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Follow-Up Study Of 1981, 1982, And 1983 Freshman Students At Eastern Illinois University Who Scored Low On The Act And/Or Nelson Denny Reading Test

Reo John Rorem

Eastern Illinois University

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FOLLOW-UP STUDY OF 1981, 1982, AND 1983 FRESHMAN
STUDENTS AT EASTERN ILLINOIS UNIVERSITY WHO SCORED
LOW ON THE ACT AND/OR NELSON DENNY READING TEST

REO JOHN ROREM

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FOLLOW-UP STUDY OF 1981, 1982, AND 1983 FRESHMAN
STUDENTS AT EASTERN ILLINOIS UNIVERSITY WHO SCORED
LOW ON THE ACT AND/OR NELSON DENNY READING TEST
(TITLE)

BY

REO JOHN ROREM

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF

Specialist in Education

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY
CHARLESTON, ILLINOIS

1983
YEAR

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FOLLOW-UP STUDY OF 1981, 1982, AND 1983
FRESHMAN STUDENTS AT EASTERN ILLINOIS UNIVERSITY
WHO SCORED LOW ON THE ACT AND/OR NELSON DENNY READING TEST

BY

REO JOHN ROREM

B. A. in Psy., Eastern Illinois University, 1981
M. S. in Ed., Eastern Illinois University, 1982

ABSTRACT OF A RESEARCH STUDY

Submitted in partial fulfillment of the requirements
for the degree of Specialist in Education at the Graduate School
of Eastern Illinois University

CHARLESTON, ILLINOIS
1983

428927

Statement of Problem:

This study took place at Eastern Illinois University in Charleston, Illinois. The groups studied consisted of 2,777 Eastern Illinois students who entered college in the Fall of 1981 (1,452 students) or the Fall of 1982 (1,325 students) as freshmen students. All of these students had taken the American College Testing Program (ACT) and Nelson Denny Reading Test during Summer 1982 Orientation.

The study was done to provide information about predictability and correlation that the ACT and Nelson Denny Reading Test has with the student's Grade Point Average (G.P.A.).

The study also was designed to determine if workshops or the General Studies (G.S.T.) 1000 Reading course showed a significant difference in G.P.A.'s among students who received scores of 16 or below on the ACT and/or 65 or below on the Nelson Denny Reading Test and went to these workshops or the G.S.T. 1000 course compared to those students who scored approximately the same on the ACT and Nelson Denny Test and did not go to workshops or to the Reading course.

This study was used to help the Testing Services and the Academic Advisement determine if certain test scores could be used in detecting possible academic problems which students might have. For this reason, a study of this kind was needed to provide information to see if the current cut-off scores were adequate and if the ACT and Nelson Denny Reading Test are valid enough in predicting the G.P.A. of Eastern Illinois students.

Procedure:

To determine the significance and/or correlation of the test scores and the influence of workshops on the students' G.P.A.'s, a variety of statistical tests were done. The average G.P.A. for six different categories of test scores, the one-tail t-test, the Pearson r, the Multiple R, and the Correlated t Ratio were the statistical analyses done. The results were listed in the tables.

Recommendations:

Based on the results, four recommendations were made.

1. It is recommended that both the ACT and the Nelson Denny Reading test scores be used to place students in certain courses which apply to their abilities.
2. It is recommended that students who score below 16 on the ACT 'Subtest of Social Studies' and below 65 on the Nelson Denny Test be placed in the G.S.T. 1000 course.
3. It is recommended that students who scored 12 or below on the ACT and 51 or below on the Nelson Denny Reading Test be required to go to the G.S.T. 1000 course and the test taking workshops in case test anxiety might be the student's problem not the lack of reading ability.
4. It is also recommended that further studies done concerning G.P.A. should include other variables; such as, motivation, course load, IQ, college prep, etc....

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ACKNOWLEDGEMENTS

The writer wishes to thank the Testing Service Director at Eastern Illinois University, Mrs. Lana Brown, for her help in obtaining and allowing access to Eastern's records, test scores, and recent research studies done on the ACT and Nelson Denny Reading Tests.

The writer also thanks Dr. Paul Overton for his assistance and support while writing this paper.

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Chapter 1

INTRODUCTION

Background Information

In today's society (1983), there is an outcry that public education is failing to teach students basic skills at levels which provide all students with a chance to compete equally for the so called "American Dream". When our public schools fail adequately to instruct students in the basic skills, colleges and universities are finding it difficult to ignore the problem of students admitted to the institutions who are unable to function at a passing level.

One of the major problems facing teachers, students, and administrators at the university level is the lack of reading skills. "Written statements from prestigious groups such as the Carnegie Commission on Higher Education (1973) and all of more than 60 authors recently reviewed by this 'writer' have urged the establishment of developmental and remedial reading programs at the college level."¹ The students coming into our institution who are lacking in basic skills will likely find college a difficult task. Levitz and Noel found academically unprepared students prone to having the highest dropout rate in higher education. This study further shows that institutions can reduce this dropout rate by providing well run college learning support programs.²

¹Ed Kent and Ed Smith, "Forum For Reading," The Journal For Colleges Reading Improvement, U.S., Educational Resources Information Center, ERIC Document ED 190 178, 1979, p. 18.

²Randi Levitz and Lee Noel (Ed.), How To Succeed with Academically Under-Prepared Students., The American College Testing Program, 1982, p. 4.

