A Relationship Between Physical Fitness and Social and Academic Achievement of Junior High School Girls

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A RELATIONSHIP BETWEEN PHYSICAL FITNESS
AND SOCIAL AND ACADEMIC ACHIEVEMENT
OF JUNIOR HIGH SCHOOL GIRLS

A Thesis
Presented to
the Graduate Faculty
Central Washington State College

In Partial Fulfillment
of the Requirements for the Degree
Master of Education

by
Shirley Mae Oakes
August 1966
APPROVED FOR THE GRADUATE FACULTY

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CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS USED

I. THE PROBLEM

Statement of the problem. This study was made to determine the relationship between scores made on the California Physical Performance Test and the Academic Achievement of seventh grade girls in Springstowne Junior High School, Vallejo, California. A second purpose was to determine the relationship between the physical fitness test scores and social preference scores as indicated by a sociometric test.

Importance of the study. In the fields of physical education and general education there seems to be a disagreement as to the importance of physical fitness in relation to the total education of the child. Through this study the researcher made an attempt to help clarify the meaning of "total education."

Most studies of this nature have been in relation to boys or men from high school to college age. Therefore, there is a need to examine the relationships of physical performance and academic achievement among girls.

Some studies have been made on the relationship of physical fitness and social acceptance pertaining to
athletes. It was of interest to see if girls who do well on physical performance tests are also socially preferable to their peers.

Scope of the problem. One hundred sixteen seventh-grade girls attending Springstowne Junior High School, in Vallejo, California, were used in this study.

Limitations. This study did not take into consideration the possible influence of socio-economic factors.

Basic assumptions. The California Physical Performance Test is a measurement of physical fitness.

Social achievement can be measured.

Academic achievement is most generally measured by grade-point average.

II. DEFINITIONS OF TERMS USED

Physical fitness. A characteristic determined by scores on the California Physical Performance Test.

Academic achievement. For the purpose of this study, academic achievement was represented by Grade Point Average, or GPA, a numerical score derived from the average of all grades received by a student during a given quarter.

Intelligence Quotient. The IQ's were measured by the California Short-Form Test of Mental Maturity, S-57.
Social achievement. For the purpose of this study it was determined by the results of a socio-questionnaire.
CHAPTER II

REVIEW OF THE LITERATURE

Physical fitness in the United States of America has gone through three periods of promotion. First, President Theodore Roosevelt "publically advocated the vigorous life as a way to make our nation strong" (69:1155). Secondly, during World War I, twenty-seven states passed laws requiring physical education to be taught in the public schools after the poor physical condition of our recruits was publicized. The third promotional phase, inspired by the poor condition of post-war recruits, began after World War II. First President Eisenhower and later President Kennedy expressed concern with the fitness of the nation (69:1155). It has been said that "Fitness is a fleeting thing, it comes and it goes" (71:9).

Historically, different nations have used physical fitness for youth as support for political and social ideologies, such as 19th century Germany and Sweden, and 20th century Italy, Germany, and Russia (69:1155). The Germans used youth fitness as a part of their military propaganda while the ancient Greeks thought of it as cultural beauty. Oberteuffer says:

To guard the health of the nation is a worthy ambition no matter what our destiny may be. To control disease, to improve nutrition, to prevent mental and
nervous diseases, to seek emotional, social, and intellectual stability, and to secure appropriate growth and development of children and youth becomes almost as abiding national passion (69:1155).

President Kennedy was concerned with the plight of our youth. He wrote:

If our bodies grow soft and inactive, if we fail to encourage physical development and prowess, we will undermine our capacity for thought, for work, and for the use of those skills vital to an expanding and complex America (54:17).

In the Purpose of the Study, the writer referred to the terminology of "total" education. Just what is included in this term? If physical fitness development can develop in an individual potential in his physical being, his social acceptance, and his intellectual attributes, is it not educating the whole person?

Fred Hein, Director of Health Education, Department of Health Education, American Medical Association, stated that:

In a broad sense, fitness may be used to refer to over-all well being, which has moral, intellectual, social, and emotional components as well as physical ones (40:34).

Dr. Delbert Oberteuffer, professor of Physical Education at Ohio State University, says that "To educate means to enrich the capacities of human intelligence" (69:1157).

The Minister of National Education of France, Marie Therese Eyquem, stated in 1960 that:

Physical exercise, in fact, gives a child a sense of equality, self-mastery, ease and proper self-
appraisal. He can adjust better to group living, has a sense of social responsibility, and a respect for just discipline (26:13).

The conclusion of this chapter will present a review of the related literature as referring to pertinent parts of this study and will be subheaded as follows:

I. Literature on the Relationship of Physical Fitness to Academic Success or Grade Point Average.
   A. Positive Relationships
   B. Negative Relationships

II. Literature on the Relationship of Physical Fitness to Social Acceptance.
   A. Positive Relationships
   B. Negative Relationships.

I. LITERATURE ON THE RELATIONSHIP OF PHYSICAL
FITNESS TO SOCIAL ACCEPTANCE

A. Positive Relationships

There seems to be conflicting views on whether or not there is a relationship between physical fitness, intelligence, and grade-point averages. Jacobsen cited several early studies done by Hilderbant, Rogers, and Caldwell and Wellman. In 1917, Hilderbant conducted research with 100 high school girls in Illinois. The "50 girls who stood
highest in physical training were definitely higher in academic scholarship than the 50 who stood lowest" (46:282). Rogers, in 1922, completed a study in California using twenty students. "The scholarship records of athletes were 4.45 points above those of all pupils and were higher than those of non-athletes of equal mental ability" (46:282). In 1926, Caldwell and Wellman studied sixty-three boys and fifty girls. They found "Athletes slightly older, lower in intelligence, higher in scholarship, were taller, more extroverted and more proficient in physical activity than all pupils" (46:283).

