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Incremental Validity of New Tests in Prediction of Infantry Performance

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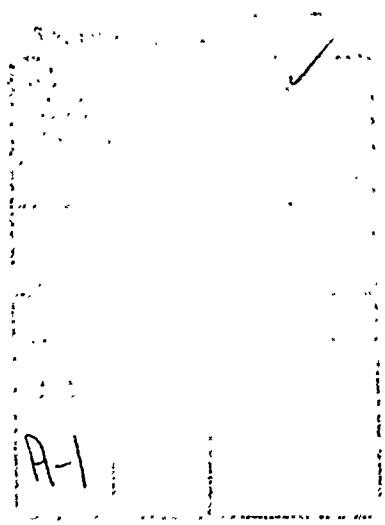

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ABSTRACT

The Armed Services Vocational Aptitude Battery (ASVAB) is highly oriented to math and verbal content areas. New predictor tests that are unique relative to the current ASVAB subtests may have potential for improving predictive validity. The purpose of this research memorandum is to investigate the incremental validity of several new tests that were administered as part of the Marine Corps Job Performance Measurement project for the infantry occupational field.

EXECUTIVE SUMMARY

The Armed Services Vocational Aptitude Battery (ASVAB) is the test used by the military services to select and classify recruits. The ASVAB is composed of ten subtests that measure four general content areas: verbal, mathematical, technical, and speed. The purpose of this research memorandum is to investigate several new tests that differ in content and scope from the current ASVAB. Each new test was judged relative to its ability to improve the prediction of infantry performance by the ASVAB.

The new tests included paper-and-pencil measures of spatial ability (space perception (SP), reasoning (RS), and assembling objects (AS)), a video-firing test (VF), and a background questionnaire (Armed Services Applicant Profile--ASAP). The measures of infantry performance were developed for or collected as part of the Marine Corps Job Performance Measurement (JPM) project: a hands-on performance test (HOPT), a written job knowledge test (JKT), proficiency marks (PRO), and training grades from the school of infantry (GPA).

Examinees were first-term infantrymen from four military occupational specialties (MOSs). Over 1,000 riflemen were tested, and about 300 Marines in three other infantry specialties were examined: machinegunner, mortarman, and assaultman. Two days were required for each Marine to complete all performance testing.

RESULTS

The estimation of validity coefficients is influenced by a variety of factors: restriction of score distributions due to the selection process, shrinkage in multiple correlations when applying optimal regression weights to other samples, criterion unreliability, time of administration for the predictors, etc. The impact of these factors as well as sampling errors on validity coefficients is even further magnified when the primary issue is the difference between validity coefficients. Efforts were taken to account for several potential error sources in the estimation of validity coefficients.

The multiple correlations between all ASVAB subtests and each performance criterion were computed to provide the base against which increments in validity by the new tests would be judged. These multiple correlations showed that ASVAB was highly related to JKT, HOPT, and GPA. The ASVAB was moderately related to PRO. Figure I shows both the sample and range-corrected ASVAB validity bases (computed for the enlistment ASVAB and also for a concurrently administered ASVAB) against hands-on performance. These ASVAB bases were also computed for the other performance criteria. The new tests had to demonstrate improvements in validity above and beyond these levels that ASVAB is currently able to achieve. For the infantry rifleman hands-on test, the

VF test improved the ASVAB validity by 0.015 to 0.03 validity points. The incremental validities against rifleman hands-on performance for each new predictor are plotted in figure I.

Table I highlights the best single new predictor test against each criterion for all four specialties. Several new predictor tests resulted in the largest increments in validity against HOPT. These findings were consistent with the differences in job requirements, which were reflected in differences in hands-on test content for these specialties. Part of the hands-on test for the rifleman specialty required each Marine to negotiate an unknown trail as if on a squad patrol and to engage popup targets with the M16A2 rifle. The prediction of accurately hitting these targets and other rifleman tasks was improved by the VF test. For the assaultman MOS, each Marine was required to fire the Launch Effects Trainer (LET), a device that simulates firing of the Dragon missile. Again, the VF test was one of the better new predictors in improving the assaultman validity; AS also was found to enhance the validity. Job requirements for the machinegunner and mortarman specialties tended to be more spatially oriented. Machinegunners were required to establish intersecting fields of fire as well as to prepare range cards that document direction, elevation, and range of targets. The space perception (SP) test was found to be the best new predictor in improving the prediction of machinegunner job performance. The mortarman hands-on test required the Marine to complete many procedural requirements in mounting, boresighting, and laying the mortar. The assembling objects (AS) test resulted in the most incremental validity for this specialty.

Table I. Best new predictor test for each criterion

	Criterion			
MOS	HOPT	JKT	PRO	GPA
Rifleman	VF	AS	ASAP	VF[a]
Machinegunner	SP	AS	ASAP	
Mortarman	AS	AS, SP	ASAP	
Assaultman	VF, AS	AS	ASAP	

a. Validity results against GPA were based on examinees from all MOSs. Findings were consistent for both training locations.

The JKTs for each MOS contained many common infantry items although each test also had some items that were unique. AS was found to be the best new predictor test in improving the validity against each JKT in the range of 2 to 4 percent. Such a consistent outcome may partially be due to the similarity of test content across these specialties.

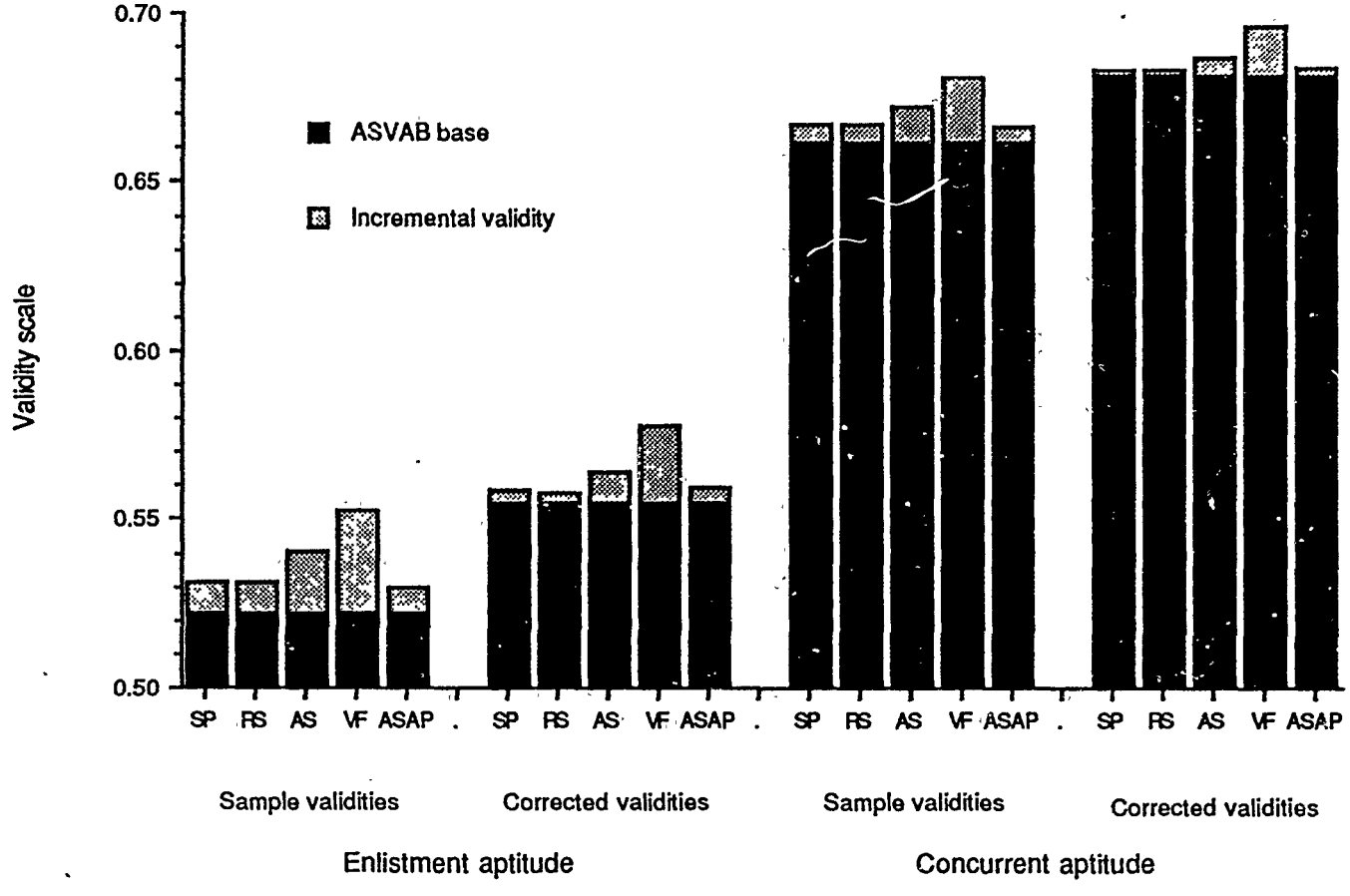

Figure I. Sample and corrected validities for enlistment and concurrent aptitude against hands-on performance for infantry riflemen

The ASVAB only moderately predicted PRO marks; the validity was about 0.35. The ASAP was consistently the best new predictor for improving the validity for these supervisor ratings. Despite significant improvements in the prediction of PRO marks, the absolute validities were still relatively low.

Several corrections were made to the validity coefficients to account for the impact of various extraneous sources of error. The impact of these corrections is noticeable in figure I. Such corrections tended to significantly reduce the gains in validity due to the new predictor test. Incremental validities corrected for range restriction were typically half as large as the sample incremental validities. Increments based on concurrent aptitude were likewise less than gains computed for enlistment aptitude by a factor of a half. Adjustments for time in service reduced even further the incremental gains (this impact is not determinable from figure I). The impact of these error sources highlights the potential for considerable overestimation of incremental validities if appropriate corrections and adjustments are not made.

CONCLUSIONS

Data from the Marine Corps JPM project allowed for a thorough examination of the measurement and prediction of infantry performance. These analyses showed that the ASVAB does an excellent job of predicting a variety of infantry performance measures--hands-on performance tests, written job knowledge tests, and infantry school training grades. ASVAB moderately predicts an infantryman's proficiency rating. The ability of any new predictor test to enhance the ASVAB's ability to predict infantry performance was slight and mixed (except for proficiency marks, which are questionable as objective measures of job performance).

The estimation of validity coefficients is influenced by a variety of factors. Efforts were taken to account for several potential error sources. Such corrections and adjustments tended to significantly reduce the gains in validity due to the new predictor test. Substantial overestimation of incremental validities is possible if appropriate corrections and adjustments are not made.

Given the variability of incremental validity estimates across MOSs and criteria, it is difficult to make a strong recommendation as to which, if any, of the new predictors should be considered for possible inclusion in the ASVAB. Although similar gains found in other research have been noted to possibly have considerable dollar value, any true benefit that would result in fiscal savings has yet to be demonstrated. Therefore, the slight validity gains found in these analyses have yet to demonstrate any tangible significance that would positively impact the overall manpower selection and classification process.

Even if "significant" increments in validity had been noted, further investigation of the measurement properties of any new tests is still required. For example, while the video firing test tended to be one of the better tests against hands-on performance, the test may be susceptible to practice effects as demonstrated in the significant test-retest gains over the period of 7-10 days. Performance on such video tests may also be affected by previous experience with video games or computers. Such practice effects or experience may possibly cancel any validity gains if the test were used for operational testing. Additional issues that would need to be researched include subgroup analysis, coaching and test-taking strategies, and logistical concerns for implementing the test within an operational testing program.

Given the challenge to improve the prediction of infantry performance, it was found that larger percentage gains can be achieved by refining the current aptitude composites or by using an optimal classification system based on all ASVAB subtests than can be achieved by adding new predictor tests to the ASVAB. Such gains may be achieved by simply correcting known inefficiencies in the current classification system. With only minimal gains resulting from new predictor tests and an unknown benefit associated with such small gains, it would be more prudent to concentrate on refining the existing classification system.

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INTRODUCTION

The Armed Services Vocational Aptitude Battery (ASVAB) is the test used by the military services to select and classify recruits. The ASVAB is composed of ten subtests that measure four general content areas: verbal, mathematical, technical, and speed. Various aptitude composites, computed from the ten ASVAB subtests, are used to classify recruits into clusters of military occupational specialties (MOSs) that are most suited to their aptitudes.

Various analyses have confirmed the four general content areas of the ASVAB [1], although these factors tend to be correlated. This implies that the ASVAB is limited in the number of dimensions that it effectively measures. To the extent that military jobs are multi-dimensional and require a variety of skills and abilities, the ASVAB may not be sensitive to the prediction of these qualities. The consideration of new dimensions that might supplement the existing ASVAB by expanding its range of predictors may hold significant promise for improving the overall selection and classification system.[1]

However, the consideration of new predictors is unjustified if there is not a similar concern for the performance measure against which the new tests are to be validated. The ability of the ASVAB to predict the traditional military performance criterion of training grades is typically good due to their shared academic nature. Training grades are often based on written examinations of job knowledge obtained in a classroom setting. Persons performing well on written predictor tests also tend to perform well on written criterion tests. The possibility of additional (or different) predictors significantly improving the ASVAB-training grade relationship across a variety of jobs or clusters of jobs is unlikely.

The joint-service Job Performance Measurement (JPM) project offers a unique opportunity for the validation of new predictor tests. A primary purpose of the JPM project has been to develop objective and standardized measures of job performance that reflect the broad range of military job requirements. The expanded scope of the hands-on performance tests will measure the unique abilities that are needed in the work setting but that are not necessarily required for academic success. In this way, the services will be able to differentially

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1. Efforts within the joint-service computerized adaptive testing (CAT) project for the ASVAB are examining the use of computers for expanding the measurement of aptitudes beyond those currently assessed by the paper-and-pencil ASVAB. The Defense Advisory Committee on Military Personnel Testing has noted that, "to a significant extent, the practical value of a nationwide CAT system will depend on the success of this research effort [investigation of additional predictive validity of new predictor tests]" [2, p. 21].

associate the skills and abilities required in various jobs with the predictors of those abilities so that the match of the person and job can possibly be improved.

Without simultaneous research in both the predictor and criterion realms, analyses of incremental validity for any new predictor tests may be somewhat misleading and will certainly be incomplete. By limiting the focus to the existing ASVAB subtests predicting the more complete criterion measures of the JPM project, only that part of job performance that is the product of the four highly related content factors will be illuminated. The prediction of any differential abilities required for successful job performance will potentially be masked due to the inadequacy of ASVAB to predict those dimensions (and therefore appear as a lack of relationship with the ASVAB). Conversely, research involving new predictors validated against traditional performance measures will possibly be fruitless as well. Increments in validity against training criteria may be hard to obtain or may even restrict the types of new predictors to tests that are not overly different from the current math and verbal orientation of the ASVAB.

The purpose of this research memorandum is to investigate the ability of several new predictor tests to improve the prediction of infantry performance beyond what the ASVAB is currently able to achieve. The new predictor tests were administered as part of the Marine Corps JPM project. These tests included paper-and-pencil measures of spatial ability, a video-firing test, and a background questionnaire. Increments in validity due to these new tests were judged relative to the complete battery of ASVAB subtests. Two sources of aptitude scores were examined: ASVAB at time of enlistment into the Marine Corps and a concurrent ASVAB administered as part of the project. Four different performance criteria were also examined: hands-on job performance tests, written job knowledge tests, proficiency marks (Marine Corps operational supervisory ratings), and final course grades in the infantry training school. Reliability estimates for both the predictors and criteria were computed in addition to the absolute and incremental validities of each new predictor test. Summary remarks noting the practical significance of the incremental validity for the new predictors conclude the research memorandum.

TECHNICAL CONSIDERATIONS FOR ASSESSING INCREMENTAL VALIDITY

The relationship between a selection test (a predictor) and a performance measure (a criterion) is typically expressed in terms of their correlation (a validity coefficient). The difficulties that impact the estimation of validity are well known. Such difficulties are magnified when examining incremental validity since such analysis involves differences in validity coefficients. The incremental validities computed for this research memorandum are not a unique statistic but rather the difference between two validity coefficients. The validity of the ASVAB to predict infantry performance serves as the

base and is subtracted from the validity of the ASVAB when supplemented by an additional predictor test. Some of the technical considerations affecting the computation of validities are briefly discussed.

Performance Criterion

The measure of job performance must be an accurate and objective reflection of what an individual is required to perform on his job. If the performance criterion is not representative of actual job performance, its measurement is meaningless and its prediction would be of no value.

In 1981, the Joint-Service Job Performance Measurement (JPM) project was initiated to facilitate the services' development of valid measures of military job performance. Because of its high fidelity to actual job performance, hands-on performance of job-sample tasks was established as the benchmark criterion measure. A National Academy of Sciences (NAS) committee that provides technical oversight to and evaluation of the joint-service project endorsed the services's declaration of hands-on tests as the benchmark criterion:

> The hands-on technology is not just another means of assessing performance. It is the only method, short of observing people on the job, that elicits the actual behaviors required to perform job tasks....The very directness of the hands-on methodology makes it in theory the ideal criterion measure... [3, p. 27].

Other performance measures were also developed or collected as part of the Marine Corps JPM project (e.g., written job knowledge tests, training grades, operational performance ratings). Therefore, the criteria collected by the JPM project offer a diverse array of performance measures against which to evaluate the incremental validity of new predictor tests. However, greater emphasis will be ascribed to the outcomes associated with the hands-on performance measures due to their greater fidelity to actual job behaviors.

Aptitude Measures

Incremental validity of new tests must be determined relative to the existing set of predictors in the ASVAB. The complete set of ASVAB subtests, not a composite of the subtests or a derived measure of general cognitive ability, must be used as the validity standard against which new tests are judged. This requirement provides a common base for comparison of validity increments as well as recognizes the potential fallibility of any composite. Any definition of the predictor set, other than the full complement of ASVAB subtests, would possibly lead to underestimates of absolute validity, and thereby overestimates of incremental validity. Therefore, all ten ASVAB subtests were used as predictors to maximize the predictive validity currently available in the ASVAB.

A second aptitude-relevant issue concerns the timing of test administration for both the ASVAB and the new set of predictors. Ideally, both the ASVAB and the new predictors should be administered at the same time (preferably at time of enlistment). However, such a longitudinal analysis of increments in validity is not possible for the current study.

An alternative strategy is to readminister the ASVAB so that it is concurrent with the administration of the new predictor tests. This concurrent administration of all predictor measures attempts to control for extraneous factors. Such factors may possibly include gains in test performance due to training, experience, or individual maturity that may have occurred during the lapse between testing periods. Also, concurrent administration seeks to minimize motivational differences across testing sessions. Since administration of the new predictors was not possible at the time of enlistment for this project, the ASVAB was readministered as part of the Marine Corps JPM project so that differences in incremental validity could be evaluated as a function of enlistment and concurrent aptitude.

Correction for Range Restriction

A validity coefficient computed on a sample of job incumbents will generally underestimate the true validity of a selection test for the population of applicants to which the test is administered. This is because the selection process restricts the distributions of both predictor and criterion scores by screening out potentially unsuccessful applicants. The degree of range restriction differs across specialties: standards for low-level jobs would tend to screen out relatively few applicants; standards for more technically demanding jobs would tend to be more restrictive.

To be able to compare validity coefficients across jobs with differing degrees of selection, the coefficients must be placed on a common scale. "Correction for range restriction" produces this common metric by estimating what the validity would be in the full population of potential applicants. The 1980 youth population served as the reference population from which all corrections for this research memorandum were derived [4]. A multivariate range correction procedure was used that accounts for the effects of selecting individuals on all ten ASVAB subtests [5]. Because population variances are not available for the new predictor tests, corrections to validity coefficients due to range restrictions accounted for explicit selection only on the ASVAB, not the new predictors. The new predictors were treated as incidental selection variables in the correction procedures.

Shrinkage of Multiple Correlations and Cross Validation

Multiple correlations (MRs) are merely extensions of simple correlation coefficients in that the criterion is regressed on multiple predictor measures as opposed to one. The square of the MR expresses

the magnitude of the predictive power of the regression. Regression weights are assigned to each predictor to maximize the MR for the sample on which the regression is computed. If the regression weights are then applied to a different sample, the resulting MR will almost always be smaller than the MR obtained in the original sample. This decrement in MRs is referred to as "shrinkage."

