

THIS REPORT HAS BEEN DELIMITED
AND CLEARED FOR PUBLIC RELEASE
UNDER DOD DIRECTIVE 5200.20 AND
NO RESTRICTIONS ARE IMPOSED UPON
ITS USE AND DISCLOSURE.

DISTRIBUTION STATEMENT A

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION UNLIMITED.

UNANNOUNCED

Category 3

②
mc

RESEARCH MEMORANDUM

NUMBER 56-18

July 1956

B951353

DDC FILE COPY.

RELEASED

DATE 130 June 1956

CONSTRUCTION OF THE
TESTS OF PHYSICAL SKILL AND STAMINA, PSS-1 (DOL-1), PT 3143
A-3-288-21

THIS PAGE IS BEST QUALITY REPRODUCTION
FROM COPY FURNISHED TO DDC

DDC
RECEIVED
DEC 31 1979
RECEIVED

A

69 12 19 129

PERSONNEL RESEARCH BRANCH

PERSONNEL RESEARCH AND PROCEDURES DIVISION, TAGO

UNANNOUNCED

14 AGO-PRB-RM-56-18

9 Research Memorandum 56-18

6 CONSTRUCTION OF THE TESTS OF PHYSICAL SKILL AND STAMINA, PSS-1 (DOL-1), PT 3143, A-3-288-21.

127

I. INTRODUCTION

11 Jul 56

The popular concept of a soldier has for ages been that of a man in robust health with great physical stamina and rugged endurance. A combat soldier's life in war time is rugged ("mud, lice and kilometers"). Whatever physical stamina means for modern combat soldiers also applies to the leader of such soldiers--he must share the hardships of the field soldier as well as lead them.

Research by the Staff at the United States Military Academy suggested that measures of physical proficiency were closely related to the Aptitude for Service Rating (ASR--a composite of ratings by tactical officers and by fellow cadets), which in turn predicted future performance of the cadets as officers. Accordingly in 1947 and 1948, a series of studies of these relationships was made by Personnel Research Branch (integrated summary of these studies is presented in 17). Several physical proficiency batteries along with other variables were examined. In one of these studies, efficiency ratings on WD AGO Form 67-1 was used as a criterion; in another, rating on combat performance in Korea was used as the criterion. Both studies showed that the best USMA predictors of future effectiveness as company grade officers were: (1) Aptitude for Service Rating, (2) Physical Education Course Grade, (3) Conduct, and (4) Tactics Course Grade.

The USMA has for many years stressed the development of physical stamina and presence as well as academic achievement. The selection process for entrance to the Academy included, among other requirements, rigid standards on a physical (medical) examination. During the years of WW II, a minimum standard of physical efficiency was added to the selection requirements in order to insure that graduates could meet severe requirements of combat. In spite of more stringent physical requirements at entrance and lengthy physical training after admission, some candidates could not meet the Academy's minimum standard for the senior year and were discharged because of physical ineptitude. To prevent this type of attrition by denying admission to physically inadequate candidates, additional work on physical efficiency for selection purposes was initiated. A preliminary entrance battery of nineteen tests was developed by the Academy. PRB assisted in evaluating this and subsequent batteries and as a result made certain recommendations for an abbreviated battery. Such a revised battery is now operational.

Approved for	
THIS GALT	
DU TAB	
Unannounced	
Classification	
Distributive/	
Availability Codes	
Available/or	
Special	

003650

II. OBJECTIVES OF THIS PROJECT

From the above observations, it is concluded that physical characteristics are important in leadership situations, particularly in Army officer assignments. However, physical requirements may not be equally important in all assignments and perhaps even irrelevant in some few assignment areas. The objective of Branch Program A-3-288-20 is the construction of tests and techniques to predict the success of Army officers in particular leadership areas. It is therefore appropriate that some tests of physical skills and stamina be included in a predictive battery. It may be that successful officers are above the average of the civilian population in certain physical qualities, and further, that in some MOS's the need for such qualities is of much greater importance than in others.

The selection or construction of tests measuring physical skills and stamina which are useful as predictors of military leadership was the objective of the present project. The tests were to be capable of differentially predicting success in the leadership areas chosen for study (18).

III. METHOD AND RESULTS

A review of the pertinent literature failed to reveal any reference, outside of military studies, to the use of physical effectiveness variables (other than stature and weight) as predictors of leadership. However, in the literature dealing with military leadership, there is such a plethora of reference to specific tests when discussing the relationship between gross muscular proficiency and leadership, that for present purposes it became a task of selecting appropriate ones from among those available.

The physical skills and stamina predictor variables selected in this project can be divided into three categories.

1. Gross muscular performance
2. Physiological measurements
3. Fine muscle and eye-hand coordination

A. TESTS OF GROSS MUSCULAR PERFORMANCE

It is hypothesized that tests in this category should discriminate between performance in the more sedentary and in the more physically active leadership areas--perhaps, more specifically, between the "tactics" area(s) and others. Discriminating tests, therefore, should reflect:

1. Endurance
2. Strength (Power)
3. Balance
4. Agility
5. Flexibility

A large number of PRB reports were examined. Guidance was provided by previous studies describing: the correlation of 27 variables (24 of them, tests) with ASR at USMA (11); intercorrelations of 25 tests and 8 other variables analyzed into 12 factors (13); the selection of 13 tests (based on the 12 factors) to identify men suitable for Arctic service (10); and 4 tests designed to predict the desirability of EM for combat (8). Valuable information of similar nature was obtained from other PRB reports (5, 6, 7, 9, 12, 14, 16, 17) and from studies of Army physical fitness tests (1, 2, 3, 4). The research at USMA on physical proficiency suggested the majority of tests selected for inclusion in the present battery.