These early studies were weak as some used monthly failures instead of marks or test scores, questionable standards, and a limited number of subjects.

Appleton (1:82) in his study of West Point Cadets, found that those who entered the Academy low on the fitness scale tended to remain low and showed a greater degree of failure to complete the course than those who entered high on the fitness scale.

Jarman, citing Popp's study of sophomore high school boys, reported that after giving the Physical Fitness Index test to the boys of Coos Bay, Oregon, Popp selected for his study the top twenty and the bottom twenty boys. He found that "only one boy in the top fitness group failed to graduate with his high school class, while eight boys in the low group did not graduate with their class" (47:10-11).
Jarman (47:99), testing high school boys as a part of the Medford Project, and McMillen, testing high school girls, found that Physical Fitness Tests do predict academic success.

In his study of 296 high school freshmen, Kemp found that "the successful athletes had higher grade-point averages and stayed in school longer than the non-successful athletes" (53:29). McCollum supports this study by using the AAHPER Test of Physical Fitness, the California Test of Mental Maturity, and the grade-point averages for the whole year. He found no significant difference in IQ between the fit and the unfit, but "the difference in grade-point average is significant at the .02 level of confidence" (62:28).

Beaney, in a study of British children eight to eighteen years old, found a correlation of $r = .32$ between play ability and general ability. He stated that:

The results obtained . . . in this research also point to the fact that marked ability in Games correlated high with Intelligence, while poor play ability shows a low correlation (3:251).

Bushar emphasizes this in a quote from Radler and Kephart's book, *Success Through Play*:

Motor activity of some kind underlies all behavior including higher thought processes. In fact any behavior . . . can function no better than do the basic motor abilities upon which it is based (7:38).

One study concentrated on special conditioning exercises for those freshmen who achieved low scores on the
physical fitness tests. The tests consisted of sit ups (2 minutes), pull ups, 400-yard pick-a-back run, and 300-yard shuttle run. Sills used the entrance tests for the entering freshmen at the University of Iowa and their grade-point average for the semester the student was involved. He found "there is a higher correlation between gains in physical fitness and academic success for low level fitness students than for high-level fitness students" (82:337).

Ray did a study of 432 Palo Alto, California, high school boys with his records covering from one to four years. He used the Terman Group Test, academic grades, and a specially designed decathlon to test physical fitness. "Within the limits of IQ group, this study finds physical ability a more reliable predictor of academic standing than is relative IQ" (74:140). Ray continues, "The athlete is not only superior in mental ability as measured by IQ, but more superior as measured by academic failures" (74:141).

A number of researchers "found that students with the lowest Physical Fitness Index scores were above the average of their class in scholastic aptitude, but were generally doing poorer academic work" (17:17). Failure to develop physical fitness puts a stumbling block on productivity, creativity, and a "ceiling on genius" (43:38). Thus, if a body is easily fatigued, the mind and body will not react to their potential. Howe (43:13) refers to Lewis
Terman, concurs with this idea based on his twenty-five year study of the gifted child. Leitae (58:15) has shown that giving exercise to people between work periods, thereby reducing mental fatigue, improves their mental performance.

Third grade children found to be superior in motor ability tests also demonstrated better academic achievement than a similar group whose motor ability was poor (17:19-20).

Jarman cited a study which took place in France and Belgium. The academic load was reduced by two or more hours per day and the time allowed for physical education and physical improvement in health was increased. "As would be expected, a general improvement in health and physical development followed; however, there was also a corresponding increase in academic achievement" (47:22). Stein discussed a study by Oliver and another by Corder similar to this. Oliver's study involved institutionalized mentally retarded boys twelve to fifteen years old in England. The experimental group improved significantly in physical fitness and emotional stability. Intelligence quotients increased in twenty-five per cent of the experimental group. "No significant improvements in I.Q. were reported among the control group" (86:26) Corder also used retarded boys for his subjects. The group that received the planned physical education period "showed significant gain scores over the control group on the full and verbal scales of the
Wechsler Intelligence Scale of Children" (86:26). His study was limited to eight boys in each group.

According to Gutin "there seems to be a moderate but significant relationship between degree of fitness improvement and degree of improvement in mental task ability following stress" (36:3744). In his study he used a control group of twenty-six Hunter College students who had twelve weeks of physical fitness and another group of twenty-six who had no physical fitness exercises. The groups were given a series of mental tasks followed by forty-five minutes of a low intensity period of physical and mental exertion. Both groups were pre-tested and post-tested using the Indiana Motor Fitness Index. Analysis of covariance and t-tests for unmatched groups applied to pre-test and post-test gain scores of mental task scores indicated that:

... within each group a correlation coefficient was obtained between the pretest-posttest fitness gain scores and the mental task gain scores. A coefficient of correlation was also derived for both groups combined (36:3743).

Ward (95:19), in his doctoral dissertation, reports that "Seegars and Postpichal found a definite correlation between intelligence and athletic ability of boys, ages 11-16. Brighter boys tended to achieve better scores on the athletic ability tests."

According to Bucher,

Recently, such authorities as Arnold Gesell, Arthur T. Jersild, and the Swiss psychologist Jean Piaget,
found that a child's earliest learnings are motor (involving neuromuscular systems and resulting in movement such as running, jumping, reaching, etc.) in nature and form foundations for subsequent learnings (7:38).

This theory has been put to use by educators and researchers to help the slow learners, immature youngsters, and mentally retarded students improve their skills in reading, writing, speaking, spelling, and arithmetic. They have prescribed a remedy based on physical education. As a result, primary grade pupils are creeping, walking, skipping, galloping, jumping, hopping and marching—with the ultimate aim of improving language arts and mathematics (73:11).

