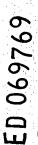ABSTRACT

        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)

# Development of USES Aptitude Test Battery

# for

# Asparagus Sorter

(agric., can. & preserv., whole tr.)  529.687

U.S. DEPARTMENT OF LABOR

W. Willard Wirtz, Secretary

MANPOWER ADMINISTRATION

BUREAU OF EMPLOYMENT SECURITY

Washington, D.C. 20210

1

Technical Report on Development of USES Aptitude Test Battery

For ...............

Asparagus Sorter (agric.; can. & preserv.; whole. tr.) 529.687
(8-04.10)

B-654 or S-374

U. S. Employment Service
in Cooperation with
Washington State Employment Service
March 1966

2.

DEVELOPMENT OF USES APTITUDE TEST BATTERY

For

Asparagus Sorter (agric.; can. & preserv.; whole. tr.) 529.687
(8-04.10)

B-654 or S-374

This report describes research undertaken for the purpose of developing
General Aptitude Test Battery (GATB) norms for the occupation of Asparagus
Sorter (agric.; can. & preserv.; whole. tr.) 529.687 (2nd Edition DOT code
8-04.10).  The following norms were established:


| GATB Aptitudes | Minimum Acceptable GATB, B-1002 Scores |
|---|---|
| K - Motor Coordination | 95 |
| M - Manual Dexterity | 95 |


RESEARCH SUMMARY

Sample:
       136 applicants for jobs at the Birds Eye Division of General Foods
       Corporation in Walla Walla, Washington.

Criterion:
       Supervisory ratings

Design:
       Concurrent (test and criterion data were collected at approximately
       the same time).

       Minimum aptitude requirements were determined on the basis of a job
       analysis and statistical analyses of aptitude mean scores, standard
       deviations, and selective efficiencies.

Concurrent Validity:
       Phi Coefficient = .26 (P/2 <.005)

Effectiveness of Norms:

Only 67% of the non-test-selected workers used for this study were
good workers; if the workers had been test-selected with the above
norms, 78% would have been good workers. 33% of the non-test-selected
workers used for this study were poor workers; if the workers had
been test-selected with the above norms, only 22% would have been
poor workers. The effectiveness of the norms is shown graphically
in Table 1:

TABLE 1

Effectiveness of Norms

|  | Without Tests | With Tests |
|---|---|---|
| Good Workers | 67% | 78% |
| Poor Workers | 33% | 22% |

SAMPLE DESCRIPTION

Size:
N = 136

Occupational Status:
Job applicants

Work Setting:
Applicants who were subsequently employed by Birds Eye Division of
General Foods Corp. in Walla Walla, Washington.

Employer Selection Requirements:

Education: No requirement

Previous Experience: No requirement. The majority of the applicants
had previous experience with either Birds Eye
or another company.

Tests: No tests used

Other: Personal interview to determine desire and willingness to
work in a food processing plant on a permanent basis.

Principal Activities:
The job duties for each worker are comparable to those shown in the
job description in the Appendix.

Minimum Experience:
>All applicants had at least one month's total experience at the time of rating.

## TABLE 2

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

|  | Mean | SD | Range | r |
|---|---|---|---|---|
| Age (years) (N=136) | 35.0 | 12.2 | 17-63 | .286** |
| Education (years) (N=136) | 10.5 | 2.3 | 3-16 | -.079 |
| Experience (months) (N=107)* | 44.1 | 42.9 | 1-180 | -.030 |

** Significant at the .01 level

## EXPERIMENTAL TEST BATTERY

All 12 tests of the GATB, B-1002A were administered during 1964 before the start of the season for most of the sample (applicants) and shortly after the start of the season for a few permanent employees of the company.

## CRITERION

The criterion data consisted of supervisory ratings of job proficiency.

Rating Scale:
>Rank order ratings were made by first-and second-line supervisors at the end of the 1964 season on asparagus. The final scale consisted of the supervisors' ratings. The scores were averaged for an employee rated by more than one supervisor.

Reliability:
>Intercorrelations were obtained among the independent ratings made by first-line and second-line supervisors. (Some of these correlations are based on an extremely small number of cases.) The entire crew of asparagus sorters was rated to reduce the possibility that the tested sample was not randomly distributed in the crew. Therefore, the intercorrelations are based on a total sample of 292 rather than an N of 136. These intercorrelations ranged from .21 to .88 for all day shift supervisors and from .38 to 1.00 for night shift supervisors. The final scale consisted of the average of the supervisory ratings received (1-6). Seventy-six were rated by more than one supervisor.

* The statistics on experience were calculated on the 107 applicants who had had experience at the time of testing.

Criterion Score Distribution: Possible range is 3-91

|                            | N   | M    | SD   | Range |
|----------------------------|-----|------|------|-------|
| Total Rated Employees      | 292 | 48.5 | 17.8 | 3-91  |
| Tested Employees in Sample | 136 | 48.4 | 17.9 | 8-91  |

Criterion Dichotomy:

The criterion distribution was dichotomized into low and high groups by placing 33% of the sample in the low group to correspond with the percentage of workers considered unsatisfactory or marginal. Workers in the high criterion group were designated as "good workers" and those in the low group as "poor workers." The criterion critical score is 40.

