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COMPARABILITY OF NAVY ELECTRONICS TECHNICIAN SELECTION TEST AND CERTAIN ARMY CLASSIFICATION BATTERY MEASURES

M. A. Fischl, Robert M. Ross, and Joann Kaczmarek

MANPOWER DEVELOPMENT AND UTILIZATION TECHNICAL AREA

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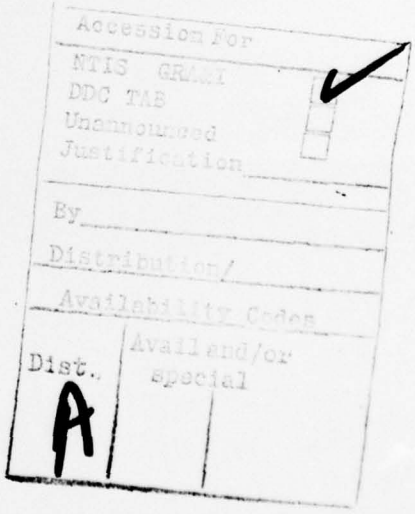

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M. A. Fischl, Robert M. Ross
and
Joann Kaczmarek

Submitted by:
Ralph R. Canter, Chief
Manpower Development and Utilization Technical Area

January 1976

Approved by:

E. Ralph Dusek, Director
Individual Training and Performance
Research Laboratory

J. E. Uhlaner, Technical Director
U.S. Army Research Institute for
the Behavioral and Social Sciences

COMPARABILITY OF NAVY ELECTRONICS TECHNICIAN SELECTION TEST AND CERTAIN ARMY CLASSIFICATION BATTERY MEASURES

BACKGROUND

The Department of Defense has requested that the armed services explore the feasibility of developing an entry test battery common to all U.S. military services. Each of the armed services is currently performing research in support of this effort. The first stage in the Army's program is to analyze, in an Army population, the relationship between Army tests and certain Navy and Air Force tests. The primary relationships examined in this report are between each of four Army Classification Battery (ACB) Form 1973 subtests and the Navy Electronics Technician Selection Test (ETST) Form 7. The four ACB subtests considered are Mathematics Knowledge (MK), Science Knowledge (SK), Electronics Information (EI), and Mechanical Comprehension (MC). In addition, relationships between ETST scores and certain other Army tests scores are also presented.

METHOD

The Navy ETST was administered to a national sample of U.S. Army enlisted men and women at three Reception Stations during September and October 1974. All examinees had previously been administered the ACB at, Armed Forces Examining and Entrance Stations (AFEES), hence ACB scores were available. The breakdown of the sample by Reception Station is as follows:

100 enlisted men (EM) and 100 enlisted women (EW) at Fort Jackson, S.C.
200 EM at Fort Knox, Ky.
200 EM at Fort Ord, Calif.

In addition to this primary sample, in 1966 the ETST had been administered to a stratified sample of about 1200 Army enlisted men as part of the research which led to identification of the original content specifications for the Armed Services Vocational Aptitude Battery (ASVAB)[1]. Correlations of the parts of the ETST form then operational, with the then operational Army Classification Battery tests, are also shown in this report.

Although the 1966 sample spanned the full population range on general ability, the primary sample in the current data set suffered ability restriction in two ways. First, there were no cases from the lowest decile of the population, and there were fewer than half of the expected number of cases in the next lowest decile (percentiles 10-19). These restrictions are the result of the testing of enlistees,[2] instead of applicants, at a time when the minimum Armed Forces Qualification Test (AFQT) enlistment standard was at the 16th percentile. Second, in addition to general ability restriction, all examinees had previously qualified at the 30th percentile (Army

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[1] Bayroff, A.G., and Fuchs, E.F. The Armed Services Vocational Aptitude Battery. ARI Technical Research Report 1161, February 1970.

[2] For administrative reasons.

Standard Score 90) in at least one aptitude area. The aptitude area composites contain both general ability measures and also measures of specific aptitudes. All reported correlations would be higher if the full range of general and specific abilities had been represented in the sample.

RESULTS

Table 1 presents all intercorrelations among ACB and ETST component scores. Correlation coefficients shown with asterisk were computed from the 1966 data.

DISCUSSION

NAVY AND ARMY MATHEMATICS KNOWLEDGE TESTS

The ETST Mathematics test and the ACB Mathematics Knowledge (MK) subtest include high school algebra items. To investigate the possibility that only one of these tests need be used in a common armed services aptitude battery, the relationship between ETST Math and ACB MK was evaluated.

