof.
5. White Collar
6. Skilled Labor
7. Semi-Skilled
8. Unskilled
0. Unknown

56   Vocational Goal

1. Executive   37*
2. Professional
3. Proprietors
4. Sem-Prof.
5. White Collar
6. Skilled Labor
7. Semi-Skilled
8. Unskilled
0. Unknown

57 - 58   Curriculum

0. Unknown or other 22
1. Business & Pub.
   Service
2. Engineering
3. Education (Ele.
   & Phy.)
4. Science & Arts-L (Ed)
5. Science & Arts-S & C
   (Ed)
6. Science & Arts-S & C
7. Science & Arts-L
8. Communications Arts
9. Home Economics
10. Agriculture
11. Agriculture (Ed)

59   Curriculum Changes   23*

60   Drop-out   21

61 - 62   Hours Carried Fall '58   16

63 - 64   Hours Carried Winter ' 59   17

65 - 66   Hours Carried Spring '59   18

67 - 68   Hours Carried Total (FWS)   19

69 - 71	Total hours before Fall '58	33
72 - 74	Total College Credits	40
75 - 76	Basic College Course Credits	20*
77	Reduced Class Load Fall to Winter	16-17
78	Increased GPA Fall to Winter	12-13

IBM CARD

APPENDIX B

COURSES USED FOR COMPUTATION OF GRADE

POINT AVERAGES IN SOCIAL STUDIES

AND NATURAL SCIENCE

I. Social Studies

Anthropology

Economics

Geography

History

Political Science

Sociology

II. Natural Science

Anatomy

Astronomy

Biochemistry

Biology

Botony

Chemistry

Geology

Physics

Physiology

Zoology

APPENDIX C

I. Classification of Curriculum

    0 Unknown or other

    1 Business and Public Service

    2 Engineering

    3 Education (Elementary and Physical)

    4 Science and Arts - Linquistic (Education)

    5 Science and Arts - Scientific (Education)

    6 Science and Arts - Linquistic

    7 Science and Arts - Scientific

    8 Communications Arts

    9 Home Economics

    10 Agriculture

    11 Agriculture (Education)

II. Classification of Father's Occupational Status

    1 Executive (Big Business)

    2 Professional

    3 Proprietors (Managers, Farmers, Small Business)

    4 Semi-Professional (Technicians)

    5 White Collar (Clerks, Sales)

    6 Skilled Labor (Foremen)

    7 Semi-Skilled Labor

    8 Unskilled Labor

    0 Unknown - deceased - retired

APPENDIX D

STANDARD ERROR OF THE ZERO-ORDER

CORRELATION COEFFICIENTS

Tables XIII-A and XIII-B

.70 - .81   .04

.50 - .69   .06

.30 - .49   .08

.10 - .29   .09

Tables XIV-A and XIV-B

.70 - .89   .09

.50 - .69   .12

.30 - .49   .15

.10 - .29   .17

Tables XV-A, XV-B, XVI-A and XVI-B

.70 - .89   .06

.50 - .69   .08

.30 - .49   .10

.10 - .29   .12

APPENDIX E

FREQUENCY DATA RELATED TO THE EFFECT

OF SEX, MARITAL STATUS* AND MILITARY STATUS*

ON SUCCESS-FAILURE

	CJC Transfer Students			Non-Transfer Students		
	Above 2.0 GPA	Below 2.0 GPA	Total	Above 2.0 GPA	Below 2.0 GPA	Total
Male	103	34	137	117	20	137
Female	26	10	36	33	3	36
Total	129	44	173	150	23	173
Married	23	6	29	6	1	7
Single	80	28	108	112	18	130
Total	103	34	137	118	19	137
Veteran	36	10	46	18	0	18
Non-Vet.	66	25	91	100	19	119
Total	102	35	137	118	19	137

*Male only

APPENDIX F

TITLE: Product Moment Correlation, Means, Standard Deviation,
          Variances and Covariences, Card Input.

TYPE: Entire Program

DURATION: Input: 100 Cards/minute maximum
             Computation: $53.3n^2 + 60.2n$ Milliseconds
             Output: 25 $p_1 n(n+1)$ milliseconds - for correlation matrix
                           $25(1+p_2)(5+n)n$ milliseconds - for mean, standard
                           deviation and variance - covariance matrices.

          where s = sample size
                n = number of variables
                ~~k = Number of characters per row of the measurement tape~~
                p_1 = number of characters with which each correlation
                    coefficient is punched.
                p_2 = number of characters with which each mean, standard
                    deviation, variance and covariance is to be punched.

