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A Study of Scholastic Achievement and Physical Performance at Logan Junior High School

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Two Plan B Reports

A STUDY OF SCHOLASTIC ACHIEVEMENT AND PHYSICAL PERFORMANCE
AT LOGAN JUNIOR HIGH SCHOOL

and

THE COLOR ACHIEVEMENT PROGRAM AS A METHOD OF
MARKING IN THE PHYSICAL EDUCATION CLASS
AT LOGAN JUNIOR HIGH SCHOOL

A STUDY OF SCHOLASTIC ACHIEVEMENT AND PHYSICAL PERFORMANCE

AT LOGAN JUNIOR HIGH SCHOOL

by

Richard Sackett

Report No. 1 submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF SCIENCE

in

Physical Education

Plan B

Approved:

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INTRODUCTION

It has been a common statement by many educators that the athletic type is a person who has "more brawn than brain." Many people assume that low physical ability usually accompanies superior mental ability and high physical ability usually accompanies inferior mental ability. Some members of the academic faculty object to relinquishing school time for athletic and sporting activities. They assume that the majority of the students involved are of the poorer academic type and cannot afford to miss school time for sporting and athletic activities.

Research on previous studies support the contention that mental achievement and physical fitness are related and that there is a consistent tendency between strength and both academic achievement tests and grade point average. Intelligence is not monolithic; it is a composite of mental factors. For example, some students who excel in English find mathematics to be extremely difficult. There is no indication that the correlation between the mental trait that ensures success in English and the mental trait that ensures success in mathematics is greater than the correlation between physical ability and mental ability.

Statement of the Problem

The purpose of this investigation was to study the relationship between grade point scores and physical performance scores of junior high

school boys .

Delimitations

There are many different types of physical performance tests . This study was concerned with the effect of one type of physical performance test, Deseret News Junior Pentathlon Program (5) .

Definition of Terms

1. Deseret News Junior Pentathlon--An athletic program which has been organized to develop skill in two major sports: track and field, and basketball. The events included are broad jump, high jump, ball put, and basketball goal throw.

2. Scholastic achievement--Determined by student's grade point average.

3. Coefficient--Each subject is allotted points for his height, weight, and age; the total of which is known as the coefficient score.

4. Deseret News Junior Pentathlon event mark--The subject's performance made in each of the five events, for example the number of baskets made in the basketball goal throw.

5. Deseret News Junior Pentathlon point score--Subjects receive points for their performance in each of the five events according to their coefficient.

REVIEW OF LITERATURE

Many academic teachers down-grade the scholastic efforts and abilities of athletes. They assume that physical education endeavors attract individuals who do not succeed academically (6). Previous studies support the contention that mental achievement and physical fitness are related. Terman stated that after 25 years of studying intellectually gifted children:

The results of the physical measurements and medical examination provide a striking contrast to the popular stereotype of the child prodigy, so commonly predicted as a pathetic creature, over-serious, undersized, sickly, hollow-chested, nervously tense, and bespectacled. There are gifted children who bear some resemblance to this stereotype, but the truth is that almost every element in the picture except the last, is less characteristic of the gifted child than of the mentally average. (19, p. 13)

Educators and researchers, with primary interest in helping the slow learner, mentally retarded, and the immature youngster improve their skills in arithmetic, speaking, spelling, writing, and reading have been studying a remedy based on physical education. There are many schools that are using running, walking, jumping, climbing, etc. in the elementary grades to help improve language arts and arithmetic ability. Students participating in this program have been described as living examples that physical development plays a major role in the learning of academic skills.

Dr. Delacto (Philadelphia Institute) explains that the problem of poor achievement is caused by a delay or disorganization of neurological

growth. Dr. Delacto states:

A normal child goes through certain definite steps of neurological development during the first six to eight years of his life, as specific areas of his spinal cord and brain develop. A great abundance of the proper sensory stimuli from a youngster's environment is essential to full and proper development at each stage. The brains of children who are deprived of these stimuli--either because of brain injury or because of factors in environment--do not develop fully. Such youngsters have difficulty in learning. (13, p. 1)

Many educators are organizing combined language arts and physical education programs to help overcome deficiencies.

