

A COMPARISON OF THE RESULTS OF THE BARROW
MOTOR ABILITY TEST SCORES OF ATHLETES
AND NON-ATHLETES

by

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INTRODUCTION

Proper placement and scheduling of students in basic classes of Physical Education 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. Educators need to know as much concerning the student's ability to perform skills as his ability to do academic work if the student's "whole" needs are to be met.¹

Previous to the 1961-62 school year at Kansas State University the physical education program required four semesters for graduation. Activities offered were: 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 encouraged to participate in as many different activities as possible in his four semesters of participation.²

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

² William 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 Unpublished Master's Report, Kansas State University, Manhattan, Kansas, 1963.

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 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 due to the lowering of the requirements. As an incentive these elective courses were for 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 administration 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 tested, in order, power, strength, and agility. The three-battery test was selected because of the speed in administration and the indoor facilities available.³

The students who attained a prescribed score of 144

³ Ibid

in the test were given their choice of activities. Those who did not pass the suggested score were placed in a special class. The special classes were wrestling, weight training and gymnastics.

PURPOSE OF THE STUDY

This study shows the results and analyses of the best 62 scores in the Barrow Motor Ability Test given to the basic physical education classes at Kansas State University during the fall semester of the 1965-66 school year. These are compared with results of the same test administered to the scholarship football players at Kansas State University during the spring semester of 1966.

It is the purpose of this report to study the results of this test and find if the scholarship football players have motor ability equal to that of the best of the non-athletes at Kansas State University. A secondary purpose is to ascertain if the football players as a whole fail to measure up in any one of the three categories: power, agility, and strength, as compared with the top sixty-two persons in the basic physical education program.

BACKGROUND OF THE BARROW TEST

The test was developed 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. The author of the test was Dr. Harold M. Barrow, head of the Physical Education Department at Wake Forest College, Winston-Salem, North Carolina.

The purpose was to develop an easily administered test of motor ability for college men. The results could be used for classification, guidance and measurement of achievement.⁴

To form 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 were the ones most highly related to motor ability. These factors were agility, hand-eye-foot-eye co-ordination, 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.

⁴ Op.Cit., Barrow

From the findings of this research, Barrow decided upon two batteries of tests. Number one had six items and tested the six most highly related factors:

ITEM	FACTOR
Standing broadjump	Power
Medicine ball put	Strength
Zigzag run	Agility
Softball throw	Arm-shoulder co-ordination
Wall pass	Hand-eye co-ordination
60-yard dash	Speed

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

The six-item test showed 70 per cent improvement over a best test. The three-item test is recommended for indoor administration or for quick classification.⁵

⁵ Ibid.

NORMS FOR THE BARROW TEST

Tables I to III give the norms used in scoring the test. They were established by Barrow in his study.⁶

⁶ Ibid.

TABLE I

NORM USED FOR ZIGZAG RUN

Time in Seconds	Score	Time in Seconds	Score	Time in Seconds	Score	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	27.9-30.0	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	31.2-32.3	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 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"		33
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
8' 11"		71	6' 8"		36	4' 4"		1
8' 10"		70	6' 7"		35			
		69	6' 6"		34			

TABLE III

NORM USED FOR MEDICINE BALL PUT

Distance in feet	Score	Distance in feet	Score	Distance in feet	Score	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	22	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	47-37.5	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
58-58.5	78	42.5-43	54	26	29	10	4
59	79	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

METHOD OF ADMINISTERING THE TEST

The Barrow Motor Ability Test was administered by the class instructors with assistance from the student teachers and other Physical Education staff members.. The test was given to all members of the required physical education classes at Kansas State University during the first week of the fall semester, 1965-66.

The area for testing was the gymnasium section of Ahearn Field House. The gymnasium is large enough to include three full size basketball courts. Two zigzag run courses were set up at one end of the gymnasium and one at the opposite end. Bowling pins were used for the center and corner obstacles. (See diagram on page 14 for course layout).

There were two medicine ball put areas in the middle basketball court. The areas were laid out with markings every six inches.

At opposite ends of the gymnasium two broadjump areas were set up and marked off in feet and inches.

At the beginning of the class periods each student was given a temporary roll card which he filled out with his name, school, and classification. He carried this card with him to each of the three test stations. Each tester recorded the best time or length and the points scored at each item on the back of the roll card.

After completing all three events the student's cards were collected and the scores were totaled.

