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2 May 1946

STANDARDIZATION OF AGCT-3b TOTAL AND PART SCORES

I. GENERAL

1. Early in 1942, the Personnel Research Section formulated plans for the development of a new battery of tests designed to increase the efficiency of classification at Reception Centers. In planning the new tests it was recognized that a different pattern of skill and information was required by each Army job. A test was constructed for each of the skills or areas of knowledge most widely used in the Army.

2. As a part of this research project four non-information tests were developed (see PFS study #568) to provide both a measure of general ability such as that formerly provided by AGCT-1 and measures of particular skills or abilities. Form a of these tests which are designated AGCT-3 was released in April 1945 and is now in general use. While three other forms were developed, none of the remaining forms had been standardized. The research study to be described is concerned with the standardization of Form b.

II. POPULATION

The population consisted of 1000 Fifth Service Command selectees (Camp Atterbury Reception Center, July 1945) selected from a larger group of 1500 to give the breakdown by color and Army Grade presented below as Table I. The Camp Atterbury Reception Center was chosen since the AGCT distributions are more nearly representative of those for the country as a whole than are the distributions for any other Reception Center. The breakdown by color and Army Grade is that obtained for standardizing AGCT-3a and is representative of the Army as a whole.

TABLE I

NUMBER OF CASES BY COLOR AND AGCT-3a GRADE

<u>GRADE</u>	<u>WHITE</u>	<u>COLORED</u>	<u>TOTAL</u>
I	55	1	56
II	279	4	283
III	298	14	312
IV	236	67	303
V	17	29	46
TOTAL	885	115	1000

III. VARIABLES

1. a. Army General Classification Test, AGCT-3a-total standard score
- b. AGCT-3a total raw score (sum of part raw scores)
2. a. Reading and Vocabulary, RV-3a, standard score
- b. RV-3a raw score (scoring formula- $R-1/3w + 10$)
3. a. Arithmetic Reasoning, AR-3a, standard score
- b. AR-3a raw score (scoring formula- $R-1/3w + 10$)
4. a. Arithmetic Computation, AC-3a, standard score
- b. AC-3a raw score (scoring formula- $R-1/3w + 10$)
5. a. Pattern Analysis, PA-3a, standard score
- b. PA-3a raw score (scoring formula- $P-1/4w + 10$)
6. AGCT-3b total raw score (sum of part raw scores)
7. Reading and Vocabulary, RV-3b, raw score (scoring formula- $R-1/3w + 10$)
8. Arithmetic Reasoning, AR-3b, raw score (scoring formula- $R-1/3w + 10$)
9. Arithmetic Computation, AC-3b, raw score (scoring formula- $R-1/3w + 10$)
10. Pattern Analysis, PA-3b, raw score (scoring formula- $R-1/4w + 10$)

IV. PROCEDURE

A. In the field

1. The tests were administered by a technician from the Personnel Research Section. Draft board schedules for the period of testing were checked with those for a comparable period prior to testing to insure absence of gross bias in the selection of boards sending men to the Reception Center during the testing period.

B. In PRS

1. All Papers were scored
2. Scatter plots of raw scores were prepared between AGCT-3a total score and AGCT-3b total score; RV-3a and RV-3b; AR-3a and AR-3b; AC-3a and AC-3b; and between PA-3a and PA-3b.
3. Means, SD's, and percentiles were calculated for each variable and correlations determined for each scatter plot.
4. Standard scores were then determined for each AGCT-3b raw score scale by the method of equivalent percentiles. AGCT-3b total scores were made equivalent to AGCT-3a total scores; AGCT-3b Reading and Vocabulary scores were made equivalent to AGCT-3a Reading and Vocabulary scores, etc. The curve of 3b raw on 3b standard scores (as thus computed) was then "smoothed" to eliminate minor irregularities. The AR-3b, AC-3b, and PA-3b scales were judged to be sufficiently similar to the 3a scales to warrant using them without change.

V. RESULTS

The means, SD's and correlations are presented in Table II while the conversion tables are presented as Tables III and IV.

