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ABSTRACTS OF

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ABSTRACTS OF HFRB RESEARCH PUBLICATIONS--FY 1961

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INTRODUCTION

Research Note 116 identifies both by publication serial number and by Research and Development Research Task all research publications prepared and released by the Human Factors Research Branch of The Adjutant General's R and D Command in FY 1961. The listing includes 2 Technical Research Reports, 8 Technical Research Notes, 3 Research Studies, and 16 Research Memorandums.

Abstracts have been prepared for the majority of FY 1961 publications. Where a publication has been abstracted, the principal research findings have been described as much as possible in non-technical language. Technical language has generally been used as the most expeditious method of communicating details of research and analysis.

FY 1961 RESEARCH PUBLICATIONS

Types of Publications

HFRB Technical Research Reports are publications describing completed research studies or programs which contribute directly to the solution of Army human factors problems. The Report is generally divided into two parts--a brief general report to management and a technical supplement.

HFRB Technical Research Notes are primarily of interest to technically trained research workers in the National Military Establishment and in other governmental research agencies. Notes present technical information concerning research methodology or basic psychological knowledge growing out of the work program.

HFRB Research Studies are special reports to military management, generally prepared in response to questions raised by operating agencies when early answers are needed. Research Studies may include presentations to military management, interim bases for changes in personnel operations, and bases for research decisions. Distribution is usually restricted to operating agencies with a direct interest in the content. However, significant Research Study content is eventually incorporated within Technical Research Reports and Notes and through these media becomes available for general use.

HFRB Research Memorandums are technical publications presenting information the scope of which is of interest primarily within the Human Factors Research Branch. Research Memorandums include the following types of content: details concerning construction of experimental instruments, fragmentary or incidental data, and methodological developments relating primarily to HFRB operations. Because, as in the case of the Research Study, significant content is eventually incorporated within Technical Research Reports and Notes, and through these media becomes available for general use, outside distribution is not usually made.

Numbering Systems

HFRB research publications are numbered consecutively and continuously from year to year, in separate series for the four types of publications. Publications released during FY 1961 include Reports 1120 and 1121, and Notes 107 through 114. Research Studies prepared during FY 1961 include RS 60-3, RS 61-1 and 61-2. Research Memorandums prepared during FY 1961 include RM 60-14 through 60-24 and RM 61-1 through 61-5.

Distribution

Initial distribution of each Research Report and Research Note is made directly by the Human Factors Research Branch. Research Reports are distributed primarily to operational and research facilities and their sponsors in the Department of Defense, to other interested governmental agencies, and to the Library of Congress which in turn distributes to depository libraries. Research Notes are distributed primarily to technically trained research workers, including those reached through Library of Congress channels.

Qualified agencies and individuals not on initial automatic distribution may be furnished copies of Research Reports and Notes upon request to the Human Factors Research Branch as long as initial stocks last. When stock has been exhausted, copies may be obtained through the following sources:

Department of Defense agencies and their contractors should address requests for copies to: Commander, Armed Services Technical Information Agency, ATTN: TIPDR, Arlington Hall Station, Arlington 12, Virginia.

Other agencies and individuals may obtain information concerning availability and cost of microfilm or photostatic copies from: Office of Technical Services, Department of Commerce, Washington 25, D. C., ATTN: Technical Reports Section.

Copies may also be obtained on loan from depository libraries in many metropolitan and university centers. A list of these libraries appears on Pages 18 through 20.

Research Studies and Research Memorandums are not available for general distribution.

ABSTRACTS OF HFRB RESEARCH PUBLICATIONS--FY 1961

TECHNICAL RESEARCH REPORTS

1. TRR 1120. Uhlener, Julius E. and Zeidner, Joseph. The Army Night Seeing Tester-- development and use. May 1961

Efforts of the Human Factors Research Branch to develop a standardized test of night visual acuity culminated by 1960 in the development of the Army Night Seeing Tester ANST-II. The Army's requirement was for an effective and simple test which would enable commanders at local echelons to capitalize on individual differences in the ability to see at night. The ANST-II, engineered to precise requirements established by experimentation in night vision testing, is a compact, portable, rugged instrument, well adapted to use under field conditions.