The same test was administered to the scholarship football players on the afternoon of March 24, 1966. Because of the smaller number of participants only one station for each event was set up on one basketball court. The tests were administered and recorded the same as for the students of the basic physical education classes.

A sample of the card given to each student and each football player is shown in Figure 1.

FIGURE 1

SAMPLE OF THE CARD GIVEN TO EACH STUDENT
AND EACH FOOTBALL PLAYER

<u>Event</u>	<u>Time or Distance</u>	<u>Points</u>
Standing Broadjump	7'4"	46
Zigzag run	21.4 sec.	74
Medicine ball put	54'	<u>71</u>
		191

RESULTS OF THE TESTS

On the following pages is a complete description of each test and comparison of the results of the two groups tested. Sixty-two scholarship football players from Kansas State University and the top sixty-two scores from the required physical education test scores will be compared. The following tables, figures, and graphs will help to easily analyze the results. The appendix will contain a complete listing of the test scores.

ZIGZAG RUN

The course was set up in the form of a 16 by 10 foot rectangle with a bowling pin in the center and each corner. The course was run in a figure eight fashion. The student started at point X and ran the prescribed course three times around. His time was recorded to the nearest tenth of a second.

A diagram of the course is given in Figure 2.

FIGURE 2

DIAGRAM OF THE ZIGZAG RUN COURSE

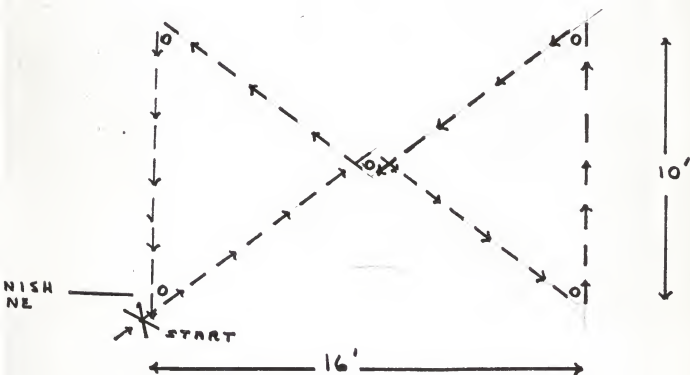


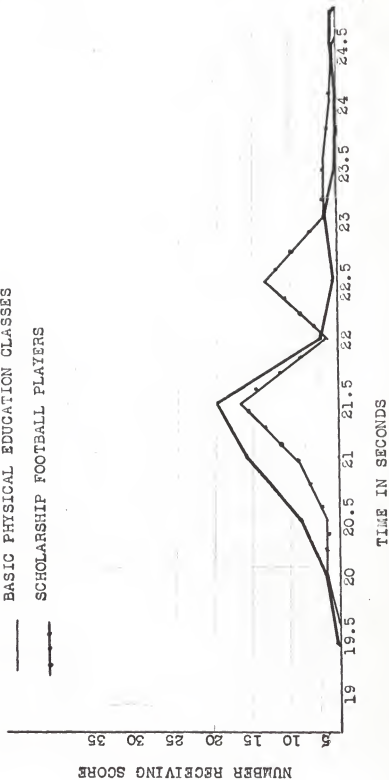
FIGURE 3

COMPARISON OF ZIGZAG RUN TIME

BASIC PHYSICAL EDUCATION CLASSES AND SCHOLARSHIP FOOTBALL PLAYERS

— BASIC PHYSICAL EDUCATION CLASSES

— SCHOLARSHIP FOOTBALL PLAYERS



Each individual ran the prescribed course only once in the basic physical education classes as the time factor would not allow for a practice run. In view of this fact the scholarship football players were also not allowed a practice run. It is interesting to note that after the test for the scholarship football players, some of the participants were allowed to run the zigzag course for the second time. These almost invariably produced faster times. It should also be mentioned that several instructors or student teachers were allowed to administer the test in the physical education classes, but only one teacher was used for the football players.

A table with the results of the zigzag run is shown below.

TABLE IV
RESULTS OF THE ZIGZAG RUN

Classification	Basic Physical Education Class Time in Seconds	Scholarship Football Players Time in Seconds	Difference in Seconds
Best Time	19.4	19.6	P.E. .2
Median	21.02	21.39	P.E. .37
Mean	21.04	21.69	P.E. .65
Mode	21.2	21.2	Same
Standard Deviation	1.96	1.12	
Range of Middle 68%	20.06-21.98	20.27-22.51	
Poorest Time	24.5	24.8	P.E. .3

The best time for the physical education classes was

19.4 seconds. Only one student attained this time. The best time for the football players was 19.6 seconds. Only one player was clocked this fast although there were three who had a time of 19.8 seconds. The difference in seconds was a marginal .2.

