Technical Report 845

Army Synthetic Validity Project: Report of Phase I Results

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Editors

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The two major objectives of the Army Synthetic Validity (SYNVAL) Project are

- to identify and evaluate an optimal composite of selection measures for any Army enlisted MOS and estimate the validity of this composite for predicting job performance; and
- to develop and refine a procedure for setting a minimum qualifying score to assure a reasonable probability of successful job performance, as well as other appropriate cutting scores for other critical selection decisions (e.g., for selecting recruits with potential for outstanding performance).

Synthetic validation approaches typically begin with the identification of a set of job components that can be used to describe the population of jobs being studied. A prediction

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equation is derived for linking available selection tests to each component. Subject matter experts (SMEs) are asked to identify the importance of each component to overall job performance. Finally, the prediction equations for the various components are weighted according to the judgment weights and summed to obtain an equation for predicting overall performance for the job.

The Synthetic Validity Project is charged with developing procedures for specifying minimum qualifying scores and other appropriate cut scores on the predictor composites identified for each job. Procedures will be developed for identifying job performance standards for each job. These performance standards will then be linked to scores on the predictor composite for that job.

There are three phases in the SYNVAL Project. Phase I was recently completed. For synthetic validation, the completion of Phase I represents a major accomplishment--development of a set of procedures for deriving synthetic equations that will predict performance for a small set of jobs. This set of procedures will obtain criticality ratings on job components, link predictors to job components, and combine that information to obtain prediction equations for three jobs. The SYNVAL standard setting research is designed to commence after job component models are adequately established. Therefore, for Phase I, we investigated three methods for describing performance standards at the job component level and one method for combining component standards into an overall standard.

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FOREWORD

In 1980 the Assistant Secretary of Defense directed all services to pursue a long-range systematic program to validate the Armed Services Vocational Aptitude Battery (ASVAB) and to compare enlistment standards with on-the-job performance. The Army has been investigating the validity of the ASVAB, as well as several new predictor measures, for a sample of 20 diverse Military Occupation Specialties (MOS). This effort, known as Project A, has been very successful in validating the ASVAB, as well as in providing the Army with a greater understanding of knowledge, skills, abilities, and other personal characteristics (KSAOs) required for these 20 MOS.

A major question now facing the Army is how to extend the wealth of data collected for Project A to the other 250-plus entry-level Army MOS and to new MOS created for new hardware systems as they become operational. A second challenge is to determine the methods needed for setting job performance standards that can be used in making selection and classification decisions.

The Army currently has a research project, the Synthetic Validity Project (SYNVAL), that addresses these challenges. Specifically, the objectives of SYNVAL are to (1) evaluate synthetic validity techniques for determining MOS-specific selection composites for each MOS; and (2) evaluate alternative methods for setting minimum qualifying scores on each of these composites. The research will proceed in three phases. Phase I was recently completed and this document provides information on Phase I research plans, objectives, and results.

Based on the results of the evaluations, recommendations will be made for the most promising approach for developing job performance prediction equations for all of the Army's 250-plus MOS and for setting performance standards for these MOS. The technical quality of this project is guided by the Scientific Advisory Committee, Drs. Phil Bobko (Chair), Robert Linn, Richard Jaeger, Joyce Shields, and Robert Guion.

EDGAR M. JOHNSON
Technical Director

ARMY SYNTHETIC VALIDITY PROJECT: REPORT OF PHASE I RESULTS

EXECUTIVE SUMMARY

Requirement:

The two major objectives of the Army Synthetic Validity Project are to identify and evaluate procedures for

- identifying an optimal composite of selection measures for any Army enlisted Military Occupational Specialty (MOS) and estimating the validity of this composite for predicting job performance; and
- setting a minimum qualifying score so as to assure a reasonable probability of successful job performance, as well as other appropriate cutting scores for other critical selection decisions (e.g., for selecting recruits with potential for outstanding performance).

Synthetic validity approaches typically begin with the identification of a set of job components that can be used to describe the population of jobs being studied. A prediction equation is derived for linking available selection tests to each component. Subject matter experts (SMEs) are asked to identify the importance of each component to overall job performance. Finally, the prediction equations for the various components are weighted according to the importance judgment weights and summed to obtain an equation for predicting overall performance for the job.

The standard setting task of the Synthetic Validity Project is charged with developing procedures for specifying minimum qualifying scores and other appropriate cut scores on the predictor composites identified for each job. Procedures will be developed for identifying job performance standards for each job, and these performance standards will then be linked to scores on the predictor composite for that job.

Procedure:

There are three research phases in the Project. In each phase, synthetic validity procedures and standard setting procedures are developed or refined and then tried out on a new sample of MOS. A major goal in Phase I for synthetic validity was to obtain and evaluate synthetic prediction equations for three MOS. Three job component models (consisting of tasks, activities, or attributes) were developed and used to obtain job description judgments. Predictors were linked via expert judgment to the job components. Various ways of generating prediction equations were investigated. A second goal was to evaluate difference in the job descriptions generated by different types of judges.

A major goal in Phase I standard setting was to investigate different ways of setting performance standards. Performance level definitions were developed. Three standard setting methods reflecting performance on tasks, critical incidents, and by soldiers were developed to obtain component standards. One method was developed for combining the component standards.

Findings:

For synthetic validity, the completion of Phase I represents a major accomplishment for the project. First, each of the three job component models produced reliable and comprehensive job descriptions. Second, valid predictors were successfully linked via expert judgment to those job components. Third, using job description and job component validity information, we formed prediction equations that had high predictive validity for each of the three jobs.

For standard setting, Army SMEs found the performance level definitions to be reasonable and workable. The three methods for setting standards resulted in different standards and also in some differences in the degree of consensus among judges in setting the standards. In deriving an overall standard from component standards, there was evidence that a linear compensatory model accurately captures the judges' aggregation strategies.

Utilization of Findings:

At the conclusion of Phase I, we have shown that synthetic validity yields valid predictions for three jobs. Future phases of the project will aim to extend the validity. In Phase II, we will continue work to refine the job component models, perhaps to reduce the number of models and explore an optimal way of generating prediction equations to yield the highest predictability and discriminability among jobs.

Meaningful performance standards were obtained for the three jobs. Future phases of the project will refine the methods to yield better agreement among the judges and greater convergence across methods.

ARMY SYNTHETIC VALIDITY PROJECT: REPORT OF PHASE I RESULTS

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ARMY SYNTHETIC VALIDITY PROJECT: REPORT OF PHASE I RESULTS

INTRODUCTION

The Army Synthetic Validity (SYNVAL) Project is designed to evaluate techniques for determining critical entry requirements for each enlisted Military Occupational Specialty (MOS). The project has two main components. The first component is an evaluation of synthetic validation (as defined by Lawshe, 1952; Balma, 1959) as a means for identifying and weighting the critical knowledge, skills, abilities, and other personal characteristics (KSAOs) required for successful job performance. These weighted KSAOs are then used to create an appropriate test battery for selection. The second component is the development and refinement of procedures for setting standards for on-the-job performance in each MOS and for linking selection composite score levels to these job performance standards.

The SYNVAL project is organized into three phases. In each phase, synthetic validation procedures and standard setting procedures are developed or refined and then tried out on a new sample of MOS. This report documents the results of Phase I data collection and analysis activities.

Summary of Previous Reports

Considerable work preceded the Phase I data collection. Much of this work is reported in detail in other documents and is only briefly mentioned here. We began the project with a review of literature on synthetic validation procedures and prior efforts to validate these procedures. A significant part of the review also covered various job component models that have been used in job analytic research and in synthetic validation. The results of this review are reported in A Review of Models and Procedures for Synthetic Validation for Entry-level Army Jobs (Crafts, Szenas, Chia, & Pulakos, 1988).

Synthetic validation begins with the development of a set of job descriptors that can be used to characterize any job in the domain under consideration. We call these descriptors "components" and refer to the model driving the specification of these descriptors as a Job Component Model. As described in the sections that follow, we developed three alternative job component models and pilot tested instruments for obtaining job descriptions using each model. The results of this pilot test are reported in Synthetic Validation Project: Pilot Test Report (Chia, Owens-Kurtz, Peterson, & Szenas, 1988).

Finally, we also reviewed literature relating to setting performance standards. The results of this review are reported in A Review

Finally, we also reviewed literature relating to setting performance standards. The results of this review are reported in A Review of Procedures for Setting Job Performance Standards (Pulakos, Wise, Arabian, Heon, & Delaplane, 1989).

Synthetic Validation and Phase I Objectives

The overall goal of the Synthetic Validation Project is to develop and evaluate alternative synthetic procedures for choosing valid selection and classification predictor measures for specific jobs. The project is a logical extension of the Army's landmark research in selection and classification (Projects A and B). Chapter 2 provides the background for the SYNVAL project and also describes the overall design and plan of the project for generalizing the validity information from a limited set of jobs to all jobs. The project has adopted a phased approach for extending validity to all jobs.

A major goal for synthetic validation for Phase I was to obtain synthetic prediction equations for three MOS--Infantryman (11B), Light-wheel Vehicle Mechanic (63B), and Administrative Specialist (71L). For that to occur, two preparatory steps must be satisfied. First, we must be able to describe an MOS reliably in terms of job components. A job component model for this purpose should yield a reliable and comprehensive description of a job. Second, after the job content is specified, valid predictors must be linked to those job components. In Phase I, we investigated using job experts and testing experts to estimate the validity of a host of predictor constructs for job components and for more macro areas of job performance. These two steps provided all the needed information to generate synthetic equations for three jobs. Clearly, these procedures require a major role from job experts for providing judgments about job content and performance. Therefore, another goal for Phase I was to examine how judges should be selected.

Job component models. Three job component models were investigated in Phase I. The first job component model is called the "Task Category Model." It is composed of major job tasks that describe the content of jobs. The second job component model, "Job Activity Model," is composed of general job behaviors that may be relevant for several specific jobs. Judges are asked to describe a job in terms of critical components. Chapter 3 is a description of the development of the two models and of results of using the two models with Army job experts. The relevant Phase I issues are: reliability of criticality judgments (i.e., frequency and importance), discriminability between jobs, comprehensiveness of coverage, and appropriateness of judges.

The third job component model, the "Attribute Model," is composed of predictor variables or constructs such as cognitive abilities, non-cognitive attributes such as temperament and interests, and psychomotor and perceptual abilities. A job can be described directly in terms of these attribute requirements by having job experts estimate the analyses. Therefore, the description of the development of the attribute model and results of analyzing validity judgments are documented separately in Chapter 4.

Linking predictor constructs to job components and job performance. One of the more difficult steps in synthetic approaches to validation has been to obtain validity information for the job components. However, recent research by Wing, Peterson, and Hoffman (1984) and Schmidt, Hunter, Croll, and McKenzie (1983) suggested that expert judgments of validity are highly accurate estimates of validities obtained empirically. Therefore in Phase I, we also collected validity estimates for 31 predictors for job components and for more macro levels of performance. These procedures and results are presented in Chapter 5.

Evaluation of synthetic equations. Chapter 6 describes how synthetic equations are formed for each job. There can be a large number of permutations for forming prediction equations from the different job component models and weighting schemes. Some combinations resulted in better predictability while others resulted in better differential prediction among jobs. Chapter 6 begins to explore some of those possibilities.

Judge characteristics and selection. During pilot tests conducted prior to Phase I, we requested Army officers, senior NCOs, and civilians to provide the job description judgments. We have found that as a group, the participants have provided reasonably reliable and useful data. With the same types of judges in Phase I, we began to examine the individual rater characteristics that led to more accurate judgments. This research is reported in Chapter 7. The results will have implications for judge selection or screening in future research phases and when the procedures are operational.

Standard Setting and Phase I Objectives

The standard setting component of the Synthetic Validation Project is charged with developing procedures for specifying minimum qualifying scores and other appropriate cut scores on the predictor composites identified for each job. We are evaluating a two-step approach to standard setting. For the first step, we intend to develop procedures for identifying appropriate job performance standards for each MOS. For the second step we will specify a method for linking these performance standards to scores on the predictor composite for that job.

Phase I research began to address the first step. There were three subgoals. First, performance standards should be defined. We began by defining four levels of acceptability as an alternative to the more common "all or none" (acceptable or unacceptable) approach. We tested these definitions with Army SMEs. Second, we attempted to locate these performance standards (acceptability levels) onto a performance continuum. We tested three methods for obtain performance level descriptions for different performance areas. Third, the performance standards for the different areas should be combined. We tested one method for obtaining overall performance standards.

Performance level definitions. In Phase I, we proposed four levels of performance. These four levels were as follows:

- unacceptable = Soldiers who consistently perform like this do not belong in the Army. Their performance is hurting the Army, and they should be discharged early.
- marginal = Soldiers who consistently perform like this need remedial training. Their performance is of little or no benefit to the Army. Unless they receive training and improve their performance, they should be barred from re-enlistment.
- acceptable = Soldiers who consistently perform like this are doing an adequate job. They are making positive contributions to the Army. They should be allowed to re-enlist.
- outstanding = Soldiers who consistently perform like this are doing extremely well. They are making exceptional contributions to the Army and are excellent examples to their peers. They should be encouraged to re-enlist and should be given special consideration for promotion or extra responsibilities.

The four levels of acceptability of a soldier's performance were intended to correspond to operational responses to such performance. One of the goals in Phase I was to clarify the definition of the four levels. Army SMEs reviewed these performance levels and attempted to use them for performance level descriptions.

Performance level descriptions. Another goal for Phase I was to define performance in terms of the four levels. Three methods for locating the levels of performance were tested, and these three methods were designed to allowed us to determine soldiers' performance level as measured in Project A. Project A research (Campbell, 1986) indicated that a soldier's job performance is multi-dimensional. Therefore, we attempted to set standards for several relevant job performance dimensions. These dimensions included General Soldiering Proficiency, Effort and Leadership, Personal Discipline, and Physical Fitness and Military Bearing, and one to three performance areas that are specific to the three Phase I jobs.

The first approach was the Soldier-based method. This method required judges to estimate directly the percent of incumbents who are performing unacceptably, marginally, acceptably, or outstandingly on each performance dimension. The second approach was based on examples of Army-wide and MOS-specific critical incidents gathered for Project A. Judges were asked to rate whether an incident was unacceptable, marginal, acceptable, or outstanding. The third approach was the Task-based method. We presented ten levels of performance using Project A MOS-specific hands-on test data and asked judges to rate the acceptability of each performance level.

Some of the key issues that we addressed include how much agreement was there among judges and how comparable were the standards between the standard setting methods. In addition, we also examined the effects of two manipulations on the resulting standards. One manipulation was the availability of normative data. Half of the judges received normative data and half did not. The other manipulation was practice. Again, half of the judges was allowed to work on a short practice exercise before commencing on the actual exercise. The resulting standards for the three approaches and the effects of the manipulations are presented in Chapter 7.

Deriving overall standards. The above three standard setting approaches were intended to obtain performance levels on performance dimensions. In order to characterize a more global performance level for the job, the performance levels on the performance dimensions can be combined. In Phase I, we explored how judges aggregated or combined the component standards into an overall standard. We constructed forty hypothetical soldiers with varying levels of performance on three performance dimensions and asked judges to describe the acceptability of each soldier's overall performance. Some questions that were explored included the strategies for combining component standards and how judges viewed extreme performance. These results are described in Chapter 8.

Review by Scientific Advisory Committee

Part of the project plan includes the review of plans and research results by the Scientific Advisory Committee (SAC). Members of the SAC are Drs. Phil Bobko, Robert Guion, Robert Linn, Richard Jaeger, and Joyce Shields. The Phase I results reported in this document have been presented to and reviewed by the SAC on November 9 and 10, 1988. A copy of the minutes of that meeting is found in Appendix A. During the meeting, SAC members offered a number of specific suggestions for future research. These suggestions and their implications are summarized in the last chapter.

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CHAPTER 2:

The Application of Synthetic Validation to the Development of System Wide Selection and Classification Procedures

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SUMMARY

The overall goal of the Synthetic Validation Project is to develop and evaluate alternative synthetic procedures for choosing valid selection and classification predictor measures for specific jobs.

The U.S. Army selects 110,000 - 130,000 people per year from 400,000 - 500,000 applicants and must assign them to 275 different entry level jobs (MOS) while meeting a number of constraints. It is a formidable individual and organizational decision-making task and makes heavy demands on personnel research.

The ongoing Army Selection and Classification Project (Project A) has produced a large selection/classification research data bank by choosing a sample of 19 jobs from the population of 275 jobs and assessing 300-600 people from each job on a 4-hour experimental predictor battery and 12 hours of criterion measurement. However, there is still a problem of how to develop selection and classification procedures for the 256 remaining jobs. Three major options are to: conduct additional criterion-related research, cluster jobs on the basis of their judged similarity around the 19 empirically based prediction equations (i.e. validity generalizations), or use synthetic validation procedures to selection and weight predictors in a battery.

The synthetic validation project is designed to evaluate the third strategy by developing three alternative synthetic procedures, extensively pilot testing each one, and then evaluating them against each other and against the empirically derived prediction equations that are part of the Project A database.

This chapter discusses the nature of the selection/classification problem in the Army, the parameters of the Project A data file, and the overall design of the current project. The parameters that distinguish the alternative synthetic procedures being compared and evaluated are the unit of analysis, the type of expert judge, and the type of judgment required. The relevant data are the distributional

properties and reliabilities of the judgments, the discriminability among jobs produced by each method, and the correspondence between synthetic and empirical estimates in the Project A validation sample of 19 jobs (MOS). The remaining chapters look at the major parts of the project in more detail.

CHAPTER 2:

The Application of Synthetic Validation to the Development of System Wide Selection and Classification Procedures

THE ARMY CONTEXT

The Army faces the following decision-making requirements, as regards the selection and classification of entry level enlisted personnel (new accessions). During the past 5-10 years approximately 400,000 - 500,000 people have applied each year for approximately 110,000 - 130,000 openings. The available openings are distributed unevenly across approximately 275 different jobs ranging from infantryman to helicopter engineer to mechanic to paramedic to administrative/clerical specialist. Each new accession goes immediately to basic training and then to advanced training in his/her chosen specialty. The number of training slots that will be available is budgeted at least one year in advance and many cost/benefit parameters are optimized if every seat is filled with appropriate people on the day the class starts. The individual choice of MOS is a function of training seat availability at a particular time, the current priority for "filling" the MOS, the individual's preference, and whether or not the individual's scores on the Armed Services Vocational Aptitude Battery (ASVAB) meet certain cutoffs. This is a complex decision process which must take place very quickly and is made on the basis of a relatively small amount of information.

External issues about which the Army must be concerned are a fluctuating labor supply with its general downward trend, and the ups and downs of the federal budget which have a direct effect on resources devoted to recruiting and the resulting nature of the applicant pool. At the same time, new equipment and new systems have been developed and the technical content and ability requirements of almost all MOS have increased markedly.

As a consequence of all of the above, accurate selection and optimal classification have become more critical than ever. At the same time, there is constant pressure on all the defense services to provide evidence that their personnel decision-making procedures are appropriate and valid. As an organization, the Army is a very large and very visible employer.

PROJECTS A & B

The Synthetic Validation Project is functionally related to two other research and development projects aimed at improving the Army's selection and classification decision making procedures: Project A and Project B.

Project B

Project B is based on theory and method in econometrics and operations research. It has developed the models and software for an enlisted personnel assignment system that takes into account:

- forecasts in the future applicant supply
- forecasts of personnel needs in each MOS
- hiring goals for different subpopulations
- the rate at which training class slots are currently filling
- the MOS priorities designated by the Army
- the differential utility of different expected levels of performance within and across MOS
- the level of selection accuracy and differential prediction across MOS provided by the predictor battery.

Project B is intended to be a state-of-the-art algorithm for optimizing personnel decisions, given certain goals, and for conducting a wide variety of "what if" exercises as regards changes in labor supply, priorities, utilities, and criterion content.