Research to develop a test of night vision was conducted concurrently with basic experimentation on individual differences in the night vision process. A useful relationship was found to exist between ability to see at intermediate (moonlight) levels of illumination and at very low (starlight) levels. On the basis of this relationship, testing at the intermediate level was adopted as meeting practical needs of the Army, and at the same time simplifying testing procedures and reducing the required dark adaptation period to 10 minutes. Factor analyses of night vision tests revealed that almost all individual variation in night seeing ability was accounted for by two major factors: brightness contrast sensitivity and the ability to discriminate fine detail (line resolution).

ANST scores have proved to be stable measures of night seeing performance. Soldiers with high or better-than-average ANST scores have performed in general more effectively in night field problems than have soldiers scoring low on the test. An ANST prototype has been made available to USCONARC for field use.

2. TRR 1121. Birnbaum, Abraham H., Orleans, Isak D. and Stubbs, Joel. Selecting the first-line supervisor. June 1961.

The Army Civilian Supervisor Selection Battery has been used operationally since 1959 to select Wage Board first-line supervisors. Battery components are the Basic Ability Test, a test of mental capacity, the Supervisory Practices Test, a test of supervisory judgment, and the Supervisor Performance Report, a descriptive phrase test filled out by the supervisor of the applicant for a first-line position. The present study was undertaken to provide alternate forms of the Supervisory Practices Test and to study on an Army-wide basis the effectiveness of both operational and experimental tests.

Using a concurrent design, all tests were validated on a sample of 623 Wage Board supervisors against a criterion of average ratings of supervisory skills by supervisors and peers. Neither the Basic Ability Test nor the Supervisory Practices Test proved to have utility for the identification of potentially efficient Wage Board supervisors. The third component of the battery, the Supervisor Performance Report, can continue to be used in identifying those individuals who should be promoted to supervisory positions.

TECHNICAL RESEARCH NOTES

3. TRN 107. Helme, William H., Trump, James B. and Fitch, David J. Validation of common core Pattern Analysis and Mechanical Knowledge Tests for Mechanical Maintenance courses. July 1960

The Armed Services have cooperatively engaged in the development of five classification tests for use in common core areas. Each service has undertaken research to determine the suitability of the tests to its own needs. The common core tests--the Pattern Analysis Test constructed by the Air Force and the Mechanical Knowledge Test built by the Navy--were evaluated for Army use in classification to mechanical job areas. The two tests were administered to samples in ten Army school courses.

Neither common core test was recommended for operational use by the Army at the present time. The common core Pattern Analysis Test, either singly or in the appropriate aptitude area composite, was considerably less effective as a selector for Precision Maintenance courses than was the Army's operational Pattern Analysis Test. The common core Mechanical Knowledge Test held some promise of contributing to improved differential classification, particularly for Motor Maintenance courses. New tests are now being developed to measure more specific experiential factors related to success in specific types of Army jobs in the mechanical area. The common core Mechanical Knowledge Test, along with these new mechanical ability measures, will be evaluated in further studies designed to improve the basis for classifying individuals for jobs within the broad mechanical occupational area.

4. TRN 108. Uhlaner, Julius E. Systems research --Opportunity and challenge for the measurement research psychologist. July 1960.

Dr. Uhlaner examines systems research from the point of view of the human factors research scientist dealing with military problems. The Research Note was adapted from a paper presented by Dr. Uhlaner before the Tri-Service Personnel Conference held in Pensacola, Florida, 25-27 May 1960.

The measurement research psychologist can use the systems approach to advantage in his research efforts, particularly where the objective is improvement of a total operation through optimal balance of critical factors. The human factors aspects of systems must be considered early in systems development to keep pace with rapid technological advances. A systems approach provides the possibility for an initial thorough analysis of the total system with consequent consideration of all crucial factors--man and machine--in timely fashion. The measurement psychologist is, at the same time, in a position to influence the development of systems research methodology, contributing design and techniques for such objectives as identification and definition of critical factors, the development of a common metric with which to evaluate man and machine performance, and estimations of the equivalence of simulated and operational systems performance as criteria.

A framework for human factors oriented systems research is offered within which problems may be structured. Reflecting a philosophy of integrated research and an orientation toward completeness and accuracy of end-product (total system operational effectiveness), the framework is organized around three basic elements: (1) systems components to be studied (independent variables), (2) output or performance (dependent variables), and (3) conditions or environment in which the system operates.