The degree of shrinkage is primarily a function of the number of predictors and sample size. The best procedure for estimating the degree of shrinkage is to perform a cross-validation. This requires that the available observations are split into two random samples (one for estimation and the other for validation). Predicted values of the criterion variable are computed in the validation sample based on the weights determined in the estimation sample. The correlation between the actual and predicted values is then computed. The difference between this correlation and the MR in the estimation sample is an estimate of the shrinkage. If the shrinkage is small (and MR is meaningful), then the estimation regression is warranted for future predictions.

Formula methods have been derived to estimate the degree of shrinkage in MRs as opposed to the computing of separate regressions on a split sample [6]. These formulas make use of all observations and result in more precise estimates of the shrinkage.

Computing an estimate of the population cross-validated multiple correlation (CVR) is a two-stage process. First, an estimate of squared population multiple correlation ($\hat{\rho}^2$) is computed:

$$\hat{\rho}^2 = 1 - \frac{N - 1}{N - p - 1} (1 - R^2) \qquad (1)$$

where N is the sample size, p is the number of predictors, and R^2 is the observed squared multiple correlation. This quantity is then used as input for computing the CVR:

$$CVR^2 = \frac{(N - 1)\ \hat{\rho}^4 + \hat{\rho}^2}{(N - p)\ \hat{\rho}^2 + p} \qquad (2)$$

where all symbols are defined above. The square root of this quantity is the value used throughout this research memorandum for computing the validity base and incremental gains due to the new predictors.

Formula (1) applies only to the case where the predictors are considered fixed, as in a typical selection and classification process. Fixed predictors imply that generalizations based on the CVR pertain only to the exact set of predictors under investigation (the ten ASVAB subtests in this case) and not to a population of predictors.

Criterion Unreliability

All performance criteria are not measured with the same reliability. To the extent that the criteria are unreliable and contain measurement error, estimates of validity coefficients will also be affected. Theoretically, a test cannot correlate with another variable more highly than it correlates with its own true score (a test score measured with no error); therefore, test validity cannot exceed the square root of test reliability.

It follows that the increments in validity of new predictor tests computed against multiple performance criteria may be affected by differences in criteria reliabilities. Corrections to validities can be made to compensate for unequal measurement reliability (see [7, p. 69]). Such corrected values are the maximum coefficients that are obtainable if all measurement error could be eliminated, i.e., perfect criterion reliability. An accurate estimate of the criterion reliability is essential to obtaining the proper correction.

The primary concern for this research memorandum is relative comparisons among validity gains for new predictors within a criterion, not absolute comparisons of the magnitude of validity increments across criteria. The focus of the analyses is on the hands-on performance measures, and the other criteria were examined for the relative consistency of outcomes. Therefore, corrections to validity coefficients for criterion unreliability were not computed. (As will be shown in a later section, the differences in criterion reliability were not as discrepant as expected, so such corrections would not have a differential impact on the results.) However, sufficient information is provided in the tables to allow such corrections to be calculated.

Controlling for Time in Service

As noted earlier, validities may be adversely affected by a time lapse between the administration of the enlistment predictors and the new predictors of interest. To account for the possible impact of temporal differences, the ASVAB was readministered so that all predictor information would be collected at the same time and under the same conditions.

However, the examinees of the JPM sample also differed with respect to their length of service, ranging from 5 to 48 months. Such time differences may affect performance on the predictor tests and/or the performance tests simply due to on-the-job experience, training, or maturity. To control for these potential developmental effects, a separate set of analyses used time in service (TIS) and its square as covariates in each regression before the new predictor test was entered. In this manner, performance scores were statistically adjusted as if all examinees had the same number of months of service.

TEST ADMINISTRATION

Each Marine was tested for two days. One day was devoted to hands-on testing and the other day was for written tests. All tests were administered by retired Marines who received extensive training in how to administer tests in a standardized manner and accurately score and record test performance. The administrators specialized in giving either the hands-on tests or the written tests. Multiple administrators rated the performance of selected examinees to monitor the scoring consistency and accuracy of test administrators throughout the four-month testing period.

Examinees were first-term infantrymen from four MOSs. Over 1,000 riflemen were tested, and about 300 Marines in each of the other three specialties were examined: machinegunner, mortarman, and assaultman. Examinees were randomly selected for testing by Headquarters, Marine Corps, so that reasonable distributions of time in service, paygrade, and educational level were obtained. Approximately 20 percent of the riflemen were retested on all materials after an interval of 7-10 days.

Criterion Measures

Four performance measures were collected for each Marine. A description of each measure follows.

Hands-on performance tests (HOPT) were developed for the four first-term infantry MOSs. Based on official Marine Corps publications, training materials, and extensive task analyses by job experts, the domain of infantry job requirements was specified. Tasks were organized into relatively homogeneous content areas, called duty areas (e.g., land navigation, tactical measures, grenade launcher, squad automatic weapon). Job requirements differed across the four MOSs, although there was a large core of common infantry tasks. Each MOS had 13-14 duty areas. Tasks were sampled from each duty area so that hands-on test scores would generalize to the full range of infantry job requirements within that duty area [8]. Alternate forms of the hands-on test were developed in response to test security concerns and also to examine test reliability.

A written job knowledge test (JKT) was also developed to parallel the content of the hands-on test. A separate written test composed of about 200 items was developed for each MOS. No time limits were imposed, but examinees typically finished in two hours. An alternate form of the JKT was also constructed.

Operational Marine Corps supervisory ratings, called proficiency marks (PRO), were obtained from Headquarters, Marine Corps. Proficiency marks are given every six months to enlisted personnel, or earlier if an individual is transferred to another unit. The rating score used for these analyses was the mean of all available proficiency marks for an

individual. Over 90 percent of the Marines tested in the JPM project had received at least three proficiency marks; the average person had received more than five ratings.

Training grades (GPA) in the School of Infantry were also collected from historical records. Grades could not be found for all Marines who were administered the new predictor tests. Other analyses of training grades have shown that different relationships exist between aptitude and grades for the two training locations (Base A and Base B) [9]; therefore, the two bases were analyzed separately.

Predictor Tests

The new predictors included three paper-and-pencil tests, a video firing test, and a biographical questionnaire. Below is a description of each.

The Space Perception (SP) test was a paper-and-pencil test that measured spatial visualization. The test was administered as part of ASVAB 5/6/7 and was composed of 20 items that required visualization of paper-folding and -unfolding tasks. Twelve minutes were allowed to complete the test.

The Assembling Objects (AS) test was obtained from the Army's JPM project [10]. The paper-and-pencil test was a measure of spatial visualization and mental rotation. There were 36 items and the time limit was 18 minutes.

The Reasoning (RS) test was also obtained from the Army's JPM project [10] and was composed of 30 written items that measured spatial reasoning and pattern recognition. A time limit of 12 minutes was imposed.

A test of video firing (VF) was administered to assess psychomotor skills. The test required firing a pistol at moving targets on a video screen. The test consisted of four shooting trials for up to five scenarios of increasing difficulty. The test was untimed but typically required 10-15 minutes to complete.

A shortened version of the Armed Services Applicant Profile (ASAP) was also administered. ASAP was a biographical questionnaire that was obtained from the executive agent for the joint-service instrument [11]. The administration was untimed but required approximately 20-30 minutes to complete the 60-item form.

The ASVAB was readministered so that the new predictor tests could be evaluated relative to concurrent aptitude information. The full battery was group administered and required approximately three hours to complete. To motivate examinees to perform to the best of their abilities, a strong incentive was provided--if the ASVAB scores from the JPM administration exceed an individual's scores of record, the higher

JPM scores would be substituted. This motivator was effective because many enlisted personnel seek to transfer to other occupational fields or apply for the warrant officer program, which have higher aptitude requirements. Approximately 60 percent of the Marines who participated in the JPM testing satisfied the necessary criteria and improved their aptitude scores of record.

RESULTS

Reliability Estimates

Tables 1 through 4 present the reliability estimates for three of the criterion measures (reliability could not be computed for training grades) and all the new predictor tests. Where appropriate, the following reliability estimates were computed:

- Test-retest: both test forms of the hands-on test and job knowledge test and the same form for the new predictors were readministered to about a 20-percent sample of the infantry riflemen after an interval of 7-10 days.
- Alpha coefficient: a measure of the internal consistency of test items (or tasks) that reflects the degree to which item responses are homogeneous.
- Scorer agreement: the percentage agreement between two test administrators as they observe and score the step-level performance of one examinee.
- Analysis of variance (ANOVA) reliability: similar to the alpha coefficient in that the statistic indicates the consistency among multiple observations of the same performance measure.

The hands-on tests were found to be very reliable (see table 1). Test-retest reliability was 0.70. There was a significant retest gain in performance of over 0.8 standard deviation. Such gains over a time period of 7-10 days may reflect the positive impact of practice on the performance of infantry tasks or simply a better understanding of the hands-on testing procedures. Further analysis of these retest improvements showed that the gains were not related to aptitude; both high- and low-aptitude personnel made equivalent advances in performance. Alpha coefficients were consistently high for all MOSs. Test administrators also agreed on the scoring of the performance that they observed.

As expected, the written job knowledge test was found to be slightly more reliable than the hands-on measures. Table 2 shows that the test-retest reliability was 0.73 with no retest gains. The alpha coefficients ranged from 0.87 to 0.90 for the four MOSs. The JKT was a difficult test: an infantryman on average answered about 45 percent of the written items correctly.

Table 1. Reliability of hands-on performance test

Reliability measure	Reliability estimate	Other relevant information				
Test-retest		Initial test		Retest		
		Mean	SD	Mean	SD	N
Rifleman	0.70	52.4	8.6	59.4	8.2	190
Alpha coefficient[a]		Number of test items				N
Rifleman	0.87	71 and 68 tasks				880
Machinegunner	0.87	72 and 70 tasks				257
Mortarman	0.88	75 and 72 tasks				217
Assaultman	0.83	80 and 76 tasks				239
Scorer agreement						
Rifleman	0.90					
Machinegunner	0.90					
Mortarman	0.89					
Assaultman	0.90					

a. Alpha reliability estimates are the mean for the two forms of the hands-on test. Differences between the two coefficients for any MOS were never greater than 0.02.

Table 2. Reliability of job knowledge test

Reliability measure	Reliability estimate	Other relevant information				
Test-retest		Initial test		Retest		
		Mean	SD	Mean	SD	N
Rifleman	0.73	43.5	9.0	43.8	10.5	189
Alpha coefficient[a]		Number of test items				N
Rifleman	0.89	199 for each test form				896
Machinegunner	0.89	190 for each test form				306
Mortarman	0.90	189 for each test form				312
Assaultman	0.87	190 for each test form				314

a. Alpha reliability estimates are the mean for the two forms of the job knowledge test. Differences between the two coefficients for any MOS were never greater than 0.02.

A simple analysis of variance design of subjects, ratings, and their interaction showed that proficiency marks were reasonably stable and consistent. Three reliability estimates were computed based on the three, four, and five most recent ratings that an individual had received. Table 3 reports reliabilities for the ratings that ranged from 0.66 to 0.70.

Table 3. Reliability of proficiency marks

Reliability measure	Reliability estimate	Mean squares Between	Mean squares Within	N
ANOVA reliability				
3 most recent ratings	0.66	24.09	8.17	1755
4 most recent ratings	0.67	25.54	8.42	1406
5 most recent ratings	0.70	25.42	7.67	1104

Given that the new predictor tests were somewhat shorter in length, their reliabilities tended to be slightly lower than those of the criterion measures. Table 4 shows that test-retest estimates were high for SP and ASAP, and relatively low for the other three tests. The ASAP is a factual questionnaire, so such high reliabilities were expected. A significant retest gain of about 0.75 standard deviation was noted for VF; all other tests showed negligible improvements. Again, further analysis of the VF retest improvements showed that they were not related to aptitude. Alpha coefficients for each test were also moderately high.

Table 4. Reliability of new predictor tests

Reliability measure	Reliability estimate	Other relevant information				
Test-retest		Initial test		Retest		
		Mean	SD	Mean	SD	N
SP	0.73	11.4	3.9	11.9	4.2	197
RS	0.58	18.9	5.8	19.2	6.2	197
AS	0.57	22.3	7.2	22.3	8.1	197
VF	0.63	198.6	30.3	221.2	38.3	211
ASAP	0.90	5.8	13.1	5.2	13.9	192
Alpha coefficient		Number of test items				N
SP	0.78	20 items				1837
RS	0.85	30 items				1837
AS	0.88	36 items				1837
VF	0.82	4 trials				1849

Estimates of New Predictor Uniqueness

A necessary, but not sufficient, condition for new predictors to demonstrate increments in validity is that the new tests need to measure aptitudes that are somewhat unique relative to the ASVAB. Predictors that have high correlations with ASVAB can improve validity only by enhancing test reliability, which is unlikely given the already high ASVAB reliabilities. New tests that measure unique aptitudes have potential for incremental validity.

The uniqueness (U) of a new test is defined as the reliable variance of the test that is not related to ASVAB:

$$U = Rel(NP) - R^2(NP, ASVAB) \quad (3)$$

where, Rel(NP) is the reliability of the new predictor test (NP), and R^2(NP, ASVAB) is the squared multiple correlation for the regression of the new predictor test on all ASVAB subtests adjusted for shrinkage. The estimates of uniqueness for each new predictor test are presented in table 5. These estimates were computed based on both enlistment and concurrent aptitude information using test-retest as the measure of reliability.

Table 5. Uniqueness estimates[a] for new predictor tests relative to enlistment and concurrent aptitude scores

New predictor test	Aptitude scores	
	Enlistment	Concurrent
SP	0.39	0.36
RS	0.25	0.20
AS	0.29	0.25
VF	0.40	0.39
ASAP	0.81	0.78

a. Estimates were based on test-retest reliability of new predictors and multiple correlations of the new predictors regressed on all ASVAB subtests. Reliabilities and multiple correlations were corrected for range restriction.

There was essentially no difference in the uniqueness estimate based on enlistment and concurrent aptitude. The ASAP showed the highest uniqueness due to both its high test-retest reliability and lack of relationship with the ASVAB subtests. Video firing and the space perception test were comparable with moderate levels of uniqueness; the reasoning and assembling objects tests showed the least promise of

having unique and reliable variance. From the uniqueness perspective, ASAP, video firing, and space perception would be the best candidate tests for possibly improving the validity of the ASVAB against infantry job performance.

Intercorrelations and First-Order Validity

The intercorrelations among the new predictors were examined to determine the degree to which the tests measured the same concept. The relationship between the new predictors and ASVAB as well as the validity of each test with five performance criteria were computed. Table 6 reports these results for the infantry rifleman. The correlations are corrected for range restriction; sample and corrected correlation values are reported in appendix A for each MOS.

Table 6. Correlations of infantry rifleman criteria and predictors corrected for range restriction

	Criterion					Predictor				
	HOPT	JKT	PRO	GPA A[a]	GPA B[a]	SP	RS	AS	VF	ASAP
Enlistment										
AFQT	0.56	0.77	0.34	0.61	0.40	0.47	0.60	0.47	0.42	0.27
GT	0.63	0.78	0.35	0.65	0.40	0.55	0.63	0.54	0.49	0.23
ASVAB[b]	0.67	0.80	0.38	0.66	0.41	0.61	0.65	0.59	0.54	0.33
Concurrent										
AFQT	0.58	0.81	0.38	0.61	0.40	0.50	0.63	0.52	0.44	0.29
GT	0.63	0.80	0.39	0.63	0.41	0.56	0.67	0.58	0.49	0.26
ASVAB[b]	0.69	0.83	0.41	0.67	0.42	0.64	0.69	0.63	0.55	0.37
Predictors										
SP	0.45	0.46	0.23	0.37	0.24	1.00	0.54	0.59	0.38	0.10
RS	0.47	0.59	0.29	0.43	0.33	0.54	1.00	0.63	0.40	0.21
AS	0.47	0.55	0.23	0.41	0.23	0.59	0.63	1.00	0.40	0.17
VF	0.49	0.42	0.27	0.44	0.24	0.38	0.40	0.40	1.00	0.11
ASAP	0.22	0.29	0.31	0.14	0.09	0.10	0.21	0.17	0.11	1.00
Mean	52.80	44.35	43.69	49.83	50.13	11.01	18.76	22.03	196.1	6.56
SD	10.22	12.08	2.19	11.62	10.51	4.32	6.40	7.86	33.71	13.03
N	870	862	870	512	641	870	870	870	870	870

a. Statistics for GPA include examinees from other MOSs.
b. The correlations and validities for ASVAB represent multiple correlations based on all ASVAB subtests.

Three major observations were drawn from table 6. First, the three paper-and-pencil measures of spatial ability (SP, RS, and AS) were highly correlated (0.54 to 0.63). The video firing test was moderately related to the spatial tests and, as expected, the ASAP was not overly related to any of the other predictor measures. Second, the intercorrelations between the new predictors and the existing ASVAB subtests showed RS to be most highly related to ASVAB, and ASAP the least related. The results were consistent for both enlistment and concurrent aptitude scores. Third, the pattern of validities between the new tests and the five performance criteria were very similar: ASAP was least related to each performance criteria; all other new predictors were about equally related to the performance measures. Similar correlations were noted for the other MOSs that are reported in appendix A.

The multiple correlations noted in table 6 between ASVAB and each performance criterion provided the base against which all judgments of incremental validity were made. The validities show that ASVAB was highly related to JKT (0.80), HOPT (0.67), and GPA for Base A (0.66). The ASVAB was moderately related to PRO (0.38) and GPA for Base B (0.41). Similar validities were noted for concurrent aptitude information. The new tests would have to demonstrate improvements in validity above and beyond these levels that ASVAB is currently able to achieve.

Incremental Validity

Tables 7 through 11 report the ASVAB validity base (taken from table 6) and the validity increments due to each new predictor test. A separate table is reported for each MOS. The tables contain the following information:

- Multiple correlations (MR), sample validities, and validities corrected for range restriction
- Estimates of the cross-validated multiple correlations (CVR)
- Increment (IN) in the cross-validated multiple correlation over the ASVAB validity base due to the new predictor
- Increment expressed as a percentage improvement (%) over the ASVAB base (IN divided by ASVAB-base CVR).

Grade point average was combined for all four MOSs and reported in a separate table because all individuals received the same initial infantry training. Findings are reported for both enlistment and concurrent aptitude information.

Table 8. Increments in validity by new predictor tests for infantry machinegunner performance

Panel A: Sample validities

	HOPT				JKT				PRO			
	MR	CVR	IN	%	MR	CVR	IN	%	MR	CVR	IN	%
Enlistment aptitude												
ASVAB	0.6435	0.6063			0.6164	0.5751			0.2364	0.0688		
SP	0.6550	0.6154	0.0091	1.5	0.6336	0.5906	0.0154	2.7	0.3020	0.1621	0.0933	135.6
RS	0.6506	0.6104	0.0041	0.7	0.6255	0.5811	0.0060	1.0	0.2427	0.0621	*	*
AS	0.6446	0.6034	*	*	0.6566	0.6171	0.0419	7.3	0.2366	0.0506	*	*
VF	0.6519	0.6119	0.0056	0.9	0.6219	0.5770	0.0018	0.3	0.2365	0.0503	*	*
ASAP	0.6587	0.6197	0.0134	2.2	0.6216	0.5766	0.0015	0.3	0.3953	0.2962	0.2274	330.4
Concurrent Aptitude												
ASVAB	0.6306	0.5916			0.6891	0.6578			0.2659	0.1195		
SP	0.6482	0.6076	0.0160	2.7	0.7080	0.6758	0.0180	2.7	0.3103	0.1751	0.0556	46.5
RS	0.6402	0.5983	0.0067	1.1	0.6966	0.6630	0.0051	0.8	0.2705	0.1112	*	*
AS	0.6322	0.5891	*	*	0.7199	0.6894	0.0316	4.8	0.2659	0.1033	*	*
VF	0.6385	0.5964	0.0048	0.8	0.6949	0.6610	0.0032	0.5	0.2682	0.1072	*	*
ASAP	0.6466	0.6058	0.0142	2.4	0.6915	0.6571	*	*	0.4075	0.3125	0.1930	161.5

Panel B: Validities corrected for range restriction

	HOPT				JKT				PRO			
	MR	CVR	IN	%	MR	CVR	IN	%	MR	CVR	IN	%
Enlistment Aptitude												
ASVAB	0.7828	0.7626			0.7846	0.7645			0.3344	0.2233		
SP	0.7891	0.7674	0.0048	0.6	0.7930	0.7717	0.0072	0.9	0.3808	0.2766	0.0533	23.9
RS	0.7867	0.7647	0.0021	0.3	0.7890	0.7672	0.0027	0.4	0.3386	0.2172	*	*
AS	0.7835	0.7611	*	*	0.8045	0.7846	0.0201	2.6	0.3345	0.2112	*	*
VF	0.7874	0.7655	0.0029	0.4	0.7873	0.7653	0.0008	0.1	0.3344	0.2111	*	*
ASAP	0.7911	0.7697	0.0071	0.9	0.7871	0.7651	0.0006	0.1	0.4541	0.3730	0.1497	67.1
Concurrent Aptitude												
ASVAB	0.7686	0.7469			0.8171	0.8004			0.3462	0.2399		
SP	0.7814	0.7588	0.0119	1.6	0.8291	0.8119	0.0115	1.4	0.3798	0.2752	0.0353	14.7
RS	0.7760	0.7527	0.0058	0.8	0.8224	0.8044	0.0040	0.5	0.3503	0.2340	*	*
AS	0.7706	0.7467	*	*	0.8356	0.8192	0.0188	2.3	0.3462	0.2282	*	*
VF	0.7746	0.7512	0.0043	0.6	0.8211	0.8030	0.0026	0.3	0.3473	0.2297	*	*
ASAP	0.7776	0.7546	0.0077	1.0	0.8184	0.8000	*	*	0.4557	0.3751	0.1352	56.4

* Increment in cross-validated multiple correlation by new test was negative due to adjustment made for shrinkage.