The median for the physical education classes was 21.02 seconds. The median for the football players was 21.39 seconds. This gave the physical education classes a faster median time of .37 seconds.

The mean or average for the physical education students was 21.04. The mean for the football players was 21.69 seconds. The physical education classes had a .65 second faster time.

The mode for the physical education classes was in the 21-21.4 second range. Twenty out of the sixty-two students received this score. The mode for the football players was in the same range, 21-21.4 seconds. This group had seventeen out of the sixty-two in this range.

The standard deviation for the physical education classes was .96 seconds. The range for the middle 68 per cent was 20.06 to 21.98 seconds.

The standard deviation for the football players was 1.12 seconds. The middle 68 per cent of the players had times between 20.27 to 22.51 seconds. The poorest time for both groups fell in the 24.5-24.9 range. Each group had one participant in this range.

STANDING BROADJUMP

The standing broadjump was set up by placing a piece of masking tape on the floor for a starting line. A piece of masking tape was placed perpendicular to it and was marked off in feet and inches. Each student was permitted one practice jump and three trials. The distance of the best trial was recorded and the accorded points given. Measurements were taken from toe of take-off line to the back of the heel. The contestant was disqualified on his jump if he touched over 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	Basic Physical Education Class Distance in feet and inches	Scholarship Football Players Distance in feet and inches	Difference in feet and inches
Best distance	9'7"	9'7"	Same
Median	8'4.10"	7'9.17"	6.93"
Mean	8'4.31"	7'10.15"	6.16"
Mode	8'2.50"	7'5.50"	9.0"
Standard deviation	5.32"	7.44"	
Range of middle 68%	7'10.78"-8'9.42"	7'1.73"-8'4.61"	
Poorest distance	7'5"	6'3"	1'2"

The best jump for the physical education classes was

9'7". The best for the football players was an identical 9'7". One participant from each group attained this distance.

The median score for the physical education classes was 8'4.10". The median for the football players was 7'9.17". This showed a difference of 6.93" in favor of the physical education classes.

The mean distance for the physical education classes was 8'4.31". The mean performance for the football players was 7'10.15". Students from the physical education classes had a higher mean by 6.16 inches.

The mode for the physical education classes was in the 8'2"-8'3" range. They had 14 of the 62 in this range. Football players had 18 in their mode range which was 7'4"-7'7". This showed a difference of nine inches in favor of the basic physical education classes.

The standard deviation for the physical education group was 5.32". The middle 68 per cent had a range from 7'10.78" to 8'9.42".

The standard deviation for the football players was 7.44". The middle 68 percent fell in the 7'1.73"-8'4.61" range.

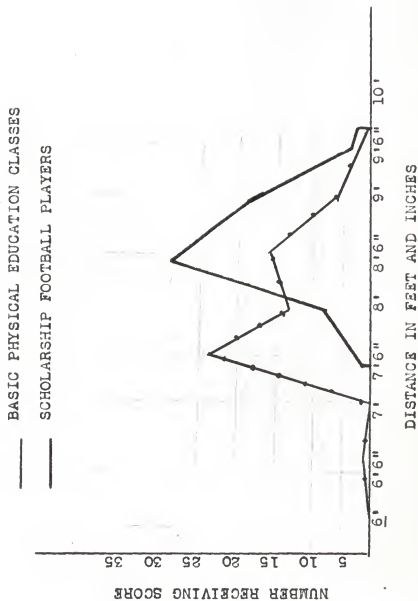
The poorest distance for the physical education group was 7'5". Two of the sixty-two students jumped this dis-

tance. The poorest distance for the football group was 6'3". This was attained by the student who had the lowest total score for the football players. Only one other football player failed to jump at least seven feet. The standing broadjump was the most constant of the three tests given.

FIGURE 4

COMPARISON OF STANDING BROADJUMP DISTANCES

BASIC PHYSICAL EDUCATION CLASSES AND SCHOLARSHIP FOOTBALL PLAYERS



MEDICINE BALL PUT

The course was 70 feet, marked off in one half foot intervals. Two lines, a starting and a finishing, were marked off perpendicular to the measured distance for the throwing area. They were 15 feet apart and the finishing line was on the 0 foot line. The student had to stay in this area for each put. If he fell over the take-off line it constituted a foul.

