A Comparative Analysis of Performance by the Madelia Public School Students on the Kraus-Weber Test and the AAHPER Fitness Test

Donald Ray Nehowig

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A COMPARATIVE ANALYSIS OF PERFORMANCE BY THE MADELLA
PUBLIC SCHOOL STUDENTS ON THE KRAUS-WEBER
TEST AND THE AARUPR FITNESS TEST

BY

DONALD RAY HEHOWIG

A thesis submitted
in partial fulfillment of the requirements for the
degree Master of Science, Department of Physical
Education, South Dakota State College
of Agriculture and Mechanic Arts

August, 1960
This thesis is approved as a creditable, independent investigation by a candidate for the degree, Master of Science, and acceptable as meeting the thesis requirements for this degree; but without implying that the conclusions reached by the candidate are necessarily the conclusions of the major department.

Thesis Advisor

Head of the Major Department
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D. E. M.
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CHAPTER I

INTRODUCTION

Physical fitness has always been an important part of an athletic program, and it has always been highly regarded for our servicemen during war years. But people who were concerned with our overall fitness brought out the fact that this fitness decreases markedly after an athletic season and after a war. Most alarming of all was the fact that a high percentage of our people have never reached a point of sufficient physical fitness for daily life. Dr. Hans Kraus brought this out when he published the results of the Kraus-Weber Test of Minimum Muscular Fitness in 1953.¹ Dr. Kraus tested children in the United States and Europe, and he found that American children were far below the European's in physical fitness.

This report by Dr. Kraus stirred our nation's leaders to such an extent that President Eisenhower created a Council on Youth Fitness and had numerous meetings to discuss the fitness problem and how it could be improved. Many conferences have been held, and many more are planned on the national, state and local level.

The American Association for Health, Physical Education and Recreation joined in the movement for fitness and among other things

formulated a youth fitness test. This test was administered on a nation-
al level to a random sampling of school children from the fifth through
the twelfth grade. This test tested several aspects of motor fitness and
indicated the average level of fitness of youth throughout the nation. 2

Statement of the Problem

The purpose of this study is to compare the physical fitness of
the students within the Nodelia Public Schools and with that of other
areas. Steps in the solution of this problem were:

1. The administration of the Kraus-Weber Test of Minimum
Muscular Fitness* to pupils in grades five to eleven.

2. A comparison of the results of the Kraus-Weber Test of
Minimum Muscular Fitness in the Nodelia Public Schools with results
from other areas.

3. The administration of the American Association of Health,
Physical Education and Recreation's Youth Fitness Test** to grades
five to eleven.

4. A comparison of the results of the American Association of
Health, Physical Education and Recreation's Youth Fitness Test in the
Nodelia Public Schools with results from other areas.

5. A comparison of the test scores of athletes and non-athletes
in the Nodelia Public Schools, with respect to their performance in
the American Association of Health, Physical Education and Recreation's
Youth Fitness Test.

2 Paul A. Burnsick, "AAHPER's Youth Fitness Project," Journal
of Health, Physical Education, and Recreation, XXVII, p. 17, November,
1957.

* Hereafter referred to as the Kraus-Weber Test.

** Hereafter referred to as the AAHPER Test.
Delimitation

This study is limited to grades five to eleven in the Madelia Public Schools, Madelia, Minnesota. Grades five and six had no required physical education, but had a recess period in the morning and afternoon at which time they took part in physical activity. Grades seven to ten had physical education required twice a week. Girls in the eleventh grade had no physical education period other than the Girls' Athletic Association, in which a small per cent of the girls took part. Boys in grade eleven had no physical education or activity period except those who took part in interscholastic athletics.
CHAPTER II

RELATED LITERATURE

Our government has for a long time been concerned with the problem of physical fitness. This concern has been brought about basically by: (1) the 40 per cent medical rejection of the nation's youth in World War II drafts; and (2) the controversial Kraus-Hirschland report to the President in 1955.

It was, however, this report by Kraus and Hirschland on the results of the Kraus-Weber Test of Muscular Fitness given to American school children in northeastern urban and suburban communities, and the subsequent comparison with European children which focused the attention of the public on this problem. Information revealed in this report aroused the concern of the majority of persons interested in the health and fitness of the young people in our country. Since that report, "fitness" has been a popular subject but has meant different things to different people.

Steinbrenner defined physical fitness as follows:

Physical fitness implies freedom from disease or significant deviation from normal structure and function; enough strength, speed, agility, endurance, and skill to accomplish the maximum tasks that the day may bring; and mental and emotional adjustment appropriate to the age of the individual. Physical fitness is only a phase of total fitness. The limitations of fitness are determined and modified by inheritance; but within these limitations daily living practices may develop and otherwise

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influence fitness. Suitable work, adequate nutrition, exercise, rest, relaxation, the use of preventive and therapeutic medical services, and the avoidance of excesses, including alcohol and tobacco, are all important in maintaining fitness.

Stafford and Duncan thought the following about fitness:

The individual who is physically fit has a well-proportioned and a well-developed body, without a surplus of soft fat, and his posture is usually good. He has adequate muscular strength for his needs, and this strength is well controlled. He performs his activities, with a high degree of motor proficiency. He has a supple, well balanced body which he uses in a skillful, well-coordinated manner, and with a minimum of energy expended. The physically fit individual usually has an alert mind. He also has that confidence, courage, initiative, pride, and self discipline which accompanies good morale. Finally, he has an abundance of energy which allows him to push himself to the limits of his endurance in sustained activities involving speed, power, and strength without ill effects. His body is functioning with a maximum of efficiency.

A short definition of physical fitness is the one presented by Scott and French, who defined it as "an effective total response to work or activity of whatever intensity may be required."

Cureton stated:

Physical fitness means a great deal more than freedom from sickness or passing a medical inspection. In addition to freedom from germinal or chronic disease, possessing good teeth, good hearing, good eye sight, and a normal mentality, physical fitness means the ability to handle the body well and the ca-

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Larson and Yocom brought the following out about physical fitness:

Physical fitness is one phase of total fitness and may be used interchangeably with motor fitness. Other phases of total fitness include social, emotional and intellectual components. They listed the following as components of physical fitness: (1) resistance to disease; (2) muscular strength and muscular endurance; (3) endurance (Cardiovascular-Respiratory); (4) muscular power; (5) flexibility; (6) speed; (7) agility; (8) coordination; (9) balance; and (10) accuracy.

McCloy stated that the following were needed for physical fitness: (1) Heredity of vital organs (one born with organs of higher quality); (2) good health; (3) good hygienic habits; (4) physical conditioning; (5) endurance; and (6) body flexibility.

Wear stated that an individual who is physically fit for daily living must have the following characteristics:

1. he is able to respond efficiently and satisfyingly to the usual physical demands of his daily work and play; 2. he is able to engage in at least one moderately active physical activity; 3. he is able to recover from such activity in a short time without any unpleasant after-effects; 4. he has a reserve of energy at the end of a regular day which enables him to approach the activities of the evening (work or recreation) with interest and enthusiasm; 5. he is able to sleep well after an ordinary day and is able to begin the next day completely recovered from

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the activities of the preceding day, and, 6. he is free from removable defects and disorders.10

One of our more recent definitions came from Paul Romsickler who said:

Physical fitness includes those qualities which will permit an individual to perform life activities involving speed, strength, agility, power, and endurance and to engage in various kinds of physical activity required of modern day living, including sports and athletics, and to be able to maintain an optimum amount of fitness for the individual involved.11

The background for the report by Kraus in 1955 was actually laid in 1945 when Kraus and E. Eisenmenger-Weber studied and reported on two hundred posture cases of school children who had been patients at the posture clinic of Columbia's Presbyterian Medical Center.12 The study was evaluated and the tests now known as the Kraus-Weber Tests of Minimum Muscular Fitness were organized and used as a basis for a low back clinic.

It took Kraus and Weber eighteen years of actual work in the clinic to devise the test. Only six tests were selected out of the larger number given to the clinic group; these six were thought to be the most valid.


