

A FOLLOW-UP STUDY OF THE BARROW MOTOR ABILITY TEST OF FRESHMEN
STUDENTS IN BASIC PHYSICAL EDUCATION CLASSES AT
KANSAS STATE UNIVERSITY DURING 1966-67

by

KENNETH JOE RUSSELL

B. S., Kansas State University, 1967

A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Physical Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1967

Approved by:


Major Professor

LD
2668
R4
1968
R8
C.2

TABLE OF CONTENTS

Page

INTRODUCTION	1
REVIEW OF THE LITERATURE	4
PURPOSE OF THE STUDY	6
LIMITATIONS	6
BACKGROUND OF THE BARROW TEST	7
NORMS FOR THE BARROW TEST	9
METHOD OF ADMINISTERING THE TEST	13
TESTS AND RESULTS	15
Zigzag Run	16
First Test	17
Second Test	18
Improvements	19
Comparison of First and Second Test Scores	20
Standing Broadjump	21
First Test	22
Second Test	22
Improvements	23
Comparison of First and Second Test Scores	24
Medicine Ball Put	25
First Test	26
Second Test	26
Improvements	27
Comparison of First and Second Test Scores	28

TABLE OF CONTENTS--Continued

	Page
RESULTS OF THE TOTAL TEST	29
CONCLUSION	32
RECOMMENDATIONS FOR FUTURE TESTING	34
ACKNOWLEDGEMENTS	35
LITERATURE CITED	36
APPENDIX	37

LIST OF TABLES

TABLE	PAGE
I. Norm Used for Zigzag Run	10
II. Norm Used for Medicine Ball Put	11
III. Norm Used for Standing Broadjump	12
IV. Results of the Zigzag Run	17
V. Results of the Standing Broadjump	21
VI. Results of the Medicine Ball Put	25
VII. Results of the Total Test	29
VIII. Total Score Improvement	31
IX. Test Scores for Swimming Group	38
X. Test Scores for Weight Training Group	43
XI. Test Scores for Gymnastics Group	48
XII. Frequency Table for the Medicine Ball Put First Test--Swimming Class	53
XIII. Frequency Table for the Medicine Ball Put Second Test--Swimming Class	54
XIV. Frequency Table for the Standing Broadjump First Test--Swimming Class	55
XV. Frequency Table for the Standing Broadjump Second Test--Swimming Class	56
XVI. Frequency Table for the Zigzag Run First Test--Swimming Class	57
XVII. Frequency Table for the Zigzag Run Second Test--Swimming Class	58

LIST OF TABLES--Continued

TABLE	PAGE
XVIII. Frequency Table for the Medicine Ball Put .	
First Test--Weight Training Class	59
XIX. Frequency Table for the Medicine Ball Put	
Second Test--Weight Training Class	60
XX. Frequency Table for the Standing Broadjump	
First Test--Weight Training Class	61
XXI. Frequency Table for the Standing Broadjump	
Second Test--Weight Training Class	62
XXII. Frequency Table for the Zigzag Run	
First Test--Weight Training Class	63
XXIII. Frequency Table for the Zigzag Run	
Second Test--Weight Training Class	64
XXIV. Frequency Table for the Medicine Ball Put	
First Test--Gymnastics Class	65
XXV. Frequency Table for the Medicine Ball Put	
Second Test--Gymnastics Class	66
XXVI. Frequency Table for the Standing Broadjump	
First Test--Gymnastics Class	67
XXVII. Frequency Table for the Standing Broadjump	
Second Test--Gymnastics Class	68
XXVIII. Frequency Table for the Zigzag Run	
First Test--Gymnastics Class	69
XXIX. Frequency Table for the Zigzag Run	
Second Test--Gymnastics Class	70

LIST OF FIGURES

FIGURE	PAGE
1. Sample Score Card	14
2. The Zigzag Run Course	16

INTRODUCTION

There is a need in physical education today for an evaluation of the college student's ability in motor learning and performance. In the area of motor ability particularly there is a need for a valid, reliable, objective, and usable test for college men.

In physical education, proper placement and scheduling of students in basic classes is necessary if individual needs are to be met. Social development is more likely to occur when individuals and groups are equated in powers and abilities. It is also a valuable adjunct for a program to diagnose individual weaknesses so that prescription of activities may be made. When these procedures are followed, the effectiveness of teaching is materially increased. When classification, motivation, and teaching efficiency criteria are met, college physical education departments may change the poor student attitude which has characterized college physical education programs in the past. Educators need to know as much about the student's ability to perform skills as about his ability to do academic work if the student's "whole" needs are to be met.¹

Prior to the 1961-62 school year Kansas State University required four semesters of physical education for graduation. Activities offered were the following: football, basketball, volleyball, softball, wrestling, beginning swimming, advanced swimming, beginning bowling, advanced bowling, gymnastics, and trampoline. Each student was given a choice of the activity in which he wished to participate and each student was

¹Harold M. Barrow, "Test of Motor Ability for College Men," Research Quarterly, October, 1954, 25:253.

encouraged to participate in as many different activities as possible in his four semesters of participation.²

A basic change in the physical education program was effected at the beginning of the 1961-62 school year. Only two semesters of required physical education were needed to meet the general education requirements for graduation. The reasons for lowering the requirement were limited staff and facilities.

At this time an elective physical education program was initiated to compensate for loss of activities because of the lowering of the requirements. As an incentive these elective courses counted as one-hour credit towards graduation. The elective activities were tennis, golf, bowling, and weight training. To be eligible to take these courses the student must have had a prerequisite of one year of basic physical education.

After one year under this program, the physical education department decided to inaugurate a testing program to use the limited time available to them with better direction for each student's individual needs.

This test consisted of the standing broadjump, medicine ball put, and the zigzag run. These items, in order, tested power, strength, and agility. The three-battery test was selected because of its speed in administration and the indoor facilities available.³

²William W. Guthridge, "A Comparison of the Results of the Barrow Motor Ability Test Scores of Wake Forest College and Kansas State University Required Physical Education Classes, 1962-63 School Year." Unpublished Master's Report, Kansas State University, Manhattan, Kansas, 1963.

³Ibid

The students who attained a score of 144 or higher in the test were given their choice of activities if there were more than one class offered at that time. Those who did not attain the score of 144 or higher were placed in a special class. The special classes were weight training, wrestling and gymnastics; students were placed in a beginning swimming class if they did not pass the swimming test.

REVIEW OF THE LITERATURE

There has not been a great deal written in regard to the Barrow Motor Ability Test. The most important work, of course, was completed by Barrow, who developed the test. The purpose of the Barrow Motor Ability Test is to develop an easily administered test of motor ability for college men. A test battery consisting of the medicine ball put, zigzag run, and standing broadjump was recommended for indoor use and a more complete test battery was recommended for outdoor use. Barrow also developed score tables, norms, score cards, and directions for administering the test.⁴

Guthridge compared the results of the Barrow Motor Ability Test scores of Wake Forest College and Kansas State University required physical education classes in 1962-63. He found the mean score for the Kansas State University group in the zigzag run to be 1.96 seconds faster than that of the Wake Forest mean score. The results of the standing broadjump were found to be almost identical for students at both schools. In the medicine ball put Kansas State freshmen had a mean score of 2.59 feet better than that of the Wake Forest group. The mean total score was also found to be higher for the freshman at Kansas State.⁵

Fraser compared the results of the Barrow Motor Ability Test scores of athletes and non-athletes at Kansas State University in 1966. He compared scholarship football players as athletes with a selected group of basic physical education students as non-athletes.

⁴Barrow, op. cit., pp. 253-257.

⁵Guthridge, op. cit., pp. 11-20.

In Fraser's study, the physical education group had a mean score in the zigzag run of .65 of a second better than that of the scholarship football players. The physical education group had a mean score in the standing broad jump of 6.16 inches better than that of the scholarship football players. The results for the medicine ball put were almost identical for both groups. The mean total score for the physical education classes was 205 points as compared with 192 points for the scholarship football players.⁶

⁶Jerry W. Fraser, "A Comparison of the Results of the Barrow Motor Ability Test Scores of Athletes and Non-Athletes." Unpublished Master's Report, Kansas State University, Manhattan, Kansas, 1966.

PURPOSE OF THE STUDY

The purpose of this study was to compare the overall group scores of the retesting of 196 students who failed the Barrow Motor Ability Test given to all basic physical education students at Kansas State University during the fall semester of 1966-67, with their initial scores. A second purpose was to compare the improvement made among the swimming, weight training, and gymnastics groups. A third purpose of this study was to compare the improvement made within groups on the criterion measures of power, agility and strength.

LIMITATIONS

Limitations on this study which may influence the validity of the results might be such factors as lack of expertness of the timers in stopping the watch, the slickness of the gymnasium floor and the quality of the soles of the shoes in adhering to the floor while performing all three items in the test. How much each of the above mentioned items would influence the results is very difficult to estimate; however, it is recognized that these factors were prevalent while administering the test.

BACKGROUND OF THE BARROW TEST

The Barrow Motor Ability Test was developed by Dr. Harold M. Barrow in 1953 for partial fulfillment of the degree of Doctor of Physical Education in the School of Health, Physical Education, and Recreation at Indiana University. Dr. Barrow is now head of the Physical Education Department at Wake Forest College, Winston-Salem, North Carolina.

The purpose of his study was to develop an easily administered test of motor ability of college men. The results may be used for classification, guidance, and measurement of achievement.⁷

To determine the test Barrow started with 87 items which had been used in the past to measure 15 different factors of motor ability. Employing the jury technique, Barrow's professors serving as the jury decided to utilize eight of the 15 factors. They chose the items most highly related to motor ability. These factors were agility, hand-eye-foot-eye coordination, speed power, arm and shoulder co-ordination, strength, balance, and flexibility.

This selection narrowed the 87 items of measurements to 29. These 29 items were administered on a test-retest basis to 222 male students in required physical education classes at Wake Forest College. Based upon the findings of this research, Barrow decided upon two batteries of tests. Number one had six items which tested the six most highly related factors:

ITEM	FACTOR
Standing broadjump	Power
Medicine ball put	Strength
Zigzag run	Agility

⁷Barrow, op. cit., p. 253.

