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Relationship of Physical Fitness to Success in Junior High Among Sunnyside Junior High Boys

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RELATIONSHIP OF PHYSICAL FITNESS TO SUCCESS IN JUNIOR HIGH AMONG SUNNYSIDE JUNIOR HIGH BOYS

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CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS USED

The public and the schools have again been reminded of the importance of physical fitness among America's youth, this time in the form of suggestions from the President's Council on Youth Fitness. The problem did not lie in the programs of all schools across the nation, but many programs had been neglecting the "physical" in their programs.

Along with many suggestions about what to do about poor programs came some old familiar comments about the advantages of being and staying physically fit. The President's council reported:

> Physical fitness is but one aspect of fitness, however, it is a very significant aspect and one which is basic to other forms of excellence (21).

The old Roman quotation, "A sound mind in a sound body" (26:29), was also mentioned as a reason for "reemphasizing" fitness.

These are but two of the many comments concerning physical fitness and its contributions to the social, mental, and psychological factors which make up the child.

Whether or not physical fitness does make a contribution to the social, mental, and psychological make up of the child is yet to be accepted by many people.

I. THE PROBLEM

Statement of the problem. It was the purpose of this study to show what relationship, if any, exists between the characteristics of physical fitness and success, as measured by grade achievement, attendance, and social prestige, among Sunnyside Junior High boys.

The criteria for success as dealt with by this study were developed as follows: It is generally considered that scholastic achievement in the form of grades is a basis for success by most parents. Parents also generally agree that attendance has a bearing on achievement and therefore was also selected as a criterion for success. Many parents also base their child's success on the number and "quality" of his friends. For the most part, election to school offices is a matter of popularity, especially at this age level. For this reason, membership and offices held in school organizations was also selected. The exact definitions of these terms are given in the following paragraphs.

Physical fitness in this study was measured by three fitness tests, two of which are well known in the field of physical education. The youth fitness test of the American Association of Health, Physical Education, and Recreation, hereafter referred to as the AAHPER youth fitness test, the Elder Physical-Motor Fitness Test, and a six item test referred to as the activity test will be the measuring devices for determing physical fitness. The administration and scoring of these tests is covered under procedures.

The major sub-problems dealt with were the administration, scoring, and recording of the results of the many tests used in the study, the collection and recording of all data pertinent to the measurement of success, a statistical analysis of the collected data, and a summary of the findings with recommendations for further study.

Importance of the study. Most of the studies in this area have been done with regard to one characteristic at a time. Many of these were concerned only with athletic abilities. Less has been done to determine the relationship which might exist between physical fitness and other

characteristics as a group. Although it was necessary to deal with these factors individually in the study, the analysis and summary combines them into the term success.

Delimitation of the problem. In this study 196 boys from grades 7, 8, and 9 were used. The study covered a two year period and concerned itself one year with the boys as 7th and 8th graders, and the following year, the same boys as 8th and 9th graders. In the beginning there were 301 boys, but only those in attendance for the entire two year period were considered in this study.

The tests were given both in mass and individually. The mass tests were closely supervised by the instructor and student assistants. The individual tests were given by the instructor. Because three tests were used, some of the items were repeats, however, they were given only once and the results were recorded on all tests where they applied. The tests were used as the sole measure of physical fitness, thus, only the physical traits measured by these tests were considered.

Limitations of the study. This study made no provision for differences in motivation, thus the highly

motivated may have done considerably better than one not so highly motivated. It is assumed that because of the number of boys in the test, high and low scores will cancel each other.

II. DEFINITIONS OF TERMS USED

Activity test. A six item test designed for use at Sunnyside Junior High which consisted of these items: over hand chins, push-ups, sargent jump, 600 yard run, sit-ups, and leg lifts.

Attendance. The attendance officers list absences as sickness or personal reasons. Only those absences due to medical reasons were considered.

Extra-Curricular organization. Any school sponsored organization which is voluntary in nature and elects officers.

Grades. Each student at Sunnyside Junior High is enrolled in seven classes each day and all seven of these grades were considered.

Grade point total. The numerical values which determined the grade point total were these: A = 4, B = 3, C = 2, D = 1, and X = 0. The sum of the seven numerical grades was the raw score for achievement.

Junior high boys. For the purpose of this study, junior high consisted of grades 7, 8 and 9.

Physical activity. Physical activity means any organized event or situation which was of value in increasing physical fitness.

Physical fitness. Those traits which were measureable by the physical fitness tests used in this study--AAHPER test, Elder test, and the activity test.

Success. As used in this study, success was considered to be made up of grade achievement, school attendance, and social adjustment and prestige.

X. The grade used to denote failure in a subject was an X.

III. ORGANIZATION OF THE REMAINDER OF THE THESIS

Chapter II contains a review of pertinent information in the form of other studies similar to or related to this one.

Chapter III lists the procedures that were followed to collect the necessary data to solve the problem. Administration and scoring of the various tests used are included.

The analysis of data is reported in Chapter IV. Information regarding techniques of analysis are explained as they relate to the results of the study.

The summary, conclusions and some recomendations for further study can be found in Chapter V.

