



8-1-1971

## A Correlation of Academic Achievement as Measured by the Iowa Tests of Educational Development with Success of Varsity Players in Football in Iowa High Schools

Thomas C. Pinkham

[How does access to this work benefit you? Let us know!](#)

Follow this and additional works at: <https://commons.und.edu/theses>

---

### Recommended Citation

Pinkham, Thomas C., "A Correlation of Academic Achievement as Measured by the Iowa Tests of Educational Development with Success of Varsity Players in Football in Iowa High Schools" (1971). *Theses and Dissertations*. 3488.  
<https://commons.und.edu/theses/3488>

This Thesis is brought to you for free and open access by the Theses, Dissertations, and Senior Projects at UND Scholarly Commons. It has been accepted for inclusion in Theses and Dissertations by an authorized administrator of UND Scholarly Commons. For more information, please contact [und.common@library.und.edu](mailto:und.common@library.und.edu).

A CORRELATION OF ACADEMIC ACHIEVEMENT AS MEASURED BY  
THE IOWA TESTS OF EDUCATIONAL DEVELOPMENT  
WITH SUCCESS OF VARSITY PLAYERS IN  
FOOTBALL IN IOWA HIGH SCHOOLS

by  
Thomas C. Pinkham

Bachelor of Arts, University of Northern Iowa

A Thesis  
Submitted to the Faculty  
of the  
University of North Dakota  
in partial fulfillment of the requirements  
for the degree of  
Master of Science

Grand Forks, North Dakota

August  
1971

T1971  
P65

This Thesis submitted by Thomas C. Pinkham in partial fulfillment of the requirements for the Degree of Master of Science from the University of North Dakota is hereby approved by the Faculty Advisory Committee under whom the work has been done.

W. C. Koenig  
(Chairman)

John L. Quaday  
John C. Peterson

Allan Johnson  
Dean of the Graduate School



Permission

Title A CORRELATION OF ACADEMIC ACHIEVEMENT AS MEASURED BY THE IOWA  
TESTS OF EDUCATIONAL DEVELOPMENT WITH SUCCESS OF VARSITY  
PLAYERS IN FOOTBALL IN IOWA HIGH SCHOOLS

Department Health, Physical Education, and Recreation

Degree Master of Science

In presenting this thesis in partial fulfillment of the requirements for a graduate degree from the University of North Dakota, I agree that the Library of this University shall make it freely available for inspection. I further agree that permission for extensive copying for scholarly purposes may be granted by the professor who supervised my thesis work or, in his absence, by the Chairman of the Department or the Dean of the Graduate School. It is understood that any copying or publication or other use of this thesis or part thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the University of North Dakota in any scholarly use which may be made of any material in my thesis.

Signature

Tom P. Hanson

Date

July 28, 1971

#### ACKNOWLEDGEMENTS

The writer wishes to express his thanks and appreciation for the valuable assistance rendered by Mr. Walter Koenig, Chairman of his graduate committee. He is also grateful to Dr. John Quaday and Dr. John Peterson for time spent on the advisory committee.

The writer wishes to express his appreciation to Mrs. Myrna Bower, typist, for her flexible scheduling of conferences to complete the paper.

The writer also wishes to thank Dr. Richard Landry for his assistance in the statistical analysis of the data.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS . . . . . iv

LIST OF TABLES . . . . . vi

ABSTRACT . . . . . vii

Chapter

I. INTRODUCTION . . . . . 1

    Definitions

    Review of Literature

    Delimitations

    Limitations

    Statement of the Problem and Summary

II. METHODOLOGY . . . . . 16

III. RESULTS . . . . . 20

IV. DISCUSSION . . . . . 22

V. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS . . . . . 25

    Summary

    Conclusions

    Recommendations

APPENDICES . . . . . 27

BIBLIOGRAPHY . . . . . 36



LIST OF TABLES

Table		Page
1.	Correlations of Composite Score With High School Grades . . . . .	11
2.	Correlations of Composite Score on the ITED With Measures of Intelligence or Scholastic Aptitude . . . . .	12
3.	Correlations Between Scores on Third Edition and Fourth Edition of the ITED, Editions Taken One Year Apart . . . . .	13
4.	Multiple Regression . . . . .	20
5.	Analysis of Variance for the Regression . . . . .	21
6.	Raw Data . . . . .	34

## ABSTRACT

This study was designed to determine the relationship between academic achievement as measured by the composite score on the Iowa Tests of Educational Development and success of varsity players in football. Success in football was defined as winning 70 percent or more of conference games.

A random sample of one hundred Iowa high schools was used in the study. Letters were sent to administrators of the schools to collect achievement scores for all varsity football letter winners and the conference team record. An average composite score was figured for each team, as was the team percentage of wins. A correlation was then calculated to determine the relationship.

A computer was used to determine the correlation coefficient. That coefficient was found to be  $-.0079$ . That figure was not significant and the null hypothesis that there was no relationship between academic achievement and success in football was accepted.

