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ACB and AQB-I Compared in
Terms of Category IV
Acceptance Rate

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FOREWORD

The tables in this Research Memorandum were developed to provide data for USAPRO personnel in briefing members of DCSPER during the period the Army Qualification Battery, AQB-1 was being introduced.

Since this Research Memorandum was prepared, the AQB-1 has been superceded for use with the Active Army by two new alternate forms of each component test. Two additional tests, the General Information Test (GIT) and the Classification Inventory (CI), have become part of the AQB. The AQB-1 has now been authorized for use by Reserve components. The acceptance rates for the new forms of the AQB may differ somewhat from those reported here for AQB-1.

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ACB AND AQB-1 COMPARED IN TERMS OF CATEGORY IV ACCEPTANCE RATE

The Armed Forces Qualification Test (AFQT) has been since 1950 the measure used for screening enlisted men for all branches of the Armed Forces; since 1949 the Army Classification Battery (ACB) has been employed in classifying enlisted men at Reception Stations after acceptance into the Army.

In October 1957, the ACB was introduced at six Armed Forces Examining Stations (AFES) as an additional screening tool for Category IV applicants for enlistment. Category IV individuals were rejected if they failed to achieve a standard score of 90 or higher on two or more aptitude areas. In August 1958, the program was extended to all AFES and applied also to Selective Service registrants. There was obvious need for a shorter battery of tests which would differentially predict aptitude area scores within Category IV in less time than was required for the ACB.

The Army Qualification Battery (AQB-1) was consequently developed. As originally presented, it consisted of the four content areas of the AFQT scored separately (Verbal, Arithmetic Reasoning, Tools, Space) plus four newly constructed short tests (Clerical Speed, Mechanical Aptitude, Automotive Information, Electrical Information). Each of these eight tests was a short counterpart of a longer ACB test. Development and standardization of the AQB has been described by Bayroff, Seeley, and Anderson (1959).

During the standardization of the AQB, a question was raised by DCSPER concerning the effects of substituting AQB for the ACB. How would the AQB compare with the ACB in terms of acceptance rate within Category IV? Would substitution of the AQB for the ACB result in a larger or smaller percentage of Category IV personnel with two or more aptitude area scores of 90 or higher? To answer these questions, data collected in the AQB standardization study were examined.

Table 1 shows the percentages of Category IV personnel passing various numbers of aptitude areas. Table 2 shows comparable figures for a high Category IV (percentiles 21-30) sample. Figures for the operational AFQT sample are based on a maximum of 163 Category IV cases collected at three Training Divisions (Forts Dix, Knox, and Chaffee) in April 1958. Both applicants for enlistment and Selective Service registrants were included, but in unknown proportions. In general, these figures seemed to suggest that ACB is somewhat the stricter screening device, rejecting more men than AQB, at least at the point of greatest present interest, the passing of two or more aptitude areas with scores of 90 or better. Because of the small N, the unknown ratio of registrants to enlistees, plus the fact that Systems Development Branch reported somewhat differing percentages on a sample the Branch had collected, findings were checked on an additional and substantially larger sample.

In August 1958, a sample of 1032 Selective Service registrants and 248 applicants for enlistment, all Category IV, were tested at ten selected AFES in six Army Areas.^{1/} Table 3 contains the basic percentage figures for these two groups. In brief, results reversed indications from the previous sample. In the more recent sample, AQB appeared to be a stricter screening instrument than ACB, particularly for Selective Service registrants. Whereas ACB accepted 70.2% of the registrants as passing two or more aptitude areas with scores of 90 or better, AQB accepted only 56.5%. If we overlook the smallness of the April 1958 sample, and the fact that it contained both registrants and applicants in unknown proportions, the most obvious factor to which this difference may be attributed is the sequence of the batteries. In April, AQB followed ACB; in August, AQB preceded ACB and thus avoided any possible practice effect. On the Clerical Speed Test, in particular, practice effect is known to be considerable.

