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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 and a personnel evaluation form are also included. (AG)

Development of USES Aptitude Test Battery

for

Transportation Agent

(air transport) 912.368

U.S. DEPARTMENT OF LABOR
W. Willard Wirtz, Secretary
MANPOWER ADMINISTRATION
BUREAU OF EMPLOYMENT SECURITY
Washington, D.C. 20210

Technical Report on Development of USES Aptitude Test Battery

For .....

TRANSPORTATION AGENT (air trans.) 912.368

S-379

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

August 1966

DEVELOPMENT OF USES APTITUDE TEST BATTERY

For

TRANSPORTATION AGENT (air trans.) 912.368
S-379

This report describes research undertaken for the purpose of developing General Aptitude Test Battery (GATB) norms for the occupation of Transportation Agent (air trans.) 912.368. The following norms were established:

GATB Aptitudes	Minimum Acceptable GATB, B-1002 Scores
N - Numerical Aptitude	85
Q - Clerical Perception	85
M - Manual Dexterity	80

RESEARCH SUMMARY

Sample:
50 male workers employed as Transportation Agents at Flying Tiger Line, Westchester, California.

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, aptitude-criterion correlations and selective efficiencies.

Concurrent Validity:
Phi Coefficient = .41 ($P/2 < .005$)

Effectiveness of Norms: Only 66% of the non-test-selected workers used for this study were good workers; if the workers had been test-selected with the above norms, 79% would have been good workers. 34% 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 21% would have been poor workers. The effectiveness of the norms is shown graphically in TABLE I.

TABLE I

Effectiveness of norms

	Without Tests	With Tests
Good Workers	66%	79%
Poor Workers	34%	21%

SAMPLE DESCRIPTION

Size: N = 50

Occupational Status: Employed workers

Work Setting: Workers were employed by Flying Tiger Line, Westchester, Calif.

Employer Selection Requirements:

Education: High School graduate preferred.

Previous Experience: None

Tests: None

Other: Pass physical examination. Above average in physical development.

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 sample had completed 6 months on-the-job training.

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)	32.9	11.3	19-57	.138
Education (years)	11.5	2.5	7-18	-.053
Experience (months)	58.6	60.6	6-192	.311 *

* Significant at the .05 level

EXPERIMENTAL TEST BATTERY

All 12 tests of the GATB, B-1002B, were administered during 1965 concurrent with the collection of criterion data.

CRITERION

The criterion data consisted of supervisory ratings of job proficiency made at approximately the same time as test data were collected. The ratings were made by the operations supervisor.

Rating Scale: USES Form SP-21 "Descriptive Rating Scale" (see Appendix).

Reliability: A reliability coefficient of .89 was obtained between initial ratings and reratings obtained at least two weeks later.

Criterion Distribution:

Possible Range:	18-90
Actual Range:	44-90
Mean:	62.8
Standard Deviation:	9.1

Criterion Dichotomy: The criterion distribution was dichotomized into low and high groups by placing 34% 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 58.

APTITUDES CONSIDERED FOR INCLUSION IN THE NORMS

Aptitudes were selected for tryout in the norms on the basis of a qualitative analysis of test and criterion data. Aptitudes G, Q and M which do not have a high correlation with the criterion were considered for inclusion in the norms because the qualitative analysis indicated that they were important for the job duties and the sample had a relatively high mean score on these aptitudes. A relatively high mean score with employed workers may indicate that some sample pre-selection has taken place. 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 to understand and follow written and verbal instruction in connection with loading and unloading procedures.
Q - Clerical Perception	Necessary in the accurate checking and recording of all pertinent information regarding cargo shipments
M - Manual Dexterity	Necessary in loading and unloading cargo using various types of equipment.

TABLE 4

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

Aptitude	Mean	SD	Range	r
G - Intelligence	101.3	18.9	51-132	.254
V - Verbal Aptitude	99.3	15.4	68-133	.316*
N - Numerical Aptitude	99.0	18.4	50-136	.310*
S - Spatial Aptitude	103.6	18.1	55-133	.115
P - Form Perception	97.2	22.5	28-152	.140
Q - Clerical Perception	102.2	16.2	68-171	.191
K - Motor Coordination	100.3	16.1	62-134	.174
F - Finger Dexterity	93.6	25.1	34-137	.249
M - Manual Dexterity	102.4	25.5	42-154	.205

*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
Irrelevant									
Relatively High Mean	X			X		X			X
Relatively Low Standard Dev.									
Significant Correlation with Criterion		X	X						
Aptitudes to be Considered for Trial Norms	G	V	N			Q			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 G, V, N, Q and M at trial cutting scores were able to differentiate between the 66% of the sample considered good workers and the 34% 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. Norms of N-85, Q-85, and M-80 provided the highest degree of differentiation. The validity of these norms is shown in Table 6 and is indicated by a Phi Coefficient of .41 (statistically significant at the .005 level).

