DOCUMENT RESUME

ED 082 058 CE 000 367

AUTHOR	Vitola, Bart M.; And Others
TITLE	Validity of Armed Services Vocational Aptitude Battery, Form 1, to Predict Technical School Success.
INSTITUTION	Air Force Human Resources Lab., Lackland AFB, Tex. Personnel Research Div.
REPORT NO	AFHRL-TR-73-7
PUB DATE	Jul 73
NOTE	18p.
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*Aptitude Tests; Armed Forces; *Military Personnel; *Predictive Ability (Testing); Success Factors; *Test Validity; *Vocational Aptitude; Vocational Schools
IDENTIFIERS	Airman Qualifying Examination; AQE; Armed Services Vocational Aptitude Battery; ASVAB

ABSTRACT

Validities of the four aptitude indexes of the Armed Services Vocational Aptitude Battery (ASVAB), Form 1, and the Airman Qualifying Examination-66 (AQE), were determined for final grades in 46 airman training courses. Comparisons were made between AQE and ASVAB in terms of their ability to predict technical school success. The data demonstrate the ASVAB is an effective instrument for use in the military high school testing program and may be used satisfactorily, as is AQE, to assign enlistees to technical training. Three of the four selector aptitude indexes of the ASVAB (General, Administrative, and Electronics) evidenced their appropriateness by having higher validities for their appropriate courses than any of the other ASVAB aptitude indexes. This sort of specific validity did not obtain for the selector index of the Mechanical cluster. However, 15 of the 16 validities obtained for the selector index in the Mechanical area were at a significant (.01), useful and acceptable level. (Author)

AFHRL-TR-73-7

AIR FORCE

HUMAN RESOURCES

VALIDITY OF ARMED SERVICES VOCATIONAL APTITUDE BATTERY, FORM 1, TO PREDICT TECHNICAL SCHOOL SUCCESS

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July 1973

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Unclassified

Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY *(Corporate author)* Personnel Research Division Air Force Human Resources Laboratory Lackland Air Force Base, Texas 78236	2a. REPORT SECURITY CLASSIFICATION 2b. GROUP

3. REPORT TITLE

VALIDITY OF ARMED SERVICES VOCATIONAL APTITUDE BATTERY, FORM 1, TO PREDICT TECHNICAL SCHOOL SUCCESS

4. DESCRIPTIVE NOTES *(Type of report and inclusive dates)*

5. AUTHOR(S) *(First name, middle initial, last name)*

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Cecil J. Mullins
Paul R. Croll

6. REPORT DATE	7a. TOTAL NO. OF PAGES	7b. NO. OF REFS
July 1973	17	5

8a. CONTRACT OR GRANT NO.	9a. ORIGINATOR'S REPORT NUMBER(S)
b. PROJECT NO. 7719	AFHRL-TR-73-7
c. Task No. 771910	9b. OTHER REPORT NO(S) *(Any other numbers that may be assigned this report)*
d. Work Unit No. 77191001	

10. DISTRIBUTION STATEMENT

Approved for public release; distribution unlimited.

11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY Personnel Research Division Air Force Human Resources Laboratory Lackland Air Force Base, Texas 78236

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Validities of the four aptitude indexes of the Armed Services Vocational Aptitude Battery (ASVAB), Form 1, and the Airman Qualifying Examination-66 (AQE), were determined for final grades in 46 airman training courses. Comparisons were made between AQE and ASVAB in terms of their ability to predict technical school success. The data demonstrate that ASVAB is an effective instrument for use in the military high school testing program and may be used satisfactorily, as is AQE, to assign enlistees to technical training. Three of the four selector aptitude indexes of the ASVAB (General, Administrative, and Electronics) evidenced their appropriateness by having higher validities for their appropriate courses than any of the other ASVAB aptitude indexes. This sort of specific validity did not obtain for the selector index of the Mechanical cluster. However, 15 of the 16 validities obtained for the selector index in the Mechanical area were at a significant (.01), useful and acceptable level.

DD FORM 1 NOV 65 1473

Unclassified

Security Classification

14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
aptitude index validities ASVAB validities AQE validities high school testing program correction for restriction of range operational tests selected and unselected populations						

PREFACE

Work was accomplished in-house under Project 7719, Air Force Personnel System Development on Selection, Assignment, Evaluation, Quality Control, Retention, Promotion, and Utilization; Task 771910, Armed Forces Operation Selection Tests.

Appreciation is extended to the Computer and Management Sciences Branch of the Personnel Research Division for their cooperation in developing the data sources for this study. Special recognition is given to the efforts made by the personnel in the Project Analysis and Programming Section (PESAW).

This report has been reviewed and is approved.