As Table 1 shows, the correlation between Army and Navy items tapping high school algebra was .68. Given restriction of range factors and the small number of items involved (both ACB MK and ETST Math are 20-item sets), this is substantial common variance. Alternate forms of the same tests, when so short, often correlate no more highly. It is also interesting to note that each of these tests bears the identical relationship (r = .59) with the AFQT.

NAVY AND ARMY SCIENCE TESTS

The ACB contains no direct counterpart to the Navy's General Science test (ETST GS). The ETST GS contains physical science items whereas the ACB Science Knowledge (SK) subtest contains items tapping knowledge of biology and chemistry. Nevertheless, Table 1 shows that the Navy ETST GS correlates .61 with ACB SK; again, in a restricted sample and with short tests.

NAVY AND ARMY ELECTRICAL TESTS

The Navy ETST Electricity and Radio (ER) test is a very difficult test for an Army population. Its mean score in the current Army accession population is just at the chance level. It is quite likely that this very low "ceiling" in the Army group is a major contributor to the extremely low correlation of ETST ER with ACB EI. We note that this r is only .39, while the other two ETST measures correlate with ACB measures in the .60's. Clearly the two electrical tests are not good substitutes for one another.

Table 1

RELATIONSHIPS BETWEEN ARMY CLASSIFICATION BATTERY SUBTESTS AND ELECTRONICS TECHNICIAN SELECTION TEST ELEMENTS[a,b]

	AFQT				ETST				ACB			
	Total	AR	WK	PA	Total	MATH	GS	ER	MK	SK	EI	MC
AFQT		81	84	57	65	59	58	34	59	65	35	52
AR			55	34	56	54*	44	30*	56	49	23	37
WK				26	56	46	52	32	47	61	33	43
PA					42	38	39	19	37	36	29	47
ETST						84	82	69	66	62	52	55
MATH							53	35	68	50	36*	40
GS								38	48	61	50	55
ER									35	33	39	34*
ACB-MK										47	33	37
SK											47	43
EI												48
MC												

[a]N = 590 EM and EW at three Reception Stations during September and October 1974.

[b]Decimal points omitted from correlation coefficients.

*Asterisk indicates correlation coefficients obtained from original ASVAB research (N = 1200). See Bayroff, A.G., and Fuchs, E.F. The Armed Services Vocational Aptitude Battery. ARI Technical Research Report 1161, February 1970.

CORRELATIONS BETWEEN AFQT AND SELECTED ARMY AND NAVY TESTS

Because the AFQT is considered a test of general ability, the correlations between AFQT scores and various ETST and ACB scores are relevant. These correlations reflect the influence of the "g" factor in the tests under consideration. As may be seen in Table 1, the ETST total score correlates quite highly with AFQT (r = .65), indicating that the ETST is in large part a general ability measure. As might be expected, the ETST Math set correlated more highly with AFQT, followed by ETST GS, with ETST ER most unique. A similar pattern emerges among the Army tests, MK and SK being much more highly correlated with AFQT than EI is. No total score is computed over these ACB items, so there is no Army equivalent to the total ETST score for comparison with AFQT.

OTHER COMPARISONS OF SELECTED NAVY AND ARMY TESTS WITH POTENTIAL FOR INTERSERVICE USE

The possibility exists of using the Electronics Technician Selection Test as a unit in the new ASVAB. Since more than one Army aptitude area composite includes mathematics items and two science related item-sets, use of the ETST for Army classification is worth examining.

No previous Army research reports the relationship between ETST total score and any subtests of ACB-73. The data of Table 1 show these relationships:

r ETST/MK = .66	r ETST/AR = .56
r ETST/SK = .62	r ETST/MC = .55
r ETST/WK = .56	r ETST/EI = .52

It is interesting to note that the complete ETST correlates much more highly (r = .52) with the Army EI subtest than does the specific ER set (r = .39). Inasmuch as the Army subtests are very short, the r's presented above might be encouraging. A subsequent report will consider the differential validity contribution of each of these item sets, which is, after all, the ultimate assessment.

CONCLUSIONS

From the analysis presented it appears that certain test score relationships possess a level of commonness which gives reasonable support to the prospect that some Army and Navy tests might be substituted for each other in an interservice test battery.

1. The probability that the Navy's ETST Math set and the Army's Mathematics Knowledge subtest are interchangeable seems relatively high.

2. Despite the different science content, the Navy's ETST General Science set correlates .61 with the Army's subtest of Science Knowledge. Both sets include a substantial "g" factor, indicated by respective correlations with AFQT of .58 and .65. Determination of substitutability will depend on patterns of intercorrelations among aptitude area elements and contributions to differential validity.

3. The Army and Navy Electrical sets are not similar enough to be substituted for each other.