By providing such programs, the problem of having to reduce academic standards of admissions could be solved.

'Happily, numerous colleges and universities have found that it is possible to maintain the integrity of academic standards and at the same time help academically underprepared students to successfully meet those standards. By providing effective and efficient academic and personal/social support systems, colleges and universities have helped underprepared students succeed and persist.'³

The Statement of the Problem

One purpose of this research was to determine if students who had done poorly on either the American College Testing Program (ACT) and/or Nelson Denny Reading Test had difficulty maintaining a Grade Point Average (G.P.A.) of 2.00.

This research was also designed to see if a relationship exists between the Nelson Denny Reading Test and the ACT test, the Nelson Denny Reading Test and G.P.A., and the ACT test and G.P.A..

The research also proposed to see if a significant difference in G.P.A. existed among students who scored a 16 or below on the composite of the ACT and/or a 65 or below raw score on the Nelson Denny Test*, who went to developmental workshops or took the General Studies (G.S.T.) 1000 course, compared to students scoring the same on the ACT and/or Nelson Denny Test who did not go to any developmental workshops or took the G.S.T. 1000 course.

³Levitz and Noel, op. cit., p. 7.

*A 65 Raw Score on the Nelson Denny Reading Test is equal to 10.0 grade Reading Level.

The Sub-Problems

The first sub-problem was determining the cut-off scores by which to identify students who may have academic problems at Eastern Illinois University. The first cut-off was 13-16 composite on the ACT test and/or a 51-65 on the Nelson Denny Reading Test.* The second cut-off level was those students who scored 12 or below on the ACT test and/or a 50 and below on the Nelson Denny Reading Test.**

The second sub-problem was to see if the G.P.A. varies among these groups: 13-16 on ACT test and a score above 65 on Nelson Denny Reading Test; 13-16 on ACT and 51-65 on Nelson Denny; 12 and below on ACT and 65 or above on Nelson Denny; 12 and below on ACT and 51-65 on Nelson Denny; and 12 and below on ACT and 50 and below on the Nelson Denny.

The Limitations

The study was limited to those incoming freshmen who went through summer orientation and had taken the battery of tests which Eastern Illinois University Testing Services and Counseling Center gave to each incoming student during this time.***

The present study had several limitations. First the study was limited to the school years of 1981-1982 and 1982-1983 freshmen.

*A score of 16 or below on the ACT test and/or a 65 or below Raw Score on the Nelson Denny Reading Test is the cut-off which the Testing Services uses at Eastern Illinois University.

**A Raw Score of 50 on the Nelson Denny Reading Test is equal to a 7.1 Grade Equivalent.

***The tests that incoming freshmen take are: Effective Study Test, Nelson Denny Reading Test, and ACT if not taken previously. Math placement to business and math majors is required and interest inventories to all freshmen.

More specifically, 1981-1982 had 1,452 freshmen taking these tests, and 1982-1983 had 1,325 taking the tests. The study did not differentiate between subgroups, such as sex or ethnic populations. This study applied to only those students whose G.P.A. was available to the Testing Services Office. Also, the research done was Post-Facto Research.

Definition of Terms

ACT - The American College Testing Program. The Academic Test covers four subject matter areas; English, Mathematics, Social Studies, and Natural Sciences. The test is used to assess each student's general educational development and ability to complete college level work. The range of the ACT Standard Score Scale is 1-36, and the approximate mean Composite score of college-bound high school students is 18.

Alpha Error - The probability of being wrong whenever the null hypothesis is rejected.

Correlated t Ratio - Statistical test of the hypothesis of difference between two sample means, where the sample selection is correlated.

Correlation Coefficient - A quantitative formulation of the relationship existing among two or more variables. Correlation coefficients range in value from +1.00 to -1.00.

Degrees of Freedom (df) - With interval (or ratio) data, degrees of freedom refer to the number of scores free to vary after certain restrictions have been placed on the data.

Effective Study Test (E.S.T.) - E.S.T. is designed to measure a student's knowledge about effective study methods and the factors influencing their development.

General Studies 1000 (G.S.T.) - G.S.T. is a course designed in learning principles as they apply to the development of efficient study skills; emphasis on reading instruction designed to improve comprehension and rate of reading.

Match Group Design - Groups are paired occurring to one or more similar variables.

Mean (\bar{X}) - A measure of central tendency specifying the arithmetic average.

Multiple R - A single numerical value that quantifies the correlation among three or more variables.

Nelson Denny Reading Test - This test is composed of two subtests, vocabulary and comprehension. The vocabulary section consists of 100 items, each with five answer choices, and has a time limit of 15 minutes. The comprehension section contains eight reading passages and a total of 36 questions, each with five answer choices. The time limit for this section is 20 minutes the first minute being used to determine reading rate. The range of Coefficients is from .17 to .67 with a median of .47. The Raw Score ranges from 1 to 172.

N - Number of subjects.

Null Hypothesis - The assumption that the results are simply due to chance. When testing the hypothesis of difference, the null hypothesis states that no real differences exist in the population from which the samples were drawn.

Pearson r - It is used to test the hypothesis of association.

Population - The entire number of persons, things, or events having at least one trait in common.

Post-Facto Research - A type of research that, while not allowing for cause-and-effect conclusions, does allow the researcher to make better-than-chance predictions.

Probability (P) - The statement as to the number of times a specific event can occur out of the total possible number of events.