It was concluded that academic achievement scores can not be used as possible predictors for future team success. This study showed that there was no relationship between the two.



## CHAPTER I

### INTRODUCTION

Coaches everywhere have been interested in determining what factors must be combined to produce winning athletic teams. Football coaches have been doing the same, and this study has attempted to identify one of the characteristics of those participating on successful football teams. Do the students who have the mental ability and the perseverance to study and achieve in school also combine these factors to form teams that win more games? This is the main question that has been investigated in this study.

#### Definitions

Football Roster -- Those athletes winning varsity letters in football.

ITED -- Iowa Tests of Educational Development.

Success in Football -- Winning 70 percent or more of the conference games.

#### Review of Literature

There have been a number of related studies that demonstrated the relationship between academic achievement and physical activity or athletic participation. A total of 285 boys of whom 98 were athletes were included in the study by Purdy (1). A scholastic index was devised

involving the academic grade received by the student for a course. The grades used in the index included those of the tenth, eleventh, and the first half of the twelfth grades. Through this scholastic index it was discovered that in eight of ten years covered by the study, the athletes had higher scholastic ratings than the nonathletes.

When comparing scholastic ratings with the sports in which student-athletes participated, it was found that baseball players had the highest, basketball players were next, and football players had the lowest scholastic ratings. It was determined that participants in three sports had higher indices than participants in two sports, and that participants in one sport had the lowest indices.

In another study comparing success in physical education with scholastic success, Beebee (2) selected two groups of students, one from the highest level, and one from the lowest level in scholastic achievement during the first semester of the school year.

Beebee concluded:

1. Records in the Department of Physical Education for Men show that success or failure in this Department is largely controlled by the same factors that control academic success in the University.
2. Men scholastically successful also excel in their work in physical education because they make more efficient use of their bodies than do those whose academic standing is low. . . .

While most studies have reached similar conclusions not all have done so. Westendarp (3) found a negative correlation between physical efficiency, as measured by tests of motor ability, coordination, strength, endurance, and speed, and mental capacity and performance, as measured by the standard intelligence tests and academic



grades in high school. She concluded that those scoring high on physical tests had a low mental capacity.

Cooper and Davis (4) conducted forty-one studies comparing athletic ability and scholarship. Thirty-one were made at the college level and ten at the high school level. From their findings the authors concluded "that nonathletes appeared to do better in school work than athletes although the differences were not statistically significant." It was also determined that athletes made better grades after their season had ended.

In a similar study, Rarick (5) indicated that evidence tended to show that neither intercollegiate nor interscholastic athletics had a damaging effect upon scholarship. In Rarick's study, the students who failed were not included. Rarick reasoned that those students who were not eligible to compete should not be classified as athletes. He also indicated that the amount of emphasis placed by the school administrators on the sport seemed to have a direct relationship to the effect of athletics upon scholarship.

Brace (6) stated the following findings in stressing the relationship between physical development and academic success. From a study of 1400 children between the ages of six and fourteen years who had failed at some time to be promoted, it was found that repeaters were inferior in weight and height to children who were "non-repeaters" and yet came from homes of about the same social status.

Brace reported a study by Paull in which three groups of children were arranged according to their school marks. It was found that the group with the best marks contained the largest number of



children who were above average in height and weight. Paull concluded that there was a positive relationship between physical development and success in school studies.

In a study very closely related to the topic of this paper, Beebee and Tuttle (7) compared scholarship with athletic success. They stated: "The data indicated that scholastic attainments and athletic success are directly related." This was shown by the fact that, in the majority of cases, the scholastic attainments of letter winners during the championship years were the highest or well above the average of the group for the period studied.

Ray (8), in his study "Interrelationship of Physical and Mental Abilities and Achievement of High School Boys," found that the athletes were not only superior in mental ability as measured by intelligence quotient, but had fewer academic failures.

Giaque (9) concluded that teachers' marks and other examination ratings were highly subjective and lacked any usable norms. He said that statements concerning the relationship between scholarship and physical fitness should not be made until studies involving scholarship ratings were based on proven norms, reliability, and validity.

McCloy (10) in a study concerning the relationship between intelligence and athletic ability, stated that whenever scores on intelligence tests have been correlated with measurements on physical, athletic or games ability, the derived correlation coefficients have been approximately zero. He said the abstract intelligence quotient is a relatively useless score in physical education.

McCloy's statement raised questions concerning what intelligence is. How is it related to achievement? Patricia McBroom (11) stated, "Intelligence is an inborn all-around intellectual ability, inherited or at least innate, not due to teaching and training." Jensen (12) defined intelligence as "the capacity for abstract reasoning and problem solving." He went on to say that the first really useful test of intelligence and the basis for nearly all present-day tests was the Metrical Scale of Intelligence devised in 1905 by Binet and Simon. This test was devised for the purpose of identifying children who were likely to fail in school. The students so identified were then to be placed in special schools before losing too much ground or becoming too discouraged. This test was regarded as a major breakthrough in the history of psychology.