Harold E. Fischer, Colonel, USAF
Commander

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VALIDITY OF ARMED SERVICES VOCATIONAL APTITUDE BATTERY, FORM 1, TO PREDICT TECHNICAL SCHOOL SUCCESS

I. BACKGROUND

In 1962, the Air Force inaugurated a military high school testing program. The purpose of the program was to provide guidance counselors with vocational aptitude information on their students and to identify those students who possessed enlistment qualifications. The instrument used was the Airman Qualifying Examination (AQE). The AQE is a two-hour, multi-subtest battery which yields four aptitude composites designated as General, Administrative, Mechanical, and Electronics. A 20-interval centile scale (01, 05, 10, . . ., 95) with 5 percent of the normative base in each interval is used as the basis for converting the indexes of the four composites.

Rather than norming on the World War II mobilization population, Air Force uses recent samples tested on special composites of tests from the Project TALENT national aptitude census battery as its normative reference base. These Project TALENT composites were developed (Dailey, Shaycoft, & Orr, 1962) to reproduce the content and variance of the four AQE composites.

In 1966, the Assistant Secretary of Defense, Manpower and Reserve Affairs, established a joint services committee of measurement and evaluation personnel from each of the services whose task was to design, construct, develop, and standardize a single high-school testing aptitude battery which would meet the needs of each of the armed services. When completed, this aptitude battery, called the Armed Services Vocational Aptitude Battery (ASVAB), would serve as the testing instrument in a joint services high school testing program.

II. ASVAB DEVELOPMENT

Military basic trainee samples were tested with the aptitude batteries used by the Army, Navy, and Air Force. Four samples were drawn: 1,000 cases each from the Army, Navy, and Air Force, and 300 from the Marine Corps (The Marine Corps uses the Army's battery of tests for classification purposes). Each sample was administered the aptitude batteries from each of the three services. A counterbalanced order was used to minimize possible practice effects. Intercorrelations of these subtest scores were computed to provide for selection of ASVAB subtests which could give adequate content coverage for all services. Nine subtests were selected on the basis of these analyses. A brief description of the subtests is presented in the appendix.

Eight of the nine subtests of the ASVAB were developed from items selected from the Army, Navy, and Air Force classification tests. Criteria for item selection were mean difficulty level (proportion of examinees responding correctly), a lowest limit of acceptance in terms of discrimination level, and content validity. The 25 items in each of the eight subtests were arranged in order of difficulty so that about 85 percent of the examinees would pass the first few and the passing percentage would decrease to about 25 percent near the end of each subtest. Rather than the spiral omnibus format used for the AQE, the subtests were arranged for separate timing, thus, allowing examinees any possible benefit to be derived from maintaining mental set. The ninth subtest, a modification of the Army Coding Speed Test, is a 7-minute, 100-item test designed to measure clerical accuracy and speed in coding.

The Army, being the Department of Defense executive agent for the ASVAB, was charged with the task of standardizing the ASVAB to the World War II mobilization population base. In 1970, Bayroff and Fuchs published a report explaining the norming procedures.

In September of 1968, the ASVAB became operational in the military high school testing program.

III. STANDARDIZING THE ASVAB FOR AIR FORCE USE

In that same time period Vitola and Alley (1968) published a report dealing with the development and standardization of Air Force composites for the ASVAB in which the ASVAB was normed to the Project TALENT base rather than the World War II mobilization population base.

In addition to standardizing the ASVAB for Air Force use, intercorrelations were computed among all AQE scores, ASVAB variables, and each of the

Project TALENT aptitude composites. The resulting correlations demonstrated parallel relationships between AQE and ASVAB composities and the matching Project TALENT composities, supporting the alternate-form concept for the two tests.

Based on established homogeneity between the AQE and ASVAB composites, the ASVAB was standardized against Project TALENT norms. A brief explanation of the norming methodology is as follows:

Four separate samples of basic airmen (N=1,000) were tested on the entire ASVAB and the corresponding parts of the Project TALENT battery necessary to derive either a General, Administrative, Mechanical or Electronics composite.

Regression problems were computed to assess the extent to which use of all ASVAB subtests as predictors enhanced prediction of each AQE aptitude index over that achieved from selected ASVAB subtests alone, and to assess the contribution of each of the selected subtests to aptitude index prediction. Analyses of these problems resulted in content modification of ASVAB subtests and decisions about relative subtest integer weights.

A second series of regression problems was computed and the revised ASVAB subtest composites and high school course completion variables were used as predictors of the corresponding AQE composite. Integer bonus values for high school course completion were derived from the regression weights.

All composite means and standard deviations were compared between the ASVAB and AQE norming samples.

Equipercentile conversion tables between each of the four ASVAB aptitude composites and its Project TALENT reference composite were prepared, and reliabilities for each ASVAB composite were computed.