TABLE 6

Concurrent Validity of Test Norms, N-85, Q-85 and M-80

	Nonqualifying Test Scores	Qualifying Test Scores	Total
Good Workers	6	27	33
Poor Workers	10	7	17
Total	16	34	50

Phi Coefficient (O) = .41
Significance Level = P/2 $<$ .005

Chi Square (X^2) = 8.517

DETERMINATION OF OCCUPATIONAL APTITUDE PATTERN

The data for this study did not meet the requirements for incorporating the occupation studied into any of the 36 OAP's included in Section II of the Manual for the General Aptitude Test Battery. The data for this sample will be considered for future groupings of occupations in the development of new occupational aptitude patterns.

SP-21
Rev. 2/61

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

DESCRIPTIVE RATING SCALE
(For Aptitude Test Development Studies)

Score____

RATING SCALE FOR _____
D. O. T. Title and Code

Directions: Please read Form SP-20, "Suggestions to Raters", and then fill in the items listed below. In making your ratings, only one box should be checked for each question.

Name of Worker (print) _____
(Last) (First)

Sex: Male_____ Female_____

Company Job Title: _____

How often do you see this worker in a work situation?

☐ See him at work all the time.

☐ See him at work several times a day.

☐ See him at work several times a week.

☐ Seldom see him in work situation.

How long have you worked with him?

☐ Under one month.

☐ One to two months.

☐ Three to five months.

☐ Six months or more.

A. How much work can he get done? (Worker's ability to make efficient use of his time and to work at high speed.)

☐ 1. Capable of very low work output. Can perform only at an unsatisfactory pace.

☐ 2. Capable of low work output. Can perform at a slow pace.

☐ 3. Capable of fair work output. Can perform at an acceptable but not a fast pace.

☐ 4. Capable of high work output. Can perform at a fast pace.

☐ 5. Capable of very high work output. Can perform at an unusually fast pace.

B. How good is the quality of his work? (Worker's ability to do high-grade work which meets quality standards.)

☐ 1. Performance is inferior and almost never meets minimum quality standards.

☐ 2. The grade of his work could stand improvement. Performance is usually acceptable but somewhat inferior in quality.

☐ 3. Performance is acceptable but usually not superior in quality.

☐ 4. Performance is usually superior in quality.

☐ 5. Performance is almost always of the highest quality.

C. How accurate is he in his work? (Worker's ability to avoid making mistakes.)

☐ 1. Makes very many mistakes. Work needs constant checking.

☐ 2. Makes frequent mistakes. Work needs more checking than is desirable.

☐ 3. Makes mistakes occasionally. Work needs only normal checking.

☐ 4. Makes few mistakes. Work seldom needs checking.

☐ 5. Rarely makes a mistake. Work almost never needs checking.

D. How much does he know about his job? (Worker's understanding of the principles, equipment, materials and methods that have to do directly or indirectly with his work.)

☐ 1. Has very limited knowledge. Does not know enough to do his job adequately.

☐ 2. Has little knowledge. Knows enough to "get by."

☐ 3. Has moderate amount of knowledge. Knows enough to do fair work.

☐ 4. Has broad knowledge. Knows enough to do good work.

☐ 5. Has complete knowledge. Knows his job thoroughly.

E. How much aptitude or facility does he have for this kind of work? (Worker's adeptness or knack for performing his job easily and well.)

☐ 1. Has great difficulty doing his job. Not at all suited to this kind of work.

☐ 2. Usually has some difficulty doing his job. Not too well suited to this kind of work.

☐ 3. Does his job without too much difficulty. Fairly well suited to this kind of work.

☐ 4. Usually does his job without difficulty. Well suited to this kind of work.

☐ 5. Does his job with great ease. Exceptionally well suited for this kind of work.

F. How large a variety of job duties can he perform efficiently? (Worker's ability to handle several different operations in his work.)

☐ 1. Cannot perform different operations adequately.

☐ 2. Can perform a limited number of different operations efficiently.

☐ 3. Can perform several different operations with reasonable efficiency.

☐ 4. Can perform many different operations efficiently.

☐ 5. Can perform an unusually large variety of different operations efficiently.

G. How resourceful is he when something different comes up or something out of the ordinary occurs? (Worker's ability to apply what he already knows to a new situation.)

☐ 1. Almost never is able to figure out what to do. Needs help on even minor problems.

☐ 2. Often has difficulty handling new situations. Needs help on all but simple problems.

☐ 3. Sometimes knows what to do, sometimes doesn't. Can deal with problems that are not too complex.

☐ 4. Usually able to handle new situations. Needs help on only complex problems.

☐ 5. Practically always figures out what to do himself. Rarely needs help, even on complex problems.

H. How many practical suggestions does he make for doing things in better ways? (Worker's ability to improve work methods.)

☐ 1. Sticks strictly with the routine. Contributes nothing in the way of practical suggestions.

☐ 2. Slow to see new ways to improve methods. Contributes few practical suggestions.

☐ 3. Neither quick nor slow to see new ways to improve methods. Contributes some practical suggestions.

☐ 4. Quick to see new ways to improve methods. Contributes more than his share of practical suggestions.

