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ABSTRACT

The study involved the use of a structured job analysis instrument called the Position Analysis Questionnaire (PAQ) as the direct basis for the establishment of the job component validity of aptitude tests (that is, a procedure for estimating the aptitude requirements for jobs strictly on the basis of job analysis data). The sample of jobs used consisted of 658 jobs for which PAQ analyses were available that were "matched" with 141 jobs for which the United States Training and Employment Service had published test data for job incumbents for the nine tests of the General Aptitude Test Battery (GATB). Job dimension scores were derived for the 658 jobs and were used as predictors. The criteria were developed for each of the 141 "matched" jobs based on the scores of the job incumbents on the nine tests: (1) mean test score; (2) a score one standard deviation below the mean (called a potential cutoff score); and (3) a validity coefficient. The results generally supported evidence from previous studies that data based on a structured job analysis procedure can be used for establishing the job component validity of aptitude tests, thereby eliminating the need for conventional test validation procedures in many situations. (Author)

THE UTILITY OF JOB DIMENSIONS BASED ON FORM B OF THE POSITION ANALYSIS QUESTIONNAIRE (PAQ) IN A JOB COMPONENT VALIDATION MODEL

Lloyd D. Marquardt

and

Ernest J. McCormick

Occupational Research Center
Department of Psychological Sciences
Purdue University
West Lafayette, Indiana 47907

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Ernest J. McCormick,
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This study involved the use of a structured job analysis instrument called the Position Analysis Questionnaire (PAQ) as the direct basis for the establishment of the job component validity of aptitude tests (that is, a procedure for estimating the aptitude requirements for jobs strictly on the basis of job analysis data). The sample of jobs used consisted of 658 jobs for which PAQ analyses were available that were "matched" with 141 jobs for which the United States Training and Employment Service had

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published test data for job incumbents for the 9 tests of the General Aptitude Test Battery (GATB).

Job dimension scores (based on principal components analyses of PAQ data) were derived for the 658 jobs, and were used as predictors. The criteria were developed for each of the 141 "matched" jobs, these being based on the scores of the job incumbents, on the 9 tests. These were: (1) mean test score: (2) a score one standard deviation below the mean (called a potential cutoff score); and (3) a validity coefficient. The results generally supported evidence from previous studies that data based on a structured job analysis procedure can be used for establishing the job component validity of aptitude tests, thereby eliminating the need for conventional test validation procedures in many situations.

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INTRODUCTION

One of the basic objectives of personnel psychology is that of the selection and placement of individuals in jobs which they are capable of performing adequately. In order to accomplish this, psychologists have developed numerous tests which presumably measure a number of human abilities, and have validated these tests against such job criteria as tenure, productivity, job effectiveness, accidents, etc. The major thrust in this area has been toward the establishment of the empirical validity of selection devices using the predictive and concurrent models. Both of these methods, however, have problems associated with them. These problems include such aspects as small sample sizes, criterion contamination (e.g., halo effects, leniency effects, etc.), attrition of employees in the sample prior to the completion of the study, and restrictions of range of either the predictor or the criterion data. In addition, from the viewpoint of the organization, there is the very real consideration of the cost of performing empirical validations of selection devices.

Aside from these issues, an argument can be made that empirical validation, even if it were universally possible in terms of sample sizes and other considerations, has the quality of not being very parsimonious in a practical sense (McCormick, Cunningham, and Thornton, 1967). It would seem reasonable to believe that one could move from the conventional dead-center approach of empirical validation in each job situation to an approach based upon validity generalization which does not require that validations be performed in each individual situation (Lawshe, 1952; Balma, 1959; Ghiselli, 1959; McCormick, 1959). Such a shift should make possible a more parsimonious basis for the establishment of valid predictors in cases where it has not previously been possible or practical to do so. Should such an approach meet current federal guidelines for fair employment practices, it would have the added advantage of providing evidence that an organization is not discriminating in its employment practices, and that, in fact, the organization is using appropriate selection devices.

History of the Concept of Validity Generalization

The concept of validity generalization has been a part of the psychological literature for approximately two decades. It was introduced by C.H. Lawshe under the title "synthetic validation" in a symposium on the utility of industrial psychology for small businesses at the 1951 meetings of the American Psychological Association. His paper was later published (Lawshe, 1952), thus entering the term into the literature. At that time, Lawshe described the concept of synthetic validity as follows:

> (The term) synthetic validity is used here to denote the inferring of validity in a specific situation. The concept is similar to that involved when the time study engineer establishes standard

> times for new operations, purely on an a priori basis, through the use of "synthetic times" for the various elements constituting the operation.

The first published test of the synthetic validation paradigm is found in an article by Lawshe and Steinberg (1955) in which they demonstrated the utility of this approach for use with clerical jobs. Griffin (1959), Drewes (1961), and Guion (1965) have also worked with the concept of synthetic validation or validity generalization, thus adding additional evidence for the potential utility of this procedure.

Several authors have, however, recently expressed some dissatisfaction with the term "synthetic" validity. Guion (1965), for example, makes the point that it is not validity which is being synthesized ("it can only be observed and reported'), but rather the test battery. He adds that the term synthetic validity should be considered a convenient shorthand statement for "synthesis of a valid test battery." Thus, he considers the term synthetic validity to be a "logical misnomer." McCormick (1974), also feels some uneasiness with respect to the title "synthetic validity," and, as a result, has introduced the term "job component validity" as a possible substitute. Since the use of this term would seem to put to rest some of the conceptual misunderstanding which has resulted from the use of the term "synthetic validity," the term "job component validity" will be used in this report to refer to the concept in question.

McCormick and his students (Mecham and McCormick, 1969; McCormick, Jeanneret, and Mecham, 1972), as part of a larger effort relating to the use of structured job analysis information, explored the possibility of developing a job component validation system based on structured job analysis data. They found that they were able to predict successfully various normative test data criteria, using job data based on a job analysis questionnaire called the Position Analysis Questionnaire (PAQ) as predictors. In terms of a job component validation model, that study, in essence, resulted in the derivation of combinations of quantitative job data ("job dimension" scores) which were substantially predictive of actual test scores of incumbents and associated validity coefficients. With such a system, it should be possible to build up estimates of the aptitude requirements for a job through the analysis of the job with the PAQ, and the subsequent use of the regression equations for obtaining estimates of relevant aptitude requirements.

