

A STUDY OF PROFICIENCY IN CERTAIN PHYSICAL-EDUCATION
TESTS AND ACTIVITIES FOR TWO GROUPS OF
EIGHTH-GRADE BOYS

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**A STUDY OF PROFICIENCY IN CERTAIN PHYSICAL-EDUCATION
TESTS AND ACTIVITIES FOR TWO GROUPS OF
EIGHTH-GRADE BOYS**

THESIS

**Presented to the Graduate Council of the North
Texas State College in Partial Fulfillment
of the Requirements**

For the Degree of

MASTER OF SCIENCE

By

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178-129
Arlington, Texas

June, 1950

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CHAPTER I

INTRODUCTION

Purpose of the Study

The purpose of this study was to make a comparative investigation of certain phases of the physical-education status of eighth-grade boys in the Travis Junior High School, Harlingen, Texas, for the 1948-1949 school session. The basis for comparison for the boys' physical-education proficiency was their intelligence quotients, obtained by means of the California Test of Mental Ability. It was believed that such a study as this would contribute further information on the problem of whether intelligence has any relationship to proficiency in physical skills.

Limitations

In this study physical-education status or proficiency is understood to refer to the standing of the pupil in general motor capacity, in athletic ability, and in achievement in certain activities included in the physical-education program for boys. The study was limited to the 132 boys enrolled in physical-education classes at the eighth-grade level in the Travis Junior High School, Harlingen, Texas, during the 1948-1949 school session. The investigation

was not planned to include an evaluation of the entire physical-education program, but rather was limited to comparisons of skill in eight particular physical activities, plus an evaluation of general athletic ability. Proficiency in these physical activities was judged by the speed, skill, or accuracy with which given activities were performed. Hence, skill in performance as determined by careful observation of the individual boys was the criterion by which athletic ability was evaluated. The problem resolved itself into a comparison of performance skill with intelligence quotients.

Procedure

After the intelligence quotients for the group had been determined by the administration of the California Test of Mental Ability, the names of the 132 boys enrolled in eighth-grade physical-education classes were divided into two numerically equal groups, one of higher intelligence and the other of lower. It should be noted at this point that no distinction between members of the two groups was made in the classes, nor did the pupils themselves know to which group they belonged as a result of the mental test. However, for purposes of tabulating data, the two groups were considered by the investigator as distinct entities, and all comparisons were based upon the degree of skill exhibited by

members of the higher and lower intelligence groups set up for this study.

Generally practiced activities of a physical nature were chosen for the purpose of determining general motor capacity and physical achievement. The tests selected were those recommended by authorities as providing an adequate basis for evaluating certain phases of physical-education status for boys at this age level.

Throughout the school year the boys, one by one, were given the opportunity to perform these tests of physical and motor ability. All tests were administered under careful supervision and observation, and in each instance it was ascertained that the boy knew exactly what he was to do before he proceeded with the official test. The ideal situation would have been to administer each test to each boy several different times and compute his scores from the average of his attainment on the individual testings; but lack of time prevented this repetition of the tests, and each boy was given each test only once.

When all testings had been completed, individual attainments were tabulated and averages were computed for the higher and lower intelligence groups. These average attainments, when compared with average intelligence quotients for the same groups, constituted the basis upon which conclusions were drawn.

As a further means of determining the significance of the findings revealed by comparing the skill exhibited in the various physical feats by the two groups of boys, coefficients of correlation were calculated for the five physical activities in which the differences in skill between the two groups appeared to be greatest. These activities were chinning the bar, the running broad jump, the sixty-yard dash, the eight-pound shot-put, and the Sargent jump. It was believed that if any significant differences existed, they would be substantiated by this statistical procedure.

The method used for the calculation of the coefficients of correlation was that advocated by Allen L. Edwards in his book, Statistical Analysis for Students in Psychology and Education, published in 1946. In connection with the discussion of each of these five physical activities, the coefficient of correlation is mentioned, and its degree of significance is indicated.

A further statistical approach to the determination of the reliability of the findings included the calculation of the probable error for each of the coefficients of correlation.

Sources of Data

The sources of data for this study were both human and documentary. Human sources were the eighth-grade boys who

participated in the study, whereas documentary sources were the writings of certain authorities in the field of physical education pertaining to the tests of physical and motor skills selected for use in this study.

Related Studies

Apparently, no studies have been made along identical lines with the present investigation, but a brief discussion will be given of a few studies which bear some relationship to the problem under consideration in these pages.

In 1947 McCloy and Anderson conducted a study for the purpose of measuring the sports abilities of high-school girls. The purposes of this effort were defined by the investigators as (1) to investigate the possibility of predicting sports skills and abilities of high-school girls by means of readily standardized tests; (2) to investigate test elements most closely allied to such sports skills; and (3) to investigate the relative importance of these various test elements. The subjects co-operating in the study were 155 girls in the tenth, eleventh, and twelfth grades of the North High School, Des Moines, Iowa. The age range was from fifteen to eighteen years, inclusive. All of the girls were rated by two physical-education instructors on the sports skills of tennis, basketball, swimming, volleyball, and

softball. They also were rated on sports, intelligence, and poise.

Conclusions formulated by McCloy and Anderson as a result of their investigation were as follows:

1. The variables most highly correlated with sports ability are the Sargent jump and the various forms of the Brace test and the Johnson test.

2. The ability to change directions, particularly as measured by the Cozens dodging run, is a valuable phase of physical education.

3. Tests of motor educability, as measured by the various forms of the Brace test and the Johnson test, are exceedingly useful in judging sports abilities.

4. The ability to make quick and adaptative motor responses as measured by the Blocks test also seems to be an important part of the components making up the general sports ability of the individual.

5. The ability to visualize spatial relationships, as measured by the paper-and-pencil tests developed by Thurstone, is significant in judging sports proficiency.¹

Brace conducted a study whose purpose was to identify traits responsible for individual differences in the ability

¹Charles Harold McCloy and Theresa Anderson, "The Measure of Sports Ability in High School Girls," Research Quarterly, XVIII (March, 1947), 2.

to learn motor skills involving more or less total bodily activity. The procedure followed involved the selection of physical performance tests (called learning tests by Brace) which emphasize general body co-ordinations, the working out of scores on the learning tests made during a series of ninety repeated trials, computing the percentage of improvement in learning by special methods, and correlating the amount of learning with various physical tests. Included in the study were the following six learning tests: the tangle, rhythm test, wall volley, ball bounce, kick test, and target toss. Brace concluded that McCloy's tests of general motor ability, general motor capacity, general motor achievement quotients, and motor quotients measure strength, speed, agility, and power to a greater extent than they test the ability to learn.²

Kulcinski conducted a study to determine the effectiveness of superior, normal, and subnormal intelligence quotients of fifth- and sixth-grade boys and girls in the learning of selected fundamental muscular skills. Two batteries of tests were administered before and after training to show whether improvement had occurred.

Kulcinski's findings include the following: (1) group comparisons showed a significant degree of learning by the

²David K. Brace, "Studies in Motor Learning of Gross Bodily Motor Skills," Research Quarterly, XVII (December, 1947), 242.

superior groups when compared with the normal and subnormal groups; (2) there was a marked superiority of the normal groups over the subnormal groups, and a high degree of superiority of the superior groups over the subnormal groups; (3) there was no difference between the sexes in achievement on the simple test battery before the period of training; but (4) a definite tendency favoring the girls appeared in the superior group when the simple test battery was administered after training; (5) girls were definitely superior to boys in the difficult battery after training; (6) boys were superior to girls in the five most difficult exercises of the simple battery before training, but this tendency changed after training to favor the girls in the eleven most difficult exercises of the final battery; (7) girls were found to be significantly superior to boys in the difficult exercises of the final battery, perhaps because of differences in intelligence and training.³

In a study by Espenschade conducted at the University of California, two sections in gymnastics and tumbling for women were compared; likewise, physical-education majors were compared with non-majors. Both groups were given the Brace test and the Iowa revision of the Brace test, and

³Louis E. Kulcinski, "The Relation of Intelligence to the Learning of Fundamental Muscular Skills," Research Quarterly, XVI (December, 1945), 266.

during the semester both groups participated in the same gymnastic and tumbling program, but in addition one section was given extensive instruction and practice in the Brace test and its Iowa revision. In all tests improvement was noted when a final measure was taken at the end of the semester, but the investigator concluded that specific instruction and practice did not in this instance influence the amount of improvement, which had to be credited to better bodily co-ordination, greater physical strength, and improved bodily flexibility, all as the result of practice in gymnastics and tumbling. Espenschade concluded (1) that improvement in the scores on stunt-type test batteries may be brought about by regular practice in activities designed to develop bodily co-ordination, strength, flexibility, and control; (2) that the degree of improvement is not equal for all individuals; and (3) that the Iowa revision of the Brace test is the most practical measure to use when only one battery of stunts is to be employed.⁴

Perhaps the study most closely related to the present investigation is that by White, who made a comparative analysis of the physical-education status and the academic status of one hundred senior girls enrolled in the Crozier Technical High School, Dallas, Texas, in May, 1947. Purposes

⁴Anna Espenschade, "Practice Effects in the Stunt Type Tests," Research Quarterly, XVI (March, 1945), 35.

of the study were outlined as follows: (1) to determine the relationship of the ratings of the students in activities in the physical-education program by physical education instructors and the general motor capacity scores made by the students; (2) to determine the relationship of the physical-education grades and the general motor capacity scores of the students; (3) to determine the relationship of the physical-education grades and the academic grades of the students; (4) to determine the relationship of the intelligence quotients and the general motor capacity scores of the students; and (5) to determine the relationship of the academic grades and the general motor capacity scores of the students.

The following conclusions were formulated by White as a result of her study: (1) there was a very small degree of relationship between physical-education grades and academic grades, general motor capacity scores and academic grades, and general motor capacity scores and intelligence quotients; (2) physical-education grades as computed by instructors at the Crozier Technical High School did not tend to indicate the real ability of the students in activities of the physical-education program; (3) ratings on physical activities by authorities gave a more accurate description of the physical-education status of the students than did the physical-education grades; and,

in general, (4) there was little relationship between the physical-education status and the academic status of the girls included in the study.⁵

⁵Maribel White, "A Comparative Study of the Physical Education Status and the Academic Status of One Hundred Senior Girls of N. R. Crozier Technical High School of Dallas, Texas, in May, 1947" (Unpublished Master's Thesis, Department of Physical Education, North Texas State Teachers College, Denton, Texas, 1947), pp. 1-3, 46-47.

CHAPTER II

PROFICIENCY OF EIGHTH-GRADE BOYS IN CERTAIN PHYSICAL ACTIVITIES

As previously stated, the purpose of this study was to make a comparative investigation of certain phases of the physical-education status of eighth-grade boys in the Travis Junior High School, Harlingen, Texas, for the 1948-1949 school session. It was hoped that the data would reveal whether the level of intelligence as measured by standardized tests of mental ability bore any relationship to the degree of skill or proficiency exhibited in performing the physical activities and stunts selected for use in the study. Coefficients of correlation were computed to lend further insight into the significance of certain findings.

Records for the 132 boys enrolled in eighth-grade physical education classes were kept carefully for each physical performance, and for purposes of comparison the data were tabulated in two groups, one including the boys of higher intelligence and the other, those of lower intelligence. These data will be presented and compared in the present chapter, and differences between the achievements of the two groups of eighth-grade boys will be noted.

Intelligence, Age, Height,
and Weight

Table 1 presents the two groups of eighth-grade boys according to their intelligence quotients, as determined by the California Test of Mental Maturity, Elementary Series, and shows also the chronological age, the height, and the weight of each boy at the time the study was conducted.