CHAPTER II

REVIEW OF LITERATURE

Much has been said about the benefits of being physically fit especially since the "national limelight" was again put on fitness. Various claims are made about what being fit can do for the individual in terms of increased work output, more enjoyable leisure time, and just plain feeling better.

Much has also been written about the beneficial effects of a high level of physical fitness, and although they are not specifically concerned with the total subject of this study, articles have been written and other studies made relating physical fitness to the components of scholastic achievement, social prestige, and health. These have been grouped in this study and called success.

In scanning the literature related to this study, the most generally accepted definition of fitness was the one expressed by the AAHPER Fitness Conference of September 1956 (1:8-9) in which they defined fitness in this way:

> Fitness is that state which characterizes the degree to which a person is able to function. It implies the ability of each person to live most effectively within his potentialities. Ability to

> function depends upon the physical, mental, emotional, social, and spiritual components of fitness, all of which are related to each other and are mutually interdependent.

This definition is all encompassing and includes components not directly covered in this study. However, the committee added these comments in expanding their definition.

> This means that each person in order to satisfy his own needs and, at the same time, contribute his share to the welfare of society must possess optimum organic health consistent with heredity and the application of present health knowledge. He must also possess sufficient co-ordination, strength, and vitality to meet emergencies, as well as the requirements of daily living.....(1:8-9)

Johns, Sutton, and Webster (15-187) further define physical fitness as being "a condition, a state of readiness, of preparation to do a job. It is a desireable state in which the body is prepared to meet effectively the requirements of the environment in which it is placed."

With this definition of total fitness and that of physical fitness in mind this writer reviewed the available pertinent literature relative to this study. Although physical fitness has been related to success as a whole, for clarity the findings have been dealt with separately as they may apply to the total concept of success.

Physical fitness related to achievement. Probably the most widely heralded study relating physical fitness to achievement is that done by Appleton (8) in which he noted that at the United States Military Academy, over a ten year period, a significant positive relationship existed between the physical abilities of entering cadets and the criterion of success or failure to graduate from the academy. This, of course, is a very positive statement by Appleton that according to his findings physical fitness and achievement are definitely related to some degree.

Raney (23) also found among the 600 boys and girls tested that those who were rated best at playing physical games were also superior in intelligence and general ability. Physical fitness would necessarily have to play some part in the children's abilities in vigorous physical games, causing one to conclude again that physical fitness is related in some way to the intelligence measured in this study.

Snyder (3:18) reports this relationship a little differently in his thesis when he states that youngsters

who are highly endowed mentally seem more apt to have better physical development and be better coordinated than the average.

Hollis J. Caswell, President Emeritus of Columbia University, (7:1) states, "During 25 years of teaching experience, I found there is an undeniable correlation between physical fitness and mental fitness." Dr. Caswell is attesting to the importance of a strong physically fit youth who will be able to tackle the ever-increasing complexities of the academic classroom.

Johns, Sutton, and Webster (15:190) further exemplify this thought when they say that "The physically fit person is able to perform work for longer periods of time with less exhaustion." To the modern day student, expecially college bound students, beset with long hours of both mental and physical work, it means greater opportunity for success.

In an article published by the AAHPER (2) it was stated that lack of physical activity is making children soft and it's slowing down their thinking processes. A man once said "If you want to know if your brain is flabby, feel your legs." The article further noted that physical fitness means survival and at all times it is the basis of intellectual achievement.

Physical fitness as related to health. This relationship is probably more readily accepted than any of the others discussed in this study. It is easier for the lay person to see and understand this possible relationship. A physically fit body would naturally lead one to expect that it was also a healthy body. This would seem to be a logical assumption. Literature concerned primarily with this relationship was not found to be plentiful possibly because it appears too obvious to warrant extended study.

The Tea Council of the United States (26:2) reported that a person who is physically fit will get more enjoyment out of life, look better, study better, work harder, and get the most fun out of life. They further state that being physically fit will help build a good foundation which will carry over into later life. The fitness habits formed early in life will enable a person to stay active longer, be healthier, and enjoy a happier and longer life.

Hein and Ryan (13) reported that the fit person lives a more productive life, a more satisfied life, is better able to cope with everyday emergencies, is more resistant to disease, and will probably live as long or longer than someone who is not fit.

Withers (33:117) quotes Hipocrates, the father of medicine, as saying "exercise strengthens while inactivity wastes....."

Van Liere, (30:153) in his study of exercise and the body, expressed a view that exercise will give more years to life. He further comments:

> It is accepted by many people, including physicians, that a certain amount of physical exercise is beneficial to the physical development and health of the human being, and that it increases work capacity and prolongs life.

Wells (32) found a high relationship exists between fitness and students who were less emotional, less anxious, more poised, and more sure of themselves. Those who were emotional, less poised, and less sure of themselves scored lower on his 38 item battery of fitness tests. These characteristics could influence both attendance and work output for the school child.

A negative attitude is expressed by Hess and Fultz (14:369) in their study of the damaging effects of strenous exercise. "Certain studies based on premises difficult for those who value exercise to accept, have suggested that some undesireable outcomes may be possible."

