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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)

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TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

Tomato Peeler (Can. + p Reserv.) 529.227

S - 77

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EDUCATION & WELFARE
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TM 001 274

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

U. S. DEPARTMENT OF LABOR
Bureau of Employment Security
Washington 25, D. C.
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STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY
FOR
Tomato Peeler (can. + preserv.) 529.227-142

S-77

Summary

The General Aptitude Test Battery, B-1001, was administered to a sample of 61 women employed as Tomato Peelers 529.227 at the H. E. B. Canning Company, Harlingen, Texas; Quality Foods Cannery, McAllen, Texas; and Akin Products Company, McAllen, Texas. The criterion consisted of supervisory ratings expressed in broad categories. 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 Tomato Peeler (can. + preserv.) 529.227

Table I shows, for B-1001 and B-1002, the minimum acceptable score for each aptitude included in the test norms for Tomato Peeler (can. + preserv.) 529.227

TABLE I

Minimum Acceptable Scores on B-1001 and B-1002 for S-77

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	75	M	Part 9 Part 10	75

Effectiveness of Norms

The data in Table IV indicate that 12 of the 21 poor workers, or 57 percent of them, did not achieve the minimum scores established as cutting scores on the recommended test norms. This shows that 57 percent of the poor workers would not have been hired if the recommended test norms had been used in the selection process. Moreover, 31 of the 40 workers who made qualifying test scores, or 78 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 Tomato Peeler (can. & preserv.) 529.887.

II. Sample

The GATB, B-1001, was administered during April 1953 to a sample of 61 women employed at three canning companies in Texas as Tomato Peelers. The following number of women in the sample were employed at each company:

N	Company
21	H. E. B. Canning Company, Harlingen, Texas
20	Quality Foods Cannery, McAllen, Texas
20	Akin Products, McAllen, Texas

The workers in the three companies were combined into one sample of 61 workers since they were all performing the same job in the same manner and comparable criterion data could be obtained. All of these companies canned tomatoes and had essentially the same type of set-up for operational canning, which includes using the same size pail and producing the same general type of pack.

The workers selected for inclusion in these samples represent a group of relatively "permanent" employees. That is, they live in the vicinity of the plants and have been doing the work season after season and work on various products to be canned. The operation of is a highly seasonal operation which lasts a maximum period of six weeks with a peak employment of two and a half weeks. No specific training time was indicated for this type of work.

Table II shows the mean, standard deviation, range, and Pearson product-moment correlation (corrected for broad category) with the criterion for age. There were no education data available since the sample consisted mostly of Latin Americans with very hazy or indefinite amounts of schooling in terms of United States standards. There were also no experience data available since the sample worked in such a variety of canning operations that it was not possible to obtain any detailed work experience pertaining specifically to tomato peeling.

TABLE II

Mean (M), Standard Deviation (σ), Range, and Pearson Product-Moment Correlation (Corrected for Broad Category) with the Criterion ($_{c}r$) for Age

Tomato Peeler (can. & preserv.) 529.887

N = 61

	M	σ	Range	$_{c}r$
Age (years)	31.0	9.8	18-62	-.321

The negative correlation between age and the criterion is significant at the .05 level, which may indicate that the younger workers tend to be the best workers.

III. Job Description

Job Title: Tomato Peeler (can. & preserv.) 529.387-042

Job Summary: Removes peel and core from tomato, using fingers and knife, after tomatoes have been blanched. Sits or stands facing conveyor belt which conveys blanched tomatoes. Grabs tomato with either hand from conveyor. Removes core with knife in a circular motion and squeezes peel from tomato with fingers of opposite hand. Flips skin and core into refuse container, drops cored and peeled tomato into pail.

IV. Experimental Battery

All of the tests of the GATB, B-1001, were administered to the sample group.

