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The Effect of One Semester of Physical Education on Male Freshmen and Sophomores at Yankton College

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THE EFFECT OF ONE SEMESTER OF PHYSICAL EDUCATION ON MALE FRESHMEN AND SOPHOMORES AT YANKTON COLLEGE

BY

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CHAPTER I

INTRODUCTION

The physical fitness of the men, women, and children of the United States is, and should be, an item of great concern to every member of our population. This important phase of our lives is receiving a great deal of attention today. This increased interest in physical fitness is evident in all walks of life, from our nation's leaders to the man in the street.

The startling results of the Kraus-Weber test, which indicated a low state of fitness among American children as compared with European children, have played an important role in drawing attention to the apparent weakness of our population.[1] As a result, school men in general, and physical educators in particular have been called on to try to alleviate the situation. The trend in physical education today seems to be one toward emphasis on building the strength and endurance of our students so that they will be possessed of the power and vigor to lead normal, healthy lives in today's fast moving world.

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[1] Hans Kraus, Ruth Hirschland, "Minimum Muscular Fitness in School Children", Research Quarterly, vol. 25, 178-187, American Association for Health, Physical Education, and Recreation: Washington, D. C., May, 1954.

Statement of the Problem

The purpose of this investigation was to determine the effect of the required physical education service program at Yankton College on the male college freshmen and sophomores.

Sub-problems

1. To administer a selected test of strength and endurance at the start of the second semester and record the results.

2. To retest the same students with the same test at the completion of the semester and record the results.

3. To treat the results statistically by computing the means, the difference between the means, and the significance of the difference between the means.

4. To establish a total fitness score for each student.

Delimitations

1. This research was limited to the examination of 88 college freshmen and sophomores at the beginning and end of the second semester of required physical education during the 1958-1959 school year.

2. The study was limited to the administration of the Navy Standard Test of Physical Fitness which consists of five items.

3. No attempt was made to limit or control the conduct of the subjects outside of class. Control over diet, amount of sleep, dissipation habits, or other items which might concern personal health was not exercised.

4. The program was interrupted for vacations twice during the second semester. The physical education facilities were not available for classes due to a high school basketball tournament during the fifth week, and spring vacation which took two periods during the eighth week.

5. No attempt was made to determine the effect of motivation on the test scores. It should be noted, however, that the fullest cooperation and effort was evident during the testing phases as well as the activity phases of this study.

Need For the Study

Every freshman and sophomore boy and girl who registers at Yankton College is required to participate in the physical education service courses for two years unless excused for reasons of a medical nature. This activity is designed to play its role along with the other course offerings in developing the individual. This means that each phase of our educational system must make its contribution to the total growth of the individual.

Bucher defines physical education as follows:

> Physical education, an integral part of the total education process, is a field of endeavor which

> has as its aim the development of physically, mentally, emotionally, and socially fit citizens through the medium of physical activities which have been selected with a view to realizing these outcomes.[2]

If this definition is accepted physical education is capable of making this broad contribution. Every phase of the education program must from time to time be examined and evaluated to determine the extent of its contribution. The writer has endeavored to make a partial evaluation of the physical education service program through an observance of the changes in physical fitness which may have taken place as a result of participation in this program. It is to be hoped that the results of this testing program will furnish information which will lead to the improvement of the program offered.

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[2]Charles A. Bucher, Foundations of Physical Education, p. 28, The C. V. Mosby Company: St. Louis, 1956.

CHAPTER II

REVIEW OF RELATED LITERATURE

During periods of national stress, such as World Wars I and II, great emphasis has been placed on the physical fitness of the nation's population. Recent developments in the cold war with Russia have brought about an interest which closely resembles the "war fitness fever." As a result there is considerable agitation to have physical education programs geared primarily to improving physical fitness. Ellis Champlin had this to say along that line:

> We must base all physical education programs and methods on tests of physical fitness, and adapt the physical fitness program to each pupil's needs thus determined. We must retest to measure pupil progress, determine the value of programs, and modify future activity as needed.[3]

Physical educators, however, have needed little impetus to encourage them to test and retest to determine the contribution of various types of physical activity to physical fitness.