These motor movements have been utilized by physical therapists where brain damage has occurred. This is called patternning, according to Stein, who states:

This rehabilitative therapy is based upon the assumption that all brain cells are educable and that when some of these cells are damaged, those unaffected will gradually, with training, take over the function of the afflicted cells. As motor ability improves, lost sensory perceptions also return. This process has shed new light on the potential for motor development, not only in the brain injured, but for all mentally retarded regardless of cause (86:27).

Howe, in his study of normal and retarded children, found that "the normal children were consistently superior to the mentally retarded on a variety of motor skill tasks (43:354). Stein and Pangle support this view stating:

The mentally retarded tend to perform two to four years behind their normal peers, a relationship which suggests that the two groups are more nearly alike in motor function when compared on the basis of mental rather than chronological age (87:37).
In evaluating work completed with the emotionally mentally retarded, Stein and Pangle found evidence that "significant I.Q. gains have been achieved by EMR boys participating in programs of planned and progressive physical education activities" (87:38).

Bucher cited Keogh and Benson who worked with forty-three under-achieving boys, ages 10-14, in experimental work at the Psychology Clinic School at UCLA. "They found that as individuals, half of the boys from 10 to 12 years old exhibited poor motor performance" (7:39).

In referring to the gifted student, Snyder says, "Actually, youngsters who are highly endowed mentally seem more apt to have a better physical development and be better coordinated than the average" (84:18).

In 1950 Weber tested 246 male freshmen at the State University of Iowa. He used the Iowa Physical Efficiency Profile and their academic grades during the freshman year. His study showed that:

There was a significant relationship between physical-fitness scores and grade point average for a year. The coefficient of correlation was .41, which is at the one-per-cent level of significance (98:473).

Using the movement pattern concept, Godfrey made a limited study of children eight to eleven years old, who were experiencing school difficulties in one or more subjects but had normal or higher intelligence. The program
was conducted by the Department of Physical Education for Women, Purdue University. They used gymnasium activities with the trampoline, mats, apparatus, rhythm movements, and the swimming pool. The program was held once a week for two hours. The parents attended and were to carry on the program until the next meeting. Godfrey states that "all participants showed improvement in school subject grades and achievement test scores. A matched group of nonparticipants did not show comparable results" (33:65). She continued by saying: "The implication would seem to be that physical education has a contribution to make also to academic achievement in the elementary school" (33:66).

H. H. Clarke and Boyd O. Jarman studied boys nine, twelve, and fifteen years old and

... found a consistent tendency for the high groups on various strength and growth measures to have higher means on both academic achievement tests and grade-point averages than low groups (7:40).

Frank Jones (51:5), President of CAHPER, referred to a study that was conducted over a ten-year period using children in the Shaker Heights School District in Ohio. Hopwood and Van Iden examined the scholastic records of 8,000 students and from this group selected 134 boys who had spent ten or more years in the district. They used the Wetzel Grid to assess physical growth. Three groups were identified: (1) the group whose group pattern was
was normal in elementary, junior high, and senior high school; (2) those who were normal in elementary but deviated at the other two levels; and (3) those whose growth patterns deviated at all three levels. The first group was found to have higher scholastic averages than the other two groups. The investigators stated that "physical fitness appears to be an important prerequisite for good scholastic achievement" (51:5).

St. George (77:45) studied the relationship of physical fitness to success using grade-point achievement, school attendance, and social adjustment and prestige for his criteria for success. He tested 196 junior high school boys at Sunnyside, Washington and concluded that there is a definite positive relationship between physical fitness and success.

Contrary to some views, Sturm feels the athlete "does not suffer scholastically but actually does better" (88:37).

In citing Irving's study, Jones summarized the research by saying "those boys who had progressed into the higher fitness groups had statistically significant higher academic grade point levels than those who remained at the lower fitness levels" (51:5). Irving (45:6) attributes this partially to the results of high motivation.
Hart and Shay concluded that:

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 the college student (38:445).

Industry is also doing research to find the relationship between mental alertness and physical fitness. "We feel there is an important relationship between this and physical fitness and hope to share your findings in this field," stated Lillian Gilbreth, a famous management consultant, in a speech at the Fourth International Congress on Physical Education and Sports for Girls and Women in 1961 (30:14).

B. Negative Relationships

There are, however, some opposite conclusions made by researchers. Johnson, cited by Jarman (47:16), concluded that there is no significant relationship between physical skills, grade point average, or general intelligence. Studies by Paterson, McCloy, and Simmons, reported by Coefield (17:21) tend to support Johnson's reasoning. McCloy stated his results of several investigations: "... correlations between the intelligence quotients and measurements of physical, athletic, or games ability have been approximately zero" (17:21). Thompson also agreed with this theory in her study of elementary school
children. She found that "there was little evidence of a relationship between motor performance and mental achievement (91:12). However, she felt her results "may have been in part influenced by the test conditions encountered and/or the low reliability of certain of the motor tests" (91:1506).

Gross used the Navy Standard Physical Fitness Test and College Ability Test (SCAT) and found no significant relationship between the two "nor with physical fitness and total grade point average" (34:5714). Another study done at Washington State University by Mack found that "the physical fitness test showed a lack of relation with the A.C.E. mental ability examination and the grade point average during the first semester" (61:87).