Baukus (1973) provides some evidence that the job component validation scheme developed by McCormick,and described above, is in fact a system which has some utility for personnel selection. Baukus first noted that the job component validation system developed by McCormick is limited to predictions based upon the General Aptitude Test Battery (GATB) of the U.S. Training and Employment Service. Since the GATB is not available commercially, Baukus decided to determine whether the predictions of aptitude test requirements of jobs based on the GATB would hold up when commercially available tests similar to the GATB tests were used. In order to do so, PAQ analyses for a sample of first line supervisory jobs in an electronics manufacturing firm were first obtained. These PAQ analyses were then scored according to the method developed by Mecham and McCormick (1969), and the predictions of the three most valid GATB tests noted. In the case of this sample these three tests were: GATB-G (General Intelligence), GATB-V (Verbal), and GATB-N (Numerical). Mean test scores and validity coefficients (obtained with a concurrent validation strategy) for the Wesman Personnel Classification Test (WPCT) were obtained for a sample of supervisors on the job analyzed with the PAQ. Since the WPCT is described as a general intelligence test composed of verbal and numerical subtests, it was seen as providing the types of data needed to verify the PAQ predictions based upon the GATB. The mean test scores predicted for the GATB, and those obtained from the WPCT, were converted to t-scores and compared. No significant differences were found for the Verbal and Numerical subtest scores, but the difference between total test scores on the WPCT, and as predicted for the GATB-G, was significant at the .05 level. Baukus suggests that this difference may have been the result of GATB-G and WPCT Total scores not being comparable in terms of measuring the same ability, rather than being the result of erroneous predictions based on PAQ data. The analysis using validity coefficients showed no significant differences between the predicted GATB-N validity coefficient and the empirically determined WPCT Numerical validity coefficient, but did show significant differences for G and V. In these cases, however, both the PAQ and the WPCT indicated validity for both tests (the G and V tests), but the validity coefficients in the case of the WPCT tests were significantly higher. Overall, it would seem that this study does lend support for the job component validation scheme developed by Mecham and McCormick (1969), and thus for the concept in general.

Purpose and Scope of the Present Study

The present study consisted of further exploration of PAQ data as the basis for establishing the job component validity of aptitude tests for jobs. In this regard the study involved two approaches. The first of these was concerned with using quantitative job analysis data for individual jobs as the direct basis for predicting what aptitude tests would be appropriate for use in selection of personnel for individual jobs. The second approach was concerned with such predictions for individual jobs using a combination of job analysis data for the jobs in question and data concerning the relevance of various human attributes to the performance of various job activities. In addition, the efficiency of prediction of the two methods were compared.

METHOD

General Approach

The theoretical approach used in this study was primarily the job component validity paradigm developed by McCormick (McCormick, 1959; McCormick, Jeanneret, and Mecham, 1972; McCormick, 1974). It is the premise of this approach that a set of ability requirements for a job, which are suitable for personnel selection purposes, may be built up from a knowledge of the activities which comprise that job. Essentially, this premise postulates that an order exists in the world of human work, and, that because of this underlying order, if a given level of ability is required to perform a given job activity at a given level on one job, then the same level of ability will be required to perform that activity when it occurs to the same degree as a part of another job (McCormick, Cunningham, and Thornton, 1967). It is this underlying order which forms the basis for validity generalization, and, thus, for the job component validation.

The preferable approach to the establishment of the job component validity of personnel tests would seem to be based on the following procedures:

> (1) some method for identifying or quantifying the various constituent components of jobs; (2) a method for determining, for an experimental sample of jobs, the human attribute(s) required for successful job performance when a given job comoment is common to several jobs; and (3) some method of combining the estimates of human attributes required for individual job components into an overall estimate of the attribute requirements for an entire job. (McCormick, 1974)

Once such a system has been developed, it should then be possible to predict the attribute requirements for virtually any job whose activity requirements overlap with those used in establishing the system. In the best of all worlds it would be desirable to determine uniquely for each of several or many job components the specific abilities required for performance of the activities implied, and to identify tests which measure such abilities. The research for developing the data base for such a job component validation procedure, however, would be prohibitive at the present time. Therefore, it is probably necessary to follow procedures that are somewhat less direct, but that may still provide a practical basis for identifying the tests that presumably would be valid for the selection of candidates for various jobs. The present study represents one particular approach for doing this. In particular this study involved the use of job activity data as predictors and test data of job incumbents as criteria.

Data Bases Used as Predictors

If a multiple regression approach using job-related data as predictors is to be feasible, it is necessary that the data which characterize each of the jobs in the sample be expressed in terms of common metrics. This was accomplished in the present study by obtaining analyses of each of a number of different jobs using the Position Analysis Questionnaire (PAQ), Form B, developed by McCormick, Jeanneret, and Mecham (1969). Since the same job analysis questionnaire was used to analyze each of the jobs, and because this particular job analysis questionnaire was specifically designed for use with a broad spectrum of jobs, comparisons between and among the jobs in terms of the activities which comprise each job are possible. Thus, these data should be suitable for use as predictors in a multiple regression paradigm.

Three sets of predictor data based on the PAQ were used for each job in the sample. The first consisted of scores on 30 "divisional" job dimensions that resulted from separate principal component analyses for 3700 jobs of the job elements of the six divisions of the PAQ (McCormick and Marquardt (June 1974). The second set consisted of scores on 14 "general" job dimensions that resulted from the principal component analysis for the same 3700 jobs of 168 of the job elements of the PAQ pooled together. These two sets of job dimensions are referred to as being based on "job data." The second type of predictor data consisted of component scores for each of the 23 job dimensions derived in a study by Marquardt and McCormick (1973). These dimensions were derived through principal components analyses of a set of data developed by Marquardt and McCormick (1972) which consisted of ratings of the relevance of each of 76 human attributes to the performance of each of the job elements of the PAQ. Thus, there were 23 predictor scores for each of the jobs in the sample under this condition. These data are referred to as "attribute profile data."

Data Bases Used as Criteria

In terms of logical considerations, the preferable approach for testing the job component validation model proposed by McCormick would be based on empirically-validated data concerning the level and types of human attributes necessary for the performance of each of many specific types of job activities. Thus, for any given job component there would be a statement of the human attribute(s) required for its successful performance. Given such a body of data it would then be possible to analyze any given job in terms of the various job components in question, identify which job components were embodied in the job, and then set forth for the job as its overall job requirements the summation of the human attributes which had previously been found to be required for the several components that had been identified as being embodied in the job.

Data which meet these requirements, however, would be difficult to develop if one would be interested in such data for a large and varied sample of jobs. At the present stage of affairs, therefore, some alternative approach for the establishment of job component validity would be required. In the present study this approach consisted essentially of the use of job dimension scores for individual jobs as predictors of test data for incumbents on corresponding jobs. The job dimensions can be considered as one type of job component. In connection with test data for job incumbents, the most comprehensive set of test data available for incumbents on various types of jobs consists of that for the General Aptitude Test Battery (GATB) of the United States Employment Service (USTES).