Each student was permitted one practice put and three trial puts. The distance of the best trial, measured to the nearest half foot, was recorded and the accorded points were given. A six pound medicine ball was used in this event.

The results of the medicine ball put are shown below.

TABLE VI
RESULTS OF THE MEDICINE BALL PUT

Classification	Basic Physical Education Class Distance in feet	Scholarship Football Players Distance in feet	Difference in feet
Best distance	66	62	P.E. 4
Median	50.19	51.88	S.F. 1.69
Mean	50.53	50.65	S.F. .12
Mode	49.5	49.5	Same
Standard deviation	4.18	4.90	
Range of middle 68%	46.01-54.37	46.98-56.78	
Poorest distance	42	42	Same

The best put for the physical education classes was 66 feet. One boy put the ball this distance. The football players best put was 62 feet. One player achieved this distance. This made the best put for the football players 4 feet shorter than the best of the physical education classes.

The median score for the physical education classes was lower in this event. Their score was 50.19 while the football players were 1.69 feet higher with a median score of 51.88.

The physical education classes' mean for the medicine ball put was 50.53 feet. The mean for the football players was 50.65 feet. This gave the football players a higher mean by .12 feet.

The mode for both, the classes and the football players, was in the 49 to 50 feet range. The physical education classes had 13 out of 62 in this range and the football players had 10 out of 62.

The standard deviation for the physical education classes was 4.18 feet. The middle 68 per cent fell in the 46.01-54.37 feet range.

The standard deviation for the football players was 4.90 feet. The middle 68 per cent of the scores fell in a range from 49.98-56.78 feet.

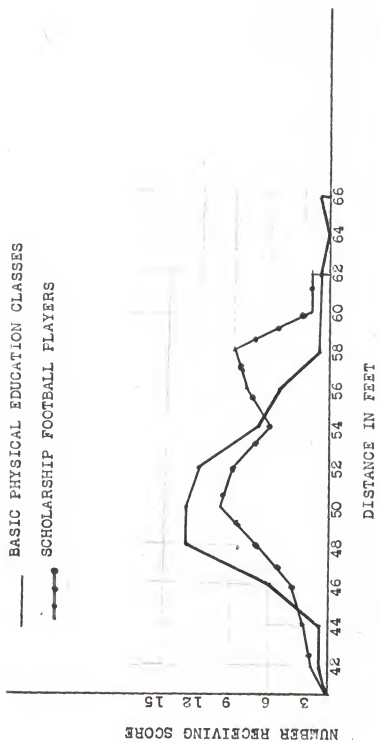
Two football players and one physical education student recorded the poorest score in the medicine ball put.

These three put the ball 42 feet.

The range of scores show the football players had a definite number of higher scores and would have had a definite advantage if not for a few poor scores.

FIGURE 5

COMPARISON OF MEDICINE BALL PUT DISTANCES
 BASIC PHYSICAL EDUCATION CLASSES AND SCHOLARSHIP FOOTBALL PLAYERS



RESULTS OF THE TOTAL TEST

The following table shows the results of the total test.

TABLE VII

RESULTS OF THE TOTAL TEST

<u>BASIC PHYSICAL EDUCATION CLASSES</u>							
<u>Classification</u>	<u>Zigzag run</u>		<u>S.B.J.</u>		<u>M.B.P.</u>		<u>Total</u>
	<u>Time</u>	<u>Points</u>	<u>Dist.</u>	<u>Points</u>	<u>Dist.</u>	<u>Points</u>	
Best score	20.7	79	9'6"	79	66'	90	248
Mean	21.04	77	8'4.31"	62	50.53'	66	205
Poorest score	24.5	54	7'5"	48	42'	53	155

<u>SCHOLARSHIP FOOTBALL PLAYERS</u>							
<u>Classification</u>	<u>Zigzag run</u>		<u>S.B.J.</u>		<u>M.B.P.</u>		<u>Total</u>
	<u>Time</u>	<u>Points</u>	<u>Dist.</u>	<u>Points</u>	<u>Dist.</u>	<u>Points</u>	
Best score	20.4	81	9'7"	80	58'	78	239
Mean	21.69	72	7'10.15"	54	50.65'	66	192
Poorest score	24.8	52	7'5"	48	42'	53	153

In analyzing the above table one can see that the best score by the physical education classes was 248 points. This is the best score ever recorded at Kansas State University. To achieve such a tremendous score the individual has to be excellent in every category.

The best score recorded by the football players was 239. This is an excellent score and was recorded by one of the top players on the squad.