Random Sample - Sample selected in such a way that every element or individual in the entire population has an equal chance of being chosen.

Significance - A statistical term used to indicate that the results of a study are not simply a matter of chance.

t Ratio - Statistical test used to establish whether or not a significant difference exists between two sample means.

Variable - Anything that varies and can be measured.

METHODS OF PROCEDURE

Description of the Population

The population consisted of students at Eastern Illinois University. Eastern Illinois University is located in east-central Illinois on highways 130 and 16 in Charleston. The campus grounds of the University cover an area of over 316 acres of landscape, generally level land. Approximately 10,000 students make up the 1982 enrollment at Eastern, with Fall semester having a slightly higher enrollment than Spring semester. Summer enrollment has approximately 3,700 students with approximately 1,900 being full-time.

The different degrees offered at Eastern Illinois University are: Specialist in Education, Master of Arts, Master of Business Administration, Master of Science, Master of Science in Education, Master of Science in Library Science, Bachelor of Arts, Bachelor of Arts and Board of Governors, Bachelor of Music, Bachelor of Science, Bachelor of Science and Career Occupations, Bachelor of Science in Business, and Bachelor of Science in Education.

The student body that was used for this study was the freshman classes for the school years 1981-1982 and 1982-1983. The total number of students that had taken the Nelson Denny Reading Test and the ACT and had their scores on file for 1981-1982 was 1,325 and 1,452 for the 1982-1983 school year.

Sources of Data

The main data collected were provided through the Testing Services Office. From computer print-outs, each student's name,

social security number, recent G.P.A., Nelson Denny's vocabulary, comprehension, and raw score, and ACT English, Social Studies, and Composite scores were given.

Names of students who attended workshops, such as test-taking techniques, tutoring, and the writing center, or had taken the G.S.T. 1000 course, were obtained from the Counseling Center, Reading Center, and Testing Services.

Data that contained the probation and dismissal list of students for 1982 were obtained from the Records Office. Information about Eastern Illinois University's policies about probation, dismissal, and admissions requirements was acquired from the Admissions and Academic Assistance Offices.

Treatment of Data

The information described in the previous section was compiled and several statistical tests were done with these data. The first type of statistical analysis computed involved determining the average G.P.A. for those students who scored above 16 on the Composite of the ACT and had a raw score above 65 on the Nelson Denny. Another statistical analysis was done to determine the average G.P.A. for those students who scored 16 or below on the Composite of the ACT and/or a 65 or below on the Nelson Denny.

Assigning the students who scored low on either the ACT, the Nelson Denny, or both into one of six separate categories and finding the average G.P.A. for that group was the second statistical test done.

A one-tail t-test was used to determine if G.P.A.'s varied

among students who scored high on the ACT and Nelson Denny, 'Sample 1', to students who scored low on the tests, 'Sample 2'.

Product-moment correlation coefficient or Pearson r was computed between Nelson Denny and G.P.A., ACT 'Subtest of Social Studies' and G.P.A., Nelson Denny and ACT 'Subtest Social Studies', ACT Composite and G.P.A., and ACT Composite and Nelson Denny.

A multiple R correlation between ACT 'Subtest of Social Studies', Nelson Denny Raw Score, and G.P.A. was computed to determine if a significant correlation could be found among the three variables.

The last statistical study computed was a matched-group design using correlated t ratio to determine if any statistical significant could be determined between 'Group 1' those students who had low scores on the ACT and/or Nelson Denny and did not go to workshops or to G.S.T. 1000 to improve their skills to those students 'Group2' who had low test scores and did go to workshops or to the G.S.T. 1000 course.

Hypothesis

$H_1: U_1 = U_2$ Sample 1, students who scored above 16 Composite on ACT and above 65 Raw Score Nelson Denny Reading Test, is representative of a population whose mean is identical with the mean of the population being represented by Sample 2, students who scored 16 or below on ACT and/or 65 or below for Raw Score on the Nelson Denny.

$H_2: p = 0$ States there is zero correlation between the Nelson Denny Reading Test and G.P.A..

$H_3: p = 0$ States there is zero correlation between the ACT 'Subtest of Social Studies' and G.P.A..

$H_4: p = 0$ States there is zero correlation between Nelson Denny Reading Test and the ACT 'Subtest of Social Studies'.

$H_5: p = 0$ States there is zero correlation between the ACT Composite and G.P.A..

$H_6: p = 0$ States there is zero correlation between the ACT Composite and the Nelson Denny Reading Test.

$H_7: p = 0$ States there is zero correlation among the ACT 'Subtest of Social Studies', the Nelson Denny Reading Test, and G.P.A..

$H_8: U_1 = U_2$ Sample 1, students who received letters and did not go to workshops or take the G.S.T. 1000 course, is representative of a population whose mean is identical with the mean of the population being represented by Sample 2, students who received letters and did go to workshops or did take the G.S.T. 1000 course.

Chapter 2

REVIEW OF THE RELATED LITERATURE

Introduction

Predicting academic success has presented an intriguing and challenging problem because there has always been discrepancies between predictions and achievements for individuals. Previous research studies have been numerous and diverse, using a variety of techniques and batteries of instruments. Many of the studies are global in nature of ability to predict overall success at some level of academic pursuit, whether it be elementary, high school, or college.