The USTES has published normative test data for the nine tests of the GATB, which include mean test scores for job incumbents, and associated validity coefficients, for over 450 jobs (U.S. Department of Labor, 1970). The nine tests of the GATB include: G (Intelligence); V (Verbal Aptitude); N (Numerical Aptitude); S (Spatial Aptitude); P (Form Perception); Q (Clerical Perception); K (Motor Coordination); F (Finger Dexterity); and M (Manual Dexterity). These data were obtained from employees on the various jobs in a multitude of organizations. (The validity data reported were based on concurrent validation studies.) The particular data had not been used for the selection of the employees in the sample. To the extent that the test data were not biased by whatever pre-selection procedures had been used by organizations involved in the studies, and to the extent that they truly do reflect the level of aptitudes necessary for the performance of the jobs, these data should give some indication of the levels of various human abilities required for adequate performance on the jobs in question. These test data were used as the basis for three criteria of the relevance of the nine tests to the jobs in question. The first set of criterion values consisted of the mean test scores of incumbents in the various jobs used in the study. The rationale for the use of this criterion is based on the assumption that people tend to gravitate into those jobs that are compatible with their own abilities. Thus, jobs for which the mean test scores of incumbents are high (such as in the V-Verbal test) might be assumed to have higher requirements for the quality measured by the test than in the case of jobs for which the mean test scores are low. The second criterion (based on the same assumption) consisted of what will be called "potential cutoff scores." These were computed by subtracting from the mean test score of incumbents in each job the standard deviation associated with that mean. The standard deviation value subtracted from each mean was that which the USTES reported for incumbents on the job in question, and not that associated with GATB scores in the general population. This particular set of data was included in order to have a criterion which might more closely approximate cutting scores as they are used in the field, since it is not generally the case that the mean is used as a cutting score. It should be noted here that these "potential cutoff scores" are not meant to be applied in personnel operation on an across-the-board fashion, since actual cutoff scores usually are established in part on the basis of labor market condition. But for experimental purposes it was considered desirable to use some "standard" cutting score as a criterion to test the effectiveness with which the procedures used would predict a criterion that might approximate that used in common employment practice.

The third set of criterion data used in this study consisted of the coefficients of validity for the various subtests and jobs, as reported by the USTES. Validity coefficients, insofar as they are free of many of the problems typically found when validations are attempted in the field (e.g., restricted range, criterion contamination, halo effect, etc.), may be viewed as giving an indication of the relationship between the ability tapped by a given test and performance on the job. Thus, they should give some indication of the abilities required to perform various jobs Validity coefficients are, however, notoriously "wobbly," due in part to criterion contamination, the use of an improper criterion, restriction of range, small samples, etc. Thus, even though an aptitude may be required to perform a given job, and a reliable test of that aptitude is used as a predictor, a significant relationship between test scores and performance measures may not be found even though the test is, in reality, a valid indicator of success on the job. For this reason, it was expected that the set of validity coefficients would not be predicted as effectively by combinations of component scores as would mean test scores and potential cutoff scores.

Selection of the Sample

The PAQ analyses included in the base sample of 3700 jobs developed in a study reported by Marquardt and McCormick (1974) were first reviewed to identify those analyses which corresponded to jobs for which the USTES had published GATB test data. (This base sample of 3700 jobs was taken from an overall data pool of over 8,000 PAQ analyses, and was stratified to match the occupational characteristics of the American labor force. For further details regarding this sample, see Marquardt (1974) or Marquardt and McCormick, (Report No. 4, June 1974). It was found that 658 of the cases in the base sample matched jobs for which GATB test data were available. These actually represented 658 positions on 141 different jobs. Thus, there were multiple analyses for certain of the jobs in the sample, although in most cases such analyses were obtained from different organizations. In addition, the 141 distinct jobs in the sample matched 125 sets of GATB norms. The difference between the number of distinct jobs in the sample, and the number of sets of GATB norms, occurred for two reasons. First, the USTES, in certain instances, pooled jobs with different titles and/or D.O.T. numbers to arrive at the sample for which a given set of means, standard deviations, and validity coefficients was determined. An example of such an instance occurred with the jobs of Civil Engineer, Electrical Engineer, and Mechanical Engineer, which the USTES combined into one sample when computing the GATB norms. Secondly, for some such instances, PAQ analyses of more than one of the pooled jobs were available in the base sample of 3700 jobs (the case illustrated above being one such instance). When this occurred, the PAQ analyses of each of the jobs which were pooled by the USTES were included in the sample. It was decided to include each of these distinct jobs in the sample because there was no possible manner of determining whether they truly have different aptitude requirements. Possible ramifications of these sample characteristics will be discussed in the discussion section.

Analyses Performed

For each of the jobs represented by the 658 PAQs included in the sample, three sets of component scores (called job dimension scores) were derived, these being: (1) the 30 divisional job dimensions based on job data for 3700 jobs derived by Marquardt and McCormick (Report No. 4, June 1974); (2) the 14 overall or general dimensions based on the same data; and (3) the 23 job dimensions based on attribute profiles of the job elements of the PAQ (Marquardt and McCormick 1973). All the component scores were in standard score form. In the case of those based on job data, the standardization was based on the characteristics of the base sample of 3700 jobs.

These three sets of component scores were then used as predictors in a series of multiple regression analyses using each of the three criteria mentioned above as related to the jobs for which GATB data were available, namely mean test scores of incumbents, potential cutoff scores, and validity coefficients. Such analyses were carried out separately for the three criteria for each of the nine GATB tests. A double cross-validation procedure was used with the sample being split randomly into two halves, (A and B). Thus, a total of 243 separate multiple regression analyses were performed (9 tests x 3 criteria x 3 samples (A,B, Overall) x 2 types of component scores = 243 analyses). A stepwise multiple regression procedure was used for all of these analyses. The results of these analyses are reported in the following section.

RESULTS

The results of the stepwise multiple regressions using job dimension scores as predictors and mean test scores of incumbents, potential cutoff scores, and validity coefficients as criteria are summarized in Tables 1, 2, and 3 respectively. These tables report, for each of the three criteria, the multiple correlations obtained for each of the nine tests of the GATB, separately showing the coefficients obtained for Sample A, Sample B, and the Overall Sample. The multiple correlations obtained through cross-validation by applying the regression equations derived from Sample A to Sample B, and vice versa, are reported in the same tables. Finally, each table reports separately the results obtained from the three types of job dimensions (those obtained from job data, and those obtained from attribute profile data).

Tables 4, 5, and 6 report, for the Overall Sample, the dimensions involved in the regression equations derived for each GATB test and criterion, Table 4 reporting on the divisional job dimensions based on job data, Table 5 reporting on the general job dimensions based on job data, and Table 6 reporting on the dimensions based on attribute profile data. (Additional data, including the specific regression equations derived in this study, may be found in Marquardt, (1974). Finally, the intercorrelation matrix of the mean test scores of incumbents which were used in this study is given in Table 6.