Table 7. Increments in validity by new predictor tests for infantry rifleman performance

Panel A: Sample validities

	HOPT				JKT				PRO			
	MR	CVR	IN	%	MR	CVR	IN	%	MR	CVR	IN	%
Enlistment aptitude												
ASVAB	0.5371	0.5225			0.5999	0.5880			0.2452	0.2028		
SP	0.5472	0.5315	0.0090	1.7	0.6055	0.5926	0.0045	0.8	0.2508	0.2050	0.0023	1.1
RS	0.5468	0.5311	0.0086	1.7	0.6224	0.6103	0.0223	3.8	0.2563	0.2117	0.0089	4.4
AS	0.5553	0.5401	0.0176	3.4	0.6392	0.6278	0.0398	6.8	0.2487	0.2025	*	*
VF	0.5673	0.5527	0.0302	5.8	0.6032	0.5901	0.0021	0.4	0.2656	0.2228	0.0200	9.9
ASAP	0.5456	0.5299	0.0074	1.4	0.6147	0.6022	0.0141	2.4	0.3347	0.3022	0.0994	49.0
Concurrent Aptitude												
ASVAB	0.5684	0.5553			0.6614	0.6519			0.2829	0.2469		
SP	0.5731	0.5587	0.0035	0.6	0.6626	0.6521	0.0002	0.0	0.2838	0.2442	*	*
RS	0.5725	0.5581	0.0028	0.5	0.6695	0.6593	0.0074	1.1	0.2852	0.2457	*	*
AS	0.5778	0.5637	0.0085	1.5	0.6815	0.6718	0.0199	3.1	0.2829	0.2432	*	*
VF	0.5915	0.5781	0.0228	4.1	0.6630	0.6526	0.0006	0.1	0.2966	0.2590	0.0121	4.9
ASAP	0.5735	0.5592	0.0039	0.7	0.6672	0.6570	0.0050	0.8	0.3583	0.3286	0.0816	33.1

Panel B: Validities corrected for range restriction

	HOPT				JKT				PRO			
	MR	CVR	IN	%	MR	CVR	IN	%	MR	CVR	IN	%
Enlistment Aptitude												
ASVAB	0.6712	0.6621			0.8017	0.7968			0.3841	0.3595		
SP	0.6773	0.6676	0.0054	0.8	0.8041	0.7986	0.0018	0.2	0.3873	0.3605	0.0010	0.3
RS	0.6772	0.6674	0.0053	0.8	0.8112	0.8060	0.0093	1.2	0.3906	0.3640	0.0045	1.3
AS	0.6825	0.6729	0.0108	1.6	0.8185	0.8136	0.0168	2.1	0.3861	0.3591	*	*
VF	0.6901	0.6808	0.0186	2.8	0.8031	0.7977	0.0009	0.1	0.3962	0.3702	0.0107	3.0
ASAP	0:6764	0.6666	0.0044	0.7	0.8080	0.8027	0.0059	0.7	0.4411	0.4188	0.0592	16.5
Concurrent Aptitude												
ASVAB	0.6899	0.6815			0.8260	0.8217			0.4074	0.3848		
SP	0.6927	0.6835	0.0020	0.3	0.8264	0.8217	0.0000	0.0	0.4080	0.3830	*	*
RS	0.6925	0.6833	0.0018	0.3	0.8296	0.8249	0.0032	0.4	0.4089	0.3840	*	*
AS	0.6958	0.6867	0.0052	0 8	0.8347	0.8303	0.0085	1.0	0.4074	0.3824	*	*
VF	0.7049	0.6962	0.0147	2.2	0.8269	0.8221	0.0004	0.1	0.4165	0.3922	0.0074	1.9
ASAP	0.6930	0.6839	0.0024	0.4	0.8285	0.8238	0.0021	0.3	0.4579	0.4368	0.0520	13.5

* Increment in cross-validated multiple correlation by new test was negative due to adjustment made for shrinkage.

Table 9. Increments in validity by new predictor tests for infantry mortarman performance

Panel A: Sample validities

	HOPT				JKT				PRO			
	MR	CVR	IN	%	MR	CVR	IN	%	MR	CVR	IN	%
Enlistment aptitude												
ASVAB	0.5846	0.5350			0.6302	0.5878			0.1843	*		
SP	0.6037	0.5521	0.0171	3.2	0.6512	0.6077	0.0200	3.4	0.2125	*	*	*
RS	0.5963	0.5434	0.0084	1.6	0.6701	0.6297	0.0419	7.1	0.3118	0.1684	*	*
AS	0.6106	0.5603	0.0253	4.7	0.6608	0.6189	0.0311	5.3	0.2710	0.1015	*	*
VF	0.6027	0.5509	0.0159	3.0	0.6536	0.6105	0.0227	3.9	0.2399	0.0444	*	*
ASAP	0.5998	0.5476	0.0126	2.4	0.6424	0.5974	0.0097	1.6	0.4251	0.3298	*	*
Concurrent Aptitude												
ASVAB	0.5871	0.5379			0.7160	0.6858			0.2377	0.0600		
SP	0.6013	0.5493	0.0115	2.1	0.7255	0.6934	0.0076	1.1	0.2529	0.0691	0.0091	15.2
RS	0.5882	0.5338	*	*	0.7226	0.6901	0.0043	0.6	0.3111	0.1673	0.1073	178.9
AS	0.6055	0.5542	0.0164	3.0	0.7262	0.6942	0.0084	1.2	0.2960	0.1432	0.0833	138.8
VF	0.5935	0.5400	0.0021	0.4	0.7212	0.6885	0.0027	0.4	0.2691	0.0982	0.0382	63.7
ASAP	0.5986	0.5461	0.0082	1.5	0.7217	0.6891	0.0033	0.5	0.4424	0.3524	0.2925	487.7

Panel B: Validities corrected for range restriction

	HOPT				JKT				PRO			
	MR	CVR	IN	%	MR	CVR	IN	%	MR	CVR	IN	%
Enlistment Aptitude												
ASVAB	0.6455	0.6057			0.7371	0.7096			0.1983	*		
SP	0.6608	0.6191	0.0134	2.2	0.7508	0.7222	0.0126	1.8	0.2246	0.0114	*	*
RS	0.6549	0.6122	0.0065	1.1	0.7633	0.7365	0.0268	3.8	0.3197	0.1807	*	*
AS	0.6665	0.6256	0.0200	3.3	0.7572	0.7294	0.0198	2.8	0.2803	0.1174	*	*
VF	0.6601	0.6182	0.0125	2.1	0.7524	0.7240	0.0144	2.0	0.2505	0.0648	*	*
ASAP	0.6578	0.6156	0.0099	1.6	0.7451	0.7157	0.0060	0.9	0.4304	0.3368	*	*
Concurrent Aptitude												
ASVAB	0.6413	0.6008			0.7886	0.7674			0.2370	0.0587		
SP	0.6541	0.6112	0.0104	1.7	0.7966	0.7741	0.0067	0.9	0.2573	0.0772	0.0186	31.6
RS	0.6423	0.5975	*	*	0.7936	0.7707	0.0033	0.4	0.3129	0.1701	0.1114	190.0
AS	0.6573	0.6149	0.0141	2.3	0.7969	0.7743	0.0070	0.9	0.3005	0.1505	0.0919	156.6
VF	0.6478	0.6039	0.0030	0.5	0.7934	0.7704	0.0031	0.4	0.2730	0.1050	0.0463	79.0
ASAP	0.6513	0.6080	0.0072	1.2	0.7930	0.7699	0.0026	0.3	0.4446	0.3554	0.2967	505.8

* Increment in cross-validated multiple correlation by new test was negative due to adjustment made for shrinkage.

Table 10. Increments in validity by new predictor tests for infantry assaultman performance

Panel A: Sample validities

	HOPT				JKT				PRO			
	MR	CVR	IN	%	MR	CVR	IN	%	MR	CVR	IN	%
Enlistment aptitude												
ASVAB	0.4592	0.3893			0.5009	0.4400			0.3123	0.1940		
SP	0.4787	0.4060	0.0167	4.3	0.5174	0.4534	0.0134	3.1	0.3577	0.2470	0.0530	27.3
RS	0.4632	0.3866	*	*	0.5083	0.4424	0.0024	0.5	0.3157	0.1861	*	*
AS	0.4900	0.4199	0.0306	7.9	0.5448	0.4865	0.0465	10.6	0.3239	0.1983	0.0043	2.2
VF	0.4986	0.4305	0.0412	10.6	0.5057	0.4392	*	*	0.3596	0.2497	0.0556	28.7
ASAP	0.4722	0.3979	0.0086	2.2	0.5191	0.4555	0.0155	3.5	0.3952	0.2983	0.1042	53.7
Concurrent Aptitude												
ASVAB	0.5543	0.5035			0.6160	0.5749			0.3590	0.2597		
SP	0.5632	0.5084	0.0049	1.0	0.6245	0.5804	0.0054	0.9	0.3832	0.2821	0.0224	8.6
RS	0.5543	0.4979	*	*	0.6160	0.5704	*	*	0.3601	0.2503	*	*
AS	0.5669	0.5128	0.0094	1.9	0.6325	0.5897	0.0147	2.6	0.3598	0.2499	*	*
VF	0.5678	0.5139	0.0104	2.1	0.6160	0.5704	*	*	0.3837	0.2827	0.0230	8.9
ASAP	0.5636	0.5090	0.0055	1.1	0.6255	0.5816	0.0066	1.2	0.4306	0.3448	0.0850	32.7

Panel B: Validities corrected for range restriction

	HOPT				JKT				PRO			
	MR	CVR	IN	%	MR	CVR	IN	%	MR	CVR	IN	%
Enlistment Aptitude												
ASVAB	0.5630	0.5136			0.6885	0.6575			0.3583	0.2587		
SP	0.5770	0.5247	0.0111	2.2	0.6970	0.6637	0.0062	0.9	0.3972	0.3009	0.0422	16.3
RS	0.5659	0.5116	*	*	0.6923	0.6583	0.0009	0.1	0.3611	0.2518	*	*
AS	0.5851	0.5343	0.0206	4.0	0.7115	0.6802	0.0227	3.5	0.3681	0.2614	0.0027	1.0
VF	0.5913	0.5416	0.0279	5.4	0.6909	0.6568	*	*	0.3988	0.3031	0.0444	17.1
ASAP	0:5723	0.5192	0.0055	1.1	0.6979	0.6647	0.0073	1.1	0.4301	0.3441	0.0854	33.0
Concurrent Aptitude												
ASVAB	0.6281	0.5889			0.7494	0.7256			0.3487	0.2457		
SP	0.6347	0.5922	0.0033	0.6	0.7542	0.7284	0.0028	0.4	0.3703	0.2645	0.0188	7.7
RS	0.6282	0.5846	*	*	0.7494	0.7230	*	*	0.3515	0.2382	*	*
AS	0.6384	0.5965	0.0077	1.3	0.7593	0.7342	0.0086	1.2	0.3499	0.2360	*	*
VF	0.6365	0.5942	0.0054	0.9	0.7494	0.7230	*	*	0.3646	0.2566	0.0109	4.4
ASAP	0.6353	0.5929	0.0040	0.7	0.7549	0.7292	0.0036	0.5	0.4210	0.3323	0.0866	35.3

* Increment in cross-validated multiple correlation by new test was negative due to adjustment made for shrinkage.

Table 11. Increments in validity by new predictor tests for infantry training grades

Panel A: Sample validities

	Base A				Base B			
	MR	CVR	IN	%	MR	CVR	IN	%
Enlistment Aptitude								
ASVAB	0.5106	0.4832			0.2679	0.2156		
SP	0.5158	0.4859	0.0027	0.6	0.2679	0.2101	*	*
RS	0.5217	0.4925	0.0093	1.9	0.2741	0.2178	0.0022	1.0
AS	0.5252	0.4962	0.0131	2.7	0.2681	0.2103	*	*
VF	0.5243	0.4953	0.0121	2.5	0.2844	0.2304	0.0148	6.8
ASAP	0.5110	0.4806	*	*	0.2754	0.2194	0.0037	1.7
Concurrent Aptitude								
ASVAB	0.5294	0.5037			0.2817	0.2324		
SP	0.5337	0.5055	0.0019	0.4	0.2839	0.2299	*	*
RS	0.5351	0.5071	0.0034	0.7	0.2839	0.2299	*	*
AS	0.5376	0.5098	0.0062	1.2	0.2839	0.2299	*	*
VF	0.5401	0.5126	0.0089	1.8	0.2932	0.2412	0.0088	3.8
ASAP	0.5294	0.5009	*	*	0.2901	0.2374	0.0049	2.1

Panel B: Validities corrected for range restriction

	Base A				Base B			
	MR	CVR	IN	%	MR	CVR	IN	%
Enlistment Aptitude								
ASVAB	0.6639	0.6480			0.4147	0.3846		
SP	0.6670	0.6495	0.0016	0.2	0.4147	0.3814	*	*
RS	0.6704	0.6532	0.0052	0.8	0.4183	0.3854	0.0008	0.2
AS	0.6725	0.6554	0.0075	1.2	0.4148	0.3815	*	*
VF	0.6720	0.6549	0.0069	1.1	0.4243	0.3921	0.0075	2.0
ASAP	0.6642	0.6465	*	*	0.4190	0.3862	0.0016	0.4
Concurrent Aptitude								
ASVAB	0.6735	0.6581			0.4218	0.3925		
SP	0.6758	0.6589	0.0008	0.1	0.4233	0.3909	*	*
RS	0.6768	0.6600	0.0018	0.3	0.4233	0.3909	*	*
AS	0.6779	0.6612	0.0031	0.5	0.4232	0.3909	*	*
VF	0.6798	0.6632	0.0050	0.8	0.4286	0.3969	0.0044	1.1
ASAP	0.6735	0.6565	*	*	0.4265	0.3945	0.0021	0.5

* Increment in cross-validated multiple correlation by new test was negative due to adjustment made for shrinkage.

There were occasional instances in which the increments in the CVR due to the new predictor tests were negative. This is due to adjustments that are made in computing the CVR to account for the additional predictor. For those cases in which the change in CVR was negative, the additional predictor did not improve the overall validity.

The analyses focused on the rifleman MOS because over 1,000 were tested as part of the JPM project. Complete criterion and predictor information was available for approximately 870 riflemen. Complete data for the other three infantry specialties were collected on less than 250 examinees. Due to the potential impact of sampling errors on computing differences in validity coefficients for specialties with relatively small samples, more emphasis was placed on the rifleman findings.

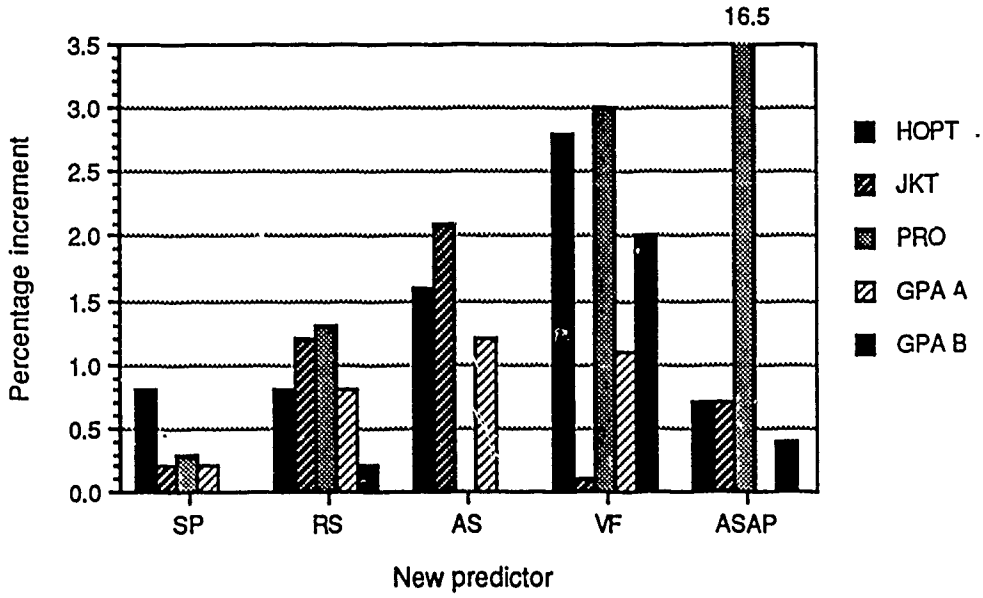
Enlistment Versus Concurrent Aptitude

The magnitude of the CVRs was greater for the concurrent than enlistment CVRs (see tables 7 through 11). However, the increments in CVRs were less for concurrent than enlistment aptitude scores. Given this combination of a higher validity base but lower increments, the percentage change for increments in validity was lower for concurrent than for enlistment aptitude scores. Therefore, the concurrent administration of the ASVAB does appear to account for some error sources resulting from time differences between the enlistment aptitude and the administration of the new predictors.

The percentages for validity increments based on concurrent aptitude scores were typically half as large as the percentage increments shown against enlistment aptitude scores. Figures 1 and 2 plot the percentage increments in the validity of all rifleman performance measures. The controlling effect of concurrent aptitude was to increase the magnitude of the CVRs while reducing the validity gains due to the new predictor tests. Despite differences in incremental validities based on enlistment versus concurrent aptitude scores, the rank ordering of the new predictors yielding the largest validity gains was not affected.

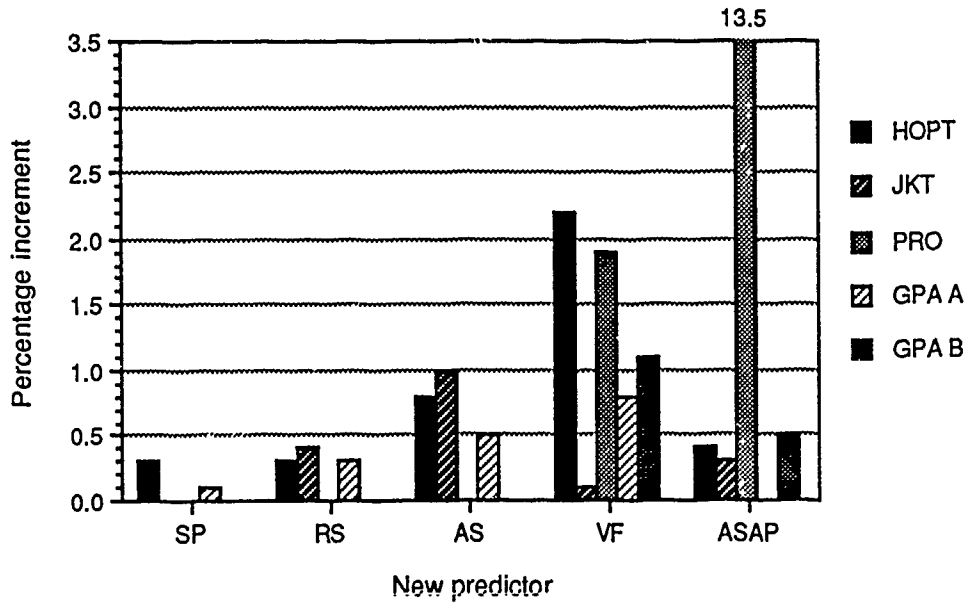
Best New Predictor for Each Criterion

Table 12 summarizes the information presented in tables 7 through 11 by highlighting the best single new predictor test against each criterion for all four MOSs. Several consistent trends emerged.



NOTE: Increases for training grades include data from other MOSs.