ITEM	FACTOR
Softball throw	Arm-shoulder coordination
Wall pass	Hand-eye coordination
60-yard dash	Speed

Test number two had three items. It was composed of the standing broadjump, medicine ball put, and zigzag run. As has been noted, these three items appeared in the six-item test.

The six-item test showed 70 percent improvement over a simple best test. The three-item test is recommended for indoor administration or for quick classification.⁸

⁸Ibid., pp. 253-256.

NORMS FOR THE BARROW TEST

The following norms were used in scoring the test. They were established by Barrow in his study completed in 1953.⁹

⁹Ibid., p. 255.

TABLE I
 NORM USED FOR ZIGZAG RUN

Time in Seconds	Score						
17.5	100	21.3	75	25.1-25.2	50	29.0-29.1	25
17.6	99	21.4-21.5	74	25.3-25.4	49	29.2	24
17.7-17.8	98	21.6	73	25.5	48	29.3-29.4	23
17.9	97	21.7-21.8	72	25.6-25.7	47	29.5	22
18.0-18.1	96	21.9	71	25.8	46	29.6-29.7	21
18.2	95	22.0-22.1	70	25.9-26.0	45	29.8-29.9	20
18.3-18.4	94	22.2	69	26.1	44	30.0	19
18.5	93	22.3-22.4	68	26.2-26.3	43	30.1-30.2	18
18.6-18.7	92	22.5-22.6	67	26.4	42	30.3	17
18.8	91	22.7	66	26.5-26.6	41	30.4-30.5	16
18.9-19.0	90	22.8-22.9	65	26.7	40	30.6	15
19.1	89	23.0	64	26.8-26.9	39	30.7-30.8	14
19.2-19.3	88	23.1-23.2	63	27.0-27.1	38	30.9	13
19.4	87	23.3	62	27.2	37	31.0-31.1	12
19.5-19.6	86	23.4-23.5	61	27.3-27.4	36	31.2	11
19.7	85	23.6	60	27.5	35	31.3-31.4	10
19.8-19.9	84	23.7-23.8	59	27.6-27.7	34	31.5	9
20.0-20.1	83	23.9	58	27.8	33	31.6-31.7	8
20.2	82	24.0-24.1	57	27.9-28.0	32	31.8	7
20.3-20.4	81	24.2	56	28.1	31	31.9-32.0	6
20.5	80	24.3-24.4	55	28.2-28.3	30	32.1	5
20.6-20.7	79	24.5-24.6	54	28.4-28.5	29	32.2-32.3	4
20.8-20.9	78	24.7	53	28.6	28	32.4-32.5	3
21.0	77	24.8-24.9	52	28.7-28.8	27	32.6	2
21.1-21.2	76	25.0	51	28.9	26	32.7-32.8	1

TABLE II
 NORM USED FOR MEDICINE BALL PUT

Distance in feet	Score						
72	100	56-56.5	75	40	50	23.5	25
71.5	99	55.5	74	39.5	49	22.5-23	24
70.5-71	98	55	73	38.5-39	48		23
70	97	54.5	72	38	47	21.5	22
69.5	96	53.5-54	71	37.5	46	21	21
69	95	53	70	37	45	20-20.5	20
68-68.5	94	52.5	69	36-36.5	44	19.5	19
67.5	93	51.5-52	68	35.5	43	19	18
67	92	51	67	35	42	18.5	17
66.5	91	50.5	66	34.5	41	17.5-18	16
65.5-66	90	50	65	33.5-34	40	17	15
65	89	49-49.5	64	32.5	39	16.5	14
64.5	88	48.5	63	32	38	15.5-16	13
64	87	48	62	31-31.5	37	15	12
63-63.5	86	47-47.5	61	30.5	36	14.5	11
62.5	85	46.5	60	30	35	14	10
62	84	46	59	29-29.5	34	13.5	9
61.5	83	45.5	58	28.5	33	12.5-13	8
60.5-61	82	44.5-45	57	28	32	12	7
60	81	44	56	27.5	31	11.5	6
59.5	80	43.5	55	26.5-27	30	10.5-11	5
59	79	42.5-43	54	26	29	10	4
58-58.5	78	42	53	25.5	28	9.5	3
57.5	77	41.5	52	24.5-25	27	9	2
57	76	40.5-41	51	24	26	8.5	1

TABLE III
 NORM USED FOR STANDING BROADJUMP

Distance in feet and inches	Score	Distance in feet and inches	Score	Distance in feet and inches	Score
11'1"	100	8'9"	68	6'5"	35
11'0"	99	8'8"	66	6'4"	31
10'11"	98	8'7"	65	6'3"	30
10'10"	97	8'6"	64	6'2"	29
10'9"	96	8'5"	63	6'1"	28
10'8"	95	8'4"	61	6'0"	26
10'7"	94	8'3"	60	5'11"	25
10'6"	93	8'2"	59	5'10"	24
10'5"	92	8'1"	58	5'9"	23
10'4"	91	8'0"	56	5'8"	22
10'3"	90	7'11"	55	5'7"	20
10'2"	89	7'10"	54	5'6"	19
10'1"	87	7'9"	53	5'5"	18
10'0"	86	7'8"	51	5'4"	16
9'11"	85	7'7"	50	5'3"	15
9'10"	84	7'6"	49	5'2"	14
9'9"	83	7'5"	48	5'1"	13
9'8"	82	7'4"	47	5'0"	11
9'7"	81	7'3"	45	4'11"	10
9'6"	80	7'2"	44	4'10"	9
9'5"	79	7'1"	43	4'9"	8
9'4"	77	7'0"	41	4'8"	6
9'3"	75	6'11"	40	4'7"	5
9'2"	74	6'10"	39	4'6"	4
9'1"	73	6'9"	38	4'5"	3
9'0"	71	6'8"	36	4'4"	3
8'11"	70	6'7"	35		1
8'10"	69	6'6"	34		

METHOD OF ADMINISTERING THE TEST

The Barrow Motor Ability Test was given to all required physical education classes at Kansas State University after each student had been given a swimming test, during the second week of the fall semester 1966-67. The test was administered by the class instructor with assistance from student teachers and other staff members.

The area used for testing was the gymnasium of Ahearn Field House. The gymnasium has three full-size basketball courts. Two zigzag run courses were set up on one court. Bowling pins were used for the center and corner obstacles (see diagram on page 16 for course layout).

The middle basketball court was used for two medicine ball put areas. The areas were laid out with markings every six inches.

Two standing broad jump areas were laid out on the remaining court. These areas were marked off in feet and inches.

At the beginning of the class periods the students were given instructions regarding the test. Each student was given a score card on which he wrote his name, school, and classification. The students carried this card individually to each of the three test stations. The tester at each station recorded the best time or the distance and the points scored at each station on the back of each student's card.

Upon completion of all three events, each student returned his card to the instructor in charge of the class and the scores were totaled. With the exception of those students who failed the swimming test, each student was then assigned to an activity which was based upon his total score for the test items. Those students failing the swimming test, were placed in a beginning swimming class. Those students who passed the

swimming test, but received below 144 points on the Barrow Motor Ability Test were placed in a weight training, wrestling, or gymnastics class. Students who passed both the swimming and motor ability tests were given their choice of the previously mentioned activities plus beginning bowling and a football - basketball class.

FIGURE 1
SAMPLE SCORE CARD

Event	Time or Distance	Points
Standing Broadjump	6'2"	29
Medicine Ball Put	36'0"	44
Zigzag Run	25.4 sec.	<u>49</u>
		122

Those students who failed the first Barrow Motor Ability Test were retested during the sixteenth week of the second semester by their instructor. These students were given the previously described tests.

TESTS AND RESULTS

On the following pages is a description of each test, with a comparison of the results obtained by the three groups. There was a total of 196 students in this study. The number of students in each group was as follows: 66 in the gymnastics group, 66 in the swimming group, and 64 in the weight training group. The tables and figures will aid one in easily interpreting the results. In the appendix is a complete listing of the test scores and frequency tables.

ZIGZAG RUN

The course used was set up in rectangular form 16 by 10 feet. Bowling pins were used as center and corner obstacles. A trial run was allowed each student. He started at point X and ran the prescribed figure eight course three times around. His time was recorded to the nearest tenth of a second with a stop watch.

FIGURE 2

THE ZIGZAG RUN COURSE

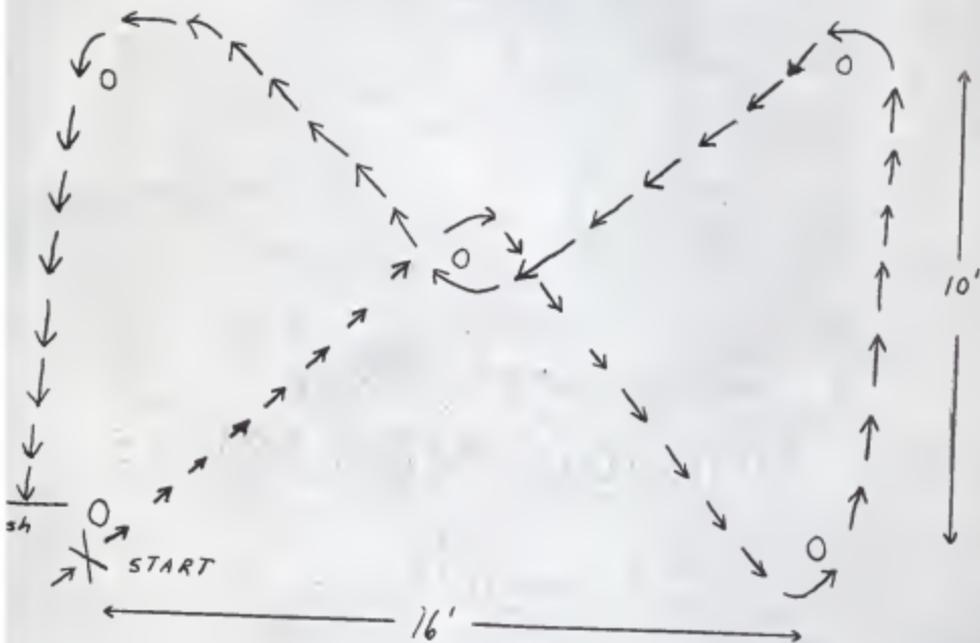


TABLE IV
RESULTS OF THE ZIGZAG RUN

Classification	Weight Training Time in Seconds	Gymnastics Time in Seconds	Swimming Time in Seconds
<u>First Test</u>			
Best time	22.40	22.60	23.00
Median	25.12	25.19	25.92
Mean	25.16	25.34	26.17
Poorest Time	28.30	28.10	33.50
<u>Second Test</u>			
Best time	21.40	21.90	23.50
Median	24.43	24.52	26.09
Mean	24.45	24.60	26.25
Poorest Time	28.00	28.70	31.40
<u>Improvements</u>			
Best time	+1.00	+ .70	- .50
Median	+ .69	+ .67	- .17
Mean	+ .71	+ .74	- .08
Poorest Time	+ .30	- .60	+ 2.10
<u>Comparison of First and Second Test Scores</u>			
Improved scores	82.0%	68.2%	44%
Decreased scores	15.6%	28.8%	56%
Stayed the same	1.6%	3%	0