The underlying intent of standardizing the ASVAB for Air Force use was, when sufficient ASVAB data had matured, to obtain information concerning its effectiveness as a measure of predicting technical school success. How well an airman's aptitude index agrees with whether he succeeds or fails in technical school is a measure of the validity of the classification instrument for that particular job area. Thus, it is the primary purpose of this report to determine the extent to which the four ASVAB composites, General, Administrative, Mechanical and Electronics, predict the probability of technical school success.

IV. METHOD

The validities are reported as product-moment correlations (r) between the aptitude index and the final course grade. These correlations are restricted because they are developed on samples selected for training. This truncation, or reduction in range, requires correction through mathematical formulae which permit the estimation of the correlation in an unrestricted population. Formulae presented by Guilford (1965) were used to correct the correlation of the selector aptitude index with final school grade for restriction on AQE, and to correct ASVAB and non-selector AQE correlations for restriction on a third variable (AQE).

Data were gathered from 8,151 non-prior-service basic airmen during the period of October 1968 through July of 1969. To qualify as a subject for this study, each airman must have been selected for entry into the Air Force by scoring a minimum aptitude index of 40 on at least one composite of the AQE, he must have been given the ASVAB Form 1 during those time periods and, subsequently, he must have successfully completed a course in a technical school to which he had been assigned after completion of basic training. Data for 46 courses met these specifications.

Intercorrelations were computed between the four AQE aptitude composites and the criterion of final school grade for each of the 46 courses. Using the methodology indicated above, the resulting coefficients were corrected for restriction of range. Analysis of the data resulted in a determination of the validity of the selector aptitude index as a predictor of success for the particular course.

ASVAB validities between the four aptitude composites of the ASVAB and the criterion of final school grade (FSG) for each of the 46 courses were also computed for this sample of airmen. The resulting coefficients were corrected for restriction of range, using a formula which applies to a correlation of a new test (ASVAB) with a criterion (FSG), when selection has been made on the basis of a third variable (AQE).

V. RESULTS AND DISCUSSION

The ASVAB validities for the 46 courses are presented in Tables 1, 2, 3 and 5, grouped according to the aptitude index that serves as the selector index. Within each table, courses have been grouped to reflect career field structure. Courses are coded and designated by a prefix which indicates level of training and kind of student, and by a suffix designating the kind of equipment for which training is given (AFM 50-5 for details). No designation of significance level was made in Tables 1, 2, 3 and 5 since all coefficients were significantly different from zero at the .01 level. Tables 7 through 10 compare aptitude index validity coefficients, corrected and uncorrected, between AQE-66 and ASVAB Form 1.

Courses in the General Aptitude Cluster

Table 1 shows the ASVAB validities for technical school courses in the General cluster. It is evident that the General aptitude index of the ASVAB is more effective than any other aptitude index derived from ASVAB as a predictor of technical school success for the nine courses for which it is the selector aptitude index. Generalizing the magnitude of the validities obtained to other courses in the General aptitude area, ASVAB may serve as part of a selection and classification vehicle in the Air Force personnel classification system.

Courses in the Administrative Aptitude Cluster

Table 2 shows ASVAB validities for technical school courses in the Administrative cluster. For the seven courses listed in the Administrative area (Table 2), the validities of the Administrative aptitude index tend to be a little lower than the validities of the General aptitude index for courses in the General area (Table 1). The Administrative aptitude index of the ASVAB is uniformly effective as a predictor of technical school success for the seven courses for which it is the selector aptitude index. The Administrative index of the ASVAB could also serve as part of a selection and classification vehicle in the personnel classification system.

Courses in the Mechancial Cluster

Table 3 shows ASVAB validities for technical school courses in the Mechanical cluster.

Analysis of the data of Table 3 reveals: (*a*) in eight of the 16 courses in the Mechanical area, the selector aptitude index predicts the criterion at a slightly higher level of validity than any of the other ASVAB aptitude indexes, (*b*) in two courses the selector aptitude index predicts the criterion at the same level of validity as at least one of the other ASVAB aptitude index, and (*c*) in six of the courses, the selector aptitude index predicts the criterion at a slightly lower level of validity than at least one of the other ASVAB aptitude indexes. In 15 of the 16 courses, the selector index in the Mechanical area predicts the criterion at a signicant (.01), useful and acceptable level of efficiency.

Since the Mechanical index of ASVAB, as a selector index for the 16 courses in the Mechanical cluster, did not predict at a higher level of validity than one or more other aptitude indexes, AQE-66 validity data in the Mechanical cluster were gathered for the same 16 courses. These data are shown in Table 4. Analysis of the data results in the conclusion that the need to improve the level of prediction of the Mechanical index of ASVAB is not a problem in ASVAB alone. Similar relationships were found between the Mechanical index of AQE-66 and the mechanical technical school course grades. It is probable that changes in technology or instructional technique have altered the nature of the criterion variable, resulting in less thanoptimumprediction.