Table 1

Multiple Correlations and Cross-Validation Coefficients of Combinations of Dimension Scores as Related to Mean Test Scores of Incumbents on Various Jobs[1]

GATB Test	Multiple Correlations by Sample			Cross-Validation Coefficients by Sample[2]	
	A[3]	B[4]	Overall[5]	B to A	A to B
Divisional Dimensions Based on Job Data					
G (Intelligence)	.73	.75	.73	.74	.71
V (Verbal Aptitude)	.76	.77	.76	.72	.74
N (Numerical Aptitude)	.73	.75	.74	.70	.74
S (Spatial Aptitude)	.67	.68	.67	.65	.66
P (Form Perception)	.65	.67	.65	.60	.63
Q (Clerical Perception)	.73	.76	.74	.71	.73
K (Motor Coordination)	.75	.77	.75	.73	.75
F (Finger Dexterity)	.59	.62	.59	.51	.55
M (Manual Dexterity)	.47	.50	.46	.37	.41
General Dimensions Based on Job Data					
G (Intelligence)	.72	.73	.72	.71	.72
V (Verbal Aptitude)	.75	.75	.74	.74	.74
N (Numerical Aptitude)	.72	.74	.72	.72	.72
S (Spatial Aptitude)	.65	.65	.65	.64	.65
P (Form Perception)	.60	.62	.65	.60	.60
Q (Clerical Perception)	.72	.73	.72	.72	.72
K (Motor Coordination)	.75	.75	.75	.75	.75
F (Finger Dexterity)	.21	.26	.23	.16	.23
M (Manual Dexterity)	.27	.31	.28	.22	.30
Dimensions Based on Attribute Profile Data					
G (Intelligence)	.73	.75	.74	.69	.73
V (Verbal Aptitude)	.75	.77	.75	.71	.74
N (Numerical Aptitude)	.72	.75	.73	.68	.72
S (Spatial Aptitude)	.67	.66	.66	.62	.64
P (Form Perception)	.63	.63	.63	.60	.62
Q (Clerical Perception)	.71	.73	.71	.68	.69
K (Motor Coordination)	.73	.74	.73	.70	.72
F (Finger Dexterity)	.57	.58	.56	.49	.52
M (Manual Dexterity)	.51	.48	.47	.39	.44

1 Based on the General Aptitude Test Battery (GATB)

2 The prediction equations derived from Sample A were applied to Sample B, and vice versa, and the predicted and observed values were then correlated

3 N = 329

4 N = 330

5 N = 659

Table 2

Multiple Correlations and Cross-Validation Coefficients of Combinations of Dimension Scores as Related to Potential Cutoff Scores[1]

GATB Test	Multiple Correlations by Sample			Cross-Validation Coefficients by Sample[2]	
	A[3]	B[4]	Overall[5]	B to A	A to B
Divisional Dimensions Based on Job Data					
G (Intelligence)	.74	.76	.74	.72	.74
V (Verbal Aptitude)	.77	.79	.77	.73	.77
N (Numerical Aptitude)	.74	.76	.74	.72	.74
S (Spatial Aptitude)	.68	.68	.68	.67	.66
P (Form Perception)	.65	.67	.65	.61	.65
Q (Clerical Perception)	.73	.75	.73	.70	.7[illegible]
K (Motor Coordination)	.73	.75	.73	.70	.71
F (Finger Dexterity)	.54	.56	.54	.50	.51
M (Manual Dexterity)	.45	.47	.42	.32	.36
General Dimensions Based on Job Data					
G (Intelligence)	.73	.74	.73	.73	.73
V (Verbal Aptitude)	.77	.77	.76	.76	.76
N (Numerical Aptitude)	.73	.74	.73	.73	.73
S (Spatial Aptitude)	.66	.65	.66	.66	.65
P (Form Perception)	.61	.62	.61	.59	.62
Q (Clerical Perception)	.71	.71	.72	.70	.69
K (Motor Coordination)	.72	.72	.72	.72	.72
F (Finger Dexterity)	.23	.28	.24	.18	.25
M (Manual Dexterity)	.28	.33	.29	.23	.29
Dimensions Based on Attribute Profile Data					
G (Intelligence)	.74	.76	.75	.70	.74
V (Verbal Aptitude)	.77	.79	.77	.74	.77
N (Numerical Aptitude)	.74	.76	.74	.68	.74
S (Spatial Aptitude)	.67	.65	.65	.63	.63
P (Form Perception)	.62	.63	.62	.60	.61
Q (Clerical Perception)	.69	.71	.69	.64	.67
K (Motor Coordination)	.70	.72	.70	.66	.69
F (Finger Dexterity)	.54	.55	.53	.45	.49
M (Manual Dexterity)	.47	.47	.44	.36	.36

[1] Based on the General Aptitude Test Battery (GATB), and computed by subtracting from the mean test score the standard deviation associated with that mean

[2] The prediction equations derived from Sample A were applied to Sample B, and vice versa, and the predicted and observed values were then correlated

[3] N = 329

[4] N = 330

[5] N = 659

Table 3

Multiple Correlations and Cross-Validation Coefficients of Combinations of Dimension Scores as Related to Coefficients of Validity[1]

GATB Test	Multiple Correlations by Sample			Cross-Validation Coefficients by Sample[2]	
	A[3]	B[4]	Overall[5]	B to A	A to B
Divisional Dimensions Based on Job Data					
G (Intelligence)	.41	.40	.38	.32	.29
V (Verbal Aptitude)	.42	.41	.39	.32	.31
N (Numerical Aptitude)	.40	.44	.39	.27	.31
S (Spatial Aptitude)	.46	.46	.44	.39	.40
P (Form Perception)	.37	.34	.32	.23	.23
Q (Clerical Perception)	.38	.38	.34	.25	.25
K (Motor Coordination)	.34	.27	.26	.17	.12
F (Finger Dexterity)	.37	.45	.39	.28	.35
M (Manual Dexterity)	.46	.45	.40	.27	.27
General Dimensions Based on Job Data					
G (Intelligence)	.37	.37	.36	.32	.33
V (Verbal Aptitude)	.33	.33	.33	.30	.24
N (Numerical Aptitude)	.37	.38	.37	.32	.36
S (Spatial Aptitude)	.40	.42	.39	.38	.38
P (Form Perception)	.33	.31	.31	.29	.28
Q (Clerical Perception)	.28	.31	.28	.22	.27
K (Motor Coordination)	.24	.16	.15	.04	.02
F (Finger Dexterity)	.35	.43	.37	.32	.38
M (Manual Dexterity)	.39	.44	.39	.32	.32
Dimensions Based on Attribute Profile Data					
G (Intelligence)	.38	.37	.36	.31	.28
V (Verbal Aptitude)	.34	.36	.33	.27	.29
N (Numerical Aptitude)	.32	.36	.31	.23	.25
S (Spatial Aptitude)	.38	.41	.38	.32	.34
P (Form Perception)	.32	.32	.28	.19	.21
Q (Clerical Perception)	.29	.31	.27	.17	.19
K (Motor Coordination)	.30	.27	.23	.12	.11
F (Finger Dexterity)	.35	.42	.36	.25	.33
M (Manual Dexterity)	.33	.39	.32	.20	.23