When the total of 132 eighth-grade boys was divided into two groups of equal size numerically, each of the two groups contained sixty-six individuals. Table 1 indicates that the point of division for the groups when the numerical grouping was arranged occurred at the intelligence quotient of ninety-nine. To begin with, the total of 132 boys was arranged according to intelligence quotient, descending from highest to lowest. Then, when the two groups were organized, each containing sixty-six individuals, the intelligence quotient of ninety-nine became the dividing point, with ten such intelligence quotients occurring in the higher intelligence group and two in the lower intelligence group. That this level is a satisfactory point of division between higher and lower intelligence levels is indicated by Otis, who has stated that average intelligence is that range represented by intelligence quotients of ninety to 110.¹

¹Arthur S. Otis, Statistical Method in Educational Measurement, p. 148.

TABLE 1

INTELLIGENCE QUOTIENTS, AGE, HEIGHT, AND WEIGHT
OF 132 EIGHTH-GRADE BOYS OF THE HARLINGEN
JUNIOR HIGH SCHOOL

| Boy | Higher Intelligence Group | | | | Lower Intelligence Group | | | |
|-----|---------------------------|-------|--------|--------|--------------------------|-------|--------|--------|
| | I. Q. | Age* | Height | Weight | I. Q. | Age* | Height | Weight |
| 1 | 131 | 14-3 | 62.25 | 117 | 99 | 13-10 | 62 | 93 |
| 2 | 125 | 14-6 | 63 | 99 | 99 | 13-9 | 64 | 153 |
| 3 | 125 | 13-7 | 67 | 119 | 98 | 14-11 | 67.25 | 130 |
| 4 | 122 | 13-5 | 63 | 114 | 98 | 15-9 | 62 | 121.5 |
| 5 | 120 | 14-2 | 68.5 | 131 | 98 | 15-8 | 63 | 102 |
| 6 | 118 | 13-1 | 64 | 112 | 97 | 15-6 | 65 | 129 |
| 7 | 117 | 14-0 | 63.75 | 113 | 96 | 13-11 | 58 | 85 |
| 8 | 117 | 14-4 | 57 | 80 | 96 | 14-2 | 64 | 105 |
| 9 | 117 | 14-6 | 64.5 | 159 | 96 | 13-9 | 64 | 133.5 |
| 10 | 116 | 14-9 | 69 | 139 | 96 | 14-9 | 61.5 | 112 |
| 11 | 115 | 13-9 | 67 | 126 | 96 | 13-8 | 65.5 | 108 |
| 12 | 114 | 14-10 | 65 | 110 | 96 | 13-9 | 60 | 106 |
| 13 | 114 | 14-8 | 64 | 104 | 95 | 14-6 | 63 | 108 |
| 14 | 114 | 14-6 | 60.5 | 106 | 95 | 13-7 | 56.25 | 85 |
| 15 | 112 | 13-11 | 62.25 | 106 | 94 | 14-2 | 63.5 | 110 |
| 16 | 110 | 13-10 | 61.5 | 107 | 94 | 13-6 | 64.25 | 120 |
| 17 | 110 | 14-7 | 69.5 | 144 | 94 | 15-9 | 67 | 136 |
| 18 | 110 | 13-4 | 62.75 | 178 | 94 | 15-3 | 68.5 | 135 |

TABLE 1 -- Continued

| Boy | Higher Intelligence Group | | | | Lower Intelligence Group | | | |
|-----|---------------------------|------|--------|--------|--------------------------|-------|--------|--------|
| | I. Q. | Age* | Height | Weight | I. Q. | Age* | Height | Weight |
| 19 | 110 | 13-9 | 66 | 112 | 92 | 14-8 | 59.25 | 89 |
| 20 | 110 | 13-6 | 63 | 100 | 92 | 14-10 | 66 | 116 |
| 21 | 109 | 14-9 | 64 | 113 | 92 | 13-9 | 57 | 72 |
| 22 | 109 | 13-8 | 62 | 107 | 92 | 14-6 | 66.75 | 136 |
| 23 | 108 | 14-3 | 67 | 132 | 91 | 15-4 | 69.5 | 132 |
| 24 | 108 | 14-2 | 61 | 97 | 91 | 15-6 | 64.5 | 108 |
| 25 | 108 | 14-1 | 59.25 | 78 | 91 | 14-8 | 65 | 174 |
| 26 | 108 | 14-0 | 62.5 | 108 | 90 | 14-7 | 58 | 81 |
| 27 | 107 | 13-5 | 66.25 | 134 | 89 | 16-2 | 67 | 134 |
| 28 | 107 | 14-3 | 58.25 | 92 | 89 | 15-5 | 64 | 123 |
| 29 | 106 | 14-2 | 66.5 | 123 | 89 | 16-4 | 66 | 140 |
| 30 | 106 | 14-7 | 61.5 | 103 | 89 | 15-8 | 67.5 | 154 |
| 31 | 106 | 14-5 | 65 | 104 | 88 | 14-9 | 68 | 132 |
| 32 | 106 | 13-2 | 66.25 | 138 | 88 | 16-4 | 65 | 134 |
| 33 | 106 | 13-4 | 66.25 | 131 | 88 | 14-3 | 63.5 | 124 |
| 34 | 106 | 14-0 | 67 | 144 | 88 | 14-8 | 62.5 | 92 |
| 35 | 105 | 13-2 | 57 | 83 | 88 | 15-5 | 65 | 124 |
| 36 | 105 | 13-4 | 68 | 127 | 88 | 15-3 | 67 | 134.5 |
| 37 | 105 | 15-1 | 66.75 | 132 | 87 | 17-2 | 65.25 | 121.5 |

TABLE 1 -- Continued

| Boy | Higher Intelligence Group | | | | Lower Intelligence Group | | | |
|-----|---------------------------|-------|--------|--------|--------------------------|-------|--------|--------|
| | I. Q. | Age* | Height | Weight | I. Q. | Age* | Height | Weight |
| 38 | 105 | 13-8 | 64 | 107 | 86 | 15-5 | 67 | 132 |
| 39 | 105 | 14-4 | 66 | 130 | 86 | 16-9 | 65 | 125 |
| 40 | 104 | 14-2 | 62.5 | 102 | 86 | 15-3 | 64.5 | 113 |
| 41 | 104 | 13-2 | 61.5 | 88 | 85 | 14-6 | 65 | 109 |
| 42 | 104 | 14-4 | 62.75 | 100.5 | 85 | 15-3 | 62.75 | 103 |
| 43 | 103 | 14-5 | 65 | 141 | 84 | 14-4 | 63 | 109 |
| 44 | 103 | 13-6 | 59.5 | 99 | 84 | 15-6 | 66 | 132 |
| 45 | 103 | 14-8 | 63 | 108 | 84 | 14-3 | 66.5 | 140.5 |
| 46 | 103 | 14-3 | 56 | 81 | 84 | 13-9 | 63 | 113 |
| 47 | 103 | 13-6 | 63.5 | 114 | 84 | 14-7 | 62 | 106 |
| 48 | 102 | 13-4 | 63.5 | 100 | 83 | 15-2 | 67 | 108 |
| 49 | 102 | 14-2 | 61.5 | 100 | 82 | 16-6 | 66 | 144 |
| 50 | 102 | 14-0 | 60 | 101 | 81 | 15-3 | 65.5 | 119 |
| 51 | 101 | 13-7 | 63.5 | 132 | 81 | 15-8 | 64 | 122 |
| 52 | 101 | 14-9 | 62 | 94 | 81 | 14-10 | 61 | 110 |
| 53 | 101 | 16-1 | 66 | 109 | 78 | 15-6 | 68 | 116 |
| 54 | 101 | 15-8 | 67 | 119 | 78 | 15-4 | 68.5 | 135.5 |
| 55 | 101 | 14-10 | 62.5 | 107 | 78 | 15-5 | 67 | 139 |
| 56 | 100 | 13-7 | 58 | 89 | 77 | 15-8 | 66.25 | 145 |

TABLE 1 -- Continued

| Boy | Higher Intelligence Group | | | | Lower Intelligence Group | | | |
|----------------------|---------------------------|-------|--------|--------|--------------------------|-------|--------|--------|
| | I. Q. | Age* | Height | Weight | I. Q. | Age* | Height | Weight |
| 57 | 99 | 14-2 | 66.5 | 112.5 | 76 | 15-9 | 61.75 | 112 |
| 58 | 99 | 12-11 | 65 | 130 | 76 | 13-5 | 61 | 108 |
| 59 | 99 | 13-8 | 62.5 | 100 | 75 | 14-9 | 68 | 145 |
| 60 | 99 | 15-1 | 65 | 109 | 75 | 15-7 | 62 | 102 |
| 61 | 99 | 14-4 | 65 | 97 | 74 | 15-3 | 65 | 122 |
| 62 | 99 | 13-6 | 62.5 | 105 | 72 | 15-8 | 62.5 | 114 |
| 63 | 99 | 15-3 | 66.5 | 140 | 72 | 15-10 | 67 | 147 |
| 64 | 99 | 14-4 | 64.25 | 119.5 | 71 | 13-9 | 63 | 112 |
| 65 | 99 | 15-4 | 63.5 | 122 | 66 | 15-7 | 69 | 148 |
| 66 | 99 | 14-4 | 59 | 85 | 49 | 16-4 | 61.25 | 116 |
| To- tal | 7081 | 932 | 4195 | 7463.5 | 5706 | 989.5 | 4244 | 7940 |
| Aver- age | 107.3 | 14.1 | 63.6 | 113.1 | 86.4 | 14.9 | 64.3 | 120.3 |

*Age is recorded in years and months; that is, the entry "14-3" indicates an age of fourteen years and three months.

Boys are identified in all tables by numbers ranging from one to sixty-six. As there were two groups of numerically equal size included in this study, each boy number pertains to two individuals, one in the higher intelligence

group and one in the lower. Members of each intelligence group are listed in Table 1 according to intelligence quotients, from highest to lowest, and this order of listing will be followed in all succeeding tables. Whereas the highest intelligence quotient recorded for any individual boy in the eighth grade was 131, the lowest was forty-nine. There was a difference of 20.9 points between the average intelligence quotient for members of the higher and lower groups, as indicated in the averages in the end of Table 1. Ranges in intelligence quotients were from ninety-nine to 131 for the higher intelligence group and from forty-nine to ninety-nine for the lower intelligence group.

As to age and height and weight of the boys in the study, wide ranges were noted. Boys of the higher intelligence group ranged in age from twelve years and eleven months to fifteen years and eight months, whereas those of the lower intelligence group ranged from thirteen years and five months to seventeen years and two months. In height the members of the higher intelligence classification ranged from fifty-six to 69.5 inches, whereas those of the lower group ranged from 56.25 to 69.5 inches. Very wide ranges were noted for weight, the boys of the higher intelligence group varying from seventy-eight to 178 pounds and those of the lower intelligence group, from seventy-two to 174 pounds.

The average boy in the lower intelligence group was almost a year older, slightly less than an inch taller, and weighed a little over seven pounds more than the average boy in the higher intelligence group.

Chinning the Bar

Among the tests of physical-education status selected for this study was that of chinning the bar, data for which are presented in Table 2. This activity is highly recommended by McCloy, who describes it as follows:

Use either a horizontal bar or a pair of small rings attached to a horizontal bar. The subject hangs from the bar or the rings by his hands, using either the forward or the reverse grip as he chooses. He pulls himself up until his chin is even with his hands, or over the bar. Then he lowers himself until his arms are completely straight. He is not permitted to kick, jerk, or use a kip motion. Any such maneuver or the failure to go clear down or clear up should count as a half movement. After four consecutive half movements the exercise is stopped and the subject retested later. He is permitted to chin himself as rapidly or as slowly as he desires. The stronger boys usually prefer to chin and dip quite rapidly. In both chinning and dipping, counting should be out loud, and the subject should be encouraged both before beginning the exercise and during the exercise to continue as long as possible.²

Table 2 shows that three boys in the higher intelligence group and two in the lower intelligence group were unable to chin the bar at all; for those who could achieve this performance, the number of times the bar was chinned by each

²Charles Harold McCloy, Tests and Measurements in Health and Physical Education, p. 33.