Research is in progress which examines the composite validity of various combinations of ASVAB subtests that should improve the level of prediction of the Mechanical aptitude index, when it is being used as a selector index for entry into technical school.

Courses in the Electronics Cluster

Table 5 shows the ASVAB validities for technical school courses in the Electronics Cluster. Compared to the levels of validity obtained in the other three clusters, the Electronics aptitude index yields the most satisfactory overall level of prediction. In all 14 courses, the selector aptitude index predicts the criterion at a higher level than any of the other aptitude indexes.

Data, showing means and standard deviations of the four ASVAB and AQE composites and final school grade for graduates of the 46 technical courses, are presented in Table 6.

Table 1. **ASVAB Validities for Techinical School Courses in the General Cluster**[a]

Course		Minimun AI	N	Aptitude Index Validities							
				Mechanical		Administrative		General		Electronics	
				r	r_c	r	r_c	r	r_c	r	r_c
3ABR20630	Imagery Interpreter Specialist	80	116	.37	.78	.30	.80	.42	.86	.43	.84
3ABR25231	Weather Observer	80	99	.32	.81	.39	.79	.35	.84	.34	.81
3ABR27230	Air Traffic Control Operator	60	156	.21	.50	.32	.59	.42	.68	.39	.67
3ABR27330	Aircraft Control and Warning Operator	60	133	.30	.55	.38	.66	.66	.83	.55	.77
3AQR90010	Medical Service Fundamentals	60	401	.45	.69	.56	.77	.69	.84	.61	.80
3ABR90230	Medical Service Specialist	60	50	.45	.70	.41	.67	.63	.84	.55	.77
3ABR92230	Protective Equipment Specialist	40	60	.53	.66	.26	.45	.42	.69	.37	.56
3ABR63130	Fuel Specialist	40	150	.34	.45	.34	.46	.42	.54	.38	.50
3ABR81130	Security Specialist	40	707	.45	.60	.45	.62	.58	.72	.56	.70

[a]Validities reported uncorrected (r) and corrected for restriction of range (r_c).

Table 2. **ASVAB Validities for Technical School Courses in The Administrative Cluster**[a]

Course		Minimun AI	N	Aptitude Index Validities							
				Mechanical		Administrative		General		Electronics	
				r	r_c	r	r_c	r	r_c	r	r_c
3ABR29130	Communications Center Specialist	60	215	.33	.45	.42	.64	.42	.62	.43	.61
3AQR29222	Printer Systems Operator, Prep	60	91	.14	.28	.34	.50	.35	.46	.34	.48
3ABR29231	Morse Systems Operator	60	84	.01	.24	.28	.57	.25	.50	.22	.51
3ABR29330	Ground Radio Operator, Voice	60	215	.08	.21	.25	.38	.22	.35	.15	.29
3ABR64530	Inventory Management Specialist	60	789	.27	.49	.48	.75	.47	.71	.46	.68
3ABR67133	Disbursement Accounting Specialist	80	122	.11	.27	.32	.37	.21	.25	.22	.25
3ABR73230	Personnel Specialist	60	262	.42	.63	.63	.86	.62	.82	.62	.81

[a]Validities reported uncorrected (r) and corrected for restriction of range (r_c).

Table 3. **ASVAB Validities for Technical School Courses in the Mechanical Cluster**[a]

	Course	Minimum AI	N	Mechanical r	Mechanical r_c	Administrative r	Administrative r_c	General r	General r_c	Electronics r	Electronics r_c
				Aptitude Index Validites							
3ABR42132	Aircraft Pneudralic Repairman	40	115	.49	.62	.25	.41	.48	.61	.48	.61
3ABR42430	Aircraft Fuel Systems Mechanic	40	66	.13	.29	.37	.39	.43	.47	.45	.50
3ABR43131-A	Aircraft Maintenance Specialist (Reciprocating engine)	40	238	.52	.67	.50	.61	.54	.69	.58	.71
3ABR43131-C	Aircraft Maintenance Specialist (Jet, 1 and 2 engines)	40	691	.38	.55	.34	.43	.40	.54	.37	.53
3ABR43131-E	Aircraft Maintenance Specialist (Jet, over 2 engines)	40	302	.47	.63	.27	.39	.42	.57	.46	.62
3ABR43131-F	Aircraft Maintenance Specialist (Turbo-prop)	40	271	.48	.66	.31	.41	.47	.64	.47	.64
3ABR43230	Jet Engine Mechanic	40	485	.45	.61	.38	.51	.49	.59	.42	.54
3ABR44330	Missile Mechanic	50	53	.50	.67	.46	.59	.60	.73	.64	.77
3ABR46130	Munitions Maintenance Specialist	60	73	.31	.55	.43	.59	.58	.73	.38	.61
3ABR46230	Weapons Mechanic	60	345	.27	.53	.26	.43	.35	.52	.31	.53
3ABR47330	Vehicle Repairman, GP	40	52	.73	.82	.55	.68	.68	.79	.71	.81
3ABR53430	Airframe Repair Specialist	40	150	.55	.70	.46	.59	.47	.63	.56	.69
3ABR53530	Corrosion Control Specialist	50	51	.54	.71	.57	.73	.82	.88	.65	.78
3ABR54330	Electrical Power Production Specialist	50	120	.54	.64	.35	.48	.49	.60	.52	.62
3ABR60531	Air Cargo Specialist	50	170	.43	.55	.36	.46	.43	.58	.42	.55
3ABR60730	Aircraft Loadmaster	50	83	.38	.59	.49	.63	.69	.80	.58	.73