Table 1

PERCENTAGES OF CATEGORY IV PERSONNEL^a
 ATTAINING 90 OR ABOVE ON ACB VS AQB APTITUDE AREAS
 (APRIL 1958 DATA COLLECTED AT TRAINING DIVISIONS)

Number of Aptitude Areas Passed	Sample (N = 163) based on operational AFQT		Sample (N = 130) based on experimental AFQT	
	ACB	AQB ^b	ACB	AQB ^b
3 or more	34	49	38	55
2 or more	47	61	58	75
1 or more	75	71	84	89
None	25	29	16	11

^a Enlistees and Selective Service Registrants; AFQT Percentiles 10-30.

^b AQB administered after ACB.

^{1/} New York, Cincinnati, Louisville, Atlanta, Montgomery, Houston, San Antonio, Chicago, Los Angeles, and Oakland.

Table 2

**PERCENTAGES OF HIGH CATEGORY IV PERSONNEL^a
 ATTAINING 90 OR ABOVE ON ACB VS AQB APTITUDE AREAS
 (APRIL 1958 DATA COLLECTED AT TRAINING DIVISIONS)**

Number of Aptitude Areas	Sample (N = 70) based on operational AFQT		Sample (N = 68) based on experimental AFQT	
	ACB	AQB ^b	ACB	AQB ^b
3 or more	60	69	50	77
2 or more	74	77	75	93
1 or more	88	83	90	99
None	12	17	10	1

^a Enlistees and Selective Service Registrants; AFQT Percentiles 21-30.

^b AQB administered after ACB.

Two other factors were looked into that might have caused a difference between the two samples in the percentage passing two or more aptitude areas. The distribution of the cases in terms of AFQT scores threw no light on the problem. In the April sample, 93 cases (57%) were in the 10-20 percentile range; the remaining 43% were in the 21-30 percentile range. The August sample, with 582 cases (56%) in the 10-20 percentile range, was for practical purposes identical. Concerning the motivation of the men in the two samples, speculation is all that can be offered. Both tests were administered with the same instructions, the August sample to men in AFES and the April sample to men in the early weeks of basic training. Whether motivation would be lower during basic training than in AFES, or vice versa, is a matter for conjecture.

In November 1959, an additional sample of 1050 Category IV personnel was collected for cross-standardization of AQB-1. Only Selective Service registrants were included, these coming from six AFES.^{2/} The sample was more carefully stratified than earlier samples. The AQB was administered before the ACB. Although primary concern in this study was with conversion tables and relationships among the variables, figures were obtained showing the percent of men passing from 1 to 8 aptitude areas with standard scores of 90 or higher, and 100 or higher.

^{2/} New York, Atlanta, New Orleans, Detroit, Oakland, and Los Angeles.

Table 3

PERCENTAGES OF CATEGORY IV SELECTIVE SERVICE REGISTRANTS^a
 ATTAINING 90 OR ABOVE ON ACB VS AQB APTITUDE AREAS
 (AUGUST 1958 DATA)

Number of Aptitude Areas Passed	Selective Service Registrants ^a (N = 1032)				Applicants for Enlistments ^b (N = 248)	
	90 or higher on AA		100 or higher on AA		90 or higher on AA	
	ACB	AQB ^c	ACB	AQB ^c	ACB	AQB ^c
3 or more	54	34	21	4	81	72
2 or more	70	56	33	13	92	90
1 or more	86	79	58	37	96	99
None	14	21	42	63	4	1

^a AFQT Percentiles 10-30.

^b AFQT Percentiles 21-30.

^c AQB administered before ACB.

Table 4 summarizes the results. When this table is compared with Table 3, the 1959 percentages are seen to be similar to those of the August 1958 study. Again, the AQB passed fewer men than did ACB. However, for both AQB and ACB aptitude areas, the percentage of passers was greater in this sample than in the August 1958 sample. Since the proportion of high (AFQT percentile 21-30) Category IV men in the 1959 sample (50%) was slightly greater than in the 1958 study (44%), a higher percentage of passers among the 1959 cases at any given cut point was to be expected.