In 1941 Hughes made a study of University of Michigan summer school students. His aim was to observe changes in physical performance ability resulting from a controlled program of physical activities. The experimental group for

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[3]Ellis H. Champlin, Essential Program Procedures for the Development of Fitness, Mimeographed speech, National Physical Education Convention, Kansas City, Missouri, 1958.

the test numbered 1141, and was comprised of a seemingly normal sample of university students. Hughes included the following test items in his initial test:

1. Standing height
2. Weight
3. Right grip
4. Left grip
5. Pull-ups
6. Push-ups
7. Vertical jump
8. Standing broad jump
9. 60 yard sprint
10. 440 yard sprint

Following a two month period, during which a wide variety of physical activities were performed, a retest was made. The following conclusions were presented:

1. Physical performance was markedly improved.

2. The entire group showed a gain in total efficiency.

3. Improvement in terms of percentages was not less than twenty per cent.

Mean scores on push-ups and pull-ups, which are items used in the writer's study, showed respective gains, in number of repetitions, of 5.25 and 2.85 respectively.[4]

Sills, in a similar study, experimented with thirty-three male freshmen who had low physical fitness scores. This group was placed in a special conditioning program for one semester. A random sample of the freshman class was selected as a control group, and went through the same program. When the results were tabulated, both groups showed

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[4]Byron Hughes, "Test Results of the University of Michigan Physical Conditioning Program", Research Quarterly, vol. 13, 498-512, American Association for Health, Physical Education, and Recreation: Washington, D. C., 1942.

substantial increases. The low fitness group improved an average of seventeen points as compared with an average improvement of eleven points by the control group.[5]

Landis conducted an investigation which generally followed the lines of the previously mentioned studies. He used the Larson Test of Motor Ability and a modification of the Air Force PFR Test to determine variations in motor fitness of college freshmen due to a planned program of physical education activities. His testing program revealed a significant gain in physical fitness for 7 out of the 8 test groups which were involved. These groups were divided so that a varied program of physical activities could be evaluated. Activities included were: a general conditioning program, tumbling, swimming, boxing, tennis, volleyball, wrestling, and gymnastics. The groups participating in the conditioning program, wrestling, and tumbling exhibited gains in the pull-ups which were significant at the 1 per cent level of confidence. Those who participated in weight training showed a gain which was significant at the 5 per cent level. Wrestling, conditioning, tennis, volleyball, and tumbling participants showed gains in the sit-ups which were significant at the 1 per cent level of confidence.

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[5] Frank Sills, "Influence of Physical Education Activities on Motor Ability and Physical Fitness of Male Freshmen", Research Quarterly, vol. 25, 333-337, American Association for Health, Physical Education, and Recreation: Washington, D. C., October, 1934.

Weight training, usually credited with a high degree of efficiency in building strength and endurance, provided the least improvement in sit-up scores of any activity. The general conclusions presented were that all groups showed mean gains. Tumbling and gymnastics were the only activities which exhibited mean gains in every activity, while tennis, swimming, and boxing showed the least total improvement.[6]

Cureton administered the Larson Strength Test, consisting of the following items: chinning, dipping, and vertical jump; to two thousand six hundred male physical education students at the University of Illinois. Findings indicated an increase in the composite test score of 6.7 per cent over a two year testing period. Chinning showed a rather unusual increase of 27.95 per cent. The increases were attributed, at least in part, to a concomitant conditioning program in physical education.[7]

The United States Navy measured the improvement in general fitness of recruits, personnel of service schools,

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[6]Carl W. Landis, "Influences of Physical Education Activities on Motor Ability and Physical Fitness of Male Freshmen", Research Quarterly, vol. 26, 295-307, American Association for Health, Physical Education, and Recreation: Washington, D. C., October, 1955.

[7]Thomas K. Cureton, "Improvement in Motor Fitness Associated with Physical Education and Physical Fitness Clinic Work", Research Quarterly, vol. 14, 154-157, American Association for Health, Physical Education, and Recreation: Washington, D. C., May, 1943.

and members of the V-12 training program in a study in which records were kept on six hundred fifty thousand men. The test used was the Navy Standard Test of Physical Fitness, which was the same one employed in the present investigation. Results showed an increase in Physical Fitness Scores from forty-one to fifty-one, or a gain of twenty four per cent. Although a close record of activities was not kept, (activities were not standard for the groups) this evidence seems to substantiate the hypothesis that improvement in physical fitness through vigorous muscular activity is possible.[8]

In a ten year study of ten thousand Yale University freshmen during the years 1947 to 1956, definite improvement in physical fitness according to a pre-established set of minimum standards was noted. One pertinent finding of this study was that strength of abdominal flexors increased at a much more rapid rate than did flexors and extensors of the arms.[9]

Summary

A review of literature brings out several implications which are pertinent to this study. They are as follows:

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[8] Education for Victory, vol. 2, 118, "Improvement in Physical Fitness", U. S. Office of Education: Washington, D. C., May, 1944.