[a]Validities reported uncorrected (r) and corrected for restriction of range (r_c).

Table 4: **AQE-66 Validities for Technical School Courses in the Mechanical Cluster**[a]

Course		Minimun AI	N	Aptitude Index Validities: Mechanical r	Mechanical r_c	Administrative r	Administrative r_c	General r	General r_c	Electronics r	Electronics r_c
3ABR42132	Aircraft Pneudraulic Repair	40	115	.35	.55	.26	.43	.30	.49	.34	.54
3ABR42430	Aircraft Fuel Systems Mechanic	40	66	.05	.26	.20	.72	.34	.88	.17	.66
3ABR43131-A	Aircraft Maintenance Specialist (Reciprocating engine)	40	238	.53	.71	.49	.66	.53	.71	.54	.71
3ABR43131-C	Aircraft Maintenance Specialist (Jet, 1 and 2 engine)	40	691	.34	.55	.35	.56	.38	.60	.39	.62
3ABR43131-E	Aircraft Maintenance Specialist (Jet, over 2 engines)	40	302	.30	.56	.27	.51	.30	.56	.44	.72
3ABR43131-F	Aircraft Maintenance Specialist (Turbo-prop)	40	271	.47	.68	.30	.47	.44	.63	.41	.60
3ABR43230	Jet Engine Mechanic	40	485	.42	.62	.39	.59	.44	.64	.49	.69
3ABR44330	Missile Mechanic	50	53	.52	.71	.49	.67	.46	.64	.57	.75
3ABR46130	Munitions Maintenance Specialist	60	73	.37	.63	.42	.68	.47	.73	.39	.65
3ABR46230	Weapons Mechanic	60	345	.32	.59	.29	.54	.29	.55	.36	.63
3ABR47330	Vehicle Repairman, GP	40	52	.65	.79	.56	.71	.67	.80	.61	.76
3ABR53430	Airframe Repair Specialist	40	150	.53	.71	.44	.61	.42	.59	.44	.61
3ABR53530	Corrosion Control Specialist	50	51	.62	.77	.65	.79	.74	.86	.71	.84
3ABR54330	Electrical Power Production Specialist	50	120	.26	.47	.25	.46	.33	.57	.43	.69
3ABR60531	Air Cargo Specialist	50	170	.24	.44	.36	.60	.39	.64	.37	.61
3ABR60730	Aircraft Loadmaster	50	83	.44	.66	.55	.77	.61	.82	.61	.82

[a]Validities reported uncorrected (r) and corrected for restriction of range (r_c).

Table 5. **ASVAB Validities for Technical School Courses in the Electronics Cluster**[a]

Course		Minimun AI	N	Aptitude Index Validities: Mechanical r	Mechanical r_c	Administrative r	Administrative r_c	General r	General r_c	Electronics r	Electronics r_c
3ABR30130	Aircraft Radio Repairman	80	114	.29	.78	.38	.78	.41	.84	.52	.86
3ABR30131	Aircraft Electronic Navigation Equipment Repairman	80	138	.17	.58	.15	.60	.22	.76	.32	.82
3ABR30133	Electronic Warfare Repairman	80	62	.37	.79	.16	.68	.21	.78	.38	.82
3ABR30134	Aircraft Inertial and Radar Navigator Systems Repairman	80	71	.33	.75	.26	.27	.39	.84	.39	.85
3ABR30430	Radio Relay Equipment Repairman	80	61	.42	.84	.16	.19	.22	.62	.38	.85
3ABR30434	Ground Radio Communications Equipment Repairman	80	70	.44	.86	.25	.68	.33	.81	.43	.87
3ABR30630	Electronic Communications and Cryptographic Equipment Systems Repairman	80	50	.03	.34	.20	.31	.19	.58	.27	.64
3ABR30730	Telecommunications Control Specialist/Attendant	80	82	.41	.82	.41	.83	.42	.83	.43	.84
3ABR32231-A	Weapons Control Systems Mechanic	80	60	.16	.68	.19	.71	.18	.69	.16	.75
3ABR36330	Communications and Relay Center Equipment Repairman, Elec/Mech	60	52	.30	.56	.19	.43	.33	.63	.43	.69
3ABR40230	Aerospace Photographic Systems Repairman	60	66	.26	.38	.20	.37	.27	.58	.27	.59
3ABR42133	Aerospace Ground Equipment Repairman	60	208	.57	.80	.34	.60	.50	.79	.59	.83
3ABR42230	Instrument Repairman	40	68	.32	.62	.30	.49	.36	.65	.39	.67
3ABR42330	Aircraft Electrical Repairman	40	134	.35	.56	.38	.60	.41	.62	.42	.64