5. TRN 109. Drucker, Arthur J. and Brown, Emma E. Abstracts of HFRB research publications--FY 1960. August 1960.
6. TRN 110. Helme, W. H., Kotula, L. J. and Fitch D. J. Preliminary evaluation of measures to predict Army reenlistment. December 1960.

A low reenlistment rate, particularly among first-term enlisted personnel, has been of great concern to the Army as well as to the other military services. A research program was undertaken to identify the Army's career-motivated RA enlisted personnel at the beginning of their period of service so that long-term training may be given to those qualified men who are most likely to remain in the Army.

An experimental self-description instrument incorporating a number of personality and attitudinal measures was administered to two enlisted samples--a group of first-term enlistees upon entry into service and a group of enlistees upon expiration of initial term of service. Two item-analysis keys were derived, one to maximize prediction of intention to reenlist expressed at entry into service, the other to maximize prediction of actual reenlistment action taken at the end of an initial term of service. In a cross-validation sample composed of 256 reenlistees and 278 nonreenlistees at end of initial term of service, both keys were found to be highly predictive of reenlistment. For the key based on actual reenlistment, the validity coefficient was .90, and for the intention criterion key, .82. The magnitude of the two coefficients, coupled with the fact that the two keys correlated .92, indicated that the components

of reenlistment intention and of reenlistment action are essentially the same. Results reinforced the hypothesis that an attitudinal pattern associated with reenlistment action can be identified and that effective operational measures can be developed for identifying career-motivated personnel at time of entry into service.

7. TRN 111. Rosenberg, Nathan, Skordahl, Donald M. and Kaplan, Harry. Validation of Army Fixed-Wing Aptitude Battery against success in ROTC flight training. May 1961.

The Army Fixed-Wing Aptitude Battery (AFWAB) has been used operationally since 1956 to select trainees for the Army Fixed-Wing Flight Training Program. The present study was undertaken to evaluate the battery for use in selecting trainees for the ROTC Flight Training Program. Additional purposes were to provide information which could be used to establish cutting scores appropriate to the Army's ROTC flight training requirements for a given year and to study the effect of weighting the tests by a multiple correlation procedure.

The battery was administered to samples of ROTC Flight Training Program applicants representative of ROTC classes of academic years 1956-57, 1957-58, and 1958-59 (total N = 1245). The AFWAB was found to have useful validity against a criterion of successful completion of the Flight Training Program ($r = .33$). All component tests were found to contribute to the selective efficiency of the battery (correlation coefficients ranged from .20 to .24, intercorrelation coefficients from .11 to .52). The unit-weighted composite proved to be as effective as the administratively more cumbersome optimally weighted score.

8. TRN 112. Rosenberg, Nathan, Kaplan, Harry, and Skordahl, Donald M. Validation of Army Fixed-Wing Aptitude Battery against success in Army Flight Training. May 1961.

Operational use of the Army Fixed-Wing Aptitude Battery (AFWAB) in selecting men for Army Flight Training was authorized in 1956. Concurrently, research was begun to evaluate the new battery against training criteria. The purpose of the present study was to determine the validity of the battery in relation to success in the Army Primary Flight Training Program (FTP) where most attrition from the training program occurs.

The battery was administered to 1109 men in classes entering FTP at Camp Gary during 1957. The AFWAB composite scores yielded a validity coefficient of .41 for a pass-fail criterion (students who for any reason did not complete the course were considered failures). Against pass-fail by reason of flying deficiency, the coefficient was .32. Validity and intercorrelation coefficients obtained for component tests of the AFWAB indicated that it would not be advisable to eliminate any of the tests from the battery. Scores based on unit weights of component tests yielded the same predictive efficiency as the more complicated statistical weighting.

9. TRN 113. Klieger, Walter A., Dubuisson, Adrian U. and deJung, John E. Prediction of unacceptable performance in the Army. June 1961.

The objective of this study was to explore the potential usefulness of a variety of personnel measures in identifying those enlisted men who meet current induction or reenlistment standards but whose cumulative record of performance in the Army is likely to prove unacceptable. The predictor measures were obtained on a group of 1780 first-term enlisted men completing basic combat training at Fort Leonard Wood during 1953-54. The measures included AFQT scores, various indices based upon background information, average Basic Training ratings, scores on a basic training written proficiency test, and scores on a basic training performance (Stakes) test. Indices of unacceptability were based upon type of discharge and court-martial record.