First Test. The best time recorded for the weight training group was 22.40 seconds. The best time recorded for the gymnastics group was 22.60 seconds. The best time for the swimming group was 23.0 seconds. The weight training group had the best time. The difference in seconds was .60 of a second faster than that of the swimming group and .20 of a second faster than that of the gymnastics group.

The median for students of the weight training group was 25.12 seconds as compared with 25.19 seconds for the gymnastics group and

and 25.92 seconds for the swimming group. These comparisons indicated the weight training group had the faster median time. The difference in seconds was .07 of a second faster than that of the gymnastics group and .80 of a second faster than that of the swimming group.

The mean for the weight training students was 25.16 seconds as compared with 25.34 seconds for the gymnastics group and 26.17 seconds for the swimming group. This comparison showed the weight training group had a mean score of 1.00 second faster than did the swimming group and .18 of a second faster than that of the gymnastics group.

The poorest time for the weight training group was 28.30 seconds as compared with 28.10 seconds for the gymnastics group and 33.5 seconds for the swimming group.

Second Test. The best time for the weight training group was 21.40 seconds as compared with 21.90 seconds for the gymnastics group and 23.50 for the swimming group. Once again the weight training group had the fastest time. The difference in seconds was .50 of a second faster than that of the gymnastics group and 2.10 seconds faster than that of the swimming group.

The median for the weight training group was 24.43. The median for the gymnastics group was 24.52. The median for the swimming group was 26.09. The weight training group had the fastest median time. The difference in seconds was .09 of a second faster than that of the gymnastics group and 1.66 seconds faster than that of the swimming group.

The mean for the weight training group was 24.45 seconds as compared with 24.60 seconds for the gymnastics group and 26.25 seconds for the swimming group. The weight training group had a .15 of a second faster time than that of the gymnastics group and 1.80 seconds faster time than that of the swimming group.

The poorest time for the weight training group was 28.0 seconds as compared with 28.70 seconds for the gymnastics group and 31.40 seconds for the swimming group.

Improvements. The weight training group improved its best time on the first test 1.0 second as compared with a .70 of a second improvement for the gymnastics group and a loss of .50 of a second for the swimming group. These records showed the weight training group's improvement was .30 of a second better than that of the gymnastic group and 1.50 seconds better than that of the swimming group.

The weight training group improved their median on the first test .69 of a second. The gymnastics group improved their median on the first test by .67 of a second. The swimming group's median time was slower by .17 of a second. This indicated that the weight training group's improvement was .02 of a second better than that of the gymnastics group and .52 of a second better than that of the swimming group.

The weight training group improved their mean on the first test by .71 of a second as compared with a .74 of a second improvement for the gymnastics group and a loss of .08 for the swimming group. This score made the gymnastics group's improvement .03 of a second better than that of the weight training group and .79 of a second better than that of the swimming group.

The weight training group improved their poorest time on the first test by .30 of a second. The gymnastics group increased their poorest time on the first test by .60 of a second. The swimming group improved their poorest time on the first test by 2.10 seconds.

Comparison of First and Second Test Scores. A comparison of the per cent of participants that improved their second times as compared with their first times revealed that 82.8% of the weight training group improved their times as compared with the improvements of 68.2% of the gymnastics group and 44% of the swimming group.

The weight training group had 15.6% of the group which improved their times. The gymnastics group had 28.8% of their group who increased their times. The swimming group had the highest percentage that failed to improve their times; 56% of the group did not raise their times.

The remaining percentages of scores in each group showed neither improvements or raising of times but remained constant.

STANDING BROADJUMP

The distance in the standing broadjump was measured in inches and feet. For the starting line a piece of masking tape was placed on the floor and perpendicular to the jumping area. Each student was permitted one practice jump and three trials. The distance of the best trial was recorded and the correct number of points was given. The jump was disqualified if the contestant's toe touched in front of the starting line on his take-off.

The results of the standing broadjump are shown in the table below.

TABLE V
RESULTS OF THE STANDING BROADJUMP

Classification	Weight Training	Gymnastics	Swimming
	Distance in feet and Inches	Distance in feet and Inches	Distance in feet and Inches
		<u>First Test</u>	
Best distance	8'0"	7'10"	7'6"
Median	6'4.39"	6'6.70"	6'2.50"
Mean	6'4.37"	6'6.18"	6'3.23"
Poorest distance	5'1"	4'10"	4'0"
		<u>Second Test</u>	
Best distance	8'1"	9'6"	7'10"
Median	6'9.81"	7'0.59"	6'5.09"
Mean	6'9.06"	7'0.74"	6'5.65"
Poorest distance	5'5"	5'6"	4'5"
		<u>Improvements</u>	
Best distance	+1"	+1'8"	+4"
Median	+5.42"	+5.89"	+2.59"
Mean	+4.69"	+6.56"	+2.42"
Poorest distance	+4"	+8"	+5"
		<u>Comparison of First Test to Second Test</u>	
Improved score	79.7%	72.7%	51.5%
Decreased score	15.6%	16.7%	45.5%
Stayed the same	4.7%	10.6%	3%

First Test. The best jump was recorded by the weight training group with a jump of 8'0" while the gymnastics group had a best jump of 7'10" and the swimming group, 7'6". The difference in inches was 6 inches better than that of the swimming group and 2 inches better than that of the gymnastics group.

The weight training group had a median distance of 6'4.39" as compared with that of the gymnastics group's median of 6'6.70" and the swimming group's median of 6'2.50". This median time shows the gymnastics group's median was 2.31 inches better than that of the weight training group and 4.20 inches better than that of the swimming group.

The mean score for the swimming group was 6'3.23" as compared to 6'4.37" for the weight training group and 6'6.18" for the gymnastics group. The mean for the gymnastics group was 2.95 inches better than that of the swimming group and 1.81 inches better than that for weight training group.

The poorest distance recorded by the swimming group was 4'0", which was also the poorest jump recorded for all groups. The poorest jump for the gymnastics group was 4'10". A 5'1" jump was the poorest recorded for the weight training group.

Second Test. The best jump recorded by the swimming group on the second test was a 7'10" jump as compared with a 8'1" jump for the weight training group and a tremendous jump of 9'6" for the gymnastics group. This best jump of the gymnastics group was 1'5" better than that of the weight training group and 1'8" better than that of the swimming group.

The gymnastics group had a median of 7'0.59" on the second test as compared with 6'9.81" for the weight training group and 6'5.09" for the swimming group. The median of the gymnastics group was 2.78 inches better

than that of the weight training group and 7.50 inches better than that of the swimming group.

The mean score of the swimming group on the second test for the broad-jump was 6'5.65". The weight training group had a mean of 6'9.06". A mean score of 7'0.74" was achieved by the gymnastics group on the second test. The mean of the gymnastics group was 3.68 inches better than that of the weight training group and 7.09 inches better than that of the swimming group on the jump.

On the second test a jump of 5'6" was the poorest jump for the gymnastics group. The swimming group had a poorest jump of 4'5" which again was the poorest jump for all groups. The poorest jump for the weight training group was 5'5".

Improvements. The weight training group improved their best jump 1 inch as compared to a 1 foot 8 inch improvement for the gymnastics group and a 4 inch improvement for the swimming group. This record shows the most improved jump to be that of the gymnastics group, which one might assume to be due to the fact that much of the work in the gymnastics classes was done on the trampoline.

The weight training group improved its median jump by 5.42 inches. The gymnastics group improved its median 5.89 inches and the swimming group improved its median 2.59 inches. These results indicate the gymnastics group's improvement in the standing broadjump .47 of an inch better than that of the weight training group and 3.30 inches better than that of the swimming group.

The gymnastics group improved its mean jump over the first test by 6.56 inches. The weight training group improved its mean by 4.69 inches. The swimming group improved its mean score over the first test by 2.52

inches. The gymnastics group's improvement was 1.87 inches better than that of the weight training group and 4.14 inches better than that of the swimming group.

The swimming group improve its poorest time by 5 inches. The weight training group improved its poorest time by 4 inches. The poorest time scored by the gymnastics group on the first test was improved by 8 inches on the second test; this was the most improvement of the three groups.

Comparison of First and Second Test Scores. The swimming group had 60.6% of their group improve their second jump as compared with a group improvement of 72.7% for the gymnastics group and a group improvement of 79.7% for the weight training group.

The weight training group had 15.6% of their group decrease their jump. For the swimming group 45.5% of the group decreased their jump. The gymnastics group had 16.7% of their group who decreased their jump.

The remaining percentages of scores in each group showed neither improvement nor lowering of their scores, but scored the same on the second testing.

MEDICINE BALL PUT

The medicine ball put course was 70 feet, marked off in half foot intervals. Two lines, a starting and a finishing, were marked off perpendicular to the measurement for the throwing area. The two lines were 15 feet apart with the finishing line on the 0 foot line. The student was required to stay within this area or his throw was disqualified.