Some of the most extensive research done on correlations between the American College Testing Program (ACT), the Nelson Denny Reading Test, and Grade Point Average (G.P.A.), and also the predicting of college G.P.A., has been done by Leo Munday. Munday found a correlation of .70 between the Nelson Denny Reading Test and the ACT 'Subtest of Social Studies'. A .73 correlation between the ACT Composite scores and the Nelson Denny Reading scores was found after testing 7,618 students in 14 separate colleges.⁴ "Educators and researchers concerned with improving the prediction of college grades are interested in the overlap of present predictors with other possible variables."⁵ Other findings from the Munday study show a .63 correlation between the ACT English scores and the Nelson

⁴Leo Munday, "Correlations Between ACT and Other Predictors of Academic Success in College," College and University, (Fall, 1968), p. 72.

⁵ibid., p. 67.

Denny Reading scores, .59 correlation between the ACT Natural Science scores and the Nelson Denny Reading scores, and .40 correlation between the ACT Math scores and the Nelson Denny Reading scores.⁶

Reading Grade Equivalents Using ACT Composite Scores

Research done by the American College Testing Program to determine students' reading levels from the Composite of the ACT test scores was done with 1,200 students at a Texas college. Four steps were followed in the analysis of the data. The Raw scores on the Comprehension Section of the Nelson Denny Reading Test were converted to grade equivalents using a conversion table. ACT scores and Nelson Denny scores were cross-tabulated in the desired combination (ACT Composite score with Nelson Denny Comprehension score). Median Nelson Denny grade equivalent for each ACT score was computed and graphed. A line was graphed and used to generate the Concordance Table.⁷

<u>ACT Composite</u>	<u>Estimated Grade Equivalent</u>
5	8
6 - 8	9
9 - 11	10
12 - 15	11
16 - 19	12
20	13

⁶Munday, op. cit., p. 72.

⁷American College Testing Program, "Estimating Reading Grade Equivalents Using the ACT Assessment Program," (1977), p. 2.

Multiple R

To assess empirically the relationship between the ACT test scores and reading skill level, ACT scores and Nelson Denny Reading scores were collected from 1,839 students at Burlington County College. Dr. Schroeder used the ACT English and ACT Social Science scores and the Nelson Denny Raw Score total as his three variables and found a Multiple R of .70 with a standard error of 16.9.⁸

Predictive Ability

When using only one test, the predictive ability for G.P.A. is reduced. For the Nelson Denny Reading Test, the summary of ninety-four studies showed a range of coefficients from .17 to .67 with a median of .47.⁹ Comparing the ACT and G.P.A., the correlation has been found to be in the area of .41¹⁰, thus accounting for only 16% of the variance.

Beyond Testing

No matter how high or low a person may score on a given Academic test, there are other variables that affect a student's success in a college setting. Of the different factors in determining potential success of students, Hieronymus and Leher found that the inclusion of

⁸Lee L. Schroeder, The Estimation of Reading Skill Via the American College Test, American College Test, 1976, p. 2.

⁹Michael J. Bennett and James Brown, The Nelson Denny Reading Test Examiner's Manual, Riverside Publishing Company, 1981, p. 7.

¹⁰American College Testing Program, Using the ACT Assessment on Campus, 1982, p. 3.

academic achievement, motivation, educational expectations, and biographical factors must be considered along with intellectual ability.¹¹

For those students who do score low on academic tests and may be lacking in some basic skills, Levitz and Noel found that academic support through the provision of developmental or remedial education is necessary, but, by itself, insufficient. Students must learn to motivate themselves. Their findings show that students need to understand their learning strengths and weaknesses to bolster their confidence in their own abilities, to negotiate the academic and social system to adopt effective and efficient methods of processing information, and to alter previously established attitudes about their own potential and their sense of self-worth.¹²

Underpreparedness

Levitz and Noel classified "underpreparedness" (the lack of skills which hinders a student from reaching his/her educational goals) as a relative matter that affects every institution, in which 10-15% of the students have credentials that put them in the lowest brackets in terms of academic readiness. Levitz and Noel conclude that two central facts about "underprepared" students have been documented: first, students who are academically underprepared are among the most dropout-prone in higher education. Second, institutions have discovered that the dropout rate among this group can be significantly reduced.¹³

¹¹Richard L. Longfellow, Prediction of junior required english grades using expectancy tables, Unpublished thesis, Eastern Illinois University, 1981, p. 12.

¹²Levitz and Noel, op. cit., p. 5.

¹³ibid., p. 4.

Kent and Smith found in their studies done on developmental programs, that the most common weaknesses were programs not designed to meet students needs, like short term courses and courses that are not staffed by qualified professionals. On the other hand, the programs that were successful had traits which incorporated counselors, emphasized individualization, used qualified professionals, and had follow up evaluations on students' progress.¹⁴

Recent Research at E.I.U.

The most recent study done at Eastern Illinois University comparing test scores and G.P.A.'s was done by Julie Sterling, Coordinator of Test Administrations. The study was done with 1982 Fall semester freshmen who obtained test scores of 16 or below on the Composite ACT, 65 or below on the Nelson Denny Reading Test, and/or a Raw Score of 87 or below on the Effective Study Test.¹⁵ The results of Mrs. Sterling's study are as follows:

Total Number of Students = 1,452

Total Number of Students who received letters = 293

Criteria for letters:

Low ACT (Composite 13-16) / High Nelson-Denny (grade equivalent of 10.0 or above)

Low ACT (composite 13-16) / Low Nelson-Denny (grade equivalent of 10.0 or below)

Low ACT (composite 13-16) / EST (raw score of 87 or below)

Low ACT (composite of 12 or lower)

Low ACT (composite of 13-16) / Low Nelson-Denny (grade equivalent of 10.0 or below) / Low EST (raw score of 87 or below)

¹⁴Kent and Smith, op. cit., p. 19.

