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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 also included. (AG)

TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

VENETIAN BLIND ASSEMBLER 6-39.551

B-457 or S-187

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

U. S. DEPARTMENT OF LABOR
Bureau of Employment Security
Washington 25, D. C.

January 1962

VENETIAN BLIND ASSEMBLER 6-39.551

B-457 or S-187

Summary

The General Aptitude Test Battery, B-1002A, was administered to a sample of 66 women employed as Venetian Blind Assemblers 6-39.551 at the Carey-McFall Company, Montoursville, Pennsylvania. The criterion consisted of rank order ratings which were made by the Plant Superintendent and converted to linear scores. On the basis of mean scores, correlations with the criterion, job analysis data, and their combined selective efficiency, Aptitudes K--Motor Coordination, F--Finger Dexterity, and M--Manual Dexterity were selected for inclusion as test norms.

GATB Norms for Venetian Blind Assembler 6-39.551 - B-457 or S-187

Table I shows, for B-1001 and B-1002, the minimum acceptable score for each aptitude included in the test norms for Venetian Blind Assembler 6-39.551.

TABLE I

Minimum Acceptable Scores on B-1001 and B-1002 for B-457 or S-187

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
T	CB-1-K	80	K	Part 8	85
F	CB-1-O CB-1-P	90	F	Part 11 Part 12	85
M	CB-1-M CB-1-N	90	M	Part 9 Part 10	85

Effectiveness of Norms

The data in Table V indicate that 13 of the 22 poor workers, or 59 percent of them, did not achieve the minimum scores established as cutting scores on the recommended test norms. This shows that 59 percent of the poor workers would not have been hired if the recommended test norms had been used in the selection process. Moreover, 40 of the 49 workers who made qualifying test scores, or 82 percent, were good workers.

TECHNICAL REPORT

I. Purpose

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 Venetian Blind Assembler 6-39.551.

II. Sample

On March 28, 29 and 30, 1960, the General Aptitude Test Battery, B-1002A, was administered to 66 women employed as Venetian Blind Assemblers 6-39.551 at the Carey-McFall Company, Montoursville, Pennsylvania.

The total work force of Venetian Blind Assemblers in this plant volunteered to participate in the study. All are considered experienced according to company standards.

Workers desiring work with the company file an application and are given an informal interview by the Plant Superintendent. There are no age or educational requirements for the job of Venetian Blind Assembler 6-39.551. No previous blind-assembly work is required. However, two requirements for employment are that a worker should be tall to reach hooks for hanging up blinds and must be right-handed because the job is set up for right-handed individuals only.

Each new worker is given a demonstration and explanation of procedure. The new worker works for one week with an experienced employee. Good workers have a chance of being promoted to Foreman. All workers in the experimental sample had completed their training and had at least two months of experience as an assembler.

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

TABLE II

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

N = 66

	M	σ	Range	r
Age (years)	31.7	9.7	18 - 50	-.061
Education (years)	10.4	1.8	6 - 12	.078
Experience (months)	53.8	49.7	2 - 204	.038

There are no significant correlations with the criterion for age, education or experience. The data in Table II indicate that the sample is suitable for test development purposes with respect to age, education, and experience.

III. Job Description

Job Summary: Assembles parts of venetian blinds. Attaches tapes and tilt cords to top rail and hangs top rail on overhead rack so that tapes fall free. Inserts required number of slats through loops in tape and threads lift cord through holes in slats. Fastens end tapes to bottom rail. Places metal equalizer on lift cord.

Work Performed: Grasps two tapes and throws ends across table to other member of team. Lifts top rail from pile and attaches top ends of tapes while other worker attaches other ends of tapes to bottom rail. Staples tapes to rails, using air-powered stapler if top and bottom rails are made of wood; attaches tapes, using clips, by pushing clips into slots of rails, if top and bottom rails are made of metal.

Deftly inserts cords into holes in top rail and threads over pulleys. Caps ends of metal rails. Slides cap on bottom rail to cover opening. Winds tapes and cords around rails to make a neat bundle for transport to next assembly unit.

Grasps a rail and tape sub-assembly, unwinds cords and tapes and reaches up to hang top rail on hooks. Pulls down tilt cords and slides a tassel over each, ties knot in each, and pulls tassel down over knots.

Grasps bundle of slats from pile on pallet. Inserts slats, one into each opening in tapes, feeding with right hand and pushing to left with left hand. Taps ends of slats with wooden rod to align slat holes for insertion of cords.

Attaches steel needle to end of each lift cord and inserts each needle in appropriate hole in top slat. Feeds each lift cord with left hand as weight of needle pulls each cord down through slat holes. Pulls needle off end of each lift cord and knots end of each cord in appropriate slot in bottom rail. Attaches equalizer to lift cord. Closes and ties blinds and places completed blind on conveyor for transport to packer.

IV. Experimental Battery

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

V. Criterion

The criterion consisted of rank-order ratings converted to linear scores. Ratings were made by the Plant Superintendent on May 23, 1960 and represent an evaluation of each worker's overall job performance.

VI. Qualitative and Quantitative Analyses

A. Qualitative Analysis:

The job analysis indicated that the following aptitudes measured by the GATB appear to be important for this occupation.

Motor Coordination (K) - required in stapling tape ends in position and inserting cords into top rail and threads over pulleys; sliding tassels over cords; distributing slats, one to each opening.

Finger Dexterity (F) - required in inserting needle into top slot and knotting ends of cords quickly and neatly; feeding cord into equalizers; winding tapes and cords around rails; pushing small clips into slots of rail.