Many expressions, not necessarily based on research, can be found in recent articles advocating that physical fitness will make you "feel better", "work better", "live longer", "be happier", and "enjoy life more". All of these comments seem to add to the contention that most people are in agreement that physical fitness is related to health and healthy living even though they may not understand how or why they are related.

Physical fitness as related to social adjustment and prestige. Social adjustment and social prestige, or popularity as it would affect junior high boys, is probably not readily seen to be related to the level of physical fitness of an individual, however it may affect success as it is dealt with in this study. It has become a measure of success to the junior high boy for he is sometimes accepted or rejected by a group on the basis of his popularity in the student body. Many clubs and organizations in the junior high are also measures of a student's popularity especially when election of officers or appointment to committees is left to the group.

Several articles and studies were found showing a definite relationship to exist between physical fitness and prestige among student peers at the various levels of school.

Cowell (9:286-306) discusses the importance of social acceptance early in life and relates this to physical fitness in this way:

> There is a lot of interaction which centers around physical skill. Children lacking motor or physical skills are often eliminated from social participation. The development of the human personality cannot progress without the social group. Our life is a highly social order thus physical activity is necessary from kindergarten through high school to develop social learnings which will help the person to be accepted later in life.

The physical activity called for by Cowell is that vigorous type which is highly beneficial to the body physically which in turn will aid in the social development of the child.

Though working with only twenty boys, Rarick and McKee (22:142-152) discovered that the ten with a high level of motor achievement tended to be more frequently well adjusted in school and personal relationships. This study of third grade boys further indicates that a high level of physical and motor development is related to social adjustment.

Friendship and companionship, of special importance to boys of junior high age, is related to physical fitness according to Furfey (12:47-61) who found in his study that when boys select buddies, physical development had a larger correlation with companionship that did intelligence or other characteristics tested. Wellman (31:126-131) also found this to be true in her study of school children's choices of companions. She found that differences in size, strength, and health seemed to be more important in social acceptance than moderate differences in intelligence.

It would seem to be generally accepted that physical fitness and athletic participation on a varsity level would be fairly highly related. This being the case, the athlete has more of an opportunity to acquire social prestige than does the non-athlete. The opinion is substantiated by several studies. Tuddenham (29:257-276) found that many studies demonstrate that athletic prowess contributes to social prestige. He states, "Athletic competence, daring, and leadership is a source of prestige for boys."

Tryon, (28:4) found in her study of some evaluations of adolescent personality by adolescents, that in early

and middle adolescence social excitement is directed toward the athletic leader or a person whose physical abilities give status.

A moderately high relationship between social status and athletic ability in almost all age groups of junior high boys in Texas was found to exist by McGraw and Tolbert (16:72-78).

Flowtow, Marks, and Ondrus (11:498-504) also discovered that members of athletic teams and boys with high sports scores had higher social status than boys who had low sports scores or did not make the team. This was uncovered in their charting of social relationships of school children.

The above mentioned studies were found by this writer to be most closely related to the subject of this study. Though they all seem to be pointed towards the idea that physical fitness is definitely related to these components of success in junior high school, they were not selected on that basis. Very few studies were found to dispute this idea in the available sources. In fact, only one such study could be found and it has appeared in the preceding paragraphs.

CHAPTER III

PROCEDURES

In an attempt to solve the problem of what relationship, if any might exist between physical fitness and success in school among 7th, 8th and 9th grade boys, it was decided to extend the study over a two year period. This was due mainly to the amount of time available to carry out the study, especially during the first year. For this reason, the first year was concerned with physical fitness as related to grades, a measure of success. The following year the same boys were used to determine the relationship which might exist between fitness and attendance, a measure of health, and fitness and social prestige.

I. FIRST YEAR: INITIAL TESTS

Explanation and administration of the AAHPER youth fitness test. The AAHPER youth fitness test is used at Sunnyside Junior High as part of its testing program and was therefore selected as one of the tests to be used in this study. It has national norms and is scored on a percentile score based on the classification index for grouping the students. The index takes into consideration

age, height, and weight. Particulars of the index and the test can be found in the test manual published by the AAHPER (4).

The test was administered the first week of school, before any instruction or exercises were performed. This was to show the status of the students at the beginning of the school year. The tests were administered according to the instructions given in the AAHPER test manual. The students were asked to do their best in each test. The tests were given in a two-day period. The test card used for the recording of data appears in Figure 1.

Each student recorded his raw score on the card after completing each test. When the test was completed the raw scores were changed to percentile scores according to the classification and percentile indexes listed in the test manual. This was done by the instructor and his student assistants. The percentile scores were totaled by machine and the total recorded in the appropriate places on each card.

FIGURE 1.