The six tests were designed to test the flexibility and to measure the strength of the upper and lower back, the abdominal muscles, and the flex-or muscles of the hip joint. If any one of the six items was failed, according to Kraus, it indicated that the person was below minimum fitness.

Although a valid test for determining physical fitness has not yet been devised, Dr. Rogers, originator of the Rogers Physical Fitness Test, stated "Doctors Kraus and Weber have provided in their battery of six tests, far and away, the most valid and generally useful measure of physical fitness for children of elementary school age."\(^{13}\)

Recognizing that the number of people with low back disorders was increasing in the United States, Kraus and Hirschland attempted to determine what level a person must maintain for minimum muscular fitness. They also concluded from their experiences that most cases of the disorders could have been prevented if the person knew what level he had to attain.

Kraus and Hirschland took the Kraus-Weber test into the northeastern part of the United States and tested 4,264 American school children. They hoped that this series of testing would answer some of the questions on the number of low back disorders. They reported that 57.9 per cent of the children between the ages of six to nineteen failed one or more of the items and therefore failed to meet the minimum requirements for health. Kraus and Hirschland then decided to compare the

American children with the European children. They gave the test to 2,870 children from Austria, Italy and Switzerland. From this study they found that only 8.1 per cent of the Europeans failed one or more of the test items. When Kraus and Hirschland tried to determine at what age the muscle deficiency became apparent, they were alarmed to find out that children entering the first grade were already deficient. Even more alarming was the fact that they left school in the same or worse condition than when they first entered. This seemed to indicate that the schools could not remedy the situation through their present programs.14

Weakness, as well as flexibility, failures have shown that at no time did American statistics approach the fitness levels of the Europeans. "The major difference," Kraus claimed, "is the fact that the European children do not have the benefit of a highly mechanized society; they do not use cars, school buses, elevators or any other labor saving devices. They must walk everywhere. Their recreation is largely based on the active use of their own bodies."15

It was a common feeling among physical educators that the Kraus-Hirschland report seemed to indicate our need for expanding our physical education program from the high school group to the pre-school group. The general feeling was that it was a lack of sufficient exercise that caused

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15Ibid., pp. 17-19.
this deficiency.

The report by Kraus and Hirschland brought many comments from physical educators in the United States. A. T. Slater-Hammel felt that we should not be alarmed over the report of physical deficiency in Americans. He stated, "Americans today are healthier, live longer, and break more athletic records than any generation of their ancestors."  

But George Haws felt differently about the subject and remarked, "We may be healthy as a nation, live longer because of science and break more athletic records than other countries, but breaking records on the part of a fraction of one per cent of the young people of the country doesn't give physical fitness to the other ninety-nine plus per cent."  

Discussions then arose as to whether the Kraus-Neber Tests were designed to determine optimum or minimum levels of fitness. Kraus' answer was, "They were tests which indicated a level of strength and flexibility in certain key muscle groups below which functioning of the whole body as a healthy organism seemed to be endangered."  

Kraus felt that any person whose fitness fell below this level was a sick individual with a constant strain.

The Kraus-Hirschland findings were studied by other physical ed-

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ucaters in order to secure more information on the fitness of American youth. They extended the study to their own schools and surrounding territory.

Fox and Atwood administered the Kraus-Weber Tests to 575 Iowa City school children in grades one through six in three non-public schools. They reported that 66.1 per cent failed one or more of the items and that 39.9 per cent failed the flexibility part of the test. Both of these marks were higher than the 57.9 per cent test failure and 44.3 per cent flexibility failure reported by Kraus.19

Fox and Atwood questioned parts of the Kraus-Weber Test and wondered how adequate the test actually was. They stated that no credit was given for partially doing one of the items in that the person either passed or failed the items. Another question was raised regarding the position that had to be held for ten seconds in three of the test items. Atwood and Fox questioned how the ten second interval which suggested sufficient strength for normal living was determined. Kraus' explanation was, "The Kraus-Weber Tests for Muscular Fitness are not designed to determine optimum levels of muscular fitness, but rather to determine whether or not the individual has sufficient strength and flexibility in the parts of the body upon which demands are made in normal daily living."20


Phillips and others gave the test to 1,456 Indiana elementary school children. The purposes of the test were: (1) to compare the Indiana score with the Kraus-Hirschland findings; (2) to determine the reliability of the test; (3) to compare the test results with test results on a grip-strength test; and (4) to distinguish the performances on each of the test items by age and by sex. 21

A city of 26,000 was selected, and any child who was not physically normal was excluded. Seven faculty members administered the test, but only one had been trained and certified by Dr. Kraus in giving the test. Repeats of the test were given to two hundred and fifteen of the children by a tester other than the one which first gave the test. This was to determine the reliability of the test. Also one hundred and twenty-six of the children took a grip strength test so that results of the Kraus-Weber test and the grip strength test could be checked to see if there was any relationship between the two. Results were as follows: (1) coefficients of over .950 in all cases found the tests to be very reliable; (2) 45.1 per cent failed the test; (3) 36.3 per cent of the children failed the flexibility item; (4) girls were superior to boys at all age levels due to the flexibility item; and (5) no relationship between grip strength and Kraus-Weber test. 22


22 IMIA.
Phillips found only six failures on the back strength items, and he therefore thought that these items should be eliminated or other substitutes.

Ford Hess came to the aid of the Kraus-Weber test after his findings in the state of Pennsylvania. Hess tested 5,131 children in four cities in Pennsylvania and found the following percentage of failures in each city: Erie-67 per cent, Butler-52 per cent, Lancaster-49 per cent and Lock Haven-49 per cent. 23

Later Hess wrote to the Journal of Health, Physical Education and Recreation with regards to Dr. Margaret Fox's critical report on the test. 24 He disagreed with her views and said, "We in physical education should accept the challenge inherent in the Kraus-Weber findings, and take another searching look at the philosophy and/or objectives we have so generously 'donated' to education in which we seem to have forgotten the importance of vigor in our striving to gain variety." 25

Hess also found that both boys and girls improved flexibility through a program of exercise and games for six weeks. Because Kraus thought muscles should be tested "cold" in an effort to know how they

23 W. Harrison Clark, Physical Fitness Newsletter, University of Oregon: March, 1956.


would respond in daily activities, he did not provide warm-up periods or additional trials on the test.

The flexibility item of the Kraus-Weber Test was challenged by Lawther who also felt the test was not entirely valid. He took the view of Gladys Scott on flexibility: "It is impossible to state how much flexibility is desirable principally because it depends upon the individual's build, muscular strength, and the activities in which he is to engage." Lawther felt that too much stress was placed on the flexibility item in interpreting the whole Kraus-Weber score.

Other points brought out by Lawther in the comparison of the fitness of Americans and Europeans were: (1) Americans are taller, heavier, and live longer than at any preceding time in United States history; (2) the items of the Kraus-Weber Test involve many of the movements carried on by the formal and individual gymnastic programs which still form the base of physical education in Europe; (3) "Fitness for what" he said, "we can develop in a few weeks a minimum muscular fitness to do the average task of life by overload exercise in doing that task," and; (4) physical performance cannot be measured by tests of isolated movements and still determine the functional efficiency of the whole organism.

Foreign countries began taking an interest in the Kraus-Weber test, and reports came in from India and Japan.


