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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 [illegible] in this report. A description of the validation sample [illegible]. (AG)

TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

DIRECTOR, FUNERAL 0-65.20
EMBALMER 0-65.10

B-346
or
S-93

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

U. S. DEPARTMENT OF LABOR
Bureau of Employment Security
Washington 25, D. C.
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GATB #2108
Spring 1956

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY FOR DIRECTOR, FUNERAL 0-65.20 EMBALMER 0-65.10

B-346 or S-93

Summary

The General Aptitude Test Battery, B-1002A, was administered in February, 1955 and February, 1956 to a sample of 50 students enrolled in the Wayne University Department of Mortuary Science, Detroit, Michigan. The criterion consisted of grade-point averages based on grades in the required courses in the first semester of the third year of the curriculum. On the basis of the statistical results and the job analysis data, Aptitudes G-Intelligence, V-Verbal Aptitude and N-Numerical Aptitude were selected for inclusion in the test norms.

GATB Norms for Director, Funeral 0-65.20 and Embalmer 0-65.10 - B-346 or S-93

Table I shows, for B-1001 and B-1002, the minimum acceptable score for each aptitude included in the test norms for Director, Funeral 0-65.20 and Embalmer 0-65.10.

TABLE I

Minimum Acceptable Scores on B-1001 and B-1002 for B-346 or S-93

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
G	CB-1-H CB-1-I CB-1-J	105	G	Part 3 Part 4 Part 6	100
V	CB-1-J	95	V	Part 4	95
N	CB-1-D CB-1-I	110	N	Part 2 Part 6	105

Effectiveness of Norms

The data in Table IV indicate that 10 of the 16 poor students, or 62 percent of them, did not achieve the minimum scores established as cutting scores on the recommended test norms. Moreover, 31 of the 37 students who made qualifying test scores, or 84 percent, were good students.

TECHNICAL REPORT

I. Problem

This study was conducted to determine the best combination of aptitudes and minimum scores to be used on the General Aptitude Test Battery for the occupations of Director, Funeral 0-65.20 and Embalmer 0-65.10.

II. Sample

The General Aptitude Test Battery, B-1002A, was administered to a total sample of 51 students attending the Wayne University Department of Mortuary Science in Detroit, Michigan. One group, consisting of 19 male and 2 female students, was tested in February 1955; the second group, consisting of 28 male and 2 female students, was tested in February 1956. Of the 51 people tested, one was eliminated from the sample because complete criterion data were not available. This resulted in a final sample of 50 students (47 men and 3 women). All of the students in this sample had completed two years in Wayne University's College of Liberal Arts and were finishing up the final year of the three-year program in Mortuary Science. These students also had varying amounts of work experience in the Mortuary Science field prior to or during their enrollment in the Mortuary Science curriculum.

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 Criterion (r)
for Age, Education, and Experience

Director, Funeral 0-65.20
Embalmer 0-65.10

N = 50

	M	σ	Range	r
Age (years)	24.4	5.9	20 - 37	-.062
Education (years)	14.2	.5	14 - 16	.237
Experience (months)	42.2	30.2	6 - 168	-.168

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

III. Job and Course Descriptions

A. Job Title: Director, Funeral 0-65.20

Job Summary: Makes arrangements for and conducts funerals: Interviews family to acquire data about deceased and to aid in planning details, such as selecting coffin and burial clothes, arranging for services and floral displays, publishing death notices and selecting burial plot. Arranges coffin in room where services are to be held, adjusting lights and floral displays. Estimates number of mourners and provides for their transportation. Selects pallbearers to remove coffin to hearse and from hearse to grave. Operates device to lower coffin into grave. Prepares bodies for shipment. Frequently embalms body.

B. Job Title: Embalmer 0-65.10

Job Summary: Prepares bodies for burial in conformity to State laws: Washes body with germicidal soap. Sews lips shut and packs orifices with cotton to prevent leakage. Drains blood from body, supplanting it with embalming fluid. Punctures internal organs through abdomen to remove fluids and gases. Closes incisions and dresses body. Applies cosmetics to face to restore its natural expression. Places body in coffin. Restores maimed or disfigured bodies to their normal appearance by molding wax, plaster of paris, or other material, and affixing it to injured portions of body.

C. Course Description

The completion of 60 hours credit in an approved College of Liberal Arts and 35 hours credit in Mortuary Science is necessary to qualify for graduation from the three-year program in Mortuary Science. Graduation from this program and one year as a resident trainee, either before or after schooling, are necessary to become a practitioner of Mortuary Science in Michigan.

The first two years of the three-year program in Mortuary Science are called the preprofessional part of the program. To complete the requirements for this part, a student must earn 60 hours of credit. The department recommends the inclusion of the following courses in this part of the student's program: English (6 hours); General Chemistry (8 hours); Organic Chemistry (3 hours); Social Sciences, including Geography, History, Government, Economics, Sociology and Philosophy (8 hours); Zoology or Biology (4 hours); Psychology (2 or 3 hours); Mathematics or Accounting (4 hours).