TABLE 2

PROFICIENCY OF 132 EIGHTH-GRADE BOYS
IN CHINNING THE BAR

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|-----------------|--------------------------|-----------------|
| | Intelligence Quotient | Number of Times | Intelligence Quotient | Number of Times |
| 1 | 131 | 2 | 99 | 9 |
| 2 | 125 | 13 | 99 | 1 |
| 3 | 125 | 8 | 98 | 6 |
| 4 | 122 | 8 | 98 | 3 |
| 5 | 120 | 30 | 98 | 4 |
| 6 | 118 | 3 | 97 | 10 |
| 7 | 117 | 6 | 96 | 6 |
| 8 | 117 | 2 | 96 | 5 |
| 9 | 117 | 1 | 96 | 5 |
| 10 | 116 | 6 | 96 | 5 |
| 11 | 115 | 11 | 96 | 6 |
| 12 | 115 | 1 | 96 | 1 |
| 13 | 114 | 3 | 95 | 29 |
| 14 | 114 | 0 | 95 | 11 |
| 15 | 112 | 7 | 94 | 6 |
| 16 | 110 | 7 | 94 | 5 |
| 17 | 110 | 2 | 94 | 6 |

TABLE 2 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|-----------------|--------------------------|-----------------|
| | Intelligence Quotient | Number of Times | Intelligence Quotient | Number of Times |
| 18 | 110 | 0 | 94 | 6 |
| 19 | 110 | 2 | 92 | 11 |
| 20 | 110 | 7 | 92 | 4 |
| 21 | 109 | 9 | 92 | 12 |
| 22 | 109 | 3 | 92 | 5 |
| 23 | 108 | 7 | 91 | 10 |
| 24 | 108 | 5 | 91 | 10 |
| 25 | 108 | 5 | 91 | 0 |
| 26 | 108 | 3 | 90 | 9 |
| 27 | 107 | 6 | 89 | 6 |
| 28 | 107 | 9 | 89 | 1 |
| 29 | 106 | 0 | 89 | 3 |
| 30 | 106 | 3 | 89 | 11 |
| 31 | 106 | 1 | 88 | 6 |
| 32 | 106 | 5 | 88 | 12 |
| 33 | 106 | 8 | 88 | 0 |
| 34 | 106 | 6 | 88 | 3 |
| 35 | 105 | 4 | 88 | 16 |
| 36 | 105 | 9 | 88 | 2 |

TABLE 2 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|-----------------|--------------------------|-----------------|
| | Intelligence Quotient | Number of Times | Intelligence Quotient | Number of Times |
| 37 | 105 | 22 | 87 | 7 |
| 38 | 105 | 6 | 86 | 13 |
| 39 | 105 | 10 | 86 | 7 |
| 40 | 104 | 10 | 86 | 7 |
| 41 | 104 | 4 | 85 | 5 |
| 42 | 104 | 7 | 85 | 11 |
| 43 | 103 | 2 | 84 | 5 |
| 44 | 103 | 7 | 84 | 4 |
| 45 | 103 | 5 | 84 | 12 |
| 46 | 103 | 11 | 84 | 13 |
| 47 | 103 | 14 | 84 | 3 |
| 48 | 102 | 5 | 83 | 3 |
| 49 | 102 | 16 | 82 | 14 |
| 50 | 102 | 4 | 81 | 14 |
| 51 | 101 | 1 | 81 | 14 |
| 52 | 101 | 10 | 81 | 4 |
| 53 | 101 | 4 | 78 | 3 |
| 54 | 101 | 12 | 78 | 9 |

TABLE 2 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|----------------------|---------------------------|-----------------|--------------------------|-----------------|
| | Intelligence Quotient | Number of Times | Intelligence Quotient | Number of Times |
| 55 | 101 | 4 | 78 | 11 |
| 56 | 100 | 4 | 77 | 6 |
| 57 | 99 | 13 | 76 | 3 |
| 58 | 99 | 3 | 76 | 20 |
| 59 | 99 | 1 | 75 | 3 |
| 60 | 99 | 9 | 75 | 6 |
| 61 | 99 | 6 | 74 | 6 |
| 62 | 99 | 11 | 72 | 22 |
| 63 | 99 | 7 | 72 | 2 |
| 64 | 99 | 13 | 71 | 6 |
| 65 | 99 | 7 | 66 | 11 |
| 66 | 99 | 10 | 49 | 11 |
| To- tal | 7081 | 440 | 5706 | 490 |
| Aver- age | 107.3 | 6.6 | 86.4 | 7.4 |

individual ranged from one to thirty for the higher intelligence group and from one to twenty-nine for the boys of lower intelligence. Whereas only fifteen of the boys of

higher intelligence were able to chin the bar as many as ten times or more, there were twenty-two in the lower intelligence group who achieved this feat. Averages for the two groups reveal that the average boy in the lower intelligence group was able to chin the bar approximately 0.8 time more than the average boy in the higher intelligence group, the average number of times being 7.4 and 6.6, respectively. Of course, the higher achievement of the lower intelligence group may have been due to age, height, and weight differences, but if intelligence can be accepted as an indirect factor in such differences, then it may be concluded that intelligence may possibly operate indirectly in influencing ability to chin the bar, the performer's skill in this feat being in inverse ratio to the intelligence quotient; that is, the data obtained in this study indicate that there is a slight tendency for the boy of higher intelligence to be less adept at chinning the bar than one of lower intelligence.

When coefficients of correlation and probable errors were computed for these factors in accordance with the method previously indicated, it was found that no statistical significance existed between any of them. For the higher intelligence group the coefficients were calculated as follows:

1. Between chinning the bar and intelligence quotients, $-.026 \pm .082$.
2. Between chinning the bar and age, $-.003 \pm .081$.
3. Between chinning the bar and weight, $-.002 \pm .081$.
4. Between chinning the bar and height, $.183 \pm .079$.

For the lower intelligence group, the coefficients of correlation were as follows;

1. Between chinning the bar and intelligence quotients, $-.315 \pm .073$.
2. Between chinning the bar and age, $.041 \pm .081$.
3. Between chinning the bar and weight, $-.139 \pm .080$.
4. Between chinning the bar and height, $-.111 \pm .081$.

Hence, it is apparent that, for this group of boys at least, neither intelligence, age, weight, nor height was of statistical significance in determining their proficiency in chinning the bar.

Running High Jump

The running high jump is widely recognized by physical educators as a good means of testing muscular co-ordination and bodily powers. In using this test, the person being tested is asked to run a certain distance to a given starting point at which place he comes to a stop, crouches momentarily, and leaps as high into the air as he can. At the point where the jumping occurs, some type of measuring

device is set up by which to gauge the height of the jump, the measurement being calculated on the basis of the distance from the ground to the highest point reached by the feet of the jumper.

Table 3 presents the data representing the achievements of the 132 eighth-grade boys with respect to the running high jump. The height of the jump is recorded in feet and inches, but averages are calculated in feet and tenths thereof. In no instance was the height of the jump as much as five feet, and in only one instance was the jump less than three feet; hence the jumps were largely from three and one-half to four and one-half feet in height, as indicated in Table 3. In the running high jump, the higher intelligence group ranged from two feet, eight inches to four feet, eight inches, whereas the lower intelligence group ranged from three feet to four feet, eight inches. The averages for both groups shown in the table indicate a slight advantage of one tenth of a foot for the boys with lower intelligence, the average height of the jump for this group being 3.9 feet, whereas that of the boys with higher intelligence was 3.8 feet. Thus it is shown that the boys of lower intelligence quotients were slightly more adept in the high jump, but the difference is negligible, and its causes cannot be determined.

TABLE 3

PROFICIENCY OF 132 EIGHTH-GRADE BOYS
IN THE RUNNING HIGH JUMP

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|----------------|--------------------------|----------------|
| | Intelligence Quotient | Height of Jump | Intelligence Quotient | Height of Jump |
| 1 | 131 | 3' 6" | 99 | 3' 10" |
| 2 | 125 | 4' 3" | 99 | 3' 6" |
| 3 | 125 | 3' 9" | 98 | 3' 10" |
| 4 | 122 | 3' 8" | 98 | 4' 4" |
| 5 | 120 | 3' 10" | 98 | 4' 0" |
| 6 | 118 | 3' 9" | 97 | 3' 11" |
| 7 | 117 | 3' 9" | 96 | 3' 8" |
| 8 | 117 | 3' 0" | 96 | 4' 6" |
| 9 | 117 | 3' 0" | 96 | 3' 9" |
| 10 | 116 | 4' 5" | 96 | 3' 8" |
| 11 | 115 | 4' 8" | 96 | 4' 0" |
| 12 | 115 | 3' 0" | 96 | 3' 8" |
| 13 | 114 | 3' 9" | 95 | 3' 10" |
| 14 | 114 | 3' 6" | 95 | 3' 11" |
| 15 | 112 | 3' 6" | 94 | 3' 6" |
| 16 | 110 | 3' 4" | 94 | 3' 9" |
| 17 | 110 | 3' 10" | 94 | 3' 8" |

TABLE 3 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|----------------|--------------------------|----------------|
| | Intelligence Quotient | Height of Jump | Intelligence Quotient | Height of Jump |
| 18 | 110 | 2' 8" | 94 | 4' 0" |
| 19 | 110 | 3' 9" | 92 | 3' 6" |
| 20 | 110 | 3' 10" | 92 | 4' 2" |
| 21 | 109 | 4' 3" | 92 | 3' 3" |
| 22 | 109 | 3' 3" | 92 | 3' 10" |
| 23 | 108 | 4' 1" | 91 | 4' 4" |
| 24 | 108 | 3' 9" | 91 | 4' 8" |
| 25 | 108 | 4' 0" | 91 | 3' 0" |
| 26 | 108 | 4' 1" | 90 | 3' 4" |
| 27 | 107 | 4' 7" | 89 | 4' 4" |
| 28 | 107 | 3' 6" | 89 | 3' 8" |
| 29 | 106 | 3' 9" | 89 | 3' 9" |
| 30 | 106 | 3' 7" | 89 | 4' 7" |
| 31 | 106 | 3' 9" | 88 | 3' 9" |
| 32 | 106 | 4' 6" | 88 | 3' 10" |
| 33 | 106 | 4' 0" | 88 | 3' 5" |
| 34 | 106 | 4' 5" | 88 | 3' 3" |
| 35 | 105 | 3' 2" | 88 | 4' 3" |
| 36 | 105 | 4' 6" | 88 | 3' 8" |

TABLE 3 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|----------------|--------------------------|----------------|
| | Intelligence Quotient | Height of Jump | Intelligence Quotient | Height of Jump |
| 37 | 105 | 4' 2" | 87 | 3' 8" |
| 38 | 105 | 3' 8" | 86 | 4' 4" |
| 39 | 105 | 4' 6" | 86 | 3' 11" |
| 40 | 104 | 3' 11" | 86 | 4' 0" |
| 41 | 104 | 3' 6" | 85 | 3' 11" |
| 42 | 104 | 4' 0" | 85 | 4' 1" |
| 43 | 103 | 3' 10" | 84 | 3' 10" |
| 44 | 103 | 4' 0" | 84 | 4' 2" |
| 45 | 103 | 3' 9" | 84 | 4' 8" |
| 46 | 103 | 4' 0" | 84 | 3' 7" |
| 47 | 103 | 3' 9" | 84 | 4' 1" |
| 48 | 102 | 4' 1" | 83 | 4' 3" |
| 49 | 102 | 3' 10" | 82 | 4' 4" |
| 50 | 102 | 3' 9" | 81 | 4' 8" |
| 51 | 101 | 3' 3" | 81 | 4' 7" |
| 52 | 101 | 4' 1" | 81 | 3' 9" |
| 53 | 101 | 3' 9" | 78 | 4' 4" |
| 54 | 101 | 4' 3" | 78 | 4' 5" |
| 55 | 101 | 3' 8" | 78 | 4' 5" |

TABLE 3 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|---------|---------------------------|----------------|--------------------------|----------------|
| | Intelligence Quotient | Height of Jump | Intelligence Quotient | Height of Jump |
| 56 | 100 | 3' 6" | 77 | 4' 2" |
| 57 | 99 | 4' 2" | 76 | 3' 9" |
| 58 | 99 | 3' 4" | 76 | 4' 0" |
| 59 | 99 | 3' 9" | 75 | 3' 8" |
| 60 | 99 | 3' 6" | 75 | 3' 6" |
| 61 | 99 | 3' 9" | 74 | 4' 0" |
| 62 | 99 | 4' 1" | 72 | 4' 4" |
| 63 | 99 | 3' 10" | 72 | 3' 3" |
| 64 | 99 | 4' 2" | 71 | 3' 8" |
| 65 | 99 | 4' 1" | 66 | 4' 1" |
| 66 | 99 | 3' 8" | 49 | 3' 9" |
| Total | 7081 | 251.5' | 5706 | 259' |
| Average | 107.3 | 3.8' | 86.4 | 3.9' |

Running Broad Jump

The running broad jump is valuable as a measurement of physical power.³ The object in this feat is to run for a

³Ibid., p. 65.

certain distance to a given starting point, at which place the contestant crouches momentarily and then leaps as far forward as possible. The span of the jump is measured horizontally along the ground from the starting point to the point of contact with the ground at the conclusion of the jump.