Each student was permitted one practice put and three trial puts. The distance of the best trial was recorded and the correct number of points was given. A six pound medicine ball was used.

The results of the medicine ball put are shown below.

TABLE VI

RESULTS OF THE MEDICINE BALL PUT			
Classification	Weight Training	Gymnastics	Swimming
	Distance in Feet	Distance in Feet	Distance in Feet
		<u>First Test</u>	
Best Distance	51	46	45
Median	37.81	36.97	37.50
Mean	38.12	36.77	37.05
Poorest Distance	26	28	20
		<u>Second Test</u>	
Best Distance	55	46	48
Median	40.68	39.17	37.12
Mean	40.83	38.68	37.71
Poorest Distance	30.50	28	27.50
		<u>Improvements</u>	
Best Distance	+4	0	+3
Median	+2.87	+2.20	- .38
Mean	+2.71	+1.91	+ .66
Poorest Distance	+4.50	0	+7.50
		<u>Comparison of First and Second Test Scores</u>	
Improved scores	82.8%	68.2%	44%
Decreased scores	10.9%	19.7%	44%
Stayed the same	6.3%	12.1%	12%

First Test. The best put for the weight training group was 51 feet as compared with 46 feet for the gymnastics group and 45 feet for the swimming group. The best put for the weight training group was 5 feet better than that of the gymnastics group and 6 feet better than that of the swimming group.

The median for the weight training group was 37.81 feet as compared with 36.97 feet for the gymnastics group and 37.50 feet for the swimming group. The weight training group's median was .84 of a foot better than that of the gymnastics group and .31 of a foot better than that of the swimming group.

The mean put for the weight training group was 38.12 feet. The mean for the gymnastics group was 36.77 feet. The mean for the swimming group was 37.05 feet. The mean put for the weight training group was 1.35 feet better than that of the gymnastics group and 1.07 feet better than that of the swimming group.

The poorest put for the weight training group was 26 feet in comparison with 20 feet for the gymnastics group and 27.50 feet for the swimming group.

Second Test. The best put for the weight training group in the second test was 55 feet compared with 46 feet for the gymnastics group and 48 feet for the swimming group. The best put for the weight training group is 9 feet better than that of the gymnastics group and 7 feet better than that of the swimming group.

The median put for the weight training group in the second test was 40.68 feet. The gymnastics median was 39.17 feet and the swimming group's median was 37.12 feet. The median for the weight training group was 1.51 feet better than that of the gymnastics group and 3.56 feet

better than that of the swimming group.

The poorest put on the second test for the weight training group was 30.50 feet. The poorest put on the second test for the gymnastics group was 28 feet. The swimming group had a poorest put of 27.50 feet.

The mean score for the weight training group on the second test was 40.83 feet. The mean score for the gymnastics group on the second test was 38.68 feet. The swimming group had a mean score of 37.71 feet on the second test. The mean score for the weight training group in the medicine ball put was 2.15 feet better than that of the gymnastics group and 3.12 feet better than that of the swimming group.

Improvements. The weight training group improved their best put over the first test by 4 feet as compared to no improvement on the second test for the gymnastics group and a 3 feet improvement for the swimming group. This result showed the weight training group's improvement to be 4 feet better than that of the gymnastics group and 1 foot better than that of the swimming group on the second test.

On the second test the weight training group improved its median over the first test by 2.87 feet. The gymnastics group improved its median 2.20 feet. The swimming group lowered its median .38 of a foot. These figures show that the weight training group's improvement .70 of a foot to be better than that of the gymnastics group and 2.05 feet better than that of the swimming group.

The weight training group improved their poorest put over the first test by 4.50 feet. The gymnastics group had no improvement over their poorest put on the second test. The swimming group had an improvement of 7.50 feet which was higher than either of the other two groups.

Comparison of First and Second Test Scores. The weight training group had 82.8% of their group improve their puts as compared with 68.2% improvement in the gymnastics group and 44% improvement in the swimming group.

The weight training group had 10.9% of their group lower instead of increase its puts. The gymnastics group had 19.7% of its group lower its score in the puts. The swimming group had the highest percentage with 44% of participants decreasing their scores in the puts.

The remaining percentages of scores in each group show neither improvement or lowering of scores, which remained identical with first scores.

RESULTS OF THE TOTAL TEST

The following table shows the results of the total test.

TABLE VII

RESULTS OF THE TOTAL TEST

Classification	Medicine B. P.		S. B. J.		Zigzag Run		Total Points
	Dist.	Points	Dist.	Points	Time	Points	
<u>GYMNASTICS GROUP</u>							
<u>First Test</u>							
Best Score	37'	45	7'10"	54	26.2	43	142
Mean	36.77'	44	6'6.18"	34	25.34	49	127
Poorest score	31'	36	5'3"	15	26.1	44	95
<u>Second Test</u>							
Best Score	39'	48	9'0"	71	24.2	56	175
Mean	38.68'	48	7'0.74"	43	24.60	54	145
Poorest Score	33'	39	5'6"	19	25.0	51	109
<u>WEIGHT TRAINING GROUP</u>							
<u>First Test</u>							
Best Score	42'	53	7'0"	41	25.3	49	143
Mean	38.12'	47	6'4.37"	31	25.16	50	128
Poorest Score	30'	34	5'4"	16	25.9	45	95
<u>Second Test</u>							
Best Score	46'	59	8'0"	56	22.9	65	180
Mean	40.83'	51	6'9.06"	38	24.45	54	143
Poorest Score	46'	59	5'6"	19	27.7	34	112
<u>SWIMMING GROUP</u>							
<u>First Test</u>							
Best Score	36.5'	44	7'6"	49	25.1	50	143
Mean	37.05'	45	6'3.23"	30	26.17	43	118
Poorest Score	33.50'	40	4'0"	0	33.50	0	40
<u>Second Test</u>							
Best Score	43'	54	7'3"	45	23.50	61	160
Mean	37.71	46	6'5.65"	34	26.25	43	123
Poorest Score	31'	36	4'5"	3	30.60	15	54

When the test as a whole is analyzed, one can note that the best score on the first test was 143 total points on all items for both the swimming group and the weight training group while the score for the gymnastics group was 142. One might add that this test was limited to those students who failed the first test; this is the explanation for all scores on the first test being below 144 points.

The best scores on the second test show a significant improvement. The best total score for all items for the swimming group on the second test was 160; the best total score for the gymnastics group on the second test was 175; however the best total score for the weight training group on the second test was 180.

The mean total score on the first test for the weight training group was 128 points. The swimming group had a mean total score of 118 points on the first test. The gymnastics group had a mean total score of 127 points. These points show the mean total score of the weight training group to be 1 point better than that of the gymnastics group and 10 points better than that of the swimming group.

The mean total score of 145 points on the second test for the gymnastics group is above passing. The weight training group had a mean total score of 143 points on the second test or just 1 point below passing. The swimming group had a mean total score of 123 points on the second test. This score shows that the gymnastics group improved their mean total score 18 points as compared with 15 points of improvement for the weight training group and 5 points improvement for the swimming group.

The poorest score on the first test for the swimming group was 40 points. The poorest score on the first test for the gymnastics group was 95 points. The weight training group had a poorest score of 95 points on the first test.

The swimming group had a poorest score on the second test of 54 points which is an improvement of 14 points. The gymnastics group had a poorest score of 109 points on the second test or an improvement of 14 points. The weight training group had a poorest score of 112 points or an improvement of 17 points over the first testing.

TABLE VII
TOTAL SCORE IMPROVEMENT

Classification	Weight Training		Gymnastics		Swimming	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
Improved scores	59	92.2	56	84.9	34	51.5
Scores decreased	5	7.8	9	13.7	30	45.5
Scores stayed the same	0	0	1	1.4	2	3.0
Scores now passing	29	45.3	37	56.1	10	15.2

As indicated in Table VIII, the results of the Barrow Motor Ability test, weight training seems to help the most as far as improvements in the total score. As shown in the above results, the weight training group had 92.2% of their group improve their total scores. The gymnastics group was a close second with 84.9% of their group improving their total scores. The swimming group had the least percentage of improvement with 51.5% of their group improving their total scores. One might add that the primary objective of the swimming classes, in which the swimming group was instructed, was to improve their swimming ability. Of secondary importance was improvement of their agility, power and strength.

As shown in Table 8 the gymnastics group led with the number of scores above passing. It had a total of 37 students, or 56.1%, as compared with 29 students, or 45.3% of the students of the weight training group and 10 students, or 15.2%, of the swimming group.

CONCLUSIONS

Within the limitations of this study the following conclusions seem justifiable. The weight training group had more students improve their times or distances than did the gymnastics group or the swimming group. The swimming group had the highest percentage of students who failed to improve their times or distances. The weight training group had the lowest percentage of students who failed to improve their times or distances.

The weight training group had the highest percentage of students improving their total scores with 92.2% compared with 84.9% for the gymnastics group and 51.5% for the swimming group. The gymnastics group has the highest percentage of students who have now passed the Barrow Motor Ability Test with 56.1% of the students now passing as compared with 45.3% for the weight training group and 15.2% for the swimming group.

The weight training group had the best mean score improvement of 2.71 feet in the medicine ball put with the swimming group having the lowest mean score improvement of .66 of a foot. The gymnastics group had the best mean score improvement of 6.56 inches in the standing broadjump with the swimming group having the poorest mean score improvement of 2.42 inches. The gymnastics group had the best mean score improvement of .74 of a second in the zigzag run and the swimming group had the lowest mean score improvement of .08 of a second.

One can conclude that the special classes of weight training and gymnastics definitely improved the power, agility, and strength of the students in these classes who had failed the Barrow Motor Ability Test.

Even though the primary objective of the swimming classes was not to improve power, agility, and strength of the students, some improvement in these areas was achieved.