[1] Based on the General Aptitude Test Battery (GATB)

[2] The prediction equations derived from Sample A were applied to Sample B, and vice versa, and the predicted and observed values were then correlated

[3] N = 329

[4] N = 330

[5] N = 659

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Table 4

Divisional Job Dimensions Based on Job Data Which Were Involved in the Regression Equations

Criterion	J1-1	J1-2	J1-3	J1-4	J1-5	J2-6	J2-7	J3-8	J3-9	J3-10	J3-11	J3-12	J3-13	J3-14	J4-15	J4-16	J4-17	J4-18	J4-19	J4-20	J5-21	J5-22	J5-23	J6-24	J6-25	J6-26	J6-27	J6-28	J6-29	J6-30
Mean Test Scores of Job Incumbents																														
GATB-G (Intelligence)			X			X		X		X		X	X											X				X		
GATB-V (Verbal Aptitude)			X			X	X			X		X	X								X	X						X		
GATB-N (Numerical Aptitude)			X			X		X		X		X	X											X				X	X	
GATB-S (Spatial Aptitude)			X			X				X	X		X			X			X					X					X	
GATB-P (Form Perception)			X			X		X	X	X			X			X			X					X					X	
GATB-Q (Clerical Perception)				X				X	X	X		X							X					X				X		
GATB-K (Motor Coordination)			X					X	X	X		X	X						X					X				X		
GATB-F (Finger Dexterity)			X	X			X	X	X	X	X		X	X					X					X	X					
GATB-M (Manual Dexterity)				X		X	X			X			X	X				X	X				X	X	X	X				
Potential Cutoff Scores																														
GATB-G (Intelligence)			X			X				X			X		X			X						X				X	X	
GATB-V (Verbal Aptitude)	X		X			X	X			X			X					X						X				X		
GATB-N (Numerical Aptitude)			X	X		X		X		X		X	X											X				X		
GATB-S (Spatial Aptitude)		X	X			X				X	X		X			X			X					X					X	
GATB-P (Form Perception)			X			X		X	X	X			X		X	X			X					X					X	
GATB-Q (Clerical Perception)			X	X				X	X	X			X						X					X			X	X	X	
GATB-K (Motor Coordination)			X	X				X	X	X		X	X						X					X				X		
GATB-F (Finger Dexterity)			X					X	X	X	X		X	X	X				X					X	X					
GATB-M (Manual Dexterity)				X		X	X			X			X	X				X	X				X		X	X				
Coefficients of Validity																														
GATB-G (Intelligence)						X	X		X	X			X	X			X		X				X		X		X	X		
GATB-V (Verbal Aptitude)	X				X	X				X	X		X						X		X	X	X				X	X		
GATB-N (Numerical Aptitude)					X		X	X	X				X	X			X		X	X					X			X		
GATB-S (Spatial Aptitude)			X			X		X				X					X										X	X		X
GATB-P (Form Perception)	X	X				X				X	X	X													X		X	X		X
GATB-Q (Clerical Perception)	X	X				X				X			X						X	X		X	X		X				X	
GATB-K (Motor Coordination)			X	X		X	X		X							X	X				X	X	X					X		X
GATB-F (Finger Dexterity)	X			X		X	X			X			X	X	X					X							X	X	X	
GATB-M (Manual Dexterity)				X		X	X		X	X	X		X										X			X	X	X		

Table 5

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General Job Dimensions Based on Job Data
Which Were Involved in the Regression Equations

Criterion	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14
Mean Test Scores of Job Incumbents														
GATB-G (Intelligence)	X	X	X	X		X		X	X	X	X			
GATB-V (Verbal Aptitude)	X	X	X	X		X	X	X		X				
GATB-N (Numerical Aptitude)	X	X	X	X		X		X	X	X	X			
GATB-S (Spatial Aptitude)	X			X				X	X	X	X			X
GATB-P (Form Perception)	X	X	X	X			X	X	X	X	X	X		
GATB-Q (Clerical Perception)	X	X	X	X		X	X			X				
GATB-K (Motor Coordination)	X	X	X	X	X	X	X			X				
GATB-F (Finger Dexterity)	X		X			X		X		X	X		X	
GATB-M (Manual Dexterity)	X		X			X	X	X		X	X		X	
Potential Cutoff Scores														
GATB-G (Intelligence)	X	X	X	X		X		X	X	X	X			
GATB-V (Verbal Aptitude)	X	X	X	X		X		X	X	X				
GATB-N (Numerical Aptitude)	X	X	X	X		X		X	X	X	X			
GATB-S (Spatial Aptitude)	X			X				X	X	X	X			X
GATB-P (Form Perception)	X	X	X	X			X			X	X	X		
GATB-Q (Clerical Perception)	X	X	X	X		X	X		X	X		X		
GATB-K (Motor Coordination)	X	X	X	X	X	X	X			X				
GATB-F (Finger Dexterity)	X		X	X	X	X		X		X	X			
GATB-M (Manual Dexterity)	X		X		X	X	X	X		X	X		X	
Coefficients of Validity														
GATB-G (Intelligence)	X			X	X	X	X	X	X		X			X
GATB-V (Verbal Aptitude)	X		X	X	X			X		X	X			X
GATB-N (Numerical Aptitude)	X		X	X	X		X		X	X	X			X
GATB-S (Spatial Aptitude)		X	X	X	X	X					X			
GATB-P (Form Perception)	X	X	X	X	X	X		X	X					X
GATB-Q (Clerical Perception)	X	X		X	X		X		X		X		X	
GATB-K (Motor Coordination)		X	X			X	X	X		X				
GATB-F (Finger Dexterity)	X	X		X	X	X				X				
GATB-M (Manual Dexterity)	X	X		X		X					X			

Table 6 **BEST COPY AVAILABLE**

Job Dimensions Based on Attribute Profile Data Which Were Involved in the Regression Equations