The value of the physical education program in aiding scholastic achievement will depend upon the variety of movement experiences in the many motor activities, stressing a modest performance in all the activities not just one or two. If the physical education program can do this it will help to ensure a high standard of academic achievement (2).

Studies conducted in Manchester, England, revealed that only 2.35 percent of the students who were above average in scholarship were below average in physique as determined by body measure and 39.7 percent with poor scholarship were below average in physique (1).

A study in England of 180 boys from a large grammar school was conducted on the relationship between games performance and intelligence. The boys' ages were from 9 to 15. Their level of game performance was assessed on the participation attained within the school sports program. The game score for each boy was then compared with his intelligence score. Start (18) found a positive correlation between intelligence and games performance; however, the correlation was not statistically significant.

A survey by Eidsmoe (7) was made of the academic standing of the members of 16 boys basketball teams representing their school in the Iowa State High School Tournament. The results of the survey were very satisfying, especially to those who were advocates of physical education. The grade point average of the 168 basketball boys was 2.566. The grade point average for the members of all the classes in which these players were enrolled was 2.186. Eidsmoe (7) was urged to make a similar survey of football players. Those encouraging the undertaking represented the point of view that basketball demands rapid action and thinking, whereas football requires less thinking and more strength.

Thirty top ranking Iowa high school football teams were chosen for the survey. Academic grades of the 24 players on each squad who played the most during the football season were used in the study. The total grade point average of the football players was 2.523, whereas the grade point average of their non-participating classmates was 2.085.

In another study by Eidsmoe (6) involving girls basketball teams in the Iowa State Tournament an even wider departure in academic performance in favor of the participating athletes was found. The grade point average for the 96 girl basketball participants was 2.887 on a 4-point system and a 2.288 grade point average for the non-participating girls in the same classes.

"To the layman, athletes are 'dumb' all brawn and no brains--who somehow get through school by divine providence and the grace of kindly teachers," (4, p. 56). Connor (4) felt a need to undertake a study

dealing with this problem. During a five year span from 1950-1954 the 774 graduating seniors from Alexandria High School in Minneapolis were used in Connor's investigation. Of the 774 subjects, 74 had lettered in one or more of the school's five interscholastic sports; baseball, basketball, football, golf, and track. The study compared mental ability and scholastic achievement of non-athletes and athletes. The data in Table 1 compare the scholastic averages and mental ability ratings of (a) the senior letterman, (b) the senior non-letterman, and (c) the entire senior class. At Alexandria High School the athletic teams are composed of boys with greater mental ability and greater achievement records than the non-athletes in Alexandria High School.

Snyder (17) found that many persons believe superior mentality and superior physical development do not go hand in hand. However, his findings indicated that children who are superior mentally seem more apt to have better physical development and coordination than the average child. One can have both "brains and brawn;" each aspect may supplement and reinforce the other.

Recently a case study at Purdue University was completed in a special program of gross motor activities designed as therapy to facilitate academic school achievement. The program was a loosely structured one of problem-solving activities designed to elicit movement patterns and to permit experimentation. The treatment consisted of gymnasium activities including trampoline, mats, apparatus, rhythm instruments, and swimming. The students selected for the study were

Table 1. Comparison of scholastic averages and mental ability of athletes and non-athletes

Year	Number in class	Number of letterman	Number of non-letterman	Class scholastic average	Letterman scholastic average	Non-letterman scholastic average	Class average I.Q.	Letterman average I.Q.	Non-letterman average I.Q.
1950	156	14	142	2.31	2.39	2.30	103	105	103
1951	130	11	119	2.35	2.59	2.33	105	105	105
1952	164	15	149	2.37	2.23	2.39	104	106	103
1953	141	14	127	2.48	2.56	2.47	105	110	104
1954	<u>183</u>	<u>20</u>	<u>163</u>	2.49	2.68	2.46	105	110	105
	774	74	700						
Five year average				2.40	2.49	2.39	104	107	102

having academic achievement problems even though they had normal or above average intelligence. All participants showed improvement in grades and achievement test scores. A matched group of non-participants did not show comparable results (9). The author did not elaborate on the method of experimentation.