SCORE CARD FOR RECORDING
RESULTS OF AAHPER TEST

SUNNYSIDE JUNIOR HIGH SCHOOL
DEPARTMENT OF PHYSICAL EDUCATION
AAHPER YOUTH FITNESS TEST

Name_____ Date_____

Personal Data	Trial 1	Trial 1 Exponent	Trial 2	Trial 2 Exponent
Age in months	____	____	____	____
Height in inches	____	____	____	____
Weight	____	____	____	____
Sum of Exponent		____		____
Classification		____		____

	Raw Score	Percentile	Raw Score	Percentile
Pull-ups	____	____	____	____
Sit-ups	____	____	____	____
Shuttle run	____	____	____	____
Standing Broad Jump	____	____	____	____
50 yard dash	____	____	____	____
Softball throw	____	____	____	____
600 yard run	____	____	____	____
	Total	____	Total	____

Computing the mean and median. The total of each student's test was considered to be his raw score for fitness as measured by the AAHPER test. When the tests were completed the mean was computed by the use of the grouped frequency distribution of the raw scores as discussed by Clarke (8:399-401). The median was also computed from the same frequency table. The methods and formulae used are discussed later in this study.

The mean was of the most value in this study since it is necessary to do additional statistical computations from it.

In addition to the measures of central tendency mentioned above, the standard deviation was computed, as was the standard error of the mean, and the probable error.

From this information, the standard score for each case was computed and recorded for use in the correlations.

Explanation and administration of the Elder Physical-Motor Fitness Test. The Elder test was used in this study because the instructor was familiar with the test and because norms for the school had been established the year before. This test was also given during the first

week of school according to the instructions received from Central Washington State College. The test consisted of push-ups, burpees (20 second), a zig-zag run, standing broad jump, (this test had been given before in the AAHPER test and was not repeated for this test), and a test of flexibility.

FIGURE 2.

SCORE CARD FOR RECORDING
RESULTS OF ELDER TEST

SUNNYSIDE JUNIOR HIGH SCHOOL
DEPARTMENT OF PHYSICAL EDUCATION
ELDER'S PHYSICAL (MOTOR) PERFORMANCE TEST

Name_____Age_____Grade_____Date_____

ACTIVITY	INITIAL RS-TS	1st QTR. RS-TS	2nd QTR. RS-TS	3rd QTR. RS-TS	4th QTR. RS-TS
Push-ups	__ __	__ __	__ __	__ __	__ __
Burpees (20 Sec.)	__ __	__ __	__ __	__ __	__ __
Zig-Zag	__ __	__ __	__ __	__ __	__ __
Broad Jump	__ __	__ __	__ __	__ __	__ __
Flexibility	__ __	__ __	__ __	__ __	__ __
Composite	__ __	__ __	__ __	__ __	__ __

This test was given in a one day session by the use of stations. The instructor gave part of the tests and his student leaders conducted the others. The students were instructed to do their best on all the tests. The students recorded their raw scores on the score card. When the tests were complete, the instructor and the student leaders converted the raw scores to "T" scores with the use of the conversion chart.

Computation of the mean and median. Following the conversion of raw scores to "T" scores the data was handled in the same manner as that of the AAHPER test. Standard scores for each case were computed for further use in the correlations.

Explanation and administration of the activity test. This test was constructed at Sunnyside Junior High and had been in use for some time, as the sole measuring device of the testing program. The norms for the school had been established the year before on the basis of 475 cases.

The test battery included several tests which had been given before in the other two tests. These tests were not repeated here but, instead, the results were

transferred from the other tests to this one. The tests were given and supervised by the instructor and his student leaders. Raw scores were changed to "T" scores and the total of each student's "T" scores became his raw score for this test. Statistical computations used on the other tests were repeated here and the standard scores for each case were computed and recorded for further use in the correlations with achievement.

II. END OF THE FIRST QUARTER

Readministration of tests and recording of grades. In addition to readministrating the Elder test and the activity test (The AAHPER test was given as an initial test and again at the end of the school year.) and computing all of the statistical information before mentioned, it was necessary to record the total of the seven grades that were achieved during the first quarter of school. These first quarter grade totals were correlated with the results of the fitness tests given at the beginning of the year to determine if a relationship existed.

The grade total was recorded beside each student's name with the individual grades having these numerical

values. Each"A" was worth 4 points, each "B" 3 points, each"C" 2, each "D" 1 point, and each failure received 0 points. The total of the seven grades was considered to be the student's raw score for achievement. These raw scores were grouped on a frequency table and the before mentioned statistical procedures were again followed yielding the mean, median, and standard score for each case.

The fitness tests were given again at the end of this quarter so that their results could be compared with the grades to be earned in the coming quarter.

III. REMAINDER OF THE YEAR

During the remainder of this first year the same procedure was followed at the end of each quarter. The grades received at the end of each quarter were related to the level of fitness reached at the beginning of that quarter. All statistical computations were the same as used in the previous quarter. All procedures and results were handled identically. At the end of the last quarter, however, the final quarter grades were correlated with the final fitness tests rather than the tests given

at the beginning of the final quarter. This was done to relate the achievement to the highest level of fitness reached during the year--in most cases.

IV. SECOND YEAR: INITIAL TESTS

Scope of the study the second year. The second year the study was concerned with the relationship which might exist between physical fitness and attendance and social status. The administration of the fitness tests was done in the same manner as the previous year. The study was interested only in absences due to sickness so any absence not due to sickness was considered as a day in attendance. The attendance officers recorded this information in the office.