Project A

Project A is a very large personnel selection and classification validation project that was intended to use a sample of jobs (MOS) from the entire population of enlisted MOS to validate both the existing test battery (ASVAB) and a battery of newly developed selection/classification tests against a comprehensive set of performance measures. The major research issues revolved around:

- how to define and measure job performance
- the tradeoff between the number of jobs vs. the sample size for each job, given that resources did not permit drawing a sample from each of the 275 MOS
- identification of predictor domains with the highest potential for adding selection validity and classification validity to the existing ASVAB
- how specific variables should be targeted in each domain for predictor development
- how performance measures should be aggregated into composites for validation purposes

- how to choose predictor batteries and estimate validity for jobs (MOS) for which no empirical data could be obtained.

Design and Method

To pursue the project's objectives while addressing the above issues, the following design was used in Project A.

There were two major validation samples: a concurrent sample taken from the 1983/84 cohort and measured on both the new predictors and new criterion measures in 1985; and a longitudinal sample assessed on the predictors when they entered the Army in 1986/87 and tested on the performance measures in 1988/89. Each sample consists of 80 to over 900 people in each of 21 MOS which were selected to be representative of the entire population of enlisted MOS. Consequently, both samples contain over 20,000 individuals with predictor and criterion measures.

Criterion measures were developed by conducting an extensive task analysis and critical incident analysis of each MOS. All available sources and multiple expert reviews were used to generate a full listing of all tasks in each MOS as well as judgments about the criticality and difficulty of each task and the similarity among tasks. The critical incident analysis produced a complete set of performance dimensions for each MOS. For a representative sample of critical tasks in each MOS, job sample (hands-on) exercises, paper-and-pencil knowledge tests, and rating scales were developed. Also, behavioral rating scales were developed for each of the dimensions that survived the critical incident retranslation and SME reviews. In addition, rating scales were developed to assess expected performance in combat. Finally, existing administrative records were examined and six variables retained as performance indicators (e.g., number of awards and letters of commendation). The full performance assessment required 12 hours per individual.

Potential new predictor variables were selected through a painstaking process of literature search, expert review, and evaluation of previous research. The goal was to produce a four-hour battery of new tests that would maximize the chances of improving selection/classification accuracy for the entire system (i.e. population of MOS). In the end, the domains from which the experimental predictors were sampled were the following (in addition to the ASVAB)

- spatial ability
- perceptual speed and accuracy
- psychomotor abilities
- personality/temperament
- vocational interests
- biographical history

The major steps in the analysis were directed first at developing a basic set of predictor scores from the four-hour battery, a basic set of performance scores from the 12 hours of criterion assessment, and a model of performance that would account for the covariances among criterion scores. Then the correlations between each predictor score and each criterion score for each MOS were calculated, and an analysis of differential prediction across criterion dimensions within MOS (e.g., do different measures predict different dimensions of performance for given jobs) and across MOS for each major criterion dimension (e.g., do different measures predict the same dimension of performance for different jobs) was carried out.

Results

After analysis, the item subtests of the ASVAB plus the four-hour battery of experimental tests were arrayed into 24 predictor scores. They are listed in Table 1.

The multiple performance measures were first aggregated into 28-31 basic criterion scores (depending on the MOS) by means of expert judgment panels and exploratory factor analyses. A confirmatory analysis procedure was then used to test the fit of these basic scores with alternative models of the latent criterion structure. The best fitting model included five content factors and two method factors. They are shown as Table 2.

The first validation analyses generated a 24 (predictors) by 5 (criteria) matrix of validity coefficients for each MOS. These matrices were examined for the level of average validity, for profiles of validities across predictors for each criterion factor, for patterns of validities across the five factors within MOS, and validity patterns across MOS for each of the five criterion factors. The following conclusions summarize the results:

- Each of the five criterion factors can be predicted with considerable accuracy, but not by the same predictors.

- There is considerable differential prediction across criterion factors within each MOS. This suggests that different goals could be emphasized in selection/classification (e.g., maximizing technical performance vs. minimizing discipline/motivational problems).

- The only criterion factor to show significant differential prediction across MOS was the core technical performance factor. For the other four performance components, the same predictor profile was found in each MOS.

Table 1

Project A Test Content and Predictor Composite Scores

ASVAB Subtests	General Cognitive Ability Composites
Mechanical Comprehension Auto Shop Electronics Information	Technical
Math Knowledge Arithmetic Reasoning	Quantitative
Verbal General Science	Verbal
Coding Speed Number Operations	Speed

Table 1 (Contd.)

Project A Test Content and Predictor Composite Scores

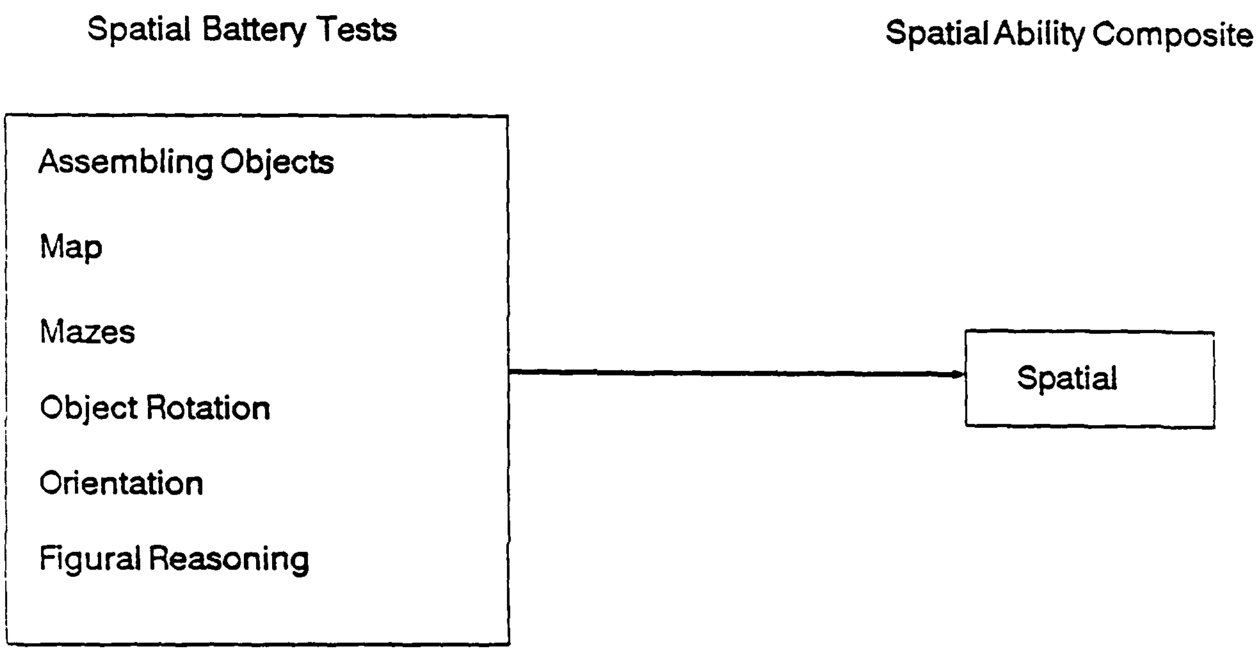

Table 1 (Contd.)

Project A Test Content and Predictor Composite Scores

Computer Battery Tests	Perceptual-Psychomotor Ability Composites
Cannon Shoot Test (Time Score) Target Shoot Test (Time To Fire) Target Shoot Test (Log Distance) Target Tracking 1 (Log Distance) Target Tracking 2 (Log Distance)	Psychomotor
Short Term Memory Test (Decision Time) Perceptual Speed & Accuracy Test (Decision Time) Target Identification Test (Decision Time)	Complex Perceptual Speed
Short Term Memory Test (Percent Correct) Perceptual Speed & Accuracy Test (Percent Correct) Target Identification Test (Decision Time)	Complex Perceptual Accuracy
Number Memory Test (Percent Correct) Number Memory Test (Initial Decision Time) Number Memory Test (Mean Operations Decision Time) Number Memory Test (Final Decision Time)	Number Speed & Accuracy
Choice Reaction Time Simple Reaction Time	Simple Reaction Speed
Choice Reaction Percent Correct Simple Reaction Percent Correct	Simple Reaction Accuracy

Table 1 (Contd.)

Project A Test Content and Predictor Composite Scores

ABLE Scales	Temperament-Personality composites
Self-Esteem Work Orientation Energy Level	Achievement Orientation
Conscientiousness Non-Delinquency	Dependability
Emotional Stability	Adjustment
Physical Condition	Physical condition

Table 1 (Contd.)

Project A Test Content and Predictor Composite Scores

AVOICE Scales	Vocational Interests
Clerical/Administrative Medical Services Leadership/Guidance Science/Chemical Mathematics Electronic Communications	Skilled Technical
Mechanics Heavy Construction Electronics Vehicle/Equipment Operator	Structural/ Machines
Combat Rugged Individualism Firearms Enthusiast	Combat-Related
Number Memory Test (Percent Correct) Number Memory Test (Initial Decision Time) Number Memory Test (Mean Operations Decision Time) Number Memory Test (Final Decision Time)	Number Speed & Accuracy
Choice Reaction Time Simple Reaction Time	Simple Reaction Speed
Choice Reaction Percent Correct Simple Reaction Percent Correct	Simple Reaction Accuracy

Table 1 (Contd.)

Project A Test Content and Predictor Composite Scores

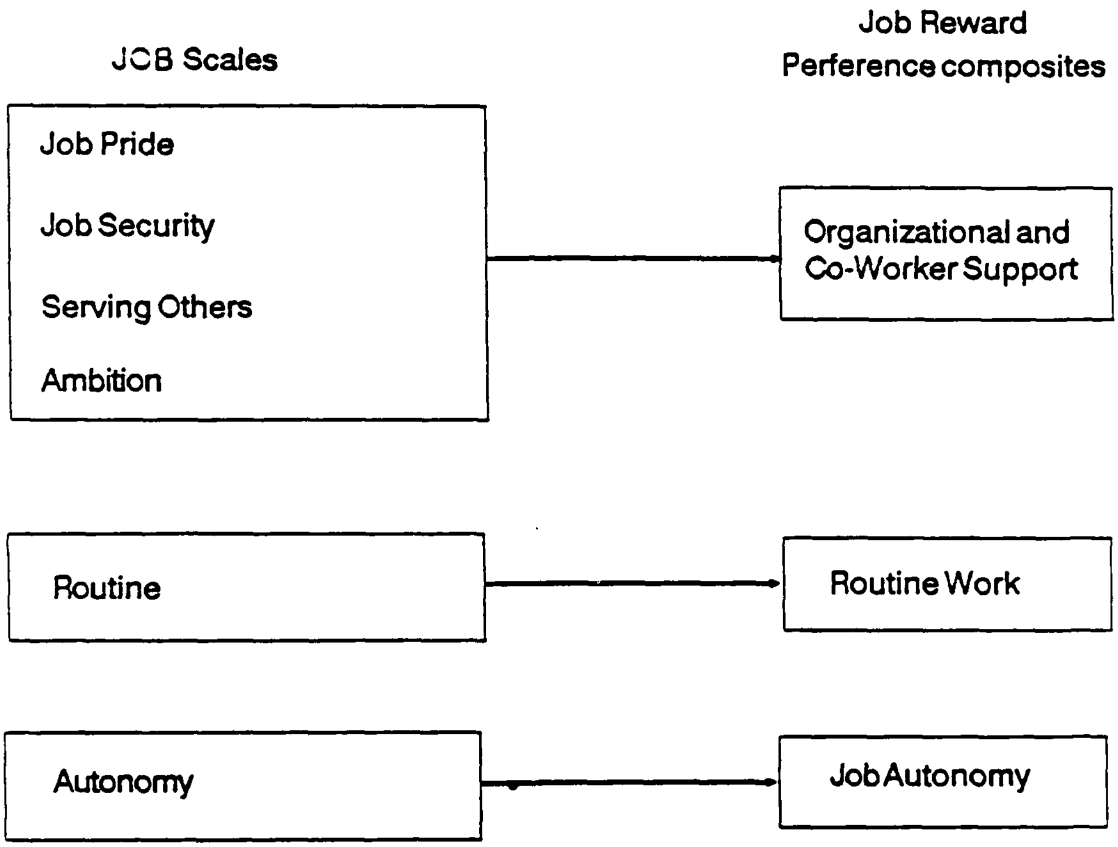

Table 2

Mapping of Performance Factors Onto Latent Performance Constructs

	Latent Performance Constructs							
	Content Constructs					Method Constructs		M16
Criterion Measure*	Core Technical Proficiency	General Soldiering Proficiency	Effort/ Leadership	Personal Discipline	Physical Fitness/ Military Bearing	Written Know-ledge Tests	Rating Scales	M16 Qualification
AWB Effort			X				X	
AWB Discipline				X			X	
AWB Fitness					X		X	
AWB Overall			X	X			X	
MOS Technical			X				X	
MOS Other			X				X	
Cmbt Perform Well			X				X	
Cmbt Avoid Mistake			X	X			X	
Adm Awards/Certs			X					
Adm Phys Readiness					X			
Adm M16								X
Adm Articles 15				X				
Adm Promotion Rate				X				
HO Technical	X							
HO Communications		X						
HO Vehicles		X						
HO General Soldier		X						
HO ID Threat/Target		X						
HO Safety/Survival		X						
JK Technical	X					X		
JK Communications		X				X		
JK Vehicles		X				X		
JK General Soldier		X				X		
JK ID Threat/Target		X				X		
JK Safety/Survival		X				X		
SK Technical	X					X		
SK Communications		X				X		
SK Vehicles		X				X		
SK General Soldier		X				X		
SK ID Threat/Target		X				X		
SK Safety/Survival		X				X		

Note: Within each rating instrument, all of the factors were constrained to have an equal loading on the Rating Scales method construct. For example, the Perform Well and Avoid Mistakes factors from the Combat Performance Prediction Scale were constrained to have identical loadings on the Rating Scales method construct, but this loading did not have to be the same as the loading for the Army-Wide BARS factors, the MOS-Specific BARS factors, or the Common Task Scales factors.

*AWB = Army-wide behaviorally anchored rating scales; HO = hands-on; JK = job knowledge; SK = school knowledge.

The Basic Issue

Using Project A results, optimal prediction equations can be developed for 19 MOS and classification efficiency can be examined across the same 19. However, the Army must select and assign people to approximately 275 MOS. When implemented, the Project B algorithm must lead to decision for all applicants.

There are three major ways to approach this issue:

- Empirical validation could be carried out for all 275 MOS.
- Since the 19 MOS were selected to be representative of clusters of MOS judged to be similar in content within each cluster, validity generalizations could be assumed within each cluster and examined empirically across the 19. That is, the significant differential prediction across MOS for the Core Technical Proficiency (CTP) factor may be accounted for by fewer than 19 equations.
- A synthetic validation procedure could be used to select a predictor battery for each MOS. The 19 MOS in the Project A sample provide a means for empirically validating any such synthetic procedures.

It is the latter strategy which is the focus of the Synthetic Validation Project. If a successful synthetic validation procedure could be developed, it would provide a less costly way (and perhaps the only feasible way) of developing selection/classification procedures for new MOS, for MOS that have undergone significant changes, or for MOS that have relatively few people in them

The remaining chapters in this report describe the major parts in this synthetic validation effort, a brief overview of which is given below.

THE SYNTHETIC VALIDATION PROJECT

The "synthetic validity" approach was first introduced by Lawshe (1952) as an alternative to the situational validity approach, which requires separate validity analyses for each job in the organization. Balma (1959) defined synthetic validity as "discovering validity in a specific situation by analyzing jobs into their components, and combining these validities into a whole."

Guion (1976) provides a review of several approaches to conducting synthetic validation. The approach most relevant to the problem at hand involves

- identifying job components that are common across a range of jobs

- using criterion-related validity procedures to validate potential predictors of each component of job performance (pooling incumbents across jobs as appropriate), and

- developing predictor composites for each job by combining the prediction equations for each of the job components that are relevant to the job.

The usefulness of this variant of synthetic validation depends on three critical operations.

First, a set of components must be identified that cover all important aspects of performance in all enlisted jobs. The taxonomy of job components must be reasonably exhaustive of the job population such that the critical parts of any particular job can be described completely by the weighted sum of all relevant components and very little else. In addition, there must be a group of subject matter experts (SMEs) available who understand these components well enough to provide reliable and accurate importance or relevance weights for the components in a particular job.

Second, it must be possible to establish equations for predicting performance on each component from current or potential selection measures. The prediction equation for a given component must be independent of the particular job for which the component is judged relevant. Either empirical or a combination of empirical and judgment-based procedures must be used to establish the predictive relationships for each component. There also must be reliable differences between the prediction equations for different components. To the extent that the same measures predict all components of performance, the overall prediction equations will necessarily be the same across jobs (since it will not matter which components are relevant). In such a case a validity generalization model would apply, and there would be no basis for differential classification.

Third, synthetic validation models assume that overall job performance can be expressed as the weighted or unweighted sum of individual performance components. Composite prediction equations are typically expressed as the corresponding sum of the individual component prediction equations. To estimate the validity of the composite prediction equation, validity estimates for the predictors of each component are needed and some further assumptions are required. Most typically, it is assumed that errors in estimating different components of performance are uncorrelated.

Project Design

The general design of the Synthetic Validation Project is as follows. After a thorough literature search, we outlined a set of alternative methods for describing job components. These were based on our own and previous work in constructing taxonomies of human performance (e.g., Fleishman and Quaintance, 1984). There are four principal kinds of components or descriptive units for analyzing jobs: behavior description approaches (e.g., handling objects), behavior requirements approaches (e.g., decision making), ability requirements approaches (e.g., finger dexterity), and task characteristics approaches (e.g., fires main gun).

After an initial review of alternative types of components, we decided to combine behavior requirements and ability requirements and to proceed with three approaches. The first is a Job Behaviors Model. The components are defined as general job behaviors that are not task specific, but which can underlie several job tasks. Examples might be "recalling verbal information" or "driving heavy equipment." For this approach we are attempting to identify a set of behaviors that can be linked reliably to predictor measures. Some concerns are that it may be difficult to develop the taxonomy of behavior in sufficient detail to be useful, the judgments of job relevance may be difficult, and these descriptions may not be accepted by those making the judgments.

The descriptive units in the second approach are Job Tasks. An initial list of performance tasks was developed in Project A from duty area descriptions for the 111 enlisted jobs with the largest number of incumbents. These descriptions provide a basis for defining job components that are clusters of tasks rather than behaviors within tasks. The chief advantages of this model are a close match to previous empirical validity data and the familiarity of SMEs with these kinds of descriptions. The primary concerns are that the taxonomy may not be complete enough to handle new jobs and that the relationships of job component performance to individual predictors may be difficult to determine reliably and accurately.

The final approach is an Individual Attribute Model. In this approach, the components are job requirements described in terms of mental and physical abilities, interests, traits, and other individual difference dimensions. This model eliminates the need to establish links between predictors and job components because the job components are the predictors. The chief concern with this approach is that there may be no SMEs who know enough about both the job and the human attribute dimensions to describe job requirements accurately. Also, this approach may not be as acceptable as a method based on more specific job descriptors.

Procedure

The Synthetic Validation Project follows an iterative procedure. The iterative approach provides an opportunity for revisions of the models and research methods followed by evaluation of a more refined version of each approach. The design specified first a series of exploratory workshops to assess the completeness and clarity of each job component model followed by three phases of further development and evaluation. In Phase I, initial procedures were tested for three of the Project A MOS. In Phase II, revised procedures will be tested for seven more Project A MOS. Final procedures will be tested in Phase III for nine more Project A MOS and four MOS not sampled by Project A.

Throughout the project design, the emphasis is on the identification and evaluation of alternative approaches to the implementation of synthetic validation procedures. We will evaluate the extent to which each of the three models can meet the assumptions for synthetic validation and the extent to which each leads to an optimal predictor battery. In the course of doing that, we will compare the results produced by different types of judges when evaluating the relevance of the different types of components for the target jobs. For example, are officers or NCOs the better judges of which task components are the most relevant for a specific job? Are psychologists or Army officers the better judges of which attributes will predict performance on a particular job? The criticality judgments produced by the type-of-judge/type-of-component combinations will be compared in terms of their distributional properties, interjudge reliabilities, discriminability, and acceptability.