[9] Erwin T. Blesh, Alfred E. Scholz, "Ten Year Study of Physical Fitness at Yale University", Research Quarterly, vol. 28, 321-326, American Association for Health, Physical Education, and Recreation: Washington, D. C., December, 1957.

1. All the studies reviewed followed the "single group method" which was followed in this study.

2. The physical fitness tests involved in the studies contained many of the items used in this study.

3. There was a general similarity in the activities employed in the various research projects examined and the program administered by the writer.

4. Gains in general physical fitness were noted in every study reviewed.

CHAPTER III

PROCEDURES

Source of Data

The subject group for this study consisted of eighty-eight Yankton College freshmen and sophomores. All were enrolled in the required physical education service program. As no attempt was made to select the participants according to any set criteria, the group was heterogeneous in nature. Physical activity backgrounds varied from boys who participated actively in college football to students who had had practically no connection with physical education in their lifetime. Most of the subjects, although not participating in college athletics, had had some experience in high school athletics. The eighty-eight students who completed both phases of the testing program were the only ones considered in this study. Six class members dropped during the course of the semester.

The Physical Education Program

Instructors in the class procedures at Yankton College were the writer and the director of physical education. The director met with classes on Monday and Wednesday at 7:45 a.m. and 8:40 a. m. The writer met his classes on Monday and Wednesday at 1:00 p. m. and 1:55 p. m. Classes were fifty minutes

in duration. Students were allowed two unexcused absences per semester according to school regulations.

The second semester was eighteen weeks in length, but four class periods in physical education were given up to other activities as previously explained. The first two periods of the semester were set aside for testing and orientation and the last two periods for testing.

Activities for the second semester included badminton, weight training, basketball, and softball. The students were divided into groups within their classes and rotated from activity to activity on a four weeks basis. The only exception to this schedule was that all class members engaged in softball the final four weeks of the term.

The group participating in weight training followed a careful warm up procedure for each workout. Instruction consisted of lecture and demonstration of weight training techniques. Each student had an individual work out sheet. He was required to work through his series of exercises each class period, always attempting to increase the number of repetitions from eight to twelve. When he was able to perform his exercise twelve times, he was instructed to increase the weight and go back to eight repetitions.

Players, engaged in the badminton units, always preceded their activity with mild warm up exercises. The unit plan in badminton included learning of rules, fundamental shots, and basic strategy for doubles and singles play.

The time was about evenly divided between practice on basic skills and actual competition.

Calisthentics were administered to the basketball and badminton groups at the same time. Following this basic warm up, the students participating in basketball were given fundamental instruction. Passing, dribbling, and shooting drills designed to develop skills and improve condition were employed. In the later stages of the unit teams were organized for competition.

In the late spring softball was introduced as an outdoor activity. This was carried on largely on a competitive basis. Basic instruction was given on rules and strategy, but little time was spent on the development of skills.

Administration of Tests

The Navy Standard Test of Physical Fitness was administered at the beginning of the second semester and the results were recorded on a standard record form. From these scores a composite physical fitness score was determined. The subjects were retested at the end of the semester, the scores were recorded, and a physical fitness score was determined.

In making selection of a test, the following criteria were considered:

1. The test must be one which could be administered

with a minimum of equipment.

2. The test should be one which could be administered successfully to a large group by one individual.

3. The test should be one which would give an accurate picture of the strength, endurance, and agility of the subjects.

On the basis of these factors the Navy Standard Physical Fitness Test was selected. Another factor in the selection of this test was that the writer was familiar with the test, having been a subject in Marine Corps training, and having engaged in a previous study of the test.