RECOMMENDATIONS FOR FUTURE TESTING

The author makes the following suggestions:

All students should be required to wear a gym uniform and shoes with a non-slip sole. Care should also be taken to be certain that the gym floor is not slick since a slick floor affects the zigzag run, medicine ball put, and broadjump.

The testers administering the test should meet beforehand and discuss testing procedures to assure uniformity. The weight of the medicine balls should also be checked.

Each test should be preceded by a demonstration and explanation of the test.

The scores recorded should be added by the person giving the test and rechecked by another person to assure a correct score.

When the students are retested, the tester should follow these directions and not retest the students haphazardly as has been done in the past.

The score of a student who has been absent frequently should not be used in future tests utilizing the rétest score.

ACKNOWLEDGEMENTS

The author wishes to express appreciation to Assistant Professor Raymond A. Wauthier, major instructor, for guidance, advice, time, and efforts in the development of this report.

Appreciation is also expressed to Professor T. M. Evans, Head of the Physical Education Department, for his assistance in preparing this report.

Thanks is expressed to all persons who aided in the administration of the test and retest and to the students who cooperated in the taking of the test.

LITERATURE CITED

- Barrow, Harold M. "Test of Motor Ability for College Men." Research Quarterly, October, 1954, 25:253-256.
- Fraser, Jerry W. "A Comparison of the Results of the Barrow Motor Ability Test Scores of Athletes and Non-Athletes." Unpublished Master's Report, Kansas State University, Manhattan, Kansas, 1966.
- Guthridge, William W. "A Comparison of the Results of the Barrow Motor Ability Test Scores of Wake Forest College and Kansas State University Required Physical Education Classes, 1962-1963 School Year." Unpublished Master's Report, Kansas State University, Manhattan, Kansas, 1963.

APPENDIX

TABLE IX

TEST SCORES FOR SWIMMING GROUP

Medicine Ball Put		Zigzag Run		Standing Broadjump		Total Points
Dist.	Points	Time	Points	Distance	Points	
38'	47	25.5	48	6'0"	26	121 *
39.5'	49	24.3	55	6'3"	30	134
33'	39	28.1	31	5'8"	22	92
31.5'	36	27.2	37	7'0"	41	114
36.5'	44	25.1	50	7'6"	49	143
36.5'	44	24.0	57	7'10"	54	155
30'	34	27.0	38	6'0"	26	98
32'	37	28.2	30	6'3"	30	97
42'	53	26.0	45	6'0"	26	124
41'	5'	27.3	36	6'0"	26	113
39'	48	25.8	46	6'4"	31	125
36'	44	26.0	45	6'0"	26	115
32'	37	26.0	45	6'0"	26	108
37'	45	27.7	34	5'6"	19	98
31'	36	24.6	54	5'7"	20	110
36.5'	44	24.0	57	6'6"	34	135
39.5'	49	26.0	45	6'1"	28	122
40'	50	25.9	45	6'3"	30	125
32'	37	28.0	32	6'2"	29	98
37'	45	24.0	57	6'3"	30	132
39'	48	26.8	39	6'8"	36	123
34'	42	24.8	52	6'6"	34	128
42'	53	25.2	50	6'9"	38	141
48'	62	24.8	52	7'3"	45	159
31.5'	36	24.7	53	7'4"	46	135
32'	37	24.2	56	7'0"	41	134
34'	42	25.3	49	7'0"	41	132
34'	42	25.1	50	7'3"	45	137

*Top score indicates the first test score and the bottom score indicates the second test score.

TABLE IX--Continued

TEST SCORES FROM SWIMMING GROUP

Medicine Dist.	Ball Put Points	Zigzag Run		Standing Broadjump		Total Points
		Time	Points	Distance	Points	
37.5'	46	26.9	39	6'6"	34	119 *
39'	48	26.7	40	6'3"	30	118
36'	44	25.4	49	6'2"	29	122
34'	42	27.0	38	6'4"	31	111
37.5'	46	25.7	47	6'4"	31	124
38'	47	27.0	38	6'0"	26	111
39'	48	26.3	43	7'1"	43	134
42'	53	26.8	39	6'9"	38	130
34.5'	41	26.8	39	5'3"	15	95
35.5'	43	27.3	36	6'0"	26	105
38.5'	48	26.1	44	5'11"	25	117
37'	45	25.6	47	6'6"	34	126
37.5'	46	26.4	42	6'9"	38	126
30'	47	26.2	43	7'0"	41	137
20'	19	27.0	38	6'1"	28	85
30'	34	26.1	44	6'6"	34	112
37'	45	24.0	57	6'3"	30	132
36'	44	24.5	54	6'0"	26	124
37.5'	46	24.3	55	6'4"	31	132
42'	53	25.0	51	6'0"	26	130
40'	50	26.3	43	6'0"	26	119
36.5'	44	27.5	35	5'10"	24	103
38'	47	23.2	63	6'4"	31	141
38'	47	25.3	49	6'0"	26	122
40'	50	27.7	34	5'0"	11	95
37'	45	28.9	26	5'10"	24	95
36'	44	26.2	43	6'2"	29	116
34.5'	41	26.1	44	6'0"	26	111
31'	36	26.4	42	6'0"	26	104
28'	31	26.7	40	6'2"	29	100

*Top score indicates the first test score and the bottom score indicates the second test score.

TABLE IA--Continued

TEST SCORES FROM SWIMMING GROUP

Medicine Ball Put		Zigzag Run		Standing Broadjump		Points
Dist.	Points	Time	Points	Distance	Points	
30'	34	25.2	50	6'0"	26	110 *
33'	39	28.4	29	6'6"	34	102
37'	45	24.3	55	6'0"	26	126
36'	44	25.4	49	4'11"	10	103
35'	42	23.3	62	6'0"	26	130
37'	45	25.4	49	5'8"	22	116
40'	50	24.9	52	6'3"	30	132
39'	48	25.7	47	6'5"	33	128
44'	56	27.7	34	7'2"	44	134
43'	54	24.2	56	6'10"	39	149
44'	56	31.3	10	7'2"	44	110
41.5'	52	24.0	57	6'7"	35	144
35'	43	23.2	63	6'8"	36	142
36'	44	25.0	51	6'8"	36	131
37'	45	25.7	47	6'1"	28	120
34'	42	27.0	38	6'3"	30	110
42'	53	25.7	47	6'8"	36	136
48'	62	25.2	50	7'2"	44	156
45'	57	25.7	47	5'9"	23	127
47.5'	61	26.7	40	6'10"	39	140
38'	47	23.0	64	6'0"	26	137
43'	54	23.5	61	7'3"	45	160
37'	45	27.0	38	6'8"	36	119
37.5'	46	26.5	41	6'6"	34	121
45'	57	26.3	43	6'11"	40	140
41'	51	26.4	42	7'6"	49	142
38'	47	24.1	57	6'5"	33	137
39.5'	49	25.8	46	7'6"	49	144

*Top score indicates the first test score and the bottom score indicates the second test score.

TABLE IX--Continued

TEST SCORES FROM SWIMMING GROUP

Medicine Ball Put		Zigzag Run		Standing Broadjump		Total Points
Dist.	Points	Time	Points	Distance	Points	
41'	51	25.5	48	5'11"	25	124 *
37.5'	46	25.8	46	7'6"	49	141
37'	45	27.9	32	7'0"	41	118
36'	44	26.5	41	7'3"	45	130
36'	44	26.1	44	6'1"	28	116
42'	53	26.8	39	6'6"	34	126
36'	44	24.9	52	7'2"	44	140
40'	50	24.5	54	7'9"	53	157
41'	51	27.0	38	5'6"	19	108
36'	44	26.5	41	6'0"	26	111
31'	36	29.0	25	4'3"	0	61
31'	36	30.6	15	4'5"	3	54
29'	33	28.4	29	5'0"	11	73
33'	39	29.2	24	5'0"	11	74
41'	51	26.1	44	5'11"	25	120
41'	51	26.5	41	6'4"	31	123
41'	51	26.0	45	6'6"	34	130
41'	51	27.8	33	6'6"	34	118
42'	53	32.8	1	5'3"	15	69
41'	51	31.9	6	5'5"	18	75
36.5'	44	27.8	33	6'0"	26	103
37'	45	23.9	58	6'0"	26	129
35'	42	23.5	61	5'11"	25	128
34'	40	24.3	55	7'2"	44	139
36'	44	25.7	47	6'0"	26	117
36'	44	27.5	35	6'2"	29	108
41'	51	25.7	47	6'9"	38	136
42'	53	27.0	38	7'3"	45	136

*Top score indicates the first test score and the bottom score indicates the second test score.

TABLE IX--Continued

TEST SCORES FROM SWIMMING GROUP

Medicine Ball Put Dist.	Points	Zigzag Run		Standing Broadjump		Total Points
		Time	Points	Distance	Points	
33.5'	40	33.5	0	4'0"	0	40 *
36'	44	30.7	14	5'2"	14	72
36'	44	24.7	53	7'11"	43	140
36'	44	24.3	55	6'11"	40	139
39'	48	27.0	38	7'0"	41	127
38'	47	25.6	47	7'7"	50	154
34'	40	23.5	61	6'10"	39	142
35.5'	43	24.3	55	6'9"	38	136
36'	44	25.0	51	6'7"	35	130
34'	40	28.6	28	6'11"	40	128
43'	54	28.9	26	7'5"	48	128
40'	50	29.0	25	6'9"	38	113
31'	36	29.8	20	6'6"	34	90
27.5'	30	29.0	25	6'2"	29	84
42'	53	24.8	52	6'8"	36	141
44'	56	23.9	58	7'0"	41	155

*Top score indicates the first test score and the bottom score indicates the second test score.