Table 4

PERCENTAGES OF AFQT CATEGORY IV SELECTIVE SERVICE REGISTRANTS^a
 ATTAINING 90 OR ABOVE ON ACB VS AQB APTITUDE AREAS
 (NOVEMBER 1959 DATA; N = 1050)

Number of Aptitude Areas Passed	90 or higher		100 or higher	
	ACB	AQB ^b	ACB	AQB ^b
3 or more	56	43	19	4
2 or more	74	64	34	15
1 or more	88	86	61	39
None	12	14	39	61

^a AFQT Percentiles 10-30.

^b AQB administered before ACB.

On balance, when the data from all three studies are considered with the pertinent circumstances surrounding each study, it appears safe to conclude that the percentage of Category IV men passing AQB aptitude areas at 90 or above is lower than the percentage passing ACB areas--when AQB is administered prior to ACB. However, when only one battery is administered as in an operational situation, it does not seem reasonable to conclude that the percentage of AQB passers over a period of time would be substantially, or, in fact, any smaller than the percentage of a comparable group tested with ACB.

The remaining tables in this report contain additional data concerning percent of passers on ACB and AQB aptitude areas. Results are shown for a number of breakdowns of the basic data: high level Category IV men (21-30 percentile) compared with low level (10-20 percentile); numbers passing at a standard score of 90 on the aptitude areas as opposed to a standard score of 100; numbers passing the General Technical (GT) Aptitude Area specifically and one or more additional areas. Each of the several tables is self-descriptive.

REFERENCE

Bayroff, A. G., Seeley, L. C. and Anderson, A. A. Development of the AQB. U. S. Army Personnel Research Office. Technical Research Report 1117. October 1959.

TABLE 5

AFQT CATEGORY IV SELECTIVE SERVICE REGISTRANTS PASSING TWO OR
MORE APTITUDE AREAS AT STANDARD SCORE OF 90 OR HIGHER
(AUGUST 1958 DATA; N = 1032)

	ACB		AQB	
	N	%	N	%
AFQT Percentile 21-30	402	89	387	86
AFQT Percentile 10-20	322	55	196	34

Table 6

PERSONNEL HAVING GENERAL TECHNICAL (GT) APTITUDE AREA SCORES 90 OR ABOVE
AND 100 OR ABOVE--ACB VS AQB IN THREE SAMPLES

Sample		ACB		AQB	
		N	%	N	%
Applicants for Enlistment (AFQT Pctl 21-30) N = 248 (August 1958)	GT 90+	101	41	77	31
	GT 100+	26	10	15	6
Selective Service Regis- trants (AFQT Pctl 10-30) N = 1032 (August 1958)	GT 90+	278	27	219	21
	GT 100+	109	11	51	5
Both Applicants for Enlist- ment and Selective Service Registrants (AFQT Pctl 10-100) N = 540 (April 1958)	GT 90+	409	76	417	77
	GT 100+	323	60	328	61

Table 7

PERCENT OF CATEGORY IV PERSONNEL PASSING (90+) GT
AND ONE OR MORE OTHER APTITUDE AREAS
(AUGUST 1958 DATA)

	248 Enlistees (AFQT percentiles 21-30)		1032 Selective Service Registrants (AFQT percentiles 10-30)	
	ACB	AQB	ACB	AQB
GT + 1 or more areas	45	26	26	19
GT + 2 or more areas	38	23	22	14

Table 8

PERCENT AT AFQT 31 PERCENTILE OR HIGHER WHO PASS GT AT 90 + AND AT 100 + --
STRATIFIED SAMPLE OF 540^a COMPARED WITH THEORETICAL
(NORMAL BIVARIATE SURFACE) DISTRIBUTION

GT Category		Theoretical	Empirical
ACB	90 +	87	88
	100 +	68	75
AQB	90 +	89	90
	100 +	69	76

^aSample collected in April 1958 at three Training Divisions.