Figure 1. Percentage increment in validity for infantry rifleman performance: enlistment aptitude scores



NOTE: Increases for training grades include data from other MOSs.

Figure 2. Percentage increment in validity for infantry rifleman performance: concurrent aptitude scores

Table 12. Best new predictor test for each criterion and MOS

MOS	Criterion			
	HOPT	JKT	PRO	GPA
Rifleman	VF	AS	ASAP	VF[a]
Machinegunner	SP	AS	ASAP	
Mortarman	AS	AS, SP	ASAP	
Assaultman	VF, AS	AS	ASAP	

a. Validity results against GPA were based on examinees from all MOSs. Findings were consistent for both training locations.

Several new predictor tests resulted in the largest increments in validity against HOPT for the four MOSs. These findings were consistent with the differences in job requirements, which were reflected in differences in hands-on test content for these specialties. The hands-on test for the rifleman specialty required each Marine to negotiate an unknown trail as if on a squad patrol and to engage popup targets with the M16A2 rifle The prediction of accurately hitting these targets and other rifleman tasks was most improved by the video firing (VF) test. Similarly for the assaultman MOS, each Marine was required to fire the Launch Effects Trainer (LET) from the sitting-, kneeling-, and standing-supported positions. This laser trainer simulated the actual firing of the Dragon missile. Again, the VF test was one of the better new predictors in improving the assaultman validity; the assembling objects test (AS) also was found to enhance the validity. Job requirements for the machinegunner and mortarman specialties tended to be more spatially oriented. Machinegunners were required to establish intersecting fields of fire as well as to prepare range cards that document direction, elevation, and range of targets. The space perception (SP) test was found to be the best new predictor in improving the prediction of machinegunner job performance. The mortarman hands-on test required the Marine to complete many procedural requirements in mounting, boresighting, and laying the mortar. The AS test resulted in the most incremental validity for this specialty.

The JKTs for each MOS contained many common infantry items although each test also had some items that were unique. AS was found to be the best new predictor test in improving the validity against each JKT. Such a consistent outcome may be due to the dominance of test content similarity for the core infantry tasks of these specialties.

The ASVAB only moderately predicted PRO marks. The ASAP was invariably the best new predictor for improving the validity for these supervisor ratings. Because of the low ASVAB validity base in predicting PRO, most of the percentage increments are large. Despite such significant percentage improvements, the absolute validities against PRO marks were still relatively low.

Validity Increments Controlling for Time in Service

Time in service and its square were entered into the regressions along with the ASVAB subtests as the incremental validity of each new predictor test was redetermined. Detailed tables of the absolute and incremental validities are reported in appendix B and summarized here.

The net effect of including time in service in the regression was a rather substantial increase in the absolute validity for HOPT and PRO but not for JKT. In other words, experience had a strong effect on the level of an individual's HOPT and PRO scores while individuals perform at comparable levels on the JKT despite any differences in experience. It followed that controlling for time in service also tended to reduce the percentage increment of the validity gain due to the new predictor. However, despite this reduction in percentage gains, the best set of new predictors for each criterion was the same as previously determined for enlistment and concurrent aptitude (as shown in table 12).

Summary

Several corrections were made to the validity coefficients to account for the impact of various extraneous sources of error. Such corrections tended to significantly reduce the gains in validity due to the new predictor test. Table 13 summarizes the impact of these corrections by reporting means and standard deviations of the percentage increments across all new predictors and MOSs (N equals at least 20 for each cell of the table--four MOSs and five new predictor tests). Given the extreme magnitude of the results for proficiency marks, they are not included in this table.

Incremental validities corrected for range restriction were typically half as large as the sample incremental validities, a mean percentage increment of 1.0 percent versus 2.0 percent. Increments based on concurrent aptitude were likewise less than gains computed for enlistment aptitude: a mean percentage increment of 1.2 percent versus 2.8 percent for differences in observed validities, and a mean percentage increment of 0.6 percent versus 1.3 percent for differences in corrected validities. Adjustments for time in service reduced even further both absolute and percentage increments (these figures are not summarized in table 13). The impact of these error sources highlights the potential for considerable overestimation of incremental validities if appropriate corrections and adjustments are not made.

Table 13. Means and standard deviations[a] of percentage gains in incremental validity for all new predictor tests and MOSs

	Observed				Corrected			
	Enlistment		Concurrent		Enlistment		Concurrent	
HOPT	3.0	(2.6)	1.4	(1.1)	1.6	(1.4)	0.9	(0.7)
JKT	3.2	(2.9)	1.1	(1.3)	1.3	(1.2)	0.6	(0.6)
GPA	1.7	(2.1)	1.0	(1.3)	0.6	(0.7)	0.3	(0.4)
	2.8	(2.7)	1.2	(1.2)	1.3	(1.2)	0.6	(0.6)
	2.0	(2.2)			1.0	(1.0)		

NOTE: Standard deviations are in parentheses.

a. For HOPT and JKT, means and standard deviations are computed over four MOSs and five new predictor tests (N equals 20 for each cell). For GPA, the statistics are computed over two bases and five new predictors (N equals 10 for each cell).

A final point of interest is the magnitude of increments in validity. These analyses have been based on the use of all ASVAB subtests in the prediction of infantry performance, while in practice classification decisions are based on aptitude composites. As stated earlier, the GT composite is used for the specialties of the infantry occupational field. Table 6 shows the GT validities for multiple criteria for the rifleman specialty. The ASVAB validity bases are also reported. The differences between these validities computed for GT versus the ASVAB demonstrate the current inefficiency of the infantry classification system. By simply using a more optimal classification approach with all ASVAB subtests, validity gains in the range of 2 to 10 percent could be achieved against multiple criteria. Similar validity gains of 6 percent were achieved with the recent change in definition of the Armed Forces Qualification Test (AFQT) [12]. Increments in validity have been achieved in the past by revising composite definitions and still remain to be captured by further changes in the current classification system.

CONCLUSIONS

Data from the Marine Corps JPM project allowed for a thorough examination of the measurement and prediction of infantry performance. These analyses showed that the ASVAB does an excellent job of predicting a variety of infantry performance measures--hands-on performance tests, written job knowledge tests, and infantry school training grades. ASVAB moderately predicts an infantryman's proficiency rating. The ability of

any new predictor test to enhance the ASVAB's ability to predict infantry performance was slight and mixed (except for proficiency marks, which are questionable as objective measures of job performance).

The estimation of validity coefficients is influenced by a variety of factors: restriction of score distributions due to the selection process, shrinkage in multiple correlations when applying optimal regression weights to other samples, criterion unreliability, time of administration for the predictors, etc. The impact of these factors as well as sampling errors on validity coefficients is even further magnified when the primary issue is the difference between validity coefficients. Efforts were taken to account for several potential error sources in the estimation of validity coefficients. Such corrections and adjustments tended to significantly reduce the gains in validity due to the new predictor test.

Substantial overestimation of incremental validities is possible if appropriate corrections and adjustments are not made. Further corrections for criterion unreliability are necessary if policymakers are concerned about the absoluteness of incremental validities (as would be the case for a cost-benefit type of analysis) versus the relative comparison among many new predictors to determine which has the greatest potential for improving ASVAB validity.

The collection of concurrent aptitude information has important implications for the design of future incremental validity research. The written ASVAB requires about three to four hours to administer; the computerized adaptive version can be completed in about two hours. This is a significant time commitment which, if concurrent aptitude information is not necessary, could be devoted to the administration of additional new predictor tests. The results of these analyses show that concurrent aptitude was necessary to control for intervening factors between the administrations of the ASVAB and the new predictors. Although there was a high correlation between enlistment and concurrent aptitude scores, approximately 60 percent of the infantrymen improved their scores of record by about two-thirds of a standard deviation. These gains in aptitude could be the result of training, on-the-job experiences, or additional education. This requirement for concurrent aptitude information should be even stronger for more technically demanding specialties where training and job experience are even more intensive than for the infantry occupational field.

The Marine Corps was also able to enhance the motivation of the infantrymen taking ASVAB by changing their scores of record if they improved. This incentive was critical to the collection of accurate concurrent aptitudes and also should be incorporated into any future incremental validity research.

Given the variability of incremental validity estimates across MOSs and criteria, it is difficult to make a strong recommendation as to which, if any, of the new predictors should be considered for possible inclusion in the ASVAB. Although similar percentage gains found in

other research have been noted to possibly have considerable dollar value [13], any true benefit that would result in fiscal savings has yet to be demonstrated [12]. Therefore, the slight validity gains found in these analyses have yet to demonstrate any tangible significance that would positively impact the overall manpower selection and classification process.

Even if "significant" increments in validity had been noted, further investigation of the measurement properties of any new tests is still required. For example, while the video firing test tended to be one of the better tests against hands-on performance, the test may be susceptible to practice effects as demonstrated in the significant test-retest gains over the period of 7-10 days. Performance on such video tests may also be affected by previous experience with video games or computers. Such practice effects or experience may possibly cancel any validity gains if the test were used for operational testing. Additional issues that would need to be researched include subgroup analysis, coaching and test-taking strategies, and logistical concerns for implementing the test within an operational testing program.

Given the challenge to improve the prediction of infantry performance, it was found that larger percentage gains can be achieved by refining the current aptitude composites or by using an optimal classification system based on all ASVAB subtests than can be achieved by adding new predictor tests to the ASVAB. Such gains may be achieved by simply correcting known inefficiencies in the current classification system. With only minimal gains resulting from new predictor tests and an unknown benefit associated with such small gains, it would be more prudent to concentrate on refining the existing classification system.

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1. The numbers in parentheses are CNA internal control numbers.

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APPENDIX A

SAMPLE AND CORRECTED CORRELATIONS OF INFANTRY CRITERIA AND PREDICTORS

APPENDIX A

SAMPLE AND CORRECTED CORRELATIONS OF INFANTRY CRITERIA AND PREDICTORS

Correlations among the Marine Corps aptitude composites and all new predictor tests are presented in this appendix. The aptitude composites computed by the Marine Corps are General Technical (GT), Mechanical Maintenance (MM), Electronics Repair (EL), Clerical/Administrative (CL), and the Armed Services Qualification Test (AFQT). The five new predictor tests are space perception (SP), reasoning test (RS), assembling objects (AS), video firing (VF), and the Armed Services Applicant Profile (ASAP).

Separate tables are presented for each MOS and each performance measure: hands-on performance test (HOPT), job knowledge test (JKT), and proficiency mark (PRO). Grade-point average (GPA) is reported in separate tables because all MOSs had the same initial training. Sample as well as corrected correlations are presented. Descriptive statistics are also presented for each variable.

Table A-1. Correlation matrix for hands-on performance test (sample values): infantry rifleman (0311)

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	HOPT	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
HOPT	1.00	.40	.47	.52	.45	.35	.41	.48	.55	.50	.34	.34	.32	.35	.38	.13
Enlistment ASVAB																
AFQT	.40	1.00	.89	.73	.90	.84	.80	.73	.64	.77	.62	.39	.43	.33	.26	.13
GT	47	.89	1.00	.89	.87	.73	.75	.75	.74	.78	.57	.49	.48	.42	.36	.09
MM	.52	.73	.89	1.00	.85	.59	.65	.71	.81	.76	.49	.48	.43	.43	.39	.06
EL	.45	.90	.87	.85	1.00	.76	.75	.72	.71	.81	.59	.44	.43	.38	.30	.13
CL	35	.84	.73	.59	.76	1.00	.66	.60	.51	.65	.65	.33	.41	.34	.27	.17
Concurrent ASVAB																
AFQT	41	.80	.75	.65	.75	.66	1.00	.93	.76	.89	.84	.41	.48	.40	.28	.18
GT	48	.73	.75	.71	.72	.60	.93	1.00	.88	.89	.78	.49	.54	.47	.36	.14
MM	55	.64	.74	.81	.71	.51	.76	.88	1.00	.88	.63	.50	.49	.47	.40	.10
EL	50	.77	.78	.76	.81	.65	.89	.89	.88	1.00	.76	.49	.50	.45	.33	.17
CL	34	.62	.57	.49	.59	.65	.84	.78	.63	.76	1.00	.31	.43	.39	.26	.22
New predictor tests																
SP	.34	.39	.49	.48	.44	.33	.41	.49	.50	.49	.31	1.00	.46	.53	.29	.03
RS	32	.43	.48	.43	.43	.41	.48	.54	.49	.50	.43	.46	1.00	.55	.28	.12
AS	35	.33	.42	.43	.38	.34	.40	.47	.47	.45	.39	.53	.55	1.00	.30	.10
VF	38	.26	.36	.39	.30	.27	.28	.36	.40	.33	.26	.29	.28	.30	1.00	.03
ASAP	13	.13	.09	.06	.13	.17	.18	.14	.10	.17	.22	.03	.12	.10	.03	1.00
Mean	52 80	48.97	102.59	102.34	100.03	101.50	47.63	103.30	105.13	100.83	100.96	11.01	18.76	22.03	196.11	6.56
Std dev	8 98	18.68	12.54	14.44	13.12	10.55	21.70	14.66	14.55	13.44	12.92	4.04	5.65	7.25	31.26	12.64
N	870	870	870	870	870	870	870	870	870	870	870	870	870	870	870	870

Table A-2. Correlation matrix for job knowledge test (sample values): infantry rifleman (0311)

		Aptitude scores										New predictor tests				
		Enlistment					Concurrent									
	JKT	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
JKT	1.00	.54	.55	.54	.56	.50	.62	.62	.59	.64	.55	.34	.42	.44	.27	.20
Enlistment ASVAB																
AFQT	.54	1.00	.89	.73	.90	.84	.81	.74	.64	.78	.64	.40	.43	.33	.26	.13
GT	.55	.89	1.00	.89	.87	.73	.75	.76	.74	.79	.58	.50	.48	.43	.36	.09
MM	.54	.73	.89	1.00	.85	.59	.65	.71	.81	.76	.50	.49	.43	.44	.39	.06
EL	.56	.90	.87	.85	1.00	.76	.76	.73	.71	.81	.60	.45	.44	.39	.30	.12
CL	.50	.84	.73	.59	.76	1.00	.67	.60	.50	.65	.65	.33	.40	.34	.26	.17
Concurrent ASVAB																
AFQT	.62	.81	.75	.65	.76	.67	1.00	.93	.75	.89	.84	.41	.48	.40	.28	.18
GT	.62	.74	.76	.71	.73	.60	.93	1.00	.88	.89	.78	.50	.54	.47	.36	.13
MM	.59	.64	.74	.81	.71	.50	.75	.88	1.00	.88	.63	.51	.49	.47	.40	.10
EL	.64	.78	.79	.76	.81	.65	.89	.89	.88	1.00	.76	.50	.50	.46	.33	.17
CL	.55	.64	.58	.50	.60	.65	.84	.78	.63	.76	1.00	.31	.43	.38	.25	.22
New predictor tests																
SP	.34	.40	.50	.49	.45	.33	.41	.50	.51	.50	.31	1.00	.47	.53	.29	.03
RS	.42	.43	.48	.43	.44	.40	.48	.54	.49	.50	.43	.47	1.00	.55	.28	.11
AS	.44	.33	.43	.44	.39	.34	.40	.47	.47	.46	.38	.53	.55	1.00	.29	.10
VF	.27	.26	.36	.39	.30	.26	.28	.36	.40	.33	.25	.29	.28	.29	1.00	.03
ASAP	.20	.13	.09	.06	.12	.17	.18	.13	.10	.17	.22	.03	.11	.10	.03	1.00
Mean	44.35	49.01	102.64	102.42	100.07	101.56	47.88	103.51	105.30	100.96	101.11	11.02	18.79	22.06	196.34	6.63
Std dev	9.02	18.64	12.52	14.43	13.11	10.53	21.60	14.52	14.47	13.36	12.77	4.04	5.62	7.25	31.27	12.63
N	862	862	862	862	862	862	862	862	862	862	862	852	862	862	862	862

Table A-3. Correlation matrix for proficiency marks (sample values): infantry rifleman (0311)

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	PRO	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
PRO	1.00	.18	.19	.19	.18	.18	.24	.26	.24	.24	.22	.14	.17	.13	.18	.26
Enlistment ASVAB																
AFQT	.18	1.00	.89	.73	.90	.84	.80	.73	.64	.77	.62	.39	.43	.33	.26	.13
GT	.19	.89	1.00	.89	.87	.73	.75	.75	.74	.78	.57	.49	.48	.42	.36	.09
MM	.19	.73	.89	1.00	.85	.59	.65	.71	.81	.76	.49	.48	.43	.43	.39	.06
EL	.18	.90	.87	.85	1.00	.76	.75	.72	.71	.81	.59	.44	.43	.38	.30	.13
CL	.18	.84	.73	.59	.76	1.00	.66	.60	.51	.65	.65	.33	.41	.34	.27	.17
Concurrent ASVAB																
AFQT	.24	.80	.75	.65	.75	.66	1.00	.93	.76	.89	.84	.41	.48	.40	.28	.18
GT	.26	.73	.75	.71	.72	.60	.93	1.00	.88	.89	.78	.49	.54	.47	.36	.14
MM	.24	.64	.74	.81	.71	.51	.76	.88	1.00	.88	.63	.50	.49	.47	.40	.10
EL	.24	.77	.78	.76	.81	.65	.89	.89	.88	1.00	.76	.49	.50	.45	.33	.17
CL	.22	.62	.57	.49	.59	.65	.84	.78	.63	.76	1.00	.31	.43	.39	.26	.22
New predictor tests																
SP	.14	.39	.49	.48	.44	.33	.41	.49	.50	.49	.31	1.00	.46	.53	.29	.03
RS	.17	.43	.48	.43	.43	.41	.48	.54	.49	.50	.43	.46	1.00	.55	.28	.12
AS	.13	.33	.42	.43	.38	.34	.40	.47	47	.45	.39	.53	.55	1.00	.30	.10
VF	.18	.26	.36	.39	.30	.27	.28	.36	.40	.33	.26	.29	.28	.30	1.00	.03
ASAP	.26	.13	.09	.06	.13	.17	.18	.14	.10	.17	.22	.03	.12	.10	.03	1.00
Mean	43.69	48.97	102.59	102.34	100.03	101.50	47.63	103.30	105.13	100.83	100.96	11.01	18.76	22.03	196.11	6.56
Std dev	2.09	18.68	12.54	14.44	13.12	10.55	21.70	14.66	14.55	13.44	12.92	4.04	5.65	7.25	31.26	12.64
N	870	870	870	870	870	870	870	870	870	870	870	870	870	870	870	870

Table A-4. Correlation matrix for hands-on performance test (sample values): machinegunner (0331)

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	HOPT	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
HOPT	1.00	.51	.56	.61	.59	.44	.54	.58	.59	.57	.50	.42	.41	.32	.27	.24
Enlistment ASVAB																
AFQT	.51	1.00	.91	.73	.91	.86	.85	.78	.66	.79	.68	.38	.47	.34	.16	.16
GT	.56	.91	1.00	.89	.88	.74	.80	.81	.74	.78	.62	.45	.51	.42	.27	.11
MM	.61	.73	.89	1.00	.85	.55	.72	.78	.81	.77	.55	.46	.44	.41	.30	.10
EL	.59	.91	.88	.85	1.00	.75	.84	.80	.73	.84	.67	.46	.52	.41	.24	.17
CL	.44	.86	.74	.55	.75	1.00	.71	.63	.52	.65	.70	.36	.46	.34	.15	.19
Concurrent ASVAB																
AFQT	.54	.85	.80	.72	.84	.71	1.00	.91	.76	.90	.82	.38	.48	.40	.18	.21
GT	.58	.78	.81	.78	.80	.63	.91	1.00	.90	.89	.71	.47	.52	.46	.24	.16
MM	.59	.66	.74	.81	.73	.52	.76	.90	1.00	.88	.60	.47	.45	.44	.22	.12
EL	.57	.79	.78	.77	.84	.65	.90	.89	.88	1.00	.74	.45	.50	.42	.21	.19
CL	.50	.68	.62	.55	.67	.70	.82	.71	.60	.74	1.00	.33	.45	.34	.19	.24
New predictor tests																
SP	.42	.38	.45	.46	.46	.36	.38	.47	.47	.45	.33	1.00	.53	.51	.27	.15
RS	.41	.47	.51	.44	.52	.46	.48	.52	.45	.50	.45	.53	1.00	.57	.20	.09
AS	.32	.34	.42	.41	.41	.34	.40	.46	.44	.42	.34	.51	.57	1.00	.22	.15
VF	.27	.16	.27	.30	.24	.15	.18	.24	.22	.21	.19	.27	.20	.22	1.00	.09
ASAP	.24	.16	.11	.10	.17	.19	.21	.16	.12	.19	.24	.15	.09	.15	.09	1.00
Mean	55.00	51.19	104.94	106.70	102.53	101.40	51.13	105.53	108.98	103.80	102.33	11.70	19.28	22.74	202.07	7.80
Std dev	7.96	19.29	12.34	13.78	13.16	10.87	21.36	14.35	14.33	13.04	11.65	4.23	5.31	7.46	33.31	12.55
N	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243