Mahajan reported that 3,700 children in suburban and rural schools in India were given the Krans-Weber Test and that 9.1 per cent failed one or more items. The most striking result was that only 4.6 per cent of the Indian children failed on flexibility compared with the 44.3 per cent flexibility failure reported by Kraus.28

Noguchi tested 6,549 school children on the Krans-Weber Test in four cities of Japan. The cities tested were Yokohama, Osaka, Takamatsu, and Nagasaki. He reported the following results: (1) different regions of Japan did not vary greatly in test failures; (2) only 3.3 per cent failed the flexibility item; (3) most failures were found in younger children and they decreased with age; and (4) certain parts of the test (items 1-2-4) were difficult for the Japanese children, while others (items 3-5-6) were too easy for them.29

Noguchi felt that the index of the leg length/height affected the test one way or another. He also thought that the fundamental motor ability of the various races contrasted because of differences in their body constitutions, in their school curriculums in physical education, and in their way of living.30


30 Ibid., p. 20.
Shaffer tested 2,281 junior high boys and girls in Johnston, Pennsylvania, and came up with the following results: (1) weight seemed to influence flexibility to a greater degree than height; (2) failures of the Kraus-Weber Test and I. Q. Test were parallel. The less intelligent had the higher rate of failure to a significant degree; and (3) reduced 46.25 per cent failures to 8.33 per cent after a conditioning program. 31

Kirchner and Glines extended the Kraus-Weber Test to the northwestern part of the United States by testing 1,195 elementary school children in Eugene, Oregon. The results indicated the following: (1) 38.1 per cent test failures; (2) the group was superior to any other published American study; (3) the girls were superior to boys at all age levels due to greater failure of boys on the flexibility item; (4) of the 455 children who failed the test, 78.7 per cent failed only one item; (5) for both sexes there was a decrease in strength failures at each increased age level; and (6) the children in schools with a good physical education program had almost 15 per cent fewer test failures than did those with poor programs. 32

During a three week period at Bedford, Ohio, 420 boys were tested, and only eight failed to pass all six tests. The only part failed by these eight boys was the flexibility item. It was assumed that the school's


program of conditioning exercises before each physical education class, which resembled the movements involved in the Kraus-Weber Test, were responsible for the low percentage of failures.33

Later Burton, in a study of 1,057 Iowa school children between ages of six and fifteen years, modified the scoring of the original item and provided additional tests for arms and legs. This was to propose a scoring system for the Burton Revision of the Kraus-Weber Test by determining the 75th, 50th and 25th percentiles for boys and girls respectively, according to age. She figured it would give physical educators more of a basis for diagnosing the muscular fitness of children in the age range six through fifteen than is now available in the pass or fail scoring of the Kraus-Weber Test. 34

In the state of Washington, Mathews stated that the governor was alarmed over the fitness problem in the state and requested study of it in the schools. Moses Lake Junior High School was selected as the school to be studied. The Rogers PFI Test and the Kraus-Weber Test were administered to 1,000 boys and girls. The lowest 40 in the PFI Test were selected as the sub-fit group to be studied. The Kraus-Weber test was given just to find any marked deviations in a child. The tests were not used

33Kraus-Weber is Tested at Bedford, Ohio, High, "Physical Education and School Activities Newsletter, June 20, 1957.

to determine how many passed or failed, but were used to establish a basic approach to a better physical education program.\textsuperscript{35}

Mel Logtgerman administered the Kraus-Weber Test to 767 Sioux Indian children and 754 Caucasian children in South Dakota. The Indian group tested showed 41.6 per cent test failures; while in comparison the Caucasian children only had 32.9 per cent who failed one or more test items.\textsuperscript{36}

The Kraus-Weber Test was given to 1,195 boys and 1,130 girls in East Pakistan in 1958. Following are some of the findings: (1) the overall minimum muscular fitness of boys and girls of East Pakistan is below the standard of European children, but somewhat higher than American children; (2) there were fewer failures as the boys got older, probably due to the opportunity of being able to take part in sports and games; and (3) girls were most deficient, probably because no physical education program of any type was conducted for them.\textsuperscript{37}

Donald Mathews and associates tested 66 college women on three hip flexibility tests, an adapted Kraus-Weber floor touch test, Leighton Flexometer Test and Wells Sit and Reach Test. Results indicated:


\textsuperscript{36}Mel Logtgerman, "A Study Made to Determine the Muscular Fitness Status of a Group of Sioux Indian and Caucasian Children as Determined by the Kraus-Weber Test of Minimum Muscular Fitness," Unpublished Masters Thesis, South Dakota State College, 1957.

(1) no significant relationship between the flexibility of the hip joint in the Antero-posterior plane and the length of body segments; and (2) the adapted Kraus-Weber Test is the most objective of the three flexibility tests. 38

There has been considerable misunderstanding and misinterpretation of the meaning and implication of the Kraus-Weber Test. Some of the questions concerning the test were as follows: (1) Why was the Kraus-Weber Test truly a test of muscular fitness? (2) Why was flexibility an important part of muscular fitness? (3) Why are there not available norms for the Kraus-Weber Test as to age, sex, weight and height groups? (4) Why do not the Kraus-Weber Tests Correlate with strength tests? Dr. Kraus defended his tests with the following answers: (1) a person with sugar in his urine would not be considered healthy even though all other findings are normal; therefore, a person who failed one of a battery of minimum tests should be considered below minimum; (2) flexibility was an important part of muscular fitness in that its absence reflects tension; (3) in regard to norms he felt they were self correlating in that they test strength against body weight and size. As long as a person walks, he must manage his weight and his height with his key posture muscles. It was emphasized by Dr. Kraus that they were the ones being tested and no norms were needed; and (4) the Kraus-Weber Tests were muscular tests for strength and flexibility. No direct correlation with

sole strength tests can be expected. Grip strength alone is not correlated with strength of posture muscles. Moreover, grip strength only correlates about 25 per cent with total strength. 39

National interest in physical fitness grew after the findings of Kraus and Hirschland, and one of our physical educators, C. H. McGloy, stated, "Improvement of the physical functions of man is still a major function of the physical educator." He emphasized the development and maintenance of an adequate amount of strength, endurance, skills and flexibility to maintain fitness. He added, "If America is to learn how to keep fit, we as physical educators must teach them how." 40

In June of 1956, a conference on fitness was held at the United States Naval Academy, Annapolis, Maryland. Called by President Eisenhower, it was the first peace time conference held by the national government. Eisenhower called the conference because he felt that more should be done to help our children become physically fit and better qualified to face the everyday living of modern life.

In the Annapolis meeting, Vice-President Nixon brought out the following facts: (1) less than 50 per cent of our high schools have physical education; (2) 91 per cent of 150,000 elementary schools in our country have no gymnasiums; (3) 90 per cent of the United States elementary schools have less than five acres necessary for essential play areas; and (4) only 1,200 of the 17,000 communities in the United


States have full time recreation leadership. 41

Nixon added, "We are not a nation of softies, but we could become one if some attention is not given to the fact the new forms of inventions are making life too easy for us." 42

President Eisenhower established a Council on Youth Fitness and selected Vice-President Nixon as Chairman of the council. Later Shane MacCarthy was chosen as Executive Director of the council. 43

Oregon was the first state to take action on Eisenhower's appeal for better fitness. A Central Physical Fitness Committee was formed by the Oregon Association for Health, Physical Education and Recreation. Its purpose was to develop an effective physical education program in the Oregon schools. 44

Governor Stratton of Illinois was also alarmed over the situation and he called together a Conference of Youth Fitness in Illinois. This conference also took action on developing better physical education programs within the state. 45

42 Ibid., pp. 8-10
44 H. Harrison Clarke, Physical Fitness Newsletter, University of Oregon, Eugene, Oregon, November, 1955.
The American Association of Health, Physical Education and Recreation entered into the national picture by holding a fitness conference in September of 1956. Such a conference was seen as essential in giving direction to the association's fitness program. Their purpose was: (1) to prepare a statement outlining the consensus of knowledge and belief concerning fitness; and (2) to plan for implementing this statement through the physical education programs.

Ray Duncan, president of the AAMEP during the fitness movement, brought out the fact that they were the largest professional group with an interest in fitness, and they could be the leader in the field of fitness.