Bauer, in his study of 209 sixth grade boys, used the SCAT (ability) and STEP (progress) tests, the General Motor Capacity Tests (McCloy), and Motor Achievement tests for his criteria. He concluded that "motor capacity and mental capacity were not significantly correlated" (2:115)

One investigation completed in 1965 in the junior high level using girls as subjects found "... that there is no significant difference in physical fitness between high and low achievers and high and low intelligence groups" (89:21).
Stein and Pangle relate that:

Almost no relationship has been found between intelligence quotients and measurements of physical proficiency among normal subjects. While correlations have been low when assessing this relationship among the retarded, they have been higher and have shown a more positive trend than with the non-retarded" (87:38).

Jacobsen cites two early investigations: one made by Power in 1913 and the other by Hall in 1928. In the investigation by Power, instructors of twenty California high schools evaluated athletics in relation to education. "From 60 to 95 per cent believed athletics detrimental to intellectual effort, scholarships, memory, concentration, reasoning and will power" (46:282). This study was weak in that it used the method of circularized opinion. Hall used a sampling from four Colorado High Schools. He stated that:

... boy athletes were lower in intelligence and in scholarship than non-athletes and were about one-half year older. Girl athletes were slightly higher in intelligence quotient; however, girls were about two months younger than non-athletes (46:284)

Ward (95:21) reported on the studies of Jack, Giauque and DeGiovanna, who studied grades five through eight, high school boys, and college men, respectively. All found no significant difference between physical fitness and intelligence.

Hinchen, in his study of the relationships between reading ability and physical motor competencies, found "that training in motor skills does not influence reading" (41:45).
Hayes conducted a study of all male students in a large urban high school in Washington State. They were given the Washington State Physical Fitness Test. The boys were then divided into four groups on the basis of the McCloy's Classification Index and samples were drawn by lots. The fitness test scores were correlated with the average academic grades during the fall semester of 1961. "Three of the correlations were positive and the fourth was negative, but none was significant at the .05 level" (39:90). The investigator felt that the negative correlation may have resulted from the high number of seniors who were repeaters in physical education.

Bauer reported on a study by Reihold W. Goll on the physical ability of 183 seventh and eighth grade students. Their intelligence range was between 60 and 140.

There was no significant correlation between the mental and physical ability for the group as a whole. There did appear to be a correlation between physical ability and school success, but not between a mental test and a physical test (2:41).

"Athletes have a slightly lower intelligence than non-athletes" (75:537). This is part of the summary of the investigation done by Reals and Reess. They investigated 888 high school boys of a graduating class of 1936. For evaluative criteria they used the average marks in all subjects for four years, the IQ scores from the Terman Group Test of Mental Ability, the boys' chronological age,
and the scores on the Sones-Harry High School Achievement Test given the last month of the senior year. They concluded that "with intelligence held constant, the scholarship of athletes is below the scholarship of non-athletes when an objective measure is the criterion" (75:539).

II. LITERATURE ON THE RELATIONSHIP OF PHYSICAL FITNESS TO SOCIAL ACCEPTANCE

It is the feeling of many physical educators that social acceptance can be developed through a good program of physical education. The following research seems to support this view.

A. Positive Relationships

Dr. Robert R. Luby, Divisional Director of Health and Physical Education in the Michigan Public Schools, stated,

In recent years, psychiatrists have contended that children develop many of their ego strengths through the development of physical skills and that these ego strengths are vital to total life adjustments (60:80).

Glassow reported on studies done by Ragsdale and Beck. The former compared forty-five women majors in physical education and forty-five non-majors. The ladies were rated by high school principals. "The group ratings were equal in appearance and manners and purposeful use of time." However, the majors were superior in leadership and
initiative and more of them "had a high degree of emotional control" (32:63). Beck studied 586 women in UCLA swimming, volleyball, and dance fundamentals classes. Sociometric tests were given after the sixth, twelfth, and thirteenth weeks. "Correlations between skill and friendship were positive, range was .27 to .90" (32:63).

In a study of 438 junior high school boys done by McCraw and Tolbert, it was found that:

The relationship between sociometric status and athletic ability seems to be moderately high in almost all groups studied and there apparently is no appreciable relationship between sociometric status and mental maturity" (63:79).

They also felt that perhaps this status was achieved by participation in interschool athletics more than any other reason. The investigators used an Athletic Index and interschool and intramural athletics to measure athletic ability. A sociometric rating questionnaire was used to measure their social status and the New California Short-Form Test was used to measure Mental Maturity.

In a research report to the United Nations Educational, Scientific and Cultural Organization at a meeting held in Budapest, Dr. Bakonyo reported that "During adolescence Budapest children attach importance to physical prowess and those who excel in this enjoy positions of prestige in their group" (85:1620).
A study conducted by Bull of the University of Hull, England, used four criterias. The first, physique, was assessed by the Sutcliffe and Canham's method using height and weight indices. The second, fitness, was measured through the use of the Iowa Brace Test, Squat Thurst, Sargent Jump, and Gymnastic attainment tests. The third criteria was an estimate of temperament. Bull (8:153) used Highfield's "Camp on the Island" device to test the latter. This denotes the roles the students place each other in a camp situation, such as doing chores, nursing the sick, exploring for danger or food supplies, and providing the amusements. The fourth criteria was determined by the Spatial Ability Test designed by I. M. Smith.

Pupils whose motor capacity is high in both agility and power, particularly the latter, tend to be regarded by their contemporaries as fit for the admired roles of exploration, foraging and defense (8:153).

Jones (52:287) and Bruce (6:89) agree to the theory that there is a relationship between the physically fit and positive social factors.

Eighty University of Illinois male students were given a battery of tests consisting of physical fitness tests and a psychological test. The physical fitness tests consisted of measures of cardiovascular-respiratory systems, motor fitness, and measures of physique. Cattell's Sixteen Personality Factors were used as the psychological test.
Wells found that "There are significant relationships between physical fitness variables and psychological variables, as demonstrated by measurements on this sample of 80 subjects" (100:2531).