The measures most predictive of unacceptability were AFQT score ($r = .31$) and age at entry ($r = .26$), both of which are available prior to entry into the Army. These measures combined resulted in a multiple R of .41. While basic training measures and evaluations contributed little to the prediction afforded by variables available prior to the start of basic training, the addition of the Stakes test and the Basic Training rating did increase the multiple to .44 and .46, respectively.

10. TRN 114. Zeidner, J., Sadacca, R. and Schwartz, A. I. Human factors studies in tactical image interpretation: The value of stereoscopic viewing. June 1961.

The Human Factors Research Branch is engaged in a series of research studies concerned with the selection and utilization of personnel in aerial surveillance systems. Major emphasis is being placed on improving intelligence extraction from imagery by means of selecting potentially better interpreters, determining proper use of equipment, improving the work methods and techniques interpreters employ, and combining the efforts of a number of interpreters to improve overall team performance. The principal objective of the present study was to assess the usefulness of stereoscopic viewing in terms of quality of information obtained and the rate at which it is extracted.

Performance measures based on tactical photographs obtained during the Korean war and strategic photographs were administered to two matched groups of image interpreters. For each measure, pairs of stereo photographs were provided to one of the two groups and nonstereo photographs to the other. Using t-tests and analysis of variance, stereo and nonstereo viewing methods were found not to differ appreciably in terms of the quality of information provided or in the confidence expressed by interpreters in the information they extracted. Although the accuracy of the two viewing methods was similar, the initial rate of information extraction tended to be higher under the nonstereo viewing condition. Results of the study were sufficiently strong to suggest that the value of stereo viewing should not be taken for granted.

RESEARCH STUDIES

11. RS 60-3. Zeidner, Joseph, and Sadacca, Robert. Research on human factors in image interpreter systems. July 1960.

Research into the human factors underlying imagery interpretation stems from the Army's critical need for effective intelligence information obtainable from such imagery sources as photographs, infrared, radar, TV, and other sensor devices. The present research study delineates HFRB's general approach and reports a preliminary analysis of image interpretation performance data.

Preliminary forms of objective measures of photointerpreter performance in terms of accuracy and completeness of information extracted were tried out on small samples of trainees and experienced image interpreters. Results, inconclusive in view of the small samples, have provided direction for subsequent research efforts. For example, improvement in accuracy resulting from pooling independent interpreter reports pointed to the desirability of determining the most effective means of integrating team products under varying conditions. Other elements of the image interpreter system which evidently influence output and which merit research effort are work methods and techniques, use of mechanical and reference aids, optimal viewing time, and the psychological set of the viewer.

12. RS 61-1. Dobbins, D. A. Human factors research on vigilance performance--Planned approach. May 1961.

Technologically advanced weapons systems place great demands upon Army personnel performing jobs of which sustained vigilance is a dominant element. Research Study 61-1 presents the general plan for research formulated by the Human Factors Research Branch to minimize the incidence of human error in critical assignments.

The typical vigilance task--monitoring radiosopes, for example--requires the operator to respond to some critical visual or auditory signal that appears infrequently and unpredictably, but at the same time not to respond to noncritical signals. HFRB seeks to generate principles applicable to the Army's vigilance jobs through study of the demands the task of monitoring makes upon the individual, the environmental conditions that promote high levels of performance, and the personal characteristics of individuals conducive to successful performance in vigilance assignments.

A generalized vigilance testing apparatus, appropriate to the various psychological and physiological problems to be studied, is being developed. Vigilance performance tasks, including both auditory and visual displays, are being devised. Through laboratory experimentation a systematic research effort will be made to establish the environmental determinants and personal correlates of vigilance.

13. RS 61-2. Sternberg, Jack J., deJung, John, and Hammer, Charles. Distribution of aptitude area scores among high school senior women. May 1961.

In a national emergency, many critical skills are expected to be in short supply. Assignment of fully qualified men to meet the expanded needs of the Army's combat units would make it much harder for the Army to fill noncombat jobs, particularly in technical occupational areas. Womanpower, effectively utilized, can supply some of the needed skills. Assignment of qualified women in unaccustomed job areas would allow men to be used in critical combat jobs.