Weber (20) in his study of physical fitness and academic grades at the State University of Iowa found a significant relationship between physical fitness scores and grade point averages; a correlation of .41 which was at the 1 percent level of significance. Weber (20, p. 471) concluded "this finding indicates that good physical fitness, as measured

tended to accompany, fairly well, achievement of academic success during the year for the subjects studied." The study used 246 male freshman at the State University of Iowa. A physical fitness test was given to each subject. The test consisted of (a) sit-ups for two minutes, (b) pull-ups, (c) 100 yard pick-a-back run, and (d) 300 yard shuttle run. An average score was derived for each subject. The grade point score was based upon the subject's grade for his freshman year. The grade point average for the year was correlated with the physical fitness score of the 246 subjects.

Gleason and Klausmeier (8) made a study of 120 third and fifth grade children comparing physical growth and academic achievement. In this study they used children who were below the mean age of height, weight, strength, and mental achievement in reading, arithmetic, and language. Uneven growth in height, weight, and strength of grip development tended to be accompanied by uneven and low achievement in reading, arithmetic, and language among the group tested.

A study on the affect of college football participation and its effect on academic achievement was attempted at Indiana State College. Harwick's (11) findings indicated that participation in varsity football does cost something in terms of academic achievement. No attempt was made to evaluate the worth of participation.

A large number of the hours required to participate as a varsity football player are ill timed since the game must go on regardless of what

academic assignments, projects, or tests are scheduled. This is not the case in most high schools and junior high schools.

In the field of physical education and general education there is much controversy over the place and importance of programs for physical fitness in connection with the total education of the student. Hart and Shay (10) attempted to discover whether or not a relationship exists between the academic achievement and the level of physical fitness. A correlation of .449 was found between academic success and physical fitness which was significant beyond the .01 level of confidence. Although physical fitness is not a general predictor of academic success it is high enough to be considered as a necessary factor for the improvement of academic index in the general education of students (15).

In Shaffer's (16) study of variables affecting Kraus-Weber failures, a positive correlation was found to exist between intelligence quotient and Kraus-Weber test failures. As intelligence increased Kraus-Weber failures decreased. Clarke and Jarman (3) studied 217 white male students of Medford, Oregon. They were given three strength and two growth measures. The boys were put into high and low scoring groups and equated by use of intelligence quotients. There was a consistent tendency for the high groups on the experimental variables to have higher means on both academic achievement tests and grade point average. The difference between means were not always significant. Two groups of third grade students and their scholastic capabilities were studied by Rarick and McKee (14). Motor proficiency tests were given to the two groups. One

group scored high and the other low on the motor tests. The superior motor performance group demonstrated better scholastic adjustment, as evidenced by the large number of subjects with high intelligence and excellent or good ratings in reading, writing, and comprehension.

May (12) reports that there is a definite correlation between physical ability and mental ability; however, this correlation is not great enough to permit success in predicting mental status for individuals, knowing physical status, or predicting physical status knowing mental status.

It has been concluded by Welty (21) that there is no conclusive evidence that extra curricular activities are detrimental to better academic achievement. Through the use of a questionnaire, 41 seniors from a high school senior class were selected on the basis of the greatest amount of participation in extra curricular activities. The group studied was above average in intelligence and achievement having an I.Q. of 111.9. The achievement of the group in school subjects was an average of B or better.

Results strongly indicate that we need to revise our thinking or perhaps our prejudices (6). May (10, p. 49) states, "Too often we forget that physical education is education through the physical, not merely education of the physical."