The mean total score or average for the basic physical education was 205 points. One must keep in mind while read-

ing this score, that the participants are the top physical specimens in the Kansas State University freshmen class. These selected participants do not include freshmen who are checked out for a varsity sport.

The mean score for the football players was a total of 192 points. This was 13 points less than the total for the physical education classes. Eight of the 13 points resulted from the standing broad jump.

The physical education classes recorded more points, 77 to 72, in the zigzag run. The football players and the physical education classes tied for the mean of the medicine ball put, although the football players had 36 participants above this mean while the physical education classes had only 28.

The standard deviation for the physical education classes was 7.85. Their middle 68 per cent fell in the range from 196.76 to 212.46 points.

By finding the standard error of the two means of the total results of the test and substituting these standard errors in a formula which finds the standard error of the differences of the means, we arrived at an answer of 2.79. By dividing this answer (2.79) into the difference of the means (13) we arrive at the answer, 4.66.

It is customary to take a difference divided by the standard error of the difference of three as indicative

of a significant difference (virtual certainty) since there is only about one chance in a 1000 that a difference of plus three standard deviations will arise. There are, therefore, 99.9 chances in 100 that the highest scores of the Basic Physical Education Classes will, on the average, always score above the Scholarship Football Players.

CONCLUSION

It is a problem to draw any definite conclusions from the previous test scores. All the conditions were nearly the same with the exception of the zigzag run. Ideally, the zigzag run should be timed by one individual using the same stop watch. This would eliminate any differences in reaction time in the timers and any possible defective stop-watches.

Assuming the conditions were all equal the following conclusion was drawn from this study. The Kansas State Scholarship Football Players, on an average, rank favorably with the best motor ability available at Kansas State University. (Majority of physical education participants were freshmen)

Viewing the apparent differences in the scores one must keep in mind a few facts. The football players do keep in rigorous training for the better part of the year. If not for this fact they might not score as well.

The main difference in scores between the two groups was in the standing broadjump. The physical education classes' distances were better by 6.16 inches, on the average.

The football players as a whole did not average any better than the physical education classes in the medicine ball put. More players made longer puts than did the physi-

cal education group. The mean for both groups was identical in value, 66 points.

RECOMMENDATIONS FOR FUTURE TESTING

The author makes the following suggestions:

A demonstration should be given for each event to each group participating.

All testers should meet beforehand and decide upon specific methods of testing and recording. This would make the test more uniform and, therefore, more efficient.

This year, the physical education students were tested in their street clothes. Some had gym shoes and some did not. Some of the clothes were so tight as to be restrictive. To be more uniform, all students should be given the test while dressed in proper gym uniform.

If this comparison or one similar is undertaken, it would be recommended that listing of the heights and weights of the participants be included in the findings, thus presenting the factor of effect of body build on motor ability performance.

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

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APPENDIX

TABLE VIII

TEST SCORES FOR PHYSICAL EDUCATION CLASSES

Zigzag run		Standing Broadjump		Medicine Ball Put		Total Points
Time	Points	Dist.	Points	Dist.	Points	
20.7	79	9'6"	79	66'	90	248
19.6	86	8'6"	64	52'	68	218
22.0	70	9'	71	56'	75	216
20.2	82	8'6"	64	51.5'	68	214
24.5	54	9'2"	74	62.5'	85	213
20.4	81	8'9"	68	49'	64	213
21.4	74	8'5"	63	56.5'	75	212
22.6	67	8'10"	69	56'	75	211
20.5	80	8'8"	66	50'	65	211
21.5	74	8'7"	65	47.5'	72	211
20.5	80	8'8"	66	57'	65	211
20.9	78	8'11"	70	54.5'	61	209
21.5	74	8'2"	59	52'	76	209
21.1	76	8'4"	61	54.5'	72	209
22.5	67	9'2"	74	51.5'	68	209
21.2	76	8'3"	60	47'	72	208
21.0	77	8'5"	63	47.5'	68	208
19.8	84	8'4"	61	44.5'	61	206
20.2	82	8'5"	63	44.5'	61	206
20.5	80	8'9"	68	50.5'	57	205
20.7	79	8'2"	68	54.5'	57	204
20.6	79	8'3"	59	55.5'	66	204
21.8	72	7'8"	60	50.5'	72	204
20.7	79	8'2"	51	45'	74	204
20.6	79	8'2"	59	51'	66	204
20.2	82	8'6"	64	48.5'	57	203
21.2	76	8'3"	60	52'	67	203
20.4	81	8'2"	59	50'	63	203
21.7	72	8'5"	63	47'	68	203
20.6	79	8'2"	59	48.5'	65	203
20.2	82	8'3"	60	48.5'	61	203
21.1	76	8'6"	64	51'	63	203
21.4	74	8'8"	66	45.5'	63	203
21.6	73	8'5"	63	51'	67	203
20.3	81	8'5"	63	45.5'	68	202
20.5	80	8'3"	60	48'	62	202
19.8	84	8'	56	48.5'	62	202
20.4	81	8'7"	65	43.5'	55	201
21.5	74	8'1"	58	52.5'	69	201
21.4	74	8'5"	63	49.5'	64	201
20.7	79	7'11"	54	50'	67	201
19.9	84	7'9"	53	49.5'	64	201