Criterion	A1-1	A1-2	A1-3	A1-4	A1-5	A2-6	A2-7	A3-8	A3-9	A3-10	A3-11	A4-12	A4-13	A4-14	A5-15	A5-16	A5-17	A6-18	A6-19	A6-20	A6-21	A6-22	A6-23
Mean Test Scores of Job Incumbents																							
GATB-G (Intelligence)	X		X	X		X	X			X	X						X						X
GATB-V (Verbal Aptitude)	X		X	X		X	X			X	X	X					X						X
GATB-N (Numerical Aptitude)	X		X	X		X	X			X	X						X						X
GATB-S (Spatial Aptitude)	X			X		X	X	X		X	X		X		X	X			X				
GATB-P (Form Perception)	X			X		X		X	X	X	X		X				X						
GATB-Q (Clerical Perception)	X			X	X		X		X	X	X		X			X	X						X
GATB-K (Motor Coordination)	X			X			X		X	X	X		X			X	X					X	
GATB-F (Finger Dexterity)	X		X	X				X		X					X			X		X	X		X
GATB-M (Manual Dexterity)		X		X			X	X	X	X						X		X		X	X	X	
Potential Cutoff Scores																							
GATB-G (Intelligance)	X		X	X		X	X			X	X						X						X
GATB-V (Verbal Aptitude)	X		X	X	X	X	X			X	X	X					X						X
GATB-N (Numerical Aptitude)	X		X	X	X	X	X			X	X						X			X			X
GATB-S (Spatial Aptitude)	X			X	X	X	X	X		X	X		X										
GATB-P (Form Perception)	X			X		X		X	X	X	X		X				X						
GATB-Q (Clerical Perception)	X			X			X		X	X			X			X	X						X
GATB-K (Motor Coordiantion)	X			X			X		X	X	X		X			X	X					X	X
GATB-F (Finger Dexterity)	X		X	X		X		X		X		X			X			X		X	X		
GATB-M (Manual Dexterity)		X				X		X		X					X			X	X	X	X		X
Coefficients of Validity																							
GATB-G (Intelligance)				X	X	X	X	X	X					X		X			X	X		X	
GATB-V (Verbal Aptitude)				X	X	X	X	X		X		X			X	X				X			X
GATB-N (Numerical Aptitude)				X		X	X	X	X	X				X	X	X						X	
GATB-S (Spatial Aptitude)	X		X		X	X	X			X	X			X			X		X				
GATB-P (Form Perception)		X	X		X	X		X			X	X					X				X		
GATB-Q (Clerical Perception)		X		X	X	X	X		X	X			X			X	X	X					
GATB-K (Motor Coordination)	X	X		X		X	X			X	X						X	X					X
GATB-F (Finger Dexterity)					X	X				X	X	X	X		X				X		X	X	X
GATB-M (Manual Dexterity)		X		X		X		X		X			X			X		X	X	X			X

Table 7

Correlations Between Mean Test Scores of Incumbents on GATB Tests for Jobs Used in Sample[1]

GATB Test	G	V	N	S	P	Q	K	F	M
G (Intelligence)									
V (Verbal Aptitude)	.93								
N (Numerical Aptitude)	.97	.89							
S (Spatial Aptitude)	.89	.71	.83						
P (Form Perception)	.83	.73	.83	.83					
Q (Clerical Perception)	.81	.87	.82	.62	.84				
K (Motor Coordination)	.76	.83	.78	.59	.81	.90			
F (Finger Dexterity)	.59	.55	.61	.56	.76	.64	.71		
M (Manual Dexterity)	.41	.32	.45	.46	.61	.46	.56	.70	

[1] Correlations for all tests except F and M are based on the norms for 125 jobs. Correlations for tests F and M are based on the norms for 122 jobs.

DISCUSSION

As described above, this study involved the use of three sets of job dimension scores for a sample of jobs (two sets based on job prediction of three test-related criteria for each of nine tests as derived from job incumbents on corresponding jobs. (The three criteria were mean test scores, potential cutoff scores, and validity coefficients.)

The multiple correlations obtained from a setpwise multiple regression procedure for the three types of predictors, the three types of criteria, and the nine tests of the GATB were, in general, fairly respectable. The ranges and medians of the multiple correlations for the nine tests are summarized below:

Basis of Job Dimensions	Criterion					
	Mean test Scores		Potential Cutoff Scores		Validity Coefficients	
	Range	Mdn.	Range	Mdn.	Range	Mdn.
Job data: divisional job dimensions	.46 - .76	.73	.42 - .77	.73	.26 - .44	.39
Job data: general job dimensions	.16 - .75	.71	.18 - .76	.71	.03 - .38	.32
Attribute profile data	.47 - .45	.71	.44 - .77	.69	.23 - .38	.32

The multiple correlations obtained when coefficients of validity were used as criteria were somewhat lower than those obtained for the previous two criteria, which confirms the *a priori* prediction that this would be the case due to the nature of validity coefficients and the problems associated with validation efforts. In the case of most tests, there was little difference in the effectiveness of the three types of predictor data (two sets of dimensions based on job data and one based on attribute profile data) in predicting all of the criteria used in this study. However, in the case of the Finger Dexterity (F) and Manual Dexterity (M) tests, the prediction based on the general job dimensions was substantially below that based on the other two sets of job dimensions. Further comments regrading these results will be given later in this section.

It should be noted that the "job data" dimension scores used as predictors in the present study were in standard score form with the standaradization having been based on the characteristics of the overall sample of 3700 jobs used by Marquardt and McCormick (Report No. 4, June 1974). Thus, if one were actually to compute the means and standard deviations of the job dimension scores for the sample of jobs used in this study, the means would not necessarily be 0, nor would the standard deviations necessarily be 1. (These means and standard deviations are reported in Appendix A, and a quick glance at these data will show this to be the case.) The reason for standardizing on the basis of the overall sample of 3700 jobs, rather than on the basis of the sample of 658 jobs, was due to the fact that the overall job sample had been stratified roughly in proportion to the occupational composition of the American labor force, whereas the job sample used in this study did not have such characteristics. In order that the results of this study have generality to a wide variety of jobs, many of which were not represented in the sample, it was reasoned that the standard scores should be derived on the basis of population characteristics.

The three criteria for each job can be viewed as different types of indications of the "importance" of the attributes measured by the tests to the jobs in question. Ideally, one would wish that the criterion data (which is based on incumbents in the jobs) would have been obtained for incumbents who had not been "pre-selected" for the jobs in question. While the GATB tests had not been used for the selection of the employees in the organizations from which the data were obtained, these organizations undoubtedly did engage in some form of selection. Since a wide variety of organizations were used in the development of the GATB norms, this selection could have ranged from little (if any) all the way to the extensive use of test batteries, biographical information, and interviews. It would not be unreasonable to expect that, in some proportion of the cases, the results obtained from the selection devices used by the organizations would correlate to some degree with those which would have resulted from the use of the GATB. The proportion is unknown in the present situation, but the potential effects of pre-selection of the GATB norms must still be taken into account when the results of the present study are analyzed.