Reporting attendance. The attendance was recorded in much the same way as the grades were. The total number of days present for the semester was recorded beside the student's name. The semester basis was chosen because the larger numbers made the computations easier and more accurate. The frequency table was again used as were all of the before mentioned statistical procedures. The standard scores for each case were computed and the correlations with physical fitness were made for each semester.

Reporting of social data. During the final year of the study, information about the social success of the students was recorded. A list was kept of those students who belonged to clubs or organizations in the school. Special notations were made for those boys who were elected to offices.

These notations were used in a percentage analysis and also in an individual score analysis to determine if a relationship existed between the student's social status and his level of fitness. The comparisons were with the final quarter fitness scores.

CHAPTER IV.

ANALYSIS OF DATA

The statistical computations of this study were in the form of correlations and their levels of significance. As mentioned before the mean and median were computed from grouped frequency tables. The statistical methods are those discussed by Clark. (8)

FIGURE 3.

FREQUENCY TABLE FOR THE COMPUTING OF SOME OF THE ELEMENTS OF STATISTICS

Number $= N$ $\quad M = AM \pm \frac{fd}{N} \cdot I \quad \sigma_m = \frac{\sigma dist.}{\sqrt{N}}$

Range $= R$ $\quad \sigma = I\sqrt{\frac{\Sigma fd^2}{N} - \left(\frac{fd}{N}\right)^2} \quad P.E._{.} = .6745\sigma_r$

Interval $= I$ $\quad "z" = \frac{X-M}{\sigma} \quad P.I.{}_{.} = 1 - \sqrt{1 - r^2}$

AM (Asumed Mean) =

$"r" = \Sigma \frac{z \cdot z}{N} \quad \sigma_r = \frac{1-r^2}{\sqrt{N}}$

Interval	Frequency (f)	Distance (d)	fd	fd_2
Totals or Sums ( )	_____	_____	_____	_____

I. THE RELATIONSHIP OF PHYSICAL FITNESS TO GRADES EARNED IN JUNIOR HIGH SCHOOL

Initial physical fitness and first quarter grades. Three physical fitness tests were given to determine the level of fitness of each student at the beginning of the school year. The results of these tests were correlated with the total grade point score at the end of the first quarter to determine if a relationship existed between the variables being tested.

AAHPER test. The AAHPER youth fitness test was first to be correlated with the first quarter grades. The mean of the test was 370.11± 2.70. The range of scores was 590. The standard deviation was 122.5. The mean for the first quarter grades was 13.48± .10 and the standard deviation was 4.76. Computing the Pearson product-moment "r", a positive correlation of .202± .02 was found to exist. A correlation of .202 has a predictive index value of only .02, making this test's predictive value 2% better than chance.

Elder test. The Elder test was the second test to be related to the first quarter grades. The mean for this test was 251.44± .60, and the standard deviation was 39.31. The range of scores was 236. The same mean

for grades, 13.48± .10, was again used and the product-moment "r" computed was a positive .362± .02. This correlation gave the Elder test a predictive value of 7% better than chance in predicting achievement in the form of total grade point score from the results of the fitness test.

Activity test. The activity test and first quarter grades were related next. The mean for the activity test was 314.78± 1.07 with a standard deviation of 49.4. The range of scores was 321. Again the grade point statistics were used yielding a positive correlation of .337± .02. This correlation gave the activity test a predictive value of 6% better than chance in predicting grade outcome from its results.

FIGURE 4.

FIRST QUARTER
FITNESS TEST STATISTICS

Test	Mean	Range	"σ"	Correlation	Predictive Value
AAHPER	370.11	590	122.5	.202	2%
Elder	251.44	236	39.31	.362	7%
Activity	314.78	312	49.4	.337	6%
Grades	13.48	24	4.76		

Second quarter relationships. Because the AAHPER youth fitness test is used at Sunnyside Junior High only twice a year, at the beginning and at the end of the school year, only two tests were used to relate physical fitness and scholastic achievement, in the form of grade point total.

Elder test. At the end of the second quarter of school the results of the fitness tests given at the beginning of this quarter were related to the grade point totals that were earned during this period. The mean for the second quarter Elder test was 289.1± .86. The standard deviation was 39.33. This mean represented an increase of 38 points over the previous quarter, indicating an increase in physical fitness of the group as a whole. The standard deviation was only slightly higher. The range was larger (260) than on the previous test. The mean for the second quarter grades showed a slight decrease to 12.98± .11. The standard deviation was slightly larger at 5.08.

The correlation from these figures was identical with that of the previous quarter, .362± .02. This indicated that the same positive relationship existed even though the grade point mean dropped slightly.

Activity test. The results of the activity test showed a slightly different picture than those of the Elder test. The mean of the activity test rose to 332.78± 1.20 with a standard deviation of 54.6. The range of scores, 317, was 5 less than the previous quarter. This test was correlated with the results of the second quarter grades and a positive correlation of .426± .02 was found to exist. This is nearly .09 higher than the previous quarter correlation of the same two variables. The predictive value was 9% better than chance.

FIGURE 5.