TEST SCORES FOR PHYSICAL EDUCATION CLASSES

Zigzag Run Time	Points	Standing Dist.	Broadjump Points	Medicine Ball Put		Total Points
				Dist.	Points	
21.5	74	8'5"	63	49'	64	201
22.3	68	8'3"	60	53.5'	71	199
22.7	66	9'7"	80	43'	53	199
21.0	75	8'3"	60	49.5'	64	199
21.0	77	7'9"	60	48'	62	199
20.9	78	7'6"	53	52'	68	199
19.4	87	8'8"	49	48.5'	63	199
21.5	74	8'6"	67	45.5'	58	199
21.5	74	8'7"	64	47'	61	199
21.8	72	8'6"	65	48'	62	199
24.4	55	7'5"	64	59'	79	198
20.9	78	8'6"	48	54.5'	72	198
21.1	76	7'11"	64	45.5'	58	198
21.3	75	7'5"	55	52'	68	198
20.7	79	8'	48	53.5'	71	198
22.8	68	8'	56	55.5'	74	198
20.8	78	7'10"	56	49'	64	198
21.3	75	7'9"	54	52'	68	197
21	77	7'9"	53	51'	67	197
21.8	72	8'3"	60	50'	65	197

TABLE IX

TEST SCORES FOR SCHOLARSHIP FOOTBALL PLAYERS

Zigzag run Time	Points	Standing Dist.	Broadjump Points	Medicine Ball Put		Total Points
				Dist.	Points	
20.4	81	9'7"	80	58'	78	239
20.6	79	9'6"	79	58'	78	236
19.8	84	8'9"	68-	58.5'	78	230
19.6	86	8'11"	70	51.5'	68	224
20.2	82	8'5"	63	56'	75	220
21.5	74	8'9"	68	56.5'	75	217
20.6	79	8'2"	59	58.5'	78	216
19.8	84	8'4"	61	53.5'	71	216
20.5	80	8'	56	59'	79	215
20.8	78	7'10"	54	60.5'	82	214
21.6	73	7'11"	55	62'	84	212
22	70	8'7"	65	56.5'	76	211
20.8	78	8'4"	61	53.5'	71	210
19.8	84	8'4"	61	49.5'	64	209
20.5	80	7'9"	53	54.5'	73	206
22.2	69	8'	56	60'	81	206
21.1	76	8'4"	62	51'	68	206
20.3	81	8'8"	66	46'	59	206
21.1	76	7'9"	53	57'	76	205
21	77	7'6"	49	58.5'	79	205
20.6	79	7'4"	46	57'	76	201
20.8	78	8'3"	60	47.5'	62	200
21.8	72	8'8"	66	47'	61	199
21	77	8'5"	63	44.5'	59	199
21.4	74	7'10"	54	52.5'	70	198
21.5	74	7'8"	51	55'	73	198
22	70	7'8"	51	56.5'	76	197
22	70	8'	56	53'	70	196
22.2	69	8'2"	59	51'	68	196
22	70	7'7"	50	57'	76	196
22	70	7'8"	51	55.5'	75	196
21.3	75	7'6"	49	54'	71	195
21	77	7'10"	54	49'	64	195
22	70	8'	56	50.5'	67	193
21	77	7'10"	54	47'	61	192
21.4	74	7'4"	46	54	71	191
21.6	73	7'6"	49	51'	68	190
21.4	74	7'4"	46	52'	68	188
21.2	76	7'11"	55	44'	56	187
21.3	75	8'1"	58	43'	54	187
21.4	74	7'3"	45	50.5'	68	187
21.8	72	7'4"	46	52.5'	69	187