The question here is basically one of whether the GATB data truly reflect the ability requirements of the jobs. To the extent that they do, the prediction equations developed in the present study should have some utility. To the extent that they do not, these prediction equations might have restricted utility. In this regard, the USTES obtained the GATB data from a wide variety of different organizations which were presumably not using the same selection systems. In addition, the samples of employees used by the USTES were actual incumbents on the jobs, who presumably were performing above some minimally acceptable level (or they would have been terminated). The use of a variety of organizations, rather than one, would have served to mitigate somewhat the effects of pre-selection on the norms, since there was undoubtedly some range to the effectiveness of whatever selection systems the organizations in question used. This, combined with the fact that the employees were, for the most part, performing effectively, should lend greater credence to the GATB data. This does not say, however, that these data reflect the minimum ability requirements for performance on the various jobs. Pre-selection on the part of the organizations involved in the USTES studies may well have resulted in the inflation of the GATB norms, and in a restricted range of these scores. The problem of a restricted range in the scores of the employees on any one of the jobs (presumably restricted to the high side) would mean that the GATB data used in the present study were too high, and should have resulted in reduced predictability of these norms. Since the multiple correlations obtained when mean test scores of incumbents, and potential cutoff scores, were used as criteria in the present study were generally respectable, one would expect that they would be even higher without the potential problem of restricted range.

In addition, the potential effect on the results of the present study of any inflation of the GATB norms due to pre-selection can be somewhat mitigated through the use of cutoff scores that are at some level below the predictions obtained using the regression equations derived in this study. Such a reduction should serve to insure that the cutoff scores which are actually used are more in line with the minimum levels of abilities actually required to perform a job.

Essentially, therefore, the use of GATB data as criteria was based on the assumption that these data do reflect in some way the abilities required for persons to perform adequately on various jobs. In the case of the use of coefficients of validity as criteria, this assumption is rather straightforward, since a coefficient of validity may be viewed as an indicator of the extent to which job performance is in fact related to test performance. The higher the coefficient of validity the greater is the predictability of job performance from test performance. However, as indicated above, coefficients of validity may be adversely influenced by several factors; most typically these factors result in underestimates rather than overestimates of validity.

The use of a criterion of mean test scores of incumbents, or of potential cutoff scores (since these are derived from the mean test scores), is predicated on the assumption that incumbents have "gravitated" into jobs that are commensurate with their own abilities. Thus, the higher the test scores of incumbents on a job, the higher is the presumed level of the ability required for job performance. Thus, if a person has moved through the labor market until he finally holds a position which is commensurate with his abilities, the mean test scores (and, therefore, potential cutoff scores) of incumbents on various jobs should be an indication of the amount of a given ability that is required for performance on the job.

Finally, the question of the characteristics of the sample used in the present study arises. It was mentioned earlier that this sample consisted of 658 cases which represented 141 jobs and 125 sets of GATB norms. Thus, there were multiple PAQ analyses for certain of the jobs in the sample, and the same set of GATB norms for certain different jobs. Since the USTES had pooled across certain types of jobs when they developed the GATB norms, the situation arose in which it was necessary to decide whether PAQ analyses for more than one of these jobs would be included in the sample. It was decided to do so in this study. Since this added variability to the predictors in the present study, without at the same time adding variability to the criteria, this should have resulted in lower multiple correlations than would have resulted had such analyses not been included in the sample. Regretably, there was no way of determining whether the GATB norms for the individual jobs pooled by the USTES were, in actuality, different. Thus, in terms of a test of the job component validation model, the possibility that the multiple correlations obtained in the present study are lower than they should be can only add further evidence for the validity of this model. It should be noted that the predictor data were based on analyses of jobs which were not the specific jobs in the specific organizations for which the test data of incumbents were obtained. Rather, the predictor data were for jobs which were considered to "match" those for which the test data were available. To the extent that the matching may have been of pairs of jobs which were somewhat different from each other it is believed that the resulting predictions would tend to be underestimated.

In general terms it would seem that most of the points discussed above would tend to minimize the basic nature of the relationship between the predictions of job dimension scores and the test-related criteria. Thus, to the extent that these factors did apply to the data the results would seem to reflect underestimates of the basic relationships.

In viewing the results that were obtained, it is evident that mean test scores and potential cutoff scores of the various tests were substantially predictable on the basis of combinations of job dimension scores, but except for the finger and manual dexterity tests (F and M), there was no appreciable difference in predictability with the three types of job dimension scores used. The predictability of coefficients of validity was systematically lower than that of the other two criteria, but this was expected due to the problems associated with carrying out empirical validations.

The final point to be discussed here concerns the differences in predictability among the GATB tests which were found in this study. It was generally found that the criteria associated with cognitive tests were predicted more effectively than were those associated with psychomotor tests. In general, the multiple correlations obtained when psychomotor test norms were used as criteria were at the lower end of the range of correlations obtained. In order to explain this result, a matrix of intercorrelations of the GATB mean test scores, was computed, (see Appendix B). The correlations in that matrix of the psychomotor test scores with the cognitive test scores were generally higher than the corresponding correlations reported by the USTES for the general population. This difference probably can be attributed to the fact that the correlations reported in Appendix C were based on the mean scores of incumbents on the jobs in the sample. The modest correlations between psychomotor tests and cognitive tests in the population generally would be expected to produce mean values for groups of people (such as incumbents on different jobs) which are higher than those in the population generally. It is possible that these "elevated" correlations may have tended to attenuate the underlying relationships between job dimension scores and test data for the psychomotor tests of the incumbents on corresponding jobs. However, there was no obvious procedure for adjusting for any such possible effect.

As noted above, the predictability of mean test scores and potential cutoff scores of the finger and manual dexterity tests (F and M) with the general job dimension was lower than with the divisional job dimensions or than those based on the attribute profiles. Although any explanation for this is somewhat speculative; it is probable that this is due to some difference in the nature of job dimensions in question. Since the "general" dimensions were based on a principal component analysis of almost all of the job elements of the PAQ, the components extracted could embody elements from the several divisions of the PAQ, as contrasted with the "divisional" job dimensions and those based on attribute profile data (in which the principal components analyses were carried out with job elements within each division of the PAQ). It is suggested that the "broader" job dimensions thus failed to provide adequately discriminating measures of the job activities that have heavy involvement of finger and manual dexterity.