For the job task and job behavior based approaches, a particular job must first be described in terms of its most relevant task or behavior content. Once the content elements are known, the expected validity of the attributes (predictor variables) must then be estimated so as to select a potential predictor battery. If a profile of attribute validities is estimated for each of several job components, then the validity profiles can be intercorrelated and the predictor covariances can also be estimated. As an alternative, the validity of a measure of each attribute of predicting job performance can be estimated directly (by either psychologists or Army personnel) and the prior judgment of which tasks or behaviors are relevant for the job is eliminated.

Again, the basic objective is to determine which combination of descriptive component, type of judge, and type of judgment leads to the best predictor battery. As used here, the term "best" refers to the optimal procedures for:

- minimizing the cost of producing the synthetic validity estimate in terms of time, number of judges, number of judgments, etc.

- maximizing the discriminability across jobs

- minimizing testing time during actual operational use (i.e., a battery with fewer tests)

- maximizing the correspondence of the synthetic prediction equations with the empirical ones as portrayed in the Project A data.

Expected Outcomes

Analyses conducted by Project A have provided evidence for reliably differential prediction of technical proficiency in different MOS (Wise, Campbell, & Peterson, 1987). Analyses based on the ASVAB subtests alone indicate, for example, that the "technical" ASVAB subtests (Mechanical Comprehension, Auto-Shop Information, and Electronic Information) provide excellent performance prediction for many technical jobs and relatively poor prediction for most clerical jobs. New predictors developed for Project A similarly show differential validity across jobs. The Combat Interest scale (Peterson, 1987), for example, shows significantly greater validity for predicting performance in combat jobs than in noncombat jobs. These results lead us to expect some reasonable success in identifying different predictor composites for different jobs. Therefore, efforts to develop refined procedures for composite identification appear justified.

The approach to selection composite development recommended as a result of this project may be at any of several levels of specificity. At one extreme, we might recommend grouping jobs into a relatively small number of families based on similarities in job component profiles. A different predictor composite would be identified for each family, but no attempt at differential prediction would be made for jobs within the same family. The job description task would consist of forming a job components profile for a new job and then matching it to one of the job family profiles.

Intermediate results might include identification of a much larger set of distinct job families or procedures for synthesizing composites based on a small number of general job components. In the latter approach, each job might have a distinct composite if job-specific weights were developed for the small number of different prediction equations corresponding to the different job components.

At the other extreme, we might demonstrate the usefulness of a full-blown synthetic validation approach. Each job would have a distinct predictor composite derived from a profile that encompassed a large number of detailed job components.

Again, the overall objective is to evaluate the major alternative synthetic validation procedures as a means for producing a selection/classification predictor battery for each job in a population of jobs and for new jobs that enter the system in the future. The Army's situation is such that a true classification strategy is required. Projects A and B have provided both the validation data and an assignment algorithm for determining optimal decision strategies and estimating their limits. It remains for validity generalization or synthetic validation to provide decision rules for all jobs in the population.

The remaining chapters in this report describe the major parts of Phase I of the Synthetic Validation Project in more detail.

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CHAPTER 3:

Analysis of Job Components: The Development and Evaluation of Alternative Methods

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SUMMARY

Synthetic validation involves disaggregating jobs into components, identifying valid predictors for the components, and aggregating component validities. One of the first steps is to develop a job component model for describing jobs in terms of components. In the Synthetic Validity Project, three job component models were developed and tested. This chapter describes the development of the first two models and the evaluation of the usability of these models for different types of judges. The third model is described in the following chapter.

The Task Category Model is composed of major job tasks that describe the content of jobs in the population. At the most general level, the taxonomy encompasses five categories: mechanical, general operations, administrative/clerical, combat, and leadership.

The Job Activity Model is composed of general job behaviors that may be relevant for several specific job tasks. The initial taxonomy was constructed from categories suggested by widely-used job analysis instruments such as the Position Analysis Questionnaire (PAQ) and elaborated by research and theory in cognition, problem solving, and interpersonal behavior. At the most general level, the taxonomy is composed of leadership, communication, information manipulation, perceptual judgments, problem solving, operating equipment, adjusting, driving, aiming, and other physical actions.

Army subject matter experts used instruments based on these job component models to describe jobs. Results showed that there was adequate agreement (single-rater reliability) in their judgments of relevance of a job component for a job. The Task Category instrument yielded more reliable judgments than the Job Activity instrument. Officers were somewhat more consistent than NCOs on the Task instrument and Field judges were more consistent than School judges on the Activity instrument. In addition, there was also adequate discriminability in their job descriptions for different jobs. Finally, judges estimated that each taxonomy covered about 70 percent of the job content.

CHAPTER 3:

Analysis of Job Components: The Development and Evaluation of Alternative Methods

As indicated in chapter 1, the Synthetic Validation Project incorporates an iterative approach for developing and testing multiple models for synthetic validation. One of the first steps in synthetic validation is the decomposition of jobs into job components.

Nature of Job Component Models

Four different bases for defining job component models, or decomposing jobs into components, were reviewed as a first step in model development. Three of these were judged reasonable for the Army's purposes of describing jobs and linking components with selection measures. This chapter will focus on two of these three job component models, describing their descriptor bases, linkages, and required judgments and potential or preferred judge types. The third model, called the Attribute Model, is an attempt to describe jobs directly in terms of the required skills and other attributes measured by the selection battery. The development and evaluation of the predictor taxonomy that is the basis of this model will be described in the next chapter.

One model developed for the Synthetic Validation Project is based on what is commonly called the "Task Characteristics" approach, which has as its basis the work itself, or the inherent characteristics of the tasks themselves. The performer's observable/overt behavior and internal processing are not taken into account. The task-based model came to be referred to as the "Task Category" model.

The second model was developed on the basis of descriptors referred to as "behaviors" in the literature, and contains components found in "Behavior Description" models. Observations and descriptions of worker behaviors while working are the units of analysis. The components of these models are thus based on observable behaviors, not on behaviors that are expected or required. The model developed for this project is called the "Job Activity" model, composed of "activities."

The choice of job component model used for synthetic validation purposes influences decisions concerning how to go about establishing the linkages for synthetic validation. These decisions basically answer the questions:

- what types of linkages are required?
- what types of judgments are required?
- who should the judges be?

Both the task-based and activity-based models require participation of expert judges to support the linkages. We will briefly summarize some findings from the literature that have implications for the judgment procedures which accompany use of these models.

Types of Linkages

Essentially, the job component model in a synthetic validation application serves as a mechanism for relating a predictor domain to a job performance domain. Thus, there are two types of linkages:

- predictor-job component linkages
- job component-overall job linkages

Applications have demonstrated that these linkages can be established empirically and/or judgmentally.

Type of Judgment

We need to specify just what types of judgments are required to establish the linkages of the model. The job description judgments are those typically collected with structured checklists or instruments to assess degree of criticality or importance of specific components for job performance. These ratings may be:

- part vs. not part of job
- importance
- frequency
- percent of time spent
- difficulty, etc.

On the other hand, predictor-job component linkages require that judges estimate the degree to which relationships exist between selection measures and job components. These may be relative validity estimates (e.g., using a rating scale) or estimates of correlation coefficients.

Judges

Two main questions concerning judges are typically addressed in the literature:

- who should the judges be--what rater group is appropriate for providing judgments required at several points in the synthetic validation process
- what qualifications should the specific raters have, in order to provide reliable, accurate information?

First, judges will provide job descriptive information in the form of estimates of criticality of job components for job performance. In addition, validity estimates will be needed to link predictor measures to job components. These two types of judgments are very different; thus, judges with different areas of expertise should provide them. Optimally, Army subject matter experts (SMEs) should provide the job descriptive judgments, while psychologists knowledgeable in the areas of test development, test validation, measurement, and individual differences should provide judgments to link predictors with job components.

Based on our review of the rater literature, we can draw some conclusions and offer some suggestions for designating judges for providing job description and validity judgments:

- reliable and accurate ratings can be obtained from incumbents, supervisors, and job analysts
- potential gains in rating quality could result from selecting judges who have proven to be "effective" performers in their own jobs
- empirical validities can be closely approximated by judged validities for a variety of tests, criteria, and jobs
- more experienced experts provide better validity estimates.

We have explained the synthetic validation model to guide the development of a job taxonomy and method for entry-level MOS. We have also examined the issues regarding synthetic validation, job taxonomies, and expert judgments. Now we will describe the development and results of field testing of the Task Category and Job Activity models.

Development of Job Component Models

Task Category Model

Initial development. In developing the task category taxonomy, project staff relied on prior job analysis information and validation data. Two sources of job analysis information guided the development of the initial task taxonomy. First, project staff reviewed general job descriptions (contained in Army Regulation 611-201) to determine job tasks that were performed by a soldier across a number of jobs. A representative sample of 111 jobs were selected. The sample of jobs had been previously clustered into 23 job clusters by personnel experts familiar with Army jobs. Initial task performance categories were derived from general job descriptions in each job cluster. The second source for identifying common job tasks was critical incidents collected to develop performance rating scales. In deriving common job tasks, emphasis was placed on determining what a soldier in each job might be observed doing and what he or she might be trying to accomplish. Therefore, each resulting category was constructed to represent a set of actions leading to an objective. From the job descriptions and the critical incidents, 53 categories were initially identified. These 53 task categories were used as criterion categories for gathering predictor-criterion validity judgments for Project A (Wing, Peterson, & Hoffman, 1984).

Development of the task performance taxonomy was also guided by results of empirical validation. Two major findings from the Project A concurrent validation influenced the emerging task taxonomy. First, the validation results suggested a basic division of job performance measures into technical proficiency ("can-do") and nontechnical aspects of performance ("will do"). Second, results of the predictor-criterion relationships revealed three or four patterns of predictor relationships for jobs as a whole. Mechanical jobs and administrative jobs had the greatest differences in predictor relationships. Combat and other jobs had intermediate patterns of predictor relationships. Interest and other noncognitive predictors added to the discrimination of combat families from other families of jobs.

The preliminary performance taxonomy that emerged from these sources was subsequently adapted to cover a wider range of jobs in terms of performance elements. As part of Project A's planning for further MOS family development, we revised and expanded the original 53 task performance categories. Specifically, we examined all of the Army MOS definitions from AR 611-201 that were not originally reviewed and added categories to cover the new job duties. We also added variables to insure coverage of the criterion domain as defined by Project A's MOS training duties areas (identified from the Army Occupational Survey Program results), behaviorally anchored rating scale (BARS) dimensions, and its MOS task clusters. Then the revised list was reviewed by a group of Army officers during one of Project A's utility workshops. Based on these additional reviews and further external and internal suggestions, the list of task performance categories was expanded to 88 task categories. In addition to our attention to coverage, we also tried to use language that would be understood by prospective Army SMEs.

Task categories taxonomy and subsequent revisions. The initial taxonomy is shown in Figure 1. Technical proficiency was initially divided into four domains: maintenance, combat, general, and administration. Nontechnical proficiency was composed of effort and leadership, personal discipline, and physical fitness and military bearing. Examples of detailed descriptions of several task category components are provided in Figure 2. The Task Category taxonomy used in Phase I is shown in Appendix A.

A number of revisions were made to the individual categories and the taxonomy after initial testing with Army SMEs. Some of the changes were:

- narrowing down the frame of reference for describing jobs to focus on the job as performed by soldiers who have completed basic training and advanced individual training and have 18 months on-the-job experience,
- clarifying the wording of items which resulted in large standard deviations of 2.0 or more in the prepilot test relevance ratings,
- collecting a frequency rating for the overall job followed by importance ratings for core technical proficiency, general soldiering proficiency, and the overall job,
- adding more job components to the model.

Pros and cons of model. Based on Project A results (i.e., content validation data), much is known about the taxonomy and its components. As a great deal of military training and testing is based on task performance, SMEs have considerable experience with judgments on the components. The method yields an easy match between job analysis information and Project A validity data because the Task Categories taxonomy and criterion measures were founded on the same theoretical framework of job performance. On the other hand, there are several shortcomings associated with using a task-based model. As the taxonomy was derived from existing jobs, it may not be comprehensive enough for describing new jobs. In addition, the method requires a large number of judgments from SMEs because of the large number of task categories. In Phase I for example, the Task Categories Taxonomy contained 96 elements compared to 53 elements for the Job Activity Taxonomy.

I. TECHNICAL COMPONENTS

A. Maintenance Components
- Troubleshoot
- Inspect
- Repair
- Install/Operate

B. Combat Components
- Use Individual Weapons/Combat
- Operate Weapon Systems
- Identify Targets
- Navigation/Determine Distance and Direction
- Safety/Survival

C. General Components
- Equipment/Vehicle Operation
- Construction and Structural Repair
- Pack/Load Materials
- Technical Procedures

D. Administrative Components
- Clerical
- Record Keeping/Scheduling
- Communication/Reporting
- Analyze Data
- Graphics/Drafting

II. NONTECHNICAL COMPONENTS

A. Effort and Peer Leadership

B. Personal Discipline

C. Physical Fitness and Military Bearing

Figure 1. Initial Task Category Taxonomy

I. TECHNICAL COMPONENTS

A. Maintenance Components

-- Troubleshoot

15. Troubleshoot electronic components -- find the cause of malfunctions in electronic equipment and components using technical manuals, tools, and test equipment (e.g. specialized test sets).

12. Troubleshoot electrical systems -- find the cause of malfunctions in electrical parts and equipment using technical manuals, tools, and test equipment (e.g. multimeters, test lights).

6. Troubleshoot mechanical systems -- find the cause of malfunctions in mechanical parts and equipment using technical manuals, tools, and test equipment (e.g. calipers, gauges, torque wrenches).

9. Troubleshoot hydraulic or pneumatic systems -- find the cause of malfunctions in hydraulic or pneumatic parts and equipment using technical manuals, tools, and test equipment (e.g. pressure gauges).

2. Troubleshoot weapons -- find the cause of malfunctions in weapons using technical manuals, tools, and test equipment.

-- Inspect

14. Inspect electronic systems -- measures use test equipment and manuals, and observe electronic systems (e.g. communications equipment, radar, missile and tank computer ballistics) to detect problems and malfunctions.

11. Inspect electrical systems -- measure, use test equipment and manuals, and observe electrical systems (e.g. generators, wiring harnesses, switches, relays, circuit breakers) to detect problems and malfunctions.

5. Inspect mechanical systems -- measure, use test equipment and manuals, and observe mechanical equipment (e.g. engines, transmissions(to detect problems and malfunctions.

8. Inspect hydraulic or pneumatic systems -- measure, use test equipment and manuals and observe hydraulic or pneumatic parts and equipment (e.g. brakes, hydraulics, refrigeration systems) to detect problems and malfunctions.

Figure 2. Examples of detailed task categories

Job Activity Model

Initial development. The descriptor, or unit of analysis, for this approach is termed the general job behavior and is defined as a behavioral unit that is not specific to particular tasks but can be an important component of several job tasks. For example, typing a letter on a typewriter and typing a letter on a Personal Computer are two job tasks. Operating a keyboard is a general job behavior that is common to each task. To develop a relevant taxonomy of behaviors with which to describe the behavioral requirements of entry level Army jobs (MOS), we first consulted major published instruments such as the Position Analyses Questionnaire (McCormick, Jeaneret,& Mecham, 1972), Occupation Analyses Inventory (Cunningham, Boese, Neeb, & Pass, 1983), and Functional Job Analyses (Fine, 1962, 1963, 1974) scales. A basic review of these instruments is presented in Fleishman and Quaintance (1984). Although none of the instruments is devoted exclusively to items that reflect behavioral units, as defined above, each of them provided ideas about the domains of behaviors that should be included in the initial taxonomy. For additional ideas, we also examined as many relevant unpublished checklists as we could find through personal contacts.

An initial list of potentially relevant items was compiled from these sources and submitted to each member of the project staff for comment, review, and suggested revisions. Much discussion ensued as to the most useful definition for a job behavior, the boundaries of the total domain, and the level of specificity at which the items should be written.

The next step was to specify a possible structure, or set of higher order categories for the taxonomy. We were all reminded at this point that psychology as a discipline has never produced an overall behavioral taxonomy. There is much research in specific areas such as problem solving/decision making, participation in groups, reading, etc. but no one has ever tried (perhaps with good reason) to develop one overall taxonomy of human behavior. Similarly, no latent structure of job behavior has been developed. However, for suggestions as to what a higher order structure for the taxonomy might include, we reviewed topics included in the Annual Review of Psychology for the past ten years for possible relevance to Army MOS. For example, various theories of leadership suggest potential categories of leadership behavior (e.g., Yukl, 1981). Fleishman and Quaintance (1984) also review several specialized behavior categorization schemes (e.g., Berliner, Angell, & Shearer, 1964).

After several iterations of editing and revisions of the input general by the above steps, an initial taxonomy hierarchical in nature, was generated and submitted to pilot testing with Army SMEs.

Job activities taxonomy and subsequent revisions. The initial taxonomy consisted of job behaviors at 3 levels of generality. At the most general level, there were seven categories.

- interpersonal behaviors
- speaking behaviors
- writing behaviors
- cognitive behaviors
- complex problem solving
- operating equipment
- physical activities

A detailed presentation of the initial taxonomy can be found in Appendix B. The current job activity taxonomy which consists of 53 components is found in Appendix D. The initial and current taxonomy in Appendices B and C show the three levels of generality of the components.

Subsequent revisions of the job activity taxonomy and its components paralleled those made to the Task Category taxonomy. Again, the revisions were:

- narrowing down the frame of reference for describing jobs to focus on the job as performed by soldiers who have completed basic training and advanced individual training and have 18 months on-the-job experience,
- clarifying the wording of items which resulted in large standard deviations of 2.0 or more in the prepilot test relevance ratings,
- collecting a frequency rating for the overall job followed by importance ratings for core technical proficiency, general soldiering proficiency, and the overall job,
- adding more job components to the model.

Pros and cons of model. The major strength of this approach is that in comparison to the Task Category components, job description using job activities allows for easier mapping to the predictor tests, most of which are also behaviorally based. There are a number of disadvantages to using a job activities model for synthetic validation. First, as the categories are composed of general job behaviors, it may be difficult to complete the taxonomy in sufficient detail to be useful. Second, a difficult judgment is needed to link validity information to the job component information. The difficulty is in linking the broad job behaviors (which may span several tasks) with the criterion measures. Third, a Job Activity model may have less face validity and probably less acceptability among Army SMEs.

Issues

A job component model provides the basis for analyzing jobs into a common set of job components. The two job component models developed for analyzing jobs into components can be evaluated on the basis of reliability, validity, and comprehensiveness. Thus we developed and tested each model to be sure it produced:

- reliable job descriptions--high interrater agreement in endorsing importance or relevance of components for jobs;

- different descriptions for jobs with distinct duties or requirements;
- comprehensive coverage of the job performance domain for a host of jobs.

In addition, we also investigated whether judges of different ranks or job assignments would produce judgments of differing reliabilities.

Method

Procedure

Two rounds of workshops were conducted to test the instruments based on the job component models. A Pilot Test was conducted in December 1987 and January 1988; a Phase I Test was conducted in March and April 1988.

At each round of data collection, we requested the participation of officers, senior NCOs, and civilians employed by the Army to serve as SMEs in the job description workshops for three military occupational specialties (MOS). The three Phase I MOS were Infantryman (11B), Light-wheeled Vehicle Mechanic (63B), and Administrative Specialist (71L). Five different sites were visited: Aberdeen Proving Ground in Maryland, Fort Benning and Fort Stewart in Georgia, Fort Benjamin Harrison in Indiana, and Fort Ord in California.

At each workshop, the workshop administrator first provided an overview of the project goals and the purpose of the workshops. In the Pilot Test, participants completed the job description questionnaires. More recently, in the Phase I Test, the participants completed both the job description questionnaires and the standard setting questionnaires. The order of the questionnaires was counterbalanced across sites, rank (officer, NCO, or civilian), and job assignment (FORSCOM or DOTD).

In the Pilot Test, participants provided importance, frequency, and difficulty ratings for each job component in relation to overall job performance; whereas, in the Phase I Test, participants provided frequency ratings, and importance ratings for Core Technical Proficiency (CTP), General Soldiering Proficiency (GSP), and Overall Job Performance (OJP).

