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PRS REPORT NO. 673

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27 SEP 1951 13

PRS-MPRS  
PR-4073  
RJW/ra  
8 December 1945

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Comparative Validity of the WDAGO Form No. 67  
and the FCL-2 According to Various Breakdowns:

MASTER FILE

II. European Theater.

I Problem

In accordance with instructions contained in WD Disposition Form from AC/S G-1, WDGS to TAG, File WDGAP 201.6, subject: "Study of Officer Efficiency Rating Methods," dated 20 July 1945, several reporting forms were tried out and compared as to validity. In report PRS No. 672 the form FCL-2 (A, B, or c) was shown to be the most suitable as a potential substitute for the WDAGO Form No. 67 in the ETO. In report PRS No. 671 the form FCL-2 (a, b, and c) was shown to be superior regardless of arm or service or grade of men to which it was applied within the ZI. This report presents a more complete analysis of the two forms as they were affected by grade, arm or service, and other factors in the ETO.

II Populations

1. Field representatives were sent to Europe, arriving at Paris on 14 September 1945. Three hundred fifteen groups from 24 installations were used as a source of cases. One or more ratings were secured for officers from the following organizational units:

a.	Army Air Forces		628
b.	Army Ground Forces		3577
	(1) Cavalry	100	
	(2) Coast Artillery	98	
	(3) Field Artillery	795	
	(4) Infantry	2584	
c.	Army Service Forces		661
	(1) Chemical Warfare	9	
	(2) Corps of Engineers	149	
	(3) Medical Administrative Corps	71	
	(4) Medical Corps	179	
	(5) Ordnance Department	52	
	(6) Quartermaster Corps	55	
	(7) Signal Corps	50	
	(8) Transportation Corps	1	
	(9) Others	95	
d.	Not stated (or otherwise unclassified)		23
	<u>Total:</u> all classes		4889

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2. . Not all of the officers were rated on both forms so that the number of cases reported upon will vary depending upon the type of analysis undertaken and the time at which the study was made.

3. Grade was reported for 3932 of the officers and was distributed as follows:

Colonel and Lt. Colonel	217
Major	276
Captain	736
1st Lieutenant	1804
2nd Lieutenant	899

### III Instruments

1. The two efficiency reporting methods employed in this study were:

a. WDAGO Form No. 67, Efficiency Report: the most current revision (1 Aug 1945) of the form now used for semi-annual efficiency reports.

b. Officer Efficiency Report, FCL-2: a radical revision of the Officer Evaluation Report, OER, prepared in three forms FCL-2a, FCL-2b, and FCL-2c, and emphasizing the forced choice (FCL) item as the name implies.

2. The above forms were compared with three criterion measures:

a. Criterion Index Score: obtained for all rates by assigning point values to the ranking by fellow officers of each ratee as among the "most competent", "least competent", or "undiscriminated middle group". Rankings were made alternately, beginning with the most competent, then the least competent, next most competent, etc. Three points were assigned for most extreme position, 2 for next most extreme position, 1 for remainder of places on "competent" lists, and 0 points if included in undiscriminated middle group. Points were positive if "most competent", and negative if "least competent". After all points were gathered for a given ratee they were averaged, multiplied by 10, and added to 30 to produce a scale ranging from 0 to 60.

b. O/R-A Score: obtained for all rates by averaging position assigned by fellow officers in a typical hypothetical group of 20 officers chosen to represent the entire officer group of the Army. Range is from 1 to 20, with 20 the best score.

c. O/R-B Score: obtained for all rates by averaging position assigned by fellow officers on a scale similar to that used in O/R-A except that hypothetical group was chosen to represent officers of the same grade and responsibility of the ratee. Range is again 1 to 20, with 20 being the best score.

