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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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Development of USES Aptitude Test Battery

for

Levers-Lace-Machine Operator

(tex. prod.) 683.782

U.S. DEPARTMENT OF LABOR

MANPOWER ADMINISTRATION

Technical Report on Development of USES Aptitude Test Battery

For . . . .

   Levers-Lace-Machine Operator (tex. prod., n.e.c.) 683.782

S-405

(Developed in Cooperation with the
North Carolina State Employment Service)

U.S. DEPARTMENT OF LABOR
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February 1968

FOREWORD

The United States Employment Service General Aptitude Test
Battery (GATB) was first published in 1947. Since that time
the GATB has been included in a continuing program of research
to validate the tests against success in many different
occupations. Because of its extensive research base the GATB
has come to be recognized as the best validated multiple aptitude
test battery in existence for use in vocational guidance.

The GATB consists of 12 tests which measure 9 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, with a standard deviation of 20.

Occupational norms are established in terms of minimum qualifying
scores for each of the significant aptitude measures which, in
combination, predict job performance. For any given occupation,
cutting scores are set only for those aptitudes which contribute to
the prediction of performance of the job duties of the experimental
sample. It is important to recognize that another job might have
the same job title but the job content might not be similar. The
GATB norms described in this report are appropriate for use only
for jobs with content similar to that shown in the job description
included in this report.

Charles E. Odell

Charles E. Odell, Director
U. S. Employment Service

DEVELOPMENT OF USES APTITUDE TEST BATTERY

for

LEVERS-LACE-MACHINE OPERATOR,
683.782-034

S-405

This report describes research undertaken for the purpose of developing General

Aptitude Test Battery (GATB) norms for the occupation of Levers-Lace-Machine Operator

(tex. prod. n.e.c.) 683.782-034. The following norms were established:

GATB Aptitudes	Minimum Acceptable GATB Scores
P - Form Perception	85
K - Motor Coordination	80
M - Manual Dexterity	90

RESEARCH SUMMARY

Sample: 54 male workers employed as Levers-Lace-Machine Operators 683.782·

in North Carolina.

Criterion: Rank-Order 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,

aptitude-criterion correlations and selective efficiencies.

Concurrent Validity: Phi Coefficient = .29 (P/2 $<$ .025)

Effectiveness of Norms: Only 67% of the nontest-selected workers used for this study

were good workers; if the workers had been test-selected with

the S-405 norms, 78% would have been good workers. 33% of

the nontest-selected workers used for this study were poor

workers; if the workers had been test-selected with the

S-405 norms, only 22% would have been poor workers. The

effectiveness of the norms is shown graphically in Table 1:

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TABLE 1

Effectiveness of Norms

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

SAMPLE DESCRIPTION

Size: N = 54

Occupational Status: Employed workers.

Work Setting: Workers were employed by The Rimco Corporation, Murphy, North Carolina;
Fairlaine Fabrics, Bryson City, North Carolina; and Oxford Fabrics,
Oxford, North Carolina.

Employer Selection Requirements:

Education: 8th grade preferred.

Previous Experience: None

Tests: Purdue Pegboard administered, but not adhered to at Rimco Corp. No tests
administered at Fairlaine and Oxford.

Other: Personal interview and previous employment reference.

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

Minimum Experience: All workers in the study had one month or more experience on
the job.

TABLE 2

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

	Mean	SD	Range	r
Age (years)	28.3	6.7	19–48	-.052
Education (years)	10.7	2.1	5–14	-.248
Experience (months)	40.9	31.8	1–108	.244

EXPERIMENTAL TEST BATTERY

All 12 tests of the GATB, B-1002B were administered during the period December 1966 to March 1967.

CRITERION

The criterion data consisted of supervisory rank-order ratings of job proficiency. Independent ratings were obtained from three supervisors in each plant.

Rating Scale: The name of each employee to be rated was placed on a separate card. The supervisors then arranged and rearranged each card to determine the rank of each man from highest to lowest job proficiency.

Reliability: The combined correlations between the linear conversions of the ranks (3) were .822, .843, and .705 respectively. The final criterion consisted of the three sets of linear conversions combined.

Criterion Distribution: Range (combined linear conversion): 48 - 252

Mean: 150.5

Standard Deviation: 50.1

Criterion Dichotomy: The criterion distribution was dichotomized into low and high groups by placing 33% of the sample in the low criterion 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."

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. Aptitude Q which does not have a high correlation with the criterion was considered for inclusion in the norms because the sample had a relatively high mean score and a relatively low standard deviation for this aptitude. For Aptitude K the qualitative analysis indicated it was important for the job duties.

and the sample had a relatively high mean score on this aptitude. A relatively high mean score with employed workers may indicate some sample pre-selection. 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
G - Intelligence	Necessary in interpreting fact sheet in order to set-up machine.
P - Form Perception	Necessary to detect small deviations in patterns.
K - Motor Coordination	Necessary in making corrections quickly.
F - Finger Dexterity	Necessary in making machine adjustments.
M - Manual Dexterity	Necessary in machine adjustments.