Results

Extensive analyses were conducted on the Phase I data, including: descriptive statistics, reliability estimates, variance component, fidelity coefficients, and profile correlations. A complete description of these results is beyond the scope of the current chapter, however, interested readers can find more detailed information in Appendix E.

Relationship of Ratings

Mean within-rater correlations of frequency, importance, and difficulty ratings are presented in Table 1. These correlations were based on only those components that had a non-zero frequency rating, since importance and difficulty were not rated for components that were not performed. For Task Categories, the mean within-rater correlations between importance and frequency ratings were *r*=.48 for 11B, *r*=.57 for 63B, and *r*=.63 for 71L. The mean within-rater correlations between difficulty and importance or frequency ratings ranged from *r*=-.09 to *r*=.25.

Table 1

Pilot Test: Mean Within-rater Correlations between Ratings

	Task Category			Job Activity		
Ratings	11B	63B	71L	11B	63B	71L
Frequency-Importance	.48	.57	.63	.56	.70	.70
Difficulty-Importance	.11	.25	.22	.08	.21	.20
Frequency-Difficulty	-.09	.13	.14	-.02	.14	.07

A similar pattern of intercorrelation was obtained for the three judgments for Job Activities. The mean within-rater correlations between importance and frequency ratings were *r*=.56 for 11B, *r*=.70 for 63B, and *r*=.70 for 71L. The mean within-rater correlations between difficulty and importance or frequency ratings ranged from *r*=-.02 to *r*=.21.

These results suggest that on both instruments, there was a great deal of redundancy in importance and frequency information, but the difficulty ratings yielded rather different information.

One of the necessary linkages in synthetic validation was between the job components and job performance measures. Therefore in the Phase I data collection, the project staff revised the relevance ratings to include importance ratings for CTP, GSP, and OJP. For Phase I, we computed correlations of the mean rating profiles across the three MOS and these correlations are displayed in Table 2. For 11B, there were no differences among the three importance ratings for CTP, GSP, and OJP. As expected, rating profiles for GSP were highly correlated across the MOS (*r*=.84-.88 for Tasks; *r*=.64-.85 for Activities). Rating profiles on CTP should differentiate the three jobs, and they did. Only low to moderate correlations resulted across jobs. The Job Activities ratings provided a high degree of discrimination between jobs with no correlation at all in the profiles for CTP. The Task Category ratings showed significantly less discrimination across jobs.

Table 2

Correlations of Mean Importance Ratings among 11B, 63B, and 71L

Task Category Instrument

	Rating and MOS							
	OJP11B	OJP63B	OJP71L	CTP11B	CTP63B	CTP71L	GSP11B	GSP63B
OJP63B	0.763							
OJP71L	0.614	0.643						
CTP11B	0.998	0.746	0.596					
CTP63B	0.544	0.927	0.524	0.523				
CTP71L	0.217	0.356	0.857	0.197	0.387			
GSP11B	0.999	0.767	0.632	0.997	0.545	0.237		
GSP63B	0.874	0.968	0.712	0.860	0.829	0.366	0.879	
GSP71L	0.825	0.776	0.918	0.812	0.587	0.602	0.839	0.873

Job Activity Instrument

	Rating and MOS							
	OJP11B	OJP63B	OJP71L	CTP11B	CTP63B	CTP71L	GSP11B	GSP63B
OJP63B	0.575							
OJP71L	0.461	0.118						
CTP11B	0.994	0.574	0.408					
CTP63B	0.272	0.917	-0.034	0.264				
CTP71L	0.147	-0.063	0.916	0.079	-0.072			
GSP11B	0.997	0.581	0.494	0.988	0.280	0.187		
GSP63B	0.847	0.885	0.365	0.841	0.654	0.084	0.854	
GSP71L	0.710	0.360	0.919	0.672	0.125	0.721	0.736	0.645

Interrater Reliability

Variance component estimates provide a concise way of summarizing differences among job descriptor means and describing the relative contribution of various conditions to variance in the ratings. Independent variables and the number of levels within each variable are as follows:

Independent Variables	Number of Levels
Component	96 for Task Category; 53 for Job Activity
MOS	3 (11B, 63B, and 71L)
Rank of Rater	2 (NCO, Officer; civilians omitted because of limited number of observations)
Assignment of Rater (Command)	2 (FORSCOM, DOTD)
Rater	160 for Task Category; 162 for Job Activity

As rater effects were nested within MOS, rank, and command (job assignment), we ran two separate analyses of variance models. The first model included only rater and component. Estimates of the variance among all raters were obtained from this model. The second model included component, MOS, rank, and command, but not rater. Variance attributable to terms with MOS, rank, and/or command were subtracted from the overall rater variance estimates from the first model. The differences provided estimates of the variance due to rater nested within MOS, rank, and command.

Variance due to component, MOS, and the component by MOS interaction were reliable sources of variance and when divided by total variance in the ratings, provided estimates of the average single-rater reliability. Single-rater reliabilities for the three importance ratings from Phase I are presented in Table 3. For the Task Category instrument, reliabilities for CTP, GSP, and OJP were .55, .46, and .52, respectively. Corresponding values for the Job Activity were .43, .30, and .37. Reliabilities for the judgments on the Task instrument were higher than those on the Job Activity instrument.

Some differences between rater types were also found. Table 4 shows the single-rater reliabilities for OJP for raters of different ranks and job assignments. For the Task Category instrument, judges from the field gave more consistent ratings than school judges. For the Job Activity instrument, officers were more consistent than NCOs.

Single-rater reliabilities from the Pilot Test were also included in Table 3. The reliability of the OJP ratings actually dropped for Phase I compared to the Pilot Test. This may be due to changes in the rating task. Obtaining separate CTP and GSP ratings prior to the OJP rating might have helped judges focus more on GSP than before, thus decreasing the variance between jobs.

Table 3

<u>Summary of Single-rater Reliability Estimates</u>

<u>for Task Category and Job Activity Instruments</u>

	Task Category				Job Activity			
	CTP	GSP	OJP	Pilot	CTP	GSP	OJP	Pilot
Overall	0.55	0.46	0.52	0.58	0.43	0.30	0.37	0.45
Within Rank	0.60	0.48	0.54	0.62	0.51	0.32	0.41	0.48
Within Command	0.72	0.52	0.59	0.63	0.50	0.32	0.41	0.47
Within Rank & Command	0.74	0.53	0.60	0.65	0.54	0.32	0.43	0.50

Table 4

Comparison of Single-rater Reliabilities for Importance for Overall Job Performance between Phase I and Pilot Test

	Task Category		Job Activity	
	Phase I	Pilot	Phase I	Pilot
NCO				
Overall	0.53	0.61	0.35	0.49
Within Assignment	0.54	0.63	0.35	0.49
Officer				
Overall	0.59	0.63	0.47	0.58
Within Assignment	0.61	0.64	0.48	0.59
FORSCOM				
Overall	0.60	0.65	0.37	0.52
Within Rank	0.61	0.66	0.39	0.53
DOTD				
Overall	0.51	0.63	0.38	0.47
Within Rank	0.53	0.64	0.39	0.48

Discriminability

Summary of the variance components results are presented in Tables 5a to 5c. A large Component by MOS interaction suggested that the weights were applied differentially for the job components across MOS. On both instruments, the variance components due to the CTP by MOS interaction were larger than the OJP by MOS or GSP by MOS interactions. The size of the GSP by MOS interaction suggested that General Soldiering tasks played a greater role in the overall rating during Phase I than during the Pilot Test. Therefore a better reliability comparison is the Phase I Core Technical ratings with the Pilot Test Overall ratings.

Table 5a

Variance Components for Ratings of Importance for Overall Job Performance

Components	Task Variance	Task Percent	Activity Variance	Activity Percent
Component	1.190	35.63%	0.430	14.48%
MOS	0.080	2.41%	0.087	2.93%
Component x MOS	0.468	14.00%	0.579	19.51%
Rank	0.021	0.63%	0.046	1.56%
Command	0.019	0.57%	0.022	0.75%
Rank x Command	0.000	0.00%	0.000	0.00%
Rank x MOS	0.000	0.00%	0.000	0.00%
Command x MOS	0.000	0.00%	0.000	0.00%
Rank x Command x MOS	0.091	2.73%	0.173	5.82%
Component x Rank	0.010	0.29%	0.067	2.25%
Component x Command	0.000	0.00%	0.022	0.74%
Comp x Rank x Command	0.000	0.00%	0.000	0.00%
Comp x Rank x MOS	0.019	0.57%	0.000	0.00%
Comp x Command x MOS	0.292	8.75%	0.075	2.53%
Cp x Rk x Cd x M	0.000	0.00%	0.004	0.13%
Rater(Rk Cd M)	0.151	4.52%	0.137	4.62%
Component x Rater	0.999	29.92%	1.327	44.67%
Total	3.341	100.00%	2.970	100.00%

Table 5b

Variance Components for Ratings of Importance for Core Technical Proficiency

	Task		Activity	
Components	Variance	Percent	Variance	Percent
Component	0.562	18.40%	0.113	3.50%
MOS	0.230	7.53%	0.238	7.38%
Component x MOS	0.897	29.36%	1.040	32.24%
Rank	0.029	0.95%	0.082	2.54%
Command	0.018	0.59%	0.076	2.36%
Rank x Command	0.000	0.00%	0.000	0.00%
Rank x MOS	0.000	0.00%	0.000	0.00%
Command x MOS	0.045	1.47%	0.032	1.00%
Rank x Command x MOS	0.155	5.07%	0.328	10.17%
Component x Rank	0.047	1.54%	0.096	2.98%
Component x Command	0.005	0.16%	0.000	0.00%
Comp x Rank x Command	0.000	0.00%	0.000	0.00%
Comp x Rank x MOS	0.000	0.00%	0.011	0.34%
Comp x Command x MOS	0.474	15.52%	0.032	0.99%
Cp x Rk x Cd x M	0.000	0.00%	0.000	0.00%
Rater(Rk Cd M)	0.030	0.98%	0.000	0.00%
Component x Rater	0.563	18.43%	1.178	36.51%
Total	3.055	100.00%	3.226	100.00%

Table 5c

Variance Components for Ratings of Importance for

General Soldiering Proficiency

Components	Task Variance	Task Percent	Activity Variance	Activity Percent
Component	1.380	41.21%	0.700	22.75%
MOS	0.048	1.43%	0.046	1.49%
Component x MOS	0.115	3.43%	0.163	5.30%
Rank	0.014	0.42%	0.015	0.49%
Command	0.013	0.39%	0.000	0.00%
Rank x Command	0.000	0.00%	0.037	1.20%
Rank x MOS	0.000	0.00%	0.000	0.00%
Command x MOS	0.000	0.00%	0.000	0.00%
Rank x Command x MOS	0.044	1.31%	0.086	2.79%
Component x Rank	0.000	0.00%	0.037	1.20%
Component x Command	0.062	1.85%	0.000	0.00%
Comp x Rank x Command	0.000	0.00%	0.000	0.00%
Comp x Rank x MOS	0.064	1.91%	0.008	0.26%
Comp x Command x MOS	0.236	7.05%	0.079	2.57%
Cp x Rk x Cd x M	0.000	0.00%	0.018	0.58%
Rater(Rk Cd M)	0.267	7.97%	0.346	11.24%
Component x Rater	1.106	33.02%	1.542	50.11%
Total	3.349	100.00%	3.077	100.00%

Another way to assess reliability was to examine fidelity coefficients, defined as the correlation of the individual rating profile with the average rating profile for a job. We correlated a judge's rating profile with the mean rating profile for the judge's MOS. Mean fidelity (correlation) coefficients of the four rating types for each MOS are summarized in Table 6a to 6d. The fidelity coefficients for the Task Category ratings were generally higher than those for Job Activity. For the Task Category, the average fidelity coefficients for the four ratings ranged from .69 to .79. For the Job Activity, the mean fidelity coefficients ranged from .55 to .77. Correlations between a judge's profile and the mean profile for a different job (e.g., 11B with 63B mean) averaged .20 to .30 points lower than member fidelity coefficients. This result also provided more support for the discriminability of job description among the three MOS.

Table 6a

Mean Fidelity Coefficients for 4 Ratings with

Frequency of Performance

MOS	Rating Type	Task Category 11B (n=88)	Task Category 63B (n=50)	Task Category 71L (n=52)	Job Activity 11B (n=88)	Job Activity 63B (n=50)	Job Activity 71L (n=52)
	Frequency	0.76	0.47	0.28	0.67	0.30	0.21
	Core Technical	0.75	0.44	0.25	0.66	0.27	0.18
11B	Gen. Soldiering	0.75	0.46	0.28	0.66	0.28	0.25
	Overall	0.75	0.46	0.26	0.66	0.27	0.23
	Frequency	0.49	0.74	0.35	0.33	0.62	0.05
	Core Technical	0.43	0.73	0.35	0.21	0.59	-0.02
63B	Gen. Soldiering	0.67	0.66	0.38	0.57	0.49	0.17
	Overall	0.59	0.72	0.36	0.41	0.60	0.05
	Frequency	0.27	0.33	0.79	0.19	0.03	0.72
	Core Technical	0.18	0.27	0.77	0.10	-0.02	0.69
71L	Gen. Soldiering	0.63	0.48	0.56	0.49	0.19	0.58
	Overall	0.47	0.41	0.73	0.31	0.06	0.69

Table 6b

Mean Fidelity Coefficients for 4 Ratings with

Importance for Core Technical Proficiency

MOS	Rating Type	Task Category 11B (n=88)	Task Category 63B (n=50)	Task Category 71L (n=52)	Job Activity 11B (n=87)	Job Activity 63B (n=50)	Job Activity 71L (n=51)
	Frequency	0.77	0.38	0.17	0.64	0.19	0.11
	Core Technical	0.77	0.35	0.14	0.65	0.16	0.09
11B	Gen. Soldiering	0.77	0.37	0.17	0.64	0.18	0.17
	Overall	0.77	0.37	0.15	0.65	0.17	0.14
	Frequency	0.47	0.67	0.28	0.28	0.56	-0.02
	Core Technical	0.41	0.69	0.29	0.16	0.59	-0.04
63B	Gen. Soldiering	0.67	0.57	0.27	0.55	0.39	0.08
	Overall	0.58	0.64	0.26	0.37	0.54	-0.03
	Frequency	0.25	0.31	0.73	0.16	-0.01	0.71
	Core Technical	0.15	0.27	0.75	0.07	-0.02	0.74
71L	Gen. Soldiering	0.63	0.40	0.44	0.46	0.10	0.53
	Overall	0.46	0.36	0.64	0.29	0.00	0.68

Table 6c

Mean Fidelity Coefficients for 4 Ratings with

Importance for General Soldiering

MOS	Rating Type	Task Category 11B (n=88)	Task Category 63B (n=50)	Task Category 71L (n=52)	Job Activity 11B (n=87)	Job Activity 63B (n=50)	Job Activity 71L (n=50)
	Frequency	0.74	0.64	0.60	0.61	0.47	0.45
	Core Technical	0.75	0.62	0.59	0.62	0.47	0.45
11B	Gen. Soldiering	0.75	0.64	0.61	0.62	0.48	0.49
	Overall	0.75	0.63	0.60	0.62	0.47	0.47
	Frequency	0.47	0.65	0.47	0.27	0.42	0.19
	Core Technical	0.41	0.60	0.43	0.17	0.35	0.09
63B	Gen. Soldiering	0.66	0.73	0.64	0.54	0.55	0.41
	Overall	0.58	0.71	0.57	0.36	0.48	0.24
	Frequency	0.27	0.36	0.52	0.21	0.14	0.50
	Core Technical	0.17	0.27	0.43	0.14	0.07	0.45
71L	Gen. Soldiering	0.63	0.64	0.72	0.49	0.37	0.62
	Overall	0.47	0.52	0.66	0.33	0.22	0.57

Table 6d

Mean Fidelity Coefficients for 4 Ratings with

Importance for Overall Performance

MOS	Rating Type	Task Category 11B (n=88)	Task Category 63B (n=50)	Task Category 71L (n=52)	Job Activity 11B (n=87)	Job Activity 63B (n=50)	Job Activity 71L (n=51)
	Frequency	0.76	0.57	0.46	0.64	0.34	0.31
	Core Technical	0.76	0.55	0.44	0.65	0.33	0.30
11B	Gen. Soldiering	0.76	0.56	0.47	0.65	0.33	0.36
	Overall	0.77	0.56	0.45	0.65	0.33	0.34
	Frequency	0.48	0.72	0.41	0.28	0.55	0.07
	Core Technical	0.42	0.69	0.39	0.17	0.52	-0.01
63B	Gen. Soldiering	0.67	0.71	0.53	0.55	0.51	0.26
	Overall	0.59	0.74	0.48	0.37	0.57	0.10
	Frequency	0.26	0.34	0.69	0.20	0.04	0.65
	Core Technical	0.16	0.26	0.63	0.12	-0.02	0.61
71L	Gen. Soldiering	0.63	0.57	0.68	0.49	0.22	0.62
	Overall	0.47	0.47	0.74	0.32	0.08	0.67

Comprehensiveness of Taxonomy. At the end of the instrument, judges were queried about how completely the taxonomy covered the job they were rating. The results of the evaluation are found in Table 7. Overall, the judges reported that the Task Category model covered 69% of the job and the Job Activity instrument, 74% of the job. Although no differences were found for judges' responses by MOS, some differences were found by rank and by Command. For each MOS, NCOs indicated that the instruments provided poorer coverage than officers or civilians. Similarly, FORSCOM judges reported poorer job coverage than DOTD judges for both instruments.

Summary and Discussion

A number of conclusions were drawn from the results. First, reliability appears adequate, with the possible exception of NCOs using the Job Activities instrument. Even these means are adequate across a number of different judges. Second, discriminability appears good, particularly for the Job Activity instrument. In addition, coverage appears adequate. While the absolute meaning of these judgments is unclear, they do indicate slightly greater coverage by the Job Activity instrument.

In comparing the two models, there was no clear winner. The greater reliability of the Task Category instrument must be balanced against the lower discriminability and possibly lower coverage that it provides. We await the results of the evaluation of the overall models through comparison with empirical results. These comparisons will be presented in Chapter 6.

Table 7

Summary of Judges' Evaluation of Instruments for Comprehensiveness

What percent of the job (you are rating) is covered by these tasks/activities?

		11B Percent			63B Percent			71L Percent			All Cases Percent	
MODEL	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD
Task	70	69.2	31.8	42	69.5	28.5	48	69.0	35.2	160	69.2	31.9
Activity	73	74.0	28.5	45	76.8	26.7	44	72.5	33.1	162	74.4	29.2

		NCO Percent			Officer Percent			Civilian Percent			All Cases Percent	
MODEL	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD
Task	84	53.2	31.9	69	88.9	18.6	7	67.1	28.1	160	69.2	31.9
Activity	83	61.0	31.3	70	90.6	14.8	9	72.2	32.7	162	74.4	29.2

		School Percent			Field Percent			All Cases Percent	
MODEL	n	Mean	SD	n	Mean	SD	n	Mean	SD
Task	46	61.5	32.9	114	72.3	31.0	160	69.2	31.9
Activity	49	65.2	31.5	113	78.4	27.4	162	74.4	29.2

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CHAPTER 4:

Development of an Attribute Taxonomy and Its Application in the Formation of Synthetic Validity Composites

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SUMMARY

This chapter focuses on the development of an attribute taxonomy and its use in one method of synthetic validation, in which the taxonomy is linked to whole jobs, or to a few job factors, by individuals familiar with the jobs.

A taxonomy of 31 attributes was developed and applied in three sets of experiments with Army Officers, NCOs, and civilians. Four judgment methods were investigated:

- ratings of attribute validity for five job performance areas
- ratings of attribute importance for five job performance areas
- estimates of attribute test scores for individuals in the bottom, middle, and top thirds on job performance
- rank ordering of attributes according to validity and importance for overall job performance.