## APTITUDES CONSIDERED FOR INCLUSION IN THE NORMS

Aptitudes were selected for tryout in the norms on the basis of a qualitative analysis of job duties involved and a statistical analysis of test and criterion data. Aptitudes P, K, F, and M were considered for inclusion in the test norms on the basis of the qualitative and statistical analyses. Tables 3, 4, and 5 show the results of the qualitative and statistical analyses.

## TABLE 3

Qualitative Analysis
(Based on the job analysis, the aptitudes indicated appear
to be important to the work performed)

| Aptitude | Rationale |
|----------|-----------|
| P - Form Perception | Aligning of asparagus butts to guide rail of moving belt and distinguishing between standard and sub-standard spears. |
| K - Motor Coordination | Positioning of spears on moving belt using both hands. |
| F - Finger Dexterity | Picking up and aligning spears. |
| M - Manual Dexterity | Placing spears on moving belts, in trays, or in water trough. |

## TABLE 4

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment Corre-
lations with the Criterion (r) for the Aptitudes of the GATB; N = 133

|  | Mean | SD | Range | r |
|---|---|---|---|---|
| G - General Learning Ability | 95.7 | 18.6 | 46-135 | .110 |
| V - Verbal Aptitude | 98.8 | 18.4 | 61-141 | .056 |
| N - Numerical Aptitude | 90.9 | 19.3 | 34-135 | .115 |
| S - Spatial Aptitude | 95.8 | 19.9 | 55-163 | .141 |
| P - Form Perception | 97.3 | 19.8 | 18-134 | .191* |
| Q - Clerical Perception | 99.0 | 16.6 | 62-141 | .066 |
| K - Motor Coordination# | 101.2 | 17.5 | 56-142 | .231** |
| F - Finger Dexterity# | 97.1 | 20.9 | 53-145 | .170* |
| M - Manual Dexterity# | 107.5 | 20.1 | 53-159 | .180* |

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

#N = 136 for aptitudes K, F, and M because three illiterates were tested on
only these three aptitudes.

## TABLE 5

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 | X |
| Irrelevant |  |  |  |  |  |  |  |  |  |
| Relatively High Mean |  | X |  |  |  | X | X |  | X |
| Relatively Low Standard Dev. |  |  |  |  |  |  |  |  |  |
| Significant Correlation with Criterion |  |  |  |  | X |  | X | X | X |
| Aptitudes to be Considered for Trial Norms |  |  |  |  | P |  | K | F | M |

## DERIVATION AND VALIDITY OF NORMS

Final norms were derived on the basis of a comparison of the degree to which trial norms consisting of various combinations of aptitudes P, K, F, and M at trial cutting scores were able to differentiate between the 67% of the sample considered good workers and 33% of the sample considered poor workers. Trial cutting scores at five point intervals approximately one standard deviation below the mean are tried because this will eliminate about one third of the sample with three-aptitude norms. For two-aptitude trial norms, minimum cutting scores of slightly more than one standard deviation below the mean will eliminate about 1/3 of the sample; for four-aptitude trial norms, cutting scores of slightly less than one standard deviation below the mean will eliminate about 1/3 of the sample. The Phi Coefficient was used as a basis for comparing trial norms. Norms of K-95 and M-95 provided the highest degree of differentiation for the occupation of Asparagus Sorter (agric.; can. & preserv.; whole. tr.) 529.687. The validity of these norms is shown in Table 6 and is indicated by a Phi Coefficient of .26 (statistically significant at the .005 level).

## TABLE 6

### Concurrent Validity of Test Norms, K-95, and M-95

|  | Nonqualifying Test Scores | Qualifying Test Scores | Total |
|---|---|---|---|
| Good Workers | 31 | 61 | 92 |
| Poor Workers | 27 | 17 | 44 |
| Total | 58 | 78 | 136 |

Phi Coefficient ($\emptyset$) = .26                    Chi Square ($X^2$) = 9.38
Significance Level = $P/2 < .005$

## DETERMINATION OF OCCUPATIONAL APTITUDE PATTERN

The data for this study met the requirements for incorporating the occupation studied into OAP-34 which is shown in Section II of the Guide to the Use of the General Aptitude Test Battery.

A-P-P-E-N-D-I-X

(See next page)

S-374                                                        March 1966

FACT SHEET

Job Title:  Asparagus Sorter (agric.; can & preserv.; whole tr.) 529.687
            (8-04.10)

Job Summary:  Works as a member of a crew standing alongside a moving con-
veyor to align asparagus spears preparatory to packing, using both hands
coordinately, and removes substandard spears for re-processing.

Work Performed:  Picks up spears coordinately with hands and aligns spears
in piles with butt ends toward  outside edge of moving belt.

Places spears with white butts in trays for retrimming and substandard spears
on return belt or in water trough for further processing.


(This sheet is printed in duplicate.  One copy should remain as part of the
Appendix in order to complete the technical report.  The other copy can be
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