Binet and Simon developed the test by studying and observing the behavior of children and what teachers expected of them in school. By noting the characteristics of those children described as "bright" and those of the "dull" students, they were able to make up a graded series of test items that agreed with teachers' judgements of children's scholastic capabilities. These tests did this more accurately than any one teacher could and without prolonged observation of the class.

This test underwent many revisions and improvements until Terman developed a form known as the Stanford-Binet Intelligence Scale, which has been regarded as the standard for the measurement of intelligence.

The idea of intelligence grew a great deal beyond its original scholastic connotations. Techniques of measurement were developed that



in no way resemble the Binet scale, nor were they designed to measure scholastic performance, but to measure the same intelligence as did the Binet scale. Jensen (12) mentioned the English psychologist Spearman who devoted most of his career to studying the finding that almost any test involving any kind of complex mental activity correlated positively with any other test involving complex mental activity. The specific content of each test made no difference. For example, a vocabulary test showed correlations in the range of .50 to .60 with a test that consisted of copying sets of designs with colored blocks. To account for the intercorrelations of these tests, Spearman hypothesized the existence of a single factor common to all tests involving complex mental processes. He thought that all such tests measured this common factor to some degree, which accounted for the intercorrelations between all tests. Spearman called this common factor "general intelligence" or g.

Spearman examined the tests that were heavily loaded with g and characterized the mental processes that they seem to involve as "The ability to educe relations and correlates." In other words the ability to see the general from the specific and the specific from the general. Jensen also mentioned a similar definition of intelligence as stated by Aquinas; "The ability to combine and separate" or to see the differences between similar things or the similarities between different things. As Jensen (12) stated, "these are the processes of conceptualization and abstraction. Tests that call for this kind of problem solving are the best measure for g."



The common feature of all these tests is that they involve the use of reasoning. A simple example of a demonstration of intelligence would be to write a letter on the back of a child. This is a unique stimulus which may never have been encountered before, yet if the child knows the alphabet he will be able to name the letter. This is a type of reasoning or association which characterized intelligence.

Because intelligence is such an intangible thing, and it has been so hard to define and measure, and because of statements like those made by McCloy and Giaque, it became apparent that a measure of achievement would be more suitable for this study.

The Iowa Tests of Educational Development provide a comprehensive and dependable description of the general educational development of the high school student. The tests do not measure the outcome of taking specific courses, but rather what a student has learned in school and throughout his educational career and his life. As Buros has said (13), "The tests emphasize ultimate and lasting outcomes of the whole program of education."

The ITED were developed at the University of Iowa. Buros (13) stated, "it is presently one of the most widely used measures of achievement ever designed."

Buros (13) also said in his book:

The ITED is on some counts one of a number of nearly perfect instruments (within the philosophy and assumptions and present skills guiding achievement test development), and its quality as well as its popularity justify a scrutiny of certain testing practices of which it is an outstanding exemplar.

As an ability test, according to Thorndike (14), it is "Designed to appraise what the individual has learned to do as a result of planned

previous experience or training, often that provided in school."

The ITED test battery is used to measure achievement in four broad areas. They are Social Studies, Natural Sciences, General Math, and English.

The tests under each category are as follows:

- Social Studies:** 90 items -- Understanding of Basic Social Concepts
- 80 items -- Ability to Interpret Reading Materials in Social Studies.
- Natural Science:** General Background in the Natural Sciences
- Ability to Interpret Reading Materials in the Natural Sciences.
- Mathematics:** 53 items -- Ability to do Quantitative Thinking.
- English:** 99 items -- Correctness and Appropriateness of Expression
- 80 items -- Ability to Interpret Literary Material
- 75 items -- General Vocabulary
- 60 items -- Use of Sources of Information.

A composite score is also given, but does not include the last test.

The basic form of the ITED is fairly long and takes four half days of testing. There are 707 items, and 26 reading passages that require 8 hours of working time. Seven of the 9 tests require 55 to 70 minutes.

A shorter version has been developed to be administered in nine class periods. Every test can be taken in a forty-five minute class period. The total working time is five and one-half hours. Efforts have been made to insure that both versions will be comparable in interpretation.



School officials are encouraged to give the tests early in the year so that the data will be influenced as little as possible by the temporary results of current instruction.

A manual is included with the test materials entitled Examiner's Manual for the ITED. It gives complete and explicit instructions for administering the test battery. No coefficient is given for objectivity, but instructions are thoroughly outlined to provide a great deal of objectivity.

As the authors (15) of the test have pointed out, validity in any test is not a single, enduring absolute characteristic that depends on the use made of the scores and the nature of the group tested. The same source has also stated:

A great variety of data may have implications concerning the validity of a test. Almost any information that contributes to our understanding of the ways in which the test may be effectively used, or serves to clarify the abilities that are measured by the test, might be regarded as evidence of validity.