Yarnall studied seventy-five senior high school boys. He reports that "a positive relationship does exist between physical fitness and popularity among the high school boys in the study" (93:288).

Merriman tested 808 high school boys. The California Psychological Inventory and fitness items such as vertical jump, chinning, and 100-yard shuttlerun, were used. Merriman then divided the group into upper and lower motor ability groups and athletes and non-athletes according to the scores.

The upper motor-ability group scored significantly higher than the lower motor-ability group on the measures of poise, ascendancy, and self-assurance and on the measures of intellectual and interest modes (66:63).

The "Statistical Examination of Data" of Tillman's study "showed some significant relationships between physical fitness and personality traits" (92:276).

In his article, "Health, Physical Education and Academic Achievement," C. A. Bucher states that "Some research has shown a relationship between scholastic success and the degree to which a student is accepted by his peer group" (7:40). He goes on to say, "Similarly, the boy or
girl who is well-grounded in motor skills usually possess status among his or her peers" (7:40).

After the AAHPER Fitness Test was given to 784 junior high school boys, two extreme groups were determined: the fit and the unfit. They were then compared in intelligence, academic achievement, sociological measures, and physiological factors. "With a mean IQ of 103.54, the fit group scored significantly higher in intelligence than the unfit group, whose mean IQ was 98.70" (95:77). In referring to the social ratings, Ward concluded that boys of this level who develop a high level of fitness will also rate high with their peers.

Biddulph tested 461 sophomore and junior high school boys in the Salt Lake City schools in physical fitness. They were then rated by four different teachers socially and were also given a sociogram. The top fifty superior athletic achievement and the inferior fifty athletic achievement groups were then designated. Their most recent scores on the Henmon-Nelson Intelligence Test were used along with grade-point averages to determine scholastic achievement. The study appeared to be well done and very thorough.

"It was found that students ranking high in athletic achievement demonstrated a significantly greater degree of personal and social adjustment than did students ranking low in athletic achievement (4:1).

In a study by Flowtow (27:502) investigating elementary school children of grades four through eight, he found
a close relationship between general ability and number of choices received on a sociometric test. In a similar study Buswell (9:51) used two groups of elementary children. The first group was tested in the kindergarten in the spring, then again in the first grade in the fall semester. The second group was tested as fifth graders and again in the sixth grade. Again the results showed that students who are doing well in their school work are also succeeding in their relations with their classmates.

Takala went further in the investigation by evaluating the relationship of physical fitness and peer relationships. The study completed at the Center for Educational Research included 700 primary and secondary children from urban as well as rural areas. Short versions of a series of Motor Fitness tests, athletic records, the amount of students' activity, and their knowledge of sports, determined their athletic ability. Interests other than sports, sociometric ratings, and ratings by their teachers determined their status.

School boys and girls actively engaged in sports and with good athletic records are popular, well accepted members of adolescent groups (correlations about +.40 on the average) (49:100).

One criticism is that the investigator failed to name the motor tests involved in the study.

A study investigated by Menzi used the Iowa Motor Fitness Test, the Cowell Personal Distant Ballot, and the
Cowell Social Behavior Trend Index. Two hundred twenty-five ninth and twelfth grade girls were tested. The results indicated:

... that the physically fit girls were more socially accepted to both boys and the girls than were the physically unfit girls at the ninth grade, the critical ratios being 8.19 for the girls' ratings, and 4.84 for the boys' ratings (65:49).

Ninth and twelfth grade girls valued qualities of being physically fit and active in games. "... It can be concluded that being physically fit was a social asset to a girl and was a quality which was recognized by the subjects' peers (65:55).

Schendel (7:66) and Carter and Shannon (13:130) found in their studies that the athletes have more leadership and desirable sociability traits than non-athletes.

Cowell in his report cited Zelaney's, Brace's and Tryon's studies.

Zeleny indicated that researchers on leadership are in practically unanimous agreement that leaders are superior to non-leaders in intelligence, scholarship or knowledge, vitality, social adaptability, and athletic ability (20:294).

Brace (20:294) in her study of pupils in grades six through nine, found a definite relationship between athletic ability and social acceptance.

Tryon found that in middle adolescence social excitement is directed toward the athletic leader or one whose physical, dramatic, social, or intellectual skills give status (20:295).
Corder (19:363) in his conclusion refers and agrees with Oliver's results in his 1960 study of educable mentally retarded children.

He found that mental ability played little part in the choice or rejection of others. There was evidence that boys were chosen for physical ability, but they were not rejected because of lack of it (19:363).

Smith and Hurst (83:84) studied eighteen trainable and twenty-five educable children at the Sheltering Arms Research Center for Retarded Children in Minneapolis. They used the Lincoln-Oseretsky Motor Development Scale and peer acceptance scales. The authors stipulated that the group was not representative of mentally retarded children as nineteen were suffering from brain damage. However, the results of the study shows a relationship between motor ability and peer acceptance.

In a study of boys who were experiencing serious learning problems, Coleman, Keogh and Mansfield (18:516) also found a relationship between fitness and adjustment ratings.

Wilson cited Terman and Oden in their studies of the gifted child. They found that the gifted child is "not the physical weakling and social misfit so often pictured in popular thought" (103:46). Lightfoot, also cited by Wilson, stated that

In recent times it had been observed and confirmed by psychological investigators that gifted girls usually rated higher than average in traits of personality and that these higher ratings tended to improve as the girls became older (103:48).
Dr. Anna Espenschade, University of California:

Berkeley, wrote:

Physical fitness and good social-emotional adjustment usually develop together in childhood. Under competent adult leadership, boys and girls play together, form friendships, cooperate or compete in groups or on teams. In play, they experience success and failure. Sometimes they lead, sometimes follow. They learn to abide by rule, to give and take, to judge themselves and others realistically (23:35).