Table 4 presents the data for the running broad jump as recorded for the 132 eighth-grade boys included in this study. Wide variations were noted in the span of the jump within both groups, the range being approximately from nine feet to fifteen feet. The range in span of the running broad jump was from nine feet, six inches to fifteen feet, seven inches for the higher intelligence group and from nine feet, two inches to fifteen feet, nine inches for the lower intelligence group. The average span of the jump for the boys of higher intelligence was 11.9 feet, whereas that for the boys of lower intelligence was 11.4 feet, revealing a slight difference in average span of 0.5 foot in favor of the boys with lower intelligence. Of course, as in other phases of this study, the presence of factors other than intelligence is recognized in the comparisons.

Statistical analysis by means of the method previously indicated did not reveal any significant relationships between any of these measured factors, although those for

TABLE 4

PROFICIENCY OF 132 EIGHTH-GRADE BOYS
IN THE RUNNING BROAD JUMP

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|--------------|--------------------------|--------------|
| | Intelligence Quotient | Span of Jump | Intelligence Quotient | Span of Jump |
| 1 | 131 | 11' 7" | 99 | 11' 0" |
| 2 | 125 | 12' 9" | 99 | 10' 5" |
| 3 | 125 | 11' 8" | 98 | 11' 10" |
| 4 | 122 | 12' 2" | 98 | 12' 7" |
| 5 | 120 | 12' 6" | 98 | 11' 11" |
| 6 | 118 | 12' 2" | 97 | 12' 4" |
| 7 | 117 | 12' 4" | 96 | 12' 0" |
| 8 | 117 | 10' 7" | 96 | 14' 3" |
| 9 | 117 | 9' 7" | 96 | 11' 11" |
| 10 | 116 | 13' 9" | 96 | 12' 3" |
| 11 | 115 | 15' 7" | 96 | 12' 9" |
| 12 | 115 | 9' 7" | 96 | 10' 10" |
| 13 | 114 | 14' 1" | 95 | 13' 4" |
| 14 | 114 | 11' 2" | 95 | 12' 5" |
| 15 | 112 | 11' 10" | 94 | 13' 0" |
| 16 | 110 | 12' 9" | 94 | 11' 0" |
| 17 | 110 | 13' 2" | 94 | 11' 10" |

TABLE 4 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|--------------|--------------------------|--------------|
| | Intelligence Quotient | Span of Jump | Intelligence Quotient | Span of Jump |
| 18 | 110 | 10' 2" | 94 | 11' 9" |
| 19 | 110 | 13' 1" | 92 | 12' 1" |
| 20 | 110 | 11' 9" | 92 | 14' 8" |
| 21 | 109 | 12' 11" | 92 | 12' 7" |
| 22 | 109 | 9' 6" | 92 | 11' 6" |
| 23 | 108 | 13' 2" | 91 | 13' 2" |
| 24 | 108 | 13' 1" | 91 | 14' 8" |
| 25 | 108 | 11' 1" | 91 | 9' 10" |
| 26 | 108 | 12' 0" | 90 | 11' 3" |
| 27 | 107 | 13' 7" | 89 | 13' 7" |
| 28 | 107 | 11' 7" | 89 | 11' 4" |
| 29 | 106 | 11' 8" | 89 | 12' 6" |
| 30 | 106 | 11' 10" | 89 | 14' 0" |
| 31 | 106 | 11' 1" | 88 | 11' 9" |
| 32 | 106 | 12' 6" | 88 | 12' 1" |
| 33 | 106 | 12' 11" | 88 | 10' 6" |
| 34 | 106 | 12' 4" | 88 | 9' 2" |
| 35 | 105 | 11' 10" | 88 | 12' 2" |
| 36 | 105 | 12' 5" | 88 | 11' 7" |

TABLE 4 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|--------------|--------------------------|--------------|
| | Intelligence Quotient | Span of Jump | Intelligence Quotient | Span of Jump |
| 37 | 105 | 13' 4" | 87 | 13' 8" |
| 38 | 105 | 11' 9" | 86 | 13' 8" |
| 39 | 105 | 12' 8" | 86 | 12' 11" |
| 40 | 104 | 11' 1" | 86 | 12' 5" |
| 41 | 104 | 10' 9" | 85 | 14' 2" |
| 42 | 104 | 13' 6" | 85 | 14' 3" |
| 43 | 103 | 11' 8" | 84 | 13' 9" |
| 44 | 103 | 13' 0" | 84 | 12' 7" |
| 45 | 103 | 12' 7" | 84 | 15' 9" |
| 46 | 103 | 11' 9" | 84 | 12' 6" |
| 47 | 103 | 13' 6" | 84 | 11' 8" |
| 48 | 102 | 12' 6" | 83 | 13' 7.5" |
| 49 | 102 | 11' 3" | 82 | 12' 10" |
| 50 | 102 | 12' 1" | 81 | 14' 7" |
| 51 | 101 | 10' 6" | 81 | 11' 6" |
| 52 | 101 | 13' 11" | 81 | 11' 8" |
| 53 | 101 | 10' 9" | 78 | 11' 2" |
| 54 | 101 | 12' 1" | 78 | 12' 8" |
| 55 | 101 | 10' 9" | 78 | 14' 3" |

TABLE 4 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|----------------|---------------------------|--------------|--------------------------|--------------|
| | Intelligence Quotient | Span of Jump | Intelligence Quotient | Span of Jump |
| 56 | 100 | 12' 1" | 77 | 12' 11" |
| 57 | 99 | 11' 10" | 76 | 11' 4" |
| 58 | 99 | 10' 6" | 76 | 13' 2" |
| 59 | 99 | 10' 8" | 75 | 11' 7" |
| 60 | 99 | 11' 2" | 75 | 11' 3" |
| 61 | 99 | 11' 3" | 74 | 12' 4" |
| 62 | 99 | 11' 2" | 72 | 12' 11" |
| 63 | 99 | 12' 7" | 72 | 11' 6" |
| 64 | 99 | 13' 5" | 71 | 12' 4" |
| 65 | 99 | 14' 9" | 66 | 14' 7" |
| 66 | 99 | 12' 7" | 49 | 11' 0" |
| Total | 7081 | 787' | 5706 | 821.75' |
| Average | 107.3 | 11.9' | 86.4 | 12.4' |

weight, height, and age were shown to be of considerably more importance than for intelligence. For the running broad jump, the coefficients of correlation for the boys of the higher intelligence group were as follows:

1. Between running broad jump and intelligence quotients, $-.104 \pm .081$.
2. Between running broad jump and age, $.051 \pm .081$.
3. Between running broad jump and weight, $.108 \pm .081$.
4. Between running broad jump and height, $.227 \pm .078$.

In the lower intelligence group the coefficients of correlation were as follows:

1. Between running broad jump and intelligence quotients, $-.079 \pm .081$.
2. Between running broad jump and age, $.304 \pm .074$.
3. Between running broad jump and weight, $.528 \pm .073$.
4. Between running broad jump and height, $.245 \pm .077$.

Thus the relationship between performance on the running broad jump and intelligence is less than that between performance in this activity and weight, height, and age.

Sixty-yard Dash

A standard which has been established for the sixty-yard dash is that the runner should strive to cover at least ten yards per second, which means that six seconds would be required to complete the entire sixty-yard dash.⁴ Many variations in individual abilities along this line occur, of course, and usually long practice is demanded before a boy of junior-high-school age can attain this standard.

⁴Ibid., p. 117.

In fact, Table 5 indicates that not a single boy in the entire group of 132 was able to complete the sixty-yard dash in six seconds, although a few of the boys completed the feat in slightly less than seven seconds and were thus very near the standard. Seventeen boys, however, required ten seconds or more to run the sixty-yard dash. The time required for boys of the higher intelligence group to run the sixty-yard dash ranged from 6.9 seconds to 12.1 seconds, whereas the range for boys of the lower intelligence group was from 6.6 seconds to 11.8 seconds.

It is obvious that in judging the proficiency of the boys in the sixty-yard dash, the shorter the time required to complete the run, the more proficient is the runner. By the use of this criterion, the lower intelligence group was favored slightly above the higher intelligence group. The average time required for the sixty-yard dash by members of the higher intelligence group was 8.8 seconds, whereas members of the lower intelligence group completed the race in an average of 8.5 seconds--a difference of 0.3 second in the average time in favor of the lower intelligence group. This slight advantage held by the boys of lower intelligence may have been due to coincidents of the sampling or to factors not considered in this study.

To substantiate this conclusion, statistical analysis according to the method previously mentioned revealed no

TABLE 5

PROFICIENCY OF 132 EIGHTH-GRADE BOYS
IN THE SIXTY-YARD DASH

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|---------|--------------------------|---------|
| | Intelligence Quotient | Seconds | Intelligence Quotient | Seconds |
| 1 | 131 | 9.3 | 99 | 9.0 |
| 2 | 125 | 9.5 | 99 | 10.8 |
| 3 | 125 | 8.9 | 98 | 9.0 |
| 4 | 122 | 8.8 | 98 | 8.1 |
| 5 | 120 | 8.9 | 98 | 8.7 |
| 6 | 118 | 9.0 | 97 | 8.3 |
| 7 | 117 | 9.1 | 96 | 8.5 |
| 8 | 117 | 10.0 | 96 | 8.0 |
| 9 | 117 | 10.7 | 96 | 9.2 |
| 10 | 116 | 96 | 8.9 | |
| 11 | 115 | 7.0 | 96 | 8.2 |
| 12 | 115 | 9.2 | 96 | 11.0 |
| 13 | 114 | 6.9 | 96 | 7.8 |
| 14 | 114 | 11.7 | 95 | 9.2 |
| 15 | 112 | 8.8 | 94 | 8.0 |
| 16 | 110 | 8.6 | 94 | 8.6 |
| 17 | 110 | 7.4 | 94 | 9.2 |