¹⁵Julie Sterling, Paper Presented at Eastern Illinois University, Testing Services, February, 1983.

Results of students who were sent letters according to the above categories:

Low ACT/High ND

Total number of letters sent -	139	
N/N	1	.72%
Left E.I.U.	7	5.04%
Remaining	131	
Probation	37	28.00%

Low ACT/Low ND

Total number of letters sent -	41	
N/N	0	
Left E.I.U.	2	2.4%
Remaining	39	
Probation	13	33.3%

Low ACT/Low EST

Total number of letters sent -	53	
N/N	0	
Left E.I.U.	2	3.8%
Remaining	51	
Probation	28	55.0%

ACT of 12 or lower

Total number of letters sent -	37	
N/N	0	
Left E.I.U.	1	3.0%
Remaining	36	
Probation	9	25.0%

Low ACT/Low EST/Low ND

Total number of letters sent -	23	
N/N	0	
Left E.I.U.	5	22.0%
Remaining	18	
Probation	9	50.0%

This research done by Mrs. Sterling shows the number and percentages of students who received letters that either left Eastern Illinois University, are on probation, or are remaining in school. This research was done in February of 1983.

Chapter 3

RESULTS

The students included in the results of this study were 1981-1982 and 1982-1983 freshman students who attended Eastern Illinois University Summer or Spring Orientation and have taken the Nelson Denny Reading Test and the American College Testing Program (ACT). There was a total of 1,325 students for the school year 1981-1982 and 1,452 students for the school year 1982-1983 that were eligible to be included in this study. Each student's social security number, name, Grade Point Average (G.P.A.), ACT Composite score, ACT Social Studies score, ACT English score, and Nelson Denny Reading Test Raw score, Nelson Denny Vocabulary score, and Nelson Denny Comprehension score are all on file at the Testing Services and were available for this study.

The purpose of this study was to determine the significance of test scores in their predictability of G.P.A.'s, and the correlation between the different tests that were given. The tests which were given were the ACT test and the Nelson Denny Reading Test.

Average G.P.A.

Table One is the first type of statistical analysis done to determine the average G.P.A. for those students who scored above 16 on the Composite of the ACT and had a Raw Score above 65 on the Nelson Denny Reading Test. The average G.P.A. for these students was 2.75. For those students who scored 16 or below on the Composite of the ACT and/or a 65 or below on the Nelson Denny Reading Test,

**TABLE ONE - AVERAGE GRADE POINT AVERAGE OF
FRESHMAN STUDENTS AT EASTERN ILLINOIS UNIVERSITY
IN 1982 BASED ON SCORES OF AMERICAN COLLEGE
TESTING PROGRAM AND NELSON DENNY READING TEST.**

Eastern Illinois University 1982 Freshman Students	Number of Students	Average G.P.A.
Students scoring Above 16 on ACT Composite and Above 65 on Nelson Denny	90	2.75
Students scoring 16 or Below on ACT Composite and/ or 65 or Below on Nelson Denny	90	2.02
Total	180	2.39

the average G.P.A. was 2.02. The difference between these two groups is .73.

Average G.P.A. for Six Different Categories
of Test Scores

Table Two is the second statistical analysis which was done by putting the students who scored 16 or below on the Composite of the ACT, and/or a 65 or below on the Nelson Denny Reading Test into one of six separate categories and finding the average G.P.A. for that group.

Group I. - Students who scored 12 or below on the ACT Composite.

N = 43

\bar{X} G.P.A. = 1.87

Group II.- Students who scored 12 or below on the ACT Composite and below 50 on the Raw Score of the Nelson Denny Reading Test.*

N = 15

\bar{X} G.P.A. = 1.60

Group III.-Students who scored a 12 or below on the ACT Composite or a 51-65 on the Nelson Denny Reading Test.

N = 16

\bar{X} G.P.A. = 1.65

Group IV.- Students who scored 13-16 on the Composite of the ACT and scored a 51-65 on the Nelson Denny Reading Test.

N = 23

\bar{X} G.P.A. = 1.62

Group V. - Students who scored 13-16 on the ACT and had a score above 65 on the Nelson Denny Reading Test.

N = 140

\bar{X} G.P.A. = 2.15

Group VI.- Students who scored above 16 on the Composite of the ACT and 51-65 on the Nelson Denny Reading Test.

N = 12

\bar{X} G.P.A. = 2.53

*A Raw Score of 65 on the Nelson Denny Reading Test = 10.0 reading level. A Raw Score of 50 on the Nelson Denny Reading Test = 7.4 grade reading level.