Vice-President Nixon presided over the first meeting of the Citizens Advisory Committee of Eisenhower's Council on Youth Fitness, held at the United States Military Academy, West Point, New York, in September of 1957. Nixon said that throughout his travels in forty different countries, the youth of this country have better nutrition, better education, better clothes, and better health than any other country. He also stressed the need for more and better physical education facilities, more well-prepared and competent teachers and leaders, and more programs of activities that provide vigorous activities for all boys and girls regardless of their


A national survey of physical fitness of American youth was under
way headed by the AAMPER Youth Fitness Council. The council adopted the
idea in their meeting of September of 1956. Four basic tasks confronted
the Youth Fitness Project: (1) to identify the major aspects of fitness;
(2) to evaluate tests now available to measure these aspects identified
and, where no suitable tests exist, to develop valid, reliable, objective
and economical tests; (3) to establish norms for the sexes and different
age levels for the various aspects of fitness by using the tests developed;
and (4) to give consideration to the formation of a fitness profile. ⁴⁸

Paul A. Hunsicker led in the development of the AAMPER Physical Fit-
ness Test that was given to children between grades five and twelve to set
up national norms on fitness. The data was compiled in the Survey Research
Center of the University of Michigan. The test included the following
items: (1) softball throw for distance, (2) standing broad jump, (3) fifty-
yard dash, (4) pull-ups or modified pull-ups for girls, (5) sit-ups, (6)
shuttle run, (7) run or walk 600 yards; and if swimming facilities were a-
available (8) (a) swim fifteen feet, (b) jump in water over your head, swim
fifteen yards, turn around, swim back one-half the distance, turn on back
and rest for one-half minute, turn on front, and swim to starting point,
and (c) swim one-hundred yards for time.⁵⁰

⁴⁸ "The West Point Fitness Conference," Journal of Health, Physical
⁴⁹ Paul A. Hunsicker, "AAMPER'S Youth Fitness Project," Journal of
⁵⁰ Ibid.
The data gathered was to give information regarding what boys and girls between grades five and twelve can do relative to selected aspects of fitness. The test battery did not investigate mental, social or emotional fitness.

The American Medical Association and the American Association of Health, Physical Education and Recreation held a joint meeting on fitness and brought out two points of special interest: (1) the living body was responsive to training; and (2) the body operated under wide margins of safety and is remarkably resistant to strain. They also felt that exercise was one of the important factors contributing to total fitness and that it should be graded according to age, reaction to activity and the state of a person's fitness.

On September 7-9, 1958, the second meeting of the President's Council on Youth Fitness and the President's Citizens Advisory Committee was held at Fort Ritchie, Maryland. The problem confronting the conference was to determine whether the American youth was adequately and properly prepared—in a physical, mental, emotional, social and spiritual sense—for the challenges that history is presenting to our civilization. The conference stated that there should be no federal control over fitness at any level of government. They felt that their main duty was to alert the nation about fitness and to guide the nation on the road to

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better fitness.

Lockwood found that only 36.7 per cent failed the Kraus-Weber Test in four South Dakota schools where the test was administered to 275 elementary and junior high school students. In all the schools tested, except one, the girls were superior in the per cent test failure. Lockwood also found that no significant difference existed in the schools with respect to the AAMPER Fitness Test. His evaluation of the schools, through the use of the LaPorte Health and Physical Education Score Card, showed that the school with the superior physical education program also ranked highest on both fitness tests.53

Eisenbraun showed that very little correlation existed between the Kraus-Weber Test and the AAMPER Fitness Test. The lower back muscles were the most important group tested during the performance of the AAMPER Test items. He also brought out that a strong pectoral muscle seemed to be the cause of lack of success in the standing broad jump and the shuttle run. Not one pupil failed the "Upper back" item of the Kraus-Weber Test; no correlation was possible between it and items of the AAMPER Test.54


Halsey studied 122 classes in Physical Education in three different schools to determine how much actual activity was carried on by each student during the activity period. She found that the median was 29 percent in a thirty minute class period, which meant that a child at the midpoint mark was actually active for only eight of the thirty minutes. She recommended the following: (1) Forms of physical education with high activity yields should be emphasised; and (2) Enough small equipment should be provided so that each child may have something for himself.  

The AAMEP took another stride towards promoting more fitness in America by emphasising the fact that we needed a total fitness program. The association realised that all concerned must work together on this fitness problem and through publications, programs, etc., they made the public aware of the fitness problem so they could take part in the movement. Through their Youth Fitness Manual, norms were made possible by the testing of hundreds of students in America. Emblems, T-shirts, sweat-shirts, etc., symbolising the fitness project, were also being awarded.  

President Dwight D. Eisenhower proclaimed May 3-9, 1959, as National Youth Fitness Week. All communities were urged to promote programs and activities demonstrating the importance of youth fitness.  

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also stressed that participation should be emphasized from cradle to the
grave.  

Starr pointed out that most teachers of Health, Physical Educa-
tion and Recreation agreed that a fitness test battery had an important
place in the instructional program. But she also brought out the fact
that no one battery of tests will completely indicate the extent of an
individual's physical fitness. Therefore, she felt that we failed to
use tests that will identify the physical needs of our youth. She was
in favor of the AMFAR Youth Fitness Test. She claimed the various
items attempted to judge the extent to which the individual is maintain-
ing or raising his physical fitness and also the extent to which the
program is helping him do this. Starr recommended the following:

(1) Tests should be given throughout school to judge the pupils ability
to maintain or raise their standard of fitness; (2) Tests can be used to
study the strength and weaknesses of the curriculum; (3) Tests can be
used to counsel students into a program based on their needs; (4) Tests
can be used to interpret the value of health, physical education and
recreation in schools; and (5) Tests can be used as motivation for pupils
to improve and maintain fitness.  

Pohndorf commented he believed that some of the responsibilities
of our unfit youths lies with the teacher. He felt that there was

57 Louis E. Means, "Celebrate National Youth Fitness Week in Your
Community," Journal of Health, Physical Education, and Recreation, XXX,
p. 12, March, 1959.

58 Helen M. Starr, "How to Fit in Fitness Testing," Journal of
probably a need for more fit teachers instead of a need for more preachers
of the gospel of fitness. In his estimation, every individual who put
forth the desirable needs for fitness should himself or herself be in a
state of good physical condition. 59

Willgoose believed that physical fitness should be the primary
objective of physical education, but that schools have instead dropped
body building exercises and gymnastics and substituted sports activities.
He felt that physical fitness had a close relationship with other skills
and would not slight other goals of physical education. 60

The President's Council on Youth Fitness felt that sports were
the core of the physical education program. They saluted sports as the
most inclusive and far reaching area of recreation activities. They
also defended professional athletics, provided that they were conducted
on a high level. Skills executed to the highest level by the profess-
ionals could contribute motivation factors to the youth fitness program. 61

Steinhans' stated:

The present push for fitness is the first to originate in
peace time without imminence of war. This movement can ad-
vance the dawn of a new day for our people and for the people

Education, and Recreation, XXX, p. 36, April, 1959.

60Carl E. Willgoose, "Physical Fitness—Our Primary Objective,"
Journal of Health, Physical Education, and Recreation, XXX, p. 32,
November, 1959.

61President's Council on Youth Fitness, "Sports Yield Youth Fit-
ness," Journal of Health, Physical Education, and Recreation, XXXI,
of the world, a day in which there will be more complete physical, mental, and social well being for all.62

In conclusion, the literature studied indicated that a new impetus was given to the physical fitness of our youth by the findings of the Kraus-Weber Test. This was the first peace time emphasis placed on youth fitness. The results of the test stirred the President of the United States to such an extent that he formed the President's Council on Youth Fitness to study the fitness problem in our country.

This resulted in a new fitness test devised by the AAHPER to further study the problem. The literature also indicated that the fitness of our nation's youth could only be solved through the efforts of local citizens and the effectiveness of the physical education, athletic and recreational programs throughout our country.

CHAPTER III

PROCEDURES

The Kraus-Weber Test and the AAMPER Test were administered to 380 students in grades five to eleven in the Madelia Public Schools, Madelia, Minnesota.

The Kraus-Weber Test was administered by the author alone; the AAMPER Test was administered by the author, assisted by the girl's and boy's physical education instructors. The tester was trained in the administering of the tests and the assistants were thoroughly instructed before the actual testing was started.