V. Criterion

The criterion consisted of supervisory ratings expressed in broad categories prepared by the foremen and owners of each of the three companies represented in this study. Production records were also secured on each of the workers based on the previous short canning season. However, they could not be used as a criterion measure since they did not have sufficient spread to differentiate adequately among the best, average, and poor workers. Therefore, in making their ratings, the foremen considered the production records in the light of other factors deemed pertinent to successful performance on the job. Each worker was placed in one of three categories: good, average or poor. These broad category ratings were converted into quantitative scores. The "good" group with 20 workers, the "average" group with 20 workers and the "poor" group with 21 workers were assigned scores of 61, 50, and 39, respectively.

VI. Statistical and Qualitative Analysis

Table III shows the means, standard deviations, and Pearson product-moment correlations (corrected for broad categories) 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 (Corrected for Broad Categories) with the Criterion ($_cr$) for the Aptitudes of the GATB

Tomato Peeler (can. & preserv.) 529.837

N = 61

Aptitudes	M	σ	$_cr$
G-Intelligence	57.5	10.5	.105
V-Verbal Aptitude	60.6	7.8	.061
N-Numerical Aptitude	49.3	15.0	.219
S-Spatial Aptitude	74.4	15.3	.142
P-Form Perception	55.0	21.8	.294*
Q-Clerical Perception	50.8	16.5	.070
A-Aiming	61.7	27.0	.479**
T-Motor Speed	51.5	27.9	.454**
F-Finger Dexterity	99.4	21.9	.607**
M-Manual Dexterity	97.3	23.9	.569**

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

The statistical results were interpreted in conjunction with the job analysis data. The job analysis indicated that the following aptitudes measured by the GATB appear to be important for this occupation:

Aiming (A) - required in grabbing tomatoes from the conveyor and in removing cores from tomatoes.

Motor Speed (T) - required in handling, coring and peeling tomatoes rapidly.

Finger Dexterity (F) and Manual Dexterity (M) - required in handling the tomatoes and working with the knife to peel and core tomatoes.

The highest mean scores were obtained for Aptitudes F and M, respectively. Aptitudes P, A, T, F, and M have standard deviations greater than 20. The extremely low mean scores on some of the aptitudes reflect an atypical sample, although this sample is probably representative of many persons employed in this seasonal occupation. These scores were not unexpected since many of the workers in this sample had difficulty with the English language and, as previously mentioned, had very hazy or indefinite amounts of formal schooling.

When N = 61, correlations of .328 and .252 are significant at the .01 level and the .05 level, respectively. Aptitudes A, T, F, and M correlate significantly with the criterion at the .01 level of confidence. Aptitude P correlates significantly with the criterion at the .05 level of confidence.

Aptitudes F and M were considered for inclusion in the test norms on the basis of the qualitative and quantitative factors cited above: both of these aptitudes appear to have some importance in terms of job analysis data and show significant correlations with the criterion, as well as the highest mean scores for the sample. Totrachoric correlations with the criterion were computed for several sets of trial norms consisting of Aptitudes F and M and various cutting scores. Norms which included these aptitudes yielded good selective efficiency.

Although there is some statistical and qualitative evidence of significance for Aptitudes A and T, they were not given further consideration for inclusion in the test norms because of their extremely low mean scores. Therefore, neither of these aptitudes was included in the final test norms.

The cutting score for Aptitude F was set at one-half standard deviation unit below the mean score and rounded to the lower adjacent five-point score level. For Aptitude M, the cutting score was set at one standard deviation below the mean score and rounded to the nearest five-point score level. Setting cutting scores at these levels yielded the best selective efficiency for the norms and resulted in cutting scores of 85 and 75 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 those workers rated as Good and Average placed in the high criterion group, and with those rated as Poor placed in the low criterion group. This resulted in 21 of the 61 workers, or 34 percent of the sample, being placed in the low criterion group.

Table IV shows the relationship between test norms consisting of Aptitudes F and M with critical scores of 85 and 75, respectively and the criterion for Tomato Peeler 529.887. 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 85 and 75, Respectively and the Criterion for Tomato Peeler (can. preserv.) 529.887

N = 61

	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	9	31	40
Poor Workers	12	9	21
Total	21	40	61

$r_{tet} = .54$ $X^2 = 5.867$

$\sigma_{r_{tet}} = .21$ P/2 < .01