The Navy Standard Physical Fitness Test is comprised of five items which are as follows:

1. A sixty second timed squat thrust (Burpee) test, which is a test of large muscle speed, power, and agility.

2. Sit-ups, which are a test of the strength and endurance of the abdominals.

3. Push-ups, which test the strength and endurance of the extensors of the arms and the shoulder girdles.

4. Squat jumps, which test the strength and endurance of the leg muscles.

5. Pull-ups, which test the strength and endurance of the flexors of the arms and the shoulder girdle.

The Navy was the first branch of the service to develop, standardize, and use extensively a physical

fitness test.[10] The items in the test were selected to measure qualities of muscular strength and endurance, and cardio-respiratory endurance.[11]

As originally set up, the test was designed to accomplish the following:

1. Determine the fitness of the men at the beginning of their training.

2. Provide information that would aid in adapting the physical fitness program to the individual needs of the men.

3. To motivate the men toward a higher level of fitness.

4. To measure the progress of the men after being in service a specified length of time.

5. Provide means of measuring the fitness of Navy personnel engaged in one activity as compared with those in others.

6. To determine whether or not the physical fitness program is accomplishing the desired results.[12]

Since the test was designed to be administered aboard ship, it could be easily administered in the gymnasium. The only equipment required for administration of the test was

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[10]Harrison Clarke, The Application of Measurement to Health and Physical Education, pp. 178-179, Prentice Hall Company: New York, 1958.

[11]Leonard Larson, Rachael Yocum, Measurement and Evaluation in Physical Health and Recreation Education, p. 165, C. V. Mosby Company: St. Louis, 1951.

[12]Harrison Clarke, The Application of Measurement to Health and Physical Education, pp. 178-179, Prentice Hall Company: New York, 1958.

a stop watch and a bar for pull-ups. The only other equipment used in the study was a mimeographed score sheet.

Although there has been no statistical data published for validation of the Navy Standard Physical Fitness Test, the inclusion of the component items in other recognized tests would seem to support the theory that they are accurate tests of strength and endurance.

The squat thrust, or Burpee, has enjoyed general acceptance as a test of agility, muscular coordination, and endurance. This test, introduced by Royal H. Burpee, has been widely used in military physical fitness tests, the Navy being the first to incorporate it.[13]

The sit-up has been used frequently as an item in physical fitness tests as well as in physical conditioning programs. It is considered to be a good measure of the strength and endurance of the abdominal muscles, and it carries reliability and objectivity coefficients of 0.80 and 0.90.[14]

The squat jump is a fair measure of strength and endurance of the leg muscles.

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[13] Measurement and Evaluation in Health, Physical Education and Recreation, pp. 53-57, American Association for Health, Physical Education, and Recreation: Washington, D. C., 1950.

[14] Larson, op. cit., p. 163.

Pull-ups, or chins, and push-ups give a good indication of the strength and endurance of the flexors and extensors of arms and the shoulder girdle. Chinning is a very reliable measure of power of flexion, having a coefficient of reliability and objectivity of 0.90.[15]

In administration of some of the tests student assistance was used. Students were paired up and they counted and recorded scores for each other. This was supervised by the instructor. In the timed event, the squat thrust, the timing was done by the instructor and the counting was done by the student partners. Groups were small enough so that this practice seemed very practical and quite accurate.

During the first orientation period students were briefed on the testing program which was to be followed. The test items were explained and demonstrated, and a short practice period was allowed. Testing proceded on the second day following the directions set forth for the test which are:

> STEP I: Squat Thrusts: (A) Starting position "Attention." (B) Squat and place hands on floor 8 inches in front of feet. (C) Thrust feet backward, arms straight, legs and back straight. (D) Return to position B. (E) Return to position of "attention." Count 1 point for each full squat thrust. Deduct one point if: hands are not placed within 8 inches of feet; feet start backward before hands are on floor; hips are above shoulder line when feet are in back; subject does not completely straighten on E, the fourth count. PERFORM AS MANY AS POSSIBLE IN ONE MINUTE.

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[15] Ibid.

STEP II: Sit-ups: (A) Subject on back, legs straight, feet twelve inches apart, and hands clasped behind head. Partner holds feet firmly to the floor. (B) Raise trunk, touch right elbow to left knee. (C) Lower trunk to floor. (D) Raise trunk, touch left elbow to right knee. Deduct one point if subject: unclasps hands from head; rests on floor; keeps knees bent at any time. PERFORM AS LONG AS POSSIBLE.

STEP III: Push-ups: (A) Subject starts face downward, hands on floor at sides of shoulders, fingers pointed forward, toes resting on floor. Extend arms, raise body from floor. Lower body until chest touches floor. Score 1 point for each complete push-up. No score if: arms are bent at top of movement; any part of body touches floor other than hands, chest or toes, and straight shoulder-hip-foot line. PERFORM AS LONG AS POSSIBLE.