Table A-5. Correlation matrix for job knowledge test (sample values): machinegunner (0331)

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	JKT	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
JKT	1.00	.54	.55	.53	.57	.49	.62	.61	.59	.61	.59	.40	.41	.46	.23	.17
Enlistment ASVAB																
AFQT	.54	1.00	.91	.74	.91	.86	.85	.78	.65	.79	.68	.37	.47	.34	.16	.16
GT	.55	.91	1.00	.89	.88	.74	.80	.81	.74	.78	.62	.45	.51	.42	.27	.11
MM	.53	.74	.89	1.00	.85	.55	.72	.78	.82	.77	.55	.46	.44	.41	.30	.10
EL	.57	.91	.88	.85	1.00	.75	.84	.80	.73	.84	.67	.46	.52	.40	.24	.17
CL	.49	.86	.74	.55	.75	1.00	.71	.63	.52	.65	.70	.36	.46	.34	.15	.18
Concurrent ASVAB																
AFQT	.62	.85	.80	.72	.84	.71	1.00	.91	.76	.90	.82	.38	.47	.39	.19	.20
GT	.61	.78	.81	.78	.80	.63	.91	1.00	.90	.89	.71	.46	.52	.46	.25	.15
MM	.59	.65	.74	.82	.73	.52	.76	.90	1.00	.88	.60	.46	.45	.43	.22	.12
EL	.61	.79	.78	.77	.84	.65	.90	.89	.88	1.00	.74	.45	.50	.42	.21	.19
CL	.59	.68	.62	.55	.67	.70	.82	.71	.60	.74	1.00	.32	.45	.34	.19	.24
New predictor tests																
SP	.40	.37	.45	.46	.46	.36	.38	.46	.46	.45	.32	1.00	.53	.51	.28	.14
RS	.41	.47	.51	.44	.52	.46	.47	.52	.45	.50	.45	.53	1.00	.57	.20	.09
AS	.46	.34	.42	.41	.40	.34	.39	.46	.43	.42	.34	.51	.57	1.00	.23	.15
VF	.23	.16	.27	.30	.24	.15	.19	.25	.22	.21	.19	.28	.20	.23	1.00	.09
ASAP	.17	.16	.11	.10	.17	.18	.20	.15	.12	.19	.24	.14	.09	.15	.09	1.00
Mean	49.24	51.24	104.96	106.70	102.58	101.41	51.21	105.63	109.96	103.85	102.37	11.74	19.30	22.76	201.96	7.89
Std dev	9.14	19.31	12.36	13.81	13.16	10.89	21.37	14.30	14.30	13.04	11.65	4.20	5.32	7.47	33.34	12.50
N	242	242	242	242	242	242	242	242	242	242	242	242	242	242	242	242

Table A-6. Correlation matrix for proficiency marks (sample values): machinegunner (0331)

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	PRO	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
PRO	1.00	.10	.10	.09	.12	.14	.10	.13	.15	.11	.17	.23	.13	.09	.04	.34
Enlistment ASVAB																
AFQT	.10	1.00	.91	.75	.91	.86	.85	.78	.65	.79	.68	.39	.47	.36	.16	.16
GT	.10	.91	1.00	.89	.88	.74	.80	.82	.75	.79	.62	.45	.51	.43	.26	.12
MM	.09	.75	.89	1.00	.85	.55	.73	.79	.83	.78	.55	.47	.45	.42	.30	.12
EL	.12	.91	.88	.85	1.00	.75	.85	.81	.74	.85	.67	.47	.53	.42	.24	.18
CL	.14	.86	.74	.55	.75	1.00	.71	.63	.52	.65	.70	.36	.46	.35	.14	.19
Concurrent ASVAB																
AFQT	.10	.85	.80	.73	.85	.71	1.00	.91	.75	.90	.82	.39	.47	.40	.18	.22
GT	.13	.78	.82	.79	.81	.63	.91	1.00	.90	.89	.71	.47	.52	.47	.24	.17
MM	.15	.65	.75	.83	.74	.52	.75	.90	1.00	.88	.60	.47	.45	.44	.21	.13
EL	.11	.79	.79	.78	.85	.65	.90	.89	.88	1.00	.73	.46	.50	.42	.20	.20
CL	.17	.68	.62	.55	.67	.70	.82	.71	.60	.73	1.00	.33	.44	.34	.18	.25
New predictor tests																
SP	.23	.39	.45	.47	.47	.36	.39	.47	.47	.46	.33	1.00	.52	.51	.27	.16
RS	.13	.47	.51	.45	.53	.46	.47	.52	.45	.50	.44	.52	1.00	.57	.20	.11
AS	.09	.36	.43	.42	.42	.35	.40	.47	.44	.42	.34	.51	.57	1.00	.22	.17
VF	.04	.16	.26	.30	.24	.14	.18	.24	.21	.20	.18	.27	.20	.22	1.00	.09
ASAP	.34	.16	.12	.12	.18	.19	.22	.17	.13	.20	.25	.16	.11	.17	.09	1.00
Mean	44.08	50.93	104.81	106.69	102.42	101.35	50.84	105.42	108.95	103.68	102.18	11.70	19.23	22.79	201.95	7.77
Std dev	2.03	19.20	12.36	13.72	13.08	10.93	21.31	14.37	14.35	12.98	11.67	4.25	5.32	7.47	33.58	12.61
N	238	238	238	238	238	238	238	238	238	238	238	238	238	238	238	238

Table A-7. Correlation matrix for hands-on performance test (sample values): mortarman (0341)

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	HOPT	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
HOPT	1 00	.33	.43	.55	.44	.24	.39	.50	.57	.48	.36	.40	.35	.42	.34	.13
Enlistment ASVAB																
AFQT	33	1.00	.91	.74	.91	.85	.84	.78	.66	.82	.70	.38	.46	.39	.21	.02
GT	43	.91	1.00	.88	.90	.76	.79	.81	.75	.82	.65	.43	.50	.47	.2S	−.02
MM	55	.74	.88	1.00	.88	.60	.67	.76	.85	.79	.57	.50	.52	.53	.37	−.00
EL	44	.91	.90	.88	1.00	.74	.79	.79	.76	.86	.66	.47	.48	.47	.31	.03
CL	24	.85	.76	.60	.74	1.00	.71	.63	.53	.67	.71	.33	.43	.39	.14	.04
Concurrent ASVAB																
AFQT	39	.84	.79	.67	.79	.71	1.00	.94	.76	.91	.85	.37	.55	.45	.30	.09
GT	50	.78	.81	.76	.79	.63	.94	1.00	.89	.91	.78	.46	.61	.53	.39	.06
MM	57	.66	.75	.85	.76	.53	.76	.89	1.00	.89	.65	.51	.59	.53	.45	.03
EL	48	.82	.82	.79	.86	.67	.91	.91	.89	1.00	.77	.45	.57	.47	.38	.04
CL	36	.70	.65	.57	.66	.71	.85	.78	.65	.77	1.00	.38	.53	.47	.22	.11
New predictor tests																
SP	40	.38	.43	.50	.47	.33	.37	.46	.51	.45	.38	1.00	.39	.56	.36	.06
RS	35	.46	.50	.52	.48	.43	.55	.61	.59	.57	.53	.39	1.00	.55	.36	.05
AS	42	.39	.47	.53	.47	.39	.45	.53	.53	.47	.47	.56	.55	1.00	.34	.13
VF	34	.21	.29	.37	.31	.14	.30	.39	.45	.38	.22	.36	.36	.34	1.00	.06
ASAP	13	.02	−.02	−.00	.03	.04	.09	.06	.03	.04	.11	.06	.05	.13	.06	1.00
Mean	52 96	51.72	105.09	105.31	102.17	102.94	50.94	106.27	108.67	103.06	104.77	11.52	19.23	22.57	203.34	8.90
Std dev	8.76	19.94	12.81	14.32	13.53	11.98	22.55	14.80	13.91	13.38	13.94	4.20	5.75	7.16	33.15	12.45
N	226	226	226	226	226	226	226	226	226	226	226	226	226	226	226	226

Table A-8. Correlation matrix for job knowledge test (sample values): mortarman (0341)

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	JKT	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
JKT	1.00	.48	.55	.62	.56	.36	.63	.69	.68	.63	.53	.44	.50	.48	.38	.12
Enlistment ASVAB																
AFQT	.48	1.00	.91	.74	.91	.85	.84	.78	.66	.82	.70	.37	.46	.39	.21	.02
GT	.55	.91	1.00	.88	.90	.76	.79	.81	.75	.82	.65	.43	.51	.47	.29	-.03
MM	.62	.74	.88	1.00	.88	.59	.67	.76	.85	.79	.56	.49	.52	.53	.37	-.01
EL	.56	.91	.90	.88	1.00	.74	.79	.79	.76	.86	.65	.47	.49	.47	.31	.02
CL	.36	.85	.76	.59	.74	1.00	.70	.63	.52	.66	.71	.33	.43	.38	.14	.03
Concurrent ASVAB																
AFQT	.63	.84	.79	.67	.79	.70	1.00	.94	.76	.90	.85	.37	.55	.45	.30	.09
GT	.69	.78	.81	.76	.79	.63	.94	1.00	.89	.91	.78	.45	.61	.52	.39	.05
MM	.68	.66	.75	.85	.76	.52	.76	.89	1.00	.88	.65	.50	.60	.52	.45	.02
EL	.63	.82	.82	.79	.86	.66	.90	.91	.88	1.00	.77	.45	.57	.47	.38	.03
CL	.53	.70	.65	.56	.65	.71	.85	.78	.65	.77	1.00	.37	.53	.46	.22	.11
New predictor tests																
SP	.44	.37	.43	.49	.47	.33	.37	.45	.50	.45	.37	1.00	.39	.56	.36	.05
RS	.50	.46	.51	.52	.49	.43	.55	.61	.60	.57	.53	.39	1.00	.55	.36	.05
AS	.48	.39	.47	.53	.47	.38	.45	.52	.52	.47	.46	.56	.55	1.00	.34	.12
VF	.38	.21	.29	.37	.31	.14	.30	.39	.45	.38	.22	.36	.36	.34	1.00	.06
ASAP	.12	.02	-.03	-.01	.02	.03	.09	.05	.02	.03	.11	.05	.05	.12	.06	1.00
Mean	52.60	51.63	105.04	105.27	102.11	102.87	50.82	106.20	108.58	102.97	104.66	11.50	19.24	22.52	203.29	8.83
Std dev	9.31	19.94	12.80	14.33	13.54	11.95	22.52	14.79	13.89	13.34	13.87	4.19	5.76	7.15	33.21	12.43
N	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225

Table A-9. Correlation matrix for proficiency marks (sample values): mortarman (0341)

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	PRO	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
PRO	1 00	.02	.04	.11	.07	.02	.10	.12	.17	.13	.11	.15	.26	.23	.19	.39
Enlistment ASVAB																
AFQT	.02	1.00	.91	.73	.91	.85	.84	.78	.66	.82	.70	.37	.47	.38	.20	.02
GT	04	.91	1.00	.88	.90	.75	.79	.81	.75	.82	.65	.43	.51	.47	.28	−.03
MM	.11	.73	.88	1.00	.87	.59	.67	.76	.85	.79	.56	.49	.53	.52	.36	−.01
EL	07	.91	.90	.87	1.00	.74	.79	.79	.76	.86	.65	.47	.49	.46	.30	.02
CL	.02	.85	.75	.59	.74	1.00	.71	.63	.52	.67	.71	.32	.44	.38	.13	.04
Concurrent ASVAB																
AFQT	.10	.84	.79	.67	.79	.71	1.00	.94	.76	.90	.85	.37	.55	.45	.29	.09
GT	.12	.78	.81	.76	.79	.63	.94	1.00	.89	.91	.78	.46	.61	.53	.38	.05
MM	.17	.66	.75	.85	.76	.52	.76	.89	1.00	.88	.65	.51	.60	.52	.44	.03
EL	.13	.82	.82	.79	.86	.67	.90	.91	.88	1.00	.77	.45	.57	.47	.37	.04
CL	.11	.70	.65	.56	.65	.71	.85	.78	.65	.77	1.00	.38	.53	.46	.21	.11
New predictor tests																
SP	.15	.37	.43	.49	.47	.32	.37	.46	.51	.45	.38	1.00	.41	.56	.36	.05
RS	.26	.47	.51	.53	.49	.44	.55	.61	.60	.57	.53	.41	1.00	.56	.35	.05
AS	.23	.38	.47	.52	.46	.38	.45	.53	.52	.47	.46	.56	.56	1.00	.34	.12
VF	.19	.20	.28	.36	.30	.13	.29	.38	.44	.37	.21	.36	.35	.34	1.00	.06
ASAP	.39	.02	−.03	−.01	.02	.04	.09	.05	.03	.04	.11	.05	.05	.12	.06	1.00
Mean	44.13	51.54	104.98	105.14	102.04	102.81	50.83	106.21	108.60	103.01	104.71	11.47	19.26	22.50	203.21	8.85
Std dev	1.61	19.89	12.75	14.21	13.45	11.94	22.52	14.79	13.92	13.39	13.96	4.18	5.69	7.15	32.98	12.50
N	224	224	224	224	224	224	224	224	224	224	224	224	224	224	224	224

Table A-16. Correlation matrix for hands-on performance test (sample values): assaultman (0351)

		Aptitude scores										New predictor tests				
		Enlistment					Concurrent									
	HOPT	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
HOPT	1.00	.36	.40	.43	.43	.30	.44	.50	.54	.51	.38	.34	.26	.37	.30	.18
Enlistment ASVAB																
AFQT	.36	1.00	.90	.74	.90	.86	.81	.74	.66	.79	.69	.33	.45	.35	.19	.19
GT	.40	.90	1.00	.88	.88	.74	.78	.78	.74	80	.65	.44	.51	.45	.27	.18
MM	.43	.74	.88	1.00	.87	.60	.67	.73	.82	.77	.53	.45	.47	.46	.27	.14
EL	.43	.90	.88	.87	1.00	.76	.77	.76	.75	.83	.64	.42	.46	.45	.24	.17
CL	.30	.86	.74	.60	76	1.00	.68	.60	51	.64	.67	.28	.43	.35	.18	.25
Concurrent ASVAB																
AFQT	.44	.81	.78	.67	.77	.68	1.00	.93	.77	.92	.88	.33	.48	.40	.24	.21
GT	.50	.74	.78	.73	.76	.60	.93	1.00	.89	91	.79	.43	.54	.50	.29	.17
MM	.54	.66	.74	.82	.75	.51	.77	.89	1.00	.89	.65	.46	.49	.48	.31	.15
EL	.51	.79	.80	.77	.83	.64	.92	.91	.89	1.00	.80	.41	.49	.48	.27	.22
CL	.38	.69	.65	.53	.64	.67	.88	.79	.65	.80	1.00	.31	.46	.44	.24	.22
New predictor tests																
SP	.34	.33	.44	.45	.42	.28	.33	.43	.46	.41	.31	1.00	.41	.59	.21	.12
RS	.26	.45	.51	.47	.46	.43	.48	.54	.49	.49	.46	.41	1.00	.57	.20	.16
AS	.37	.35	.45	.46	.45	.35	.40	.50	.48	.48	.44	.59	.57	1.00	.22	.17
VF	.30	.19	.27	.27	.24	.18	.24	.29	.31	.27	.24	.21	.20	.22	1.00	.14
ASAP	.18	.19	.18	.14	.17	.25	.21	.17	.15	.22	.22	.12	.16	.17	.14	1.00
Mean	64.28	59.41	110.19	110.65	107.44	105.75	59.94	111.40	113.19	108.62	107 12	12.22	20.47	24.54	206.02	8.09
Std dev	6.66	18.82	11.66	13.18	13.05	10.40	21.98	13.69	13.51	13.96	13.40	4.46	5.18	7.15	31.87	12.27
N	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244

Table A-11. Correlation matrix for job knowledge test (sample values): assaultman (0351)

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	JKT	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
JKT	1.00	.47	.47	.44	.48	.39	.58	.57	.52	.58	.52	.31	.31	.39	.18	.22
Enlistment ASVAB																
AFQT	.47	1.00	.90	.74	.90	.86	.81	.74	.66	.79	.69	.33	.45	.35	.19	.19
GT	.47	.90	1.00	.88	.88	.74	.78	.78	.74	.80	.65	.44	.51	.45	.27	.18
MM	.44	.74	.88	1.00	.87	.60	.67	.73	.82	.77	.53	.45	.47	.46	.27	.14
EL	.48	.90	.88	.87	1.00	.76	.77	.76	.75	.83	.64	.42	.46	.45	.24	.17
CL	.39	.86	.74	.60	.76	1.00	.68	.60	.51	.64	.67	.28	.43	.35	.18	.25
Concurrent ASVAB																
AFQT	.58	.81	.78	.67	.77	.68	1.00	.93	.77	.92	.88	.33	.48	.40	.24	.21
GT	.57	.74	.78	.73	.76	.60	.93	1.00	.89	.91	.79	.43	.54	.50	.29	.17
MM	.52	.66	.74	.82	.75	.51	.77	.89	1.00	.89	.65	.46	.49	.48	.31	.15
EL	.58	.79	.80	.77	.83	.64	.92	.91	.89	1.00	.80	.41	.49	.48	.27	.22
CL	.52	.69	.65	.53	.64	.67	.88	.79	.65	.80	1.00	.31	.46	.44	.24	.22
New predictor tests																
SP	.31	.33	.44	.45	.42	.28	.33	.43	.46	.41	.31	1.00	.41	.59	.21	.12
RS	.31	.45	.51	.47	.46	.43	.48	.54	.49	.49	.46	.41	1.00	.57	.20	.16
AS	.39	.35	.45	.46	.45	.35	.40	.50	.48	.48	.44	.59	.57	1.00	.22	.17
VF	.18	.19	.27	.27	.24	.18	.24	.29	.31	.27	.24	.21	.20	.22	1.00	.14
ASAP	.22	.19	.18	.14	.17	.25	.21	.17	.15	.22	.22	.12	.16	.17	.14	1.00
Mean	53.24	59.41	110.19	110.65	107.44	105.75	59.94	111.40	113.19	108.02	107.12	12.22	20.47	24.54	206.02	8.09
Std dev	7.57	18.82	11.66	13.18	13.05	10.40	21.98	13.69	13.51	13.90	13.40	4.46	5.18	7.15	31.87	12.27
N	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244

Table A-12. Correlation matrix for proficiency marks (sample values): assaultman (0351)

		Aptitude scores														
		Enlistment					Concurrent					New.predictor tests				
	PRO	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
PRO	1.00	.19	.20	.15	.17	.14	.26	.29	.30	.30	.23	.26	.15	.19	.20	.29
Enlistment ASVAB																
AFQT	.19	1.00	.90	.73	.89	.86	.81	.73	.65	.79	.69	.32	.46	.34	.17	.18
GT	.20	.90	1.00	.88	.88	.74	.78	.78	.73	.79	.64	.43	.52	.44	.25	.17
MM	.15	.73	.88	1.00	.87	.59	.66	.73	.81	.76	.52	.44	.47	.45	.25	.13
EL	.17	.89	.88	.87	1.00	.76	.77	.76	.75	.83	.64	.41	.47	.45	.22	.16
CL	.14	.86	.74	.59	.76	1.00	.67	.60	.50	.63	.66	.27	.44	.34	.15	.24
Concurrent ASVAB																
AFQT	.26	.81	.78	.66	.77	.67	1.00	.93	.77	.92	.87	.32	.49	.39	.23	.20
GT	.29	.73	.78	.73	.76	.60	.93	1.00	.89	.91	.79	.42	.55	.49	.28	.16
MM	.30	.65	.73	.81	.75	.50	.77	.89	1.00	.89	.64	.45	.49	.47	.29	.14
EL	.30	.79	.79	.76	.83	.63	.92	.91	.89	1.00	.79	.40	.50	.48	.25	.21
CL	.23	.69	.64	.52	.64	.66	.87	.79	.64	.79	1.00	.30	.47	.44	.23	.21
New predictor tests																
SP	.26	.32	.43	.44	.41	.27	.32	.42	.45	.40	.30	1.00	.41	.58	.19	.11
RS	.15	.46	.52	.47	.47	.44	.49	.55	.49	.50	.47	.41	1.00	.57	.21	.17
AS	.19	.34	.44	.45	.45	.34	.39	.49	.47	.48	.44	.58	.57	1.00	.21	.17
VF	.20	.17	.25	.25	.22	.15	.23	.28	.29	.25	.23	.19	.21	.21	1.00	.12
ASAP	.29	.18	.17	.13	.16	.24	.20	.16	.14	.21	.21	.11	.17	.17	.12	1.00
Mean	44.23	59.24	110.09	110.55	107.33	105.63	59.79	111.31	113.99	107.91	107.00	12.19	20.48	24.49	205.67	8.02
Std dev	1.48	18.68	11.57	13.10	12.97	10.23	21.90	13.64	13.44	13.82	13.29	4.44	5.19	7.13	31.49	12.25
N	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243