During the third year of the program the following courses in Mortuary Science are offered:

Gross Anatomy 1 M. Four hours. Lectures, laboratory work and examinations. Regional and systematic study of the anatomy of the human body; study of the vascular system and the landmarks and anatomical guides that are of importance in embalming; dissection of the human cadaver.

Business Administration 1 M. Three hours. Lectures, recitations, laboratory work and examinations. Bookkeeping and accounting; business law, analysis of financial statements; business organization and management. Emphasis on application to the function of the Mortician and the Funeral Director.

Business Organization 1 M. One hour. Organization and operation of small business; survey of the general field of business with emphasis on the problems as they pertain to the Mortuary profession.

Chemistry 1 M. Four hours. Lectures, recitations, laboratory work, examinations. General inorganic chemistry; physiological and organic chemistry as they relate to embalming; tissue fixatives, preservatives, disinfectants, diffusing agents, pigment substances; embalming fluids; the chemistry relating to Embalming Case Analysis.

Embalming 1 M. Three hours. Lectures, recitations, laboratory work. Relationship of the basic sciences to embalming, principles of preservation, disinfection, circulatory embalming and cavity treatment; embalming techniques; laws and regulations relating to embalming and funeral direction; laboratory work in embalming.

Embalming 2 M. Three hours. A continuation of Embalming 1 M. Lecture, recitations, and laboratory work.

Hygiene 1 M. Two hours. Lectures, recitations and examinations. The role of Embalmers and Funeral Directors as sanitarians. The nature, uses and methods of accumulation of vital statistics. Preventive medicine; control of communicable diseases; isolation and quarantine. Methods of sewage and refuse disposal. Nuisance control. Municipal water supply.

Microbiology 1 M. Four hours. Lectures, recitations, examinations, laboratory work. The relation of minute living organisms to disease. Putrefaction and fermentation. The use of organisms in commerce and industry. A study of the representative micro-organisms such as yeasts, molds, bacteria and protozoa. Special attention given to organisms that cause partucular problems in embalming. Immunity. Laboratory diagnosis. Laboratory techniques. Preparation of culture media. Disinfecting and sterilization.

Modeling 1 M. One hour. Lecture and laboratory. A study of basic principles of drawing. Perspective and modeling. A study and use of pigments. A study in elements of color and harmony.

Modeling 2 M. One hour. A continuation of Modeling 1 M.

Mortuary Law 1 M. Two hours. Lectures and recitations. Aspects of the common and statutory law that relate to funeral management. Contracts. Negotiable instruments. Insurance. Agency, probate law. Mortuary jurisprudence. Case studies. The Vital Statistics Law. The Funeral Directors' and Embalmers' Law; the Coroners' Law. The rules and regulations of the State Board of Examiners in Mortuary Science of the State of Michigan. The Rules of the State Board of Health.

Mortuary Science 1 M. Two hours. Lectures, recitations and examinations. Problems involved in the practice of funeral management; mortuary organization; merchandising; mortuary ethics; parliamentary procedure; association procedure and public relations.

Pathology 1 M. Two hours. Lectures, recitations, laboratory work and examinations. The causation and nature of the changes in tissues and organs that are the result of disease. Study of specific diseases. Witnessing of autopsies.

Restorative Art 1 M. One hour. Lectures, recitations, laboratory work, examinations. Anatomy of the head and extremities; cosmetology; restorative procedures.

Restorative Art 2 M. One hour. A continuation of Restorative Art 1 M. Instruction largely deals with plastic restorations of mutilated bodies.

Histology 1 M. One hour. Microscopic anatomy.

IV. Experimental Battery

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

V. Criterion

The criterion used consisted of grade-point averages based on grades received in eight courses taken during the first of the two semesters in the third year of the Mortuary Science program. These courses, which cover a total of 18 hours, include Anatomy 1 M, Chemistry 1 M, Embalming 1 M, Histology 1 M, Modeling 1 M, Hygiene 1 M, Mortuary Law 1 M, and Restorative Art 1 M.

In order to compute the grade-point averages, each "A" grade was assigned four points, each "B" grade three points, each "C" grade two points, each "D" grade one point and each "E" grade zero points. The mean grade-point average was 2.61, the standard deviation was .70, and the range was 1.00-3.89 for the experimental sample.

VI. Statistical and Qualitative Analysis

Table III shows the means, standard deviations and Pearson product-moment correlations with the criterion of grade-point averages for the aptitudes of the GATB. The means and standard deviations of the aptitudes are comparable to general working 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

Director, Funeral O-65.20
Embalmer O-65.10

N = 50

Aptitudes	M	σ	r
G-Intelligence	115.5	12.1	.466**
V-Verbal Aptitude	110.1	11.0	.445**
N-Numerical Aptitude	112.1	13.1	.541**
S-Spatial Aptitude	119.5	18.2	.158
P-Form Perception	114.0	16.1	.315*
Q-Clerical Perception	113.9	12.6	.320*
K-Motor Coordination	104.1	14.6	.051
F-Finger Dexterity	105.4	15.3	.209
M-Manual Dexterity	101.3	19.7	.198

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

The statistical results were interpreted in conjunction with the job analysis data. A qualitative analysis of the job and course descriptions indicates that the following aptitudes measured by the GATB appear to be important for Director, Funeral and Embalmer.