[a]Validities reported uncorrected (r) and corrected for restriction of range (r_c).

Table 6. Means and Standard Deviations of ASVAB and AQE Composites and Final School Grade for Graduates of 46 Technical Courses

Course	N	ASVAB Composite Mean	ASVAB Composite SD	AQE Composite Mean	AQE Composite SD	Final Grade Mean	Final Grade SD
General Cluster							
3ABR20630	116	86.08	10.58	80.33	10.25	81.56	5.29
3ABR25231	99	90.45	8.07	90.40	5.54	88.97	3.69
3ABR27230	156	79.78	13.21	77.76	10.58	90.09	4.19
3ABR27330	133	70.15	18.40	71.92	9.33	85.34	6.06
3AQR90010	401	77.19	20.25	78.95	11.38	86.85	6.94
3ABR90230	50	76.53	16.17	80.61	11.50	86.82	5.13
3ABR92230	60	63.75	17.29	62.83	14.44	89.63	3.91
3ABR63130	150	62.37	23.67	64.07	15.97	88.73	5.06
3ABR81130	707	63.01	22.28	65.62	14.01	87.52	3.81
Administrative Cluster							
3ABR29130	215	76.10	16.14	71.23	10.53	83.70	5.39
3AQR29222	91	71.92	15.98	79.45	11.78	84.57	4.24
3ABR29231	84	77.86	13.39	81.60	11.40	87.45	5.17
3ABR29330	215	69.67	14.18	79.74	9.97	88.86	5.23
3ABR64530	789	74.11	14.99	73.82	11.19	88.23	5.68
3ABR67133	122	82.25	12.24	92.42	4.26	79.73	6.62
3ABR73230	262	68.03	15.21	75.43	11.04	87.58	6.68
Mechanical Cluster							
3ABR42132	115	60.87	19.46	54.74	13.02	86.69	5.30
3ABR42430	66	51.06	16.32	44.55	4.41	83.00	5.28
3ABR43131-A	238	71.91	19.18	67.50	14.41	78.98	6.05
3ABR43131-C	691	72.75	17.02	64.99	12.42	76.97	5.96
3ABR43131-E	302	63.21	18.47	61.11	10.85	87.13	4.75
3ABR43131-F	271	72.40	17.24	66.88	13.55	81.38	6.16
3ABR43230	485	65.81	19.35	60.07	13.46	83.79	5.53
3ABR44330	53	78.02	17.08	73.68	14.11	87.38	4.14
3ABR46130	73	79.86	15.12	77.81	11.50	91.85	3.13
3ABR46230	345	79.17	14.51	75.88	10.66	91.86	3.17
3ABR47330	52	56.83	21.71	56.92	15.45	85.40	4.74
3ABR53430	150	70.95	18.17	63.39	14.44	84.89	4.64
3ABR53530	51	70.69	18.15	67.74	15.03	85.39	4.95
3ABR54330	120	62.54	20.01	61.87	11.48	81.88	5.37
3ABR60531	170	66.68	19.78	63.76	11.87	90.35	4.17
3ABR60730	83	76.69	15.21	74.04	12.57	83.33	6.22
Electronics Cluster							
3ABR30130	114	91.36	6.57	89.47	5.71	83.18	5.03
3ABR30131	138	90.36	6.22	88.48	5.79	83.90	4.52
3ABR30133	62	89.68	8.79	88.23	6.03	82.50	5.77
3ABR30134	71	91.20	6.31	89.30	5.46	82.70	4.88
3ABR30430	61	91.56	5.47	89.59	5.82	83.48	4.46
3ABR30434	70	91.00	6.95	89.36	5.79	84.60	4.50
3ABR30630	50	90.92	6.75	89.18	5.75	86.35	3.43
3ABR30730	82	90.91	7.41	88.35	5.79	85.23	4.46
3ABR32231-A	60	91.08	5.92	90.17	5.32	83.68	4.49
3ABR36330	52	84.52	11.86	79.13	10.95	83.13	5.77
3ABR40230	66	79.62	12.41	75.53	9.42	83.95	3.95
3ABR42133	208	78.71	16.47	79.16	7.40	89.28	4.34
3ABR42230	68	78.90	13.58	73.75	9.83	82.93	5.63
3ABR42330	134	77.16	13.91	73.99	10.72	85.85	4.64