B. Negative Relationships

A few research projects were found that had negative results regarding the relationship of physical fitness and social acceptance. Weber studied 246 male freshmen at the State University of Iowa. He used the Iowa Physical Efficiency Profile, academic grades at the University, and the Minnesota Multiphasic Personality Inventory for his testing tools. He reports:

There wasn't significant relationship in this study between the physical fitness scores and the scores in the nine measures of personality in the Minnesota Multiphasic Personality Inventory. There was no significant relationship between physical fitness scores and the total Minnesota Multiphasic Personality Inventory scores. The coefficient of correlation was a negative .04 (98:474).

Weatherford studied 246 boys and girls who were ninth and twelfth graders in central Ohio. She tried to relate over-achievement positively and under-achievement negatively with peer relations. She found no support for this hypothesis (97:6403).
In studies done with retarded children, Stein and Pangle (87:37) concluded that improved physical fitness does not result in corresponding gains in social status.

Frabony used the Scott General Motor Ability Test and the California Test of Personality of 1956 as her research tools. She found "no statistically significant correlation . . . between motor ability, as tested, and adjustment--total, personal, or social" (29:22).

Ward cited Moore's study with senior high school boys. "Moore found a low but significant relationship between motor capacity and intelligence" (95:19-20).

Ward states that Moore also:

... found in this same study no significant relationship between motor capacity, as measured by the McCloy General Motor Capacity Test, and personality adjustment as determined by the Bell Adjustment Inventory (95: 19-20).

III. SUMMARY

Although there has been some research to the contrary, the majority of studies show some positive correlation between physical fitness and social and academic achievement. Much of the research in this area, however, has been done with elementary children, boys in high school, and college students. Little research in this area has been done with girls of junior high school age. This factor has lead to the present study.
CHAPTER III

PROCEDURES

The group selected for the test was composed of all seventh grade girls taking part in the physical education classes at Springstowne Junior High School.

Library research was done to determine the sociometric instrument to be used. The sociometric test was then designed by the researcher for this investigation. (See Appendix)

The IQ scores were recorded from the school records.

A pretest of physical fitness was given during fall quarter. Results were computed and recorded. The test was administered by trained testers following procedures outlined in the test manual for the California Physical Performance Tests. (See Appendix for samples of pretests)

The evaluation of the girls' GPA was done at the end of fall quarter. For the purpose of this study, academic achievement was represented by the grades in all subjects of the given quarter. Each grade was given a numerical value: four points for an A, three points for a B, two points for a C, and one point for a D. The grade points were totalled, then averaged to the closest tenth of a point. These totals were recorded and the relationship between the GPA and physical fitness was determined.
by the Pearson Product-Moment Method. The relationships between IQ and physical fitness and between GPA and IQ were also correlated.

The physical fitness posttest was administered at the end of the spring quarter and scores were computed and recorded. The GPA of the fourth quarter was evaluated and recorded.

The relationships were determined statistically between the fourth quarter physical fitness scores and GPA, the physical fitness scores and IQ, and GPA and IQ.

At the end of the spring quarter, the sociometric test was administered by the researcher. The data was computed and the relationships statistically determined between the physical fitness scores and sociometric scores, GPA and sociometric scores, and the IQ's and sociometric scores.

A sociometric test determined the twenty-seven high scorers and twenty-five low scorers for further study. They were compared as to ranges and means in physical fitness, GPA, IQ, and social acceptance. These tests and comparisons were repeated in the ninth grade in the interest of the study.
CHAPTER IV

STATISTICAL ANALYSIS

The first phase of the study was to test the students in physical fitness using the prescribed method. (See Appendix for description of California Physical Performance Tests.) This test was administered in the fall and spring quarters of the seventh and ninth grades.

The students' IQ scores were recorded from official school cumulative files. A correlation, using the Pearson-Product-Moment-Method, was computed between the fall physical fitness score and the IQ score (See Table I). The result was a correlation of .002. This was also done for the spring physical fitness score and the IQ score. The result in this correlation was .004.

At the end of the fall and spring quarters the students' grade-point averages for the respective quarters were tabulated and recorded. The correlation was made using the Pearson-Product-Moment-Method, between the physical fitness test scores and the GPA in the fall. The correlation was .160, as shown on Table I. The correlation between the spring physical fitness and GPA was .230, which was significant at the .05 level of confidence).

The IQ scores and the fall GPA were correlated. The result was a \( r = .670 \). The same items were correlated
TABLE I

INTERCORRELATIONS BETWEEN PHYSICAL FITNESS, GRADE POINT AVERAGE, INTELLIGENCE QUOTIENT, AND SOCIAL STANDING

<table>
<thead>
<tr>
<th></th>
<th>Intelligence Quotient</th>
<th>Grade-Point Average</th>
<th>Social Standing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall Quarter</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Fitness</td>
<td>.002</td>
<td>.160</td>
<td></td>
</tr>
<tr>
<td>I.Q.</td>
<td></td>
<td>.670**</td>
<td></td>
</tr>
<tr>
<td><strong>Spring Quarter</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Fitness</td>
<td>.004</td>
<td>.230*</td>
<td>.308**</td>
</tr>
<tr>
<td>I.Q.</td>
<td></td>
<td>.600**</td>
<td>.117</td>
</tr>
<tr>
<td>Grade-Point Average</td>
<td></td>
<td>.558**</td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the .05 level of confidence

**Significant at the .01 level of confidence
using the spring GPA. The correlation was .600. Both correlations were significant at the .01 level of confidence.