Manual Dexterity (M) - required in handling power stapler; manipulating metal rails; pushing bottom slat into bottom rail grooves; grasping bundles of slats; manipulating slats in feeding one slat to each tape opening.

On the basis of the job analysis data, the following aptitudes are considered obviously unimportant for performing the duties of this job and are considered "irrelevant" aptitudes: V-Verbal Aptitude and N-Numerical Aptitude.

B. Quantitative Analysis:

Table III shows the means, standard deviations, and Pearson product-moment correlations with the criterion 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), and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB

N = 66

Aptitudes	M	σ	r
G-Intelligence	93.5	13.2	-.041
V-Verbal Aptitude	94.2	14.6	-.034
N-Numerical Aptitude	97.4	14.9	.145
S-Spatial Aptitude	95.4	15.5	.013
P-Form Perception	103.1	19.2	.168
Q-Clerical Perception	105.8	15.8	.175
K-Motor Coordination	104.5	13.4	.087
F-Finger Dexterity	104.9	19.3	.206
M-Manual Dexterity	103.3	19.0	.132

Aptitude Q, F and K have the highest mean scores and aptitudes G, K, V and N have relatively low standard deviations.

For a sample of 66 cases, correlations of .316 and .243 are significant at the .01 level and the .05 level of confidence, respectively. There are no significant correlations between the aptitude scores and the criterion.

C. Selection of Test Norms

TABLE IV

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important							X	X	X
Irrelevant		X	X						
Relatively High Mean						X	X	X	
Relatively Low Sigma	X	X	X				X		
Significant Correlation with Criterion									
Aptitudes to be considered for trial norms							K	F	

Based on the qualitative and quantitative evidence of significance indicated above, Aptitudes K and F were selected for further consideration for inclusion in the norms. Trial norms consisting of Aptitudes K and F with various cutting scores were evaluated against the criterion by means of the tetrachoric correlation technique. The recommended procedures specify that, for this study, at least 28 percent of the total sample should be screened out by the test norms. The results of our analysis showed that the two-aptitude norms (K-90, F-85, which yielded the highest tetrachoric correlation coefficient, and also came closest to failing the recommended minimum proportion of the sample, failed only 26 percent of the sample, or 17 individuals, including 6 in the high and 11 in the low criterion group. The best set of two aptitude norms (K-85, F-90) which did screen out more than 28 percent of the sample also failed 11 individuals in the low criterion group, but failed 8 (two more) individuals in the high criterion group, which resulted in a lower tetrachoric correlation coefficient. In view of the fact that only additional individuals in the high criterion group were failed in order to fulfill our selective efficiency requirement of failing at least 28 percent of the experimental sample, it was decided to consider a third aptitude for inclusion in trial norms. Since Aptitude M had been considered important on the basis of the qualitative analysis and had the fourth highest mean score for the sample, this aptitude was included in trial norms even though it was not initially considered relatively high on the basis of the fact that the difference between the third (103.3) and fourth (104.5) highest means, for Aptitudes K and M, respectively, was more than one point (to one decimal place).

The results of this analysis showed that the three-aptitude norms (K-85, F-85, M-85) which yielded the highest tetrachoric correlation coefficient, failed only 26 percent of the sample, or 17 individuals, including 4 in the high and 13 in the low criterion group. The best set of three aptitude norms (K-85, F-85, M-90) which did screen out more than 28 percent of the

sample also failed 13 individuals in the low criterion group, but failed 6 (two more) individuals in the high criterion group, which resulted in a lower tetrachoric correlation coefficient. Since the overall objective is to establish a set of norms which fails a maximum of the low criterion group and a minimum of the high criterion group, it was decided that, in this instance, selecting norms that fail slightly less than 28 percent of the sample was warranted. Therefore, norms consisting of K-85, F-85, and M-85 were selected as the final test norms.

VII. Validity of Norms

The validity of the norms was determined by computing a tetrachoric correlation coefficient between the test norms and the criterion and applying the Chi Square test. The criterion was dichotomized by placing as close as possible to one-third of the sample in the low criterion group. A criterion critical score of 42 was used and resulted in 22 of the workers, or 33 percent of the sample, being placed in the low criterion group.

Table V shows the relationship between test norms consisting of Aptitudes K, F and M with critical scores of 85, 85 and 85 respectively, and the dichotomized criterion for Venetian Blind Assembler 6-39.551. Workers in the high criterion group have been designated as "good workers" and those in the low criterion group as "poor workers."

TABLE V

Validity of Test Norms (K-85, F-85, M-85)

Venetian Blind Assembler 6-39.551

N = 66

	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	4	40	44
Poor Workers	13	9	22
Total	17	49	66

$r_{tet} = .79$ $\quad X^2 = 16.649$

$\sigma_{r_{tet}} = .22$ $\quad P/2 < .0005$

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

VIII. Conclusions

On the basis of the results of this study, Aptitudes K, F and M with minimum scores of 85, 85, and 85 respectively, have been established as B-1002 norms for the occupation of Venetian Blind Assembler 6-39.551. The equivalent B-1001 norms consist of T-80, F-90 and M-90.

IX. Determination of Occupational Aptitude Pattern

A significant relationship between OAP-35 and the criterion for the experimental sample was obtained. The proportion of the sample screened out by OAP-35 was .20, which is within the required range of .10 to .50. Therefore, the occupation Venetian Blind Assembler 6-39.551 will be allocated to OAP-35.