#### IV Procedures and Results

##### 1. Investigation of Form of Distributions of FCL-2a, 2b, and 2c with Regard to the Possibility of Use as Alternate Forms.

a. Previous studies in this series (PRS Nos. 671 and 672) have revealed that means and standard deviations of the three forms of FCL-2 were very similar both in ZI and ETO. In PRS Report No. 671 it was shown for the ZI that the shape of the distributions for the three forms was likewise highly similar. As a final check on the conclusion that the forms can be used interchangeably, measures of skewness ( $g_1$ ) and kurtosis ( $g_2$ ) were computed for ETO and are reported in Table I.

Table I  
Population Statistics for Three Alternate Forms of FCL-2.  
Populations Are Non-Overlapping in Personnel Rated.

<u>Form</u>	<u>FCL-2a</u>	<u>FCL-2b</u>	<u>FCL-2c</u>
N	1711	1539	1363
M	199	200	196
$\sigma$	45	50	46
$g_1$	-.79	-.71	-.85
$g_2$	.71	.29	.66

Here the various measures show slightly more variability than was the case for the ZI. The relatively low value of  $g_2$  seems especially surprising. There could be two possible explanations of this finding: either,

- (1) The FCL-2b is a peculiar form with a more nearly normal (so far as kurtosis is concerned) distribution of item difficulties, or
- (2) The population upon which FCL-2b was tried was more nearly normal than the other populations taking FCL-2a or FCL-2c.

If the former hypothesis (1) is correct, it would serve to cast serious doubt upon the equality of the forms. If the latter hypothesis (2) is true, this would prevent assuming the forms are truly alternative. Since in the ZI study the  $g_1$  values were the same, the latter hypothesis seemed the most likely. Fortunately, we can test the truth or falsity of the latter hypothesis, since all groups took the WDAGO 67 in the same form. If it shows a similar pattern throughout, the hypothesis is false; if it shows a drop in  $g_2$  for this same group, we can accept the hypothesis.

4. Comparative Validity When the Two Forms Are Applied to Different Grades of Officers.

a. While over-all validity is important, it is still necessary to determine how the forms compare when applied to different grades of officers. The actual validity coefficients for the various grades are reported in Table VI.

Table VI  
Validity Coefficients of WDAGO 67 and FCL-2 against  
Three Criteria for Grades of Officers from  
2nd Lieutenant through Colonel

<u>Echelon</u>	<u>Grade</u>	<u>WDAGO 67</u>			<u>FCL-2</u>		
		<u>Index</u>	<u>OAR-A</u>	<u>OAR-B</u>	<u>Index</u>	<u>OAR-A</u>	<u>OAR-B</u>
Higher	Lt Col and Col	.302	.381	.345	.451	.548	.534
	Major	.384	.427	.447	.423	.486	.544
Lower	Lt Col and Col	.190	.268	.318	.284	.374	.349
	Major	.240	.288	.315	.301	.362	.354
	Captain	.435	.473	.478	.478	.488	.503
	1st Lt	.450	.507	.519	.516	.533	.547
	2nd Lt	.406	.459	.473	.550	.561	.571

Points of interest in Table VI are:

(1) In all 21 cases, the FCL-2 is superior to the WDAGO 67 and usually by an amount greater than was the case for the over-all population.

(2) The size of the coefficients, in both scales, tend to become lower as one goes up the scale in grade on a given echelon level, being especially low for majors and lieutenant colonels and colonels on the lower echelon level.

(3) The fact that majors and lieutenant colonels and colonels are as well predicted in the upper echelon group as captains (and even 1st lieutenants in some cases) in the lower echelon group, would indicate that it is the criteria rather than the rating forms which have deteriorated at the upper grade levels.

b. Table VII gives the validity of the two forms for each grade against a composite criterion formed by giving unit standard score weights to the three criteria -- index, OAR-A, and OAR-B.

b. The distributions of scores on the two forms are such that when the WDAGO 67 scores are collected into 13 class intervals of .5 points and the FCL-2 into 13 class intervals with 20 points, the entire range is included. This reduction of the two forms to an equal number of class intervals, each form has 13 intervals (there were 14 intervals on each form in the ZI study), facilitates the comparison of the two forms.

c. The actual distributions, repeating the total distribution for FCL-2, are presented in Table IV. The table also reduces both sets of scores to percentage figures to equalize the populations. The percentage frequencies are then presented again in graphic form in Figure 1.