TABLE 5 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|---------|--------------------------|---------|
| | Intelligence Quotient | Seconds | Intelligence quotient | Seconds |
| 18 | 110 | 12.1 | 94 | 7.4 |
| 19 | 110 | 8.5 | 92 | 9.4 |
| 20 | 110 | 9.1 | 92 | 7.5 |
| 21 | 109 | 8.2 | 92 | 10.5 |
| 22 | 109 | 9.4 | 92 | 9.0 |
| 23 | 108 | 9.1 | 91 | 8.2 |
| 24 | 108 | 9.3 | 91 | 9.0 |
| 25 | 108 | 9.2 | 91 | 11.8 |
| 26 | 108 | 8.5 | 90 | 8.2 |
| 27 | 107 | 8.0 | 89 | 7.5 |
| 28 | 107 | 9.1 | 89 | 9.1 |
| 29 | 106 | 8.9 | 89 | 10.1 |
| 30 | 106 | 9.2 | 89 | 6.9 |
| 31 | 106 | 8.5 | 88 | 10.5 |
| 32 | 106 | 8.6 | 88 | 8.9 |
| 33 | 106 | 7.4 | 88 | 10.0 |
| 34 | 106 | 8.4 | 88 | 10.3 |
| 35 | 105 | 9.2 | 88 | 8.3 |
| 36 | 105 | 8.6 | 88 | 8.4 |

TABLE 5 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|---------|--------------------------|---------|
| | Intelligence Quotient | Seconds | Intelligence Quotient | Seconds |
| 37 | 105 | 8.0 | 87 | 8.4 |
| 38 | 105 | 8.9 | 86 | 7.5 |
| 39 | 105 | 7.2 | 86 | 8.2 |
| 40 | 104 | 8.4 | 86 | 8.8 |
| 41 | 104 | 10.2 | 85 | 9.9 |
| 42 | 104 | 8.9 | 85 | 8.9 |
| 43 | 103 | 9.1 | 84 | 6.9 |
| 44 | 103 | 8.2 | 84 | 8.1 |
| 45 | 103 | 7.8 | 84 | 6.8 |
| 46 | 103 | 8.1 | 84 | 9.7 |
| 47 | 103 | 8.9 | 84 | 8.6 |
| 48 | 102 | 7.7 | 83 | 7.9 |
| 49 | 102 | 10.6 | 82 | 8.3 |
| 50 | 102 | 9.5 | 81 | 7.3 |
| 51 | 101 | 10.0 | 81 | 7.1 |
| 52 | 101 | 9.7 | 81 | 8.2 |
| 53 | 101 | 9.1 | 78 | 8.3 |
| 54 | 101 | 8.7 | 78 | 8.6 |
| 55 | 101 | 8.8 | 78 | 7.8 |

TABLE 5 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|----------------|---------------------------|---------|--------------------------|---------|
| | Intelligence Quotient | Seconds | Intelligence Quotient | Seconds |
| 56 | 100 | 9.6 | 77 | 8.0 |
| 57 | 99 | 8.7 | 76 | 8.3 |
| 58 | 99 | 10.1 | 76 | 7.9 |
| 59 | 99 | 9.0 | 75 | 9.9 |
| 60 | 99 | 8.2 | 75 | 9.1 |
| 61 | 99 | 10.6 | 74 | 8.2 |
| 62 | 99 | 7.9 | 72 | 6.6 |
| 63 | 99 | 7.8 | 72 | 8.0 |
| 64 | 99 | 8.1 | 71 | 8.3 |
| 65 | 99 | 8.8 | 66 | 7.0 |
| 66 | 99 | 8.8 | 49 | 8.5 |
| Total | 7081 | 586.7 | 5706 | 566.6 |
| Average | 107.3 | 8.8 | 86.4 | 8.5 |

significant relationships between any of these factors. In the higher intelligence group, the coefficients of correlation were as follows:

1. Between the sixty-yard dash and intelligence quotients, $-.121 \not\leq .080$.

2. Between the sixty-yard dash and age, $.276 \pm .075$.
3. Between the sixty-yard dash and weight, $.047 \pm .080$.
4. Between the sixty-yard dash and height, $.351 \pm .071$.

For the boys in the lower intelligence classification, coefficients of correlation were the following:

1. Between the sixty-yard dash and intelligence quotients, $-.324 \pm .073$.
2. Between the sixty-yard dash and age, $.308 \pm .074$.
3. Between the sixty-yard dash and weight, $.047 \pm .081$.
4. Between the sixty-yard dash and height, $.236 \pm .077$.

Thus a more definite relationship was shown to exist between the sixty-yard dash and height and age than between the sixty-yard dash and intelligence and weight, although none of the coefficients of correlation was of statistical importance.

Eight-pound Shot-put

Table 6 indicates individual achievement in the throwing of an eight-pound shot, the object of which, of course, is to cast the weight as far as possible. Distance is computed by measuring the space from the point at which the performer stands and the point at which the shot hits the ground. The table shows wide variations in the capacity of the individual boys to perform this feat of strength, and even in the averages, distinct differences appear. Distances

TABLE 6

PROFICIENCY OF 132 EIGHTH-GRADE BOYS
IN THE EIGHT-POUND SHOT-PUT

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|----------|--------------------------|----------|
| | Intelligence Quotient | Distance | Intelligence Quotient | Distance |
| 1 | 131 | 29' 10" | 99 | 21' 6" |
| 2 | 125 | 21' 4" | 99 | 26' 9" |
| 3 | 125 | 26' 2" | 98 | 32' 1" |
| 4 | 122 | 22' 2" | 98 | 25' 4" |
| 5 | 120 | 33' 1" | 98 | 23' 7" |
| 6 | 118 | 21' 8" | 97 | 27' 10" |
| 7 | 117 | 23' 4" | 96 | 20' 3" |
| 8 | 117 | 16' 6" | 96 | 21' 7" |
| 9 | 117 | 23' 9" | 96 | 27' 11" |
| 10 | 116 | 31' 5" | 96 | 26' 1" |
| 11 | 115 | 32' 9" | 96 | 20' 7" |
| 12 | 115 | 18' 8" | 96 | 23' 9" |
| 13 | 114 | 20' 3" | 95 | 26' 8" |
| 14 | 114 | 19' 7" | 95 | 22' 5" |
| 15 | 112 | 24' 10" | 94 | 26' 5" |
| 16 | 110 | 24' 1" | 94 | 24' 4" |
| 17 | 110 | 32' 9" | 94 | 29' 3" |

TABLE 6 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|----------|--------------------------|----------|
| | Intelligence Quotient | Distance | Intelligence Quotient | Distance |
| 18 | 110 | 22' 8" | 94 | 26' 9" |
| 19 | 110 | 23' 8" | 92 | 23' 7" |
| 20 | 110 | 21' 5" | 92 | 25' 3" |
| 21 | 109 | 30' 2" | 92 | 17' 3" |
| 22 | 109 | 18' 8" | 92 | 23' 11" |
| 23 | 108 | 28' 2" | 91 | 29' 5" |
| 24 | 108 | 21' 11" | 91 | 28' 8" |
| 25 | 108 | 30' 3" | 91 | 29' 3" |
| 26 | 108 | 24' 2" | 90 | 18' 9" |
| 27 | 107 | 32' 3" | 89 | 28' 2" |
| 28 | 107 | 19' 9" | 89 | 23' 4" |
| 29 | 106 | 19' 10" | 89 | 32' 1" |
| 30 | 106 | 20' 8" | 89 | 34' 10" |
| 31 | 106 | 21' 4" | 88 | 21' 7" |
| 32 | 106 | 30' 3" | 88 | 30' 1" |
| 33 | 106 | 28' 1" | 88 | 20' 4" |
| 34 | 106 | 28' 8" | 88 | 18' 8" |
| 35 | 105 | 17' 9" | 88 | 32' 7" |
| 36 | 105 | 24' 4" | 88 | 28' 2" |

TABLE 6 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|----------|--------------------------|----------|
| | Intelligence Quotient | Distance | Intelligence Quotient | Distance |
| 37 | 105 | 33' 10" | 87 | 34' 5" |
| 38 | 105 | 26' 8" | 86 | 31' 8" |
| 39 | 105 | 30' 5" | 86 | 34' 4" |
| 40 | 104 | 22' 4" | 86 | 24' 7" |
| 41 | 104 | 19' 7" | 85 | 24' 3" |
| 42 | 104 | 19' 10" | 85 | 26' 7" |
| 43 | 103 | 32' 1" | 84 | 26' 7" |
| 44 | 103 | 24' 2" | 84 | 31' 11" |
| 45 | 103 | 21' 9" | 84 | 37' 8" |
| 46 | 103 | 20' 8" | 84 | 25' 8" |
| 47 | 103 | 28' 1" | 84 | 27' 3" |
| 48 | 102 | 19' 9" | 83 | 24' 3" |
| 49 | 102 | 25' 8" | 82 | 43' 1" |
| 50 | 102 | 20' 2" | 81 | 34' 9" |
| 51 | 101 | 21' 4" | 81 | 31' 11" |
| 52 | 101 | 22' 8" | 81 | 22' 2" |
| 53 | 101 | 20' 8" | 78 | 19' 5" |
| 54 | 101 | 25' 5" | 78 | 34' 9" |
| 55 | 101 | 21' 1" | 78 | 33' 5" |

TABLE 6 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|----------------|---------------------------|----------|--------------------------|----------|
| | Intelligence Quotient | Distance | Intelligence Quotient | Distance |
| 56 | 100 | 17' 11" | 77 | 31' 11" |
| 57 | 99 | 23' 4" | 76 | 23' 11" |
| 58 | 99 | 24' 0" | 76 | 24' 9" |
| 59 | 99 | 18' 8" | 75 | 28' 2" |
| 60 | 99 | 25' 5" | 75 | 24' 4" |
| 61 | 99 | 22' 4" | 74 | 25' 4" |
| 62 | 99 | 23' 10" | 72 | 25' 5" |
| 63 | 99 | 38' 7" | 72 | 29' 7" |
| 64 | 99 | 28' 8" | 71 | 26' 9" |
| 65 | 99 | 28' 9" | 66 | 32' 8" |
| 66 | 99 | 23' 5" | 49 | 28' 3" |
| Total | 7081 | 1617.25' | 5706 | 1788.75' |
| Average | 107.3 | 24.5' | 86.4 | 27.1' |

in the records of performers are given in feet and inches, but the averages have been translated into feet and tenths of feet. Ranges in distance attained in the eight-pound shot-put were from sixteen feet, six inches to thirty-eight

feet, seven inches for the higher intelligence group and from seventeen feet, three inches to thirty-seven feet, eight inches for the lower intelligence group. The average distance the eight-pound shot could be thrown by the boys of the higher intelligence group was 24.5 feet, whereas that for the boys of the lower intelligence group was 27.1 feet--a difference of slightly more than two and one-half feet in average distance in favor of the boys of lower intelligence.

For the higher intelligence group, the coefficients of correlation were as follows:

1. Between the eight-pound shot-put and intelligence quotients, $.0606 \pm .081$.

2. Between the eight-pound shot-put and age, $.0118 \pm .082$.

3. Between the eight-pound shot-put and weight, $.719 \pm .056$.

4. Between the eight-pound shot-put and height, $.561 \pm .056$.

For the lower intelligence group, the coefficients of correlation were as follows:

1. Between the eight-pound shot-put and intelligence quotients, $-.403 \pm .068$.

2. Between the eight-pound shot-put and age, $.748 \pm .036$.

3. Between the eight-pound shot-put and weight, .719 \angle .039.

4. Between the eight-pound shot-put and height, .161 \angle .079.

These values indicate that for both groups of boys there is a significant relationship between performance in throwing the eight-pound shot and weight. Relationships between performance in this activity and intelligence as well as height and age are insignificant.

Sargent Jump

The Sargent jump is primarily a test of the ability of the body to develop power relative to the weight of the individual himself. In this jump, the individual crouches in the position of preparing to jump and does an amount of work necessary to raise the body from the crouched position to one of complete extension. If this work is done slowly, the body does not leave the ground. If it is done with sufficient rapidity to cause the momentum of the body to continue the upward motion sufficiently to raise the feet from the floor, and to project the body still farther upward, the body then "jumps" from the floor.⁵

This test was worked out in 1921 by D. A. Sargent, who called it "the physical test of a man." This test consisted of springing into the air as high as possible, and taking as the record of the jump the difference between the height reached by the crown of the head during the jump and the

⁵Ibid., p. 57.

standing height.⁶ Thus it is seen that the Sargent jump is similar to the standing high jump. However, the scale for measuring the Sargent jump is usually given in centimeters, since that was the unit of measurement employed in the beginning when Sargent first developed the test; but the measurements can, of course, readily be translated into feet and inches if desired.