Comparison of AQE and ASVAB Validities

Prior to AQE being replaced by ASVAB in the military high school testing program, AQE validity data were readily available to high school guidance counselors to aid them in making vocational guidance decisions. Since 1968, the year ASVAB became operational, recruiters from each of the services have encountered resistance to the use of the ASVAB in the high schools because they could not present empirical evidence concerning the validity of the ASVAB to predict a degree of success in various vocational areas. Tables 7 through 10 show data comparing validities of the AQE and ASVAB to predict technical school success in a selected (r) and unselected population (R_c).

In each aptitude cluster (General, Administrative, Mechanical, and Electronics), the validities for the unrestricted population were compared between AQE and ASVAB for the technical courses falling within that cluster (Guilford, 1965, formula 9.12). Analysis of the data from Tables 7 through 10 indicate the following: (*a*) in 37 of the 46 courses, there is no significant difference between the level of prediction of AQE and the level of prediction of ASVAB, (*b*) in six courses ASVAB predicts technical school success at a significantly higher level than AQE, and (*c*) in three courses AQE predicts significantly better than ASVAB. Generally speaking, the results of this study show that ASVAB will efficiently perform as a tool to help guidance counselors make vocational guidance decisions and will also serve as an instrument for use in the initial assignment of enlistees to technical training schools.

Table 7. AQE and ASVAB Validities for Technical School Courses in the General Cluster

Course		Minimum AI	N	Aptitude Index Validities: AQE r	AQE r_c	ASVAB r	ASVAB r_c
3ABR20630	Imagery Interpreter Specialist	80	116	.37	.87	.42	.86
3ABR25231	Weather Observer	80	99	.45	.90*	.35	.84
3ABR27230	Air Traffic Control Operator	60	156	.43	.72	.42	.68
3ABR27330	Aircraft Control and Warning Operator	60	133	.40	.73	.66	.83**
3AQR90010	Medical Service, Fundamentals	60	401	.51	.76	.69	.84
3ABR90230	Medical Service Specialist	60	50	.62	.84	.63	.84
3ABR92230	Protective Equipment Specialist	40	60	.44	.62	.42	.69*
3ABR63130	Fuel Specialist	40	150	.39	.52	.42	.54
3ABR81130	Security Specialist	40	707	.48	.67	.58	.72*

*Difference significant at the .05 level.
**Difference significant at the .01 level.

Table 8. AQE and ASVAB Validities for Technical School Courses in the Administrative Cluster

Course		Minimum AI	N	Aptitude Index Validities: AQE r	AQE r_c	ASVAB r	ASVAB r_c
3ABR29130	Communications Center Specialist	60	215	.33	.61	.42	.64
3AQR29222	Printer Systems Operator, Prep	60	91	.24	.44	.34	.50
3ABR29231	Morse Systems Operator	60	84	.36	.62	.28	.57
3ABR29330	Ground Radio Operator, Voice	60	215	.15	.33	.25	.38
3ABR64530	Inventory Management Specialist	60	789	.48	.75	.48	.75
3ABR67133	Disbursement Accounting Specialist	80	122	.03	.18	.32	.37
3ABR73230	Personnel Specialist	60	262	.58	.83	.63	.86*

*Difference significant at the .05 level.

Table 9. AQE and ASVAB Validities for Technical School Courses in the Mechanical Cluster

Course		Minimum AI	N	Aptitude Index Validities			
				AQE		ASVAB	
				r	r_c	r	r_c
3ABR42132	Aircraft Pneudralic Repair	40	115	.35	.55	.49	.62
3ABR42430	Aircraft Fuel Systems Mechanic	40	66	.05	.26	.13	.29
3ABR43131-A	Aircraft Maintenance Specialist (Reciprocating engine)	40	238	.53	.71	.52	.67
3ABR43131-C	Aircraft Maintenance Specialist (Jet, 1 and 2 engines).	40	691	.34	.55	.38	.55
3ABR43131-E	Aircraft Maintenance Specialist (Jet, over 2 engines)	40	302	.30	.56	.47	.63
3ABR43131-F	Aircraft Maintenance Specialist (Turbo-prop)	40	271	.47	.68	.48	.66
3ABR43230	Jet Engine Mechanic	40	485	.42	.62	.45	.61
3ABR44330	Missile Mechanic	50	53	.52	.71	.50	.67
3ABR46130	Munitions Maintenance Specialist	60	73	.37	.63	.31	.55
3ABR46230	Weapons Mechanic	60	345	.32	.59	.27	.53
3ABR47330	Vehicle Repairman, GP	40	52	.65	.79	.73	.82
3ABR53430	Airframe Repair Specialist	40	150	.53	.71	.55	.70
3ABR53530	Corrosion Control Specialist	50	51	.62	.77	.54	.71
3ABR54330	Electrical Power Production Specialist	50	120	.26	.47	.54	.64*
3ABR60531	Air Cargo Specialist	50	170	.24	.44	.43	.55
3ABR60730	Aircraft Loadmaster	50	83	.44	.66	.38	.59

*Difference significant at the .05 level.