Table IV  
Comparative Distributions, Actual and Percent,  
of WDAGO 67 and FCL-2 for the EFO

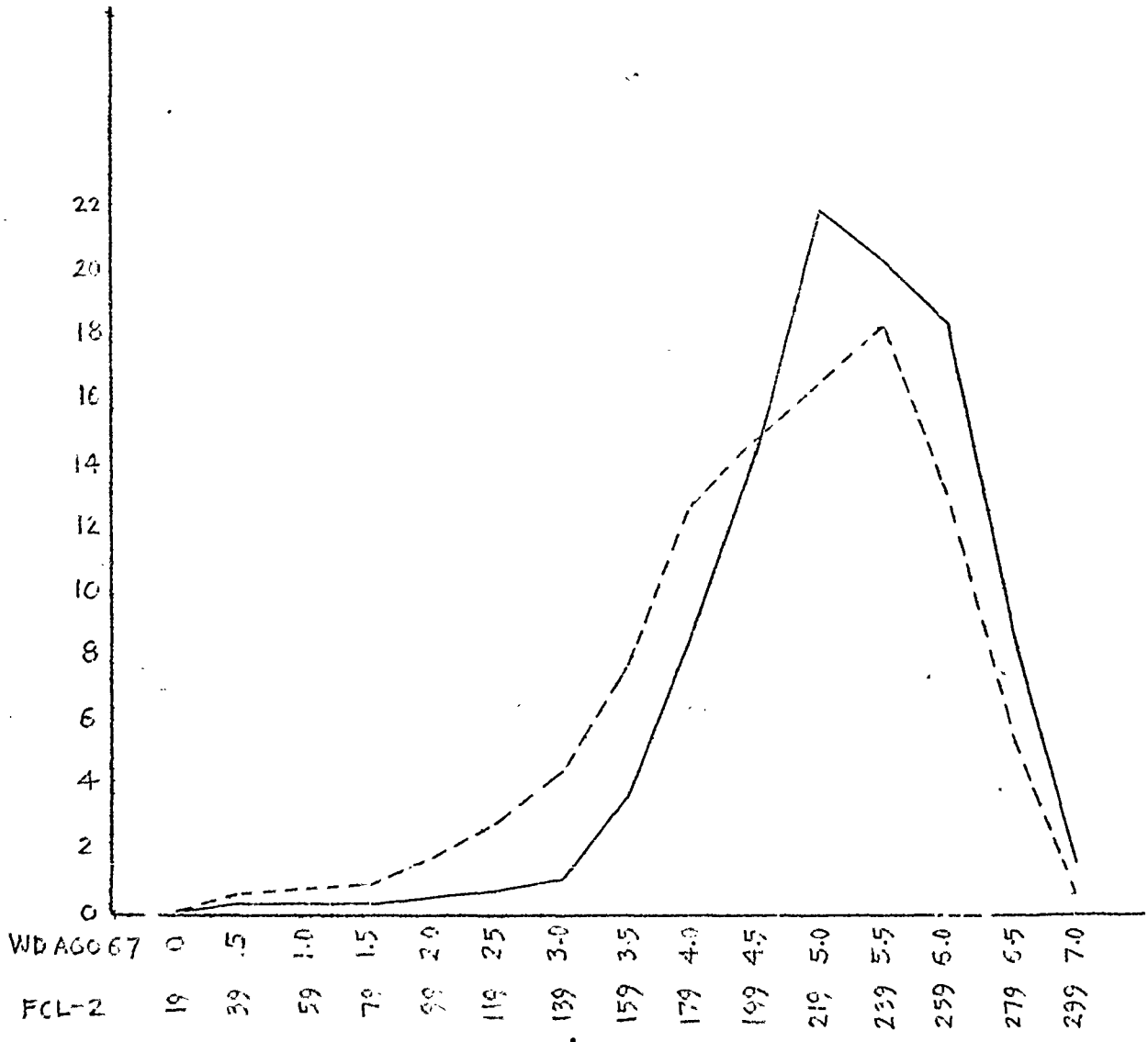
WDAGO 67			FCL-2		
Score	Frequency	Percent	Score	Frequency	Percent
6.6 - 7.0	95	1.94	280 and above	25	0.54
6.1 - 6.5	447	9.12	260 - 279	256	5.55
5.6 - 6.0	907	18.50	240 - 259	607	13.16
5.1 - 5.5	999	20.37	220 - 239	842	18.25
4.6 - 5.0	1079	22.01	200 - 219	753	16.32
4.1 - 4.5	699	14.26	180 - 199	680	14.74
3.6 - 4.0	426	8.69	160 - 179	586	12.70
3.1 - 3.5	178	3.63	140 - 159	360	7.80
2.6 - 3.0	44	.90	120 - 139	195	4.23
2.1 - 2.5	14	.28	100 - 119	125	2.71
1.6 - 2.0	7	.14	80 - 99	88	1.91
1.1 - 1.5	3	.06	60 - 79	46	1.00
0.6 - 1.0	3	.06	40 - 59	34	0.74
0.1 - 0.5	2	.04	20 - 39	16	0.35
Total	4903	100.00		4613	100.00