A study of the aptitude area scores of a sample of young women in their senior year of high school indicated that large numbers of potential WAC's would qualify for training in all noncombat occupational areas. Almost all the young women qualified in the Clerical and General Technical areas. The smallest percentage qualified in the Motor Maintenance area. Substantial percentages qualified in the General Maintenance and Electronics areas. These findings were the basis for planned studies of the job performance of enlisted women in relation to performance of enlisted men with comparable aptitude test scores.

RESEARCH MEMORANDUMS

14. RM 60-14. Haggerty, Helen and Stubbs, Joel R. Construction of the Military Academy Questionnaire, MAQ-2. August 1960.

Statistical analysis and item selection procedures are described for the construction of MAQ-2, a 200-item personality test designed for use in identifying applicants likely to resign from West Point prior to completion of training.

15. RM 60-15. Haggerty, Helen and Stubbs, Joel R. Relationship between low ASR and subsequent OEI. August 1960.

Points of cut on the Aptitude for the Service Rating (West Point Leadership measures) were set to identify the lowest 2%, lowest 4%, lowest 6%, and lowest 8%. Using a correlation coefficient of .50 between ASR and subsequent Overall Efficiency Index (OEI), tables of the normal bivariate surface were used to determine, for the theoretical 10,000 OEI cases, the number of individuals below each cut point who would fall in each half-sigma interval above and below the mean OEI-56 for West Point graduates. From these frequencies, percentages within each low group were determined.

16. RM 60-16. Orleans, Isaak D. Construction of an alternate form of the Supervisory Practices Test. September 1960.

Preliminary to construction of a new alternate form of the Supervisory Practices Test, a two-way content analysis was made of the operational instrument. One axis represented operational areas (administrative routine, grievances, personal affairs), the other behavioral modes (personal dynamics likely to influence supervisory action).

17. RM 60-17 Goldstein, Leon G. and Ringel, Seymour. Survey of human factors problems in missile and communications systems. October 1960.

The Army's missile and communications systems were observed in operation, and interviews were conducted with operating personnel at many levels of command to identify important and researchable problem areas in electronics systems operations. Three general classes of problems emerged: 1) problems of task organization and work methods to maximize system effectiveness, 2) equipment design problems, and 3) other conditions which affect formance.

18. RM 60-18. Bayroff, A. G., Seeley, Leonard C. and Anderson, Alan A. Evaluation of experimental AQB tests for screening Category IV personnel. November 1960.

With the Army requirement for supplementary screening of Category IV personnel (AFQT percentile score of 10 to 30, inclusive), need arose for short aptitude tests corresponding to Army Classification Battery tests. Development of the Army Qualification Battery (AQB) for the initial classification of Category IV personnel involved the evaluation of 11 tests, including four subtests of the Armed Forces Qualification Test, five additional aptitude tests, and two personality measures paralleling the combat aptitude measures of the ACB. In a sample of 540 men stratified on AFQT score, the experimental tests were satisfactory measures of counterpart ACB tests (r's, .65 to .90). Composites based on AQB test scores were very closely related to corresponding aptitude area scores derived from ACB tests (correlation of sums coefficients, .79 to .91). The tests can provide a satisfactory means of screening Category IV personnel to meet the Army's differential aptitude requirements.

19. RM 60-19. Boldt, Robert F., Wiskoff, Martin F. and Fitch, David J. An allocation technique applied to current aptitude input. November 1960.

The Method of Optimal Regions is an allocation technique designed to maximize across all jobs the aptitude levels of the individuals for the jobs in which they are placed. Proposed solutions to implementation problems such as simulation of the aptitude area scores distribution, consideration of tangential requirements, and IBM card layout are given.

20. RM 60-20. Bayroff, A. G., Anderson Alan A., Morton, Mary A. and Hilligoss Richard E. Standardization of Armed Forces Qualification Test AFQT-7 and -8. November 1960.

AFQT-7 and -8 were standardized on mobilization samples of 1000 examinees for each form. The equivalence of the two forms was established (r's of .91 and .92). The data obtained supported the use of a single raw-to-percentile conversion table for the two forms.

21. RM 60-21. Seeley, Leonard C. and Anderson, Alan A. Construction of item pools for experimental AQB tests--MA and ELI. November 1960.

For the Mechanical Aptitude Test, 92 pictorial, four-alternative items were constructed or selected and arranged in two 46-item forms. Two new forms of the Electrical Information Test were prepared, each containing 45 four-alternative items, of which 15 in Form A and 16 in Form B are pictorial.

