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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is included. (AG)

TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

STRIPPER, HAND (tobacco) 8-12.10

B-305 or S-62

U. S. Employment Service in
Cooperation with
Pennsylvania State Employment Service

U. S. DEPARTMENT OF LABOR
Bureau of Employment Security
Washington 25, D. C.
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GATB #2044
November 1954

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY FOR STRIPPER, HAND (tobacco) 8-12.10

B-305 or S-62

Summary

On October 19, 20, and 21, 1954, the General Aptitude Test Battery, B-1002A, was administered to 50 women employed as Stripper, Hand 8-12.10 by the General Cigar Company, Nanticoke, Pennsylvania. The criterion consisted of average hourly earnings collected over a 31 week period. On the basis of mean scores, standard deviations, correlations with the criterion, job analysis data, and their combined selective efficiency, Aptitudes F-Finger Dexterity and M-Manual Dexterity were selected for inclusion in the test norms.

GATB Norms for Stripper, Hand 8-12.10 - B-305 or S-62

Table I shows, for B-1001 and B-1002, the minimum acceptable score for each aptitude included in the test norms for Stripper, Hand 8-12.10.

TABLE I

Minimum Acceptable Scores on B-1001 and B-1002 for B-305 or S-62

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
F	CB-1-O CB-1-P	85	F	Part 11 Part 12	80
M	CB-1-M CB-1-N	65	M	Part 9 Part 10	65

Effectiveness of Norms

The data in Table IV indicate that 8 of the 13 poor workers, or 62 percent of them, did not achieve the minimum scores established as cutting scores on the recommended test norms. This shows that 62 percent of the poor workers would not have been hired if the recommended test norms had been used in the selection process. Moreover, 29 of the 34 workers who made qualifying test scores, or 85 percent, were good workers.

TECHNICAL REPORT

I. Problem

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupation of Stripper, Hand 8-12.10.

II. Sample

On October 19, 20, and 21, 1954, the General Aptitude Test Battery, B-1002A, was administered to 50 women employed as Stripper, Hand 8-12.10 by the General Cigar Company, Nanticoke, Pennsylvania. The company employs a total of 93 persons on this job. When company officials were approached regarding a larger sample, they felt that because of the extremely competitive nature of the industry and the small profit margin, it was necessary to keep production at as high a level as possible. Therefore, they would release only 50 women to take the tests. The sample of 50 was selected at random from a group of 73 which remained after exclusions for age and experience were made. Every effort was made to insure that a representative cross section of the workers was obtained.

Table II shows the means, standard deviations, ranges, Pearson product-moment correlations with the criterion and the standard errors of correlation for age, education, and experience.

TABLE II

Means (M), Standard Deviations (σ), Ranges, Pearson Product-Moment Correlations with the Criterion (r), and the Standard Errors of Correlation (σ_r) for Age, Education, and Experience

Stripper, Hand 8-12.10

N = 50

	M	σ	Range	r	σ_r
Age (years)	27.1	5.5	18 - 36	.278	.130
Education (years)	9.8	1.7	6 - 12	.306	.128
Experience (months)	39.1	30.7	12 - 148	-.043	.141

The data in Table II indicate that the sample is relatively homogeneous with respect to age. There are low, but statistically significant, correlations between age and education and the criterion. A significant positive correlation (.374) was also found between age and education. It appears that there was a tendency for the older workers in this sample to have somewhat more education and show greater production than the others. It should be noted, however, that all of the workers in this sample were relatively young; the mean age of the sample is 27.1 years and the maximum age is 36 years. The correlation obtained between experience and the criterion is not significant.

III. Job Description

Job Title: Stripper, Hand 8-12.10

Job Summary: Removes stems from tobacco leaves by hand. Picks up a handful of tobacco, unties it, and places leaves on lap. Picks up single leaf of tobacco and spreads it open. Spreads out and holds leaf with left hand and pulls out stem with right hand.

Work Performed

Picks up lot of tobacco from weighing scale, punches time card in time clock to register the time lot is received, and carries lot to work table.

Picks up handful of tobacco, unties it, and places leaves on lap. Picks up single leaf at butt end and spreads it open. Stretches butt end, back side up, on jack, and holds it in place with right hand. Spreads out rest of leaf with left hand. Holding the tip end of leaf within left hand, starts pulling out stem with right hand. Pulls out stem in 2 or 3 movements, following up with left hand to keep leaf open and braced as stem is being pulled. When pad of stemmed leaves piles up to 5 or 6 inches, removes pad and places it on filler board.

IV. Experimental Battery

All of the tests of the GATB, B-1002A, were administered to the sample group.