d. It is evident that the FCL-2 has taken scores piled up in classes with upper limits of 3.5, 4.0, 4.5, and 5.0 on the WDAGO 67 and spread them out and represented them as being actually low officers. The percentage of cases below 3.6 on the WDAGO 67 was only 5.11% (6.45% in ZI) while the FCL-2, below the corresponding lower limit of 160, had 18.74% (18.75% in ZI). At the lower end of the scale of officer efficiency, the FCL is decidedly more effective than is the WDAGO 67.

e. At the upper end of the range, however, the two scales act very similarly, with a slight advantage in favor of the WDAGO 67, with 11.06% (7.51% in ZI) of its scores above 6.0, whereas the FCL-2 had only 6.09% (6.77% in ZI) scores above 259, a comparable class limit.

FIGURE 1

PER CENT OF SCORES ON WD AGO 67 AND FCL-2  
WHICH FALL INTO 14 COMPARABLE CLASS INTERVALS  
(BASED ON DATA IN TABLE IV)



f. The best measure of effectiveness in selecting the upper 20% and lower 20% of the cases is secured by computing biserial correlations using those cutting points. When used to select the upper 20% of the cases the WDAGO 67 has a biserial correlation against the criterion index of .435, while it is .410 for FCL-2 (corresponding coefficients for the ZI study were .333 and .269). Both rating scales do about equally well. When used to cut off the lowest 20%, however, the FCL-2 is superior, but to the same degree it was in the ZI study. For WDAGO 67 the biserial coefficient is .499 and for FCL-2, .586 (corresponding coefficients in the ZI study were .171 and .658). The FR-2 is inferior to both forms in ETO -- biserial coefficients for upper cut-off point, .204; for lower cut-off point, .195.

3. Over-all Comparison of Validity of WDAGO Form No. 67 and FCL-2 against the Three Criteria.

a. It has already been demonstrated that each form of FCL-2 was superior to WDAGO 67. It has also been shown that the three forms of FCL-2 are interchangeable. We are therefore interested in discovering what the validity is when the score on any one form is used as the equivalent of the score on any other form. This material is shown in Table V.