22. RM 60-22. Klieger, Walter A. and Dubujsson, Adrian U. Civilian and military factors as predictors of Army failure. November 1960.

Frequency distributions, by type of discharge, are reported for 16 civilian and military predictor variables obtained on 2209 EM. Variables included Army grade, civilian occupation, record of law infraction, marital status, dependents, psychiatric appraisal, physical complaints, physical category and academic grade completed.

23. RM 60-23. Goldberg, Solomon C., Castelnovo, Anthony E., and Goldstein, Leon G. Construction of the Electronics Selection Battery. December 1960.

Fifteen tests were selected, adapted, or constructed for the experimental Electronics Selection Battery. Primary consideration was given to differential prediction of capacity for electrical-mechanical jobs as contrasted with electronics jobs. A pilot run indicated that the instruments have an acceptable range and difficulty level for the population in which interest is centered.

24. RM 60-24. Klieger, W. A. and deJung, J. E. Development of instruments to evaluate basic training predictors of overall acceptability. December 1960.

To develop instruments and procedures for the identification of EM potentially unsuitable for Army service, a number of experimental predictors were administered to 3000 basic trainees. Instruments will be evaluated in two-and three-year follow-up studies.

25. RM 61-1. Katz, Aaron and Sargent, Bryan, III. Construction of the Mechanical and Electrical Information Test for Women. April 1961.

The Mechanical and Electrical Information Test for Women was constructed to identify enlisted women who are capable of meeting training and job requirements in the electronics and electrical maintenance areas. The test consists of 75 four-choice items of which 40 are pictorial.

26. RM 61-2. Klieger, W. A. and Dubuisson, A. U. An analysis of experimental exit interviews. April 1961.

A content analysis of tape-recorded interviews conducted with enlisted men who received other-than-honorable discharges suggested item content for experimental predictor instruments.

27. RM 61-3. Klieger, W. A. and Dubuisson, A. U. Factors related to type-of-discharge within a group of other-than-honorable discharges. April 1961.

To gain a better understanding of the nature of the type-of-discharge criterion used in retention standards research, the relationship of reason for discharge (Separation Program Number) to type of discharge was studied. The "undesirable" category was found to account for 88.2% of all other-than-honorable discharges. Three SPN's--undesirable habits or traits of character, habits or traits manifested by misconduct, and repeated offenses not warranting courts-martial--accounted for 80% of the undesirable discharges and 70.7% of the total number of other-than-honorable discharges. (File copy only.)

28. RM 61-4. Kotala, L. J., Anderson, Alan, and Denton, Barnett. Data collection on Category IV enlistee sample for ACB-2 longitudinal study. May 1961.

Describes procedures used to obtain initial and follow-up data on an AFQT Category IV enlistee sample screened under the ACB-2 program in August-December 1958 and on a supplementary control sample.

29. RM 61-5. Dobbins, D. A., Martinek, H and Anderson, Alan A. Inter- and intra-apparatus variance of psychomotor test scores of Army helicopter pilot trainees. May 1961.

Results reemphasized the need for caution in the use of psychomotor apparatus tests--individual differences in machines do occur, and scores tend to fluctuate significantly with continued use of the same machine. Solutions involving statistical conversion and proper maintenance of equipment are discussed.

RESEARCH TASKS REPRESENTED BY FY 1961 HUMAN FACTORS RESEARCH BRANCH PUBLICATIONS

Those HFRB Research Tasks on which publications were issued during the past fiscal year are briefly described. Task Statements are grouped according to the Human Factors Research Laboratory in which the research was accomplished. The numbers appearing at the conclusion of each Task Statement designate HFRB publications abstracted or listed on pages 3 to 12.

MILITARY SELECTION RESEARCH LABORATORY

RESEARCH TASK: Methods for Improving Differential Selection for Induction and Enlistment. FY 1961.

Research on screening and induction techniques is a continuing effort which must reflect developing military policy and organization involving all the Armed Services. Current Army induction and recruitment policy bases acceptance in large part upon measures of aptitudes related to likelihood of successful performance in different kinds of Army jobs. The periodically developed operational forms of the Armed Forces Qualification Test (AFQT-7 and -8 became operational 1 July 1960) provide both a measure of general military trainability and measures of specific aptitudes corresponding to certain of the Army's aptitude area scores. A battery of short tests, the Army Qualification Battery, has been developed to permit identification at Armed Forces Examining Stations of AFQT Category IV personnel whose aptitude patterns show promise of successful performance in specific Army job areas.