In the spring quarter a sociometric questionnaire was administered. The purpose of this questionnaire was to determine the peer acceptance or rejection. Correlations were computed between spring physical fitness scores and social standing, mental maturity and social standing, and GPA and social standing, by means of the Pearson-Product-Moment-Method. The results were: spring physical fitness and social standing, $r = .308$, significant at the .01 level of confidence; IQ and social standing, $r = .117$; and GPA and social standing, $r = .558$, significant at the .01 level of confidence. (See Table I)

When, by means of a selected sample, a comparison was made of the low twenty-five seventh grade girls in social standing and the top twenty-seven seventh grade girls in social standing, we find a slightly different result. The number of students selected was determined by the natural break in the scores. The means of the physical fitness scores were 76 for the high group and 43 for the low group. The scores range from 33 to 91 for the high group and from 13 to 79 for the low group. These figures show a large difference between the two groups. (See Table II.
<table>
<thead>
<tr>
<th></th>
<th>Physical</th>
<th>Grade-Point</th>
<th>Intelligence</th>
<th>Social</th>
<th>Fitness</th>
<th>Average</th>
<th>Quotient</th>
<th>Standing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High Group (27)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>33-91</td>
<td>1.1-4.0</td>
<td>79-130</td>
<td>19-230</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>76</td>
<td>2.9</td>
<td>107</td>
<td>49</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Low Group (25)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>13-79</td>
<td>1.1-3.8</td>
<td>77-147</td>
<td>0-3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>43</td>
<td>2.3</td>
<td>104</td>
<td>1.48</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difference of Mean</td>
<td>33</td>
<td>.6</td>
<td>3</td>
<td>47.52</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In continuing the comparison, the means of the spring GPA scores were computed. The mean of the high group was 2.9, while the mean of the low group was 2.3. The ranges were 1.1-4.0 for the high group and 1.1-3.8 for the low group. The difference in this comparison is indicated in the means.

The means for IQ scores were 107 for the high group and 104 for the low group, while the ranges were 79-130 for the high group and 77-147 for the low group. In this comparison there is a difference in both areas: The mean in a positive direction for the high group and the range favoring the low group.

In the last comparison on this level, the social standing, there is a great difference in both the means and the ranges favoring the high group. For the high group the mean was 49 and the range was 19-230. For the low group the mean was 1.48 while the range was 0-3. (See Table II, page 35)

In the interest of the study the author retested the group during the spring quarter of the ninth grade in physical fitness and social acceptance. The GPA’s for that quarter were also computed and recorded.

Eighteen of the twenty-seven seventh graders in the original high group remained. Six had transferred schools, one moved to the bottom group, and one was excused from
physical education for medical reasons. Two of the girls who had been in the original high group moved down out of the selected group; seven new subjects moved into this group.

Of the original low group of twenty-five girls, only ten remained. Eight had transferred to other schools, two moved from this group into the high group, seven moved out of the low group, and one was excused from physical education. Eighteen new subjects were now found to be in the low category. The number in each group again was determined by the natural break in the scores. The high group now had twenty-seven and the low group twenty-eight girls.
<table>
<thead>
<tr>
<th>Physical Fitness</th>
<th>Grade-Point Average</th>
<th>Intelligence Quotient</th>
<th>Social Standing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High Group (26)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>38-95</td>
<td>1.8-4.0</td>
<td>90-125</td>
</tr>
<tr>
<td>Mean</td>
<td>77</td>
<td>2.8</td>
<td>106</td>
</tr>
<tr>
<td><strong>Low Group (28)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>7-87</td>
<td>1.6-3.4</td>
<td>80-147</td>
</tr>
<tr>
<td>Mean</td>
<td>54</td>
<td>2.5</td>
<td>103</td>
</tr>
<tr>
<td>Difference of Mean</td>
<td>23</td>
<td>.3</td>
<td>3</td>
</tr>
</tbody>
</table>
CHAPTER V

SUMMARY AND CONCLUSIONS

Summary and conclusions. This research was an attempt to determine if a relationship exists between various factors: intelligence quotient, grade-point average, social acceptance, and physical fitness. Zero order correlations were computed between each of the possible combinations.

The highest correlation coefficient is between IQ and GPA (.670); the second highest was social standing and GPA. Physical fitness received a correlation of .308 when compared with social acceptance, much higher than IQ which had an r of .117.

When comparing the lowest twenty-five students in social acceptance with the highest twenty-seven in social acceptance in the seventh grade, one finds an apparent difference between those who are and are not in good physical condition. A higher grade-point average is noted for those who are more physically fit although it is not statistically significant.

Recommendations. The researcher recommends further study of junior high school girls. A more complete study of the three-year period is indicated. A second recommendation is to use a battery of sociometric tests to assess the influence of socio-economic and motivation factors.
BIBLIOGRAPHY
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DESCRIPTION OF THE CALIFORNIA PHYSICAL PERFORMANCE TESTS

TEST 1

STANDING BROAD JUMP FOR GIRLS

Facilities and Equipment:
Jumping pit, mats, or turf, take-off board, floor or firm surface to turf; tape measure

Test:
Student stands with feet several inches apart and with toes just back of the take-off line or front edge of the take-off board. The take-off is made from both feet, and the student jumps forward as far as possible, landing on both feet. Free swinging of the arms and bending of the knees is permissible, but during this action of arms and legs the feet must not leave the board or take-off line until the jump is made.

Rules:
1. Three fair trials (not including fouls) shall be allowed and the best of the three recorded.
2. The student's performance is recorded in inches to the nearest inch.
3. The measurement is taken from the heel or nearest point on the ground, floor, or mat touched by any part of the body to the starting line.
4. Violation of any points under "Test" constitutes a foul.