The equipment used for the Kraus-Weber Test consisted of an athletic trainer's table approximately 30 inches high, plus two blankets. The tests were administered in the gym during a two day period. Permission was obtained from the Superintendent of Schools to administer the tests and to take students out of class at any time during that two day period.

The test was described to the children and they were told how they would be scored (all six items must be passed to achieve a passing score). The students were instructed not to practice any part of the test in order that no one individual have an unfair advantage in passing the test.

Before the actual testing was begun, the tester answered questions

*The tester was approved by Dr. R. J. Frost who had been approved for certifying other testers in the administration of the Kraus-Weber Test.*
concerning the test.

Both boys and girls removed their shoes before taking the Kraus-Weber Test. A blanket was thrown over the girls as they were lying on the table. Boys and girls were tested separately and they approached the table in a single file so that they could watch the person before them take the test.

The first five parts of the test were administered on the table and the sixth on the floor. The second blanket was rolled up and used for test items 4 and 5. The student gave his name while climbing on the table and the result of each test item was recorded on special forms.

A detailed description of the administration of the Kraus-Weber Test appears in Appendix A.

The AAMPFR Fitness Test battery consists of seven test items. The test items are: (1) the pull-up, (2) the sit-up, (3) the standing broad jump, (4) the shuttle run, (5) the 50-yard dash, (6) the softball throw for distance, and (7) the 600-yard run-walk. Test items 1-4 were administered in the gym and test items 5-7 were administered on the football field.

The pupils should be given reasonable warm-up prior to each event and any student whose medical condition is questionable should not be given the test.

A detailed description of the administration of the AAMPFR Test appears in Appendix B.
CHAPTER IV

TREATMENT AND ANALYSIS OF DATA

Treating the Data

The raw scores of the Kraus-Weber Test and the AAMPER Test were arranged in order and the data treated as described in the following paragraphs.

In the Kraus-Weber Test, the subjects were arranged by sex and grade and listed in order (Table I).

TABLE I. NUMBER OF SUBJECTS TESTED BY SEX AND GRADE

<table>
<thead>
<tr>
<th>Grade</th>
<th>Boys</th>
<th>Girls</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>27</td>
<td>22</td>
<td>49</td>
</tr>
<tr>
<td>6</td>
<td>26</td>
<td>36</td>
<td>62</td>
</tr>
<tr>
<td>7</td>
<td>25</td>
<td>32</td>
<td>57</td>
</tr>
<tr>
<td>8</td>
<td>21</td>
<td>23</td>
<td>44</td>
</tr>
<tr>
<td>9</td>
<td>28</td>
<td>27</td>
<td>55</td>
</tr>
<tr>
<td>10</td>
<td>28</td>
<td>32</td>
<td>60</td>
</tr>
<tr>
<td>11</td>
<td>29</td>
<td>26</td>
<td>55</td>
</tr>
<tr>
<td>Total</td>
<td>183</td>
<td>197</td>
<td>380</td>
</tr>
</tbody>
</table>

The total per cent test failures, total per cent incidence of weakness failures, total per cent incidence failures, and total per cent flexibility failures were computed for the entire group by class and also
by sex. A comparison of total test failures with those in other geographical areas was also determined.

The raw scores of the AAFSIR Test were first used to find the average score of the boys and girls in each event and these scores were compared with the national average as derived from the same test. The raw scores were converted into standard scores by the "orders of merit" method. The following formula as described by Garrett was employed:

\[
\text{Per cent} = \frac{100(E - .5)}{N}
\]

The standard scores of the athletic and non-athletic boys in grades nine through eleven in the Wadella Public Schools were then compared. In this study, athletic boys were defined as those who had competed in one or more sports and completed the season. Boys who did not finish the season or did not go out for a sport were classified as the non-athletic boys. Athletic and non-athletic boys were matched according to the Classification Indices appearing on page 29 of the Youth Fitness Test Manual. Exponents for age, height, and weight were employed to determine each persons classification.

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In comparing the scores of the athletes with the scores of the non-athletes, the "difference method" as described by Garrett was employed. 67 This method was selected because there were only thirty-three subjects in each group. The t-value was calculated for each test item and the level of significance determined. The five per cent level of significance was the level selected for this study.

To analyze more completely the results of the two tests, the composite scores of the AAMDHR Test were correlated with the results of the Kraus-Weber Test. As the Kraus-Weber Test was scored on a "pass-fail" basis, the data was therefore dichotomous. The method of "biserial" correlation was used to compute this relationship. The following formula as described by Garrett was employed. 68

\[
T_{bis} = \frac{N - n}{\sigma} \times \left( \frac{p \times q}{u} \right)
\]

The level of significance was obtained from Table 25 in Garrett. 69

Analysis of Data

Kraus-Weber Test

Per cent Test Failures

In analyzing the results of the Kraus-Weber Test failures, reference is made to Table II. The per cent test failures (found by dividing

68 Ibid., pp. 375-383
69 Ibid., p. 201.
the total number of test failures by the total number taking the test and
multiplying the result by one hundred) was highest in the seventh grade
with 40 per cent failing and lowest in the eleventh grade with 26.1 per
cent failing. This was interesting inasmuch as of all the grades tested,

<table>
<thead>
<tr>
<th>Grade</th>
<th>Per cent Test Failures</th>
<th>Per cent Incidence Failures</th>
<th>Per cent Incidence Weakness Failures</th>
<th>Per cent Flexibility Failures</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>31.3</td>
<td>39.6</td>
<td>18.8</td>
<td>29.8</td>
</tr>
<tr>
<td>6</td>
<td>33.3</td>
<td>40.3</td>
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<td>7</td>
<td>40.0</td>
<td>54.5</td>
<td>36.4</td>
<td>18.1</td>
</tr>
<tr>
<td>8</td>
<td>31.8</td>
<td>40.9</td>
<td>25.4</td>
<td>15.9</td>
</tr>
<tr>
<td>9</td>
<td>29.2</td>
<td>39.8</td>
<td>15.4</td>
<td>15.4</td>
</tr>
<tr>
<td>10</td>
<td>33.3</td>
<td>33.3</td>
<td>20.9</td>
<td>13.3</td>
</tr>
<tr>
<td>11</td>
<td>26.1</td>
<td>30.4</td>
<td>21.7</td>
<td>8.7</td>
</tr>
<tr>
<td>Total</td>
<td>32.3</td>
<td>39.2</td>
<td>22.4</td>
<td>16.8</td>
</tr>
</tbody>
</table>

only the eleventh grade did not have a required activity or physical ed-
ucation period. In analyzing the total test failures in all grades, it
was found that 32.3 per cent failed. This compared favorably with other
areas in the United States. There appeared to be no definite relation-
ship between age and the number of test failures.
**Per cent Incidence Failures**

Referring to Table II the per cent incidence failures (found by adding the number of abdominal, psoas, back and flexibility failures, dividing this number by the total number taking the test and multiplying the result by one hundred) was lowest in the eleventh grade at 30.4 per cent and highest in the seventh grade with 54.5 per cent. It is interesting to note that the seventh grade, which also had the highest number of test failures, was especially high in the number of incidence failures (54.5 per cent), while the other six grades ranged from 30.4 per cent to 40.9 per cent.

**Per cent Incidence of Weakness Failures**

Table II shows that the per cent incidence of weakness failures (found by adding the number of abdominal, psoas and back failures, dividing this number by the total number taking the test and multiplying the result by one hundred) was lowest in the ninth grade with 15.4 per cent and highest at the seventh grade with 36.4 per cent.