Recognizing these facts, authorities have tried to encourage consistent terminology by which validity can be classified. Thorndike (14) has offered the following types of validity which the ITED has provided figures for: concurrent, predictive, content, and construct validity.

Content validity is defined by Thorndike (14) as "the faithfulness with which the test represents or reproduced an area of knowledge." It pertains to the nature of the skills used by those taking the test in answering questions. By definition it cannot be measured by means of validity coefficients. The authors of the test have stated (15), "The major contribution that test authors can make to the evaluation



of content validity is to describe, in as meaningful terms as possible, the nature of the skills that the test items were designed to assess." Generally the test was constructed to measure several general skills believed to be of lasting importance in adult life.

Another type of validity is predictive validity. Thorndike (14) defined it as "the accuracy with which the test scores make it possible to predict some criterion variable of educational, job, or life performance." It is determined by its usefulness in predicting some future behavior of the examinee. The predictive value of achievement tests generally is used to forecast success in later school. The authors of ITED have said that the test was not designed to predict scholastic aptitude, but several studies have revealed high correlations.

A third type of validity is concurrent validity. Concurrent validity of achievement tests is indicated by agreement of test scores with other pupil achievement scores. Often these scores are compared to grade point average or rank in class. The authors disliked this because it assumed grades were superior to test scores as measures of development. Regardless, the results of various tests were reported in the Administrator's Manual (15).

The final measure of validity is construct validity. Thorndike (14) said: "Construct validity refers to the accuracy with which the test describes an individual in terms of some psychological trait or construct." This includes all measures that help clarify what the test measures. The authors (15) have said that, for achievement tests, construct validity and content validity overlap to a considerable extent as defined here.

TABLE 1

## CORRELATIONS OF COMPOSITE SCORE WITH HIGH SCHOOL GRADES

Grade	Achievement Measure	Correlation	Source
9	Average in Academic Subjects	.50	Cassell and Stanik (16)
12	Rank in Class	.65	Scannell (17)
12	Cumulative Grade-Point Average	.72	Scannell (17)
12	Rank in Class	.60	Hansmeier (18)
12	Cumulative Grade-Point Average	.64	McLaughlin (19)
9-12	Cumulative Grade-Point Average	.63 (girls) .72 (boys)	Green (20)

One type of data that can be regarded as construct validity is based on the relation between the composite score and measures of intelligence or scholastic aptitude.

Thorndike (14) has defined reliability as:

The accuracy or precision with which a measure based on one sample of test tasks at one point in time represents performance based on a different sample of the same kind of tasks or a different point of time or both. Accuracy may be expressed by a reliability coefficient or by the standard error of measurement.

In the administrator's Manual (15) it may be found that each test in the original form was constructed to yield a reliability coefficient of .91. The manual also said that subsequent tests have conformed closely to that standard.



TABLE 2

CORRELATIONS OF COMPOSITE SCORE ON THE ITED WITH MEASURES  
OF INTELLIGENCE OR SCHOLASTIC APTITUDE

Grade	Scholastic Aptitude Test	Correlation	Source
13	ACE Psychological Examination	.744 (N=401)	Hansmeier (18)
9	California Test of Mental Maturity	.593 (N=125)	Cassel and Stanik (16)
9	Henmon-Nelson Tests of Mental Ability	.841 (N=73)	Lamke and Nelson (21)
12	Henmon-Nelson Tests of Mental Ability	.848 (N=82)	Lamke and Nelson (21)
9	Otis Quick-Scoring Mental Ability Tests	.720 (N=443)	Green (20)
10	California Test of Mental Maturity	.782 (N=400)	Los Angeles Public School(22)
11	California Test of Mental Maturity	.781 (N=400)	Los Angeles Public School(22)
12	California Test of Mental Maturity	.796 (N=400)	Los Angeles Public School(22)
9	Otis Quick-Scoring Mental Ability Tests	.799 (N=118)	Kacalek (23)
9	Otis Quick-Scoring Mental Ability Tests	.572 (N=125)	Trueblood (24)

Because of the length of the tests, it is difficult to obtain parallel-forms correlations based on representative groups of students (15). But studies have been done to correlate scores between forms given in consecutive years.



The scores were obtained in the years 1960 and 1961 using forms X-3 and Y-3 in 1960, and X-4 and Y-4 in 1961. The test group consisted of all schools in Iowa giving the test program.

TABLE 3

CORRELATIONS BETWEEN SCORES ON THIRD EDITION AND FOURTH EDITION OF THE ITED, EDITIONS TAKEN ONE YEAR APART

Grade 9 vs. Grade 10	Grade 10 vs. Grade 11	Grade 11 vs. Grade 12
.91	.93	.95
(N=303)	(N=274)	(N=337)

Correlations Given for Composite Score Only.

Because of the full year between tests, differential growth was permitted by students. This means that the scores given are not typical parallel-forms coefficients. They should be regarded as conservative lower limit coefficients.