Table V  
Comparable Validity of WDAGO 67 with Separate and Combined Forms of FCL-2 with Three Criteria

N	WDAGO 67			FCL-2			
	Index	OAR-A	OAR-B	Form	Index	OAR-A	OAR-B
1333	.439	.517	.510	a	.457	.509	.518
1179	.440	.448	.433	b	.515	.517	.515
666	.407	.505	.519	c	.458	.512	.525
3178	.441	.504	.491	Combined	.497	.525	.530

b. It is evident that treating all forms of FCL-2 as equivalent has not served to lower its superiority over the form WDAGO 67. It is still from .021 to .056 higher in validity (about the same superiority as in the ZI study) depending upon the criterion used.

c. If the three criteria are combined into a single index by allotting equal weights to their standard scores, the over-all validity coefficients become: for WDAGO 67, .507; and for FCL-2, .548. These two coefficients bear the same relationship to one another (FCL-2 about .04 higher than WDAGO 67) as in the ZI run, but are each about .05 higher than in this country, indicating better criterion data in the ETO.

Table VII  
Validity of WDAGO 67 and FCL-2 for Each Grade against a  
Composite, with Equal Standard Score Weights, of  
Criterion Index, OAR-A, and OAR-B

	<u>Higher Echelon</u>		<u>Lower Echelon</u>				
	<u>Lt Col and Col</u>	<u>Major</u>	<u>Lt Col and Col</u>	<u>Major</u>	<u>Capt</u>	<u>1st Lt</u>	<u>2nd Lt</u>
WDAGO 67	.360	.452	.268	.291	.490	.526	.464
FCL-2	.537	.522	.347	.351	.519	.569	.600

The data in Table VII does nothing to change the statements or deductions made on the basis of Table VI. With this more comprehensive combined criterion, the superiority of the FCL-2 is enhanced.

c. The results in Tables VI and VII differ from those in the ZI study (PRS No. 671) in that there is less decrease in the validity coefficients for grades above captain. This is particularly noteworthy for the FCL-2. In the ZI study it was suggested that breakdown of the criterion might be more responsible for the lower validities than the breakdown of the rating scale, but that further study should be undertaken to determine whether a different method of evaluation is required for the higher ranking officers. The results of the ETO study strengthen the suspicion that a breakdown in the criteria is largely responsible for the lower validities found for some groups of higher grade officers and make the use of FCL-2 for all grades of officers more defensible. A point which should be checked further, however, is whether the conditions obtaining in the ETO were such as to permit more thorough and critical observation of higher grade officers with subsequent more effective completion of FCL-2 and criterion forms than is possible in ZI. If this is the case, methods of insuring adequate observation of the work of higher ranking officers in all situations would become necessary before any scheme of rating could be universally effective.

5. Comparative Validity of the Two Forms as Applied to Various Arms and Services.

a. The following arms or services had sufficient lower echelon rates to form fairly reliable groups for evaluating the two forms:

<u>Arm or Service</u>	<u>No. of Cases</u>	<u>Arm or Service</u>	<u>No. of Cases</u>
Infantry	2089	Medical Adm. Corps	66
Air Corps	583	Corps of Engineers	137
Field Artillery	709	Ordnance	48
Coast Artillery	94	Signal Corps	43
Medical Corps	214	Cavalry	85

b. The various arms and service officers rated each other with varying degrees of accuracy as indicated by the average inter-correlation of the three criterion measures with each other. The lowest ETO group, however, was better than the best group in ZI.

c. Arranged in order of magnitude in ETO of the actual sum of r's among the three criteria (ZI sum is shown in parentheses), the list is:

<u>Arm or Service</u>	<u>Sum of Criterion Inter-r's in ETO</u>	<u>Sum of Criterion Inter-r's in ZI</u>
Coast Artillery	2.673	(2.342)
Cavalry	2.643	(2.183)
Corps of Engineers	2.588	(2.676)
Field Artillery	2.570	(2.486)
Infantry	2.569	(2.548)
Med. Admin.	2.566	(2.535)
Air Corps	2.517	(1.920)
Signal Corps	2.492	(2.390)
Ordnance	2.375	(2.263)
Medical Corps	2.356	(2.436)

It would appear that agreement among ratings within an arm or service is a function of local working conditions rather than of the special type of duty. The Air Corps, quite unsatisfactory in the ZI, was about average for ETO. Cavalry, the next to highest in ETO, was next to poorest in ZI.

d. The actual intercorrelations among the three criteria are shown in Table VIII.