In Table 7 are shown the individual achievements of the boys in taking the Sargent-jump test. Wide ranges in ability are at once apparent by a mere glance at the table. Ranges for the higher intelligence group were from twenty-five to sixty centimeters, whereas those for the lower intelligence group were from twenty-eight to sixty-six centimeters. The average distance attained in the Sargent jump by the members of the higher intelligence group was 43.2 centimeters, whereas that of the members of the lower intelligence group was 46.1 centimeters--an average difference of approximately three centimeters in favor of the boys with lower intelligence. No definite conclusion can be drawn as to the possible relationship between intelligence and proficiency in this jump, although, as in other phases of this study, it appears that differences in age,

⁶D. A. Sargent, "The Physical Test of a Man," American Physical Education Review, XXVI (April, 1921), 188.

TABLE 7

PROFICIENCY OF 132 EIGHTH-GRADE BOYS
IN THE SARGENT JUMP

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|--------------|--------------------------|--------------|
| | Intelligence Quotient | Centi-meters | Intelligence Quotient | Centi-meters |
| 1 | 131 | 40 | 99 | 47 |
| 2 | 125 | 39 | 99 | 36 |
| 3 | 125 | 39 | 98 | 41 |
| 4 | 122 | 44 | 98 | 46 |
| 5 | 120 | 37 | 98 | 48 |
| 6 | 118 | 52 | 97 | 48 |
| 7 | 117 | 40 | 96 | 41 |
| 8 | 117 | 37 | 96 | 40 |
| 9 | 117 | 40 | 96 | 36 |
| 10 | 116 | 48 | 96 | 48 |
| 11 | 115 | 59 | 96 | 50 |
| 12 | 115 | 32 | 96 | 50 |
| 13 | 114 | 41 | 95 | 40 |
| 14 | 114 | 42 | 95 | 44 |
| 15 | 112 | 39 | 94 | 40 |
| 16 | 110 | 42 | 94 | 34 |
| 17 | 110 | 50 | 94 | 47 |

TABLE 7 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|-------------|--------------------------|-------------|
| | Intelligence Quotient | Centimeters | Intelligence Quotient | Centimeters |
| 18 | 110 | 25 | 94 | 28 |
| 19 | 110 | 45 | 92 | 41 |
| 20 | 110 | 44 | 92 | 50 |
| 21 | 109 | 49 | 92 | 43 |
| 22 | 109 | 48 | 92 | 45 |
| 23 | 108 | 54 | 91 | 57 |
| 24 | 108 | 42 | 91 | 60 |
| 25 | 108 | 41 | 91 | 36 |
| 26 | 108 | 39 | 90 | 35 |
| 27 | 107 | 50 | 89 | 52 |
| 28 | 107 | 32 | 89 | 35 |
| 29 | 106 | 35 | 89 | 52 |
| 30 | 106 | 34 | 89 | 61 |
| 31 | 106 | 39 | 88 | 36 |
| 32 | 106 | 53 | 88 | 48 |
| 33 | 106 | 51 | 88 | 33 |
| 34 | 106 | 53 | 88 | 35 |
| 35 | 105 | 34 | 88 | 49 |
| 36 | 105 | 50 | 88 | 56 |

TABLE 7 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|-------------|--------------------------|-------------|
| | Intelligence Quotient | Centimeters | Intelligence Quotient | Centimeters |
| 37 | 105 | 50 | 87 | 53 |
| 38 | 105 | 48 | 86 | 44 |
| 39 | 105 | 60 | 86 | 66 |
| 40 | 104 | 46 | 86 | 49 |
| 41 | 104 | 34 | 85 | 45 |
| 42 | 104 | 36 | 85 | 52 |
| 43 | 103 | 45 | 84 | 53 |
| 44 | 103 | 42 | 84 | 47 |
| 45 | 103 | 41 | 84 | 57 |
| 46 | 103 | 52 | 84 | 53 |
| 47 | 103 | 48 | 84 | 39 |
| 48 | 102 | 39 | 83 | 51 |
| 49 | 102 | 49 | 82 | 56 |
| 50 | 102 | 31 | 81 | 54 |
| 51 | 101 | 44 | 81 | 54 |
| 52 | 101 | 45 | 81 | 35 |
| 53 | 101 | 43 | 78 | 40 |
| 54 | 101 | 47 | 78 | 50 |
| 55 | 101 | 40 | 78 | 50 |

TABLE 7 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|----------------|---------------------------|-------------|--------------------------|-------------|
| | Intelligence Quotient | Centimeters | Intelligence Quotient | Centimeters |
| 56 | 100 | 41 | 77 | 59 |
| 57 | 99 | 41 | 76 | 35 |
| 58 | 99 | 39 | 76 | 51 |
| 59 | 99 | 30 | 75 | 47 |
| 60 | 99 | 40 | 75 | 30 |
| 61 | 99 | 44 | 74 | 54 |
| 62 | 99 | 45 | 72 | 55 |
| 63 | 99 | 52 | 72 | 39 |
| 64 | 99 | 45 | 71 | 43 |
| 65 | 99 | 55 | 66 | 59 |
| 66 | 99 | 46 | 49 | 44 |
| Total | 7081 | 2857 | 5706 | 3042 |
| Average | 107.3 | 43.2 | 86.4 | 46.1 |

height, and weight may have had some bearing on achievement, and that these differences may have had a slight relationship to intelligence quotients.

Statistical analysis, however, indicated no significant relationships. For the higher intelligence group, the coefficients of correlation were as follows:

1. Between the Sargent jump and intelligence quotients, $-.323 \pm .073$.
2. Between the Sargent jump and age, $-.031 \pm .081$.
3. Between the Sargent jump and weight, $.254 \pm .076$.
4. Between the Sargent jump and height, $.344 \pm .072$.

For the lower intelligence group the coefficients of correlation for the Sargent jump were as follows:

1. Between the Sargent jump and intelligence quotients, $-.0577 \pm .082$.
2. Between the Sargent jump and age, $.554 \pm .056$.
3. Between the Sargent jump and weight, $.139 \pm .080$.
4. Between the Sargent jump and height, $.209 \pm .078$.

Thus it is shown that none of the apparent relationships was statistically significant, although there appeared to be a slight tendency for a closer relationship between the Sargent jump and age, height, and weight than between the Sargent jump and intelligence.

Burpee Test

The test which came to be known by the name of its originator was first developed by Royal H. Burpee, a physical director for the Young Men's Christian Association of

New York City. This test, now incorporating certain modifications developed since its introduction, is performed as follows:

Upon the command to begin, the subject flexes his hips to the squat-rest position, leans forward, and places his hands on the floor somewhere in front of the feet. He then thrusts both legs backward to the front leaning-rest position, with the body approximately straight from the shoulders to the feet. He returns to an approximation of the squat-rest position, and then to a standing position. He repeats this movement as rapidly as possible until the command to stop is given. No particular degree of bending is prescribed, and there are only two major requirements as to form. When the legs are thrust backward, the knees and hips must at least straighten out. The hips may sag below a line between the shoulders and heels, but they must descend at least to such a line. When the subject returns to a standing position he must straighten up so that the trunk is in a straight line with the legs. He may if he wishes, however, be inclined forward from head to feet. In other words, the line of his body must be straight, but not necessarily vertical. The fastest performers start the feet thrusting backwards almost before the hands have touched the floor, and they bend the knees relatively little. In other words, the fastest method of performing this feat is not to squat clear down, but to bend the knees about forty-five degrees and then thrust the whole leg backwards.

The test is scored as the number of full movements and quarter movements performed in ten seconds. If a subject has performed the complete movement five times and his hands have just touched the floor on the sixth trip as the stop signal is given, he is credited with five and a quarter movements. If his feet have reached the backward front leaning-rest position, it is a half movement. If he has returned to the squat-rest position with his hands full on the floor, it is a three-quarter movement.⁷

⁷ McGloy, Tests and Measurements in Health and Physical Education, pp. 84-85.

Table 8 presents the scoring made on the Burpee test by the 132 individual boys in the eighth grade included in this study. An unusually small amount of variation is to be noted in the number of times the Burpee test was completed during the ten seconds allotted for the test. In accordance with the standards for scoring mentioned in the above quotation, the scores are listed as complete movements or as a combination of complete movements and quarter, half, or three-quarter movements. In the averages for the two groups there was no variation, and only slight difference in the range of movements completed. On the Burpee test, the higher intelligence group ranged from 5.0 to 7.75 times, whereas the range of the lower intelligence group was from 4.25 to 7.75 times. Boys in the higher intelligence group completed an average of 6.25 movements in the Burpee test during the time allotted, and those in the lower intelligence group completed exactly the same average number of movements in the same period of time. Hence, the averages were the same for the two groups of boys, and for this reason no correlations were computed in this instance.

Iowa Revision of the Brace Test

In 1927 David K. Brace published his test of motor ability. This was the first test of its kind and at the time of

TABLE 8

PROFICIENCY OF 132 EIGHTH-GRADE BOYS
ON THE BURPEE TEST

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|-----------------|--------------------------|-----------------|
| | Intelligence Quotient | Number of Times | Intelligence Quotient | Number of Times |
| 1 | 131 | 5.25 | 99 | 6.25 |
| 2 | 125 | 7.75 | 99 | 5.5 |
| 3 | 125 | 6.5 | 98 | 5.5 |
| 4 | 122 | 6.25 | 98 | 6.75 |
| 5 | 120 | 6.5 | 98 | 4.25 |
| 6 | 118 | 6.5 | 97 | 6 |
| 7 | 117 | 6 | 96 | 5 |
| 8 | 117 | 6 | 96 | 6.5 |
| 9 | 117 | 5 | 96 | 7 |
| 10 | 116 | 6 | 96 | 6.25 |
| 11 | 115 | 8 | 96 | 6.5 |
| 12 | 115 | 5.5 | 96 | 7.5 |
| 13 | 114 | 6.5 | 95 | 5.75 |
| 14 | 114 | 5.5 | 95 | 6.75 |
| 15 | 112 | 6.5 | 94 | 6.5 |
| 16 | 110 | 5.5 | 94 | 5.5 |
| 17 | 110 | 5.5 | 94 | 5.5 |

TABLE 8 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|-----------------|--------------------------|-----------------|
| | Intelligence Quotient | Number of Times | Intelligence Quotient | Number of Times |
| 18 | 110 | 5 | 94 | 4.75 |
| 19 | 110 | 6.75 | 92 | 7 |
| 20 | 110 | 6.5 | 92 | 7 |
| 21 | 109 | 7.5 | 92 | 6.75 |
| 22 | 109 | 6 | 92 | 6.25 |
| 23 | 108 | 7.5 | 91 | 7.75 |
| 24 | 108 | 5 | 91 | 7.25 |
| 25 | 108 | 6.75 | 91 | 7.25 |
| 26 | 108 | 5 | 90 | 5 |
| 27 | 107 | 7 | 89 | 6.25 |
| 28 | 107 | 5.5 | 89 | 5.75 |
| 29 | 106 | 6 | 89 | 6.5 |
| 30 | 106 | 5.75 | 89 | 7.5 |
| 31 | 106 | 4.25 | 88 | 5.5 |
| 32 | 106 | 6.5 | 88 | 5.5 |
| 33 | 106 | 6 | 88 | 5.25 |
| 34 | 106 | 7 | 88 | 5.25 |
| 35 | 105 | 7 | 88 | 5.75 |
| 36 | 105 | 6.5 | 88 | 6.75 |