The five job performance areas, obtained from factor analyses of 72 Army criteria (Wing, Peterson, & Hoffman, 1984), were: Core Technical Proficiency, performance on tasks central to the specific job; General Soldiering Proficiency, performance on tasks common across all Army jobs; Effort and Leadership; Personal Discipline; and Physical Fitness and Military Bearing. Subjects were least confident of their judgments in the score estimation method, and had lowest inter-rater agreement in this method. Results indicate that soldiers can estimate the importance and validity of attributes for five job performance areas, and can rank order the attributes according to importance and validity for overall performance, with high agreement.

Validity profiles differed between jobs for the Core Technical component of soldiers' jobs and for overall performance ranking, but not for components common across jobs. A multi-trait multi-method analysis, treating jobs as traits and validity and importance ratings as methods, found high convergent validity for all performance areas and overall ranking; discriminant validities averaged .41 lower for the Core Technical component and overall ranking than for the other performance areas. These results closely parallel prior research regarding the validity relationships between predictors and Army job performance areas (Campbell, 1986).

CHAPTER 4

Development of an Attribute Taxonomy and Its Application in the Formation of Synthetic Validity Composites

INTRODUCTION

An attribute taxonomy can be utilized in synthetic validation in two ways. First, the attribute taxonomy can be judgmentally linked to job components, such as tasks and activities, by persons knowledgeable about measurement of human abilities. We call this version of the synthetic model the Psychologist method. Alternatively, the attribute taxonomy can be linked to whole jobs, or a small number of broad job factors, by individuals familiar with the jobs, and perhaps not as familiar with human abilities. In the case of military jobs, these individuals are civilians working in military training or curriculum development, non-commissioned officers (NCOs), or officers. We have called this version of the synthetic model the Soldier method.

In the Psychologist method, the tasks or activities act as an intervening taxonomy between the attributes and the job (Figure 1). In contrast, the Soldier method has no intervening taxonomy, or a very small one consisting of a few broad job factors. While the Psychologist method links attributes to job tasks or activities "once and for all," the Soldier method requires the establishment of the attribute-job link for each job. Because they are unfamiliar with attributes, soldiers may have difficulty providing attribute-job links. This chapter will focus on the development of an attribute taxonomy and use of the taxonomy in the Soldier method. The Psychologist method will be discussed in more detail in chapter 5.

DEVELOPMENT OF THE ATTRIBUTE METHODOLOGY

We describe here the development of the initial attribute taxonomy, the development of judgment methods, the pretesting of the taxonomy and methods, and revisions to the judgment methods and taxonomy.

Developing the Initial Taxonomy

The initial attribute taxonomy was based on expert judgment research conducted by Wing, Peterson, and Hoffman (1984) for Army Project A. Project A is a multi-year research effort designed to improve the selection, classification, and utilization of Army enlisted personnel (U.S. Army Research Institute, 1983). In the Wing et al. (1984) research, 35 experts in personnel psychology estimated the validity of 53 predictor variables, or constructs, for 72 job criteria. The 53 constructs were chosen through an extensive literature search (Hough, 1988; McHenry & Rose, 1988; Toquam, Corpe, Dunnette, & Keyes, in preparation). Variables in three broad categories were investigated: cognitive abilities, noncognitive attributes such as temperament and interests, and psychomotor and perceptual abilities.

PSYCHOLOGIST METHOD

Attribute 1<--------------> Task 1 <--------------> Job A
Attribute 2 Task 2 <-------------->
: :
: : Job B
: : :
Attribute K Task L Job ZZZ

SOLDIER METHOD

Attribute 1 <----------- | -------------- | ----------> Job A
Attribute 2
: (Maybe 5-6 job
: taxons here)
:
Attribute K <----------- | -------------- | ----------> Job ZZZ

Figure 1. The Psychologist and Soldier Methods for Linking Attributes to jobs.

Each variable considered for inclusion was evaluated against 12 factors, such as Test Fairness. Based on the estimated validities provided by the judges, the 53 constructs were grouped into 21 clusters. These 21 clusters formed the basis of the initial taxonomy of 21 attributes used in the present research.

For each attribute, we wrote a definition and description of individuals high, average, and low on the attribute. The definitions and descriptions were written as nontechnically as possible to insure understanding by persons unfamiliar with testing jargon. These materials were reviewed for clarity by several other members of the project staff.

Developing Initial Methods for Collecting Judgments

We developed three judgment methods initially: validity ratings, importance ratings, and score estimation. In the validity rating method, soldiers were provided with a brief lecture and handouts describing validity. Soldiers then rated the validity of each attribute for job performance. In the importance rating method, soldiers rated the importance of each attribute to job performance. The score estimation method required soldiers to think about individuals who were in the lowest one-third, middle one-third, and highest one-third on job performance, and to estimate the scores of each group on a test of each attribute.

Pretests and Revisions

Pretest sample and method. Pretests were conducted with NCOs and officers from nine Military Occupational Specialties (MOS) at three sites (N = 202). Several key questions were investigated in the Pretests: the feasibility of the judgment task, the optimal level of detail for performance definitions, the number of performance areas, and the clarity of instructions and definitions.

A subset of 10 attributes from the attribute taxonomy was administered in the first Pretest; the full set of 21 attributes was administered in the remaining Pretests.

The performance definition and number of performance areas were varied in the first Pretest only. Soldiers were provided with a short definition of five job performance areas, a detailed definition of five job performance areas, or the official job description for their MOS. The five performance areas were derived from factor analyses of Project A criterion data (Wing et al., 1984). The areas are Core Technical Proficiency, General Soldiering Proficiency, Effort and Leadership, Personal Discipline, and Physical Fitness/Military Bearing. Core Technical Proficiency includes the proficiency with which the soldier performs the tasks that are central to the MOS. These central tasks differ from one MOS to another. The remaining four performance areas are common to all MOS. Judgments were made for the five performance areas or for overall job central to the MOS. These central tasks differ from one MOS to another. The remaining four performance areas are common to all MOS. Judgments were made for the five performance areas or for overall job performance. Subjects in the first Pretest indicated a preference for the detailed definition of job performance supplemented with the official job description, and for rating all five performance areas plus overall performance; these materials were used for the remaining Pretests.

We administered an evaluation questionnaire at the end of each judgment task. The questionnaire assessed the clarity of the judgment task instructions, difficulty of the judgment task, and clarity of the attribute definitions.

Pretest results. From the Pretest debriefings and data, we concluded that each of the three judgment tasks was feasible. Interrater agreement reliabilities were computed for the largest Pretest ($n = 149$). Single-rater reliabilities were lowest for the score estimation task, and were higher for officers than for NCOs.

Responses to the evaluation questionnaire indicated that subjects found the judgment tasks moderately difficult; the score estimation task received the highest mean difficulty rating. Subjects who completed validity or importance ratings indicated greater confidence in their judgments than subjects who completed the score estimation judgments. Two attributes, spatial ability and closure, were described as especially difficult to rate. Overall, the attribute definitions were rated as clear.

Revisions. Based on the low reliability, higher difficulty ratings, and lower confidence ratings of the score estimation method, it was dropped from further investigation.

Following the Pretests, a detailed matching of the synthetic validity attribute taxonomy to the Wing et al. (1984) constructs identified six attributes that were missing from the synthetic validity attribute taxonomy. The six attributes were added to the taxonomy. A review of predictor tests from the Armed Services Vocational Aptitude Battery (ASVAB) and the Project A Revised Trial Battery (Peterson, 1987) identified three physical ability attributes and one psychomotor attribute not included in either Wing et al. (1984) or the attribute taxonomy. Because these attributes are believed to be important for performance on some Army jobs, they were added to the synthetic validity attribute taxonomy. Following these revisions, the taxonomy contained 31 attributes.

APPLICATION OF THE SOLDIER METHOD

We report here on the first two iterations in the application of the Soldier method. We have labeled these the Pilot Test and Phase I.

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Pilot Tests

Pilot Test Sample and Method

Validity and importance ratings of the 31 attributes for the five job performance areas were obtained from civilians, NCOs, and Officers (N=127) in three MOS: Infantryman, Mechanic, and Administrative Specialist. Subjects also rank ordered the 31 attributes according to validity and importance for overall performance. An evaluation questionnaire was administered to assess the clarity of instructions, difficulty of the ranking task, and clarity and completeness of the attribute definitions.

Pilot Test Results

Because the number of civilians in the study was extremely low for both validity and importance methods, all analyses were limited to NCOs and Officers.

Analyses of variance. Due to a small sample size for Mechanics for the importance method, analyses of variance were limited to the validity ratings for the five performance areas and validity rankings for overall performance. There were two between-subjects factors (MOS and Rater Type) and one within-subject factor (Attribute). Highly significant Attribute effects for all five performance areas and for the rankings were found. Thus, the attributes did receive different ratings and rankings when averaged across all three MOS and both rater types.

The Attribute x MOS effect was highly significant for the Core Technical Proficiency performance area ($F_{60\ 1950} = 8.49$; $p<.01$) and the overall ranking ($F_{60\ 1830} = 8.46$; $p<.01$), and much less significant for the Physical Fitness/Military Bearing area ($F_{60\ 1950} = 1.48$; $p<.05$). It did not reach significance for the remaining three performance areas. This finding accords with prior expectations and Project A empirical validity results (Campbell, 1986): there are validity differences for attributes with respect to the Core Technical component of soldiers' jobs, but not with respect to the "common" parts of soldiers' jobs, which are represented by the other four performance areas.

Small but statistically significant Attribute x Rater Type effects were obtained for all five performance areas, but not for overall ranking.

Reliabilities. Inter-rater agreement reliability coefficients were computed for validity and importance ratings and rankings using output from one-way repeated measures ANOVA to estimate mean squares for attributes and for error; rater main effect was thus included as part of the error term. Reliabilities were calculated for each MOS x Performance Area x Rater Type cell where the cell N was at least 8.

Single-rater reliabilities range from .15 to .61 (mean = .33) for validity ratings and rankings, and from .25 to .61 (mean = .41) for importance ratings and rankings. Although it was not possible to compare Officer and NCO ratings for all MOS and both methods, the information available suggested that Officers generally have greater agreement than do NCOs.

Multitrait multimethod analyses. If one thinks of MOS as traits and importance and validity ratings as methods, the data can be analyzed via the logic of the multitrait, multimethod approach. Table 1 shows the results for the five performance areas separately, the rankings, and all five areas at once. Note that the ratings for Core Technical Proficiency and the rankings for overall performance show very high mean coefficients for convergent validity (between method, within MOS), as do all the other areas. Note further that the mean coefficients for discriminant validity (between method, between MOS and within method, between MOS) are on average about .40 lower for Core Technical Proficiency and rankings than for the other four performance areas. This indicates that different profiles of attributes are obtained for the three MOS for Core Technical Proficiency and for overall ranking, but not for the other four performance areas; discriminant validity exists for these two but not for the other four. These are precisely the results we would expect based on prior research conducted by Project A regarding the validity relationships between predictors and these five performance areas (Campbell, 1986).

"Policy capturing." Correlations of the mean validity and mean importance rating profiles with the mean validity and mean importance ranking profiles were computed for the three MOS for each performance area and are presented in Table 2. These analyses represent a rough "policy capturing" of the rankings of the attributes for overall performance. That is, the correlations of the attribute profiles for each performance area with the attribute ranking profile indicates the influence of each job performance area on the ranking of attributes for overall job performance.

For Infantrymen, Core Technical and General Soldiering have nearly equal and higher correlations with the ranking profile (r = .75 to .87) than do the other three areas, although the other three areas do have relatively high correlations with the ranking profile (r = .47 to .82). For Mechanics, Core Technical has high correlations with the ranking profile (r = .81 to .92), General Soldiering has moderate correlations with ranking (r = .31 to .47), and the remaining three areas have quite low correlations with ranking (r = 00 to .29). For Administrative Specialists, Core Technical has extremely high correlations with the ranking profile (r = .94 to .95); General Soldiering, Effort and Leadership, and Personal Discipline have moderate correlations with ranking (r = .53 to .67); and Fitness and Military Bearing has very small negative correlations with ranking (r = -.03 to -.10).

Table 1. Summary of Pilot Test Multi-Trait, Multi-Method Analyses: Means of the Convergent Validity (Between Method, Within MOS) and Discriminant Validity (Between Method, Between MOS and Within Method, Between MOS) Coefficients for Core Technical, General Soldiering, Effort/Leadership, Personal Discipline, and Physical Fitness/Military Bearing Performance Areas, Overall Ranking, and All Performance Areas.

	Core Technical	General Soldiering	Effort & Leadership	Personal Discipline	Fitness & Bearing	Ranking	All
Between Method, Within MOS	.89	.84	.87	.89	.94	.92	.91
Between Method, Between MOS	.42	.83	.84	.85	.92	.46	.79
Within Method,							
Between MOS	.42	.83	.84	.86	.92	.45	.79
Within Importance	.38	.80	.78	.81	.93	.36	.81
Within Validity	.45	.84	.90	.90	.92	.54	.75

Table 2. Correlations of Pilot Test Mean Importance and Mean Validity Rankings with Mean Importance and Mean Validity Ratings in Each of the Five Performance Areas

	Infantryman		Mechanic		Adm. Specialist	
	Mean Importance Rankings	Mean Validity Rankings	Mean Importance Rankings	Mean Validity Rankings	Mean Importance Rankings	Mean Validity Rankings
Mean Importance Ratings:						
Core Technical	.864	.827	.919	.835	.952	.955
General Soldier	.868	.843	.344	.473	.657	.633
Effort/Leadership	.823	.787	.086	.201	.670	.606
Personal Discipline	.790	.808	.166	.294	.604	.534
Fitness/Bearing	.574	.613	.178	.225	-.027	-.028
Mean Validity Ratings:						
Core Technical	.755	.789	.920	.813	.944	.952
General Soldier	.754	.815	.310	.329	.572	.569
Effort/Leadership	.627	.685	.070	.152	.659	.591
Personal Discipline	.473	.564	.013	.056	.528	.561
Fitness/Bearing	.568	.630	-.004	.006	-.097	-.083

Note. N = 31 for each of the correlations of means (number of attributes). Correlations have been appropriately reflected. Means are based on NCO and Officer groups.

For all three MOS, the validity and importance ratings show the same pattern of relationship of the five performance areas with the rankings, but the validity ratings consistently correlate lower with the rankings than do the importance ratings. This could indicate that the validity ratings are less susceptible to an overall "halo" effect than are the importance ratings.

Evaluations. Evaluation responses indicate that soldiers are moderately confident of their ratings and rankings. As in the Pretests, Spatial Ability and Closure were identified as difficult attributes; in the Pilot Test, several Interest attributes were also described as difficult. Soldiers stated a preference for using validity or importance ratings against the five job performance areas over using rankings to "guide selection or placement of soldiers," even though the ranking judgments were less complex and took less time to complete.

Phase I

Phase I Sample and Method

Subjects in Phase I were civilians, NCOs, and Officers (N = 196) in three MOS: Infantryman, Mechanic, and Administrative Specialist. Importance ratings and rankings were eliminated from Phase I data collections. The evaluation questionnaire was also dropped. Validity ratings were collected for only two of the five performance areas, Core Technical and General Soldiering Proficiency. In addition, validities for five common job tasks (rated most important across the three MOS in the Pilot Test) and five specific job tasks (rated most important within the MOS in the Pilot Test, and not common tasks) were rated.

Phase I Results

Reliabilities. Single-rater reliabilities, presented in Table 3, range from .19 to .57 (mean = .33). Officers were consistently more reliable than NCOs, with differences ranging from .02 to .22 (mean difference = .12). Mean reliabilities for the five specific tasks were consistently lower than mean reliabilities for the five common tasks (range of differences = .02 to .19). As noted in the table, at least 15 raters would be utilized if these methods were operationally implemented, yielding reliabilities greater than .80.

"Policy capturing." Correlations between mean validity rating profiles for Core Technical and General Soldiering and mean validity; ranking profiles for overall performance appears in Table 4. General Soldier mean profiles for each MOS are highly correlated (range = .92 to .97). The Core Technical mean profile for Infantryman is highly correlated with General Soldiering mean profiles for each MOS (range = .93 to .97). The Core Technical mean profiles for Mechanic and for Administrative Specialist have only moderate correlations with Core Technical and General Soldiering profiles across MOS (range = .29 to

Table 3. Phase 1 Single-Rater Reliabilities for Attribute Validity Ratings and Rankings by MOS and Rater Type

MOS	Core Technical ICC	Core Technical N	General Soldiering ICC	General Soldiering N	Common Tasks[a] ICC	Common Tasks[a] N	Specific Tasks[a] ICC	Specific Tasks[a] N	Rankings ICC	Rankings N
Infantryman:										
Civilian	.44	6	.26	6	.46	6	.27	6	.31[b]	5
NCO	.26	43	.21	43	.22	c	.20	d	.41	43
Officer	.41	31	.27	31	.37	29	.33	e	.47	30
All	.31	80	.23	80	.28	f	.24	g	.41	78
Mechanic:										
Civilian	--	1	--	1	--	0	--	0	--	0
NCO	.27	28	.22	28	.26	28	.19	28	.39	28
Officer	.49	20	.41	20	.40	18	.29	18	.53	19
All	.34	49	.28	49	.32	46	.22	46	.44	47
Adm. Specialist:										
Civilian	--	4	--	4	--	4	--	4	--	4
NCO	.40	22	.30	19	.32	20	.26	20	.53	24
Officer	.54	24	.33	24	.45	23	.28	23	.62	23
All	.45	50	.31	47	.38	47	.25	47	.57	51

Note. In practice, at least 15 raters in each group would provide ratings. 15-rater reliabilities range from .80 to .96.

[a] Common and Specific Tasks reliabilities are mean reliabilities for the five common tasks and five specific tasks, respectively.

[b] Attribute #30 had no variance and was excluded from this analysis.

[c] N = 39 for common tasks 1, 2, and 5; N = 38 for common tasks 3 and 4.

[d] N = 39 for specific tasks 1, 2, and 4; N = 38 for specific task 3; N = 36 for specific task 5.

[e] N = 29 for specific tasks 1-4; N = 28 for specific task 5.

[f] N = 74 for common tasks 1, 2, and 5; N = 73 for common tasks 3 and 4.

[g] N = 74 for specific tasks 1, 2, and 4; N = 73 for specific task 3; N = 70 for specific task 5.

Table 4. Correlations of Phase 1 Mean Validity Ratings for Core Technical Proficiency and General Soldiering Proficiency and Mean Validity Rankings, Computed Across the 31 Attributes

	Infantryman			Mechanic			Adm. Specialist		
	Core	General	Rankings	Core	General	Rankings	Core	General	Rankings
Infantryman:									
Core	1.000								
General	0.972	1.000							
Rankings	0.889	0.862	1.000						
Mechanic:									
Core	0.297	0.291	0.408	1.000					
General	0.928	0.921	0.819	0.443	1.000				
Rankings	0.260	0.257	0.447	0.946	0.372	1.000			
Adm. Specialist:									
Core	0.474	0.581	0.569	0.385	0.492	0.372	1.000		
General	0.941	0.967	0.867	0.314	0.920	0.282	0.662	1.000	
Rankings	0.515	0.610	0.663	0.387	0.505	0.409	0.954	0.670	1.000

Note. Ranking correlations have been appropriately reflected.
Mean ratings and rankings are based on the combined Civilian, Officer, and NCO groups.

.58). For both Mechanic and Administrative Specialist, mean ranking profiles are highly correlated (r = .95 for each) with Core Technical mean profiles, and only moderately correlated with General Soldiering mean profiles (Mechanic, r = .37; Administrative Specialist, r = .67). These results, in support of the Pilot Test findings, indicate that soldiers place more emphasis on core job tasks than common soldier tasks when ranking attribute validities for overall performance

CONCLUSIONS

Four conclusions follow from the Pilot Test and Phase I data. First, Army personnel can understand the materials and complete the validity and importance ratings and rankings. Second, inter-rater agreement reliabilities are acceptable and indicate that 15 raters should supply sufficiently reliable results in most cases. Third, Officers have higher inter-rater agreement than do NCOs. Fourth, the pattern of judged relationship between attributes and job performance areas corresponds to the pattern expected and the pattern found in earlier Army Project A research (Campbell, 1986).