**Per cent Flexibility Failures**

Table II shows that the per cent of flexibility failures (found by dividing the number of flexibility failures by the total number taking the test and multiplying the result by one hundred) was highest in the fifth grade with 28.8 per cent and lowest in the eleventh grade with 8.7 per cent. Here, except for the tenth grade, there was a general indication that flexibility increased from the fifth grade to the eleventh grade.
Per cent Test Failures (girls)

Table III indicates that the girls in the seventh grade with 46.9 per cent test failures had the least amount of muscular fitness. The ninth grade with only 25.9 per cent test failures had the lowest percentage of test failures. The fifth grade girls were next with 28.6 per cent.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Per cent Test Failures</th>
<th>Per cent Incidence Failures</th>
<th>Per cent Incidence Weakness Failures</th>
<th>Per cent Flexibility Failures</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>28.6</td>
<td>38.1</td>
<td>28.6</td>
<td>9.5</td>
</tr>
<tr>
<td>6</td>
<td>38.6</td>
<td>38.9</td>
<td>30.6</td>
<td>6.3</td>
</tr>
<tr>
<td>7</td>
<td>46.9</td>
<td>59.4</td>
<td>43.8</td>
<td>15.6</td>
</tr>
<tr>
<td>8</td>
<td>34.8</td>
<td>52.2</td>
<td>34.8</td>
<td>17.4</td>
</tr>
<tr>
<td>9</td>
<td>25.9</td>
<td>29.6</td>
<td>29.6</td>
<td>0.0</td>
</tr>
<tr>
<td>10</td>
<td>37.5</td>
<td>46.9</td>
<td>37.5</td>
<td>9.4</td>
</tr>
<tr>
<td>11</td>
<td>38.8</td>
<td>38.5</td>
<td>38.5</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Per cent Incidence Failures (girls)

Table III shows the per cent incidence failures, and girls in the seventh grade were highest with 59.4 per cent and the ninth grade lowest with 29.6 per cent.
**Per cent Incidence of Weakness Failures (girls)**

Table III shows that the highest per cent of incidence of weakness failures was in the seventh grade with 43.8 per cent. The fifth grade with 28.6 per cent and the ninth grade with 29.6 per cent had the lowest percentage of failures.

**Per cent Flexibility Failures (girls)**

Table III shows that the ninth and eleventh grade girls did not have one flexibility failure and therefore were lowest with zero per cent. The eighth grade with 17.4 per cent and the seventh grade with 15.6 per cent had the greatest percentage of flexibility failures.

**Per cent Test Failures (boys)**

Table IV shows that the boys in the eleventh grade had the lowest percentage of test failures with 20 per cent and the boys in the sixth grade had the highest with 38.5 per cent.

**Per cent Incidence Failures (boys)**

Table IV shows that the eleventh grade had the lowest percentage of incidence failures with 20 per cent and the boys in the seventh grade had the highest rate with 47.8 per cent.

**Per cent Incidence of Weakness Failures (boys)**

Referring to Table IV the boys in the tenth and eleventh grades had no failures and therefore had the lowest per cent of incidence of weakness failures with zero. The seventh grade was highest with 26.1 per cent.
TABLE IV. SUMMARY OF KRAUS-WEBER TEST FAILURES BY BOYS

<table>
<thead>
<tr>
<th>Grade</th>
<th>Per cent Test Failures</th>
<th>Per cent Incidence Failures</th>
<th>Per cent Incidence Weakness Failures</th>
<th>Per cent Flexibility Failures</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>33.3</td>
<td>40.7</td>
<td>11.1</td>
<td>29.6</td>
</tr>
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<td>6</td>
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<td>42.3</td>
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<td>7</td>
<td>30.4</td>
<td>47.8</td>
<td>26.1</td>
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</tr>
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<td>8</td>
<td>28.5</td>
<td>28.6</td>
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</tr>
<tr>
<td>9</td>
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<td>20.0</td>
<td>20.0</td>
<td>0.0</td>
<td>20.0</td>
</tr>
</tbody>
</table>

Per cent Flexibility Failures (boys)

Table IV shows that the eleventh grade boys were lowest on the flexibility failure list with 20 per cent and the sixth grade boys highest with 34.6 per cent.

Comparison of Kraus-Weber Test Results with Other Geographical Areas

Figure 1 shows that the school tested in this study on the items of the Kraus-Weber Test compared very highly with other geographical areas. The 32.3 per cent test failures at Madelia was one of the lowest scores compiled by a school in the United States. Madelia's 32.3 per cent was approximately equal to Brookings, South Dakota, score of 32.9 per cent.
Figure 1. A Comparison of the Results of the Kraus-Weber Test Failures in the Madelia Public Schools with Results from Other Geographical Areas.

- Madelia, Minn.: 32.3%
- Brookings, S. D.: 32.9%
- Eugene, Oregon: 38.1%
- Sioux Indians S. D.: 41.6%
- Indiana (Phillips' study): 45.1%
- Northeastern U. S. cities (Kraus-Hirschland study): 57.9%
- Iowa City, Iowa: 66.8%
AAPER Test

**Pull-up**

Figure 2 shows that at no age level was the average of the Madelia girls, in the modified pull-up, as high as that of the average of the girls nationally. At ages ten and sixteen the national boys' average exceeded the Madelia boys' average on this item.

**Sit-up**

Figure 3 shows that at ages ten and eleven the national girls' average in sit-ups exceeded the Madelia girls' average. The same holds true of the Madelia boys where ages ten and eleven failed to exceed the national average.

**Shuttle-run**

Figure 4 indicates that there was considerable difference between the graph pattern of the Madelia girls on the shuttle-run and the pattern of the girls nationally. The national girls' average showed a steady drop in time from ages ten to sixteen, while the Madelia girls had no definite pattern. The national girls' average was better at ages ten, twelve, thirteen and fourteen. Very little difference existed between the national boys and Madelia boys in the shuttle-run. At no age did more than one or two-tenths of a second separate the two groups. (This item is measured in time. Therefore, the lower the time the better the performance).
Figure 2. Performance of the Madelia Students on the Pull-up Test Item of the AAHPER Test as Compared with National Performance
Figure 3. Performance of the Madelia Students on the Sit-up Test Item of the AAHPER Test as Compared with National Performance
Figure 4. Performance of the Madelia Students on the Shuttle Run Test Item of the AAHPER Test as Compared with National Performance
Standing Broad Jump

Figure 5 shows that the Medelia girls, after ages ten and eleven, were superior to the national girls in the standing broad jump. It should be noted that the national girls showed a definite increase in distance with age, whereas the Medelia girls increased or stayed the same until age fifteen where they dropped in distance jumped. The same situation existed in the boys' standing broad jump. The national boys increased their distance with age, while the Medelia boys increased up to age thirteen, dropped at ages fourteen and fifteen and increased again at age sixteen. Only at age sixteen did the national boys' average better the Medelia boys' average.

50-Yard Dash

Figure 6 indicates that the general trend in the 50-yard dash was that time lowers with age. The Medelia girls were lower than the national average until ages fifteen and sixteen, where the Medelia girls' average increased one second while the national girls did not vary to such an extent. (This item is measured by time. Therefore, the lower the time, the better the performance).

Softball Throw

Figure 7 shows that distance in throwing a softball increased as the students matured. The national girls had a steady increase in distance with age, while the Medelia girls dropped at age twelve and again at age fifteen. At ages ten and eleven the Medelia girls averaged better than the national girls. In this event both the national and Medelia boys increased their distance with age. The Medelia boys, after age ten, equaled
Figure 5. Performance of the Madelia Students on the Standing Broad Jump Test Item of the AAHPER Test as Compared with National Performance
Figure 6. Performance of the Madelia Students on the 50-Yard Dash Test Item of the AAHPER Test as Compared with National Performance
Figure 7. Performance of the Madelia Students on the Softball Throw Test Item of the AAHPER Test as Compared with National Performance
or bettered the national average.

**600-Yard Run-Walk**

Figure 5 indicates a marked difference in the performance of this event by each group. At no time in the 600-yard run-walk did the national girls' average approach the Medelia girls' average. The same held true for the boys, but the difference was not as great. It is interesting to note the time increase to run the 600 yards by the national girls as they matured in age, as their best performance was at age eleven. (This item is measured by time. Therefore, the lower the time the better the performance).