TABLE 8 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|-----------------|--------------------------|-----------------|
| | Intelligence Quotient | Number of Times | Intelligence Quotient | Number of Times |
| 37 | 105 | 6.75 | 87 | 7.5 |
| 38 | 105 | 6.5 | 86 | 6.75 |
| 39 | 105 | 6.5 | 86 | 7 |
| 40 | 104 | 6.5 | 86 | 6.5 |
| 41 | 104 | 5.25 | 85 | 5.5 |
| 42 | 104 | 6.25 | 85 | 7.75 |
| 43 | 103 | 5.75 | 84 | 6.25 |
| 44 | 103 | 6.5 | 84 | 6.75 |
| 45 | 103 | 6 | 84 | 7.5 |
| 46 | 103 | 6.25 | 84 | 6.25 |
| 47 | 103 | 6 | 84 | 5.25 |
| 48 | 102 | 5.25 | 83 | 6 |
| 49 | 102 | 7.5 | 82 | 6.25 |
| 50 | 102 | 6 | 81 | 7.75 |
| 51 | 101 | 7 | 81 | 7.25 |
| 52 | 101 | 7.5 | 81 | 6.25 |
| 53 | 101 | 6.25 | 78 | 4.5 |
| 54 | 101 | 6 | 78 | 6 |
| 55 | 101 | 7 | 78 | 7 |

TABLE 8 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|----------------|---------------------------|-----------------|--------------------------|-----------------|
| | Intelligence Quotient | Number of Times | Intelligence Quotient | Number of Times |
| 56 | 100 | 7 | 77 | 7.75 |
| 57 | 99 | 6.25 | 76 | 5 |
| 58 | 99 | 5 | 76 | 7.75 |
| 59 | 99 | 5.75 | 75 | 6.5 |
| 60 | 99 | 7.5 | 75 | 5.75 |
| 61 | 99 | 6.5 | 74 | 5.25 |
| 62 | 99 | 6.5 | 72 | 5 |
| 63 | 99 | 6.5 | 72 | 7.25 |
| 64 | 99 | 7.5 | 71 | 6 |
| 65 | 99 | 6.75 | 66 | 5.75 |
| 66 | 99 | 6.25 | 49 | 6 |
| Total | 7081 | 413.5 | 5706 | 414.0 |
| Average | 107.3 | 6.25 | 86.4 | 6.25 |

its publication was intended for use as a measurement of general motor ability. The underlying philosophy of this test was quite similar to that of the Stanford-Binet intelligence test, in that a number of skills were attempted,

some of them easy and some difficult. The test consisted of twenty stunts, each of which was scored in terms of success or failure. Although the Brace test is still a good one, it has largely been modified by various revisions to make it more usable. Since it was originally intended to be a test of general motor ability, some stunts were included which were primarily dependent upon strength, whereas others were included which were not particularly related to the field of what is now called "motor educability."

The Iowa revision of the Brace test, usually referred to as the "Iowa Brace," is the most popular of the several revisions which have been made of the original Brace test. The Iowa Brace test is an attempt to develop a means of measuring motor educability. Forty stunts were studied and experimented with, then some were eliminated one by one until a total of twenty-one were found to be relatively useful stunts for the avowed purpose of the test.⁸

Table 9 indicates the number of successful and unsuccessful attempts to perform the twenty-one stunts of the Iowa Brace test in both the first and second trials. It should be noted in passing that this was the only one of the tests used in this study in which the boys were given a second chance in the event of failure on the first attempt.

⁸Ibid., pp. 69-70. For a detailed description of the twenty-one stunts in the Iowa Brace test, see ibid., pp. 70-74.

Only those stunts which were not performed satisfactorily the first time were submitted for another trial at a later date. Only two boys, both members of the lower intelligence group, succeeded in all twenty-one stunts at their first attempt, although several in both groups attained from seventeen to twenty successful performances at the first attempt. After the second effort, three boys in the higher intelligence group and four in the lower intelligence group had succeeded in attaining success on all stunts; but all of the other boys still had one or more unsuccessful attempts--averaging over three per boy--in performing the stunts even after their second effort.

Successes on the first trial of the Iowa Brace test ranged from eight to twenty in number for the higher intelligence group, who showed a range from one to eight successes in their second effort. The lower intelligence group attained successes ranging in number from eight to twenty-one (perfection) on the first trial and from one to eight on the second.

When the first and second trials are combined for ascertaining averages, it is found that the number of successful performances of stunts for both groups was almost identical, being 17.7 for the higher intelligence group and 17.2 for the lower intelligence group--an average difference of 0.5 of a stunt in favor of the boys of higher

TABLE 9

PROFICIENCY OF 132 EIGHTH-GRADE BOYS IN PERFORMING
THE TWENTY-ONE STUNTS IN THE IOWA REVISION
OF THE BRACE TEST

| Boy | Higher Intelligence Group | | | | Lower Intelligence Group | | | |
|-----|---------------------------|--------------|--------------|--------------|--------------------------|--------------|--------------|--------------|
| | First Trial | | Second Trial | | First Trial | | Second Trial | |
| | Suc- cess | Fail- ure | Suc- cess | Fail- ure | Suc- cess | Fail- ure | Suc- cess | Fail- ure |
| 1 | 14 | 7 | 5 | 2 | 13 | 8 | 3 | 5 |
| 2 | 17 | 4 | 2 | 2 | 10 | 11 | 4 | 7 |
| 3 | 14 | 7 | 6 | 1 | 19 | 2 | 2 | 0 |
| 4 | 17 | 4 | 3 | 1 | 12 | 9 | 4 | 5 |
| 5 | 18 | 3 | 1 | 2 | 18 | 3 | 1 | 2 |
| 6 | 12 | 9 | 4 | 5 | 16 | 5 | 3 | 2 |
| 7 | 17 | 4 | 2 | 2 | 12 | 9 | 5 | 4 |
| 8 | 11 | 10 | 5 | 5 | 14 | 7 | 3 | 4 |
| 9 | 13 | 8 | 2 | 6 | 10 | 11 | 7 | 4 |
| 10 | 18 | 3 | 2 | 1 | 16 | 5 | 3 | 2 |
| 11 | 18 | 3 | 2 | 1 | 14 | 7 | 3 | 4 |
| 12 | 13 | 8 | 5 | 3 | 17 | 4 | 1 | 3 |
| 13 | 15 | 6 | 1 | 5 | 13 | 8 | 5 | 3 |
| 14 | 15 | 6 | 2 | 4 | 13 | 8 | 7 | 1 |
| 15 | 16 | 5 | 3 | 2 | 16 | 5 | 3 | 2 |

TABLE 9 -- Continued

| Boy | Higher Intelligence Group | | | | Lower Intelligence Group | | | |
|-----|---------------------------|--------------|--------------|--------------|--------------------------|--------------|--------------|--------------|
| | First Trial | | Second Trial | | First Trial | | Second Trial | |
| | Suc- cess | Fail- ure | Suc- cess | Fail- ure | Suc- cess | Fail- ure | Suc- cess | Fail- ure |
| 16 | 15 | 6 | 2 | 4 | 14 | 7 | 4 | 3 |
| 17 | 11 | 10 | 8 | 2 | 12 | 9 | 5 | 4 |
| 18 | 9 | 12 | 3 | 9 | 9 | 12 | 3 | 9 |
| 19 | 17 | 4 | 2 | 2 | 18 | 3 | 0 | 3 |
| 20 | 13 | 8 | 4 | 4 | 19 | 2 | 1 | 1 |
| 21 | 15 | 6 | 4 | 2 | 9 | 12 | 8 | 4 |
| 22 | 15 | 6 | 4 | 2 | 14 | 7 | 5 | 2 |
| 23 | 15 | 6 | 3 | 3 | 16 | 5 | 1 | 4 |
| 24 | 11 | 10 | 5 | 5 | 21 | 0 | ... | ... |
| 25 | 16 | 5 | 4 | 1 | 9 | 12 | 2 | 10 |
| 26 | 14 | 7 | 3 | 4 | 11 | 10 | 5 | 5 |
| 27 | 19 | 2 | 1 | 1 | 14 | 7 | 3 | 4 |
| 28 | 20 | 1 | 1 | 0 | 14 | 7 | 4 | 3 |
| 29 | 14 | 7 | 2 | 5 | 13 | 8 | 3 | 5 |
| 30 | 16 | 5 | 3 | 2 | 15 | 6 | 4 | 2 |
| 31 | 12 | 9 | 2 | 7 | 15 | 6 | 3 | 3 |
| 32 | 20 | 1 | 0 | 1 | 12 | 9 | 7 | 2 |
| 33 | 13 | 8 | 6 | 2 | 8 | 13 | 1 | 12 |

TABLE 9 -- Continued

| Boy | Higher Intelligence Group | | | | Lower Intelligence Group | | | |
|-----|---------------------------|--------------|--------------|--------------|--------------------------|--------------|--------------|--------------|
| | First Trial | | Second Trial | | First Trial | | Second Trial | |
| | Suc- cess | Fail- ure | Suc- cess | Fail- ure | Suc- cess | Fail- ure | Suc- cess | Fail- ure |
| 34 | 15 | 6 | 1 | 5 | 12 | 9 | 6 | 3 |
| 35 | 10 | 11 | 4 | 7 | 12 | 9 | 6 | 3 |
| 36 | 15 | 6 | 3 | 3 | 15 | 6 | 1 | 5 |
| 37 | 13 | 8 | 3 | 5 | 15 | 6 | 3 | 3 |
| 38 | 14 | 7 | 3 | 4 | 10 | 11 | 1 | 10 |
| 39 | 17 | 4 | 4 | 0 | 17 | 4 | 3 | 1 |
| 40 | 14 | 7 | 5 | 2 | 16 | 5 | 3 | 2 |
| 41 | 13 | 8 | 3 | 5 | 14 | 7 | 4 | 3 |
| 42 | 16 | 5 | 1 | 4 | 20 | 1 | 1 | 0 |
| 43 | 17 | 4 | 3 | 1 | 10 | 11 | 5 | 6 |
| 44 | 17 | 4 | 4 | 0 | 11 | 10 | 3 | 7 |
| 45 | 14 | 7 | 5 | 2 | 17 | 4 | 3 | 1 |
| 46 | 17 | 4 | 1 | 3 | 16 | 5 | 3 | 2 |
| 47 | 15 | 6 | 4 | 1 | 10 | 11 | 3 | 8 |
| 48 | 16 | 5 | 2 | 3 | 21 | 0 | ... | ... |
| 49 | 15 | 6 | 5 | 1 | 15 | 6 | 4 | 2 |
| 50 | 8 | 13 | 7 | 6 | 15 | 6 | 4 | 2 |
| 51 | 13 | 8 | 2 | 6 | 20 | 1 | 0 | 1 |

TABLE 9 -- Continued

| Boy | Higher Intelligence Group | | | | Lower Intelligence Group | | | |
|----------------|---------------------------|--------------|--------------|--------------|--------------------------|--------------|--------------|--------------|
| | First Trial | | Second Trial | | First Trial | | Second Trial | |
| | Suc- cess | Fail- ure | Suc- cess | Fail- ure | Suc- cess | Fail- ure | Suc- cess | Fail- ure |
| 52 | 13 | 8 | 5 | 3 | 14 | 7 | 3 | 4 |
| 53 | 13 | 8 | 3 | 5 | 14 | 7 | 4 | 3 |
| 54 | 17 | 4 | 1 | 3 | 15 | 6 | 5 | 1 |
| 55 | 14 | 7 | 4 | 3 | 14 | 7 | 4 | 3 |
| 56 | 16 | 5 | 2 | 3 | 13 | 8 | 5 | 3 |
| 57 | 15 | 6 | 3 | 3 | 9 | 12 | 2 | 10 |
| 58 | 13 | 8 | 5 | 3 | 18 | 3 | 3 | 0 |
| 59 | 11 | 10 | 6 | 4 | 17 | 4 | 2 | 2 |
| 60 | 13 | 9 | 5 | 3 | 13 | 8 | 3 | 5 |
| 61 | 12 | 9 | 3 | 6 | 13 | 8 | 4 | 4 |
| 62 | 14 | 7 | 4 | 3 | 16 | 5 | 1 | 4 |
| 63 | 19 | 2 | 2 | 0 | 14 | 7 | 2 | 5 |
| 64 | 15 | 6 | 5 | 1 | 13 | 8 | 3 | 5 |
| 65 | 16 | 5 | 3 | 2 | 10 | 11 | 1 | 10 |
| 66 | 16 | 5 | 4 | 1 | 12 | 9 | 4 | 5 |
| Total | 967 | 417 | 218 | 199 | 927 | 462 | 212 | 247 |
| Average | 14.4 | 6.3 | 3.3 | 3.0 | 14.0 | 7.0 | 3.2 | 3.7 |

intelligence. This is the only instance in this series of tests in which the higher intelligence group showed a higher proficiency than was true of the lower intelligence group. However, the difference was so small as to be negligible and could hardly be regarded as significant enough to upset the general trend noted throughout the study--that of apparently better proficiency on the part of the boys of the lower intelligence group.