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CHAPTER 5:

The Use of Expert Judges to Form Synthetic Predictor Composites for Army Jobs

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SUMMARY

This chapter focuses on the method of obtaining expert judgments of the validity of elements in an attribute taxonomy for predicting performance on elements in three different types of job descriptor taxonomies (tasks, activities, and broad job performance areas), the reliability of those judgments for various subgroups of judges, and the method of using the validity judgments to form "synthetic" predictor composites for purposes of predicting performance on three military jobs (Infantryman, Mechanic, Administrative Specialist).

Sixty-nine judges estimated validities of thirty-one attributes for

- 51 tasks
- 29 activities
- 5 broad areas of performance (for one of the 3 military jobs).

Judges completed a Background Questionnaire that allowed the division of the sample into groups that stood lower and higher with regard to familiarity with the military, appropriate psychological training and experience, and familiarity with research completed on an important, associated military research project (Project A). Reliability of judgments made by the total group and subgroups was assessed. There appeared to be very little difference in reliability across subgroups of judges or across the type of validity estimation that was made. The judgments were acceptably reliable; single-rater reliabilities (based on total group estimates) ranged from .42 to .57 across the type of validity judgments. The judges' validity estimates were combined with judgments (by military NCOs and Officers) of the importance of the job descriptors for overall job performance and with information about the covariance of measures of the attributes to form "synthetic" predictor composite scores. This method of forming synthetic scores is described.

CHAPTER 5

The Use of Expert Judges to Form Synthetic Predictor Composites for Army Jobs

INTRODUCTION

The previous chapters in this report have introduced the general purposes for using synthetic methods of forming predictor test composites in the Army, and the basic taxonomies that are candidates for inclusion in the synthetic methodology. In this chapter, we present our recent work on collecting judgments from psychologists to link some of these taxonomies and on developing of models for formulating predictor composite scores based on the taxonomies, judgments, and logic of the synthetic methodology.

Recall that one of the primary purposes of the synthetic methodology is to formulate a predictor composite score from a battery of predictor tests for jobs for which there is no information available about predictor tests or job performance. In order to accomplish this task, taxonomies must be available to describe jobs and predictors. Previous chapters have described the development work that has resulted in four taxonomies: task categories, activities, performance areas, and attributes. As already presented, the first three taxonomies are alternative methods for describing "what is done" on a job, while the fourth taxonomy is a method for describing the abilities required to perform a job, or "what it takes to do" a job.

In our research we have thought about two ways of using these taxonomies to form predictor composite scores, the "soldier" method and the "psychologist" method. Recall from chapter 3 that the "soldier" method requires persons who are expert about the target jobs (in this case, Army jobs, thus "soldiers") to make judgments about the validity of attributes for the job as a whole, or for a very small taxonomy of job-descriptive elements. In the "psychologist" method, on the other hand, the job experts make judgments about the importance of elements in the job-descriptive taxonomy for effective performance on the target job. Psychologists, or other persons knowledgeable about the domain of human abilities and other traits, make the judgments that link the job-descriptor elements to the attributes.

In the remainder of this chapter, we describe:

- the methods and materials used for collecting judgments from psychologists that link the attribute taxonomy to the three job-descriptive taxonomies

- the sample of psychologists that completed the judgments, together with some attempts to quantify their degree of familiarity with the military and psychological experience pertinent to the kind of judgments they were asked to complete

- the degree of reliability of the judgments, for the total sample of judges and for various sub-groups of judges

- the way in which we formed predictor composite scores using the psychologists' judgments together with judgments from job experts and information about the covariances of the predictors

METHODS AND MATERIALS USED TO COLLECT PSYCHOLOGISTS' JUDGMENTS

Method

The method employed to collect the judgments linking the attributes to the task category, activity, and performance area taxonomies was very similar to the method used by Wing, Peterson, & Hoffman (1984). Judges were supplied with definitions of the attributes and definitions of job descriptors (the task categories, activities, and performance areas). Judges were then asked to estimate the validity of each attribute for each job descriptor, using a nine-point scale with each scale point anchored by a ten-point range of correlation coefficient values. Their estimates were entered on forms prepared specifically for the estimation task. Instructions were written to guide the judges through the process of making their estimates. (For those interested, copies of the rating materials and instructions are available from the senior author.) Judges' estimates were independently completed at their own pace, without supervision.

Materials

In this research effort, we wished to obtain judgments linking the 31 attributes to

- 96 task categories

- 53 activities

- 5 job performance areas in each of 3 Army jobs (Infantryman, Mechanic, and Administrative Specialist).

We wished to make several comparisons of the uses of the different judgments which argued for the use of the same judges for linking all the taxonomies. It was not feasible, however, to ask each judge to make such a large number of judgments (a total of 5,084).

Therefore, we divided both the task category taxonomy and the activity taxonomy into two "parallel" forms by placing odd-numbered items on one form and even-numbered items on the other form. (There were some minor exceptions to this rule when we wished to more evenly balance the content of the two forms). In addition, we placed a few items on both forms (there were six common items for the two task category forms and four common items for the two activity forms) in order to provide a crude check on the comparability of the general level of judgments provided by the groups responding to the two forms. Also, we asked each judge to provide judgments linking the attributes to only one of the three Army jobs, rather than all three. Each judge was asked to provide 2697 judgments, a little more than half of the number required to complete judgments for the full set of taxonomies.

We are also interested in the effects of judge characteristics on the reliability and accuracy of the estimates they provide. In an attempt to measure appropriate judge characteristics, we prepared a Background Questionnaire that we asked each judge to complete. The questionnaire was designed to measure two primary characteristics: degree of training/experience in relevant psychological content areas and degree of familiarity or knowledge about military occupations. In addition, we queried judges about their degree of familiarity with the Army's Project A, because we make much use on this project of information obtained from Project A research.

Psychological training/experience was measured by asking judges to indicate their familiarity with each of 15 content areas, called tasks, that we thought covered the areas critical to personnel selection and test validation endeavors (some examples are job analysis, content validation, design or development of cognitive tests, research on the relationship of cognitive tests to other variables). The judges indicated their familiarity by responding "yes" or "no" to seven descriptive anchors for each of the fifteen tasks. The descriptive anchors were:

- heard about this task in undergraduate course(s) or other general sources
- studied this task in graduate course(s), or studied in depth on my own
- performed parts of this task under supervision
- performed this task without supervision
- supervised others performing this task
- taught this task to others
- wrote a scholarly article or book about this task

To measure familiarity with the military, we asked judges if they had learned about the military through close family members, if they had done consulting work with the military, or if they had served in the military. We also asked judges about their familiarity with 15 job tasks; 5 tasks central to each of the 3 focal jobs (Infantryman, Mechanic, Administrative Specialist) in this phase of the research.

In summary, the judges received the following materials:

- definitions of 31 attributes
- Form A or Form B of task category definitions (51 tasks)
- Form A or Form B of activity definitions (28 or 29 activities
- definitions of five job performance areas for one job
- answer sheets for recording validity estimates
- background Questionnaire
- instructions for completing the estimates and returning materials

The judges were instructed to complete the Background Questionnaire first, then to estimate the validities for, in order, task categories, activities, and performance areas.

COLLECTION OF PSYCHOLOGISTS' JUDGMENTS

Selection of the Sample

The target population from which we obtained estimates included four subgroups:

- highly knowledgeable, experienced researchers;
- knowledgeable, experienced researchers;
- novice researchers in the process of becoming educated and experienced with regard to personnel psychology; and
- military experts.

The military experts provided ratings in the Pretest, Pilot Test, and Phase I rounds of the project. Previous chapters in this report discuss the military experts' judgments and results (Chia, Hoffman, Campbell, Szenas, & Crafts, in preparation; Owens-Kurtz & Peterson, in preparation). Nominations for researchers outside the contracting organizations who qualified for groups 1 and 2 were elicited from a highly respected, experienced, visible researcher in the area of selection and validation and from a younger, recent Ph.D. with research experience in selection and validation. Those individuals who appeared on both lists were included in the sample; the remaining names were reviewed by key members of the research team and a subset was chosen for inclusion. The final sample of outside experts contained 40 individuals.

Each contracting organization supplied a list of individuals within the organization who had time available and who qualified for groups 1, 2, or 3. Contractor staff who fell into groups 1 and 2 were primarily project directors, research scientists, senior researchers, and research associates; staff in group 3 were primarily research assistants and junior researchers. A total of 55 contractor staff members were identified.

Method

Materials were mailed to targeted individuals with a cover letter which entreated them to complete the judgments and set a deadline for receipt of the completed forms. For outside experts, the cover letter also explained that an honorarium would be paid to those who completed the judgments.

Final Sample

Completed judgments were received from 23 of the 40 outside experts solicited (57.5%). These outside experts can be divided into five groups: members of the Scientific Advisory Committee for Project A (N = 4); past-presidents of American Psychological Association (APA) Division 14 (N = 5); APA Fellows (N = 6); APA Members (N = 6); and other (N = 2). Forty-six of the 55 contractor staff members identified as potential judges completed the judgments by the deadline (83.6%); one individual's judgments were received too late for inclusion in analyses. The total sample included judgments from 69 individuals.

ANALYSES OF PSYCHOLOGISTS' JUDGMENTS

Background Questionnaire

Background Questionnaire responses were analyzed to form groups of judges based on psychological experience, familiarity with the military, intersection of experience and familiarity, and familiarity with Army Project A.

Psychological Experience Scores

Items in Section II of the Background Questionnaire assessed the judges' experience in personnel psychology. Each item required a "no" (0) or "yes" (1) response to seven descriptive anchors representing varying degrees of experience. The item score equaled the sum of the anchor responses. A second scoring method was examined, in which each anchor response was multiplied by a weight from 1 to 5 representing the degree of experience it described; the sum of the anchor scores equaled the item score. Internal-consistency reliability (coefficient alpha) was high for both scoring schemes for each item (range = .70 to .85). The weighted scoring scheme was used in all subsequent analyses. Possible scores ranged from 0 to 360; obtained scores ranged from 34 to 336, with a mean of 143.75 and standard deviation of 78.24.

Psychological Experience Groups

The distribution of psychological experience scores was examined to determine any natural breaking points at which the judges could be separated into high and low experience groups. A break occurred between scores of 154 and 173. Judges scoring 154 or lower formed the low experience group (N = 44); judges scoring 173 or higher formed the high experience group (N = 25).

Military Familiarity

Section I, item 4 of the Background Questionnaire assessed the judges' experience with or exposure to the military. Points were awarded for exposure through a spouse or family member, through work as a consultant with military organizations, and through service in the military. A total of 19 points was possible; scores obtained ranged from 0 to 11 (mean = 4.42; standard deviation = 2.65).

Items in Section III of the Background Questionnaire assessed the judges' familiarity with five job tasks from each of the three MOS under investigation: Infantryman, Mechanic, and Administrative Specialist. Judges responded 0 (unfamiliar), 1 (somewhat familiar), or 2 (very familiar) for each item. A familiarity score was computed for each MOS by summing the responses to the five items for that MOS. Internal-consistency reliability (coefficient alpha) for Infantryman familiarity was .80; for Mechanic familiarity, .77; and for Administrative Specialist familiarity, .73. A total familiarity score was also computed by summing responses to all 15 items in Section III. Internal-consistency reliability for total familiarity score was high (alpha = .85).

Military Familiarity Groups

Military experience scores and Infantryman familiarity scores, which correlated .60, were summed to form a military familiarity score. Possible scores ranged from 0 to 34; obtained scores ranged from 0 to 20 (mean = 9.12, standard deviation = 4.64). Judges scoring 8 or lower formed the low military familiarity group (N = 35); judges scoring 9 or higher formed the high military familiarity group (N = 34).

Intersection of Experience and Familiarity Groups

The intersection of psychological experience and military familiarity groups was examined. Judges in quadrant 1 were low on both experience and familiarity (N = 27). Judges in quadrant 2 were in the low experience and high familiarity groups (N = 17). Judges in quadrant 3 were in the high experience and low familiarity groups (N = 8). Judges in quadrant 4 were high on both experience and familiarity (N = 17).

Project A Familiarity Groups

Section I, item 5 assessed familiarity with Army Project A. Scores ranged from 1 to 5 with a mean of 3.20 and a standard deviation of 1.29. Judges scoring 1 or 2 (never heard of Project A or heard a presentation of results) formed the low Project A familiarity group (N = 27). Judges scoring 3 (occasionally worked on Project A) formed the moderate Project A familiarity group (N = 16). Judges scoring 4 or 5 (worked on Project A often or very frequently) formed the high Project A familiarity group (N = 26).

Reliability Analyses

We performed analyses to estimate the reliability of the judges' estimates of validities. Separate analyses were performed for Forms A and B of the task category and activity xonomies and for the three military jobs--Infantryman, Mechanic, and Administrative Specialist. Analyses of variance were performed to provide mean squares for computing intraclass coefficients. We were interested in the reliability of the estimates of validity of attributes for job descriptors, represented in the Analysis of Variance (ANOVA) as the Descriptor x Attribute interaction. Table 1 shows the ANOVA table for the analysis of validity estimates when the 31 attributes were rated against the 51 task categories found on Form A. All the judges who completed that rating task were included in the analysis, in this case, 35 raters. Also shown in Table 1 are the intraclass coefficients for the single rater case, the 10, 20, and 30 case, and the coefficient appropriate for the number of raters in the analysis.

Table 2 shows the single-rater reliabilities for the total sample of judges available for each rating task and for several sub-groupings of the total sample of available judges: those with low and high scores on Military Familiarity, those with low and high scores on Psychological Experience, those in the quadrants formed by the intersection of these two groups, and those with low, moderate, and high familiarity with Project A. In Table 2, MOS 11B = Infantryman, MOS 63B = Mechanic, and MOS 71L = Administrative Specialist.

Note first that the single-rater reliabilities for the total available raters are all at acceptably high levels, ranging from a low value of .42 for the Infantryman (11B) and a high value of .57 for Form A of the activities taxonomy.

Table 1

Sources of Variance, Sums of Squares, Degrees of Freedom, Mean Squares and Intraclass Coefficients for Psychologists' (N=35) Estimates of Validity of 31 Attributes for 51 Task Categories (Form A)

Source of Variance	Sum of Squares	DF	Mean Square
Descriptor	3741.549	50	74.831
Attribute	24538.646	30	817.955
Descriptor x Attribute	43128.552	1500	28.752
Rater	14362.916	34	422.439
Rater x Descriptor	4885.012	1700	2.874
Rater x Attribute	17109.906	1020	16.774
Rater x Desc. x Att.	42134.966	51000	0.826

The intra-class coefficients for the vector of attribute x descriptor ratings are:

Single rater: 0.491
Mean of 10 raters: 0.906
Mean of 20 raters: 0.951
Mean of 30 raters: 0.967
Mean of all raters (35) for this problem: 0.971

Table 2.

Estimates of Single-Rater Reliability (Intraclass Coefficients) for Synthetic Validity Expert Judgments, By MOS, Task Category Form, Activity Form, Military Familiarity, Psychological Experience, Project A Familiarity, and Total Groups.

	MOS						Tasks				Activities			
	11B		63B		71L		A		B		A		B	
Group	N	r	N	r	N	r	N	r	N	r	N	r	N	r
Low Military Familiarity (MF)	13	.492	11	.522	11	.568	18	.505	17	.486	18	.588	17	.557
High Military Familiarity	11	.333	11	.570	12	.479	17	.471	17	.456	17	.544	17	.562
Low Psychological Experience (PE)	17	.437	15	.557	12	.561	20	.5[illegible]7	24	.460	20	.578	24	.550
High Psychological Experience	7	.380	7	.557	11	.475	15	.482	10	.484	15	.559	10	.569
Low PE, Low MF	11	.491	9	.546	7	.563	13	.506	14	.486	13	.573	14	.556
Low PE, High MF	6	.307	6	.571	5	.556	7	.502	10	.430	7	.588	10	.544
High PE, Low MF	2	.413	2	.421	4	.583	5	.519	3	.442	5	.625	3	.539
High PE, High MF	5	.346	5	.588	7	.419	10	.454	7	.483	10	.518	7	.579
Low Project A Familiarity	10	.375	7	.500	10	.440	14	.464	13	.466	14	.510	13	.540
Moderate Project A Familiarity	5	.454	8	.537	3	.506	6	.485	10	.538	6	.620	10	.608
High Project A Familiarity	9	.462	7	.591	10	.581	15	.521	11	.412	15	.605	11	.527
Total	24	.424	22	.545	23	.519	35	.491	34	.469	35	.566	34	.558

Our hypotheses about the subgroups of raters were that those judges with greater military familiarity and more psychological experience should be "better" judges, and thus should evidence greater agreement and higher validity when their estimates are used to form prediction equations. We hypothesized a similar effect with regard to Project A familiarity.

Examination of Table 2 reveals little support for these hypotheses, at least with regard to rating reliability. Raters high on the subgrouping variables sometimes had higher reliability coefficients, and sometimes had lower coefficients. In general, the coefficients are not that different. Of the 84 coefficients, only 9 are outside the range from .40 to .60. Although we have performed no statistical tests, it seems reasonably safe to assume that sampling error accounts for almost all of the variance in the coefficients in this table.

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CHAPTER 6:

Comparative Analyses of Empirical and Synthetic Job Performance Prediction Equations

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SUMMARY

In this chapter, we describe the empirical derivation of prediction equations for the three jobs in Phase I of our study and compare these equations to alternative forms of the synthetically derived equations. Two major comparisons are reported. The first is between the different job component models. All three models yielded prediction equations with high validities for each of the three jobs. The Attribute Model yielded slightly higher validities and the Activities Model yielded slightly lower validities in comparison to the Job Task Model. None of the models discriminated between the three jobs very well. The Attribute Models yielded slightly greater discrimination and the Job Task Model yielded slightly less discrimination in comparison to the Activities Model.

The relatively low levels of discrimination prompted further investigation of the assumptions used in establishing the attribute weights for predicting performance on each job component and the component weights used in combining the prediction equations. The second set of comparisons focused on alternative procedures for computing these weights. The results showed that alternative attribute-by-component weights led to significant differences in absolute validity and only minor changes in discriminant validity with a unit weighting approach giving the best results. An alternative scaling of the component-by-job weights did lead to significant improvement in the discriminant validity of the synthetic equations with little or no change in the absolute validities.

The results indicate a high degree of validity and, with appropriate adjustments to the attribute and component weights, adequate levels of discriminability for the synthetically derived predictions. The exploratory analyses of alternative weight adjustments and the very limited number of jobs suggest the strong need for further confirmatory analyses. Such analyses are planned as parts of Phase II and Phase III of the current project.

CHAPTER 6:

Comparative Analyses of Empirical and Synthetic Job Performance Prediction Equations

In this chapter, we describe the results of our preliminary evaluation of the synthetically derived prediction equations for three Army jobs: Infantryman, Vehicle Mechanic, and Administrative Specialist. Two general criteria are used in these evaluations. The first is the absolute validity of the predictions for each job. Data from Project A were used to obtain empirical estimates of these validities. The second criterion is differential validity. To what extent are the prediction composites for each job more valid for that job than for the other jobs?

We also examined alternative wrinkles in the methods used for forming the synthetic prediction composites. First, we examined the methods used for obtaining the attribute weights used in predicting performance on each of the job components: Then, we also examined the method used for estimating the job component weights used in combining the component prediction equations.

Data

The data used in these analyses were taken from the Project A Concurrent Validation. The overall data set included predictor and job performance measures collected on soldiers in 19 different jobs. Three of these jobs were the focus of the Phase I synthetic validation efforts: 11B - Infantryman, 63B - Vehicle Mechanic, and 71L - Administrative Specialist.

The individual predictor measures included in the Project A battery have been described in detail by Peterson et al. (Peterson, Hough, Dunnette, Rosse, Houston, & Toquam, 1987). Owens-Kurtz and Peterson above describe the development of specific measures of 26 of the predictory taxonomy elements from scales in the Project A battery.

Wise, Campbell, McHenry, and Hanser (1986), and Campbell, McHenry, & Wise (1987), have described the identification and measurement of five job performance constructs of interest to the Army: job-specific proficiency, general soldiering proficiency, effort and leadership, personal discipline, and physical fitness and military bearing. Wise, Campbell, and Peterson (1987) showed that the same predictor measures are optimal for a wide range of jobs in predicting all but the first of these constructs. Significant differences across jobs were found in the predictors of job-specific proficiency.