TABLE X
TEST SCORES FOR WEIGHT TRAINING GROUP

Medicine Ball Put		Zigzag Run		Standing Broadjump		Total Points
Distance	Points	Time	Points	Distance	Points	
45'	57	25.7	47	6'3"	30	134 *
42'	53	24.6	54	6'6"	34	141
33'	39	28.3	30	6'11"	40	109
38'	47	27.5	36	7'4"	46	129
39'	48	23.2	63	6'2"	29	140
42.5'	54	22.4	68	6'10"	39	161
36'	44	25.6	47	5'10"	24	115
42'	53	25.2	50	6'3"	30	133
40.5'	51	24.2	56	6'0"	26	133
40'	50	25.0	51	7'5"	48	149
34'	40	25.5	48	6'6"	34	122
38'	47	25.3	49	6'8"	36	132
42'	53	28.2	30	7'0"	41	124
47.5'	61	24.2	56	7'4"	46	163
44'	56	26.3	43	6'6"	34	133
47'	61	24.0	57	7'3"	45	173
34'	40	24.2	56	6'8"	36	132
36'	44	24.4	55	6'8"	36	135
31'	36	26.8	39	6'2"	29	104
33'	39	26.2	43	6'4"	31	113
44'	56	24.9	52	6'0"	26	134
47'	61	23.5	61	7'0"	41	163
38'	47	24.9	52	5'6"	19	118
40'	50	26.3	43	6'4"	31	124
34'	40	26.1	44	7'0"	41	125
36'	44	24.5	54	7'3"	45	143
40'	50	24.8	52	6'7"	35	137
45'	57	24.0	57	6'6"	34	148

*Top score indicates the first test score and the bottom score indicates the second test score.

TABLE X--Continued
 TEST SCORES FOR WEIGHT TRAINING GROUP

Medicine Ball Put		Zigzag Run		Standing Broadjump		Total Points
Distance	Points	Time	Points	Distance	Points	
32.5'	38	25.0	51	7'4"	46	135 *
38'	47	28.0	32	6'6"	34	113
39'	48	23.9	58	6'11"	28	141
37'	45	26.2	43	6'3"	30	118
51'	67	27.2	37	6'4"	31	135
55'	73	26.4	42	7'5"	48	163
42'	53	25.3	49	7'0"	41	143
44'	56	24.8	52	7'1"	43	151
41.5'	52	25.5	48	7'0"	41	141
45'	57	24.2	56	7'6"	49	162
39'	48	25.5	48	5'8"	22	118
44'	56	24.6	54	5'9"	23	133
40.5'	51	24.2	56	6'6"	34	141
43'	54	23.6	60	6'2"	29	143
37'	45	24.3	55	6'11"	28	128
39.5'	49	22.8	65	6'0"	26	140
46'	59	24.9	52	6'4"	31	142
53'	70	23.4	61	6'4"	31	162
38.5'	48	23.9	58	5'7"	20	126
40'	50	24.9	52	6'5"	33	135
33'	39	25.1	50	6'11"	28	117
36.5'	44	24.0	57	6'8"	36	137
38'	47	24.6	54	7'0"	41	142
43.5'	55	23.0	64	7'3"	45	164
36'	44	22.7	66	6'0"	26	136
41.5'	52	22.8	65	6'3"	30	147
46'	59	28.3	30	6'2"	29	118
46'	59	27.7	34	5'6"	19	112
44'	56	28.1	31	5'11"	13	100
47.5'	61	26.4	42	5'5"	18	123

*Top score indicates the first test score and the bottom score indicates the second test score.

TABLE X--Continued
 TEST SCORES FOR WEIGHT TRAINING GROUP

Medicine Ball Put		Zigzag Run		Standing Broadjump		Total Points
Distance	Points	Time	Points	Distance	Points	
31'	36	26.2	43	5'8"	22	101 *
32.5'	38	25.4	49	6'0"	26	113
38'	47	24.2	56	6'9"	38	141
38.5'	48	23.6	60	7'0"	41	149
37'	45	25.7	47	5'6"	19	111
35.5'	40	25.5	48	5'9"	23	114
39.5'	49	25.5	48	6'10"	39	136
41.5'	52	22.4	68	6'6"	34	154
37'	45	25.1	50	5'7"	20	115
37.5'	46	24.7	53	5'7"	20	119
35'	42	23.9	58	6'6"	34	134
35'	42	24.2	56	6'4"	31	129
35.5'	43	24.1	57	6'0"	26	126
35.5'	43	24.0	57	7'0"	41	141
43.5'	55	24.9	52	6'6"	34	141
41'	51	25.2	50	6'10"	39	140
35'	42	25.8	46	5'8"	22	110
38'	47	25.5	48	6'6"	34	129
41.5'	52	25.7	47	7'0"	41	140
42'	53	21.4	74	7'3"	45	172
41.5'	52	24.7	53	6'7"	35	140
41.5'	52	22.8	65	7'3"	45	162
36'	44	26.2	43	6'6"	34	121
39.5'	49	25.6	47	7'0"	41	137
39'	48	25.1	50	7'3"	45	143
42'	53	24.8	52	7'6"	49	154
38'	47	26.3	43	5'6"	19	109
42'	53	26.3	43	5'8"	22	118

*Top score indicates the first test score and the bottom score indicates the second test score.

TABLE X--Continued

TEST SCORES FOR WEIGHT TRAINING GROUP

Medicine Ball Put		Zigzag Run		Standing Broadjump		Total Points
Distance	Points	Time	Points	Distance	Points	
44'	56	25.2	50	6'6"	34	140 *
46'	59	22.9	65	8'0"	56	180
44'	56	26.7	40	6'11"	40	136
44.5'	57	25.8	46	6'10"	39	142
33'	39	25.9	45	7'3"	45	129
35.5'	43	24.6	54	7'2"	44	141
35'	42	23.1	63	6'5"	33	138
42'	53	23.7	59	7'2"	44	156
40'	50	24.9	52	6'0"	26	128
42'	53	23.1	63	6'9"	38	154
36'	44	23.9	58	5'6"	19	121
42.5'	54	23.2	63	6'0"	26	143
34'	40	23.4	61	6'7"	35	136
38'	47	23.0	64	6'6"	34	145
30'	34	25.9	45	5'4"	16	95
41.5'	51	25.5	48	6'11"	40	142
37.5'	46	24.7	53	7'2"	44	143
34'	40	24.2	56	7'9"	53	151
39'	48	28.0	32	5'11"	25	105
43'	54	27.3	36	7'1"	43	133
26'	28	24.3	55	8'0"	56	139
30.5'	35	23.7	59	8'1"	58	152
35'	42	23.2	63	6'6"	34	139
39'	48	22.8	65	7'5"	48	161
47.5'	61	25.3	49	6'2"	29	139
48.5'	63	24.3	55	7'5"	48	166
30'	34	23.7	59	6'10"	39	132
31.5'	36	23.3	62	7'1"	43	141

*Top score indicates the first test score and the bottom score indicates the second test score.

TABLE X--Continued
 TEST SCORES FOR WEIGHT TRAINING GROUP

<u>Medicine Ball Put</u>		<u>Zigzag Run</u>		<u>Standing Broadjump</u>		<u>Total Points</u>
<u>Distance</u>	<u>Points</u>	<u>Time</u>	<u>Points</u>	<u>Distance</u>	<u>Points</u>	
37'	45	25.5	48	6'10"	39	132 *
39'	48	24.8	52	7'1"	43	143
36.5'	44	23.0	64	5'11"	25	133
39.5'	49	22.3	68	7'5"	48	165
33'	39	23.4	61	6'4"	31	131
34'	40	23.0	64	6'7"	35	139
39'	48	24.5	54	6'7"	35	137
43.5'	55	24.2	56	6'11"	40	151
38'	47	26.1	44	6'4"	31	122
41.5'	52	25.5	48	6'8"	36	136
37'	45	22.4	68	5'10"	24	137
39'	48	22.0	70	6'1"	28	146
32'	37	25.9	45	6'5"	33	115
45'	57	24.8	52	7'9"	53	162

*Top score indicates the first test score and the bottom score indicates the second test score.

TABLE XI
TEST SCORES FOR GYMNASTICS GROUP

<u>Medicine Ball Put</u>		<u>Zigzag Run</u>		<u>Standing Broadjump</u>		<u>Total Points</u>
<u>Distance</u>	<u>Points</u>	<u>Time</u>	<u>Points</u>	<u>Distance</u>	<u>Points</u>	
34'	40	24.4	55	7'3"	45	140 *
40'	50	23.5	61	7'7"	50	161
41'	51	26.5	41	6'7"	35	127
42'	53	26.7	40	6'6"	34	127
33.6'	40	23.7	59	6'8"	36	135
34.6'	41	23.4	61	6'7"	35	137
40'	50	26.0	45	6'7"	35	130
40'	50	26.1	44	7'6"	49	143
35'	43	24.5	54	6'7"	35	132
39'	48	23.6	60	7'0"	41	149
36'	44	24.8	52	7'2"	44	140
34.6'	41	22.6	67	7'9"	53	161
38'	47	24.8	52	7'0"	41	140
38'	47	24.3	55	8'6"	64	166
29.5'	33	22.6	67	6'0"	26	126
35'	43	27.0	38	7'0"	41	122
38'	47	25.0	51	6'2"	29	127
41.5	52	27.1	38	8'0"	56	146
37'	45	24.0	57	6'10"	39	141
40'	50	26.2	43	8'0"	56	149
39'	48	24.4	55	6'9"	38	141
43.5'	55	27.4	36	7'8"	51	142
38'	47	23.8	59	6'0"	26	132
41'	51	26.3	43	8'0"	56	150
37'	45	26.2	43	7'10"	54	142
40'	50	23.5	61	8'0"	56	167
43.5'	55	24.8	52	6'5"	33	140
46'	59	24.8	52	8'0"	56	167

*Top score indicates the first test score and the bottom score indicates the second test score.