STEP IV: Squat jumps: (A) Stand with hands clasped, palms down on top of head, feet from 4 to 6 inches apart, heel of left foot on line with toes of right foot. (B) Squat on right heel. (C) Spring into air, body and legs straight, and interchange feet position. (D) Drop to squat on left heel. (E) Spring into air, body and legs straight, and interchange feet position. Score 1 point for each spring into air. No score if: squat is incomplete; no leg interchange; hands removed from head; subject fails to straighten in air. PERFORM AS LONG AS POSSIBLE.

STEP V: Pull-ups: (A) Hang from bar, palms outward, thumbs under bar, feet above floor. (B) Pull up so that chin is over bar. (C) Return to full hanging position, arms fully extended. Score 1 point each time chin comes above bar. No score if: chin does not get above bar; arms are not straight on hang. No swinging or kipping allowed. PERFORM AS LONG AS POSSIBLE.[16]

The same testing procedure was followed in the second administration of the test at the end of the semester.

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[16]Larson, loc. cit., p. 177.

Scores were recorded on a mimeographed record sheet. (Appendix A)

CHAPTER IV

ANALYSIS OF DATA

It was not possible to average raw scores due to the difference in units of measure. For this reason it was necessary to compute standard scores for the component items of the test and for the Physical Fitness Score. T-scores for the Navy Standard Test of Physical Fitness were obtained from Table XXCIX in Larson's Measurement and Evaluation in Physical Health and Recreation Education.[17] Test instructions set forth a minimum Physical Fitness Score of fifty (on the basis of T-scores) as an indication of acceptable physical condition. With this information it was possible to draw some conclusions as to the fitness of the individual subjects.

Since the problem in this study was to determine the effect of the physical activities on the individuals, the test results were treated statistically. The experimental design was the single group method and it was therefore necessary to compute the means, the difference between the means, and the significance of these differences. The

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[17] Larson, loc. cit., pp. 483-485.

standard error of the means was determined through the use of the following formula:[18]

$$SE_D = \sqrt{\sigma^2_{M_1} + \sigma^2_{M_2} - 2r\,\sigma_{M_1}\sigma_{M_2}}$$

The device used for determining the significance of the difference was the "t" value, which was computed by dividing the difference in the means by the standard error of the difference.

The null hypothesis was applied in each case. With eighty-seven degrees of freedom (N-1) a "t" value of 1.66 was needed for significance at the five per cent level of confidence, and 2.38 for significance at the one per cent level.[19] The one tailed test of significance was applied under the assumption that any change in physical fitness due to the physical education service program would be positive.

In Table I may be found the "t" values computed from the results of the various test items. From observing this table it may be seen that the "t" values for all the items excepting the pull-up are far above those required for significance at either the five per cent or the one per cent level. The null hypothesis must therefore be rejected in

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[18]Henry E. Garrett, Statistics in Psychology and Education, pp. 226, Longmans, Green and Company: New York, 1958.

[19]Ibid., p. 427.

the case of the squat thrusts, sit-ups, push-ups, and squat jumps and a true improvement assumed.

TABLE I. DIFFERENCES BETWEEN THE MEANS, STANDARD ERROR OF THE DIFFERENCES, AND "t" VALUES COMPUTED FROM THE RESULTS OF THE PHYSICAL FITNESS TESTS

Item	M(i)	M(f)	Diff.	σ_d	"t"
Squat thrust	49.60	60.29	10.69	1.21	8.83
Sit-up	52.05	55.23	3.18	1.06	3.00
Push-up	43.92	48.81	4.89	1.00	4.87
Squat jump	49.15	59.55	10.40	1.36	7.65
Pull-up	41.65	41.48	-0.17	0.71	0.24
PFS*	47.50	52.79	5.29	0.65	8.74

*Physical Fitness Score.

In the case of the pull-ups, however, the "t" value was too small to be significant at either the one percent or five per cent level, and the null hypothesis was accepted.

The "t" value of 8.74 for the improvement in Physical Fitness Score was of such magnitude that it seems probable that a very real gain in total physical condition occurred during the time of this experiment.

CHAPTER V

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

Summary of Study

This study was conducted to determine the effects of a physical education service program on the physical fitness of college students. Physical fitness was determined at the beginning and end of the second semester through administration of the Navy Standard Physical Fitness Test. Subjects for the test consisted of eighty-eight freshmen and sophomore physical education students at Yankton College. A close record of the program was kept. After the data had been gathered, it was treated by standard statistical means to determine the means, difference in the means, standard error of the difference, and the "t" values.