Table 9

MEANS AND STANDARD DEVIATIONS OF ACB AND AQB APTITUDE AREA SCORES COMPARED FOR AFQT CATEGORY IV MEN
 ATTAINING 90 OR ABOVE ON TWO APTITUDE AREAS AND THOSE FAILING TO QUALIFY ON TWO APTITUDE AREAS
 (N = 1032 SELECTIVE SERVICE REGISTRANTS, AUGUST 1958)

Aptitude Areas	Qualifying on two AA's			Failing to qualify on two AA's		
	ACB (N = 728)	AQB (N = 591)		ACB (N = 304)	AQB (N = 441)	
	M	M	SD	M	M	SD
Combat A	89.9	84.2	13.2	74.1	78.2	5.9
Combat B	93.5	88.2	10.5	77.6	79.6	5.0
Electronic	89.6	90.4	13.0	76.8	80.2	7.0
General Maintenance	91.9	89.2	10.2	76.8	84.3	7.2
Motor Maintenance	93.3	92.5	12.6	80.1	81.4	8.1
General Technical	86.0	86.0	13.5	71.8	79.0	6.8
(New) Clerical	97.7	88.4	14.2	79.8	78.6	8.2

Table 10

YEARS OF EDUCATION
OF CATEGORY IV SELECTIVE SERVICE PERSONNEL
PASSING OR FAILING TO PASS TWO OR
MORE APTITUDE AREAS AT 90 OR ABOVE^a

AFQT Category IV	N	Means ^b	S.D.
PASSING	713	10.43	2.11
FAILING	304	9.17	2.40

^aData collected August 1958 at ten AFES.

^bDifference between means is significant: CR = 7.9.

Table 11

PERCENT OF CATEGORY IV PERSONNEL SCORING 90 OR ABOVE
ON 0-8 ACB APTITUDE AREAS IN SUCCESSIVE SAMPLES

	June 58 ^a	April 58 ^b	August 58 Enlistees only (21-30 Pctl) ^c	August 58 Enlistees plus Selective Service Registrants ^d
Number of ACB Aptitude Areas Passed	%	%	%	%
8 ^e	2	-	-	-
7	6	3	9	6
6	10	5	19	11
5	13	8	20	15
4	17	9	19	13
3	17	9	15	14
2	18	13	11	15
1	13	28	5	14
0	3	25	4	12

^aColumn 1. "Sample Survey of Military Personnel." Data collected by SDB, TAG R and D Command. ACB Zero program in effect at this time. (ACB Zero suspended 4 August when ACB testing of all Category IV started at AFES).

^bColumn 2. N = 163 collected at 3 Training Divisions (Dix, Knox, Chaffee) "A Reasonable Number" of Category IV's asked for specifically, including ACB Zero's earmarked for dropping. ACB given before AQB.

^cColumn 3. N = 248 applicants for enlistment at 10 AFES.

^dColumn 4. N = 1280 applicants and registrants (248 applicants, 1032 registrants). More enlistees wanted--roughly 1/3 of total--but not obtainable.

^eEighth aptitude area (Radio Code) not measured by USAPRO in this study.

Table 12

CORRELATION^a BETWEEN EXPERIMENTAL AFQT TOTAL SCORE AND NUMBER
OF APTITUDE AREAS PASSED (90 OR ABOVE)

	AFQT	No. of ACB AA's Passed	r
Mean	66.25	5.62	.82
S.D.	20.22	2.73	

^aSample collected in April, 1957 at Forts Ord, Dix, and Jackson (N = 535).
Project Ind b-11 (A-1-292-22).

Table 13

CRITERION RATINGS^a OF BASIC TRAINING PERFORMANCE

	N	Mean	S.D.
AFQT Cat IV	135	3.472	1.384
AFQT Cat III	177	3.816	1.457

^aSample collected in April 1957, rated in June 1957 at Forts Ord, Dix, and Jackson. Project Ind b-12 (A-1-292-23).