Boys' General Athletic Ability

As a final evaluation of physical-education status of the 132 eighth-grade boys included in this study, they were assigned scores based upon their participation in all physical-education and recreational activities offered to them, together with their degree of proficiency achieved in the tests administered for this study. The scores thus assigned were termed an evaluation of the boys' general athletic ability and are shown in Table 10.

Actually, there was relatively little variation in the scores assigned to the individual boys on the basis of their general athletic ability, most of them being in the 70's and 80's, with a few in the 90's but none below 70. For the athletic ability of the higher intelligence group, scores ranged from seventy to ninety-seven, whereas for the lower intelligence group the range in scores was from seventy to ninety-six. When averages for the two groups were computed,

TABLE 10

**EVALUATION OF 132 EIGHTH-GRADE BOYS' GENERAL
ATHLETIC ABILITY BASED UPON THEIR
PARTICIPATION AND PROFICIENCY**

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|-------|--------------------------|-------|
| | Intelligence Quotient | Score | Intelligence Quotient | Score |
| 1 | 131 | 79 | 99 | 78 |
| 2 | 125 | 84 | 99 | 85 |
| 3 | 125 | 81 | 98 | 87 |
| 4 | 122 | 79 | 98 | 86 |
| 5 | 120 | 92 | 98 | 80 |
| 6 | 118 | 82 | 97 | 83 |
| 7 | 117 | 81 | 96 | 77 |
| 8 | 117 | 71 | 96 | 87 |
| 9 | 117 | 70 | 96 | 83 |
| 10 | 116 | 90 | 96 | 81 |
| 11 | 115 | 97 | 96 | 84 |
| 12 | 115 | 71 | 96 | 84 |
| 13 | 114 | 90 | 95 | 88 |
| 14 | 114 | 71 | 95 | 82 |
| 15 | 112 | 84 | 94 | 89 |
| 16 | 110 | 79 | 94 | 80 |
| 17 | 110 | 92 | 94 | 79 |

TABLE 10 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|-------|--------------------------|-------|
| | Intelligence Quotient | Score | Intelligence Quotient | Score |
| 18 | 110 | 70 | 94 | 79 |
| 19 | 110 | 88 | 92 | 87 |
| 20 | 110 | 81 | 92 | 85 |
| 21 | 109 | 89 | 92 | 71 |
| 22 | 109 | 73 | 92 | 88 |
| 23 | 108 | 82 | 91 | 95 |
| 24 | 108 | 80 | 91 | 91 |
| 25 | 108 | 75 | 91 | 70 |
| 26 | 108 | 81 | 90 | 77 |
| 27 | 107 | 89 | 89 | 85 |
| 28 | 107 | 78 | 89 | 75 |
| 29 | 106 | 76 | 89 | 85 |
| 30 | 106 | 77 | 89 | 96 |
| 31 | 106 | 73 | 88 | 75 |
| 32 | 106 | 90 | 88 | 80 |
| 33 | 106 | 89 | 88 | 75 |
| 34 | 106 | 84 | 88 | 72 |
| 35 | 105 | 82 | 88 | 84 |
| 36 | 105 | 83 | 88 | 86 |

TABLE 10 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|-----|---------------------------|-------|--------------------------|-------|
| | Intelligence Quotient | Score | Intelligence Quotient | Score |
| 37 | 105 | 92 | 87 | 87 |
| 38 | 105 | 78 | 86 | 82 |
| 39 | 105 | 95 | 86 | 84 |
| 40 | 104 | 78 | 86 | 83 |
| 41 | 104 | 78 | 85 | 78 |
| 42 | 104 | 80 | 85 | 89 |
| 43 | 103 | 78 | 84 | 85 |
| 44 | 103 | 86 | 84 | 85 |
| 45 | 103 | 80 | 84 | 96 |
| 46 | 103 | 85 | 84 | 81 |
| 47 | 103 | 86 | 84 | 79 |
| 48 | 102 | 81 | 83 | 90 |
| 49 | 102 | 84 | 82 | 85 |
| 50 | 102 | 81 | 81 | 92 |
| 51 | 101 | 82 | 81 | 85 |
| 52 | 101 | 81 | 81 | 78 |
| 53 | 101 | 80 | 78 | 79 |
| 54 | 101 | 86 | 78 | 83 |
| 55 | 101 | 76 | 78 | 90 |

TABLE 10 -- Continued

| Boy | Higher Intelligence Group | | Lower Intelligence Group | |
|----------------|---------------------------|-------|--------------------------|-------|
| | Intelligence Quotient | Score | Intelligence Quotient | Score |
| 56 | 100 | 72 | 77 | 85 |
| 57 | 99 | 81 | 76 | 89 |
| 58 | 99 | 75 | 76 | 90 |
| 59 | 99 | 78 | 75 | 88 |
| 60 | 99 | 83 | 75 | 78 |
| 61 | 99 | 73 | 74 | 70 |
| 62 | 99 | 85 | 72 | 93 |
| 63 | 99 | 94 | 72 | 75 |
| 64 | 99 | 88 | 71 | 76 |
| 65 | 99 | 90 | 66 | 85 |
| 66 | 99 | 84 | 49 | 74 |
| Total | 7081 | 5414 | 5706 | 5453 |
| Average | 107.3 | 82.0 | 86.4 | 82.6 |

it was found that these, too, were similar. The average score made by boys in the higher intelligence group was 82.0, whereas that of the boys in the lower intelligence group was 82.6--a difference of 0.6 score point in favor

of the lower intelligence group. Although this difference is too small to be significant, it does uphold the general trend noted throughout the study, that of slightly greater physical proficiency on the part of boys of lower intelligence than of those of higher intelligence.

Summary

By way of summary, tabulations in Table 11 list the nine tests of physical-education status utilized in this study and indicate the standing of each group of boys with respect to each. This table was prepared from the averages found in the nine preceding tables, and indicates the tests or physical activities in which the higher intelligence group had a higher average skill than did the lower intelligence group, and those in which the lower intelligence group had a higher average skill than did the higher intelligence group.

It may be seen from the data presented in Table 11 that in only one test were the members of the higher intelligence group able to attain a better average skill than the members of the lower intelligence group, and it has already been shown that in this instance the difference was so small as to be almost negligible. In eight tests, however, members of the lower intelligence group were able to attain a better average skill than were those of the higher

TABLE 11

**COMPARISON OF THE HIGHER INTELLIGENCE GROUP
AND THE LOWER INTELLIGENCE GROUP AS TO
PROFICIENCY IN PERFORMING CERTAIN
PHYSICAL ACTIVITIES**

| Physical Activities | Average Skill for Higher Intelligence Group Better than for Lower | Average Skill for Lower Intelligence Group Better than for Higher | Average Difference Per Boy |
|--|---|---|----------------------------|
| Chinning the bar . | | x | 0.8 time |
| Running high jump. | | x | 0.1 foot |
| Running broad jump | | x | 0.5 foot |
| Sixty-yard dash . | | x | 0.3 second |
| Eight-pound shot-put | | x | 2.6 feet |
| Sargent jump . . . | | x | 2.9 cms. |
| Burpee test . . . | | | Equal |
| Stunts on Iowa revision of Brace Test of Motor Ability | x | | 0.5 point |
| General athletic ability | | x | 0.6 point |
| Total | 1 | 7 | . . . |

intelligence group. In no instance was the difference large enough to be significant, or statistically important, but

there was a definite trend, however slight, for the boys of lower intelligence to show somewhat greater proficiency in the execution of the tests and activities selected for use in this study. However, when these data were analyzed, few relationships were found which were statistically significant.

CHAPTER III

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to make a comparative investigation of certain phases of the physical-education status of eighth-grade boys in the Travis Junior High School, Harlingen, Texas, for the 1948-1949 school session. An effort was made to determine whether any relationship existed between intelligence levels of the boys and their degree of skill or proficiency in performing the tests or physical activities selected for use in this study. It is the purpose of the present chapter to offer certain conclusions and recommendations as a result of the data examined in the preceding chapter.

Conclusions

In the light of the data previously presented and discussed, the following conclusions appear to be warranted:

1. For this particular group of 132 junior-high-school boys, their age, height, and weight varied inversely with intelligence quotients. In other words, the pupil of higher intelligence tended to be younger, lower in stature, and of less weight than the pupil of lower intelligence status. Hence, the level of intelligence among this group of boys

was a factor in explaining differences in age, height, and weight.

2. Boys of lower intelligence tended to be more proficient in performing the tests and physical activities used in this study than was true of boys of higher intelligence.

3. Since this was true, it appeared on the surface that intelligence might have exerted some influence in determining the degree of skill and proficiency with which the boys performed the physical skills, but any suggested relationship was an inverse one; that is, the boy with higher intelligence tended to be less proficient, whereas the boy with lower intelligence tended to have more skill and proficiency.

4. As none of the coefficients of correlation involving intelligence had any statistical significance, it may be concluded that the skill of these boys in performing the physical feats included for study was unaffected by mental ability.

5. It is recognized that factors such as age, height, and weight have some bearing in these situations and that they may have exerted an influence upon the degree of proficiency of the boys in performing the physical tests.

6. There was a statistical indication of positive relationship between the factors of age, height, and weight

and the degree of proficiency attained by the boys in performing the physical tests included in this study.

7. There was more statistical evidence to indicate that age, height, and weight influenced physical proficiency more than did intelligence.

8. If it can logically be assumed that intelligence may have been a factor in determining the age of these eighth-grade boys in that those with lower intelligence may have been denied grade promotion one or more times and hence were older and larger in stature than those who had never been retained in a grade, then it may be concluded that intelligence may have exerted a slight indirect influence upon the boys' physical proficiency.

9. Other factors not considered in this study may have exerted an influence upon the findings, and for this reason it is recognized that the results of this particular investigation need to be interpreted with caution.

10. Within the limitations of the study there was a slight trend of inverse relationship between intelligence and physical skill and proficiency as measured by the tests utilized. These relationships, however, were not statistically significant.

Recommendations

It is recommended that further research be conducted along similar lines for the purpose of checking the findings

of the present study and of adding further information as to any relationships which may exist between intelligence quotients and the degree of skill or proficiency in certain physical activities.

Other studies might profitably be conducted with many additional physical tests and exercises, and with groups of boys of widely differing grades, ages, height, and weight, for the purpose of collecting further information regarding possible relationships and interrelationships among these various factors.

Studies based on personality, pupil achievement, and socio-economic status in relation to proficiency in the performance of physical tests and activities would be worthwhile and interesting in that they would provide additional data concerning certain factors which might affect physical abilities.

It is recommended that schools set up some type of physical testing program for determining individual skills and abilities in physical activities; that the pupils' attainments be entered on their school records; and that each pupil be encouraged to improve his proficiency.

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