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AGo-PRS Report 3541

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Report 3546

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6 A Standard Score Scale
for the Visual Classification Test, VC-1, X-2.

Problem:

11/26 Sep 42

To determine a standard score scale for the Visual Classification Test, VC-1, X-2.

Population:

126

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The population consisted of the 755 GCT Grade IV and V men used in the determination of critical scores for Induction Station testing. A complete description of the population is given in the report, Subject: Standardization of the Visual Classification Test, VC-1, X-2, TDA Unit, WBS, 8/5/42.

Data:

1. VC-1, X-2 raw scores, the raw scores being defined as the number of right answers.
2. GCT standard scores, the GCT form used being unidentified, but presumably 1c and 1d forms predominating.
3. GCT standard score distribution for 581,576 cases reported to this office to October 1941.

Procedure and Results:

VC-1, X-2 was to be scaled with reference to the GCT standard score scale for Army grades IV and V. The standard score scale for VC-1, X-2 should be equivalent to the GCT scale in the sense that score intervals should represent equal ranges of ability with reference to the respective tests. This, in effect, means that a given standard score stands in the same relative position among a representative distribution of GCT scores as it has among a representative distribution of VC-1, X-2 scores. It does not and is not intended to mean that a person with a given standard score in the one test will obtain the same score providing that he takes the other test.

The method of equivalent percentiles was used to determine the standard scores equivalent to VC-1, X-2 raw scores. The respective score distributions on the two tests for the 755 men who took both tests were used in computing the equivalent scores.

The obtained distribution of GCT standard scores for the 755 men to be used as the scaling population differed markedly from the expected distribution of such scores in GCT Army grades IV and V. Table I shows that the scaling population had a much greater proportion of men obtaining GCT scores ranging between 55 and 69 and a much smaller proportion with scores between 70 and 89 than would be expected in a representative sample of GCT Army grade IV and V men.

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Table I. Comparison of the GCT Distribution Obtained in the VC-1, X-2 Population with the Expected Distribution Based on 581,576 Cases.

GCT Standard Scores	Percentage in Each Score Interval	
	VC-1, X-2 Standardization Population	Expected on Basis of Actual Distribution for 581,576 Cases
85-89	9.8	19.4
80-84	7.9	18.5
75-79	7.5	14.3
70-74	5.5	12.2
65-69	22.3	8.5
60-64	19.1	7.6
55-59	11.2	6.0
50-54	5.3	4.7
45-49	4.6	3.4
39-44	6.8	5.4
Total	100.0	100.0

It was desirable that the scaling population be a representative sample of men in GCT Army grades IV and V since VC-1, X-2 was to be scaled with reference to the GCT standard score scales for those two Army grades. Accordingly, the cell frequencies in the scatterplot of GCT vs VC-1, X-2 were weighted in such a way that the obtained GCT distribution was transformed to the expected distribution of such scores shown in Table I. The expected distribution of VC-1, X-2 scores was then determined from the marginal frequencies of the weighted scatterplot. Figure 1 shows graphically the obtained and expected distributions on the two tests.

Standard score equivalents were computed for VC-1, X-2 raw scores both from the obtained and expected distributions. Table II shows the standard score equivalents when based on each of the two distributions. It will be noted that the standard score equivalents for VC-1, X-2 based on the expected distributions are lower for raw scores of 4 to 21 and higher for raw scores of 23 to 45 than are those computed on the basis of the obtained distributions. Other raw scores have the same standard score equivalents for both distributions.

Figure 2 shows graphically the relation between VC-1, X-2 raw scores and equivalent GCT standard scores when computed from the obtained and the expected distributions. The curve representing the relation between the equivalents computed from the obtained distributions shows an unusual trend, being distinctly non-linear and cyclical in character. On the other hand, the curve for the equivalents based on the expected distributions is approximately linear over the effective range of the VC-1, X-2. Comparison of Figures 2 and 2 indicates that the atypical trend of the curve for the equivalents computed from the obtained distributions is a direct correlate of the unusual obtained distributions of GCT score. It is therefore recommended that the standard score equivalents based on the expected distributions be accepted as the standard score scale for VC-1, X-2.

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TABLE II
Equivalent Scores on VC-1, X-2 and GCT Determined by the Equivalent
Percentile Method Using the Obtained and Expected Distributions for the
Two Test.