Scoring:
The distance of the best jump shall be recorded in inches.
TEST 2

KNEE PUSH-UP FOR GIRLS

Facilities: Floor of gym or room, or any smooth, level, and outdoor surface. A 1- or 2-inch mat or pad should be placed under the knees.

Test: The student gets into position to perform a knee push-up by kneeling on the mat or pad and placing hands on the floor. Next, she moves her hands forward as if she were walking on them and simultaneously bends her knees and raises her feet until the body is straight from head to knees with her weight supported on her hands and knees. The test consists of bending the arms and lowering the body until the chest, and chest only, touches the floor, then pushing up again with her arms until they are straight. The body is supported on hands and knees and must remain in a straight line from head to knees throughout the test. The exercise is repeated as many times as possible or until 50 have been executed.

Rules: 1. No resting is permitted between push-ups.
2. No push-ups shall be counted in which the student fails to (a) keep the body straight from head to knees; (b) touch the chest and only the chest to the floor; (c) push up to a full extension of the arms.

Scoring: The student's performance shall be recorded as the number of correctly executed knee push-ups she is able to do. Each correctly performed down-and-up movement counts as one push-up. A perfect score is 50. No student should be allowed to continue performing after completing this number.
TEST 3

KNEE BENT SIT-UP FOR TIME (GIRLS)

Facilities and Equipment: Clean floor or mat or turf; stop watch.

Description: The student lies on her back on a clean floor or mat or turf with her knees bent, feet on floor. Heels should be about a foot from buttocks. The angle at the knees should be less than 90 degrees. She puts her hands on the back of her neck with either the finger tips touching or the fingers clasped and places her elbows squarely on the mat. A partner holds the student's feet to keep them in touch with the mat at all times. To perform the sit-up, the student tightens her abdominal muscles and brings her head and elbows forward as she curls up, finally touching her elbows to knees. This action constitutes one sit-up. The student returns to the starting position with her elbows on the mat before she sits up again.

Preliminary Requirement: Each student must demonstrate her ability to do five sit-ups as described before she is permitted to participate in the time trials. Such a demonstration should not be done on the same day as the timed test.

Test: For students ten and eleven years of age who can meet the preliminary requirement, the number of correctly executed sit-ups performed in 30 seconds shall be the score. For girls twelve years of age and older who can meet the preliminary requirement, the number of correctly executed sit-ups performed in 60 seconds shall be the score.

Rules: 1. Only one trial shall be allowed unless the teacher believes that the student has not had a fair opportunity.
        2. No resting between sit-ups is permitted
        3. No sit-up shall be counted in which the student fails to (a) keep the fingers in contact behind the neck; (b) bring both
elbows forward in starting to sit up by pushing off the floor with only one elbow; (c) return to starting position with elbows flat on mat before sitting up again.

Scoring: The student's performance shall be recorded as the number of correctly executed sit-ups he is able to do in the time limit.

TEST 4

FIFTY-YARD DASH (GIRLS)

Facilities and Equipment: A 50-yard straight running surface; one or two stop watches; starting line and finish line.

Test: The student shall take his position behind the starting line. A standing or a crouch start may be used. The crouch start is recommended only for students who have had instruction and practice in this technique. The starter will use the commands, "Get on your mark! Get Set! Go!" The word "Go" shall be accompanied by a downward sweep of the starter's arm as a signal to the timer. Two students or more may run at one time if two or more watches are available and experienced timers are keeping time; otherwise only one student should run at a time. The lanes should be marked so that each student will run in a straight line. The timer should stand at the finish line in order to judge the exact time in which the student he is watching crosses the line.

Rules: 1. Only one trial may be given in one class period.
2. A reasonable warm-up should precede the test.
3. The score is the time elapsed between the starting signal and the moment the runner crosses the finish line.

Scoring: The score shall be recorded in whole and tenths of seconds.
TEST 5

SOFTBALL THROW FOR DISTANCE (GIRLS)

Facilities and Equipment: Softball (12-inch); tape measure; two lines drawn parallel and 6 feet apart marking the starting zone.

Test: After a reasonable warm-up, the student throws the ball overhand as far as possible from behind the restraining line. He may take one or more steps provided he remains within the 6-foot starting zone and behind the restraining line. The line next to the area toward which the ball is thrown is called the restraining line. To facilitate measurement, additional lines may be drawn parallel to the restraining line and 10 yards apart as far down the throwing area as most of the balls will land. The distance the ball is thrown can be calculated quickly by measuring from the nearest 10-yard line to the spot on which the ball lands.

Rules: 1. Three trials shall be taken with no rest between trials, and the best of these trials is recorded.
2. Measurement shall be taken of the distance from the point where the ball first lands to the restraining line. Measurement is taken at a right angle to the restraining line or to an extension of that line.
3. The score shall be recorded to the nearest foot.
4. An overhand throw must be used in performing this test.

Scoring: Length of the longest throw in each of the three trials shall be recorded to the nearest foot. (12:7-16).
SOCIOMETRIC TEST

1. Which three girls in the ninth grade would you especially like to have for your friends?
   A.
   B.
   C.

2. Name the two most popular girls in the ninth grade.
   A.
   B.

3. Briefly tell why the above girls are popular.

4. Name one girl who you would like to have for a close personal friend who is not one now.
   A.

5. Which girls would you be proud to introduce to your parents?
   A.

6. Name four girls who you would select (above all others) to be team captains in physical education.
   A.
   B.
   C.
   D.

7. Select one girl whom you especially admire.
   A.

8. What two girls would you invite to your party to make it a success?
   A.
   B.

9. Select two girls whom you would like to accompany you to the movies.
   A.
   B.

10. Select one girl to invite home for dinner.
    A.