Table A-13. Correlation matrix for grade point average from infantry training school (sample values): base A

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	GPA	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
GPA	1.00	.44	.48	.49	.47	.36	.44	.46	.50	.49	.35	.29	.30	.31	.32	.08
Enlistment ASVAB																
AFQT	.44	1.00	.90	.77	.90	.82	.81	.74	.65	.78	.62	.34	.34	.28	.31	.13
GT	.48	.90	1.00	.90	.88	.72	.76	.78	.76	.79	.58	.45	.40	.39	.41	.11
MM	.49	.77	.90	1.00	.88	.59	.67	.74	.84	.79	.50	.47	.38	.44	.44	.11
EL	.47	.90	.88	.88	1.00	.74	.76	.74	.73	.82	.57	.42	.37	.38	.36	.14
CL	.36	.82	.72	.59	.74	1.00	.64	.59	.50	.62	.63	.27	.33	.29	.31	.13
Concurrent ASVAB																
AFQT	.44	.81	.76	.67	.76	.64	1.00	.92	.75	.89	.83	.32	.40	.36	.33	.17
GT	.46	.74	.78	.74	.74	.59	.92	1.00	.89	.90	.75	.41	.48	.46	.40	.14
MM	.50	.65	.76	.84	.73	.50	.75	.89	1.00	.89	.60	.48	.47	.48	.43	.12
EL	.49	.78	.79	.79	.82	.62	.89	.90	.89	1.00	.74	.42	.46	.44	.39	.17
CL	.35	.62	.58	.50	.57	.63	.83	.75	.60	.74	1.00	.26	.38	.34	.29	.20
New predictor tests																
SP	.29	.34	.45	.47	.42	.27	.32	.41	.48	.42	.26	1.00	.44	.56	.34	.05
RS	.30	.34	.40	.38	.37	.33	.40	.48	.47	.46	.38	.44	1.00	.62	.32	.15
AS	.31	.28	.39	.44	.38	.29	.36	.46	.48	.44	.34	.56	.62	1.00	.38	.11
VF	.32	.31	.41	.44	.36	.31	.33	.40	.43	.39	.29	.34	.32	.38	1.00	.07
ASAP	.08	.13	.11	.11	.14	.13	.17	.14	.12	.17	.20	.05	.15	.11	.07	1.00
Mean	49.83	49.36	102.74	102.13	100.12	101.54	47.86	103.21	104.79	100.77	100.90	10.97	18.42	21.48	194.00	6.72
Std dev	10.11	18.57	12.52	14.77	13.29	10.18	20.94	14.37	14.80	13.46	12.66	4.11	5.53	7.41	32.03	12.68
N	512	512	512	512	512	512	512	512	512	512	512	512	512	512	512	512

Table A-14. Correlation matrix for grade point average from infantry training school (sample values): base B

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	GPA	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
GPA	1.00	.25	.25	.23	.26	.22	.24	.26	.25	.26	.19	.12	.19	.11	.16	-.03
Enlistment ASVAB																
AFQT	.25	1.00	.90	.74	.91	.85	.82	.75	.66	.79	.65	.44	.50	.38	.20	.13
GT	.25	.90	1.00	.89	.88	.73	.77	.77	.73	.78	.60	.49	.54	.43	.30	.07
MM	.23	.74	.89	1.00	.85	.59	.68	.72	.80	.75	.52	.45	.48	.40	.33	.04
EL	.26	.91	.88	.85	1.00	.76	.78	.75	.72	.81	.62	.47	.49	.40	.25	.10
CL	.22	.85	.73	.59	.76	1.00	.69	.62	.53	.67	.68	.37	.46	.38	.16	.19
Concurrent ASVAB																
AFQT	.24	.82	.77	.68	.78	.69	1.00	.93	.78	.90	.84	.46	.52	.43	.22	.16
GT	.26	.75	.77	.72	.75	.62	.93	1.00	.90	.90	.78	.52	.57	.49	.29	.12
MM	.25	.66	.73	.80	.72	.53	.78	.90	1.00	.89	.66	.49	.50	.45	.33	.09
EL	.26	.79	.78	.75	.81	.67	.90	.90	.89	1.00	.77	.51	.53	.47	.25	.16
CL	.19	.65	.60	.52	.62	.68	.84	.78	.66	.77	1.00	.39	.46	.44	.19	.21
New predictor tests																
SP	.12	.44	.49	.45	.47	.37	.46	.52	.49	.51	.39	1.00	.49	.55	.24	.08
RS	.19	.50	.54	.48	.49	.46	.52	.57	.50	.53	.46	.49	1.00	.55	.25	.05
AS	.11	.38	.43	.40	.40	.38	.43	.49	.45	.47	.44	.55	.55	1.00	.24	.12
VF	.16	.20	.30	.33	.25	.16	.22	.29	.33	.25	.19	.24	.25	.24	1.00	.02
ASAP	-.03	.13	.07	.04	.10	.19	.16	.12	.09	.16	.21	.08	.05	.12	.02	1.00
Mean	50.12	51.43	104.95	105.20	101.85	102.80	50.01	105.26	107.38	102.30	102.45	11.30	19.21	23.05	201.03	6.67
Std dev	9.92	18.73	12.30	13.76	12.86	10.76	22.32	14.82	14.30	13.48	13.10	4.13	5.91	7.11	31.83	12.60
N	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641

Table A-15. Corrected correlation matrix for hands-on performance test: infantry rifleman (0311)

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	HOPT	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
HOPT	1.00	.56	.63	.66	.62	.52	.58	.63	.68	.64	.54	.45	.47	.47	.49	.22
Enlistment ASVAB																
AFQT	.56	1.00	.95	.81	.94	.94	.92	.87	.77	.89	.86	.47	.60	.47	.42	.27
GT	.63	.95	1.00	.93	.94	.86	.90	.89	.85	.91	.81	.55	.63	.54	.49	.23
MM	.66	.81	.93	1.00	.91	.71	.79	.83	.90	.87	.71	.58	.59	.55	.52	.18
EL	.62	.94	.94	.91	1.00	.86	.89	.87	.84	.92	.81	.53	.61	.52	.46	.26
CL	.52	.94	.86	.71	.86	1.00	.86	.80	.68	.82	.86	.40	.57	.46	.41	.29
Concurrent ASVAB																
AFQT	.58	.92	.90	.79	.89	.86	1.00	.96	.84	.95	.93	.50	.63	.52	.44	.29
GT	.63	.87	.89	.83	.87	.80	.96	1.00	.92	.95	.89	.56	.67	.58	.49	.26
MM	.68	.77	.85	.90	.84	.68	.84	.92	1.00	.93	.77	.59	.63	.58	.53	.21
EL	.64	.89	.91	.87	.92	.82	.95	.95	.93	1.00	.88	.57	.65	.57	.48	.28
CL	.54	.86	.81	.71	.81	.86	.93	.89	.77	.88	1.00	.43	.60	.51	.42	.32
New predictor tests																
SP	.45	.47	.55	.58	.53	.40	.50	.56	.59	.57	.43	1.00	.54	.59	.38	.10
RS	.47	.60	.63	.59	.61	.57	.63	.67	.63	.65	.60	.54	1.00	.63	.40	.21
AS	.47	.47	.54	.55	.52	.46	.52	.58	.58	.57	.51	.59	.63	1.00	.40	.17
VF	.49	.42	.49	.52	.46	.41	.44	.49	.53	.48	.42	.38	.40	.40	1.00	.11
ASAP	.22	.27	.23	.18	.26	.29	.29	.26	.21	.28	.32	.10	.21	.17	.11	1.00
Mean	52.80	48.97	102.59	102.34	100.03	101.50	47.63	103.30	105.13	100.83	100.96	11.01	18.76	22.03	196.11	6.56
Std dev	10.22	33.79	20.04	19.99	19.99	20.02	34.28	21.24	19.25	20.08	20.09	4.32	6.40	7.86	33.71	13.03
N	870	870	870	870	870	870	870	870	870	870	870	870	870	870	870	870

Table A-16. Corrected correlation matrix for job knowledge test: infantry rifleman (0311)

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	JKT	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
JKT	1.00	.77	.78	.73	.77	.74	.81	.80	.75	.81	.77	.46	.59	.55	.42	.29
Enlistment ASVAB																
AFQT	.77	1.00	.95	.81	.94	.94	.93	.88	.77	.90	.87	.47	.59	.46	.41	.26
GT	.78	.95	1.00	.93	.94	.86	.90	.90	.85	.91	.82	.55	.62	.53	.48	.22
MM	.73	.81	.93	1.00	.91	.71	.80	.84	.90	.87	.71	.58	.59	.55	.51	.17
EL	.77	.94	.94	.91	1.00	.86	.89	.88	.84	.92	.82	.54	.61	.52	.46	.25
CL	.74	.94	.86	.71	.86	1.00	.86	.81	.68	.82	.87	.40	.56	.45	.40	.28
Concurrent ASVAB																
AFQT	.81	.93	.90	.80	.89	.86	1.00	.96	.84	.95	.93	.49	.62	.51	.43	.29
GT	.80	.88	.90	.84	.88	.81	.96	1.00	.92	.95	.89	.56	.66	.57	.48	.25
MM	.75	.77	.85	.90	.84	.68	.84	.92	1.00	.93	.77	.60	.63	.58	.52	.20
EL	.81	.90	.91	.87	.92	.82	.95	.95	.93	1.00	.88	.57	.64	.56	.47	.27
CL	.77	.87	.82	.71	.82	.87	.93	.89	.77	.88	1.00	.43	.59	.50	.41	.31
New predictor tests																
SP	.46	.47	.55	.58	.54	.40	.49	.56	.60	.57	.43	1.00	.54	.59	.38	.09
RS	.59	.59	.62	.59	.61	.56	.62	.66	.63	.64	.59	.54	1.00	.63	.39	.20
AS	.55	.46	.53	.55	.52	.45	.51	.57	.58	.56	.50	.59	.63	1.00	.39	.17
VF	.42	.41	.48	.51	.46	.40	.43	.48	.52	.47	.41	.38	.39	.39	1.00	.10
ASAP	.29	.26	.22	.17	.25	.28	.29	.25	.20	.27	.31	.09	.20	.17	.10	1.00
Mean	44.35	49.01	102.64	102.42	100.07	101.56	47.88	103.51	105.30	100.96	101.11	11.02	18.79	22.06	196.34	6.63
Std dev	12.08	33.80	20.04	19.99	19.98	20.02	34.38	21.23	19.17	20.07	20.01	4.32	6.33	7.82	33.60	13.00
N	862	862	862	862	862	862	862	862	862	862	862	862	862	862	862	862

Table A-17. Corrected correlation matrix for proficiency marks: infantry rifleman (0311)

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	PRO	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
PRO	1 00	.34	.35	.34	.35	.34	.38	.39	.37	.38	.36	.23	.29	.23	.27	.31
Enlistment ASVAB																
AFQT	34	1.00	.95	.81	.94	.94	.92	.87	.77	.89	.86	.47	.60	.47	.42	.27
GT	35	.95	1.00	.93	.94	.86	.90	.89	.85	.91	.81	.55	.63	.54	.49	.23
MM	34	.81	.93	1.00	.91	.71	.79	.83	.90	.87	.71	.58	.59	.55	.52	.18
EL	35	.94	.94	.91	1.00	.86	.89	.87	.84	.92	.81	.53	.61	.52	.46	.26
CL	34	.94	.86	.71	.86	1.00	.86	.80	.68	.82	.86	.40	.57	.46	.41	.29
Concurrent ASVAB																
AFQT	38	.92	.90	.79	.89	.86	1.00	.96	.84	.95	.93	.50	.63	.52	.44	.29
GT	39	.87	.89	.83	.87	.80	.96	1.00	.92	.95	.89	.56	.67	.58	.49	.26
MM	37	.77	.85	.90	.84	.68	.84	.92	1.00	.93	.77	.59	.63	.58	.53	.21
EL	38	.89	.91	.87	.92	.82	.95	.95	.93	1.00	.88	.57	.65	.57	.48	.28
CL	36	.86	.81	.71	.81	.86	.93	.89	.77	.88	1.00	.43	.60	.51	.42	.32
New predictor tests																
SP	23	.47	.55	.58	.53	.40	.50	.56	.59	.57	.43	1.00	.54	.59	.38	.10
RS	29	.60	.63	.59	.61	.57	.63	.67	.63	.65	.60	.54	1.00	.63	.40	.21
AS	23	.47	.54	.55	.52	.46	.52	.58	.58	.57	.51	.59	.63	1.00	.40	.17
VF	27	.42	.49	.52	.46	.41	.44	.49	.53	.48	.42	.38	.40	.40	1.00	.11
ASAP	31	.27	.23	.18	.26	.29	.29	.26	.21	.28	.32	.10	.21	.17	.11	1.00
Mean	43 69	48.97	102.59	102.34	100.03	101.50	47.63	103.30	105.13	100.83	100.96	11.01	18.76	22.83	196.11	6.56
Std dev	2 19	33.79	20.04	19.99	19.99	20.02	34.28	21.24	19.25	20.08	20.09	4.32	6.40	7.86	33.71	13.03
N	870	870	870	870	870	870	870	870	870	870	870	870	870	870	870	870

Table A-18. Corrected correlation matrix for hands-on performance test: machinegunner (0331)

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	HOPT	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
HOPT	1.00	.67	.72	.76	.75	.63	.70	.73	.74	.73	.69	.53	.57	.47	.30	.36
Enlistment ASVAB																
AFQT	.67	1.00	.95	.81	.94	.94	.94	.89	.80	.89	.88	.42	.58	.44	.14	.32
GT	.72	.95	1.00	.93	.94	.86	.91	.92	.87	.90	.84	.50	.63	.52	.24	.29
MM	.76	.81	.93	1.00	.91	.71	.83	.88	.90	.87	.76	.56	.61	.55	.31	.27
EL	.75	.94	.94	.91	1.00	.86	.93	.91	.86	.93	.87	.52	.65	.52	.24	.33
CL	.63	.94	.86	.71	.86	1.00	.87	.82	.72	.82	.88	.41	.57	.43	.13	.33
Concurrent ASVAB																
AFQT	.70	.94	.91	.83	.93	.87	1.00	.96	.86	.95	.93	.46	.61	.50	.18	.35
GT	.73	.89	.92	.88	.91	.82	.96	1.00	.94	.95	.87	.53	.65	.56	.24	.32
MM	.74	.80	.87	.90	.86	.72	.86	.94	1.00	.93	.79	.56	.62	.56	.25	.29
EL	.73	.89	.90	.87	.93	.82	.95	.95	.93	1.00	.88	.53	.64	.53	.22	.34
CL	.69	.88	.84	.76	.87	.88	.93	.87	.79	.88	1.00	.44	.60	.47	.19	.37
New predictor tests																
SP	.53	.42	.50	.56	.52	.41	.46	.53	.56	.53	.44	1.00	.60	.59	.32	.24
RS	.57	.58	.63	.61	.65	.57	.61	.65	.62	.64	.60	.60	1.00	.65	.25	.22
AS	.47	.44	.52	.55	.52	.43	.50	.56	.56	.53	.47	.59	.65	1.00	.28	.24
VF	.30	.14	.24	.31	.24	.13	.18	.24	.25	.22	.19	.32	.25	.28	1.00	.11
ASAP	.36	.32	.29	.27	.33	.33	.35	.32	.29	.34	.37	.24	.22	.24	.11	1.00
Mean	55.00	51.19	104.94	106.70	102.53	101.40	51.13	105.53	108.98	103.80	102.33	11.70	19.28	22.74	202.07	7.80
Std dev	9.79	33.80	19.97	19.95	20.01	19.91	33.72	21.38	19.85	18.97	18.75	4.61	6.05	8.18	34.35	13.13
N	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243

Table A-19. Corrected correlation matrix for job knowledge test: machinegunner (0331)

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	JKT	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
JKT	1.00	.73	.73	.71	.76	.70	.78	.77	.75	.77	.77	.49	.57	.56	.26	.30
Enlistment ASVAB																
AFQT	.73	1.00	.95	.81	.94	.94	.94	.89	.79	.89	.88	.40	.58	.44	.14	.31
GT	.73	.95	1.00	.93	.94	.86	.91	.92	.86	.90	.84	.49	.63	.51	.25	.28
MM	.71	.81	.93	1.00	.91	.71	.83	.88	.90	.87	.76	.55	.61	.54	.32	.26
EL	.76	.94	.94	.91	1.00	.86	.93	.91	.86	.93	.87	.51	.64	.51	.24	.32
CL	.70	.94	.86	.71	.86	1.00	.87	.82	.72	.82	.88	.39	.57	.43	.14	.32
Concurrent ASVAB																
AFQT	.78	.94	.91	.83	.93	.87	1.00	.96	.86	.95	.93	.44	.61	.49	.19	.34
GT	.77	.89	.92	.88	.91	.82	.96	1.00	.94	.95	.87	.51	.65	.55	.25	.30
MM	.75	.79	.86	.90	.86	.72	.86	.94	1.00	.93	.79	.55	.61	.55	.26	.27
EL	.77	.89	.90	.87	.93	.82	.95	.95	.93	1.00	.88	.51	.64	.53	.23	.33
CL	.77	.88	.84	.76	.87	.88	.93	.87	.79	.88	1.00	.42	.60	.47	.20	.36
New predictor tests																
SP	.49	.40	.49	.55	.51	.39	.44	.51	.55	.51	.42	1.00	.60	.59	.33	.22
RS	.57	.58	.63	.61	.64	.57	.61	.65	.61	.64	.60	.60	1.00	.65	.25	.21
AS	.56	.44	.51	.54	.51	.43	.49	.55	.55	.53	.47	.59	.65	1.00	.28	.23
VF	.26	.14	.25	.32	.24	.14	.19	.25	.26	.23	.20	.33	.25	.28	1.00	.12
ASAP	.30	.31	.28	.26	.32	.32	.34	.30	.27	.33	.36	.22	.21	.23	.12	1.00
Mean	49.24	51.24	104.96	106.70	102.58	101.41	51.21	105.63	109.06	103.85	102.37	11.74	19.30	22.76	201.96	7.89
Std dev	11.61	33.82	19.98	19.96	20.00	19.91	33.71	21.16	19.67	18.91	18.75	4.54	6.05	8.18	34.39	13.03
N	242	242	242	242	242	242	242	242	242	242	242	242	242	242	242	242

Table A-20. Corrected correlation matrix for proficiency marks: machinegunner (0331)

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	PRO	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
PRO	1.00	.24	.24	.23	.26	.26	.24	.26	.27	.25	.28	.29	.23	.18	.08	.38
Enlistment ASVAB																
AFQT	.24	1.00	.95	.81	.94	.94	.94	.89	.79	.88	.88	.42	.58	.45	.13	.32
GT	.24	.95	1.00	.93	.94	.86	.91	.92	.86	.90	.84	.51	.63	.53	.24	.29
MM	.23	.81	.93	1.00	.91	.71	.84	.89	.91	.88	.76	.57	.62	.55	.32	.28
EL	.26	.94	.94	.91	1.00	.86	.93	.92	.86	.93	.87	.53	.65	.53	.23	.33
CL	.26	.94	.86	.71	.86	1.00	.87	.81	.71	.81	.88	.41	.58	.44	.12	.33
Concurrent ASVAB																
AFQT	.24	.94	.91	.84	.93	.87	1.00	.95	.86	.95	.93	.46	.61	.50	.17	.35
GT	.26	.89	.92	.89	.92	.81	.95	1.00	.94	.95	.87	.54	.65	.56	.24	.32
MM	.27	.79	.86	.91	.86	.71	.86	.94	1.00	.93	.79	.57	.62	.56	.25	.29
EL	.25	.88	.90	.88	.93	.81	.95	.95	.93	1.00	.88	.54	.64	.54	.22	.35
CL	.28	.88	.84	.76	.87	.88	.93	.87	.79	.88	1.00	.44	.60	.47	.19	.37
New predictor tests																
SP	.29	.42	.51	.57	.53	.41	.46	.54	.57	.54	.44	1.00	.60	.59	.32	.25
RS	.23	.58	.63	.62	.65	.58	.61	.65	.62	.64	.60	.60	1.00	.65	.25	.23
AS	.18	.45	.53	.55	.53	.44	.50	.56	.56	.54	.47	.59	.65	1.00	.27	.26
VF	.08	.13	.24	.32	.23	.12	.17	.24	.25	.22	.19	.32	.25	.27	1.00	.12
ASAP	.38	.32	.29	.28	.33	.33	.35	.32	.29	.35	.37	.25	.23	.26	.12	1.00
Mean	44.08	50.93	104.81	106.69	102.42	101.35	50.84	105.42	108.95	103.68	102.18	11.70	19.23	22.79	201.95	7.77
Std dev	2.09	33.78	19.97	19.95	20.01	19.90	33.74	21.43	19.92	18.96	18.76	4.65	6.08	8.22	34.71	13.18
N	238	238	238	238	238	238	238	238	238	238	238	238	238	238	238	238