Table VIII  
Correlations among Three Criteria for Ten Arms or Services

<u>Code</u>	<u>Arm or Service</u>	<u>r<sub>Index OAR-A</sub></u>	<u>r<sub>Index OAR-B</sub></u>	<u>r<sub>OAR-A . OAR-B</sub></u>
10	Infantry	.845	.811	.913
20	Air Corps	.814	.787	.916
30	Field Artillery	.846	.795	.929
40	Coast Artillery	.864	.866	.943
71	Medical Corps	.716	.722	.918
77	Med. Admin. Corps	.831	.798	.927
82	Corps of Engineers	.845	.833	.910
87	Ordnance	.803	.732	.840
90	Signal Corps	.857	.742	.893
93	Cavalry	.886	.870	.897

It can be noted in Table VIII that with two exceptions, the index correlates more highly with OAR-A than with OAR-B. Without exception the OAR-A and OAR-B correlate more highly with each other than either does with the index. The fairly large differences among arms and services has already been noted.

e. In Table IX are given the validity coefficients for each instrument with each criterion, singly and in combination.

Table IX  
Validity Coefficients for WDAGO 67 and FCL-2 for Ten Arms or Services  
against Index Score, OAR-A Score, OAR-B Score,  
and a Composite of the Three Criteria

Arm or Service	WDAGO 67				FCL-2			
	Index	OAR-A	OAR-B	Composite	Index	OAR-A	OAR-B	Composite
Infantry	.454	.491	.502	.509	.462	.505	.524	.524
Air Corps	.505	.510	.508	.550	.529	.499	.490	.538
Field Artillery	.513	.596	.592	.611	.567	.524	.591	.613
Coast Artillery	.677	.652	.626	.676	.593	.579	.570	.607
Medical Corps	.448	.468	.477	.503	.502	.517	.530	.558
Med. Det. Corps	.581	.449	.444	.448	.514	.586	.575	.589
Corps of Eng.	.441	.596	.535	.550	.581	.616	.627	.648
Commissary	.580	.592	.504	.602	.517	.573	.475	.562
Signal Corps	.575	.635	.631	.651	.455	.409	.460	.469
Cavalry	.362	.356	.402	.393	.503	.503	.529	.533
Entire Study	.441	.504	.491	.507	.497	.525	.530	.518

d. In 65% of the cases the coefficient for a given arm or service is higher than the corresponding value for the Army as a whole. In 9 of the 20 cases (45%) the OAR-A is the most predictable of the three criteria.

e. The narrower range of correlations between the criteria correlations in the EFO has made this influence less important upon the validity coefficients. The high correlation found in the ZI study between validity and inter-criterion coefficients is consequently much lower: completely disappearing for the WDAGO 67 and greatly reduced for the FCL-2. The actual r's were not computed since the results were very clear from inspection of the scatterplots.

## 6. General Conclusions.

a. The FCL-2 differentiates officers of low efficiency more effectively than does the WDAGO 67.

b. The FCL-2 is more valid than the WDAGO 67 against each criterion and against the composite criterion.

c. The FCL-2 is more valid than the WDAGO 67 for each grade of officers from 2nd Lieutenant through Colonel. The validity is inversely related to grade but this appears to be the fault of the criteria rather than of the ratings. The possibility of observing the work of higher grade officers in ZI sufficiently well to make good criterion or rating evaluations needs further study.

d. The FCL-2 is more valid than the WDAGO 67 for most arms and services.

V Technicians

Field work was done by officer personnel of staff of Project PR-4073 under personal direction of Lt Colonel Donald E. Baier. Planning, analysis, and writing of this report was done by Dr. R. J. Wherry.

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Personnel Research Section, The Adjutant General's Office, Washington, D. C.

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