METHOD OF PROCEDURE

The purpose of this study was to see if a relationship exists between grade point scores and Deseret News Junior Pentathlon scores of seventh grade boys at the Logan Junior High School. An attempt was made to determine the extent to which grade point average and physical performance are correlated.

In order to carry out this investigation it was necessary to select a method of obtaining scores in both physical performance and scholastic achievement. Deseret News Junior Pentathlon scores were used as a measure of physical performance and the students' grade point average as a measure of scholastic achievement.

The Deseret News Junior Pentathlon scores were selected as a measure of physical performance for the following reasons:

1. Represents an athletic program to develop skills in track and field and basketball.
2. Its events have been planned to exercise the factors of speed, strength, accuracy, agility, coordination, and skill.
3. Could be used in large groups.
4. Test was developed for junior high school age boys.
5. Test scores eliminated subjective judgment.

The subject's grade point average was selected as a measure of scholastic achievement for the following reasons:

1. Furnished a reliable measure of subjects scholastic achievement.
2. Easily acquired.

Subjects

Two daily seventh grade boys physical education classes at the Logan Junior High School served as subjects. The two classes represent approximately one-half of the seventh grade enrollment. Students are assigned to their physical education class at random. All subjects were approximately 12 years of age. There were 47 students participating in the study.

Experimental Design

Letter grades from the seventh grade curriculum were taken from the permanent record cards for the first three quarters of the school year 1965-1966. The grade points were determined on a 4-point system.

A grade equal to four points

B grade equal to three points

C grade equal to two points

D grade equal to one point

F grade equal to no points

The Deseret News Junior Pentathlon program was administered to each subject and scores compared with their grade point average. The Deseret News Junior Pentathlon events have been planned to exercise the factors

of speed, agility, coordination, accuracy, strength, and skill.

Subjects were classified depending upon their coefficient score. In the coefficient system a boy is first allotted points for his height, weight, and age; the total of which is known as his coefficient score. Boys having a coefficient of 299 and below were classified as juniors. All subjects used in this study were classified as juniors. The Deseret News Junior Pentathlon event scores (times, numbers, height, and distance) and Deseret News Junior Pentathlon point scores were correlated with the grade point average.

Tests

Tests which were used in the Deseret News Junior Pentathlon were 50 yard dash, broad jump, high jump, basketball goal throw, and ball put. The events have been planned to exercise the factors of speed, agility, coordination, accuracy, strength, and skill.

Test one--50 yard dash

Each contestant ran against time. Two boys ran together each being timed with separate watches.

Test two--broad jump

In the broad jump each subject was allowed three jumps and was credited with the best of the three jumps. The measurement of the jump was made at right angles from the take-off and extended to the nearest

break in the ground made by any part of the jumper's body.

Test three--high jump

Each subject was allowed three jumps at each height, and a failure on the third jump disqualified the subject.

Test four--basketball goal throw

The starting line for the basketball goal throw was the regular free throw line, 15 feet from the face of the backboard. A half circle one inch thick was plainly marked on the floor eight feet in radius from a point in the middle of the face of the backboard.

The initial toss was made from back of the free throw line. Subjects could advance after the ball left their hands.

After the try for goal was made or missed, the ball was retrieved by the subject and returned to the eight foot restraining line for subsequent tries for goals. Conveying the ball to the restraining line for subsequent tries for goal was made in the same manner as prescribed for advancing the ball in basketball (no traveling).

This event required that each subject score as many baskets or goals as possible within a 2-minute time period. Each subject was given six 2-minute tries, and the average of the six tries was recorded for each subject.

Test five--ball put

In the ball put a five pound ball was used and was put from a seven

foot circle by means of an arm-push from the shoulder. Each subject had three trials and was credited with the best of these.

ANALYSIS OF DATA

Introduction

The purpose of this investigation was to study the relationship between grade point averages and Deseret News Junior Pentathlon scores of seventh grade boys. The relationship was determined by correlating Deseret News Junior Pentathlon scores and grade point averages.