V. Criterion

The criterion consists of production records expressed in terms of average hourly earnings per week over a period of 31 weeks. According to the officials of the company the desired minimum production level is 90 to 95 cents per hour. All of the workers in the sample exceeded the base rate of 75 cents per hour.

The average hourly earnings for the 31 week period ranged from $.80 to $1.55 with a mean of $1.03 and a standard deviation of $.15.

VI. Statistical and Qualitative Analysis

Table III shows the means, standard deviations, Pearson product-moment correlations with the criterion, and the standard errors of correlation for the aptitudes of the GATB.

The means and standard deviations of the aptitudes are comparable to general population norms with a mean of 100 and a standard deviation of 20.

TABLE III

Means (M), Standard Deviations (σ), Pearson Product-Moment Correlations with the Criterion (r), and the Standard Errors of Correlation (σ_r) for the Aptitudes of the GATB

Stripper, Hand 8-12.10

N = 50

Aptitudes	M	σ	r	σ_r
G-Intelligence	84.3	13.2	.368**	.122
V-Verbal Aptitude	89.3	12.2	.298*	.129
N-Numerical Aptitude	85.4	17.3	.173	.137
S-Spatial Aptitude	82.1	15.9	.314*	.127
P-Form Perception	93.3	15.5	.232	.134
Q-Clerical Perception	99.4	14.0	.318*	.127
K-Motor Coordination	96.5	14.3	.054	.141
F-Finger Dexterity	94.3	20.0	.093	.140
M-Manual Dexterity	76.8	16.4	.376**	.121

** Significant at the .01 level
* Significant at the .05 level

The statistical results were analyzed in the light of the job analysis data. The job analysis indicated that finger and manual dexterity appeared to be important for this occupation. Aptitudes F and M are required to pick up and spread the leaf and to pull the stem out quickly and deftly.

The highest mean scores for this sample were obtained for Aptitudes Q, K, F, and P, respectively. The lowest standard deviations were obtained for Aptitudes V and G, respectively.

When N = 50, correlations of .361 and .279 are significant at the .01 level and the .05 level, respectively. There are significant correlations at the .01 level between Aptitudes G and M and the criterion. There are significant correlations at the .05 level between Aptitudes V, S, and Q and the criterion.

On the basis of the foregoing considerations, including both quantitative and qualitative factors, Aptitudes F and M were chosen for inclusion in the test norms. Each of these aptitudes was found to be significant on the basis of job analysis data. In addition, Aptitude F was included in the test norms on the basis of its high mean score. Although Aptitude M did not show a high mean score, it was included in the test norms on the basis of its significant correlation with the criterion as well as its importance as indicated in the job analysis data.

Although there was statistical evidence to warrant the consideration of all of the other aptitudes, except Aptitude N, there was no evidence of their importance in the job description. Therefore, these aptitudes were not included in the test norms.

The cutting score for Aptitude F was set at one standard deviation unit below the mean and rounded to the next higher five point score level. For Aptitude M the cutting score was set at one standard deviation below the mean and rounded to the higher adjacent five point score level. Setting cutting scores at these levels yielded the best selective efficiency for the norms and resulted in critical scores of 80 and 65 for Aptitudes F and M, respectively.

VII. Concurrent Validity of Norms

For the purpose of computing the tetrachoric correlation coefficient between the test norms and the criterion and applying the Chi Square test, the criterion was dichotomized with a critical score of 92, which is a compromise point between the 90 to 95 cents per hour minimum which the company would like the workers to earn. Those workers who earned an average hourly wage of 92 cents an hour or more were placed in the high criterion group and all others were placed in the low criterion group. Table IV shows the relationship between test norms consisting of F-80 and M-65 and the dichotomized criterion. Workers in the high criterion group have been designated as "good workers" and those in the low criterion group as "poor workers."

TABLE IV

Relationship Between Test Norms Consisting of Aptitudes F and M with Critical Scores of 80 and 65, Respectively and the Criterion For Stripper, Hand 8-12.10

N = 50

	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	8	29	37
Poor Workers	8	5	13
Total	16	34	50

$r_{tet} = .60$ $\quad X^2 = 5.329$

$\sigma_{r_{tet}} = .25$ $\quad P/2 < .025$

The data in the above table indicate a significant relationship between the test norms and the criterion for this sample.

VIII. Conclusions

On the basis of all the foregoing considerations, Aptitudes F and M with minimum scores of 80 and 65, respectively, are recommended as B-1002 norms for the occupation of Stripper, Hand 8-12.10; the equivalent B-1001 norms consist of F-85 and M-65.