To a large extent, the Army uses separate measures to screen applicants who might be deficient in different areas of performance. The current project is most closely focused on the development of prediction composites for job-specific aspects of performance. For this reason, the Core Technical Proficiency (CTP) measure was used as the primary performance criterion in the analyses described below.

The Concurrent Validation sample included 491 infantrymen, 478 mechanics, and 427 clerks with complete data on the predictor and criterion measures. These samples differed somewhat in terms of the heterogeneity and mean levels of the predictor scores. Also, because all were selected job incumbents, they had higher and less variable predictor scores in comparison to the overall pool from which applicants are drawn. Common practice has been to use a multivariate correction to adjust covariances and correlations for differences in heterogeneity (Lord & Novick, 1968). The 1980 Youth Population sample to which the Armed Services Vocational Aptitude Battery (ASVAB) was administered is used as the target population. This procedure corrects for effects of restriction in range due to explicit selection on the subtests of the ASVAB.

The Concurrent Validation samples were further restricted by self-selection into each occupational specialty and by attrition after initial enlistment. We used a two-step procedure to adjust for range restriction due to both sources of selection. First, we estimated the covariance of the 26 predictor attribute measures for the entire Concurrent Validation sample (7,055 cases with complete data) and adjusted these covariances for differences between the Concurrent Validation (CV) sample and the Youth Population in the covariances of the ASVAB subtests. This provided us with estimates of what the covariances among the attribute measures would have been for the Youth Population had all of the Project A predictor measures been administered to them.

Second, we computed covariances for each of the three job-specific samples that included the 26 predictors plus the five criterion construct scores. We then adjusted these covariances for differences between the job specific sample and the estimated Youth Population covariances. Table 1 shows the means and standard deviations of the predictor measures overall CV sample. Tables 2-4 show the mean and standard deviations for each of the attribute measures in the samples for each of the three Phase I MOS. The estimated standard deviations for the Youth Population are also shown. (The means for the Youth Population are not used in the following analyses and so were not estimated.)

Method

Once the covariances of the predictor and criterion measures were estimated for each job, validities for any given composite of the predictors can be estimated through relatively direct matrix manipulations. There are two steps in forming a predictor composite score. First, the attribute scores are weighted (by estimated validities) and summed to form a predicted score for each job component. Second, these predicted job component scores are then weighted (according to job description ratings) and summed to form the predicted total job performance score.

Table 1

Predictor Means and Standard Deviations for Each Sample

VARIABLE		N	ALL MOS MEAN	ALL MOS STD DEV	1980 POPULATION STD DEV
ASVAB Subtests					
A1AS80GS:	General Science	7045	51.40	8.13	10.00
A1AS80AR:	Arithmetic Reasoning	7045	52.87	7.28	10.00
A1AS80VE:	Verbal (WK & PC)	7045	50.96	6.44	10.00
A1AS80NO:	Numeric Operations	7045	52.71	6.38	10.00
A1AS80CS:	Coding Speed	7045	51.28	6.68	10.00
A1AS80AS:	Auto/Shop Information	7045	54.14	8.53	10.00
A1AS80MK:	Mathematics Knowledge	7045	50.98	7.39	10.00
A1AS80MC:	Mechanical Comprehension	7045	53.11	8.17	10.00
A1AS80EI:	electronics Information	7045	52.14	7.55	10.00
Synthetic Validity Attribute Measures					
SVATTR01:	Verbal Ability	7045	102.37	13.51	18.97
SVATTR02:	Reasoning	7045	102.44	16.46	19.27
SVATTR03:	Number Ability	7045	100.00	17.40	25.35
SVATTR04:	Spatial Ability	7045	100.00	17.43	21.18
SVATTR06:	Mental Info. Processing	7045	100.00	23.59	24.71
SVATTR07:	Perceptual Speed & Acc.	7045	100.00	17.64	20.43
SVATTR08:	Memory	7045	50.00	14.22	14.95
SVATTR09:	Mechanical Comprehension	7045	133.33	17.63	22.85
SVATTR10:	Eye-Limb Coordination	7045	0	14.01	14.78
SVATTR11:	Precision		0	18.84	20.39
SVATTR12:	Movement Judgment	7045	6.62	9.00	9.38
SVATTR13:	Hand & Finger Dexterity	7045	16.73	7.76	7.86
SVATTR17:	Involvement in Athletics	7045	13.90	3.06	3.07
SVATTR18:	Work Orientation	7045	150.00	26.12	26.76
SVATTR20:	Cooperation/Stability	7045	150.00	26.40	26.94
SVATTR21:	Energy	7045	48.43	5.99	6.09
SVATTR22:	Conscientiousness	7045	102.48	16.52	16.66
SVATTR23:	Dominance/Confidence	7045	100.00	18.12	18.92
SVATTR24:	Interest in Using Tools	7045	200.00	32.93	34.79
SVATTR25:	Interest in Rugged Act.	7045	150.00	26.01	26.46
SVATTR26:	Interest in Protective Serv.	7045	100.00	17.03	17.20
SVATTR27:	Interest in Technical Act.	7045	150.00	23.55	23.57
SVATTR28:	Interest in Science	7045	200.00	29.23	29.51
SVATTR29:	Interest in Leadership	7045	40.07	8.45	8.59
SVATTR30:	Interest in Artistic Act.	7045	14.13	4.10	4.16
SVATTR31:	Interest in Efficiency & Org.	7045	200.00	29.95	30.71

Table 2

Predictor Means and Standard Deviations for Each Sample

11B: Infantryman

VARIABLE		N	MEAN	STD DEV
Synthetic Validation Attribute Measures				
SVATTR01:	Verbal Ability	491	104.80	13.34
SVATTR02:	Reasoning	491	103.74	16.95
SVATTR03:	Number Ability	491	100.00	16.89
SVATTR04:	Spatial Ability	491	100.00	17.69
SVATTR06:	Mental Info. Processing	491	100.00	23.75
SVATTR07:	Perceptual Speed & Acc.	491	100.00	17.30
SVATTR08:	Memory	491	50.00	14.21
SVATTR09:	Mechanical Comprehension	491	137.41	15.48
SVATTR10:	Eye-Limb Coordination	491	0.00	13.80
SVATTR11:	Precision	491	0.00	18.80
SVATTR12:	Movement Judgment	491	8.26	7.92
SVATTR13:	Hand & Finger Dexterity	491	17.75	7.34
SVATTR17:	Involvement in Athletics	491	14.51	2.96
SVATTR18:	Work Orientation	491	150.00	26.07
SVATTR20:	Cooperation/Stability	491	150.00	25.95
SVATTR21:	Energy	491	47.72	6.09
SVATTR22:	Conscientiousness	491	98.18	17.49
SVATTR23:	Dominance/Confidence	491	100.00	18.21
SVATTR24:	Interest in Using Tools	491	200.00	32.08
SVATTR25:	Interest in Rugged Act.	491	150.00	25.90
SVATTR26:	Interest in Protective Serv.	491	100.00	17.35
SVATTR27:	Interest in Technical Act.	491	150.00	23.20
SVATTR28:	Interest in Science	491	200.00	30.23
SVATTR29:	Interest in Leadership	491	40.38	8.90
SVATTR30:	Interest in Artistic Act.	491	14.21	4.26
SVATTR31:	Interest in Efficiency & Org.	491	200.00	31.11
Performance Criterion Measure				
M3RAWCTP:	Core Technical Prof.	491	102.89	16.08

Table 3

Predictor Means and Standard Deviations for Each Sample

63B: Vehicle Mechanic

VARIABLE		N	MEAN	STD DEV
Synthetic Validation Attribute Measures				
SVATTR01:	Verbal Ability	478	100.21	12.84
SVATTR02:	Reasoning	478	103.78	16.10
SVATTR03:	Number Ability	478	100.00	17.21
SVATTR04:	Spatial Ability	478	100.00	17.50
SVATTR06:	Mental Info. Processing	478	100.00	24.21
SVATTR07:	Perceptual Speed & Acc.	478	100.00	17.23
SVATTR08:	Memory	478	50.00	13.80
SVATTR09:	Mechanical Comprehension	478	138.99	16.17
SVATTR10:	Eye-Limb Coordination	478	0.00	14.19
SVATTR11:	Precision	478	0.00	18.83
SVATTR12:	Movement Judgment	478	6.96	8.41
SVATTR13:	Hand & Finger Dexterity	478	15.72	7.94
SVATTR17:	Involvement in Athletics	478	13.63	3.09
SVATTR18:	Work Orientation	478	150.00	26.36
SVATTR20:	Cooperation/Stability	478	150.00	26.73
SVATTR21:	Energy	478	47.62	6.26
SVATTR22:	Conscientiousness	478	99.76	17.31
SVATTR23:	Dominance/Confidence	478	100.00	17.80
SVATTR24:	Interest in Using Tools	478	200.00	31.49
SVATTR25:	Interest in Rugged Act.	478	150.00	25.78
SVATTR26:	Interest in Protective Serv.	478	100.00	17.16
SVATTR27:	Interest in Technical Act.	478	150.00	24.23
SVATTR28:	Interest in Science	478	200.00	30.75
SVATTR29:	Interest in Leadership	478	37.53	8.29
SVATTR30:	Interest in Artistic Act.	478	12.55	3.96
SVATTR31:	Interest in Efficiency & Org.	478	200.00	30.66
Performance Criterion Measure				
M3RAWCTP:	Core Technical Prof.	478	102.62	15.23

Table 4

Predictor Means and Standard Deviations for Each Sample

71L: Administrative Specialists

VARIABLE		N	MEAN	STD DEV
Synthetic Validation Attribute Measures				
SVATTR01:	Verbal Ability	427	100.77	13.06
SVATTR02:	Reasoning	427	100.93	16.78
SVATTR03:	Number Ability	427	100.00	17.25
SVATTR04:	Spatial Ability	427	100.00	17.09
SVATTR06:	Mental Info. Processing	427	100.00	24.99
SVATTR07:	Perceptual Speed & Acc.	427	100.00	18.45
SVATTR08:	Memory	427	50.00	14.02
SVATTR09:	Mechanical Comprehension	427	120.05	16.33
SVATTR10:	Eye-Limb Coordination	427	0.00	13.71
SVATTR11:	Precision	427	0.00	18.66
SVATTR12:	Movement Judgment	427	2.22	10.82
SVATTR13:	Hand & Finger Dexterity	427	15.05	7.92
SVATTR17:	Involvement in Athletics	427	13.01	3.46
SVATTR18:	Work Orientation	427	150.00	25.37
SVATTR20:	Cooperation/Stability	427	150.00	26.54
SVATTR21:	Energy	427	49.29	6.12
SVATTR22:	Conscientiousness	427	108.80	14.21
SVATTR23:	Dominance/Confidence	427	100.00	18.39
SVATTR24:	Interest in Using Tools	427	200.00	34.53
SVATTR25:	Interest in Rugged Act.	427	150.00	26.18
SVATTR26:	Interest in Protective Serv.	427	100.00	17.10
SVATTR27:	Interest in Technical Act.	427	150.00	23.15
SVATTR28:	Interest in Science	427	200.00	27.63
SVATTR29:	Interest in Leadership	427	41.94	8.26
SVATTR30:	Interest in Artistic Act.	427	15.84	4.01
SVATTR31:	Interest in Efficiency & Org.	427	200.00	28.82
Performance Criterion Measure				
M3RAWCTP:	Core Technical Prof.	427	101.16	17.36

In addition to the synthetically produced predictor composites, we developed "empirical" prediction equations using least-squares regression. When the same empirical data were used to estimate the validity of the empirical composites, an adjustment was applied to give unbiased estimates of cross-validation validities for these composites (Darlington, 1968, and Herzberg, 1969; both gave the same results). No adjustments were made when we estimated the validity of the empirical equation developed for one job for predicting performance in a different job, since the criterion data for the other job were not used in the development of the empirical weights.

In addition to the three empirical composites, validities were estimated for each of the three synthetic composites derived from each of the three job component models. In each case, we estimated validities for each of the composites for predicting each of the three jobs. Differences between the validity of each composite for the intended job and the average of the validities for each of the other two jobs were used as an indicator of discriminant validity.

Initial results (described below) showed high absolute validities, but relatively low levels of discriminant validity for the synthetic composites. Further analyses of alternative methods for forming the attribute weights were conducted.

Two alternative methods for forming the attribute-by-component weights (for predicting performance at the component level) and one alternative for forming the component-by-job weights (for weighting the individual prediction equations to form an overall equation) were explored. The initial method for developing prediction equations for each job component (attribute-by-component weights) used attribute weights that were proportional to the attribute-by-component validities estimated by the expert psychologists. The first alternative to these validity weights was to compute "regression" weights that took the correlations among the predictor measures into account. (In matrix terms, the regression weights are given by the product of the validity vector with the inverse of the matrix of predictor correlations.) The second alternative was to use unit weights. In this second alternative, all attributes with mean validity ratings less than 3.5 were given a weight of 0 and all remaining attributes were given a weight of 1 for combining standardized predictor scores into job component performance estimates.

The initial method used to form composite-by-job weights was to use the mean of the Subject Matter Expert (SME) ratings of the importance of the component for core technical proficiency in the job. These ratings were on a scale from 0 to 4.74 that comprised a somewhat arbitrary metric. The alternative used to compute "adjusted" weights was to use a value of 0 where the mean importance rating was less than 2.5 and to otherwise use the square of the mean importance ratings so as to increase the relative weight given to the more important components. The objective in analyzing composites derived from these alternative component weights was not to find a method with a better rationale so much as to explore the sensitivity of the final results to differences in the scaling of these weights.

Table 5. Standardized Attribute Weights for Selected Composites (in thousandths)

Comp.	1	2	3	4	6	7	8	9	10	11	12	13	17	18	20	21	22	23	24	25	26	27	28	29	30	31
11B: Infantryman																										
EM11B	306	153	113	117	-13	169	91	187	8	35	-23	45	28	59	-144	-33	138	47	22	157	-59	81	-79	28	-61	-40
TK11B	130	129	91	106	101	97	108	84	78	73	67	75	57	103	73	83	90	74	69	67	61	62	43	60	20	66
AC11B	116	110	79	91	96	90	100	72	82	78	77	68	86	107	85	97	95	83	68	78	60	59	54	76	43	70
AT11B	99	98	87	98	106	90	86	116	96	92	93	84	88	93	67	91	79	71	88	113	75	48	13	63	-22	46
VT11B	116	110	79	91	96	90	100	72	82	78	77	68	86	107	85	97	95	83	68	78	60	59	54	76	43	70
VA11B	95	90	67	90	88	83	81	63	82	84	84	65	119	121	93	119	102	84	67	106	70	53	45	75	41	67
RT11B	857	277	-326	4	235	-23	174	-371	162	-64	116	168	302	154	-8	-48	285	-59	382	-40	117	-5	-237	-0	-62	449
RA11B	671	132	-280	153	223	-0	100	-371	126	-5	133	142	403	182	-9	43	289	-164	189	172	109	-41	-253	3	-36	453
UT11B	217	165	39	64	37	68	134	27	112	81	69	42	75	95	103	118	86	103	33	48	0	12	4	103	0	0
UA11B	147	60	0	66	23	78	87	0	98	98	112	0	149	145	98	219	141	98	0	113	0	0	0	98	0	0
63B: Vehicle Mechanic																										
EM63B	27	198	-22	-13	78	79	15	608	-30	7	26	76	-68	96	63	-132	154	-31	407	83	-107	-157	29	-4	-79	-16
TK63B	133	128	95	105	97	97	106	98	79	75	62	80	51	104	69	81	92	68	79	57	53	71	45	55	19	74
AC63B	113	111	82	93	97	91	101	85	89	83	76	77	75	103	78	90	92	76	80	71	56	66	56	69	40	69
AT63B	114	121	105	115	91	81	101	163	91	75	68	96	41	84	50	58	74	48	135	63	32	99	45	41	6	65
VT63B	113	111	82	93	97	91	101	85	89	83	76	77	75	103	78	90	92	76	80	71	56	66	56	69	40	69
VA63B	88	97	72	90	92	83	81	107	116	105	80	97	81	108	72	92	92	65	110	81	57	79	54	54	33	64
RT63B	744	257	-267	-47	241	-15	178	-207	199	-70	91	208	263	200	-32	-73	285	-68	456	-150	117	57	-241	-22	-47	437
RA63B	377	134	-160	-128	230	-6	99	175	310	-20	42	271	257	320	-75	-55	283	-176	457	-218	98	144	-252	-50	3	386
UT63B	188	166	70	67	33	53	124	77	149	103	56	90	49	76	82	92	75	82	88	35	0	33	3	82	0	0
UA63B	73	115	81	42	0	0	34	170	261	195	40	171	51	79	28	106	101	28	187	51	0	81	0	28	0	0
71L: Administrative Clerk																										
EM71L	206	444	361	114	21	-52	96	-161	-94	34	-2	23	-63	111	64	-56	154	-131	-180	-23	22	15	106	48	-41	38
TK71L	160	136	101	88	99	102	111	73	68	64	53	72	46	110	81	85	97	75	55	36	49	60	47	65	30	87
AC71L	144	123	89	81	102	93	119	65	67	64	56	69	63	108	90	91	102	86	54	52	55	55	58	81	46	81
AT71L	161	126	113	68	118	151	124	56	80	82	36	132	25	106	87	85	105	53	35	5	15	40	19	38	28	122
VT71L	144	123	89	81	102	93	119	65	67	64	56	69	63	108	90	91	102	86	54	52	55	55	58	81	46	81
VA71L	168	129	89	76	109	100	139	60	64	60	46	77	49	110	87	81	116	72	45	35	53	52	60	66	46	100
RT71L	1125	402	-357	-172	208	-43	223	-510	109	-53	35	185	206	137	44	-101	262	-8	445	-139	131	-18	-222	-9	-121	452
RA71L	1283	387	-451	-220	184	-34	245	-554	87	-18	2	201	159	233	44	-183	269	-52	400	-169	138	-18	-169	-123	-150	498
UT71L	305	211	55	34	46	48	177	12	41	32	24	70	26	83	116	83	104	116	12	17	0	6	2	116	0	0
UA71L	325	225	0	0	0	0	216	0	0	0	0	117	0	54	54	54	263	54	0	0	0	0	0	54	0	0

COMPOSITE CODE:

- EM - Empirical composite
- VT - Validity attribute weights; total component weights
- VA - Validity attribute weights; adjusted comp. weights
- RT - Regression attribute weights; total component weights
- RA - Regression attribute weights; adjusted comp. weights
- UT - Unit attribute weights; total component weights
- UA - Unit attribute weights; adjusted component weights
- TK - Task category weights
- AC - Activity weights
- AT - Attribute weights

Table 5 shows attribute coefficients for each of the different predictor composites investigated. These coefficients have been scaled so as to produce scores of unit variance when applied to standardized predictor scores in the 1980 Youth Population. One result that is evident in Table 2 is that the initial and "unit-weight" synthetic composites do not include negative weights. The empirical composites do include some negative weights, although generally relatively small ones. The "regression-weight" synthetic composites, on the other hand, include a greater number of negative weights with somewhat larger values.

Results

Table 6 shows the validity estimates for the synthetic and empirical predictor composites. For the Attribute Model, both psychologist and soldier-derived composites are shown.

Table 7 shows the mean across the three jobs of the diagonal (appropriate) validities for each set of predictor composites. This value represent the mean absolute validity. Table 7 also shows (in parentheses) the difference between each of these means and the corresponding mean of the off-diagonal (inappropriate) validities. This difference statistic can be interpreted as a measure of the mean discriminant validity.

The empirical validities are quite high (a mean validity of .673 across the three MOS) and show moderate discrimination (a mean of .173 across the three MOS). The main result indicates that the different approaches to weighting the attributes led to significant differences in absolute validities. The regression weights led to low validities (.34 to .40). The validity weights led to relatively high validities (.52 to .58). In all cases except the psychologist-based attribute weights, the unit weights led to even higher validities (.53 to .63). In all but one case, the use of unit weights led to slightly higher discriminant validities.