The ITED was a suitable selection for use in this study. As an achievement test it gave a reliable composite score for each football letterman to be correlated with team success.

#### Delimitations

The following are delimitations to this investigation:

1. those schools in Iowa having a football program,
2. those schools administering the ITED,
3. those schools competing in a conference,

4. omission of all tie games, and
5. football players winning letters during the 1970 season.

#### Limitations

There is one major limitation which could involve many variables, and that limitation was any uncontrollable element that could have effected the outcome of a conference game such as:

1. weather conditions,
2. the emotional tone of the players,
3. the ability of each coach, and
4. the home crowd and home field advantages.

#### Statement of the Problem and Summary

The problem was to determine if there were relationships between academic achievement as measured by the ITED test battery and success in football. Success was defined as a percentage of wins of conference games. The hypothesis was that there is a positive relationship between academic achievement and success in football. The null hypothesis stated that there is no relationship between academic achievement and success in football.

A review of literature revealed that many studies have been undertaken to show relationship between academic success or intelligence and performance in physical activities. The results of these studies have varied greatly. Some studies have indicated a negative relationship. Other studies resulted in no relationship at all. The majority of the studies, however, indicated that there was a positive



relationship between some form of mental measurement and physical performance.

A further review of literature proved the ITED test battery to be a sound measure of academic achievement based on proven norms, reliability, and validity. It was therefore chosen as the method for measuring academic achievement.

## CHAPTER II

### METHODOLOGY

For this study there were two test procedures involved. Both test procedures involved obtaining data from a random sample of Iowa high schools.

The first set of data needed was the season records of the varsity football teams for the 1970 season. The season record was delimited to include only conference games. Winning is a commodity with a great number of variables, and this was an attempt to control these variables in a tangible way. Including conference games only insured that the caliber of the teams involved was approximately equal. It also eliminated the effects, whether positive or negative, of the emotional impact of a non-conference opponent.

In order to correlate academic success with success in football it was first necessary to collect the composite score on the ITED for each football letter winner from those schools sampled. A random sample of 100 schools was selected from the total population of high schools in Iowa. This sample was selected using the tag method. Each school was assigned a number. Then a table of random numbers was used to select the schools to be sampled.

The next step was to survey those schools randomly chosen as the sample group. Two pieces of information were necessary: (1) the



composite score for each letter winner, and (2) the conference record for the football team. A cover letter was drawn up to explain the purpose of the study and to give instructions for completing the survey (see Appendix A, page 28). The first page of the survey provided space for the football coach at each school to simply list all football letter winners for the 1970 season (see Appendix B, page 30). The second page asked the coach to supply the overall team record and the conference record. The coach was then asked to pass this information on to the school counselor for completion. The school counselor was asked to supply the composite score for the names listed on the first page of the survey. The counselor was finally asked to return only page two (Appendix C, page 31) in the self-addressed stamped envelope.

After receiving the raw data from the schools sampled it was first necessary to convert all percentile scores to standard scores for those schools sending only percentile scores. This was done by using figures provided by the test constructors (25).

Next it was necessary to figure an average standard score for each school replying. This was done using a calculator to add all scores and divide by the number of letter winners.

The final step in preparing the raw data was to figure the percentage of wins for each school in their respective conference games. This was done manually by dividing the total conference games played into the number of games won.

It was then possible to make the desired correlation by comparing the average standard score for each team to the winning percentage of conference games. This was done using a computer which



had in storage a program to make this correlation. It was only necessary to punch the data cards and call the program from storage to have the computer do the correlation.

It was hoped that the results of this study would aid coaches and other people in the field in understanding the many factors that contribute to winning. The hypothesis was that those teams made up of students with higher ITED scores win more games. In other words, do those individuals who are better achievers academically also combine to form football teams that win more games?

This study involved very little control in the sense that most experimental research does. Rather it involved the compilation of data that was obtained by each school surveyed. The setting was operational however when the data were collected.

The subjects varied greatly in this study in both age and number at each school. Any male student-athlete from the ninth grade through the twelfth grade could have qualified. The criterion was winning a football letter at each school. This criterion placed no limit on the number of subjects from each school. The number varied from twenty to thirty-seven letter winners.

The principles of experimentation were applied to effectively realize the purpose of the study. The population was defined and correctly sampled. The necessary delimitations were made to limit the scope of the study and to reduce uncontrollable variables. Finally the proper statistical method was applied to determine whether to accept or reject the hypothesis.



There were some assumptions made in this study. They were:

1. the team morale was the same in all contests,
2. the best players for the conditions were participating,
3. the goal of all players was to win,
4. the tests were administered objectively, and
5. each student did his best on the tests.

The justification for the use of this design was easily derived from the title and purpose of the study. That purpose was to show a relationship. To show a relationship a linear regression was performed to determine the correlation coefficient.

The correlation was determined between the percentage of wins and the ITED composite score for each football letter winner at each school. The null hypothesis was that there is no relationship between academic achievement and team success in football. The alternative hypothesis was that there is a relationship between academic achievement and team success.