TABLE II

Means, standard deviations and correlations between raw scores of AGCT-3a total and part scores and AGCT-3b total and part scores

Variable	AGCT-3a			AGCT-3b		
	M	SD	r	M	SD	
Total	112.7	41.1	.942	112.0	38.7	
RV	26.1	9.6	.843	25.4	9.0	
AR	28.4	11.8	.907	28.4	11.8	
AC	29.3	11.1	.900	29.0	9.9	
PA	29.0	13.4	.814	29.2	13.2	

It can be readily seen that the pairs of tests are, in general, equivalent. Correspondence between means is very exact. In the case of the standard deviations an appreciable difference exists only between the two entries for Arithmetic Computation.

The correlations between forms indicate in general that the part scores have adequate alternate form reliability. Use of the term "adequate" might be questioned in the case of the coefficient of .814 for Pattern Analysis. However, a validity of .5 could be expected to increase only to .525 if the reliability of the test were increased from .8 to .9. In view of the additional testing time that would be involved in obtaining this increase in validity changes in the test for this purpose would not seem advisable.

TABLE III

CONVERSION TABLE FROM PAW TO STANDARD SCORES FOR AGCT-3b TOTAL SCORE

Raw	Standard	Raw	Standard	Raw	Standard
Army Grade I		Army Grade I		Army Grade I	
249	163	229	155	209	145
248	162	228	155	208	145
247	162	227	154	207	144
246	162	226	154	206	143
245	161	225	153	205	143
244	161	224	153	204	142
243	161	223	153	203	142
242	160	222	152	202	141
241	160	221	152	201	141
240	160	220	151	200	140
239	159	219	151	199	140
238	159	218	151	198	139
237	158	217	150	197	139
236	158	216	150	196	138
235	158	215	150	195	137
234	157	214	149	194	137
233	157	213	149	193	136
232	156	212	148	192	136
231	156	211	147	191	135
230	155	210	146	190	135

Raw	Standard
<u>Army Grade I</u>	

189	134
188	133
187	133
186	132
185	132
184	131
183	131
182	130
181	130

<u>Army Grade II</u>	
180	129
179	129
178	129
177	128
176	128
175	128
174	127
173	127
172	127
171	126
170	126
169	125
168	125
167	125
166	124
165	124
164	123
163	123
162	123
161	122
160	122
159	121
158	121
157	121
156	120
155	120
154	119
153	119
152	119
151	118
150	118
149	117
148	117
147	117
146	116
145	116
144	115

Raw	Standard
<u>Army Grade II</u>	

143	115
142	115
141	114
140	114
139	114
138	113
137	113
136	113
135	112
134	112
133	112
132	111
131	111
130	111
129	110
128	110

<u>Army Grade III</u>	
127	100
126	109
125	109
124	108
123	108
122	107
121	107
120	106
119	106
118	105
117	104
116	104
115	103
114	102
113	102
112	101
111	101
110	100
109	100
108	100
107	99
106	99
105	98
104	98
103	97
102	96
101	96
100	95
99	94
98	94

Raw	Standard
<u>Army Grade III</u>	

97	93
96	92
95	91
94	91
93	90

<u>Army Grade IV</u>	
92	89
91	88
90	87
89	87
88	86
87	85
86	84
85	84
84	83
83	82
82	81
81	80
80	80
79	79
78	78
77	78
76	77
75	77
74	76
73	75
72	75
71	74
70	73
69	72
68	71
67	71
66	70
65	69
64	69
63	68
62	68
61	67
60	66
59	66
58	65

Raw	Standard
<u>Army Grade III</u>	
57	64
56	64
55	63
54	62
53	61
52	60
<u>Army Grade V</u>	
51	59
50	58

Raw	Standard
<u>Army Grade V</u>	
49	57
48	56
47	55
46	55
45	54
44	53
43	52
42	51
41	50
40	50
39	49

Raw	Standard
<u>Army Grade V</u>	
38	48
37	48
36	47
35	47
34	46
33	45
32	44
31	43
30	43
0-29	42