SECOND QUARTER
STATISTICAL COMPARISONS

Test	Mean	Range	"σ"	Correlation	Predictive Value
Elder	289.11	260	39.33	.362	7%
Increase	37.69	24	.02		
Activity	332.68	317	54.6	.462	9%
Increase	17.90	-5	5.2	.125	3%
Grades	12.98	24	5.08		
Increase	-.50	0	..32		

Third quarter Elder test. Tests taken during the third quarter of school indicated the level of fitness at that time and were compared with the grades earned during that same period to show what relationship they might have. The mean of the Elder test for the third quarter was 304.44± .86 which was 15.33 points higher than the previous quarter and 53 points higher than the initial test. This was an indication that the students were definitely increasing their level of fitness as measured by this particular test. The standard deviation for the test was 37.2 and the range was 265, 5 points wider than the previous test and 29 wider than the initial test.

The grade distribution was much the same as in the previous tests as the mean was 13.15± .11, .17 above the previous quarter but still slightly less than the initial grade point mean of 13.48. The standard deviation for this quarter was 4.98 and there was a 25 point range in the distribution of scores.

The correlation between the Elder fitness test and the grade point total for the third quarter was +.341± .01. This correlation was only slightly smaller than those of than those of the previous quarter, which indicated that the relationship, although small, still existed between the two variables.

Activity test. The third quarter activity test also indicated an increase in the level of physical fitness of the students. The test yeilded a mean score of 343 ± 1.16 which was about 10 points higher than the previous quarter and 29 higher than the initial test. The range of scores from high to low remainded the same as the previous quarter.

The statistics of the third quarter activity test showed a positive correlation of .406± .02 which was .02 less than the previous quarter's results. This is not large enough to be statistically significant. The predictive value of this correlation was 8% better than chance, 1% less than previously.

FIGURE 6.

THIRD QUARTER
STATISTICAL COMPARISONS

Test	Mean	Range	"σ"	Correlation	Predictive Value
Elder	304.44	265	37.2	.341	6%
Increase	15.33	5	-2.1	.02	-1%
Activity	343.00	317	52.4	.406	8%
Increase	10.32		-2.2	-.06	-1%
Grades	13.15	25	4.98		
Increase	.17	1	- .10		

Final quarter statistics. The fourth and final quarter of the first year all three of the fitness tests were again given. The AAHPER youth fitness test was given to determine the improvement made from the beginning of the school year to the end of school, so it was used again in the correlation study.

AAHPER test. The AAHPER youth fitness test had a mean score of 531.74± 2.60 which represented an increase of 161.1 over the initial test. The standard deviation was 118, slightly less than in the previous test. The mean for the fourth and final grade totals was 13.42± .01 and the standard deviation was 4.94. The difference in the two means (first and last quarters) was a scant .06 indicating very little change in the grades earned as a group during the entire year. The correlation between the AAHPER test and the final grade total was .265± .02 which has a predictive value of only 3% better than chance in predicting grade point outcome from the results of the fitness test scores. The correlation was only slightly higher than when the first test was given.

Elder test. The final quarter results of the Elder test showed a mean score for the test of 323.92± .87. This mean represented an increase of nearly 20 points over the

previous quarter. The range of scores was 258, slightly less than the third quarter spread. The standard deviation of the test was 40.6. Correlation with the fourth quarter grade totals resulted in a positive correlation of .379± .02 and a predictive value of 7.5%

The correlations found in the tests involving the Elder test and grade point totals, although all slightly different, really varied very little. The differences were hardly significant. The results did show however, that a positive correlation does exist between fitness as shown by the Elder test and the grade point totals earned at Sunnyside Junior High by the boys involved in this test.

Activity test. The final quarter for the activity test showed the mean to be 373.50± 1.20 and the standard deviation, 54.6. The range from high score to low was 363, 46 higher than the previous quarter, showing a widening of the extremes. The activity test correlated with the grades for this quarter showed a positive correlation of .419± .02, only a slight variance from the previous tests. The results shown from this test also indicate that a positive correlation exists between fitness,

as shown by the activity test, and the grade point total earned. Even though the correlation is not high, the relatively consistent correlations are an indication of a true relationship.

FIGURE 7.

FINAL QUARTER
STATISTICAL COMPARISONS

Test	Mean	Range	"σ"	Correlation	Predictive Value
AAHPER	531.74	565	118	.265	3%
Increase	161.1	-25	-4.5	.06	1%
Elder	323.92	258	40.6	.379	7.5%
Increase	19.48	-7	3.4	.038	1.5%
Activity	373.50	363	54.6	.419	8%
Increase	30	46	2.2	.013	
Grades	13.42	25	4.94		
Increase	.27	0	-.04		

II. THE RELATIONSHIP OF PHYSICAL FITNESS TO ATTENDANCE IN SCHOOL

This study was to determine the relationship of physical fitness to attendance in school but was interested only in the health aspect of that attendance. For that reason, any days absent which were not due to illness or in some way related to health were not used. The clerical staff at Sunnyside Junior High School recorded the attendance of all students and color coded them according to illness or non-illness. It was then a simple task to record the attendance score for each boy in the study. The raw scores reported in this section will be total days present less the number of days absent due to illness or other related health factors.