Table A-21. Corrected correlation matrix for hands-on performance test: mortarman (0341)

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	HOPT	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
HOPT	1.00	.39	.49	.60	.50	.31	.45	.54	.62	.53	.43	.44	.45	.50	.42	.13
Enlistment ASVAB																
AFQT	.39	1.00	.95	.81	.94	.94	.94	.89	.77	.90	.89	.33	.62	.48	.24	.10
GT	.49	.95	1.00	.93	.94	.86	.91	.91	.86	.92	.86	.40	.67	.56	.35	.05
MM	.60	.81	.93	1.00	.91	.71	.81	.87	.92	.88	.75	.49	.67	.62	.46	.04
EL	.50	.94	.94	.91	1.00	.86	.90	.90	.86	.93	.85	.45	.65	.57	.37	.09
CL	.31	.94	.86	.71	.86	1.00	.87	.80	.68	.82	.88	.30	.58	.46	.18	.11
Concurrent ASVAB																
AFQT	.45	.94	.91	.81	.90	.87	1.00	.97	.85	.95	.94	.36	.68	.54	.33	.13
GT	.54	.89	.91	.87	.90	.80	.97	1.00	.93	.96	.90	.44	.73	.60	.42	.10
MM	.62	.77	.86	.92	.86	.68	.85	.93	1.00	.93	.79	.51	.72	.63	.51	.07
EL	.53	.90	.92	.88	.93	.82	.95	.96	.93	1.00	.89	.44	.70	.57	.41	.09
CL	.43	.89	.86	.75	.85	.88	.94	.90	.79	.89	1.00	.36	.67	.54	.27	.15
New predictor tests																
SP	.44	.33	.40	.49	.45	.30	.36	.44	.51	.44	.36	1.00	.43	.59	.42	.07
RS	.45	.62	.67	.67	.65	.58	.68	.73	.72	.70	.67	.43	1.00	.63	.43	.08
AS	.50	.48	.56	.62	.57	.46	.54	.60	.63	.57	.54	.59	.63	1.00	.43	.14
VF	.42	.24	.35	.46	.37	.18	.33	.42	.51	.41	.27	.42	.43	.43	1.00	.06
ASAP	.13	.10	.05	.04	.09	.11	.13	.10	.07	.09	.15	.07	.08	.14	.06	1.00
Mean	52.96	51.72	105.09	105.31	102.17	102.94	50.94	106.27	108.67	103.06	104.77	11.52	19.23	22.57	203.34	8.90
Std dev	9.31	33.55	19.99	20.01	20.00	19.96	35.58	21.44	18.75	19.69	22.24	4.34	6.65	7.86	35.61	12.55
N	226	226	226	226	226	226	226	226	226	226	226	226	226	226	226	226

Table A-22. Corrected correlation matrix for job knowledge test: mortarman (0341)

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	JKT	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
JKT	1.00	.61	.68	.73	.68	.52	.71	.76	.77	.73	.65	.47	.62	.58	.45	.13
Enlistment ASVAB																
AFQT	.61	1.00	.95	.81	.94	.94	.93	.89	.77	.90	.89	.33	.62	.47	.24	.09
GT	.68	.95	1.00	.93	.94	.86	.91	.91	.86	.92	.85	.39	.67	.56	.35	.04
MM	.73	.81	.93	1.00	.91	.71	.81	.86	.92	.88	.75	.49	.67	.62	.46	.03
EL	.68	.94	.94	.91	1.00	.86	.90	.90	.86	.93	.85	.45	.65	.56	.37	.08
CL	.52	.94	.86	.71	.86	1.00	.87	.80	.68	.82	.88	.29	.58	.45	.18	.10
Concurrent ASVAB																
AFQT	.71	.93	.91	.81	.90	.87	1.00	.96	.84	.95	.94	.35	.69	.53	.33	.12
GT	.76	.89	.91	.86	.90	.80	.96	1.00	.93	.96	.90	.43	.73	.60	.42	.09
MM	.77	.77	.86	.92	.86	.68	.84	.93	1.00	.93	.78	.50	.72	.62	.51	.05
EL	.73	.90	.92	.88	.93	.82	.95	.96	.93	1.00	.89	.43	.70	.57	.41	.08
CL	.65	.89	.85	.75	.85	.88	.94	.90	.78	.89	1.00	.35	.67	.54	.27	.13
New predictor tests																
SP	.47	.33	.39	.49	.45	.29	.35	.43	.50	.43	.35	1.00	.43	.59	.42	.06
RS	.62	.62	.67	.67	.65	.58	.69	.73	.72	.70	.67	.43	1.00	.63	.43	.08
AS	.58	.47	.56	.62	.56	.45	.53	.60	.62	.57	.54	.59	.63	1.00	.43	.13
VF	.45	.24	.35	.46	.37	.18	.33	.42	.51	.41	.27	.42	.43	.43	1.00	.05
ASAP	.13	.09	.04	.03	.08	.10	.12	.09	.05	.08	.13	.06	.08	.13	.05	1.00
Mean	52.60	51.63	105.04	105.27	102.11	102.87	50.82	106.20	108.58	102.97	104.66	11.50	19.24	22.52	203.29	8.83
Std dev	10.69	33.55	19.99	20.01	20.00	19.95	35.54	21.41	18.68	19.63	22.15	4.33	6.67	7.83	35.67	12.52
N	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225	225

Table A-23. Corrected correlation matrix for proficiency marks: mortarman (0341)

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	PRO	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
PRO	1.00	.04	.07	.13	.09	.03	.10	.12	.17	.13	.10	.17	.25	.24	.21	.38
Enlistment ASVAB																
AFQT	.04	1.00	.95	.81	.94	.94	.94	.89	.76	.90	.89	.32	.63	.47	.24	.09
GT	.07	.95	1.00	.93	.94	.86	.91	.92	.86	.92	.86	.39	.68	.56	.35	.04
MM	.13	.81	.93	1.00	.91	.71	.81	.87	.92	.88	.75	.48	.68	.62	.45	.03
EL	.09	.94	.94	.91	1.00	.86	.90	.90	.86	.94	.85	.45	.66	.56	.36	.08
CL	.03	.94	.86	.71	.86	1.00	.88	.81	.68	.83	.88	.29	.60	.45	.18	.11
Concurrent ASVAB																
AFQT	.10	.94	.91	.81	.90	.88	1.00	.97	.85	.95	.94	.35	.69	.53	.32	.13
GT	.12	.89	.92	.87	.90	.81	.97	1.00	.93	.96	.90	.43	.74	.60	.41	.09
MM	.17	.78	.86	.92	.86	.68	.85	.93	1.00	.93	.79	.50	.73	.63	.50	.06
EL	.13	.90	.92	.88	.94	.83	.95	.96	.93	1.00	.89	.44	.71	.57	.41	.09
CL	.10	.89	.86	.75	.85	.88	.94	.90	.79	.89	1.00	.36	.68	.54	.27	.14
New predictor tests																
SP	.17	.32	.39	.48	.45	.29	.35	.43	.50	.44	.36	1.00	.44	.59	.42	.06
RS	.25	.63	.68	.68	.66	.60	.69	.74	.73	.71	.68	.44	1.00	.64	.42	.08
AS	.24	.47	.56	.62	.56	.45	.53	.60	.63	.57	.54	.59	.64	1.00	.43	.14
VF	.21	.24	.35	.45	.36	.18	.32	.41	.50	.41	.27	.42	.42	.43	1.00	.05
ASAP	.38	.09	.04	.03	.08	.11	.13	.09	.06	.09	.14	.06	.08	.14	.05	1.00
Mean	44.13	51.54	104.98	105.14	102.04	102.81	50.83	106.21	108.60	103.01	104.71	11.47	19.26	22.50	203.21	8.85
Std dev	1.61	33.54	19.99	20.01	20.00	19.96	35.67	21.55	18.88	19.82	22.35	4.33	6.66	7.86	35.40	12.59
N	224	224	224	224	224	224	224	224	224	224	224	224	224	224	224	224

Table A-24. Corrected correlation matrix for hands-on performance test: assaultman (0351)

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	HOPT	AFQT	GT	MM	EI	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
HOPT	1.00	.45	.50	.54	.53	.40	.51	.57	.61	.58	.47	.40	.41	.45	.40	.25
Enlistment ASVAB																
AFQT	.45	1.00	.95	.81	.94	.94	.93	.86	.74	.89	.89	.30	.66	.38	.41	.34
GT	.50	.95	1.00	.93	.94	.86	.92	.90	.84	.91	.85	.41	.71	.47	.47	.32
MM	.54	.81	.93	1.00	.91	.71	.82	.86	.90	.88	.73	.49	.67	.52	.46	.26
EL	.53	.94	.94	.91	1.00	.86	.90	.89	.84	.92	.84	.42	.68	.49	.44	.32
CL	.40	.94	.86	.71	.86	1.00	.86	.78	.63	.79	.87	.25	.63	.37	.38	.38
Concurrent ASVAB																
AFQT	.51	.93	.92	.82	.90	.86	1.00	.96	.83	.95	.95	.33	.69	.43	.44	.34
GT	.57	.86	.90	.86	.89	.78	.96	1.00	.92	.96	.89	.44	.72	.53	.48	.31
MM	.61	.74	.84	.90	.84	.63	.83	.92	1.00	.92	.75	.51	.67	.55	.48	.26
EL	.58	.89	.91	.88	.92	.79	.95	.96	.92	1.00	.89	.43	.69	.52	.46	.34
CL	.47	.89	.85	.73	.84	.87	.95	.89	.75	.89	1.00	.31	.67	.45	.43	.36
New predictor tests																
SP	.40	.30	.41	.49	.42	.25	.33	.44	.51	.43	.31	1.00	.45	.62	.28	.15
RS	.41	.66	.71	.67	.68	.63	.69	.72	.67	.69	.67	.45	1.00	.61	.39	.28
AS	.45	.38	.47	.52	.49	.37	.43	.53	.55	.52	.45	.62	.61	1.00	.31	.23
VF	.40	.41	.47	.48	.44	.38	.44	.48	.48	.46	.43	.28	.39	.31	1.00	.22
ASAP	.25	.34	.32	.26	.32	.38	.34	.31	.26	.34	.36	.15	.28	.23	.22	1.00
Mean	64.28	59.41	110.19	110.65	107.44	105.75	59.94	111.40	113.19	108.02	107.12	12.22	20.47	24.54	206.02	8.09
Std dev	7.15	34.58	19.91	20.06	20.06	19.96	36.24	20.08	18.16	20.52	21.36	4.72	6.34	7.62	35.14	12.91
N	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244

Table A-25. Corrected correlation matrix for job knowledge test: assaultman (0351)

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	JKT	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
JKT	1.00	.67	.67	.63	.67	.61	.73	.72	.66	.72	.69	.35	.52	.46	.36	.33
Enlistment ASVAB																
AFQT	.67	1.00	.95	.81	.94	.94	.93	.86	.74	.89	.89	.30	.66	.38	.41	.34
GT	.67	.95	1.00	.93	.94	.86	.92	.90	.84	.91	.85	.41	.71	.47	.47	.32
MM	.63	.81	.93	1.00	.91	.71	.82	.86	.90	.88	.73	.49	.67	.52	.48	.26
EL	.67	.94	.94	.91	1.00	.86	.90	.89	.84	.92	.84	.42	.68	.49	.44	.32
CL	.61	.94	.86	.71	.86	1.00	.86	.78	.63	.79	.87	.25	.63	.37	.38	.38
Concurrent ASVAB																
AFQT	.73	.93	.92	.82	.90	.86	1.00	.96	.83	.95	.95	.33	.69	.43	.44	.34
GT	.72	.86	.90	.86	.89	.78	.96	1.00	.92	.96	.89	.44	.72	.53	.48	.31
MM	.66	.74	.84	.90	.84	.63	.83	.92	1.00	.92	.75	.51	.67	.55	.48	.26
EL	.72	.89	.91	.88	.92	.79	.95	.96	.92	1.00	.89	.43	.69	.52	.46	.34
CL	.69	.89	.85	.73	.84	.87	.95	.89	.75	.89	1.00	.31	.67	.45	.43	.36
New predictor tests																
SP	.35	.30	.41	.49	.42	.25	.33	.44	.51	.43	.31	1.00	.45	.62	.28	.15
RS	.52	.66	.71	.67	.68	.63	.69	.72	.67	.69	.67	.45	1.00	.61	.39	.28
AS	.46	.38	.47	.52	.49	.37	.43	.53	.55	.52	.45	.62	.61	1.00	.31	.23
VF	.36	.41	.47	.48	.44	.38	.4	.48	.48	.46	.43	.28	.39	.31	1.00	.22
ASAP	.33	.34	.32	.26	.32	.38	.34	.31	.26	.34	.36	.15	.28	.23	.22	1.00
Mean	53.24	59.41	110.19	110.65	107.44	105.75	59.94	111.40	113.19	108.02	107.12	12.22	20.47	24.54	206.02	8.09
Std dev	9.03	34.58	19.91	20.06	20.06	19.96	36.24	20.08	18.16	20.52	21.36	4.72	6.34	7.62	35.14	12.91
N	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244

Table A-26. Corrected correlation matrix for proficiency marks: assaultman (0351)

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	PRO	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
PRO	1.00	.10	.12	.11	.12	.06	.15	.20	.24	.21	.14	.26	.13	.19	.18	.29
Enlistment ASVAB																
AFQT	.10	1.00	.95	.81	.94	.94	.93	.86	.74	.89	.89	.29	.68	.38	.39	.33
GT	.12	.95	1.00	.93	.94	.86	.92	.90	.84	.91	.85	.40	.72	.46	.45	.31
MM	.11	.81	.93	1.00	.91	.71	.82	.86	.90	.88	.73	.48	.68	.52	.46	.26
EL	.12	.94	.94	.91	1.00	.86	.90	.89	.84	.92	.84	.41	.69	.49	.42	.31
CL	.06	.94	.86	.71	.86	1.00	.86	.78	.63	.79	.87	.24	.65	.36	.36	.37
Concurrent ASVAB																
AFQT	.15	.93	.92	.82	.90	.86	1.00	.96	.83	.95	.95	.33	.70	.43	.43	.34
GT	.20	.86	.90	.86	.89	.78	.96	1.00	.92	.96	.89	.43	.73	.53	.46	.30
MM	.24	.74	.84	.90	.84	.63	.83	.92	1.00	.92	.74	.51	.67	.55	.47	.25
EL	.21	.89	.91	.88	.92	.79	.95	.96	.92	1.00	.89	.42	.70	.52	.44	.33
CL	.14	.89	.85	.73	.84	.87	.95	.89	.74	.89	1.00	.30	.68	.45	.41	.35
New predictor tests																
SP	.26	.29	.40	.48	.41	.24	.33	.43	.51	.42	.30	1.00	.45	.62	.27	.15
RS	.13	.68	.72	.68	.69	.65	.70	.73	.67	.70	.68	.45	1.00	.61	.39	.29
AS	.19	.38	.46	.52	.49	.36	.43	.53	.55	.52	.45	.62	.61	1.00	.30	.23
VF	.18	.39	.45	.46	.42	.36	.43	.46	.47	.44	.41	.27	.39	.30	1.00	.20
ASAP	.29	.33	.31	.26	.31	.37	.34	.30	.25	.33	.35	.15	.29	.23	.20	1.00
Mean	44.23	59.24	110.09	110.55	107.33	105.63	59.79	111.31	113.09	107.91	107.00	12.19	20.48	24.49	205.67	8.02
Std dev	1.51	34.57	19.91	20.06	20.06	19.96	36.25	20.10	18.13	20.49	21.28	4.71	6.43	7.62	34.53	12.88
N	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243	243

Table A-27. Corrected correlation matrix for grade point average from infantry training school: base A

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	GPA	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
GPA	1 00	.61	.65	.65	.64	.55	.61	.63	.65	.65	.56	.37	.43	.41	.44	.14
Enlistment ASVAB																
AFQT	61	1.00	.95	.81	.94	.94	.93	.87	.75	.88	.87	.33	.48	.35	.42	.21
GT	65	.95	1.00	.93	.94	.86	.90	.90	.85	.90	.82	.45	.52	.45	.51	.19
MM	65	.81	.93	1.00	.91	.71	.79	.85	.91	.88	.71	.52	.52	.52	.55	.17
EL	64	.94	.94	.91	1.00	.86	.89	.88	.83	.92	.81	.44	.52	.45	.48	.22
CL	55	.94	.86	.71	.86	1.00	.86	.80	.66	.80	.87	.27	.45	.33	.41	.20
Concurrent ASVAB																
AFQT	61	.93	.90	.79	.89	.86	1.00	.96	.82	.94	.93	.35	.52	.41	.45	.23
GT	63	.87	.90	.85	.88	.80	.96	1.00	.92	.95	.88	.44	.58	.51	.51	.21
MM	65	.75	.85	.91	.83	.66	.82	.92	1.00	.92	.74	.53	.58	.55	.54	.18
EL	65	.88	.90	.88	.92	.80	.94	.95	.92	1.00	.87	.45	.57	.50	.50	.23
CL	56	.87	.82	.71	.81	.87	.93	.88	.74	.87	1.00	.30	.50	.39	.42	.25
New predictor tests																
SP	37	.33	.45	.52	.44	.27	.35	.44	.53	.45	.30	1.00	.49	.60	.40	.08
RS	43	.48	.52	.52	.52	.45	.52	.58	.58	.57	.50	.49	1.00	.66	.41	.19
AS	41	.35	.45	.52	.45	.33	.41	.51	.55	.50	.39	.60	.66	1.00	.45	.15
VF	44	.42	.51	.55	.48	.41	.45	.51	.54	.50	.42	.40	.41	.45	1.00	.12
ASAP	14	.21	.19	.17	.22	.20	.23	.21	.18	.23	.25	.08	.19	.15	.12	1.00
Mean	49 83	49.36	102.74	102.13	100.12	101.54	47.86	103.21	104.79	100.77	100.90	10.97	18.42	21.48	194.00	6.72
Std dev	11 62	33.76	20.01	20.03	20.00	20.03	33.45	20.80	19.29	19.52	20.22	4.32	6.00	7.83	34.47	12.86
N	512	512	512	512	512	512	512	512	512	512	512	512	512	512	512	512

Table A-28. Corrected correlation matrix for grade point average from infantry training school: base B

		Aptitude scores														
		Enlistment					Concurrent					New predictor tests				
	GPA	AFQT	GT	MM	EL	CL	AFQT	GT	MM	EL	CL	SP	RS	AS	VF	ASAP
GPA	1.00	.40	.40	.38	.41	.37	.40	.41	.39	.41	.36	.24	.33	.23	.24	.09
Enlistment ASVAB																
AFQT	.40	1.00	.95	.81	.94	.94	.93	.89	.82	.91	.87	.54	.68	.53	.34	.37
GT	.40	.95	1.00	.93	.94	.86	.91	.91	.88	.91	.83	.60	.71	.57	.42	.32
MM	.38	.81	.93	1.00	.91	.71	.81	.84	.90	.86	.72	.60	.67	.56	.47	.25
EL	.41	.94	.94	.91	1.00	.86	.90	.89	.87	.92	.82	.60	.69	.56	.39	.33
CL	.37	.94	.86	.71	.86	1.00	.88	.83	.73	.84	.88	.48	.64	.52	.30	.41
Concurrent ASVAB																
AFQT	.40	.93	.91	.81	.90	.88	1.00	.97	.88	.96	.94	.57	.70	.57	.36	.38
GT	.41	.89	.91	.84	.89	.83	.97	1.00	.94	.96	.90	.62	.73	.61	.42	.34
MM	.39	.82	.88	.90	.87	.73	.88	.94	1.00	.94	.81	.62	.69	.60	.46	.29
EL	.41	.91	.91	.86	.92	.84	.96	.96	.94	1.00	.90	.62	.71	.60	.39	.37
CL	.36	.87	.83	.72	.82	.88	[illegible]	.90	.81	.90	1.00	.52	.66	.57	.33	.41
New predictor tests																
SP	.24	.54	.60	.60	.60	.48	.57	.62	.62	.62	.52	1.00	.60	.64	.36	.21
RS	.33	.68	.71	.67	.69	.64	.70	.73	.69	.71	.66	.60	1.00	.65	.38	.24
AS	.23	.53	.57	.56	.56	.52	.57	.61	.60	.60	.57	.64	.65	1.00	.35	.25
VF	.24	.34	.42	.47	.39	.30	.36	.42	.46	.39	.33	.36	.38	.35	1.00	.12
ASAP	.09	.37	.32	.25	.33	.41	.38	.34	.29	.37	.41	.21	.24	.25	.12	1.00
Mean	50.12	51.43	104.95	105.20	101.85	102.80	50.01	105.26	107.38	102.30	102.45	11.30	19.21	23.05	201.03	6.67
Std dev	10.51	33.93	19.99	19.99	19.98	19.97	36.57	22.71	20.42	21.08	20.76	4.58	7.09	7.94	34.13	13.53
N	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641	641

APPENDIX B

SAMPLE AND CORRECTED INCREMENTS IN VALIDITY BY NEW PREDICTOR TESTS, CONTROLLING FOR TIME IN SERVICE

APPENDIX B

SAMPLE AND CORRECTED INCREMENTS IN VALIDITY BY NEW PREDICTOR TESTS, CONTROLLING FOR TIME IN SERVICE

The tables of this appendix report the ASVAB validities and the validity increments due to each new predictor test for the regressions in which time in service has first been entered as a predictor. A separate table is reported for each MOS. The tables contain the following information:

- Multiple correlations (MR), sample validities, and validities corrected for range restriction
- Estimates of the cross-validated multiple correlations (CVR)
- Increment (IN) in the cross-validated multiple correlation over the ASVAB and time-in-service validity base due to the new predictor
- Increment expressed as a percentage improvement (%) over the ASVAB and time-in-service base.