**Comparison of Athletes and Non-athletes**

Table V refers to differences between athletes and non-athletes in the Medelia Public High School (grades nine to eleven) as indicated by the AAMPER Test. It is indicated that the athletes are significantly better than the non-athletes in the sit-up, standing broad jump and softball throw at the one per cent level of significance, and in the pull-up, shuttle-run, 50-yard dash and 600-yard run-walk at the five per cent level of significance. This seems to indicate that increased activity by a student may result in a better performance in the AAMPER Test.

**Biserial Correlation between AAMPER Test and Kraus-Weber Test**

Table VI shows that the correlation between the AAMPER Test and the Kraus-Weber Test was .21. This was significant at the one per cent level of significance. This indicates that there was some relationship and that it would not occur by chance in more than one out of every one
Figure 8. Performance of the Madelia Students on the 600-Yard Run-Walk Test Item of the AAHPER Test as Compared with National Performance
<table>
<thead>
<tr>
<th>Test Item</th>
<th>$N_1$ Non-athletes</th>
<th>$N_2$ Athletes</th>
<th>$(N_2-N_1)$ Difference</th>
<th>Standard Error</th>
<th>t</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sit-up</td>
<td>39.71</td>
<td>60.61</td>
<td>20.70</td>
<td>5.65</td>
<td>3.66</td>
<td>.01</td>
</tr>
<tr>
<td>Pull-up</td>
<td>42.76</td>
<td>57.22</td>
<td>14.46</td>
<td>5.74</td>
<td>2.52</td>
<td>.05</td>
</tr>
<tr>
<td>Shuttle-run</td>
<td>41.74</td>
<td>58.82</td>
<td>16.48</td>
<td>6.70</td>
<td>2.66</td>
<td>.05</td>
</tr>
<tr>
<td>Standing Broad Jump</td>
<td>39.19</td>
<td>61.35</td>
<td>22.16</td>
<td>6.09</td>
<td>3.64</td>
<td>.01</td>
</tr>
<tr>
<td>50-Yard Dash</td>
<td>43.22</td>
<td>56.75</td>
<td>13.53</td>
<td>6.08</td>
<td>2.23</td>
<td>.05</td>
</tr>
<tr>
<td>Softball Throw</td>
<td>39.92</td>
<td>60.02</td>
<td>20.10</td>
<td>5.95</td>
<td>3.38</td>
<td>.01</td>
</tr>
<tr>
<td>600-Yard Run</td>
<td>41.87</td>
<td>56.97</td>
<td>15.10</td>
<td>6.04</td>
<td>2.50</td>
<td>.05</td>
</tr>
</tbody>
</table>
Hundred cases.

**Table VI. **

**MEAN CORRELATION BETWEEN KRAUS-WEBER TEST RESULTS AND AMPER TEST RESULTS**

<table>
<thead>
<tr>
<th>AMPER Scores</th>
<th>Kraus-Weber</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pass</td>
<td>Fail</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>90-99</td>
<td>38</td>
<td>3</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>80-89</td>
<td>26</td>
<td>12</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>70-79</td>
<td>22</td>
<td>16</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>60-69</td>
<td>24</td>
<td>13</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>50-59</td>
<td>30</td>
<td>8</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>40-49</td>
<td>27</td>
<td>11</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>30-39</td>
<td>25</td>
<td>12</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>20-29</td>
<td>23</td>
<td>15</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>10-19</td>
<td>21</td>
<td>17</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>0-9</td>
<td>22</td>
<td>12</td>
<td>34</td>
<td></td>
</tr>
</tbody>
</table>

\[ r_{bis} = \frac{53.25 - 43.21}{28.86} \times \left( 0.674 \times 0.326 \right) \]

\[ = 0.210 \]
CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The Kraus-Weber Test and the AAMPER Test were administered to 380
children, fifth through eleventh grades, in the Madelia Public Schools.
The results were analyzed by standard statistical procedures.

Conclusions

The conclusions based upon data from this study are as follows:

1. Of the entire group tested on the Kraus-Weber Test, 57.7 per
cent passed. This was higher than similar results from other areas in
the United States.

2. The per cent test failures for all grades, with respect to the
Kraus-Weber Test, was lowest in the eleventh grade with 26.1 per cent and
highest in the seventh grade with 40.0 per cent.

3. The per cent test failures for the girls, with respect to the
Kraus-Weber Test, was lowest in the ninth grade with 25.9 per cent and
highest in the seventh grade with 46.9 per cent.

4. The per cent test failures for the boys, with respect to the
Kraus-Weber Test, was lowest in the eleventh grade with 29.0 per cent
and highest in the sixth grade with 35.5 per cent.

5. With respect to the average scores on the items of the AAMPER
Test, the Madelia boys and girls were consistently better than the national
average.
6. The athletes in Nadelia High School were found to be significantly better than the non-athletes in the sit-up, standing broad jump, and the softball throw at the one per cent level of significance, and in the pull-up, shuttle-run, 50-yard dash and 600-yard run at the five per cent level of significance.

7. The results of the Biserial correlation revealed that a correlation of .210 existed between the AAMPER Test and the Kraus-Weber Test. This was significant at the one per cent level of significance.

Recommendations

The author, upon completion of this study, felt that the following recommendations were justified:

1. The AAMPER Test and Kraus-Weber Test are recommended for use in schools to evaluate the fitness of their students.

2. More emphasis should be placed on the "fitness for all" theory.

3. More studies of this type should be conducted on a state level to evaluate the physical fitness of all the states separately.

4. The AAMPER Test be administered on the college level and national norms be established.
LITERATURE CITED


"Krane-Weber is Tested at Bedford, Ohio, High," Physical Education and School Activities Newsletter, June 20, 1957.


APPENDIX A
DESCRIPTION OF THE ADMINISTRATION OF
THE KEUN-WINKER TEST

Test No. 1 - Abdominal Plus

1. Purpose - To test the strength of the abdominal and Psoas muscles.

2. Position of person being tested - The person being tested lies in a supine position with his hands behind his neck. The tester holds the testee's feet down on the table.

3. Procedure - On a command of the tester the testee is instructed to keep his hands behind his neck and try to roll up into a sitting position.

4. Marking - Raising of the trunk from a supine position to a sitting position so that the trunk makes a right angle with the legs constitutes a "pass." If the testee cannot raise up into a sitting position or if he only partially raises up, it shall be considered a "fail."

Test No. 2 - Abdominal Minus

1. Purpose - Further testing of the strength of the abdominal muscles.

2. Position of person being tested - The person being tested lies in a supine position with his hands behind his neck and his knees bent. The tester holds the testee's feet down on the table.

3. Procedure - On a command of the tester the testee is instructed to keep his hands behind his neck and try to roll up into a sitting position.

4. Marking - Raising of the trunk from a supine position to a sitting position so that the trunk makes a right angle with the feet constitutes a "pass." If the testee cannot raise up into a sitting position or if he only partially raises up, it shall be considered a "fail."
Test No. 3 - Psoas (lower abdomen)

1. Purpose - To test the strength of the psoas and lower abdominal muscles.

2. Position of person being tested - The person being tested lies in a supine position with hands behind neck and legs extended.

3. Procedure - On a command of the tester the testee is instructed to keep the knees straight and lift the feet ten inches off the table. He is told to keep them up for a count of ten seconds.

4. Marking - Holding of the feet for the full ten second count constitutes a "pass." Anything less than ten seconds is considered a "fail."

Test No. 4 - Upper Back

1. Purpose - To test the strength of the upper back muscles.

2. Position of person being tested - The person being tested lies in a prone position with a blanket rolled up under his abdomen so that the body would have the feeling of a see-saw which, if weighted at either end, would be able to hold the other end in the air.

3. Procedure - On a command of the tester the testee is instructed that while the tester holds his feet down, he is to put his hands behind his neck and raise his chest, head, and shoulders up and hold them there for a count of ten seconds.