TABLE TWO - AVERAGE GRADE POINT AVERAGE OF FRESHMAN
STUDENTS AT EASTERN ILLINOIS UNIVERSITY IN 1982
ACCORDING TO THE SIX DIFFERENT CATEGORIES OF TEST SCORES

Categories of Students Based on Test Scores	Number of Students	Average G.P.A.
Group I.-Students who scored 12 or below on the ACT Composite.	43	1.87
Group II.-Students who scored 12 or below on ACT Composite and below 50 on the Nelson Denny Reading Test.	15	1.60
Group III.-Students who scored 12 or below on the ACT Com- posite or a 51-65 on the Nelson Denny Reading Test.	16	1.65
Group IV.-Students who scored 13-16 on the ACT Composite and 51-65 on the Nelson Denny Reading Test.	23	1.62
Group V.-Students who scored 13-16 on the ACT Composite and above 65 on the Nelson Denny Reading Test.	140	2.15
Group VI.-Students who scored above 16 on the ACT Composite and 51-65 on the Nelson Denny Reading Test.	12	2.53

t-Test

Table Three is the third statistical analysis which was done using a one-tail t-test to determine if G.P.A.'s varied among students who scored above 16 on the Composite of the ACT and above 65 on the Nelson Denny Reading Test Raw Score, 'Sample One', compared to those students who scored 16 or below on the Composite of the ACT and/or 65 or below on the Nelson Denny Reading Test Raw Score, 'Sample Two'.*

One-Tail t-Test

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S_{\bar{X}_1 - \bar{X}_2}}$$

$$N = 62$$

$$\bar{X}_1 = 2.87$$

$$S_1 = .8$$

$$S_{\bar{X}_1} = .15$$

$$\bar{X}_2 = 2.02$$

$$S_2 = .62$$

$$S_{\bar{X}_2} = .11$$

$$S_{\bar{X}_1 - \bar{X}_2} = .19$$

$$t \text{ Ratio} = 4.55$$

$$t_{.01 (60)} = \pm 2.39$$

$$t = 4.47 \quad \text{Reject } H_0; \text{ Significant at } P < .01$$

*When a researcher assumes that a mean difference between samples will occur and also predicts the direction of the difference, a one-tail t-test is used.

Pearson r Correlation

A. Table Four is the fourth statistical analysis which was done using the Product-Moment Correlation Coefficient or Pearson r between the Nelson Denny Reading Test and G.P.A..

$$r = \frac{\frac{\sum XY}{N} - (\bar{X})(\bar{Y})}{S_x S_y}$$

$$N = 102$$

$$\text{Nelson Denny} = \bar{X} = 101.65$$

$$S_x = 25.20$$

$$\text{G.P.A.} = \bar{Y} = 2.43$$

$$S_y = .88$$

$$df = 100 \quad r .59$$

$$r .01.(100) = .25$$

$$r .59 \quad \text{Reject } H_0; \quad \text{Significant at } P < .01$$

B. Product-Moment Correlation Coefficient or Pearson r was done between ACT 'Subtest of Social Studies' and G.P.A..

$$N = 102$$

$$\text{ACT 'Subtest'} = \bar{X} = 19.06$$

$$S_x = 6.36$$

$$\text{G.P.A.} = \bar{Y} = 2.43$$

$$S_y = .88$$

$$df = 100 \quad r .34$$

$$r .01 (100) = .25$$

$$r .34 \quad \text{Reject } H_0; \quad \text{Significant at } P < .01$$

C. Product-Moment Correlation Coefficient or Pearson r was done between the Nelson Denny Reading Test and the ACT 'Subtest of Social Studies'.

$$N = 102$$

$$\text{Nelson Denny} = \bar{X} = 101.65$$

$$S_x = 25.20$$

$$\text{Act 'Subtest'} = \bar{Y} = 19.06$$

$$S_y = 6.36$$

$$df = 100 \quad r .66^*$$

$$r .01 (100) = .25$$

$$r .66 \quad \text{Reject } H_0; \quad \text{Significant at } P < .01$$

*Leo Munday found r .70 in his 1968 Study.

D. Product-Moment Correlation Coefficient or Pearson r was done between ACT and G.P.A..

$$N = 62$$

$$ACT = \bar{X} = 19.56$$

$$S_x = 4.54$$

$$G.P.A. = \bar{Y} = 2.63$$

$$S_y = .85$$

$$df = 60$$

$$r .43^*$$

$$r .01 (60) = .33$$

$r .43$ Reject H_0 ; Significant at $P < .01$

E. Product-Moment Correlation Coefficient or Pearson r was done between the ACT Composite and Nelson Denny Reading Test.

$$N = 62$$

$$ACT = \bar{X} = 19.56$$

$$S_x = 4.54$$

$$Nelson Denny = \bar{Y} = 102.5$$

$$S_y = .26.5$$

$$df = 60$$

$$r .70^{**}$$

$$r .01 (60) = .33$$

$r .70$ Reject H_0 ; Significant at $P < .01$

Multiple R

Table Five is the fifth statistical analysis which was done using a Multiple R, a single numerical value that quantifies the correlation among three or more variables, between ACT 'Subtest of Social Studies', the Nelson Denny Reading Test, and G.P.A..

*Recent ACT Assessment Program Study found $r .41$ between ACT and G.P.A..