VC-1, X-2 RAW SCORE	GCT Standard Score		VC-1, X-2 RAW SCORE	GCT Standard Score	
	Obtained Distribution	Expected Distribution		Obtained Distribution	Expected Distribution
56	89	89	29	64	70
55	89	89	29	64	69
54	89	89	27	63	67
53	89	89	26	62	66
52	89	89	25	61	64
51	89	89	24	60	63
50	89	89	23	60	61
49	89	89	22	59	59
48	88	88	21	58	57
47	88	88	20	57	55
46	88	88	19	55	54
45	86	87	18	54	53
44	85	86	17	52	51
43	84	86	16	50	49
42	83	85	15	48	47
41	81	84	14	46	45
40	79	82	13	45	44
39	77	81	12	44	43
38	75	80	11	43	42
37	71	79	10	43	41
36	70	78	9	42	41
35	69	77	8	42	40
34	68	75	7	41	40
33	68	74	6	41	40
32	67	73	5	40	39
31	66	72	4	40	39
30	65	71	3	39	39
			2	39	39
			1	39	39
			0	39	39

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Figure 1: Cumulative Percentage Curves for Obtained and Expected GCT and VC-1, X-2 Score Distributions

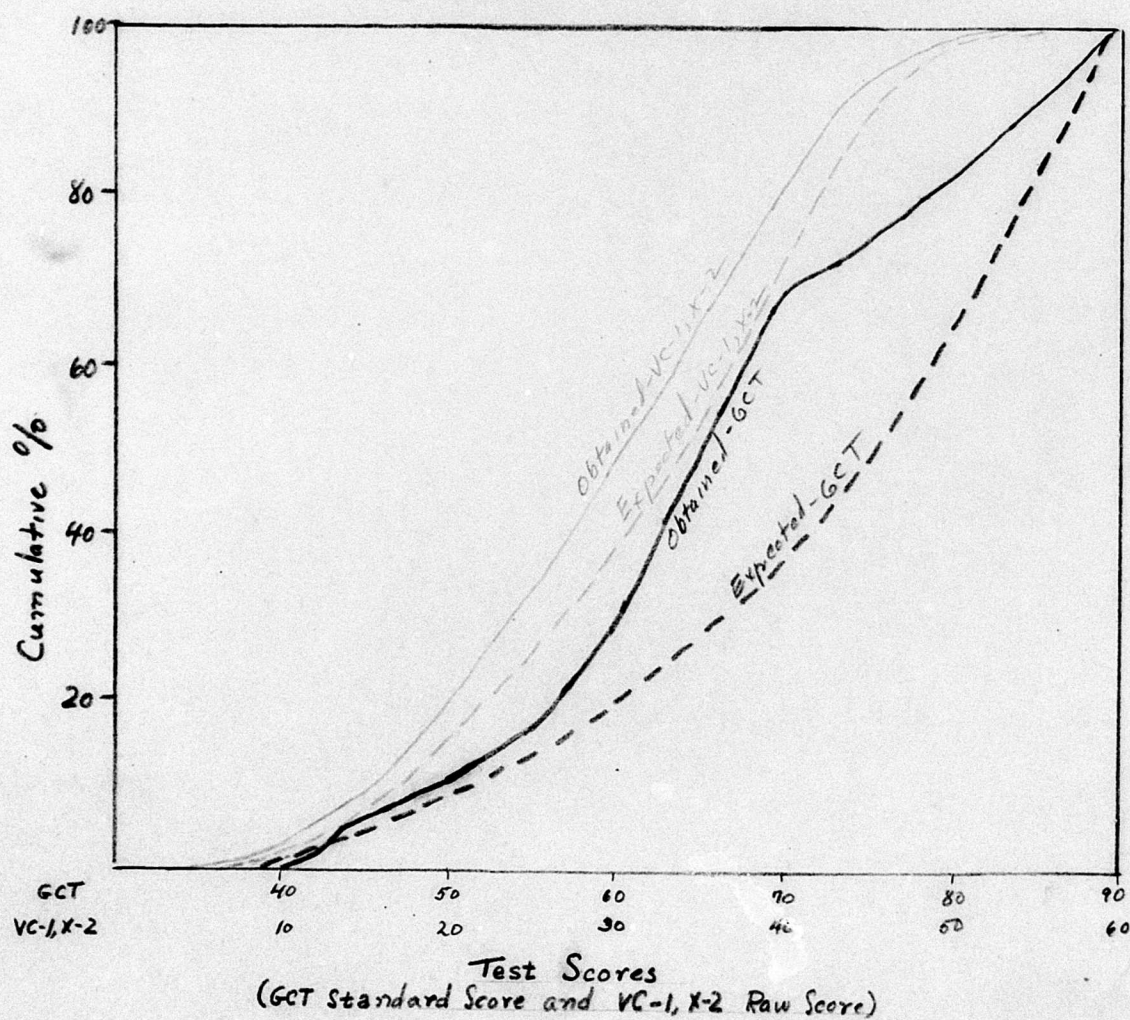


Figure 2:

Relation Between Equivalent GCT and VC-1, X-2
Scores Computed from Obtained and Expected
Score Distributions