4. Marking - Holding of the chest, head, and shoulders up for the full ten second count constitutes a "pass." Anything less than ten seconds is considered a "fail."
Test No. 5 - Lower Back

1. Purpose - To test the strength of the lower back muscles.

2. Position of person being tested - The person being tested remains prone over the blanket, but removes his hands from behind his neck and places them folded on the table with his head resting on them.

3. Procedure - On a command of the tester the testee is instructed that the tester will hold his chest down on the table and that he is to lift his legs up without bending the knees and hold them up for a count of ten seconds.

4. Marking - Holding of the legs up for the full ten second count constitutes a "pass." Anything less than ten seconds is considered a "fail."

Test No. 6 - Length of Back and Hamstrings (flexibility test)

1. Purpose - To test the length of back and hamstring muscles.

2. Position of person being tested - The person being tested stands erect in stocking feet with hands at his side.

3. Procedure - The testee is instructed to put his feet together, and keep his knees straight at all times. He is then told to lean down slowly and see how close he can come to touching the floor with his fingertips.

4. Marking - Touching the floor with the fingertips without bending the knees constitutes a "pass." If at anytime the knees are bent while attempting to touch the floor, it shall be considered a "fail."
DESCRIPTION OF THE ADMINISTRATION OF
THE AAMPER YOUTH FITNESS TEST

Test No. 1 - Pull-up (boys)

1. Equipment - A metal or wooden bar approximately 1 1/2 inches in diameter is preferred. A doorway gym bar can be used and even a piece of pipe or the rungs of a ladder can be used.

2. Description - The bar should be high enough so that the pupil can hang with his arms and legs fully extended and his feet free of the floor. Use the over-hand grasp. After assuming the hanging position, the pupil raises his body by his arms until his chin can be placed over the bar and then lowers his body to a full hang as in the starting position. The exercise is repeated as many times as possible.

3. Rules - (1) Allow one trial unless it is obvious that the pupil has not had a fair chance. (2) The body must not swing during the execution of the movement. The pull must in no way be a snap movement. If the pupil starts swinging, check this by holding your extended arm across the front of the thighs. (3) The knees must not be raised and kicking of the legs is not permitted.

4. Scoring - Record the number of completed pull-ups to the nearest whole number.
Test No. 1 - Modified Pull-up (girls)

1. Equipment - A metal or wooden bar approximately 1 1/2 inches in diameter is preferred. A doorway gym bar can be used and, if no regular equipment is available, a piece of pipe can also serve the purpose. In some instances, it is possible to use the aisle between bleacher seats and have the bleachers support the pipe at the desired height.

2. Description - Adjust the height of the bar so it is approximately at nipple level. Use the over-hand grasp. The pupil extends her legs under the bar and extends the arms fully. The arms should form an angle of 45 degrees with the floor. The heels should be braced to prevent slipping; they can be resting on a mat or against an improvised rest, like the scorer's foot. From this position the pupil raises her body by her arms until the chest touches the bar, then lowers her body to a full hang. The exercise should be repeated as many times as possible.

3. Rules - (1) No resting is permitted. (2) No pull-up shall be counted in which the pupil fails to keep the body straight, come to a full extension of the arms, or touch the chest to the bar. (3) The maximum number is 40.

4. Scoring - Record the number of completed pull-ups to the nearest whole number, with a maximum of 40.
Test No. 2 - Sit-up

1. Equipment - Mat or floor.

2. Description - The pupil lies on his back, either on the floor or on a mat, with legs extended and feet about two feet apart. His hands are placed on the back of the neck with the fingers interlaced. Elbows are retracted. A partner holds the ankles down, the heels being in contact with the mat or floor at all times. The pupil sits up, turning the trunk to the left and touching the right elbow to the left knee, returns to starting position, then sits up turning the trunk to the right and touching the left elbow to the right knee. The exercise is repeated, alternating sides.

3. Rules - (1) The fingers must remain in contact behind the neck throughout the exercise. (2) The knees must be on the floor during the sit-up but may be slightly bent when touching elbow to knee. (3) The back should be rounded and the head and elbows brought forward when sitting up as a "curl" up.

4. Scoring - One point is given for each complete movement of touching elbow to knee. No score should be counted if the fingertips do not maintain contact behind the head, if knees are bent when the pupil lies on his back, or when he begins to sit-up, or if the pupil pushes up off the floor from an elbow. The maximum limit in terms of number of sit-ups shall be: 50 sit-ups for girls, 100 sit-ups for boys.
Test No. 2 - Shuttle-Run

1. Equipment - Two blocks of wood, 2 inches by 2 inches by 4 inches, and a stopwatch. Pupils should wear sneakers or run barefooted.

2. Description - Two parallel lines are marked on the floor 30 feet apart. The width of a regulation volleyball court serves as a suitable area. Place the blocks of wood behind one of the lines. The pupil starts from behind the other line. On the signal "Ready? Go!" the pupil runs to the blocks, picks one up, runs back to the starting line and places the block behind the line; he then runs back and picks up the second block which he carries back across the starting line. If the scorer has two stopwatches or one with a split-second timer, it is preferable to have two people running at the same time. To eliminate the necessity of returning the blocks after each race, start the races alternately, first from behind one line and then from behind the other.

3. Rules - (1) Allow two trials with some rest between.

4. Scoring - Record the better of the two trials to the nearest tenth of a second.
Test No. 4 - Standing Broad Jump

1. Equipment - Mat, floor, or outdoor jumping pit, and tape measure.

2. Description - Pupil stands with the feet several inches apart and the toes just behind the take-off line. Preparatory to jumping, the pupil swings the arms backward and bends the knees. The jump is accomplished by simultaneously extending the knees and swinging forward the arms.

3. Rules - (1) Allow three trials. (2) Measure from the take-off line to the heel or other part of the body that touches the floor nearest the take-off line. (3) When the test is given indoors, it is convenient to tape the tape measure to the floor at a right angle to the take-off line and have the pupils jump along the tape. The scorer stands to the side and observes the mark to the nearest inch.

4. Scoring - Record the best of the three trials in feet and inches to the nearest inch.
Test No. 5 - 50-Yard Dash

1. Equipment - Two stopwatches or one with a split-second timer.

2. Description - It is preferable to administer this test to two pupils at a time. Have both take positions behind the starting line. The starter will use the commands, "Are you ready?" and "Go!!" The latter will be accompanied by a downward sweep of the starter’s arm to give the timer a visual signal.

3. Rules - (1) The score is the amount of time between the starter's signal and the instant the pupil crosses the finish line.

4. Scoring - Record in seconds to the nearest tenth of a second.
Test No. 6 - **Softball Throw for Distance**

1. Equipment - Softball (12 inch), small metal or wooden stakes, and tape measure.

2. Description - A football field marked in conventional fashion (five-yard intervals), makes an ideal area for this test. If this is not available, it is suggested that lines be drawn parallel to the restraining line, five yards apart. The pupil throws the ball while remaining within two parallel lines, six feet apart. Mark the point of landing with one of the small stakes. If his second or third throw is farther, move the stake accordingly so that, after three throws, the stake is at the point of the pupil's best throw. It was found expedient to have the pupil jog out to his stake and stand there; and then, after five pupils have completed their throws, the measurements were taken. By having the pupil at his particular stake, there is little danger of recording the wrong score.

3. Rules - (1) Only an overhand throw may be used. (2) Three throws are allowed. (3) The distance recorded is the distance from the point of landing to the nearest point on the restraining line.

4. Scoring - Record the best of the three trials to the nearest foot.
Test No. 7 - 600-Yard Run-Walk

1. Equipment - Track or area marked for distance required and a stopwatch.

2. Description - Pupil uses a standing start. At the signal "Ready? Go!," the subject starts running the 600 yard distance. The running may be interspersed with walking. It is possible to have a dozen subjects run at one time by having the pupils pair off before the start of the event. Then, each pupil listens for and remembers his partner's time as the latter crosses the finish. The timer merely calls out the times as the pupils cross the finish.

3. Rules - (1) Walking is permitted, but the object is to cover the distance in the shortest possible time.

4. Scoring - Record in minutes and seconds.