**Leo Munday found in his studies done in 1968, a $r .73$ between Act Composite and Nelson Denny Reading Test.

TABLE FOUR - PEARSON r CORRELATIONS BETWEEN THE NELSON DENNY READING TEST, GRADE POINT AVERAGE, ACT COMPOSITE, AND ACT 'SUBTEST OF SOCIAL STUDIES' WITH SUBJECTS BEING 1982 FRESHMEN AT EASTERN ILLINOIS UNIVERSITY

Correlations	Number of Subjects	Means	Standard Deviations	Degree of Freedom	Pearson r
<u>Nelson Denny Reading Test</u> G.P.A.	102	$\frac{101.65}{2.43}$	$\frac{25.20}{.88}$	100	.59
<u>ACT 'Subtest Soc. Stud.'</u> G.P.A.	102	$\frac{19.06}{2.43}$	$\frac{6.36}{.88}$	100	.34
<u>Nelson Denny Test</u> <u>ACT 'Subtest Soc. Stud.'</u>	102	$\frac{101.65}{19.06}$	$\frac{25.20}{6.36}$	100	.66
<u>ACT</u> G.P.A.	62	$\frac{19.56}{2.63}$	$\frac{4.54}{.85}$	60	.43
<u>ACT</u> <u>Nelson Denny Test</u>	62	$\frac{19.56}{102.5}$	$\frac{4.54}{26.5}$	60	.70
All Pearson r Correlations were significant at $P < .01$.					

Multiple R

$$R_{y,1,2} = \sqrt{\frac{r_{y,1}^2 + r_{y,2}^2 - 2r_{y,1}r_{y,2}r_{1,2}}{1 - r_{1,2}^2}}$$

$$N = 102$$

$$r_{y,1} = .59 \text{ (correlation between Nelson Denny Reading Test and G.P.A.)}$$

$$r_{y,2} = .34 \text{ (correlation between ACT 'Subtest of Social Studies' and G.P.A.)}$$

$$r_{1,2} = .66 \text{ (correlation between Nelson Denny Reading Test and ACT 'Subtest of Social Studies')}$$

$$\text{Square } r_{y,1} = (.59)^2 = .35$$

$$\text{Square } r_{y,2} = (.34)^2 = .12$$

$$\text{Square } r_{1,2} = (.66)^2 = .44$$

$$R_{y1,2} = \frac{\sqrt{(.59)^2 + (.34)^2 - 2(.59)(.34)(.66)}}{1 - (.66)^2}$$

$$R_{y1,2} = \frac{\sqrt{.35 + .12 - .26}}{.56} = \frac{\sqrt{.47 - .26}}{.56} = \frac{\sqrt{.21}}{.56} = \sqrt{.38}$$

$$R_{y1,2} = .62$$

Thus combining the ACT 'Subtest of Social Studies', the Nelson Denny Reading Test, and G.P.A. yields a Multiple R of .62.

Correlated t Ratio

Table Six is the last statistical test which was done with a Matched Group Design using a Correlated t Ratio. A matched group design is where subjects in one group are paired off on the basis of some shared characteristics with subjects in another group; the differences in the resulting pairs of scores may then be related

TABLE FIVE - MULTIPLE R CORRELATION BETWEEN THE NELSON DENNY READING TEST, G.P.A., AND ACT 'SUBTEST OF SOCIAL STUDIES' WITH POPULATION BEING 1982 EASTERN ILLINOIS UNIVERSITY FRESHMEN

Correlations	Number Of Subjects	Pearson r	Pearson r^2	Multiple R
<u>ACT 'Subtest Social Studies'</u> G.P.A.	102	.34	.12	
<u>Nelson Denny Reading Test</u> G.P.A.	102	.59	.35	
<u>Nelson Denny Reading Test</u> <u>ACT 'Subtest Social Studies'</u>	102	.66	.44	
<u>Nelson Denny Reading Test</u> G.P.A. <u>ACT 'Subtest Social Studies'</u>				.62

to the influence of the independent variable. The way the pairing was done was by the Composite scores on the ACT and the Raw scores on the Nelson Denny Reading Test.

Group 1 was those students who received letters notifying them of low scores on the ACT and/or Nelson Denny tests and did not go to workshops or to the G.S.T. 1000 Reading course to improve their skills.* The letters which were sent to students gave names of workshops and courses which are offered at Eastern Illinois University without credit, to help students improve their basic skills.

Group 2 was those students who received letters notifying them of low scores on the ACT and/or Nelson Denny Reading Test and did go to workshops or to the G.S.T. 1000 course to improve their skills.

To pair off these two groups, test scores were used, which were relatively close, 'not more than 2 points difference in the Raw score of the Nelson Denny Reading Test and not more than 1 point difference in the Composite of the ACT'. For example: Pair 1 - Subject one had a score of 15 on the ACT Composite and a Raw score of 62 on the Nelson Denny Reading Test. This subject was paired with a student who went to a workshop who scored 15 on the ACT Composite and had a Raw score of 61 or 62 on the Nelson Denny Test.

A correlated t ratio was done to find if there was a significant difference between the two groups. A correlated t ratio is used when the source of the research is either Before/After or Matched Group Design.

*E.I.U. Academic Advisement uses a Composite of 16 or below on the ACT and/or 65 Raw score or below on the Nelson Denny Reading Test to classify those students whom letters will be sent to.

Correlated t Ratio

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{s_{X_1}^2 + s_{X_2}^2 - 2r_{1,2}s_{X_1}s_{X_2}}}$$

$N = 14$ N , in this case, is number of pairs.

$$df = N - 1 = 13$$

\bar{X}_1 G.P.A. = 2.13 Did not go to workshops or take course.