Intelligence (G) - required in the course and job to learn underlying principles of Mortuary Science and to apply them on the job.

Verbal Aptitude (V) - required for a successful understanding of the large amount of lecture and reading material presented in a university curriculum.

Numerical Aptitude (N) - required in the science courses and in the business courses where bookkeeping and accounting are taught and on the job where bookkeeping and accounting procedures are applied.

Spatial Aptitude (S) - required in such third-year courses as Gross Anatomy and in the Modeling courses where principles of drawing and perspective are taught, and on the job when these principles are applied in embalming.

The data in Table III show that (1) the highest mean scores, in descending order of magnitude, were obtained for Aptitudes S, G, P and Q, respectively; (2) Aptitudes G, V and N have correlations significant at the .01 level with the criterion; (3) Aptitudes P and Q have correlations significant at the .05 level with the criterion; and (4) the smallest standard deviations were obtained for Aptitudes G and V.

On the basis of the above statistical and qualitative evidence, Aptitudes G, V, N, S, P and Q were considered for inclusion in the norms. Aptitude G appears important on the basis of the job analysis data and has a relatively high mean score, next to the smallest standard deviation and a significant correlation with the criterion. Aptitudes V and N each appear important on the basis of the job analysis data and each has a significant correlation with the criterion. In addition, Aptitude V exhibits the smallest standard deviation for this sample. Aptitude S appears important on the basis of the job analysis data and has the highest mean score for this sample. Aptitudes P and Q have relatively high mean scores and each has a significant correlation with the criterion.

Several sets of norms, consisting of various combinations of Aptitudes G, V, N, S, P and Q with appropriate cutting scores were selected for tryout. The relationship between each of these sets of trial norms and the dichotomized criterion was determined by means of the tetrachoric correlation technique. The results showed that norms consisting of V-95 and N-105 had as good or better selective efficiency than any other set of norms tried. Since there is good evidence (both qualitative and statistical) for Aptitude G, and since adding this aptitude to the norms with a cutting score of 100 does not reduce the selective efficiency, Aptitude G with a cutting score of 100 was included in the test norms. Thus, the recommended norms consist of G-100, V-95 and N-105. The cutting score for each of these aptitudes is within 10 points of one standard deviation below the aptitude mean.

VII. Concurrent Validity of Norms

For the purpose of computing the tetrachoric correlation coefficient between the test norms and the criterion of grade-point averages 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. This was accomplished by setting the grade-point average of 2.18 as the criterion critical score. Those students who had grade-point averages of 2.18 or above were placed in the high criterion group and those who had grade-point averages of 2.17 or below were placed in the low criterion group. This resulted in 16 of the 50 students, or 32 percent of the sample, being placed in the low criterion group.

Table IV shows the relationship between test norms consisting of Aptitudes G, V and N with critical scores of 100, 95 and 105, respectively, and the dichotomized criterion for Director, Funeral O-65.20 and Embalmer O-65.10. Workers in the high criterion group have been designated as "good students" and those in the low criterion group as "poor students."

TABLE IV

Relationship between Test Norms Consisting of Aptitudes G, V and N with Critical Scores of 100, 95, and 105, Respectively, and the Criterion for Director, Funeral O-65.20 and Embalmer O-65.10

N = 50

	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Students	3	31	34
Poor Students	10	6	16
Total	13	37	50

$r_{tet} = .82$ $\quad X^2 = 13.622$

$\sigma_{r_{tet}} = .25$ $\quad P/2 < .0005$

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

VIII. Conclusions

On the basis of mean scores, correlations with the criterion, job analysis data and their combined selective efficiency, Aptitudes G, V and N with minimum scores of 100, 95 and 105, respectively, are recommended as B-1002 norms for the occupations of Director, Funeral O-65.20 and Embalmer O-65.10. The equivalent B-1001 norms consist of G-105, V-95 and N-110.

IX. Determination of Occupational Aptitude Pattern

When the specific test norms for an occupation include three aptitudes, only those occupational aptitude patterns which include the same three aptitudes with cutting scores that are within 10 points of the cutting scores established for the specific norms are considered for that occupation. The only one of the existing 22 occupational aptitude patterns which meets these criteria for this study is OAP-1, which consists of G-110, V-105 and N-105 for B-1002. The selective efficiency of OAP-1 for this sample was determined by means of the tetrachoric correlation technique. A tetrachoric correlation of .58 with a standard error of .25 was obtained, which indicates a significant relationship between OAP-1 and the criterion for the experimental sample. The proportion of the sample screened out by OAP-1 was .42, which is within the required range of .10 to .60. Therefore, it is recommended that OAP-1 be used in counseling for the occupations of Director, Funeral O-65.20 and Embalmer O-65.10.