TEST SCORES FOR SCHOLARSHIP FOOTBALL PLAYERS

Zigzag run		Standing Broadjump		Medicine Ball Put		Total Points
Time	Points	Dist.	Points	Dist.	Points	
21	77	7'5"	48	47.5'	61	186
20	83	7'3"	45	44.5'	57	185
22	70	7'5"	48	49'	66	184
22	70	7'5"	48	50'	65	183
22.8	65	7'7"	50	52'	68	183
22	70	7'5"	48	48.5'	64	182
23.2	63	7'4"	46	55'	73	182
23.6	60	8'3"	60	47'	61	181
21	77	7'8"	51	42'	53	181
22.5	67	7'7"	50	49.5'	64	181
22	70	7'5"	48	47'	61	179
22	70	7'3"	45	49'	64	179
23.4	61	8'3"	60	45'	57	178
22.7	66	6'6"	34	58'	78	178
20.8	78	7'2"	44	44'	56	178
23.4	61	7'5"	48	50.5'	67	176
23.6	60	7'	41	55.5'	75	176
23	64	7'	41	49.5'	64	169
24	57	7'4"	46	42'	54	157
24.8	52	6'3"	30	52'	69	151

TABLE X
FREQUENCY TABLE FOR THE ZIGZAG RUN
PHYSICAL EDUCATION CLASSES

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>	<u>fd²</u>
19-19.4	1	4	4	16
19.5-19.9	4	3	12	36
20-20.4	8	2	16	32
20.5-20.9	16	1	16	16
<u>21-21.4</u>	<u>20</u>	<u>0</u>	<u>0</u>	<u>0</u>
21.5-21.9	5	-1	- 5	5
22-22.4	2	-2	- 4	8
22.5-22.9	4	-3	-12	36
23-23.4	0	-4	0	0
23.5-23.9	0	-5	0	0
24-24.4	1	-6	- 6	36
24.5-24.9	<u>1</u>	<u>-7</u>	<u>- 7</u>	<u>49</u>
	62		19	234

Best time---19.4 sec.

Median-----21.02 sec.

Mean-----21.04 sec.

Mode-----21 to 21.4 or 21.2 sec.

Standard deviation---.96

Range of middle 68%---20.06 to 21.98 sec.

Poorest time-----24.5 sec.

TABLE XI
FREQUENCY TABLE FOR THE ZIGZAG RUN
SCHOLARSHIP FOOTBALL PLAYERS

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>	<u>fd²</u>
19.5-19.9	4	4	16	64
20-20.4	4	3	12	36
20.5-20.9	9	2	18	36
21-21.4	17	1	17	17
<u>21.5-21.9</u>	<u>4</u>	<u>0</u>	<u>0</u>	<u>0</u>
22-22.4	13	-1	-13	13
22.5-22.9	4	-2	- 8	16
23-23.4	4	-3	-12	36
23.5-23.9	2	-4	- 8	32
24-24.4	1	-5	- 5	25
24.5-24.9	<u>1</u>	<u>-6</u>	<u>- 6</u>	<u>36</u>
	62		11	311

Best time---19.6

Median-----21.39

Mean-----21.69

Mode-----21 to 21.4 sec. or 21.2 sec.

Standard deviation---1.12

Range of middle 68%---20.27 to 22.51 sec.

Poorest time-----24.8 sec.

TABLE XII
FREQUENCY TABLE FOR THE STANDING BROADJUMP
PHYSICAL EDUCATION CLASSES

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>	<u>fd²</u>
9'6"-9'7"	2	7	14	98
9'4"-9'5"	0	6	0	0
9'2"-9'3"	2	5	10	50
9'0"-9'1"	1	4	4	16
8'10"-8'11"	2	3	6	18
8'8"-8'9"	7	2	14	28
8'6"-8'7"	10	1	10	10
8'4"-8'5"	10	0	0	0
8'2"-8'3"	14	-1	-14	14
8'0"-8'1"	4	-2	-8	16
7'10"-7'11"	3	-3	-9	27
7'8"-7'9"	4	-4	-16	64
7'6"-7'7"	1	-5	-5	25
7'4"-7'5"	2	-6	-12	72
	<u>62</u>		<u>-6</u>	<u>438</u>

Best jump----9'7"

Median-----8'4.10"

Mean-----8'4.31"

Mode-----8'2" to 8'3" or 8'2.5

Standard deviation---5.32"

Range of middle 68%---7'10.78" to 8'9.42"

Poorest jump-----7'5"