\bar{X}_2 G.P.A. = 2.34 Did go to workshops or take course.

$$\bar{X}_D = -.23$$

$$S_D = .71$$

$$S_{\bar{X}_D} = .20$$

$$t = \frac{\bar{X}_D}{S_{\bar{X}_D}} = 3.55$$

$$t_{.01 (13)} = \pm 3.10$$

$t = 3.55$ Reject H_0 ; Significant at $P < .01$

This shows a significant difference at $P .01$ in G.P.A. between those students who received letters considering their low scores on either the ACT or Nelson Denny Reading Test or both that did go to workshops or to the G.S.T. 1000 course compared to those students who did not go to workshops or the G.S.T. 1000 course.

Chapter 4

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Assuming that all data were collected, recorded, analyzed and reported correctly, the following conclusions were reached.

H₁

The first hypothesis: The null hypothesis was rejected at an alpha error of .01, indicating a significant difference in the Grade Point Average (G.P.A.) of students who scored above 16 on the Composite of the American College Testing Program (ACT) and above 65 on the Raw score of the Nelson Denny Reading Test, and those students who scored 16 or below on the ACT and/or 65 or below on the Nelson Denny Reading Test. The one-tail t-test established that a significant (nonchance) difference does exist between the two sample means for the 1982-1983 freshman class.

H₂

The second hypothesis: The null hypothesis was rejected at an alpha error of .01, indicating that there is a significant correlation between the Nelson Denny Reading Test and G.P.A.. Furthermore, the Pearson r, which was done for the 1982-1983 freshman class, found a +.59 correlation between the Nelson Denny Reading Test and G.P.A. which is moderate to a high correlation. A significant correlation is one that is not a result of chance.

H₃

The third hypothesis: The null hypothesis was rejected at an alpha error of .01, indicating that there exists a significant correlation between the ACT 'Subtest of Social Studies' and G.P.A.. The Pearson r, which was done for the 1982-1983 freshman class, found a +.34 correlation between the ACT 'Subtest of Social Studies' and G.P.A., which is a moderate correlation.

H₄

The fourth hypothesis: The null hypothesis was rejected at an alpha error of .01, indicating a significant correlation between the Nelson Denny Reading Test and the ACT 'Subtest of Social Studies'. The Pearson r, which was done for the 1982-1983 freshman class, found a .66 correlation between the Nelson Denny Reading Test and the ACT 'Subtest of Social Studies', which is a high correlation.

H₅

The fifth hypothesis: The null hypothesis was rejected at an alpha error of .01, indicating a significant correlation among the ACT Composite and G.P.A.. The Pearson r, which was done for the 1982-1983 freshman class, found a +.43 correlation between the ACT Composite and G.P.A., which is moderate correlation.

H₆

The sixth hypothesis: The null hypothesis was rejected at an alpha error of .01, indicating that there is a significant correlation between the Nelson Denny Reading Test and the ACT Composite.

The Pearson r , which was done for the 1982-1983 freshman class, found a $+0.70$ correlation between the Nelson Denny Test and the Composite ACT, which is a high correlation.

H₇

The seventh hypothesis: A Multiple R was done to find the correlation between the Nelson Denny Reading Test, the ACT 'Subtest of Social Studies', and G.P.A.. A multiple correlation of $+0.62$ was found, which is a relatively high multiple correlation.

H₈

The eighth hypothesis: The null hypothesis was rejected at an alpha error of $.01$, indicating a difference between the two sample means. Sample One were those students who received letters and did not go to workshops or to the G.S.T. 1000 course, and Sample Two were those students who received letters and did go to workshops or to the General Studies (G.S.T.) 1000 course. The correlated t ratio established that a significant difference does exist between the two sample means for the 1981-1982 freshman class.

General Conclusions

1. Test scores from the Nelson Denny Reading Test and the ACT can be used as a better than chance predictor of G.P.A.. The combination of both the Nelson Denny Reading Test and the ACT test scores held a higher predictability of G.P.A. than a single test score.

2. The Nelson Denny Reading Test Raw score correlated moderately to high with the ACT Composite and the 'Subtest of Social Studies'. A better than chance prediction exists meaning that stu-

dents who score high on the Nelson Denny Test, scored high on the ACT. Conversely, students who score low on the Nelson Denny Test more than likely will score low on the ACT test.

3. Students who score 16 or below on the ACT and/or 65 or below on the Nelson Denny Reading Test, with a better than chance predictability, will have a lower average G.P.A. than those students who scored above 16 on the ACT and above 65 on the Nelson Denny Reading Test.

4. Students attending workshops or the G.S.T. 1000 course, had a higher average G.P.A. than those students who did not attend a workshop or go to the G.S.T. 1000 course.

RECOMMENDATIONS

There are many many variables that can affect a student's G.P.A.. This study focused on the ACT, the Nelson Denny Reading Test, and workshops or courses to predict or find significant differences in the G.P.A. among Eastern Illinois students for the 1981-1982 and the 1982-1983 school years. From the results of the present study, several recommendations can be forwarded.

It is recommended that both the ACT and the Nelson Denny test scores be used to place students in certain courses which would apply to their abilities.

It is recommended that students who score below 16 on the ACT 'Subtest of Social Studies' and below 65 on the Nelson Denny Test be placed in the G.S.T. 1000 course.

It is recommended that students who score 12 or below on the ACT and 51 or below on the Nelson Denny Reading Test be required to go to the G.S.T. 1000 course and the test taking workshops in case test anxiety might be the student's problem, not the lack of reading skills or ability.

It is also recommended that further studies done concerning G.P.A. should include other variables, such as motivation, course load, IQ, college prep, etc....

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