Conclusions and Implications

From the data compiled in this study the following conclusions have been drawn:

1. The students examined in this research showed a definite improvement in physical fitness during the period of the study.

2. Arm strength, as indicated in the pull-up item, did not increase. It seems likely that more activities designed to strengthen arm flexors should be incorporated into the physical education program.

3. The mean score for physical fitness on the initial test (47.50) was below the standard established by the Navy (50.00). This would seem to indicate a definite need for activities designed to improve physical condition.

4. The testing served to help in the evaluation of the physical education program. The testing program should be continued and expanded to aid in more scientific planning of the physical education curriculum.

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APPENDIX

APPENDIX A

NAVY STANDARD PHYSICAL FITNESS TEST RECORD FORM

RECORD OF EVENTS	NUMBER	POINTS	NUMBER	POINTS
1. Squat-thrusts				
2. Sit-ups				
3. Push-ups				
4. Squat-jumps				
5. Pull-ups				

TOTAL POINTS				
Total points divided by 5 gives PFS				
Gain in PFS				
Instructor's initials				
Judge's initials				
Recorder's initials				

Total points (from scoring tables) divided by 5 gives the P.F.S. or Physical Fitness Score. The goal for good condition should be 50 or above.

See Point Scoring Table to get points for each of events completed.

APPENDIX B

RAW SCORES

Navy Standard Physical Fitness Test

Case Number	Squat Thrusts		Sit-ups		Push-ups		Squat Jumps		Pull-ups		Physical Fitness Scores	
	(i)	(f)	(i)	(f)	(i)	(f)	(i)	(f)	(i)	(f)	(i)	(f)
1	18	22	32	30	11	28	13	32	7	4	29	42
2	22	28	50	42	36	37	40	42	8	9	52	55
3	26	32	63	80	28	33	31	34	11	11	53	59
4	24	30	50	56	21	23	28	39	4	2	43	47
5	22	27	40	42	16	18	29	43	2	3	37	44
6	24	30	50	60	20	20	28	37	3	3	41	47
7	26	31	50	130	29	43	27	45	6	7	47	63
8	31	34	31	38	25	35	12	30	8	8	41	53
9	26	30	30	40	30	28	47	60	5	3	48	51
10	28	34	31	35	20	21	35	42	6	6	44	46
11	35	34	60	65	32	35	105	90	11	11	67	67
12	30	31	38	34	22	25	22	40	8	11	45	52
13	30	25	40	31	12	20	20	30	2	2	35	38
14	29	28	20	27	20	20	20	34	6	6	38	43
15	19	35	35	31	20	21	24	45	11	13	45	54
16	19	29	25	24	12	15	36	47	8	9	37	45
17	25	28	20	19	10	14	19	25	5	5	30	36
18	25	30	43	74	15	26	32	45	6	3	42	52
19	34	34	42	70	42	45	33	40	12	15	59	65
20	18	29	28	32	4	8	20	32	1	1	23	34
21	28	30	44	45	35	31	28	52	6	6	49	54
22	28	35	30	31	19	25	27	50	6	6	42	52
23	31	30	76	56	44	38	51	47	6	6	61	56
24	31	30	40	44	25	28	21	30	6	7	45	50
25	37	39	20	30	50	31	50	70	8	7	58	59

*(i) - refers to initial test
(f) - refers to final test

Navy Standard Physical Fitness Test (Continued)