## CHAPTER III

### RESULTS

Letters were sent to 100 schools that had been selected as the sample. The return from the first letter was 34 schools or 34 percent. A follow-up letter was sent and 22 more schools replied bringing the total return to 56 schools or 56 percent.

A computer was used to determine the correlation and also to do an analysis of variance for the regression. This provided more accuracy and also saved time.

The correlation coefficient was found to be  $-.0079$  as indicated in Table 4 below.

TABLE 4  
MULTIPLE REGRESSION

	Mean	Correlation X vs. Y	Std. Error of Reg. Coefficient
Variable No. 2	20.34	$-.0079$	1.64
Dependent No. 1	53.25		

See Appendix E, page 34 for a list of raw scores used.



Dependent number one above was the average winning percentage of those teams sampled. Variable number two was the average of all the average team ITED scores for the teams surveyed.

TABLE 5  
ANALYSIS OF VARIANCE FOR THE REGRESSION

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Value
Attributable to Regression	1	3.53	3.53	.00337
Deviation from Regression	54	56568.97	1047.57	
Total	55	56572.50		

The F value of .00337 was not significant. To be significant at the .05 level for 60 degrees of freedom a value of 2.79 was necessary. Therefore the F value was not large enough to be significant so the null hypothesis was accepted that there was no relationship between academic achievement and success in football.

## CHAPTER IV

### DISCUSSION

As a football coach, the investigator in this study was interested in studying and identifying a possible variable in winning football games. Football has become such a competitive sport that all aspects of the game must be studied and contended with to attain success. This study has been an attempt to study one of those variables.

The idea for this particular study began developing when the investigator was a high school football player. The teams he played on in consecutive years were very successful, yet highly skilled athletes were not abundant. One characteristic of those teams was, however, outstanding success in scholastic work. This was true in grades received, achievement tests, and intelligence. The idea evolved that there might have been some relationship between those mental characteristics and success in football.

It was believed that boys who take part in after-school activities felt more generally involved in school, or that they were more competitive or otherwise motivated in academic achievement. It may also have been that boys who were active in sports had a generally higher energy or maturity level.

Originally the correlation was going to be made between



intelligence quotients and team success. The use of intelligence quotients was discarded, however, after a review of literature showed that figure to be a difficult one with which to work. Statements like the one made by McCloy (10) earlier in this paper pointed out that a more concrete figure such as academic achievement would be a more standard figure at all schools. Also Giaque (9) influenced the investigator when he said studies involving scholarship ratings should not be used unless they are based on proven norms, reliability, and validity. Therefore, after some investigation into various tests, the ITED composite score was chosen as the measure of academic achievement to be used for this study.

Many people are skeptical to allow their children to participate in athletics because they feel participation will endanger the student's academic success. As may be seen from the results of this study there is no basis to assume football will neither harm nor help academic success. It is not appropriate, however as a result of this study, to make a conclusion one way or the other on this point.

A review of literature also revealed that results have varied greatly when comparing scholastic ability to athletic ability. From reading done, from personal experience, and from talking with people in the field, the investigator expected the results of the study to indicate a positive correlation. From the results, it may be seen that this did not prove to be true. The statistical analysis showed there was no significant correlation. The correlation coefficient obtained was small enough to say that there was no relationship because the figure could have been attributed to chance.

If the study had shown a higher correlation, the information would have proven to be most useful. For example, a coach could use achievement scores of the lower classes as a possible indication of success to come in the future. Or if he had two people of equal physical ability competing for a starting position he could use achievement scores to help make a decision regarding who to start. If the correlation had been higher, achievement scores could have been used as another basis for the coach in selecting the type of athlete who would enable his team to be successful.

Since the statistical analysis yielded no significant coefficient it would prove beneficial to make a longitudinal study to survey a few schools over a long period of time. This would make it possible to study students from the same school environment and students who had been coached and taught by generally the same people. This was the reason for the second recommendation.

These are some of the results that it was hoped would be concluded from the study. However, this did not turn out to be the case.



## CHAPTER V

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### Summary

One hundred high schools were randomly sampled from the state of Iowa and surveyed to collect data. The data obtained were the team conference football record and the composite score of the ITED battery for all varsity football letter winners for the 1970 season. A computer was then used to determine the correlation coefficient between the percentage of wins and the average ITED scores for the players.

#### Conclusions

The conclusions for this study were relatively simple. It was concluded that since academic achievement and team success in football show no relationship to each other, the coach need not consider academic achievement of his players as a contributing factor in winning in the schools sampled in Iowa. The coach needs only to be concerned with academic achievement to the extent that the athlete is eligible to compete, and to the extent that the coach is interested in the athlete as a person and interested in his scholastic success. The results of the study indicated that academic achievement has no bearing on the success of the Iowa high school football teams sampled.