NUMBER OF WORDS: 272

METHOD OF USE: The program is read into the memory in the usual way followed
                 by the parameter tape and lastly the data cards. Some
                 computing is done after each row of the measurement matrix
                 has been read into the memory. Since the correlation and
                 variance-covariance matrices are symmetric, it is necessary
                 to print only half the off-diagonal elements. The lower
                 off-diagonal and diagonal elements are printed out row by row
                 (this is equivalent, however, to printing out the upper off-
                 diagonal and diagonal elements column by column). First
                 the correlation matrix is punched out, scaled down by a
                 factor of ten, followed by an N. Next the mean and standard
                 deviations appear in two parallel columns. Finally, the
                 variance-covariance matrix is punched out. A new problem
                 can be begun by reading in new parameters.

CAPACITY: Thirty-four variables: there is no limit on the number of
             observations.

PUNCHING OF THE TAPES: For every problem four parameters are necessary. They
                        are as follows:

             1. Let "s" be the sample size. Put sS on the parameter tape.
             2. Let "n" be the number of variables. Put nN on the
                 parameter tape.

3. Let "f" be the number of decimal places to which the
    correlation matrix is to be printed. Put fF on the para-
    meter tape. If no print out is desired, f = 0.
4. Let "l" be the number of decimal places to which the means,
    standard deviations and variance-covariance matrices are
    to be printed. Put lL on the parameter tape. If no print
    out is desired, l = 0.

CARD FORMAT: The eighty column card is to be punched so that at most seventy-
two columns contain data. The remaining eight columns are not
read by this routine, and will commonly be used for
identifiers, etc. The eight columns can be any eight columns,
and need not be continuous. However, these eight columns
must be plugboard wired so that four of them go to $a_0 a_1 a_2 a_3$
of A and four more to $q_0 q_1 q_2 q_3$ of A. That column which
is wired to read into a_0 will be called column C.

There is a standard plug board already wired which puts columns
1-4 into a_0-a_3, 5-8 into q_0-q_3, and 9-44 into a_4-a_{39}, 45-80
into q_4-q_{39};

The remaining 72 columns contain all fractions ($-1 < x < 1$).
Each datum is punched with the sign over the last column
(least significant digit) or over a blank column following
the least significant digit.

Furthermore, this convention can be interchanged on any or all
cards, so that for some fields, the sign may be an overpunch
over the last column, while in other fields it can be a punch
over a blank column following the least significant digit.
The number of digits in a field will be one through eleven
digits. The format of no two cards need be alike, so that
the first field, for example, on the first card can have five
columns and the sign following, while the first field on the
second card can have seven columns with the sign punched over
the last column. Any number of columns can be left blank
anyplace on the card.

A plus sign is indicated by a punch in the 12 row, and a minus
sign, by a punch in the 11 row.

TERMINATION CARD: The last card for each row of the measurement matrix must
have a punch in the 12 row of column C, that is, the column
plug board wired to be input at a_0. Two blank cards should
follow the last (and only the last) termination card in a
deck.

METHOD USED: The product moment correlation coefficient is a measure of
the degree of relation of two variables. It may be shown
to range between +1 and -1. This program computes the matrix
of product moment correlations between each pair of a set of
variables.

The product moment correlation coefficient may be written in terms of the observed data, as

$$r_{xy} = \frac{\sum (x - \bar{x})(y - \bar{y})}{[\sum (x - \bar{x})^2 \sum (y - \bar{y})^2]^{1/2}}$$

For computational convenience this can be rewritten in terms of x, y, xy, and s as

$$r_{xy} = \frac{s \sum xy - \sum x \sum y}{([s \sum x^2 - (\sum x)^2][s \sum y^2 - (\sum y)^2])^{1/2}}$$

By using this form the observation points can be stored in the memory one at a time, the sums and product-sums being formed point by point. When the observations have all been read in the correlations are calculated and the matrix punched, for the variance-covariance it is necessary only to divide the numerator by s^2.

NOTES:

(1) After the master tape is read in, a sum check is performed. If the master tape has been read in incorrectly, ten sexadecimal characters will be punched. The master tape should then be read into the memory again.

(2) Correlations with constants are assumed to be zero in all cases. In order to avoid a division hangup the correlation between a constant and itself will be zero.

APPENDIX G

COMMUNITY COLLEGE OF ORIGIN FOR

TRANSFER STUDENTS INCLUDED IN THIS STUDY

17

Alpena	2
Battle Creek	5
Bay City	21
Benton Harbor	5
Flint	28
Grand Rapids	33
Gogebic	1
Henry Ford	11
Highland Park	3
Jackson	23
Muskegon	20
Northwestern	9
Port Huron	12