Table 10. AQE and ASVAB Validities for Technical School Courses in the Electronics Cluster

Course		Minimum AI	N	Aptitude Index Validities			
				AQE		ASVAB	
				r	r_c	r	r_c
3ABR30130	Aircraft Radio Repairman	80	114	.41	.88	.52	.86
3ABR30131	Aircraft Electronic Navigation Equipment Repairman	80	138	.36	.84	.32	.82
3ABR30133	Electronic Warfare Repairman	80	.62	.38	.84	.38	.82
3ABR30134	Aircraft Inertial and Radar Navigation Systems Repairman	80	71	.40	.88*	.39	.85
3ABR30430	Radio Relay Equipment Repairman	80	61	.45	.89	.38	.85
3ABR30434	Ground Radio Communication Equipment Repairman	80	70	.45	.90	.43	.87
3ABR30630	Electronic Communications and Cryptographic Equipment Systems Repairman	80	50	.20	.62	.27	.64
3ABR30730	Telecommunications Control Specialist/Attendant	80	82	.42	.88*	.43	.84

Table 10 *(Continued)*

	Course	Minimum AI	N	Aptitude Index Validities AQE r	r_c	ASVAB r	r_c
3ABR32231-A	Weapons Control Systems Mechanic	80	60	.30	.80	.16	.75
3ABR36330	Communications and Relay Center Equipment Repairman, Elec/Mech	60	52	.46	.74	.43	.69
3ABR40230	Aerospace Photographic Systems Repairman	60	66	.31	.62	.27	.59
3ABR42133	Aerospace Ground Equipment Repair	60	208	.40	.81	.59	.83
3ABR42230	Instrument Repairman	40	68	.40	.67	.39	.67
3ABR42330	Aircraft Electrical Repair	40	134	.34	.61	.42	.64

*Difference significant at the .01 level.

VI. CONCLUSIONS

This study determined the efficiency with which the four aptitude composites of the ASVAB predict technical school success. In three of the four aptitude clusters, General, Administrative, and Electronics, the selector index, corrected for restriction of range resulting from selection on this variable, exceeded the validity of each of the other indexes. In the Mechanical cluster this result was not obtained throughout. Nevertheless, the selector index in the Mechanical area is performing with acceptable efficiency (15 of 16 validity coefficients were significantly different from zero at the .01 level of confidence).

The ASVAB predicts technical school success at approximately the same level of validity as the AQE. Changes in the Mechanical composite are under study and a revised index may be recommended for particular courses in the Mechanical area. It appears that ASVAB has demonstrated its worth as an instrument for use in the military high school testing program, and as a selection instrument in the initial classification and assignment process of the Air Force personnel system.

With the advent of the ASVAB as a production instrument, a careful review of all composite score composition is indicated. Results of this study should allow Air Force recruiters to gain access to school systems who, heretofore, had rejected the ASVAB on the basis of the fact that the ASVAB had not demonstrated predictive validity.

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APPENDIX: ASVAB SUBTESTS

Coding Speed evaluates the examinee's ability to quickly and accurately assign coded numbers by relating them to specific words. It is designed to test clerical aptitude in speeded operations.

Word Knowledge is a test of verbal ability involving the definition of words. This is a classical vocabulary test involving non-technical terms.

Arithmetic Reasoning evaluates the examinee's ability to think through mathematical problems presented in verbal form. It involves the discovery and application of the general mathematical principles required to arrive at a correct solution to each problem, as well as performance of the necessary calculations to attain that solution.

Tool Knowledge is a pictorial test which requires the examinee to identify pictured tools and determine related items with which they are used.

Space Perception involves visualizing the folding of flat patterns into three-dimensional objects.

Mechanical Comprehension evaluates the ability of the examinee to determine from pictures of mechanical devices their operating characteristics.

Shop Information determines the examinee's previous knowledge about shop practices and the use of tools in specific situations.

Automotive Information is designed to evaluate specific knowledge about automobiles and automobile motors.

Electronics Information involves the ability to apply previously acquired knowledge in the areas of electricity and electronics toward the solution of problems in practical situations.