TABLE XI--Continued

TEST SCORES FOR GYMNASTICS GROUP

Medicine Ball Put		Zigzag Run		Standing Broadjump		Total Points
Distance	Points	Time	Points	Distance	Points	
39'	48	26.0	45	6'0"	26	119 *
42'	53	28.7	27	9'6"	79	169
36'	44	24.6	54	6'8"	36	134
41'	51	26.1	44	8'0"	56	151
41'	51	23.6	60	6'11"	28	139
37'	45	23.4	61	7'2"	44	150
31'	36	26.1	44	5'3"	15	95
28'	31	25.3	49	6'2"	29	109
37'	45	25.9	45	6'6"	34	124
37'	45	23.7	59	6'5"	33	137
36'	44	28.1	31	6'0"	26	101
35.5'	43	24.2	56	7'3"	45	144
39'	48	27.7	34	7'3"	45	127
41.5'	52	22.5	67	6'4"	31	150
32'	37	26.1	44	6'8"	36	117
37'	45	24.5	54	7'5"	48	147
35'	42	24.8	52	7'0"	41	135
42.5'	54	23.5	61	7'6"	49	164
43'	54	24.0	57	5'8"	22	133
44'	56	24.3	55	6'1"	28	139
38'	47	24.8	52	6'9"	38	137
39.5'	49	27.3	36	6'9"	38	123
36'	44	23.3	62	6'6"	34	140
38'	47	24.3	55	7'6"	49	151
39'	48	24.8	52	6'10"	39	139
39.5'	49	24.3	55	7'0"	41	145
34.5'	41	25.3	49	6'11"	40	130
41'	51	23.9	58	7'3"	45	154

*Top score indicates the first test score and the bottom score indicates the second test score.

TABLE XI--Continued
TEST SCORES FOR GYMNASTICS GROUP

Medicine Ball Put		Zigzag Run		Standing Broadjump		Total Points
Distance	Points	Time	Points	Distance	Points	
36'	44	23.4	61	6'6"	34	139 *
41'	51	23.5	61	7'4"	46	158
38'	47	25.7	47	6'1"	28	122
42'	53	23.2	63	6'9"	38	154
46'	59	27.2	37	6'11"	40	136
45'	57	24.8	52	7'5"	48	157
28'	31	26.0	45	5'11"	25	101
32'	37	23.3	62	6'2"	29	128
38.5'	48	27.9	32	6'4"	31	111
34.5'	41	26.7	40	6'4"	31	112
29.5'	33	24.5	54	6'3"	30	117
31.5'	36	24.9	52	6'1"	28	116
37'	45	25.6	47	6'2"	29	121
45'	57	23.1	63	6'3"	30	150
34'	40	24.3	55	7'4"	46	141
38'	47	23.8	59	7'4"	46	152
32'	37	27.0	38	7'0"	41	116
31'	36	24.3	55	7'2"	44	135
34'	40	25.0	51	5'11"	25	116
36'	44	26.6	41	5'10"	24	109
41.6'	52	25.0	51	6'6"	34	137
39.6'	49	24.3	55	6'6"	34	138
36.5'	44	26.2	43	6'1"	28	115
39'	48	23.9	58	6'5"	33	139
33'	39	27.8	33	6'1"	28	100
36'	44	26.0	45	6'1"	28	117
31'	36	25.9	45	6'7"	35	116
34.5'	41	25.3	49	6'11"	40	130

*Top score indicates the first test score and the bottom score indicates the second test score.

TABLE XI--Continued
TEST SCORES FOR GYMNASTICS GROUP

Medicine Distance	Ball Put Points	Zigzag Run		Standing Distance	Broadjump Points	Total Points
		Time	Points			
32'	37	24.5	54	6'9"	38	129 *
32'	37	24.6	54	6'6"	34	125
38.5'	48	26.5	41	5'11"	25	114
39'	48	25.7	47	6'6"	34	129
40.5'	51	27.3	36	6'5"	33	120
40.5'	51	23.5	61	6'5"	33	145
38'	47	25.5	48	6'4"	31	126
42'	53	23.6	60	7'9"	53	166
41'	51	26.9	39	6'8"	36	126
42'	53	23.2	63	7'11"	55	171
34'	42	24.3	55	5'10"	24	121
38'	47	24.7	53	6'6"	34	134
40'	50	26.9	39	7'4"	46	135
39'	48	24.2	56	9'0"	71	175
40'	50	24.2	56	6'5"	33	139
39'	48	24.8	52	6'3"	30	130
32'	37	25.3	49	6'7"	35	121
35'	42	24.8	52	7'3"	45	139
33'	39	24.7	53	6'6"	34	126
34.5'	41	23.1	63	7'3"	45	149
31'	36	25.0	51	4'10"	9	96
33'	39	25.0	51	5'6"	19	109
36'	44	26.4	42	6'3"	30	116
34'	40	26.1	44	6'3"	30	114
38'	47	24.6	54	6'10"	39	140
41'	51	22.0	70	6'6"	34	155
36'	44	24.2	56	6'8"	36	136
38'	47	23.0	64	6'9"	38	149

*Top score indicates the first test score and the bottom score indicates the second test score.

TABLE XI--Continued

TEST SCORES FOR GYMNASTICS GROUP

Medicine Ball Put		Zigzag Run		Standing Broadjump		Total Points
Distance	Points	Time	Points	Distance	Points	
41'	51	25.2	50	6'9"	38	139 *
39'	48	25.9	45	6'6"	34	127
41'	51	26.2	43	7'2"	44	138
41'	51	24.8	52	7'3"	45	148
36.5'	44	25.0	51	5'11"	25	120
36'	44	24.8	52	5'9"	38	134
41'	51	27.4	36	6'8"	36	123
41'	51	24.0	57	7'3"	45	153
32'	37	24.1	57	6'6"	34	128
34'	40	21.9	71	7'0"	41	152
44'	56	24.9	52	6'4"	31	139
44'	56	22.6	67	7'0"	41	164
37.5'	46	25.5	48	6'9"	38	132
39.5'	49	25.2	50	6'2"	29	128
36'	44	27.0	38	6'2"	29	111
39'	48	25.1	50	6'10"	39	137
32.5'	38	23.2	63	6'11"	40	141
34'	40	22.2	69	7'4"	46	155
36'	44	25.6	47	7'1"	43	134
45'	57	24.7	53	7'3"	45	155

*Top score indicates the first test score and the bottom score indicates the second test score.

TABLE XII
 FREQUENCY TABLE FOR THE MEDICINE BALL PUT

FIRST TEST--SWIMMING CLASS

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>
46-48	0	3	0
43-45	5	2	10
40-42	14	1	14
37-39	21	0	0
34-36	14	-1	-14
31-33	8	-2	-16
28-30	3	-3	-9
25-27	0	-4	0
22-24	0	-5	0
19-21	<u>1</u>	-6	<u>-6</u>
	N = 66		-21

Range ----- 20'0" - 45'0"

Median ----- 37.50

Mean ----- 37.05

TABLE XIII

FREQUENCY TABLE FOR THE MEDICINE BALL PUT

SECOND TEST--SWIMMING CLASS

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>
48-49	3	6	18
46-47	0	5	0
44-45	1	4	4
42-43	7	3	21
40-41	10	2	20
38-39	8	1	8
<u>36-37</u>	<u>21</u>	<u>0</u>	<u>0</u>
34-35	7	-1	-7
32-33	5	-2	-10
30-31	2	-3	-6
28-29	<u>2</u>	<u>-4</u>	<u>-8</u>
	N = 66		+40

Range -----27'6" - 48'0"

Median -----37.12

Mean -----37.71

TABLE XIV

FREQUENCY TABLE FOR THE STANDING BROADJUMP

FIRST TEST--SWIMMING CLASS

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>
7'3"-7'6"	3	4	12
6'11"-7'2"	9	3	27
6'7"-6'10"	11	2	22
6'3"-6'6"	10	1	10
<u>5'11"-6'2"</u>	<u>23</u>	<u>0</u>	<u>0</u>
5'7"-5'10"	3	-1	-3
5'3"-5'6"	3	-2	-6
4'11"-5'2"	2	-3	-6
4'7"-4'10"	0	-4	0
4'3"-4'6"	1	-5	-5
3'11"-4'2"	<u>1</u>	<u>-6</u>	<u>-6</u>
	N = 66		+45

Range -----4'0" - 7'6"

Median -----6'2.50"

Mean -----6'3.23"

TABLE XV
 FREQUENCY TABLE FOR THE STANDING BROADJUMP

SECOND TEST--SWIMMING CLASS

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>
7'7"-7'10"	3	4	12
7'3"-7'6"	8	3	24
6'11"-7'2"	9	2	18
6'7"-6'10"	7	1	7
6'3"-6'6"	17	0	0
5'11"-6'2"	13	-1	-13
5'7"-5'10"	3	-2	-6
5'3"-5'6"	2	-3	-6
4'11"-5'2"	3	-4	-12
4'7"-4'10"	0	-5	0
4'3"-4'6"	<u>1</u>	-6	<u>-6</u>
	N = 66		+19

Range ----- 4'5" - 7'10"

Median ----- 6'5.09"

Mean ----- 6'5.65"

TABLE XVI
 FREQUENCY TABLE FOR THE ZIGZAG RUN

FIRST TEST--SWIMMING CLASS

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>
32.5-33.5	2	7	14
31.4-32.4	1	6	6
30.3-31.3	0	5	0
29.2-30.2	1	4	4
28.1-29.1	4	3	12
27.0-28.0	10	2	20
<u>25.9-26.9</u>	<u>16</u>	<u>1</u>	<u>16</u>
<u>24.8-25.8</u>	<u>18</u>	<u>0</u>	<u>0</u>
23.7-24.7	8	-1	-8
22.6-23.6	<u>6</u>	<u>-2</u>	<u>-12</u>
	N = 66		+52

Range ----- 23.0 - 33.5

Median ----- 25.92

Mean ----- 26.17

TABLE XVII
FREQUENCY TABLE FOR THE ZIGZAG RUN

SECOND TEST--SWIMMING CLASS

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>
30.7-31.4	2	5	10
29.9-30.6	1	4	4
29.1-29.8	1	3	3
28.3-29.0	5	2	10
<u>27.5-28.2</u>	<u>5</u>	<u>1</u>	<u>5</u>
<u>26.7-27.4</u>	<u>12</u>	<u>0</u>	<u>0</u>
25.9-26.6	10	-1	-10
25.1-25.8	11	-2	-22
24.3-25.0	10	-3	-30
23.5-24.2	<u>9</u>	<u>-4</u>	<u>-36</u>
	N = 66		-66