TABLE 4

Means, Standard Deviations (SD), Ranges, and Pearson Product-Moment
Correlations with the Criterion (r) for the Aptitudes of the GATB; N = 54

Aptitudes	Mean	SD	Range	r
G - Intelligence	88.0	15.2	58-135	.168
V - Verbal Aptitude	86.0	11.8	65-125	-.034
N - Numerical Aptitude	86.5	16.8	54-130	.090
S - Spatial Aptitude	91.5	18.9	58-130	.097
P - Form Perception	96.1	16.5	59-143	.292*
Q - Clerical Perception	98.1	12.3	78-128	.014
K - Motor Coordination	94.4	14.8	62-128	.054
F - Finger Dexterity	94.8	16.8	64-133	.233
M - Manual Dexterity	109.2	18.5	74-165	.305*

*Significant at the .05 level

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	X
Irrelevant									
Relatively High Mean					X	X			X
Relatively Low SD		X				X	X		
Significant Correlation with Criterion					X				X
Aptitudes to be Considered for Trial Norms					P	Q	K		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, Q, K 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 one third of the sample; for four-aptitude trial norms, cutting scores of slightly less than one standard deviation below the mean will eliminate about one third of the sample. The Phi Coefficient was used as a basis for comparing trial norms. The optimum differentiation for the occupation of Levers-Lace-Machine Operator 683.782-034 was provided by the norms of P-85, K-80 and M-90. The validity of these norms is shown in Table 6 and is indicated by a Phi Coefficient of .29 (statistically significant at the .025 level).

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TABLE 6

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Concurrent Validity of Test Norms, P-85, K-80, and M-☐☐

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Workers	8	28	36
Poor Workers	10	8	18
Total	18	36	54

Phi Coefficient (ϕ) = .29   Chi Square (X^2_v) = 4.6
Significance Level = P/2 < .025

DETERMINATION OF OCCUPATIONAL APTITUDE NORMS

The data for this study met the requirements for incorporating the occupation studied into OAP-31 which is shown in Section II of the Manual for the General Aptitude Test Battery. A Phi Coefficient of .27 is obtained with the OAP-31 norms of P-85, K-80, M-80.

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

FACT SHEET

Job Title: Levers-Lace-Machine Operator (tex. prod., n.e.c.) 683.782-034

Job Summary: Sets-up, adjusts, and operates two levers-lace machines to weave yarn into lace.

Work Performed:

1. Sets up machines: Reviews figure sheet and confers with foreman to determine style and type of lace to be woven, denier of yarns required, arrangement of threading yarn through machine, arrangement of droppers in jacquard mechanism, arrangement of holes to be punched in sley, and type of jacquard cards required to weave lace according to specifications. Instructs Levers-Lace-Machine Operator Trainee to load guimp and liner yarns into machines, and to punch holes in sley. Installs jacquard cards on jacquard section of machine, observing holes punched in cards to detect variation of holes in card from figure sheet. Punches holes in cards, using hand punch, or plugs holes to correct faulty punching by Card Puncher. Arranges droppers in jacquard cards. Installs bobbin carriages, with bobbins of yarn, into machine working as member of two man team with trainee. Installs sley into machine. Threads warp ends through eye-lettes, holes in sley, between points and through holes in bars according to set-out on figure sheet to ensure specified pattern is woven. Gaits machine, using gaiting wrench.

2. Operates machine: Turns dial to set rack counter, and pulls starter rod to start machine. Patrols platform between two machines and observes weaving to detect yarn breaks or defective weaving such as irregular holes or matted yarn. Stops machine and ties in broken yarn ends and threads end of yarn through machine, or marks lace to indicate defects. Observes warp beams to determine approximate time yarn will delete from beam, and

flips switch then turns on red light to signal trainee that replenishment
of yarn is needed. Records reading on rack counter at end of shift.

3. Adjusts machine: Examines weaving mechanism to determine cause of yarn
   breaks, and removes and replaces bobbins with burrs, or wide bobbins; or
   adjust gaiting on machine,using gait wrench. Adjusts droppers to control
   movement of yarn over specified number of gaits. Removes spring that
   reduces weight on beams, when specified amount of yarn deleted from beams,
   to maintain uniform gaiting of bars the width of machine.

4. Lubricates parts of machine: Applies dry lubricant (teflube) to bobbin
   carriages and combs to reduce wear.

Effectiveness of Norms:

Only 67% of the nontest-selected workers used for this study were good
workers; if the workers had been test-selected with the S-405 norms 78%
would have been good workers. 33% of the nontest-selected workers used
for this study were poor workers; if the workers had been test-selected
with S-405 norms only 22% would have been poor workers.

Applicability of S-405 Norms:

The aptitude test battery is applicable to jobs which include a majority
of the job duties described above.

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