☐ 5. Extremely alert to see new ways to improve methods. Contributes an unusually large number of practical suggestions.

I. Considering all the factors already rated, and <u>only</u> these factors, how acceptable is his work? (Worker's "all-around" ability to do his job.)

☐ 1. Would be better off without him. Performance usually not acceptable.

☐ 2. Of limited value to the organization. Performance somewhat inferior.

☐ 3. A fairly proficient worker. Performance generally acceptable.

☐ 4. A valuable worker. Performance usually superior.

☐ 5. An unusually competent worker. Performance almost always top notch.

S-379 August 1966

FACT SHEET

Job Title: TRANSPORTATION AGENT (air trans.) 912.368

Job Summary: Loads and unloads airplane, cargo and freight by hand, or by operating gasoline-powered forklifts, and hydraulic jacks, and performs other ramp and warehouse duties, working as a member of a crew, as assigned.

Work Performed: Receives incoming cargo and freight at dock from commercial freight carrier or private shipper. Checks accuracy of data listed on air bill of lading, such as number of pieces in shipment, weight, labeling, and condition of cargo. Records on bill of lading pertinent information relating to condition and appearance of shipment, such as used cartons, punctures or holes in container, and visible or unusual markings on package. Gives, as receipt, shipper's copy or consignee's memo of air bill of lading to customer or his representative. Sends customer to billing department for extention and collection of bill when air bill is made out for cash. Stamps number of air bill of lading, and origin and destination of shipment on each piece of freight, using air bill stamp. Drives gasoline-powered forklift and manipulates lifting mechanism which lifts packages, cartons, crates, and other materials and good comprising shipment, and transports them to designated storage area of warehouse. Operates hydraulic jack to transport heavy cargo, as necessary. Loads cargo onto pallet and moves pallet of of cargo to ramp departure area of warehouse for loading on aircraft, using forklift. Posts data such as weight, destination, and number of shipping compartment where shipment is to be loaded on aircraft, to control slip. Attaches original copy of control slip to shipment and takes duplicate copy to operations office. Places all packages comprising single shipment in basket to facilitate transfer to departing aircraft.

Transfers cargo from warehouse to aircraft: Lists and positions safety barricades around plane and loading area, using forklift, to prevent unauthorized persons from wandering into area. Pushes wheeled stairway to cockpit door of plane, by hand, to facilitate exit of flight personnel and passengers and entrance of ramp servicemen to cargo area of airplane. Turns door handle to release latch on inside or outside of cargo doors and pushes doors to the side, by hand, to open them. Picks up pallets and baskets of cargo at warehouse, using forklift, and transports and places cargo at either front or rear door of aircraft, according to instructions on control slip.

Loads cargo on aircraft: Moves cargo into designated compartment, according to load work sheet and verbal instructions of lead ramp serviceman or worker directing loading operations, using Johnson Bar. Hooks cargo or barrier net to rings imbedded in floor, ceiling, and bulkheads (walls) to prevent cargo from shifting position during flight. Collects original copies of control slips that are attached to shipment, and immediately takes or routes slips to operations office so that running record of total weight is maintained. When in charge of loading, keeps running record of weight taken aboard and directs loading of cargo to specified compartments so that weight specifications are met. Loads baggage stand with special or smaller cargo and moves stand to cargo pit in bottom of aircraft. Rolls and locks cargo doors in place when loading completed.

Unloads aircraft: Turns handles and releases latch on cargo doors and pushes doors open. Removes cargo net from floors, ceilings and bulkheads, and stores net in designated area of aircraft. Moves cargo from storage compartments to doorway of aircraft, using Johnson Bar. Moves cargo from aircraft to warehouse ramp dock or predesignated ramp area according to cargo destination, using forklift. Picks up and transports cargo from warehouse to receiving area, using forklift. Checks flight manifest against cargo to insure receipt of all items comprising shipments.

Separates shipments being held for will-call from those to be delivered. Moves cargo to be delivered by truck from middle of warehouse to truck-loading dock by placing it by hand on roller-conveyer and shoving it over rollers to truck area. Picks up and drags dock plate into place between loading dock and truck bed, to facilitate loading of trucks. As required, loads or assists in loading cargo into truck, using freight dolly or by hand. Checks cargo against truck manifest during loading operation to insure that all items comprising each shipment are loaded on truck.

Bands shipping containers: Unrolls steel banding from portable reel stand and wraps steel banding around large, unwieldy, or damaged shipping containers by hand. Threads free end of band through metal-banding-machine. Squeezes one part of handle on machine to form bond between pieces of metal. Squeezes other part of handle to cut part of band still attached to reel stand.

Drives small delivery truck: Loads, unloads, and drives step van used to transport persons or cargo around airport and nearby industrial areas.

Loads ballast on aircraft: As requested, loads covered barrels of water on pallet with forklift and places pallet in rear of plane as ballast for pilot training flights. Secures barrels and pallet to floor by hooking Peck and Hale to tie-down rings in floor.

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