Range ----- 23.5 - 31.4

Median ----- 26.09

Mean ----- 26.25

TABLE XVIII
 FREQUENCY TABLE FOR THE MEDICINE BALL PUT
 FIRST TEST--WEIGHT TRAINING CLASS

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>
50-51	1	6	6
48-49	1	5	5
46-47	2	4	8
44-45	7	3	21
42-43	5	2	10
40-41	5	1	5
<u>38-39</u>	<u>13</u>	<u>0</u>	<u>0</u>
36-37	11	-1	-11
34-35	8	-2	-16
32-33	6	-3	-18
30-31	4	-4	-16
28-29	0	-5	0
26-27	<u>1</u>	-6	<u>-6</u>
	N = 64		-12

Range ----- 26' - 51'

Median ----- 37.80

Mean ----- 38.88

TABLE XIX

FREQUENCY TABLE FOR THE MEDICINE BALL PUT

SECOND TEST--WEIGHT TRAINING CLASS

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>
53-55	2	4	8
50-52	0	3	0
47-49	5	2	10
44-46	9	1	9
<u>41-43</u>	<u>17</u>	<u>0</u>	<u>0</u>
38-40	17	-1	-17
35-37	8	-2	-16
32-34	5	-3	-15
29-31	<u>1</u>	<u>-4</u>	<u>-4</u>
	N = 64		-25

Range ----- 30'6 - 55'

Median ----- 40.68

Mean ----- 40.83

TABLE XX

FREQUENCY TABLE FOR THE STANDING BROADJUMP

FIRST TEST--WEIGHT TRAINING CLASS

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>
8'0"-8'3"	1	5	5
7'8"-7'11"	0	4	0
7'4"-7'7"	2	3	6
7'0"-7'3"	8	2	16
6'8"-6'11"	7	1	7
<u>6'4"-6'7"</u>	<u>18</u>	<u>0</u>	<u>0</u>
6'0"-6'3"	13	-1	-13
5'8"-5'11"	7	-2	-14
5'4"-5'7"	7	-3	-21
5'0"-5'3"	<u>1</u>	<u>-4</u>	<u>-4</u>
	N = 64		-18

Range ----- 5'1" - 8'0"

Median ----- 6'4.39"

Mean ----- 6'4.37"

TABLE XXI
 FREQUENCY TABLE FOR THE STANDING BROADJUMP

SECOND TEST--WEIGHT TRAINING CLASS

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>
7'10"-8'1"	2	3	6
7'6"-7'9"	4	2	8
7'2"-7'5"	14	1	14
6'10"-7'1"	13	0	0
6'6"-6'9"	12	-1	-12
6'2"-6'5"	9	-2	-18
5'10"-6'1"	4	-3	-12
5'6"-5'9"	5	-4	-20
5'2"-5'5"	1	-5	-5
	N = 64		-39

Range ----- 5'5"-8'1"

Median ----- 6'9.81"

Mean ----- 6'9.06"

TABLE XXII

FREQUENCY TABLE FOR THE ZIGZAG RUN

FIRST TEST--WEIGHT TRAINING CLASS

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>
27.8-28.3	5	5	25
27.2-27.7	1	4	4
26.6-27.1	2	3	6
26.0-26.5	6	2	12
25.4-25.9	13	1	13
<u>24.8-25.3</u>	<u>13</u>	<u>0</u>	<u>0</u>
24.2-24.7	10	-1	-10
23.6-24.1	6	-2	-12
23.0-23.5	6	-3	-18
22.4-22.9	<u>2</u>	<u>-4</u>	<u>-8</u>
	N = 64		+12

Range ----- 22.4 - 28.3

Median ----- 25.12

Mean ----- 25.16

TABLE XXIII

FREQUENCY TABLE FOR THE ZIGZAG RUN

SECOND TEST--WEIGHT TRAINING CLASS

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>
27.4-28.0	3	5	15
26.7-27.3	1	4	4
26.0-26.6	6	3	18
25.3-25.7	8	2	16
24.6-25.2	12	1	12
23.9-24.5	12	0	0
23.2-23.8	8	-1	-8
22.5-23.1	9	-2	-18
21.8-22.4	4	-3	-12
21.1-21.7	1	-4	-4
	N = 64		+23

Range ----- 21.4 = 28.0

Median ----- 24.43

Mean ----- 24.45

TABLE XXIV
 FREQUENCY TABLE FOR THE MEDICINE BALL PUT

FIRST TEST--GYMNASTICS CLASS

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>
46-47	1	5	5
44-45	2	4	8
42-43	2	3	6
40-41	10	2	20
38-39	14	1	14
36-37	15	0	0
34-35	8	-1	-8
32-33	8	-2	-16
30-31	5	-3	-15
28-29	1	-4	-4
	<u>1</u>		<u>-4</u>
	N = 66		+9

Range ----- 28'0" - 46'0"

Median ----- 36.97'

Mean ----- 36.77'

TABLE XXV

FREQUENCY TABLE FOR THE MEDICINE BALL PUT

SECOND TEST--GYMNASTICS CLASS

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>
46-47	1	4	4
44-45	6	3	18
42-43	8	2	16
40-41	16	1	16
<hr/> 38-39	<hr/> 12	<hr/> 0	<hr/> 0
36-37	7	-1	-7
34-35	10	-2	-20
32-33	4	-3	-12
30-31	1	-4	-4
28-29	<hr/> 1	<hr/> -5	<hr/> -5
	N = 66		+6

Range ----- 28'0" = 46'0"

Median ----- 39,17'

Mean ----- 38,68'

TABLE XXVI

FREQUENCY TABLE FOR THE STANDING BROADJUMP

FIRST TEST--GYMNASTICS CLASS

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>
7'9"-8'1"	1	3	3
7'4"-7'8"	2	2	4
6'11"-7'3"	11	1	11
6'6"-6'10"	25	0	0
6'1"-6'5"	15	-1	-15
5'8"-6'0"	10	-2	-20
5'3"-5'7"	1	-3	-3
4'10"-5'2"	1	-4	-4
	N = 66		-24

Range ----- 4'10" - 7'10"

Median ----- 6'6.70"

Mean ----- 6'6.18"

TABLE XXVII
 FREQUENCY TABLE FOR THE STANDING BROADJUMP

SECOND TEST--GYMNASTICS CLASS

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>
9'3"-9'7"	1	6	6
8'10"-9'2"	1	5	5
8'5"-8'9"	1	4	4
8'0"-8'4"	6	3	18
7'7"-7'11"	5	2	10
7'2"-7'6"	17	1	17
6'9"-7'1"	11	0	0
6'4"-6'8"	13	-1	-13
5'11"-6'3"	9	-2	-18
5'6"-5'10"	2	-3	-6
	N = 66		+23

Range ----- 5'6" - 9'6"

Median ----- 7'0.59"

Mean ----- 7'0.74"

TABLE XXVIII
 FREQUENCY TABLE FOR THE ZIGZAG RUN

FIRST TEST--GYMNASTICS CLASS

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>
28.0-28.4	1	6	6
27.5-27.9	3	5	15
27.0-27.4	5	4	20
26.5-26.9	4	3	12
26.0-26.4	8	2	16
25.5-25.9	7	1	7
<u>25.0-25.4</u>	<u>9</u>	<u>0</u>	<u>0</u>
24.5-24.9	13	-1	-13
24.0-24.4	9	-2	-18
23.5-23.9	3	-3	-9
23.0-23.4	3	-4	-12
22.5-22.9	<u>1</u>	-5	<u>-5</u>
	N = 66		+19

Range ----- 22.6 = 28.1

Median ----- 25.19

Mean ----- 25.34

TABLE XXIX
 FREQUENCY TABLE FOR THE ZIGZAG RUN
 SECOND TEST--GYMNASTICS CLASS

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>
28.2-28.8	1	6	6
27.5-28.1	0	5	0
26.8-27.4	4	4	16
26.1-26.7	8	3	24
25.4-26.0	3	2	6
24.7-25.3	15	1	15
24.0-24.6	11	0	0
23.3-23.9	13	-1	-13
22.6-23.2	7	-2	-14
21.9-22.5	4	-3	-12
	N = 66		+28

Range ----- 21.9 - 28.7

Median ----- 24.52

Mean ----- 24.60

A FOLLOW-UP STUDY OF THE BARROW MOTOR ABILITY TEST OF FRESHMEN
STUDENTS IN BASIC PHYSICAL EDUCATION CLASSES AT
KANSAS STATE UNIVERSITY DURING 1966-67

by

KENNETH JOE RUSSELL

B. S., Kansas State University, 1967

AN ABSTRACT OF A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Physical Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1967

All students at Kansas State University are required to take two semesters of physical education. A motor ability test is given to all students in basic physical education to classify students as to motor ability needs. The students failing the Barrow Motor Ability Test are placed in remedial classes unless they failed the swimming test.

The Barrow Motor Test is a three-battery test consisting of zigzag run, medicine ball put, and standing broadjump. It tests, respectively, agility, strength, and power. The test was developed by Dr. Harold M. Barrow for partial fulfillment for a Doctor's degree of Physical Education.

This study compared the test scores of those students who failed the Barrow Motor Ability Test and were placed in weight training, gymnastics, and swimming classes.

The area for testing was Ahearn Field House gymnasium area. The test was administered by the class instructors with assistance from student teachers and other staff members. This test was given during the second week of the fall semester 1966-67. Those students who failed the Barrow Motor Ability Test were retested during the sixteenth week of the second semester.

The weight training group had the best mean score improvement of 2.71 feet in the medicine ball put. Their mean score on the second test was 40.83 as compared with 38.77 for the gymnastics group and 37.71 for the swimming group.

The gymnastics group had the best mean score improvement of .74 of a second in the zigzag run. Their mean score on the second test was

7'0.74" as compared with 6'9.06" for the weight training group and 6'5.65" for the swimming group.

The mean total score for the gymnastics group on the second test was 145 points as compared with 143 points for the weight training group and 123 points for the swimming group. The gymnastics group had the highest mean score improvement with 18 points.