TABLE IV

CONVERSION TABLE FOR PA-T SCORES

Raw Score into Standard Score and Army Grade

AGCT-3b

<u>RV-3t</u>			<u>AC-3b</u>		<u>AR-3b</u>		<u>PA-3b</u>	
Raw Score	Standard Score	Army Grade	Standard Score	Army Grade	Standard Score	Army Grade	Standard Score	Army Grade
63	162	I	157	I	160	I		
62	161	I	155	I	157	I		
61	160	I	153	I	154	I		
60	159	I	151	I	151	I	155	I
59	158	I	150	I	148	I	151	I
58	157	I	149	I	145	I	147	I
57	156	I	147	I	143	I	143	I
56	155	I	145	I	141	I	139	I
55	153	I	143	I	139	I	136	I
54	152	I	142	I	137	I	133	I
53	151	I	141	I	135	I	130	I
52	149	I	139	I	133	I	129	II
51	148	I	138	I	131	I	128	II
50	146	I	137	I	130	I	127	II
49	144	I	135	I	129	II	126	II
48	143	I	133	I	128	II	125	II
47	142	I	131	I	127	II	123	II
46	141	I	130	I	126	II	122	II
45	139	I	128	II	124	II	121	II
44	138	I	126	II	122	II	120	II

TABLE IV (Continued)

CONVERSION TABLE FOR PART SCORES

Raw Score into Standard Score and Army Grade

AGCT-3b

Raw Score	Standard Score	Army Grade	Standard Score	Army Grade	Standard Score	Army Grade	Standard Score	Army Grade
43	136	I	125	II	120	II	119	II
42	134	I	123	II	118	II	118	II
41	132	I	121	II	117	II	117	II
40	130	I	120	II	116	II	116	II
39	129	II	118	II	114	II	115	II
38	127	II	116	II	112	II	114	II
37	123	II	114	II	111	II	113	II
36	121	II	112	II	110	II	111	II
35	120	II	110	II	109	III	110	II
34	118	II	109	III	108	III	109	III
33	116	II	108	III	107	III	107	III
32	114	II	106	III	106	III	105	III
31	112	II	104	III	104	III	104	III
30	110	II	102	III	102	III	102	III
29	108	III	100	III	100	III	100	III
28	106	III	98	III	99	III	99	III
27	104	III	96	III	97	III	96	III
26	102	III	95	III	95	III	96	III
25	99	III	92	III	93	III	94	III
24	96	III	90	III	90	III	93	III
23	93	III	89	IV	89	IV	90	III
22	90	III	86	IV	86	IV	89	IV
21	88	IV	83	IV	83	IV	86	IV
20	85	IV	80	IV	80	IV	83	IV
19	82	IV	78	IV	78	IV	81	IV
18	80	IV	76	IV	76	IV	78	IV
17	78	IV	74	IV	74	IV	76	IV
16	74	IV	71	IV	72	IV	74	IV
15	69	IV	68	IV	69	IV	72	IV
14	66	IV	65	IV	66	IV	69	IV
13	63	IV	62	IV	63	IV	66	IV
12	60	IV	60	IV	60	IV	63	IV
11	58	V	58	V	57	V	60	IV
10	54	V	56	V	55	V	57	V
9	53	V	54	V	53	V	54	V

TABLE IV
CONVERSION TABLE FOR PART SCORES
Raw Score into Standard Score and Army Grade

AGCT-3b								
RV-3b			AC-3b		AR-3b		PA-3b	
Raw Score	Standard Score	Army Grade	Standard Score	Army Grade	Standard Score	Army Grade	Standard Score	Army Grade
8	52	V	52	V	51	V	52	V
7	51	V	50	V	49	V	49	V
6	50	V	48	V	48	V	47	V
5	49	V	47	V	47	V	44	V
4	48	V	46	V	46	V	44	V
3	46	V	45	V	45	V	43	V
2	44	V	44	V	44	V	43	V
1	43	V	43	V	43	V	43	V
0	42	V	42	V	42	V	42	V

VI. CONCLUSION

1. The reliabilities of the two forms are adequate.
2. The raw score means and standard deviations of the forms indicate near perfect equivalence in difficulty and spread.
3. The AGCT-3b standard score scales are adequate. This conclusion is properly demonstrated not by the results but by the adequacy of the sample and procedure. It is listed and made explicit here to serve as a basis for the recommendation to follow.

VII. RECOMMENDATIONS

1. It is recommended that the AGCT-3b standard scores scales given as Tables III and IV of this study be released for use.

VIII. TECHNICIANS

1. Field work - Captain T. C. Karłowski
2. Statistical Processing and Preparation of Report - H. E. Brogden

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Enclosed.

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A60 TNS Rpt. no. 634

Standardization of AEST-3b Total and Part Scores

2 May 80

*Performance Tests
Validation

7 July 80

NTIS, Auth: ARI notice, 2 May 80