CONCLUSIONS

The results of this study would seem to add supporting evidence for the utility of the job component validation model proposed by McCormick (1974) as the basis for establishing aptitude requirements for jobs. The results are reasonably comparable with those previously reported by McCormick, Jeanneret, and Mecham (1972). The present study, however, covered a larger sample of jobs than the previous study, and thus probably represents a more comprehensive test of the job component validity model than the previous study. In addition, the present study was based on the use of Form B of the PAQ, whereas the previous study was based on Form A.

The multiple correlations of the job dimension scores as predictors of the criteria were of such a magnitude as to be of substantial practical utility. This was especially the case with the criteria of mean test scores and potential cutoff scores (for which the multiple correlations for most of the tests were in the high 60's and low 70's). The multiple correlations with the criteria of validity coefficients were generally lower, most being in the 30's. In terms of potential practical utility, it is probable that the predictions of potential cutoff scores would be most useful.

The use of a structured type of job analysis procedure, such as represented by the PAQ, would then seem to provide the basis for establishing personnel requirements for individual jobs directly from job data, thereby eliminating the need for conventional test validation procedures in the case of at least many jobs.

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APPENDICES

APPENDIX A

Means and Standard Deviations of Variables Used[1]

Variable	Mean	Standard Deviation
Job Dimension J1-1	.0017	.9622
Job Dimension J1-2	-.0800	.9108
Job Dimension J1-3	-.0058	.9635
Job Dimension J1-4	-.0342	.9608
Job Dimension J1-5	-.0954	.8712
Job Dimension J2-6	-.0899	.9702
Job Dimension J2-7	.0423	1.0520
Job Dimension J3-8	-.0435	1.0493
Job Dimension J3-9	-.0501	.9657
Job Dimension J3-10	-.0753	1.0545
Job Dimension J3-11	.1543	1.0348
Job Dimension J3-12	.0131	.9976
Job Dimension J3-13	-.0702	.9608
Job Dimension J3-14	.0156	.9158
Job Dimension J4-15	.0779	.9682
Job Dimension J4-16	-.2495	.7032
Job Dimension J4-17	-.0894	.9602
Job Dimension J4-18	-.0248	1.0493
Job Dimension J4-19	-.0271	.8951
Job Dimension J4-20	-.0925	1.0385
Job Dimension J5-21	.0029	.9911
Job Dimension J5-22	-.0339	.9378
Job Dimension J5-23	-.0781	.9356
Job Dimension J6-24	-.0115	.9499
Job Dimension J6-25	.1352	.9705
Job Dimension J6-26	.0870	.9585
Job Dimension J6-27	-.0987	.8946
Job Dimension J6-28	-.0100	1.0366
Job Dimension J6-29	-.0639	.9863
Job Dimension J6-30	.0294	.8999
Job Dimension JG-1	-.1048	.8803
Job Dimension JG-2	.0385	1.0022
Job Dimension JG-3	.0739	1.0689
Job Dimension JG-4	-.2213	.9631
Job Dimension JG-5	-.0349	.8734
Job Dimension JG-6	.0046	.9189
Job Dimension JG-7	-.0935	.9114
Job Dimension JG-8	-.0006	.9406
Job Dimension JG-9	-.0908	.9423

APPENDIX A (cont.)

Variable	Mean	Standard Deviation
Job Dimension JG-10	-.0543	1.0400
Job Dimension JG-11	.0128	.8821
Job Dimension JG-12	.0461	.9084
Job Dimension JG-13	.1219	.7884
Job Dimension JG-14	.0069	.8951
Job Dimension A1-1	.0313	.7445
Job Dimension A1-2	.0635	.7249
Job Dimension A1-3	-.1062	.7641
Job Dimension A1-4	.0320	
Job Dimension A1-5	-.0458	.9041
Job Dimension A2-6	-.0982	.8784
Job Dimension A2-7	-.0669	.9211
Job Dimension A3-8	.0507	.6820
Job Dimension A3-9	-.0453	.6792
Job Dimension A3-10	.0240	.6225
Job Dimension A3-11	-.0217	.7711
Job Dimension A4-12	-.1151	.6035
Job Dimension A4-13	-.0907	.8125
Job Dimension A4-14	-.0049	.8444
Job Dimension A5-15	-.0060	.6822
Job Dimension A5-16	-.0632	.7631
Job Dimension A5-17	.0401	.9180
Job Dimension A6-18	-.0334	.4401
Job Dimension A6-19	-.0647	.7231
Job Dimension A6-20	-.0270	.6623
Job Dimension A6-21	-.0228	.7114
Job Dimension A6-22	.0050	.4930
Job Dimension A6-23	.0535	.6080
Mean GATB Test Score		
GATB-G	104.9574	13.9618
GATB-V	102.7508	11.9606
GATB-N	102.9347	13.5486
GATB-S	104.8283	11.5078
GATB-P	103.2295	11.8576
GATB-Q	105.4088	12.0624
GATB-K	103.4818	10.0867
GATB-F	98.1932	9.1351
GATB-M	103.5925	7.9925
Potential GATB Cutoff Scores		
GATB-G	91.4878	14.7447
GATB-V	89.3587	11.6276
GATB-N	88.4544	14.9414
GATB-S	87.9514	11.8088

APPENDIX A (cont.)

Variable	Mean	Standard Deviation
GATB-P	86.7067	12.9890
GATB-Q	91.1687	11.4532
GATB-K	86.4544	11.0618
GATB-F	79.4351	9.5041
GATB-M	83.7549	8.5690
GATB Validity Coefficients		
GATB-G	.2871	.1490
GATB-V	.2167	.1638
GATB-N	.2907	.1382
GATB-S	.1596	.1451
GATB-P	.2027	.1543
GATB Validity Coefficients (cont.)		
GATB-Q	.2334	.1508
GATB-K	.1693	.1274
GATB-F	.1442	.1457
GATB-M	.1555	.1461

[1] These means and standard deviations were derived from the Overall Sample of 658 cases.

APPENDIX B

Correlations Between Mean Test Scores of Incumbents on GATB Tests for Jobs Used in Sample[1]

GATB Test	G	V	N	S	P	Q	K	F	M
G (Intelligence)									
V (Verbal Aptitude)	.93								
N (Numerical Aptitude)	.97	.89							
S (Spatial Aptitude)	.89	.71	.83						
P (Form Perception)	.83	.73	.83	.83					
Q (Clerical Perception)	.81	.87	.82	.62	.84				
K (Motor Coordination)	.76	.83	.78	.59	.81	.90			
F (Finger Dexterity)	.59	.55	.61	.56	.76	.64	.71		
M (Manual Dexterity)	.41	.32	.45	.46	.61	.46	.56	.70	

[1] Correlations for all tests except F and M are based on the norms for 125 jobs. Correlations for tests F and M are based on the norms for 122 jobs.

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