As part of the Task effort, long-range research is being conducted to improve techniques for measuring aptitudes and other characteristics important for screening individuals for induction or enlistment. In addition, research is in progress to develop new and improved research approaches to the differential measurement of aptitude and personal qualifications. The Task is also concerned with the development of information on the mental abilities of the civilian manpower pool available for military service--information required in planning for both research in the military selection area and for manpower utilization. 18, 20, 21.

RESEARCH TASK: New Techniques for Enlisted Classification. FY 1961.

Under this task, new test content is explored and new instruments devised which will measure factors not yet differentially measured by the Army Classification Battery. To this end, a large number of newly constructed

information-type job oriented tests, intended to replace or supplement current ACB selectors, are constructed and tried out. The direction is toward tests of more specific experiential factors related to success in specific types of Army jobs, particularly in the mechanical domain where current prediction tends to be general over a wide range of jobs. Another attack on this problem is a large-scale effort based on a factorial approach. Some 17 tests of factors isolated in previous military and civilian research, and apparently relevant to Army jobs, are being validated in a longitudinal study. In addition, new forms of existing ACB tests are developed in order to maintain the established validity of the operational battery.

A special requirement involves determination of desirable combinations of screening and classification measures to evaluate the potential usefulness to the Army of applicants for enlistment and selective service registrants, particularly those relatively low in general ability. Results will be applied in screening standards. An experimental reenlistment inventory is also under development to identify at the time of entry those Army career-oriented personnel with potential for military achievement. Success in this effort will help in assigning potential career personnel to long-term job training. 3, 6, 28.

RESEARCH TASK: Matching Ability Resources of Enlisted Men in Critical Army Technical Jobs. FY 1961.

Analyses of ability resources available in the Army enlisted input have demonstrated shortages of men qualified for assignment to training in critical technical specialties such as missile operation and maintenance. The research task involves a reexamination of aptitude requirements of critical Army jobs and the identification of training courses and jobs for which selection is now made on the basis of abilities in short supply but which can be adequately filled by men qualified in less critical areas, without undue reduction of job effectiveness. In addition, individual behavior factors are being analyzed to evaluate their contribution to the problem of attrition as against the contribution of factors associated with current selection standards.

The continuing requirement for maintaining current information on the validity of the Army Classification Battery for predicting success in training and job performance entails continuing and long-range data collection on which to base revisions of the aptitude area composites. A clearer definition is also sought of ways in which available manpower could be utilized in time of mobilization as a means of maintaining the overall quality of performance in Army jobs while permitting assignment of fully qualified men to meet expanded combat requirements. 13, 25.

RESEARCH TASK: Refinement of Retention Standards. FY 1961.

The Army has need for means of identifying individual who meet current induction standards but whose overall performance in the Army would prove unacceptable. In all studies reported, acceptability is defined

in terms of the type of discharge received. Since the major contribution of the measures developed would be the prediction of motivation to function effectively as a soldier rather than prediction of ability to do so, background and personality measures have been given first consideration as the basic element of the desired procedure. Measures are sought which, in combination with mental ability, are effective in predicting retention in the Army. 9, 22, 24, 26, 27.

RESEARCH TASK: Development of Improved Civilian Supervisory Selection Techniques. FY 1960.

Civilian personnel management agencies in the Department of the Army have continuing requirements for research on civilian personnel problems. The Department of the Army directed that effective 1 July 1959 more objective procedures would be instituted to select and provide civilian supervisors.

Previous research had provided a set of measures for selection of Wage Board supervisory personnel. To implement a portion of the above directive, DCSPER, through its civilian personnel responsibility, issued an urgent requirement for the 1) construction and validation of improved alternate forms for selection of Wage Board supervisors, and 2) study of personality, attitude and other characteristics required for the most effective supervision of civilian employees. 2, 16.

COMBAT SYSTEMS RESEARCH LABORATORY

RESEARCH TASK: Psychological Factors in Consistent Error-free Performance. FY 1961.