Recommendations

The investigator made three basic recommendations as a result of this study that he believed would prove beneficial to the profession. First, it is recommended that a study be done using intelligence quotient figures rather than achievement figures. It is possible that the successful athlete may be very intelligent yet lack the drive or desire to achieve academically. This type individual would show up high using intelligence quotient figures and low using academic achievement figures.

Secondly, it is recommended that a longitudinal study be made for those reasons explained in Chapter IV.

Finally, it is recommended that a similar study be done comparing achievement scores of participants in interscholastic sports to non-participants in the same school.



**APPENDICES**

APPENDIX A

University of North Dakota  
Grand Forks, North Dakota  
March 10, 1971

Dear Sir:

As a graduate student at the University of North Dakota I am conducting a study in the field of physical education. I am trying to determine if there is any correlation between academic achievement as measured by the Iowa Tests of Educational Development (ITED) and success in football. Success is defined as those teams winning 70 percent or better of their conference games.

As a football coach I am interested in understanding as many of the variables as possible that contribute to winning. One of these variables might be academic achievement. Do the students who have the mental ability and the perseverance to study and achieve in school also combine to form teams that win more games? This is the main question that will be studied in this research project. I hope the results will be helpful to people in the coaching profession and the field of physical education.

I chose to write to the football coach at each school because I felt that because of our common interest in the sport you would be willing to take time and energy to supply the necessary information from your school. It will not, however, require much of your time.

Essentially what I need are the composite scores from the ITED for each football letter winner for the 1970 season. I am sure your school counselor could supply them. It is not necessary that I have any names, only a list of composite scores. If you would complete the "Football Letter Winners for 1970" sheet and then let the school counselor complete the questionnaire it would be most helpful.

The other thing I need is for the coach to complete the first part of the "Team Record and Composite Score" sheet. The information required here is the team overall record and the conference record.



March 10, 1971

Please complete the first part of the questionnaire and then ask the school counselor to finish it. Also ask him to return the completed materials in the self-addressed stamped envelope.

For any help you can give me I am extremely grateful and wish to thank you.

Sincerely,

Tom Pinkham





APPENDIX C

TEAM RECORD AND COMPOSITE SCORE

TEAM RECORD

FOR THE COACH:

Please supply the following information:

1. Season won-lost record: WINS \_\_\_\_\_ LOSSES \_\_\_\_\_
  2. Conference record: WINS \_\_\_\_\_ LOSSES \_\_\_\_\_
- 

COMPOSITE SCORE ON THE ITED

FOR THE COUNSELOR:

Please list below the composite scores for those students listed on the sheet entitled "Football Letter Winners for 1970." No names are necessary.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Please mail this sheet only in the self-addressed stamped envelope.

## APPENDIX D

University of North Dakota  
Grand Forks, North Dakota  
April 21, 1971

Dear Sir:

You may recall that on March 10 I sent a survey letter to be completed by both you and your school counselor. I received no answer and am therefore sending a follow-up letter asking for your assistance. It is extremely important that I receive your reply to insure accuracy of the results.

I am trying to determine if there is any correlation between academic achievement as measured by the Iowa Tests of Educational Development (ITED) and success in football. Success is defined as those teams winning 70 percent or more of their conference games.

As a football coach I am interested in understanding as many of the variables as possible that contribute to winning. One of these variables might be academic achievement. Do the students who have the mental ability and the perseverance to study and achieve in school also combine to form teams that win more games? This is the main question that will be studied in this research project. I hope the results will be helpful to people in the coaching profession and the field of physical education.

I chose to write to the football coach at each school because I felt that because of our common interest in the sport you would be willing to take the time and energy to supply the necessary information from your school. It will not, however, require much of your time.

Essentially what I need are the composite scores from the ITED for each football letter winner for the 1970 season. I am sure your school counselor could supply them. It is not necessary that I have any names, only a list of composite scores. If you would complete the "Football Letter Winners for 1970" sheet and add your team record, and let the school counselor complete the questionnaire, it would be most helpful.

If you so desire, I will be happy to send a copy of the results. Just make a note on the questionnaire when it is returned.



April 21, 1971

I would like to re-emphasize the importance of your assistance to my study. Please be so kind as to complete the materials and return them in the stamped, self-addressed envelope. I will appreciate your help very much.

Sincerely,

Tom Pinkham  
Assistant Football Coach

cjh

APPENDIX E

TABLE 6

RAW DATA

Variable 1	Variable 2
Percentage of Wins	Average Composite ITED Score
67.00	18.50
0.00	22.40
43.00	14.90
88.00	20.30
80.00	21.40
43.00	15.50
0.00	19.20
83.00	20.50
71.00	16.20
43.00	20.50
0.00	24.40
100.00	21.80
0.00	23.40
78.00	23.60
50.00	23.10
14.00	21.80
14.00	19.80
100.00	19.70
57.00	15.70
57.00	21.90
63.00	15.80
50.00	17.20
100.00	20.50
80.00	19.00
57.00	17.90
14.00	17.00
86.00	22.80
86.00	18.70
0.00	18.60
28.00	20.70
0.00	20.90
14.00	21.00
17.00	16.60
67.00	19.50
43.00	18.40