The first criterion for selecting a test was that it have a minimum correlation of .20 with ASR. The second criterion was that the tests collectively have significant loadings on the previously isolated 12 factors (13). For two test situations--"Endurance Crawl" (10) and "Digging Motion" (part of PT 1991)--no correlation with ASR or factor analysis are available; however, correlation with EM combat criterion and face validity indicates that they are of value for present purposes.

The tests of gross muscular performance selected for the present battery are:

- Test 1. Dips (17, Appendix D, Test No. 34)
- " 2. 150 yards shuttle--50 yard laps (17, Test No. 16)
- " 3. Medicine Ball Put (17, Test No. 5)
- " 4. Vertical Jump (17, Test No. 5)
- " 5. 300 Yards Run (17, Test No. 34)
- " 6. Chins (17, Test No. 29)
- " 7. Hurdle Run (17, No. 11)
- " 8. Digging Motion Endurance (PT 1991, Test No. 7)
- " 9. Endurance Crawl (PT 1991, Test No. 3)

B. PHYSIOLOGICAL MEASUREMENTS

A number of physiological tests were considered for inclusion in the battery; but, after consideration of the apparatus and skilled personnel involved, only one test was retained:

Test 10. The Harvard Step Test. This test has been used by Army Medical Corps to test physical condition. The purpose for which it was used, together with the results obtained by its use, are given elsewhere (1, 2, 4).

In addition to the results of this test, height, weight, systolic and diastolic blood pressure, and rate of pulse are transcribed from existing records on the score sheet for the present battery.

C. TESTS OF PHYSICAL COORDINATION

In addition to tests of gross muscular strength, stamina, and coordination, it was hypothesized that fine muscular control (as shown in hand-eye coordination tests) is also of importance, at least in some MOS's. Two tests of fine muscular control are therefore included in the battery.

Test 11. Two-Hand Coordination Test (15).

Test 12. Dexterity Test. A test was constructed in PRB. Upon completion, however, it was found to be so similar to one constructed by the U. S. Civil Service Commission that it seemed better to adopt the already standardized test of US CSC, if permission to do so could be obtained. Permission was granted on the condition that:

- (1) All references to US CSC are removed (blacked out) from the forms used for experimental purposes.
- (2) If the test is adopted for permanent use, certain easily made changes are effected.

These changes will in no way affect reliability or validity of the test.

IV. PREPARATION OF THE TEST BOOKLET, PT 3143

Instructions for all the selected tests are printed and bound in one test booklet, PT 3143. In addition to the tests, an introduction (called "General Directions"), which also serves as an overall SOP, is incorporated in the test booklet. A prototype scoring sheet is also included in the booklet. One or more photographs and line drawings for each test were also obtained for all tests except Test No. 5 (for which none was thought necessary). Some of the photographs were taken from PRB Files--showing the administration of tests at Fort Carson in connection with selecting personnel for arctic maneuvers. Other photographs were obtained from West Point through the courtesy of Dr. Appleton. The line drawings were especially made for this project.

PERSONNEL

Program Coordinator:	Samuel H. King
Project Director:	Neil J. Van Steenberg
Acting Statistical Advisor:	Walter A. Klieger

REFERENCES

1. Army Medical Research Laboratory. Report No. 118. The Relation of Power and Endurance Training to Physical Efficiency.
2. Brouha, L. The Step Test: A simple method for measuring physical fitness for muscular work in young men. Research Quart. 1943, 14: 131.
3. Department of the Army Field Manual. FM 21-20. Physical Training. Jan. 1946.
4. Schneider, E. C. and Karpovich, P. V. Physiology of muscular activity (3rd ed.). Philadelphia: W. B. Saunders Co., 1948.

Publications of the Personnel Research Branch, Personnel Research and Procedures Division, The Adjutant General's Office, Department of the Army.

5. Technical Research Report 735. Development of a short battery of tests to predict physical efficiency grades of West Point Cadets. February 1947.
6. Technical Research Report 770. Review of the literature: Evaluation of physical efficiency measures for classification.
7. Technical Research Report 771. Validity of a battery of physical education tests in predicting cadet ratings on aptitude for service at West Point. December 1948.
8. Technical Research Report 774. Exploratory analysis of the Army Physical Fitness Test (from FM 21-20 January 1946) in predicting desirability for combat. March 1949.
9. Technical Research Report 780. Prediction of aptitude for service from a battery of physical efficiency tests. May 1949.
10. Technical Research Report 820. Preparation of a battery of physical proficiency measures for classification. February 1950.
11. Technical Research Report 828. Further validation of physical proficiency tests against Aptitude for Service Ratings at West Point. December 1949.
12. Technical Research Report 833. Validity of low "passing scores" on physical proficiency tests in predicting leadership ratings. April 1950.
13. Technical Research Report 937. A factor analysis of measures of physical proficiency. April 1952.
14. Technical Research Report 941. Validity of personnel measures against combat performance of enlisted men in Korea. IIIA. Physical proficiency tests. April 1952.

15. Technical Research Report 962. Evaluation of instruments to select safe drivers. July 1952.
16. Technical Research Report 972. Relationships of physical proficiency test scores to West Point attrition and cadet evaluation. August 1952.
17. Technical Research Report 1077. Personnel research for the United States Military Academy, 1942-1953. October 1953.
18. Research Memorandum 56-10. Grouping of selected officer specialties into tentative leadership areas. Phase I. April 1956.