Human performance in critical jobs is a significant determinant of the overall reliability of any weapons or communications system. Errors occur both as a result of internal factors such as fatigue, boredom, poor morale, and anxiety, and also as a result of external factors such as emergency pressures, isolation, weather extremes, methods of supervision, and other working conditions. Since individuals differ in the extent of deterioration in their performance associated with the various factors, the identification of the psychological determinants related to consistent, dependable performance becomes critical. The dual objective of the task is (1) to identify critical jobs in which human errors or performance decrement might have crucial consequences, and (2) to attempt to reduce the occurrence of critical errors through experimental research and/or personnel selection techniques. 12.

RESEARCH TASK: Assignment and Allocation of Personnel to Combat Units. FY 1961.

The ultimate objective of the task is to provide a method of assigning men to advanced training so that the resultant distribution of available aptitudes is adequate to the needs of combat units as well as to the

needs of combat support units and other branches of the Army. A feasible system of assignment using linear programming has been developed which would maximize the combat effectiveness of the Army. The method accomplishes the simultaneous consideration of numerical requirements and input in terms of measured aptitudes. Implementation of the method, however, poses a large problem in terms of the multitude of personal characteristics to be examined, the number of personnel to be allocated, and the number of jobs to be filled. 19.

RESEARCH TASK: Selection of Army Helicopter Pilots. FY 1959.

Extensive and long-term research has been conducted to reduce attrition among helicopter pilot trainees through the use of improved selection instruments. As instruments were developed, they were incorporated in interim operational selection batteries in response to the urgent need to reduce attrition. Recommendation of a six-test provisional selection battery in FY 1959 was the result of a series of validation studies involving a substantial number of experimental measures of varied factor content. A selection battery for operational use has been developed based on the validation of experimental instruments for prediction of school success and job performance as helicopter pilots. 7, 8, 29.

SUPPORT SYSTEMS RESEARCH LABORATORY

RESEARCH TASK: Psychological Factors in Image Interpretation. FY 1961.

Imagery obtained from photographic, infrared, radar, and other sensor devices is a major source of military intelligence information. The usefulness of the sensor devices to the tactical commander rests on the ability of image interpreters to extract accurate and complete information rapidly from these media.

The primary objectives of this task are to identify the psychological processes and techniques utilized by interpreters in extracting information from different types of images, and to relate these processes and techniques, as well as the aptitudes, interests, and knowledge of the image interpreter, to the effectiveness of interpreter performance. The performance of image interpreters is studied under both normal and emergency tactical conditions to determine the effect on information output of stress, fatigue, and time pressures. Prior to the initiation of this task, a long-term program of HFRB research in the field of night vision was completed with the development of the Army Night Seeing Tester, a practical and effective means of evaluating military personnel according to their ability to see in the dark. 1, 10.

RESEARCH TASK: Image Systems Integration. FY 1961.

The quality and quantity of the intelligence information which an image system provides for the tactical commander depend upon how well all the elements, both human and machine, function and operate together. The primary objective of the task is to determine the best ways of integrating personnel within image systems. Research is focussed on the human factors in the total image interpretation process rather than primarily on the image interpreter himself as in the Image Interpretation Task. 11.

RESEARCH TASK: Selection and Utilization of Electronics Personnel. FY 1961.

Since the effective operation and maintenance of new electronic man-machine systems depend ultimately on human components, there is paramount need for human factor information. The objective of the task is to bring about the best utilization of personnel in these systems through the development of optimum work methods and techniques for the operations that must be performed and through improved identification and assignment of personnel to critical positions. An early objective was the development of aptitude and personality measures (the Electronics Selection Battery) to yield greater differentiation between specific technical capabilities and more general mechanical aptitude. The battery is designed to enable improved assignment to electronics jobs requiring electronic aptitude of a high degree as opposed to those jobs for which requirements are less exacting. 17, 23.

BEHAVIORAL EVALUATION RESEARCH LABORATORY

RESEARCH TASK: Psychological Measures for Use in USMA Selection and Evaluation Programs. FY 1961.

Previous research for the United States Military Academy has resulted in development of tests of mental ability, physical proficiency, and leadership for use in selecting West Point cadets. There is a continuing need to improve the selection procedures, particularly with respect to identifying leadership potential and career motivation among applicants. Current research is directed toward development of measures to identify cadet leadership characteristics and to predict attrition at the Academy, and encompasses, as well, continuing follow-up of the validity of USMA measures to predict officer performance and retention. 14, 15.

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