TABLE XV
 FREQUENCY TABLE FOR THE STANDING BROADJUMP
 SCHOLARSHIP FOOTBALL PLAYERS

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>	<u>fd²</u>
9'4"-9'7"	2	5	10	50
9'0"-9'3"	0	4	0	0
8'8"-8'11"	5	3	15	45
8'4"-8'7"	7	2	14	28
8'0"-8'3"	10	1	10	10
7'8"-7'11"	12	0	0	0
7'4"-7'7"	18	-1	-18	18
7'0"-7'3"	6	-2	-12	24
6'8"-6'11"	0	-3	0	0
6'4"-6'7"	1	-4	-4	16
6'0"-6'3"	1	-5	-5	25
	<u>62</u>		<u>10</u>	<u>216</u>

Best jump---9'7"

Median-----7'9.17"

Mean-----7'10.15"

Mode-----7'4"-7'7" or 7'5.5"

Standard deviation----7.44"

Range of middle 68%---7'1.73" to 8'4.61"

Poorest jump-----6'3"

TABLE XIV
FREQUENCY TABLE FOR THE MEDICINE BALL PUT
PHYSICAL EDUCATION CLASSES

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>	<u>fd²</u>
65-66	1	8	8	64
63-64	0	7	0	0
61-62	1	6	6	36
59-60	1	5	5	25
57-58	1	4	4	16
55-56	5	3	15	45
53-54	7	2	14	28
51-52	12	1	12	12
49-50	13	0	0	0
47-48	13	-1	-13	13
45-46	6	-2	-12	24
43-44	1	-3	-3	9
41-42	1	-4	-4	16
	<u>62</u>		<u>32</u>	<u>288</u>

Best put---66'

Median-----50.19'

Mean-----50.53'

Mode-----49'-50' or 49.5'

Standard deviation---4.18

Range of middle 68%---46.01 to 54.37'

Poorest put-----42'

TABLE XV
FREQUENCY TABLE FOR THE MEDICINE BALL PUT
SCHOLARSHIP FOOTBALL PLAYERS

<u>Scores</u>	<u>f</u>	<u>d</u>	<u>fd</u>	<u>fd²</u>
61-62	2	6	12	72
59-60	2	5	10	50
57-58	9	4	36	144
55-56	8	3	24	72
53-54	6	2	12	24
51-52	9	1	9	9
49-50	10	0	0	0
47-48	7	-1	-7	7
45-46	4	-2	-8	16
43-44	3	-3	-9	27
41-42	2	-4	-8	32
	<u>62</u>		<u>71</u>	<u>453</u>

Best put---62'

Median-----51.88'

Mean-----50.65

Mode-----49-50' or 49.5'

Standard deviation----4.90

Range of middle 68%---46.98 to 56.78'

Poorest put-----42'

A COMPARISON OF THE RESULTS OF THE BARROW
MOTOR ABILITY TEST SCORES OF ATHLETES
AND NON-ATHLETES

by

JERRY WAYNE FRASER
B.S., Kansas State University, 1965

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

1966

During the course of his work, every student at Kansas State University is required to take two semesters of physical education. Due to the short time the physical education department has to help develop the student, a motor ability test is administered to find the needs of each individual. The Barrow Motor Ability Test is chosen for several reasons.

The barrow Motor Ability Test is a three-battery test consisting of a zigzag run, standing broadjump, and medicine ball put. The test was developed by Mr. Harold M. Barrow for partial fulfillment for a Doctor's degree of Physical Education.

This study has compared the test scores of the best scores recorded by the required physical education classes and the scholarship football players at Kansas State University.

The area for testing was the Ahearn Field House gymnasium area. The test was administered to the classes by the physical education staff during the first week of the fall semester. The same test was administered to the football players on the afternoon of March 24, 1966.

In the zigzag run the physical education class had the best mean by .65 of a second. Their mean time was 21.04 and the mean time for the scholarship football players was 21.69 seconds.

The standing broadjump showed the largest difference

of any of the three events. The mean for the physical education classes was 8'4.31". The mean for the football players was 7'10.15". This showed a difference of 6.16" in favor of the physical education classes.

The mean score in the medicine ball put was an identical 66 points. The mean for the physical education classes was 50.53 feet and the mean for the football players was 50.65 feet. This gave the football players a .12 foot advantage. The football players had more participants putting the ball farther than the mean distance.

By applying the times and distances to norms made up for the test the total scores are determined. The mean score for the physical education classes was 205 points. The mean score for the scholarship football players was 13 points less at 192 points.