TABLE 6--Continued

Variable 1	Variable 2
Percentage of Wins	Average Composite ITED Score
86.00	18.70
28.00	18.10
63.00	16.20
100.00	18.30
83.00	20.70
80.00	23.00
43.00	20.70
57.00	24.70
11.00	21.90
43.00	18.30
88.00	19.60
14.00	24.50
83.00	24.90
60.00	24.80
83.00	21.80
17.00	21.50
86.00	23.30
28.00	23.50
83.00	23.10
86.00	21.20
67.00	21.20

## BIBLIOGRAPHY

1. Purdy, R. "Athletes Versus Scholars." Scholastic Coach (October, 1949), 53-55.
2. Beebee, F. S. "An Experimental Study of Some of the Factors Involved in Scholastic Success." Unpublished M.A. thesis, State University of Iowa, 1927.
3. Westendarp, Dorothy E. "Mental Capacity and its Relation to Physical Efficiency." American Physical Education Review, XXVIII (March, 1923).
4. Cooper, J. A., and Davis, E. C. "Athletic Ability and Scholarship." Research Quarterly, V (December, 1934), 68-78.
5. Rarick, Lawrence. "Survey of Athletic Participation and Scholastic Achievement." Journal of Educational Research, XXXVII (November, 1943), 174-180.
6. Brace, David K. "Some Objective Evidence of the Value of Physical Education." Journal of Health and Physical Education, IV (April, 1933), 38-41.
7. Beebee, F. S., and Tuttle, W. W. "A Study of the Scholastic Attainments of Letterwinners at the State University of Iowa." Research Quarterly (May, 1941), 33-38.
8. Ray, Howard C. "Interrelationship of Physical and Mental Abilities and Achievement of High School Boys." Research Quarterly, XI (March, 1940), 129-140.
9. Giaque, C. D. "An Inquiry into the Correlation Between Physical Fitness and Scholastic Standing." Research Quarterly, VI (March, 1935), 269-275.
10. McCloy, Charles H. Tests and Measurements in Health and Physical Education. New York: F. S. Crafts Co., 1944.
11. McBroom, Patricia. "Nurture Key to I.Q." Science News, XC (March 8, 1969), 53.
12. Jensen, Arthur R. "How Much Can We Boost I.Q. and Scholastic Achievement?" Harvard Education Review, XXXIX (Winter, 1969), 1-123.



13. Buros, O. K. The Sixth Mental Measurements Yearbook. Highland Park, New Jersey: Gryphon Press, 1965.
14. Thorndike, Robert L., and Hagen, Elizabeth. Measurement and Evaluation in Psychology and Education. New York: John Wiley and Sons, Inc., 1969.
15. The Iowa Tests of Educational Development. Manual for the School Administrator. 10th ed. Chicago: Science Research Associates, 1968.
16. Cassel, R. N., and Stancik, E. J. "California Test of Mental Maturity Weights for Predicting a Composite Score on the Iowa Tests of Educational Development." Journal of Genetic Psychology, XCVIII (1961), 88-97.
17. Scannell, Dale. "Prediction of College Success from Elementary and Secondary School Performance." Journal of Educational Psychology, LI (1960), 128-142.
18. Hansmeier, T. "The Iowa Tests of Educational Development as Predictors of College Achievement." Educational and Psychological Measurement, XX (Winter, 1960), 129-133.
19. McLaughlin, Kenneth Floyd. "Relation of Performance on Iowa Tests of Basic Skills to School Achievement." Unpublished Doctoral dissertation, State University of Iowa, 1950.
20. Green, D. "Relationship Between School Persistence and Grades, Ability, and Achievement of Secondary School Pupils." Unpublished Doctoral dissertation, State University of Iowa, 1958.
21. Lamke, T. A., and Nelson, M. J. The Henmon-Nelson Tests of Mental Ability. Boston: Houghton Mifflin Co., 1957.
22. Los Angeles Public Schools. "Summary Report of Results of Administering The Iowa Tests of Educational Development," Chicago: Science Research Associates, 1956. (Mimeographed.)
23. Kacalek, L. B. "Effectiveness of Iowa Tests of Educational Development in Predicting High School Achievement." Unpublished Master's thesis, Iowa State College, 1955.
24. Trueblood, Gerald Elwood. "Predicting Achievement in Algebra from the Iowa Tests of Educational Development." Unpublished Master's thesis, Iowa State College, 1951.
25. The Iowa Tests of Educational Development. How to Use the Test Results. 10th ed. Chicago: Science Research Associates, 1968.



26. Eidsmore, R. M. "High School Athletes Are Brighter." School Activities, XXXV (November, 1963), 75-77.
27. Pangle, R. "Scholarship Attainment and the High School Athlete." Peabody Journal of Education, XXXIII (May, 1956), 360-364.