Grade-point average is combined for all four MOSs and reported in a separate table because all individuals received the same initial infantry training. Findings are reported for both enlistment and concurrent aptitude information.

There were occasional instances in which the increments in the CVR due to the new predictor test were negative. This is due to adjustments that are made in computing the CVR to account for the additional predictor. For those cases in which the change in CVR was negative, the additional predictor did not improve the overall validity.

Table B-1. Increments in validity by new predictor tests for infantry rifleman performance, adjusted for time in service

Panel A: Sample validities

	HOPT				JKT				PRO			
	MR	CVR	IN	%	MR	CVR	IN	%	MR	CVR	IN	%
Enlistment aptitude												
ASVAB	0.5983	0.5839			0.6256	0.6124			0.3787	0.3483		
SP	0.6042	0.5888	0.0049	0.8	0.6297	0.6156	0.0031	0.5	0.3796	0.3467	*	*
RS	0.6054	0.5901	0.0062	1.1	0.6451	0.6317	0.0193	3.1	0.3833	0.3508	0.0024	0.7
AS	0.6107	0.5957	0.0117	2.0	0.6601	0.6475	0.0350	5.7	0.3796	0.3467	*	*
VF	0.6180	0.6034	0.0194	3.3	0.6271	0.6128	0.0004	0.1	0.3860	0.3538	0.0055	1.6
ASAP	0.6055	0.5902	0.0063	1.1	0.6378	0.6241	0.0117	1.9	0.4317	0.4042	0.0559	16.0
Concurrent Aptitude												
ASVAB	0.6135	0.5999			0.6686	0.6574			0.3872	0.3577		
SP	0.6160	0.6013	0.0015	0.2	0.6695	0.6573	*	*	0.3872	0.3551	*	*
RS	0.6169	0.6023	0.0024	0.4	0.6760	0.6642	0.0068	1.0	0.3881	0.3561	*	*
AS	0.6199	0.6054	0.0055	0.9	0.6871	0.6758	0.0184	2.8	0.3872	0.3551	*	*
VF	0.6301	0.6161	0.0162	2.7	0.6694	0.6573	*	*	0.3932	0.3618	0.0041	1.1
ASAP	0.6180	0.6034	0.0035	0.6	0.6734	0.6615	0.0041	0.6	0.4369	0.4099	0.0522	14.6

Panel B: Validities corrected for range restriction

	HOPT				JKT				PRO			
	MR	CVR	IN	%	MR	CVR	IN	%	MR	CVR	IN	%
Enlistment aptitude												
ASVAB	0.7100	0.7006			0.8123	0.8066			0.4722	0.4502		
SP	0.7138	0.7038	0.0031	0.4	0.8140	0.8079	0.0013	0.2	0.4729	0.4489	*	*
RS	0.7146	0.7046	0.0040	0.6	0.8207	0.8149	0.0083	1.0	0.4756	0.4519	0.0017	0.4
AS	0.7181	0.7082	0.0076	1.1	0.8273	0.8217	0.0151	1.9	0.4730	0.4490	*	*
VF	0.7229	0.7133	0.0126	1.8	0.8128	0.8067	0.0001	0.0	0.4776	0.4540	0.0038	0.9
ASAP	0.7147	0.7047	0.0041	0.6	0.8175	0.8115	0.0049	0.6	0.5119	0.4908	0.0407	9.0
Concurrent Aptitude												
ASVAB	0.7169	0.7078			0.8273	0.8221			0.4736	0.4516		
SP	0.7185	0.7086	0.0009	0.1	0.8276	0.8220	*	*	0.4736	0.4497	*	*
RS	0.7192	0.7094	0.0016	0.2	0.8307	0.8252	0.0031	0.4	0.4743	0.4505	*	*
AS	0.7210	0.7113	0.0035	0.5	0.8355	0.8302	0.0081	1.0	0.4736	0.4497	*	*
VF	0.7286	0.7192	0.0115	1.6	0.8278	0.8222	0.0001	0.0	0.4787	0.4552	0.0036	0.8
ASAP	0.7199	0.7101	0.0023	0.3	0.8295	0.8239	0.0018	0.2	0.5113	0.4902	0.0386	8.5

* Increment in cross-validated multiple correlation was negative due to insignificant improvement in validity by the new test relative to the number of predictors.

Table B-2. Increments in validity by new predictor tests for infantry machinegunner performance, adjusted for time in service

Panel A: Sample validities

	HOPT				JKT				PRO			
	MR	CVR	IN	%	MR	CVR	IN	%	MR	CVR	IN	%
Enlistment aptitude												
ASVAB	0.6570	0.6139			0.6368	0.5900			0.3652	0.2441		
SP	0.6697	0.6248	0.0110	1.8	0.6533	0.6053	0.0153	2.6	0.4135	0.3018	0.0577	23.6
RS	0.6686	0.6235	0.0096	1.6	0.6494	0.6006	0.0107	1.8	0.3791	0.2531	0.0091	3.7
AS	0.6596	0.6130	*	*	0.6793	0.6360	0.0460	7.8	0.3674	0.2362	*	*
VF	0.6669	0.6216	0.0077	1.3	0.6431	0.5932	0.0032	0.5	0.3659	0.2339	*	*
ASAP	0.6701	0.6254	0.0115	1.9	0.6405	0.5901	0.0001	0.0	0.4713	0.3793	0.1352	55.4
Concurrent Aptitude												
ASVAB	0.6568	0.6136			0.7036	0.6677			0.4084	0.3043		
SP	0.6735	0.6293	0.0157	2.6	0.7198	0.6832	0.0155	2.3	0.4320	0.3270	0.0228	7.5
RS	0.6696	0.6247	0.0111	1.8	0.7130	0.6753	0.0076	1.1	0.4153	0.3043	0.0000	0.0
AS	0.6598	0.6131	*	*	0.7359	0.7018	0.0341	5.1	0.4085	0.2949	*	*
VF	0.6653	0.6196	0.0060	1.0	0.7099	0.6717	0.0040	0.6	0.4096	0.2964	*	*
ASAP	0.6688	0.6238	0.0102	1.7	0.7046	0.6655	*	*	0.4960	0.4113	0.1070	35.2

Panel B: Validities corrected for range restriction

	HOPT				JKT				PRO			
	MR	CVR	IN	%	MR	CVR	IN	%	MR	CVR	IN	%
Enlistment Aptitude												
ASVAB	0.7903	0.7665			0.7947	0.7716			0.4323	0.3384		
SP	0.7972	0.7723	0.0057	0.7	0.8030	0.7789	0.0073	0.9	0.4713	0.3813	0.0429	12.7
RS	0.7966	0.7716	0.0050	0.7	0.8010	0.7766	0.0050	0.7	0.4433	0.3445	0.0061	1.8
AS	0.7916	0.7660	*	*	0.8162	0.7939	0.0223	2.9	0.4339	0.3320	*	*
VF	0.7957	0.7706	0.0040	0.5	0.7979	0.7731	0.0015	0.2	0.4328	0.3304	*	*
ASAP	0.7975	0.7726	0.0061	0.8	0.7966	0.7716	*	*	0.5196	0.4430	0.1046	30.9
Concurrent Aptitude												
ASVAB	0.7854	0.7610			0.8255	0.8063			0.4560	0.3692		
SP	0.7966	0.7716	0.0106	1.4	0.8354	0.8157	0.0094	1.2	0.4738	0.3846	0.0154	4.2
RS	0.7942	0.7688	0.0078	1.0	0.8316	0.8114	0.0051	0.6	0.4609	0.3677	*	*
AS	0.7880	0.7618	0.0007	0.1	0.8444	0.8259	0.0196	2.4	0.4560	0.3613	*	*
VF	0.7911	0.7653	0.0043	0.6	0.8295	0.8090	0.0028	0.3	0.4573	0.3630	*	*
ASAP	0.7920	0.7664	0.0054	0.7	0.8261	0.8051	*	*	0.5302	0.4563	0.0871	23.6

* Increment in cross-validated multiple correlation was negative due to insignificant improvement in validity by the new test relative to the number of predictors.

Table B-3. Increments in validity by new predictor tests for infantry mortarman performance, adjusted for time in service

Panel A: Sample validities

	HOPT				JKT				PRO			
	MR	CVR	IN	%	MR	CVR	IN	%	MR	CVR	IN	%
Enlistment aptitude												
ASVAB	0.6336	0.5826			0.6666	0.6215			0.3552	0.2213		
SP	0.6500	0.5977	0.0151	2.6	0.6863	0.6407	0.0192	3.1	0.3715	0.2335	0.0122	5.5
RS	0.6445	0.5911	0.0085	1.5	0.7064	0.6645	0.0430	6.9	0.4420	0.3338	0.1126	50.9
AS	0.6565	0.6055	0.0229	3.9	0.6954	0.6515	0.0300	4.8	0.4082	0.2868	0.0655	29.6
VF	0.6419	0.5880	0.0053	0.9	0.6819	0.6355	0.0140	2.3	0.3742	0.2375	0.0162	7.3
ASAP	0.6401	0.5858	0.0032	0.5	0.6717	0.6234	0.0019	0.3	0.4849	0.3911	0.1698	76.8
Concurrent Aptitude												
ASVAB	0.6288	0.5770			0.7452	0.7129			0.3829	0.2615		
SP	0.6407	0.5866	0.0096	1.7	0.7535	0.7195	0.0067	0.9	0.3917	0.2631	0.0016	0.6
RS	0.6301	0.5738	*	*	0.7531	0.7191	0.0062	0.9	0.4375	0.3276	0.0661	25.3
AS	0.6451	0.5919	0.0149	2.6	0.7541	0.7203	0.0074	1.0	0.4194	0.3026	0.0411	15.7
VF	0.6310	0.5749	*	*	0.7480	0.7132	0.0003	0.0	0.3941	0.2666	0.0051	2.0
ASAP	0.6335	0.5779	0.0009	0.2	0.7467	0.7117	*	*	0.5008	0.4119	0.1504	57.5

Panel B: Validities corrected for range restriction

	HOPT				JKT				PRO			
	MR	CVR	IN	%	MR	CVR	IN	%	MR	CVR	IN	%
Enlistment Aptitude												
ASVAB	0.6852	0.6433			0.7611	0.7313			0.3617	0.2320		
SP	0.6987	0.6554	0.0121	1.9	0.7742	0.7438	0.0125	1.7	0.3775	0.2437	0.0117	5.0
RS	0.6943	0.6501	0.0069	1.1	0.7878	0.7594	0.0282	3.9	0.4468	0.3413	0.1093	47.1
AS	0.7041	0.6618	0.0185	2.9	0.7804	0.7509	0.0196	2.7	0.4134	0.2953	0.0633	27.3
VF	0.6921	0.6476	0.0043	0.7	0.7712	0.7403	0.0091	1.2	0.3801	0.2476	0.0155	6.7
ASAP	0.6906	0.6458	0.0025	0.4	0.7645	0.7325	0.0012	0.2	0.4889	0.3972	0.1652	71.2
Concurrent Aptitude												
ASVAB	0.6778	0.6348			0.8116	0.7889			0.3886	0.2707		
SP	0.6881	0.6431	0.0083	1.3	0.8180	0.7942	0.0052	0.7	0.3981	0.2736	0.0029	1.1
RS	0.6789	0.6322	*	*	0.8173	0.7934	0.0045	0.6	0.4432	0.3364	0.0656	24.2
AS	0.6917	0.6473	0.0125	2.0	0.8184	0.7946	0.0057	0.7	0.4254	0.3121	0.0413	15.3
VF	0.6801	0.6336	*	*	0.8141	0.7898	0.0008	0.1	0.4005	0.2770	0.0063	2.3
ASAP	0.6817	0.6355	0.0007	0.1	0.8126	0.7881	*	*	0.5044	0.4174	0.1466	54.2

* Increment in cross-validated multiple correlation was negative due to insignificant improvement in validity by the new test relative to the number of predictors.

Table B-4. Increments in validity by new predictor tests for infantry assaultman performance, adjusted for time in service

Panel A: Sample validities

	HOPT				JKT				PRO			
	MR	CVR	IN	%	MR	CVR	IN	%	MR	CVR	IN	%
Enlistment aptitude												
ASVAB	0.5048	0.4314			0.5281	0.4602			0.3739	0.2590		
SP	0.5189	0.4425	0.0111	2.6	0.5411	0.4702	0.0100	2.2	0.4078	0.2963	0.0374	14.4
RS	0.5074	0.4280	*	*	0.5341	0.4615	0.0013	0.3	0.3766	0.2523	*	*
AS	0.5297	0.4560	0.0246	5.7	0.5670	0.5021	0.0418	9.1	0.3818	0.2598	0.0009	0.3
VF	0.5376	0.4658	0.0344	8.0	0.5314	0.4581	*	*	0.4064	0.2945	0.0355	13.7
ASAP	0.5111	0.4326	0.0012	0.3	0.5417	0.4709	0.0106	2.3	0.4451	0.3469	0.0879	33.9
Concurrent Aptitude												
ASVAB	0.5776	0.5202			0.6280	0.5801			0.4031	0.2993		
SP	0.5847	0.5237	0.0034	0.7	0.6357	0.5848	0.0047	0.8	0.4231	0.3173	0.0179	6.0
RS	0.5776	0.5150	*	*	0.6281	0.5758	*	*	0.4032	0.2900	*	*
AS	0.5897	0.5297	0.0095	1.8	0.6447	0.5956	0.0155	2.7	0.4041	0.2912	*	*
VF	0.5911	0.5314	0.0111	2.1	0.6280	0.5757	*	*	0.4243	0.3189	0.0195	6.5
ASAP	0.5825	0.5210	0.0007	0.1	0.6356	0.5847	0.0046	0.8	0.4668	0.3755	0.0761	25.4

Panel B: Validities corrected for range restriction

	HOPT				JKT				PRO			
	MR	CVR	IN	%	MR	CVR	IN	%	MR	CVR	IN	%
Enlistment Aptitude												
ASVAB	0.5958	0.5420			0.7026	0.6668			0.4104	0.3096		
SP	0.6062	0.5496	0.0076	1.4	0.7096	0.6716	0.0048	0.7	0.4406	0.3413	0.0317	10.2
RS	0.5978	0.5395	*	*	0.7058	0.6673	0.0004	0.1	0.4128	0.3037	*	*
AS	0.6142	0.5592	0.0172	3.2	0.7237	0.6880	0.0211	3.2	0.4175	0.3101	0.0005	0.2
VF	0.6202	0.5663	0.0243	4.5	0.7044	0.6656	*	*	0.4393	0.3396	0.0300	9.7
ASAP	0.6005	0.5427	0.0007	0.1	0.7099	0.6719	0.0051	0.8	0.4742	0.3855	0.0759	24.5
Concurrent Aptitude												
ASVAB	0.6485	0.6040			0.7572	0.7292			0.4068	0.3048		
SP	0.6538	0.6062	0.0022	0.4	0.7616	0.7317	0.0024	0.3	0.4239	0.3189	0.0141	4.6
RS	0.6485	0.6000	*	*	0.7573	0.7267	*	*	0.4076	0.2965	*	*
AS	0.6580	0.6113	0.0072	1.2	0.7671	0.7380	0.0088	1.2	0.4080	0.2972	*	*
VF	0.6578	0.6110	0.0070	1.2	0.7572	0.7267	*	*	0.4213	0.3153	0.0105	3.5
ASAP	0.6522	0.6043	0.0003	0.0	0.7616	0.7317	0.0025	0.3	0.4689	0.3786	0.0738	24.2

* Increment in cross-validated multiple correlation was negative due to insignificant improvement in validity by the new test relative to the number of predictors.

Table B-5. Increments in validity by new predictor tests for infantry training grades, controlling for time in service

Panel A: Sample validities

	Base A				Base B			
	MR	CVR	IN	%	MR	CVR	IN	%
Enlistment Aptitude								
ASVAB	0.5137	0.4866			0.3359	0.2960		
SP	0.5184	0.4888	0.0022	0.5	0.3369	0.2930	*	*
RS	0.5242	0.4952	0.0086	1.8	0.3385	0.2949	*	*
AS	0.5270	0.4982	0.0116	2.4	0.3370	0.2932	*	*
VF	0.5259	0.4971	0.0105	2.2	0.3448	0.3022	0.0061	2.1
ASAP	0.5139	0.4839	*	*	0.3434	0.3005	0.0045	1.5
Concurrent Aptitude								
ASVAB	0.5298	0.5041			0.3370	0.2974		
SP	0.5339	0.5058	0.0017	0.3	0.3409	0.2976	0.0002	0.1
RS	0.5354	0.5075	0.0034	0.7	0.3384	0.2947	*	*
AS	0.5376	0.5098	0.0057	1.1	0.3406	0.2973	*	*
VF	0.5401	0.5126	0.0085	1.7	0.3442	0.3015	0.0041	1.4
ASAP	0.5299	0.5014	*	*	0.3453	0.3027	0.0053	1.8

Panel B: Validities corrected for range restriction

	Base A				Base B			
	MR	CVR	IN	%	MR	CVR	IN	%
Enlistment Aptitude								
ASVAB	0.6658	0.6500			0.4566	0.4305		
SP	0.6685	0.6511	0.0012	0.2	0.4574	0.4285	*	*
RS	0.6719	0.6548	0.0048	0.7	0.4584	0.4296	*	*
AS	0.6736	0.6566	0.0066	1.0	0.4575	0.4287	*	*
VF	0.6729	0.6558	0.0059	0.9	0.4626	0.4343	0.0038	0.9
ASAP	0.6659	0.6483	*	*	0.4616	0.4332	0.0027	0.6
Concurrent Aptitude								
ASVAB	0.6736	0.6583			0.4552	0.4289		
SP	0.6759	0.6591	0.0008	0.1	0.4580	0.4293	0.0003	0.1
RS	0.6769	0.6601	0.0018	0.3	0.4561	0.4271	*	*
AS	0.6779	0.6612	0.0029	0.4	0.4578	0.4290	0.0001	0.0
VF	0.6799	0.6633	0.0050	0.8	0.4600	0.4314	0.0025	0.6
ASAP	0.6736	0.6566	*	*	0.4599	0.4313	0.0023	0.5

* Increment in cross-validated multiple correlation by new test was negative due to adjustment made for shrinkage.