Forty seven students participated in the study. The Deseret News Junior Pentathlon program was administered, and the grade point average was compiled for each student. At the conclusion of the study grade point averages were correlated with Deseret News Junior Pentathlon event marks and Deseret News Junior Pentathlon point scores by the use of the experimental rank difference method.

Results and analysis

At the conclusion of the study each subject had 10 scores; five Deseret News Junior Pentathlon event scores and five Deseret News Junior Pentathlon point scores. Correlations with grade point average were run on the following measures: number of baskets, points for baskets, ball put distance, points for ball put, height of high jump, points for high jump, distance of broad jump, points for broad jump, time for dash, and points for dash.

Correlations of the student's grade point average and each of the 10 Junior Pentathlon event and point scores were determined using the experimental rank difference method. A correlation of .372 was needed to be significant at .01 level of probability, and in order to be significant at the .05 level of significance the correlation was .288. Correlations of the 10 scores and their corresponding level of significance are found in Table 2.

Table 2. Correlation of grade point average and Deseret News Junior Pentathlon point and event scores

Event	Correlation
Broad jump for distance	.441**
Broad jump for points	.550**
Ball put for distance	.173
Ball put for points	.206
High jump for height	.236
High jump for points	.322*
Basketball Number of baskets	.412**
Basketball for points	.457**
50 yard dash time	.419**
50 yard dash for points	.472**

*Significant at 5 percent probability.

**Significant at 1 percent probability.

It can be seen from Table 2 that there was a positive correlation between the scores made by subjects in broad jump for distance, broad jump for points, number of baskets made in basketball goal throw, basketball for points, 50 yard dash for time, 50 yard dash for points, and their corresponding grade point scores. This correlation was significant at the .01 level of probability. There was a positive correlation between the scores made by subjects in high jump for points and their corresponding grade point scores. This correlation was significant at the .05 level of probability. There was also a positive correlation between the scores made by subjects in ball put for distance, ball put for points, high jump for height, and their corresponding grade point scores; however, this correlation was not significant.

It is interesting to note in Table 2 that the correlations of the grade point average and the Deseret News Junior Pentathlon point score is higher in all five cases than the correlations with the corresponding Deseret News Junior Pentathlon event mark.

The findings in this investigation indicate that the coefficient system which gives the little subject the same chance as the big subject in the Deseret News Junior Pentathlon point score also gives the subject with the higher grade point average a slight advantage.

The author has made no attempt in this study to determine the reason for the lower correlation of both ball put and high jump.

SUMMARY

The purpose of this study was to see if a correlation existed between scholastic achievement as measured by student's grade point average and physical performance as measured by the Deseret News Junior Pentathlon scores. The investigation was conducted at the Logan Junior High School at Logan, Utah, using 47 seventh grade boys.

Grades from each subject's curriculum were taken from the permanent record cards. Grade points were averaged using the 4-point system. The Deseret News Junior Pentathlon program was administered to each subject, and the scores were compared with the subject's grade point average. The experimental rank method was used to determine correlations. Correlations of the 10 Deseret News Junior Pentathlon event and point scores and their corresponding grade point average are found in Table 2.

Physical education programs and academic achievement are related in at least four ways (2):

1. Improving positive self concept by social and emotional development.
2. Emphasis on motor skill development.
3. Promoting physical fitness.
4. Teaching knowledge regarding good health practices.

It has been stated by Bucher (2) that more research is needed to define and establish the exact relationship of health, motor skills, and

physical activity to scholastic achievement. A close "affinity" does exist. The kind of physical education program which leads to both improved physical and social fitness is extremely important to the total education and scholastic achievement of every student.

Conclusion

The findings of this study indicate that there is a positive correlation between performance in certain physical skills and performance in scholastic achievement as measured by the student's grade point average and that this finding is consistent with other studies in this area.

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