First Semester. During the second year of this study the activity test was dropped as one of the fitness tests used by the junior high and as a result it was no longer used in this study. The remaining two tests were used, however.

The Elder Physical-Motor Test was again used as a measure of physical fitness to be related to the

attendance factor. The test was given at the beginning of the quarter and compared to the attendance results at the end of the first semester. The mean score for the Elder test at the beginning of the year was 229.42± 1.04 and the standard deviation was 47.32. The range of scores from high to low was 268.

The results of the attendance records showed a mean score of 73.74± .12 with a standard deviation 5.66. There was a range of 23 days difference between high and low scores. The correlation of the Elder fitness test with the attendance results yielded a positive correlation of .605± .02 which has a predictive index value of 21% better than chance in predicting outcome from the results of the tests.

The AAHPER test was also used in the second year's study as a determiner of fitness. The mean established on this AAHPER test was 466.63± 3.01 and the standard deviation was 133.51. The range of scores was a high 590. Correlating these results with the attendance results produced a positive correlation of .616± .008. This correlation has a predictive value of 22% better than chance. This correlation was the highest of the entire

study and compared with that of the Elder test and attendance indicates a definite positive correlation between fitness and attendance at Sunnyside Junior High among boys in this test.

Second semester. The same procedure was followed for the second semester. The final attendance total for the year was related to the final level of fitness achieved by each boy in the study. The final results of the Elder test revealed a mean score for the test of 280.89 $\pm$ .92 with a standard deviation of 40.8. The mean was considerably higher than before indicating an increase in fitness throughout the year. The standard deviation was slightly less and the range was also less than in the previous test indicating a drawing together of the extremes.

The attendance for this period was handled as before and a mean score of 170.55 $\pm$ .16 was attained. The standard deviation was 7.26. The correlation of these two tests yielded a positive correlation of .465 $\pm$ .02 and a predictive value of $\frac{1}{2}$ the same test's results earlier in the year. The possible causes of this drop will be discussed later in the summary of this study.

The results of the final quarter AAHPER test showed a mean score of 525.56± .61 and a standard deviation of 115.8. The range of scores decreased from 590 points to 520 points. These test results correlated with those of the attendance report showed a positive correlation of .432± .02 with a predictive value of 9.9%. This predictive value was even less than the previous test. As mentioned before the possible reasons for this drop will be discussed in the summary of this study.

III. THE RELATIONSHIP OF PHYSICAL FITNESS TO SOCIAL ADJUSTMENT AND PRESTIGE

In the study of the relationship which might exist between physical fitness and social adjustment and prestige, the determining factor was status in the school as measured by membership in school organizations and elected offices in those organizations.

There were 85 boys in this study who were members of school organizations and of these 22 held elected offices at some time during the school year. Of these 85 boys, 63 of them were above the mean of the fourth quarter

AAHPER fitness test. This represented 74.4% of the group. Twenty-two, or 24.6% were below the mean of the AAHPER fitness test. Of the 22 boys who held offices in these organizations, 19 were above the mean of the AAHPER test and 3 were below. This was 86.3% above the mean and 13.7% below the mean.

When compared with the Elder test, 56 boys were found to be above the mean of the fourth quarter test. Twenty-nine were below the mean. This means that 65.9% were above and 34.1% were below that mean. Of those boys who held offices in these organizations 15, or 68.2%, were above the mean and 7, or 31.8%, were below the mean.

When the same 85 cases were compared with the median scores of the AAHPER test, 60 of these were above the median and 25 were below. This is a 70.5% to 22.8% division. The boys who held offices in these organizations were divided 17 above the median and 5 below the median for a 77.2% to 22.8% division.

There were 55 boys above the Elder median score and 30 boys below the median. This represented 64.7% above and 35.3% below the fourth quarter Elder median score. The 22 officer's scores were divided 15, or 68.2%, above the median and 7, or 32.8%, below that median.

In addition, the president of the student body had the 9th highest score on the AAHPER fitness test and the highest score on the Elder test when the final tests were taken. The vice president of the student body ranked 44th on the AAHPER , well above the mean and median for the test. On the Elder test, he was 4th of the 196 boys in the test.

Each month of the school year the faculty votes on the "citizen of the month" award for each grade (7th, 8th, and 9th). Of the 27 students selected, 11 were boys and only one of these boys fell below the mean or median on either of the fitness tests. This one boy was considerably below the mean and median on both tests.

CHAPTER V.

SUMMARY

Summary and conclusions. The purpose of this study was to determine what relationship, if any, existed between physical fitness, as measured by the AAHPER fitness test, the activity test, and the Elder Physical-Motor Fitness Test, and success, as measured by scholastic (grade) achievement, school attendance, and social adjustment and prestige, among Sunnyside Junior High boys.

The test was conducted over a two year period using the same 196 boys, one year as 7th and 8th graders and one year as 8th and 9th graders. The results of all tests were recorded for each boy and converted to standard scores and later correlated with the results of the measurements of the other variables of the study. In addition to the Pearson"r", the standard error of "r" and the predictive significance of the "r" were also computed. A percentage analysis and an individual score analysis were also used to determine if a relationship did actually exist among the variables of the study.