Case Number	Squat Thrusts		Sit-ups		Push-ups		Squat Jumps		Pull-ups		Physical Fitness Scores	
	(i)	(f)	(i)	(f)	(i)	(f)	(i)	(f)	(i)	(f)	(i)	(f)
26	31	30	50	37	35	29	55	42	6	6	57	51
27	15	31	31	45	17	25	20	41	11	7	36	52
28	23	24	32	34	10	12	18	21	2	3	29	33
29	32	33	35	30	25	28	50	60	6	5	52	53
30	39	38	50	51	60	57	31	38	6	8	60	63
31	34	37	40	50	39	40	62	94	13	14	63	70
32	30	30	33	31	18	19	30	35	9	7	46	45
33	21	34	25	29	20	18	40	44	4	2	40	44
34	24	29	34	40	16	21	24	34	2	4	35	45
35	21	28	31	32	19	20	29	40	6	7	39	46
36	25	29	30	31	26	30	32	31	3	3	42	41
37	25	35	31	40	30	40	25	48	11	11	47	61
38	32	31	50	37	10	12	35	38	5	6	44	44
39	28	35	40	32	22	18	26	40	6	7	44	49
40	27	44	35	46	20	25	21	50	5	5	40	59
41	30	30	62	60	29	32	36	42	5	7	52	55
42	18	29	30	34	15	16	28	28	1	3	32	39
43	22	29	30	30	25	35	12	25	1	0	31	39
44	22	31	30	35	14	18	24	36	6	6	36	46
45	28	31	20	29	15	21	47	58	6	7	42	60
46	29	32	30	28	20	30	30	47	7	7	44	52
47	32	33	30	38	44	46	56	50	5	7	56	58
48	28	32	50	62	19	22	36	50	5	6	46	54
49	27	37	37	45	20	26	50	54	9	9	49	58
50	33	34	75	84	40	43	61	61	14	14	67	69
51	30	30	31	38	24	21	43	40	8	9	50	50
52	28	36	53	87	22	27	30	42	3	5	45	58
53	17	21	25	27	12	20	27	35	3	3	31	38
54	29	30	40	41	22	19	27	32	8	7	46	46
55	25	31	31	30	17	15	22	45	1	2	34	42

*(i) - refers to initial test
(f) - refers to final test

Navy Standard Physical Fitness Test (Continued)

Case Number	Squat Thrusts		Sit-ups		Push-ups		Squat Jumps		Pull-ups		Physical Fitness Scores	
	(i)	(f)	(i)	(f)	(i)	(f)	(i)	(f)	(i)	(f)	(i)	(f)
56	30	37	31	40	25	27	45	62	9	8	51	57
57	34	34	60	69	40	48	40	48	9	9	61	64
58	31	42	31	37	21	35	30	56	7	4	46	59
59	22	29	40	45	20	30	30	30	7	7	42	50
60	26	30	20	22	15	30	30	40	3	6	35	48
61	26	39	50	65	25	33	50	75	10	14	53	69
62	28	30	37	35	24	17	25	41	8	7	46	47
63	35	35	50	53	40	42	40	48	4	5	56	59
64	29	32	26	32	21	27	20	36	4	4	39	47
65	25	27	47	44	13	17	27	30	4	4	39	43
66	31	39	50	70	20	28	36	39	8	8	50	60
67	34	37	39	45	24	20	32	44	10	10	52	55
68	28	29	55	58	32	34	56	60	5	5	55	56
69	31	31	50	51	24	29	50	50	5	7	52	55
70	42	40	60	51	30	30	58	45	4	5	62	59
71	42	38	101	110	40	26	103	78	11	11	76	68
72	25	34	25	30	22	25	30	45	8	10	43	63
73	29	36	30	40	19	26	30	44	9	10	45	56
74	27	35	26	31	21	26	35	42	3	3	41	49
75	33	36	47	40	27	22	35	41	2	3	48	49
76	36	31	50	90	34	35	103	83	16	17	69	69
77	35	34	40	46	40	48	50	58	11	11	60	64
78	38	34	88	63	61	46	62	56	8	10	68	65
79	22	31	32	48	14	20	33	38	5	7	38	49
80	24	31	44	55	22	24	28	30	6	3	43	57
81	30	33	30	30	16	24	23	37	5	5	39	48
82	26	32	41	34	47	35	32	38	6	8	51	53
83	33	33	35	45	30	40	36	61	17	18	57	65
84	34	39	32	42	32	48	43	70	6	6	53	64
85	28	27	50	61	17	21	24	41	0	0	35	42

*(i) - refers to initial test
(f) - refers to final test

Navy Standard Physical Fitness Test (Continued)

Case Number	Squat Thrusts		Sit-ups		Push-ups		Squat Jumps		Pull-ups		Physical Fitness Scores	
	(i)	(f)	(i)	(f)	(i)	(f)	(i)	(f)	(i)	(f)	(i)	(f)
86	39	38	50	54	60	50	50	52	13	11	69	66
87	26	31	50	62	36	36	49	46	10	4	56	56
88	31	34	51	52	17	21	31	40	3	4	44	51

*(i) - refers to initial test
(f) - refers to final test