After consideration of all the findings of this study it was concluded that definite positive relationship does exist between physical fitness, as measured by the three tests, and success, as defined for this study, among the 196 Sunnyside Junior High boys considered in this study. The extent or degree of relationship is somewhat less definite.

The fitness-achievement correlations, although small, are significant according to Clark's (8:431) statement "In order to be practically certain of a relationship between two variables, the correlation should be at least three times its standard error or four times its probable error."

In the fitness-attendance correlations the initial correlations were fairly high indicating a good correlation between these two variables. However, the final correlations were somewhat less than those in the initial tests. It is believed that this significant drop at the end of the year is possibly related to a yearly situation in the Sunnyside school district. Each Spring the district delays the start of school one hour in the morning to allow students to cut asparagus before coming to school. Many

of these students get up at 5:00 a.m. to begin work and just make it to school before the final bell. In fact, many times they are either late or don't make it to school at all, in which case, parents sometimes write excuses saying my son did not feel well this morning, and hence these are recorded as "health or medical excuses". These students were often absent in the morning but returned to school in the afternoon feeling fine.

Even when this possibility is ruled out, a definite positive correlation was found to exist between fitness and attendance in this study.

The relationship between fitness and social adjustment and prestige is slightly harder to prove as definite in this study, but percentages found definitely lean toward the student who is more physically fit as being better adjusted and accepted socially than those who are significantly below the means of the various tests of fitness. In short, it is concluded that those boys found to be more physically fit had a better chance of succeeding in Sunnyside Junior High than those boys who were found to be in a low physical state.

Because of the consistant results, it is thought that the Elder Physical-Motor Fitness test was the most valuable measuring device for fitness in this study. It has been used previously to relate fitness to health.

Recommendations for further study. Further tests involving the variables of fitness and achievement or social adjustment would probably result in some having higher positive correlations, some lower positive correlations, and possibly some negative correlations.

It is recommended that further study in this area include a better measure of social status among peers, possibly a sociogram among the boys in each class. It is also suggested that a single fitness test be selected to measure fitness of the individual for the several used in this study did not yield significantly different results to warrant the use of several tests.

Another related area of study would be among girls of this age group using similar measuring devices and including such things as personal appearance (posture, carriage, height-weight ratio and poise) social popularity, and personality.

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APPENDIX

FIRST YEAR
COMPARISON OF MEANS

Test	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
AAHPER	370.11			532.00
Elder	251.45	289.11	304.44	324.00
Activity	314.78	332.68	343.00	374.50
Grades	13.48	12.98	13.15	13.42

FIRST YEAR
COMPARISON OF STANDARD DEVIATION

Test	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
AAHPER	122.50			118.00
Elder	39.31	39.30	37.2	40.6
Activity	49.4	54.6	52.4	54.6
Grades	4.76	5.08	4.98	4.94

FIRST YEAR
COMPARISON OF
CORRELATIONS AND PREDICTIVE SIGNIFICANCE

Test	First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
	"r"[1]	PI[2]	"r"	PI	"r"	PI	"r"	PI
AAHPER	+.202	2%					+.265	3%
Elder	+.362	7%	+.362	7%	+.341	6%	+.379	7.5%
Activity	+.337	6%	+.426	9%	+.406	8%	+.419	8%

[1]Correlation between that fitness test and grades for that quarter.

[2]Predictive index value of the correlation.

SECOND YEAR
COMPARISON OF MEANS
AND STANDARD DEVIATIONS

	First Semester		Second Semester	
Test	Mean	Standard Deviation	Mean	Standard Deviation
AAHPER	466.63	133.51	525.65	115.81
Elder	229.42	47.32	280.89	40.83
Attendance	73.74	5.66	170.55	7.26

SECOND YEAR
COMPARISON OF CORRELATION
AND PREDICTIVE SIGNIFICANCE

	First Semester		Second Semester	
Test	"r"[3]	PI	"r"	PI
AAHPER	+.616	22%	.432	10%
Elder	+.605	21%	.465	11%

[3]Correlation between that physical fitness test and attendance.

SECOND YEAR
ANALYSIS OF SOCIAL PRESTIGE
AND PHYSICAL FITNESS MEANS

Number of students in school clubs or organizations - 85

Number of students who held offices in these clubs - 22

CLUB MEMBERSHIP

Test	Number Above Mean	Percentage	Number Below Mean	Percentage
AAHPER	63	74.4%	22	24.6%
Elder	56	65.9%	29	34.1%

OFFICERS IN CLUBS

AAHPER	19	86.3%	3	13.7%
Elder	15	68.2%	7	31.8%

SECOND YEAR
ANALYSIS OF SOCIAL PRESTIGE
AND PHYSICAL FITNESS
MEDIANS

Number of students in school clubs - 85

Number of students who held offices in these clubs - 22

CLUB
MEMBERSHIP

Test	Number Above Median	Percent	Number Below Median	Percent
AAHPER	60	70.5%	25	29.5%
Elder	55	64.7%	30	35.3%

OFFICERS IN CLUBS

AAHPER	17	77.2%	5	22.8%
Elder	15	68.2%	7	32.8%