The adjustments to the component weights had mixed, but generally small, effects on the absolute validities. The adjusted component weights did lead to consistently higher discriminant validities.

Overall, the highest validities were derived from the Task Model. The highest mean validity was .63, very close to the mean for the empirical composite of .67. Ignoring the regression attribute weights, the greatest discriminant validity was obtained from the Activity Model. The maximum difference here was .14, compared to a difference for the empirical composite of .17.

Table 6

Validities for Each Prediction Equation Against Infantry (11B), Vehicle Mechanic (63B), and Administrative Clerk (71L)

Prediction Weighting Method	Predict Equation MOS	Task Model Criterion 11B	Task Model Criterion 63B	Task Model Criterion 71L	Activity Model Criterion 11B	Activity Model Criterion 63B	Activity Model Criterion 71L	Attribute Model Weighting Method	Attribute Model Criterion 11B	Attribute Model Criterion 63B	Attribute Model Criterion 71L
	11B	63	51	50	60	48	47		63	53	45
V x T	63B	64	51	50	61	49	48	Vx	66	56	48
	71L	63	49	52	60	46	50	Psych	64	49	54
	11B	63	50	49	57	46	44		57	45	44
V x A	63B	65	54	49	60	51	45	Vx	60	50	45
	71L	64	49	54	61	46	52	Sold	59	45	49
	11B	43	36	33	40	33	30		43	43	23
R x T	63B	42	38	32	41	38	30	Rx	41	48	24
	71L	37	29	33	37	28	33	Psych	30	22	28
	61B	42	34	32	36	29	25		35	30	24
R x A	63B	41	45	25	38	42	21	Rx	36	42	20
	71L	30	21	28	32	24	31	Sold	29	23	26
	11B	71	56	55	66	50	50		59	49	44
U x T	63B	71	58	55	67	54	50	Ux	59	48	46
	71L	69	51	58	68	49	57	Psych	62	50	49
	11B	70	56	53	54	41	39		61	51	45
U x A	63B	72	62	51	61	55	39	Ux	62	50	49
	71L	68	49	56	67	47	59	Sold	55	40	48

Empirical Prediction

		11B	63B	71L
Empirical	11B	72	59	53
	63B	61	68	33
	71L	59	35	62

V = Validity weights
R = Regression weights
U = Unit weights
T = Task category weights
A = Job activity weight

Table 7

Mean Validities: Absolute Validities and Discriminant Validities (Differences from Off-Diagonal Validities)

Attribute Weights	Task Model Component Wts Total	Task Model Component Wts Adj	Activity Model Component Wts Total	Activity Model Component Wts Adj	Attribute Model Psych	Attribute Model Soldier
Validity Wts	.553 (.008)	.570 (.027)	.530 (.013)	.533 (.031)	.577 (.035)	.520 (.023)
Regr Wts	.380 (.032)	.383 (.078)	.370 (.038)	.363 (.081)	.397 (.164)	.343 (.073)
Unit Wts	620 (.025)	.627 (.045)	.590 (.033)	.560 (.138)	.520 (.003)	.530 (.027)

Note: The mean validity for the empirically derived equation (adjusted for shrinkage) is .673. This is .173 greater than the mean off-diagonal validity for these equations.

Discussion

The results of the comparative analyses are generally supportive of the synthetic validation approach. They indicate, however, that further work is needed to evaluate the alternative approaches for forming the composite weights from the information gathered. The exploratory nature of the analysis of alternative adjustments together with the very small number of jobs studied strongly suggest the need for cross-validation through confirmatory analyses on additional samples. Fortunately, such efforts are planned as part of Phase II and Phase III of the current project.

The initial results do not show a strong preference for any one of the job component models. The effects of alternative weight estimation procedures were much greater than any differences between the different models. The tendency toward relatively uniform weighting of the different attributes suggests the need to consider both attribute and job descriptor models that are more parsimonious so that the contrast in the weights will be more significant. In addition, the use of unit weight models reduces the number of different tests that are used in predicting performance for each job, resulting in potential reductions in required testing time.

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CHAPTER 7:

Exploring the Relationships among Rater Characteristics and Fidelity of Job Description Judgments

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SUMMARY

The purpose of this research was to identify characteristics of individual raters who provide job description judgments that are consistent with the consensus job description ratings provided by all raters within a group (i.e., high rating fidelity). A tentative model of the process variables involved in job description was developed. Three individual difference characteristics were identified and measured: job experience, job knowledge, and general aptitude. Eighty non-commissioned officers (NCOs) from three jobs served as judges. Judges completed job description questionnaires representing three distinct approaches to describing jobs: task-based, activity-based, and attribute-based approaches. Relationships among the three individual difference constructs and rating fidelity were examined via path analysis. Results suggest that the data fit the hypothesized model very well. The model also did a good job of predicting which judges would provide high-fidelity judgments. Implications for selecting job description judges and goals of future research are provided.

CHAPTER 7:

Exploring the Relationship among Judge Characteristics and Fidelity of Job Description Judgments

The purpose of this research was to identify the characteristics of raters who provide job description judgments that are consistent with job description judgments provided by other raters (i.e., rating fidelity). There are both theoretical and practical reasons why this issue is important. First, by understanding the underlying knowledge, skills, abilities, and other personal characteristics (KSAOs) that are involved in job description judgments, we may begin to develop a theoretical map of the process variables involved. Second, most organizations generate and use job descriptions for a variety of human resource functions. This research may help suggest who is qualified to provide the judgments that are required to produce these job descriptions.

There has been very little research on the individual difference correlates of job description judgments. However, there have been a number of studies that have investigated the effects of individual difference variables on performance ratings (Bernardin, Cardy & Carlyle, 1982; Zedeck & Kafry, 1977; Cascio & Valenzi, 1978; Kirchner & Reisberg, 1962). In a summary of this literature, Cascio (1987) reported that: (a) interests, social insight, intelligence, and cognitive complexity show no consistent relationship with rating fidelity and accuracy; (b) the education level and job experience of the judge have small, positive correlations with fidelity and accuracy; and (c) the job performance of the judge has a substantial positive correlation with rating fidelity and accuracy.

To provide accurate, reliable performance ratings, a judge must be able to observe and evaluate behavior. The requirements of job description judgments are somewhat different. No evaluation of the effectiveness of behavior is required. Instead, the judge must be able to observe and describe behavior accurately. If the job is described in terms of tasks, the judge may be required to infer the purpose of the behavior (i.e., what the incumbent is attempting to accomplish on the job). If the job is described in terms of ability or skill requirements, the judge may be required to infer these from the behavior performed on the job.

In spite of these differences, we believe that the findings from the performance rating literature may be relevant for the present research. Specifically, we hypothesized that three individual difference constructs contribute to the fidelity of job description judgments: job experience, job knowledge, and general aptitude. Job experience and job knowledge are salient for the task of defining the job. In order for a judge to accurately define a job, he or she must have the experience and knowledge to identify the job elements that are and are not part of the job and be able to determine the criticality of each job element. General aptitude helps the judge understand the judgment task. General aptitude also contributes to abstract thinking skills, enabling the judge to link elements from the job description questionnaire to the behaviors performed on the job.

Figure 1 represents a theoretical model of how the specific judge characteristics (described below) used in our analyses affect the quality of the job description judgments. As the figure shows, job experience and general aptitude combine to influence both knowledge of the judges' own jobs and the jobs they are rating. The effect of job tenure on rating fidelity is: direct (path 11), through job knowledge (paths 7-13, and 9-14), and through on-the-job experience and job knowledge (paths 1-3-13, and 1-4-14). The effect of general aptitude on rating fidelity mirrors the effects of job tenure in that: it has a direct effect (path 12), acts through job knowledge directly (paths 10-13, and 8-14), and acts through education and job knowledge (paths 2-5-15, and 2-6-14).

Although the paths outlined are consistent across all three judgment job description questionnaires, it is quite possible that the levels of the individual difference constructs necessary for the judges to provide good judgments will differ from questionnaire to questionnaire. Clearly, less abstraction is required of the judges for the identification of tasks that are important for jobs, while much greater abstraction is required for the leap in linking attributes and jobs. Therefore, it is possible that more general aptitude is required for judges to provide high-fidelity attribute-based job description judgments than is required for high-fidelity task-based judgments. Conversely, a higher level of specific job knowledge may be required to make the task-based judgments than is required for the attribute-based judgments.

Method

Judges

Eighty non-commissioned officers (NCOs), representing three Army enlisted specialties (Infantryman, Vehicle Mechanic, and Administrative Specialist), served as judges. The judges were chosen to include representative samples of blacks, Hispanics, whites, females, and males for each specialty. The judges averaged 3.5 years in the Army and 2.8 years in their specialty.

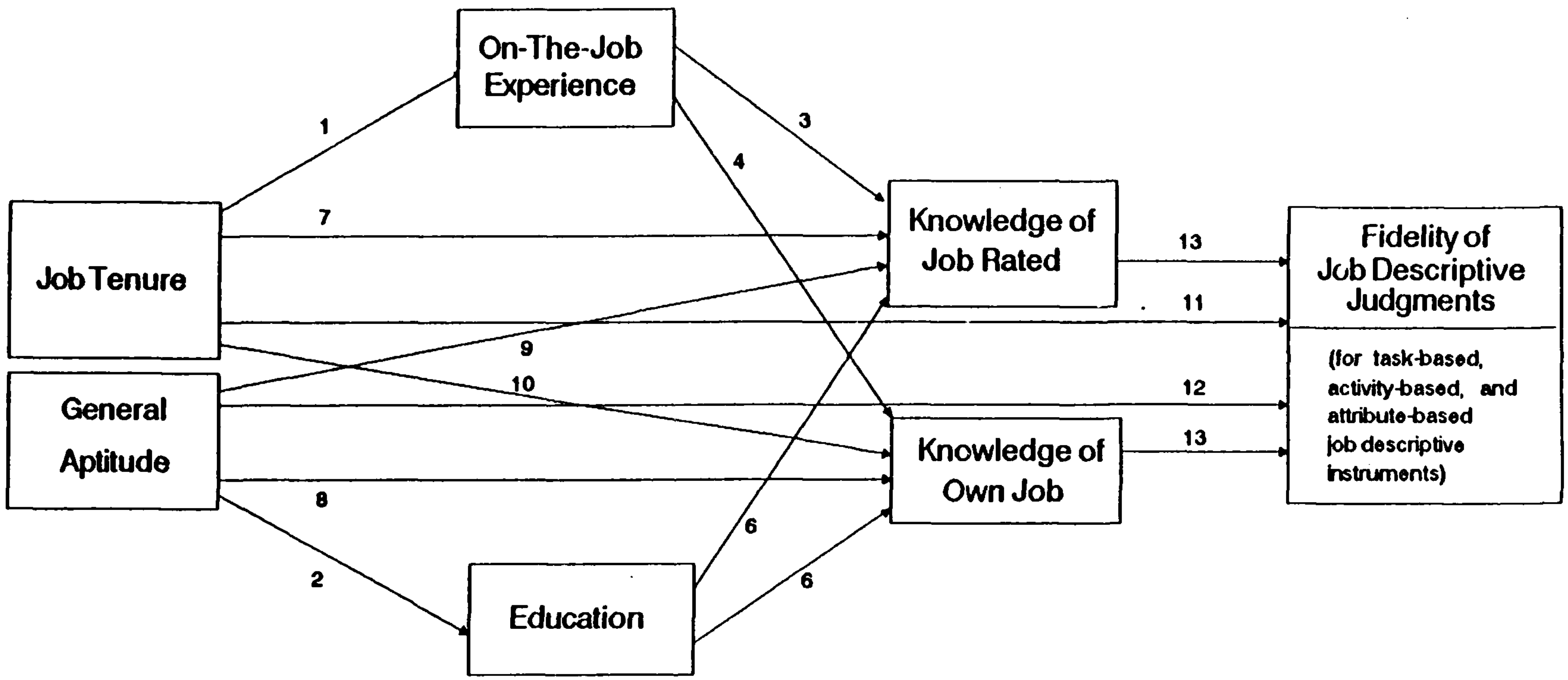

Figure 1. Hypothesized relationship among rater characteristics and job description judgments.

Job Description Questionnaires

Three job description questionnaires were developed. The purpose of these questionnaires was to provide a description of the responsibilities and requirements of soldiers with 18 - 24 months job experience (i.e., first-tour soldiers) in any of the 265 Army enlisted specialties open to new recruits.

The first questionnaire was a task-based instrument consisting of 96 task categories. The task-based approach to job description has as its focus the inherent characteristics of tasks (i.e., the work itself). The major assumptions of this approach are that the job tasks "impose certain conditions on an individual performing them, such as the goals to be achieved, procedures to be followed, characteristics of the responses elicited from the task performer, and activity content" (Crafts, Szenas, Chia, & Pulakos, 1988, p. 21). An example task category is "Send and receive radio messages--use standardized radio codes and procedures to transmit and receive messages and other information."

Judges were asked to consider the job of a soldier with 18 - 24 months experience in their specialty (i.e., the first-tour soldiers that these NCOs supervised). Judges then were instructed to provide three importance ratings for each task category:

- the importance of the task category for the job-specific/technical component of their first-tour soldiers' jobs;
- the importance of the task category for the general soldiering component of their first-tour soldiers' jobs (i.e., for the responsibilities such as navigating and first aid that are a part of every soldier's job); and
- the overall importance of the task category for their first-tour soldiers' jobs.

The second instrument was an activity-based questionnaire consisting of 53 job activities or behaviors. The activity-based approach focuses on worker behaviors. An example activity is "Monitor/interpret verbal messages--monitor, identify and/or interpret verbal messages (oral or written, obtained from radio, teletype, computer terminal, correspondences, etc.)." Judges made job-specific, general soldiering, and overall importance ratings for each activity.

The third questionnaire consisted of 31 attributes. The attribute-based approach to job description focuses on the abilities, traits, interests and other individual differences that contribute to successful job performance. An example attribute is "Verbal ability--this is the ability to use and understand spoken and written language and to communicate with others. It involves "catching on" to what's happening and coming up with and understanding words and

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ideas." Judges were provided with a brief 15-minute explanation of test validity, including examples of tests with high- and low-validity for particular jobs. They then were asked to rate the validity of each attribute for predicting job-specific and general soldiering performance of first-tour soldiers in their specialty.

Chia, Owens-Kurtz, Peterson, and Szenas (1988) and Owens-Kurtz & Peterson (1989) reported mean single rater reliabilities across the three jobs of .53, .35, and .31 for the judges in the current research, for the task-, activity-, and attribute-based questionnaires, respectively. These interrater reliabilities indicate that judges generally agree about the most and least important tasks and activities for first-tour soldiers in their specialties. The results also indicate that judges agree concerning the attributes that will provide the most and least accurate prediction of job-specific and general soldiering performance for first-tour soldiers.

Assessment of Judge Characteristics

Three additional questionnaires were designed to provide an assessment of judges' job experience and job knowledge. The first was a background information questionnaire, consisting of 13 demographic items such as gender, race, and pay grade. The second was a job history questionnaire. The questionnaire contained a list of 30 critical job tasks identified for each of the three specialties. Judges were asked to rate the number of times they had performed and supervised each task. The final instrument was a job familiarity questionnaire which consisted of 15 job knowledge test items. These items assessed the NCOs' knowledge of critical first-tour job tasks for their specialty and were sampled from approximately 100-120 job knowledge items that were developed for the MOS in Project A.

These three questionnaires and additional archival data collected from Army administrative records were used to create two measures of job experience, job knowledge, and general aptitude for each judge. The first measure of job experience was job tenure, defined as the number of years experience with the rated job. The second measure was task experience, defined as the number of tasks on the job history questionnaire that the judge had performed at least once.

The first measure of job knowledge was the percent of correct items on the job familiarity questionnaire. The second job knowledge measure was the judge's score on the Army Skill Qualification Test (SQT), which is a job knowledge test that the Army uses to assess its enlisted personnel. The chief difference between the SQT and our job familiarity questionnaire was that the SQT included items about NCO supervisory responsibilities and technical tasks that must be performed by NCOs, but that are not part of the job of first-tour soldiers.

One measure of general aptitude was the Armed Forces Qualification Test (AFQT) from the Armed Services Vocational Aptitude Battery (ASVAB). The AFQT composite includes both verbal and mathematical components. The second general aptitude measure was educational attainment, defined as the number of years of formal schooling.

<u>Rating Fidelity</u>

The fidelity of each judge's job description judgments was defined as the correlation of the judge's rating profile of the questionnaire elements with the mean profile of the remaining judges in the same job. For example, for the task-based questionnaire, the fidelity coefficient was the correlation between the judge's importance ratings of the 96 task categories and the mean importance ratings of the other raters in the judge's specialty. Thus, three fidelity coefficients were computed for each judge--one for the task-based questionnaire, one for the activity-based questionnaire, and one for the attribute-based questionnaire.

<u>Workshop Procedures</u>

All job description judgments were collected in a single four-hour workshop. Workshops were divided into two sessions with a 15-minute break between sessions. One-half of the judges were given the task-based and activity-based job description questionnaire in the first session, and one-half were given the attribute-based job description questionnaire. The order of administration of the task- and activity-based questionnaire was counterbalanced within each session. The judges were instructed to think of the entire range of duty assignments that make up the job of incumbents with 18 months of service (after completing basic and advanced training). They were instructed to draw from their experiences with the job as it is practiced throughout the Army and not just in their current assignments.

<u>Statistical Analyses</u>

Using the LISREL VI software (Joreskog & Sorbom, 1983), path analysis was used to test how well the model in Figure 1 fit the observed covariances among the job experience, job knowledge, general aptitude and fidelity measures. Two criteria were used to evaluate the fit of the model. The first was the ratio of chi-squared (X^2) to the degrees of freedom (df; Schmitt, 1978). The second criterion was rho, which is a goodness of fit index developed by Tucker and Lewis (1973). A good fit is found when X^2/df ratio is 3:1 or lower, and rho is greater than .90. In addition, the multiple correlations between the judge characteristics and the measures of rating fidelity were used to evaluate how well the model predicted judgment quality.

The model was first tested for goodness of fit while the parameter estimates for the paths leading directly to the three fidelity criteria were assumed to be equal. A second model also was tested in which these parameter estimates were allowed to vary. The goodness-of-fit of these two models was compared to determine if they fit the observed

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between the judge characteristics and the measures of rating fidelity were used to evaluate how well the model predicted judgment quality.

The model was first tested for goodness of fit while the parameter estimates for the paths leading directly to the three fidelity criteria were assumed to be equal. A second model also was tested in which these parameter estimates were allowed to vary. The goodness-of-fit of these two models was compared to determine if they fit the observed correlations significantly better when the paths to the three fidelity coefficients were allowed to vary.

Results

Table 1 contains the means and standard deviations of the six individual difference measures and the three fidelity coefficients. The correlations among these measures are shown in Table 2. The correlations among the fidelity coefficients are underlined.

Table 1

Descriptive Statistics

Variable	Type of measure	Mean*	Std Dev
General aptitude	Percentile Score	47.90	23.46
Time in job	Years	2.83	1.32
Educational level attained	Year	12.60	1.15
Experience on the job	Total Items Indorsed	69.33	30.01
Knowledge of job rated	Proportion Correct	0.67	0.13
Knowledge of own job	Percentile Score	49.60	32.37
Fidelity of task-based judgments	Correlation X 100	49.49	10.72
Fidelity of activity-based judgments	Correlation X 100	50.33	10.16
Fidelity of attribute-Based judgments	Correlation X 100	50.34	9.94

*N = 80 judges

Table 2
Correlation Matrix

	X1	X2	X3	X4	X5	X6	Y1	Y2	Y3
X1: Job tenure	1.000								
X2: General Ability	-.119	1.000							
X3: Familiarity with job rating	.113	.063	1.000						
X4: Educational level attained	.050	.357*	-.077	1.000					
X5: Job Knowledge (of job rated)	.183	.323*	.066	.283*	1.000				
X6: Job Knowledge (of own job)	-.121	.304*	.024	.298*	.189	1.000			
Y1: Fidelity of Task Judgments	-.011	.324*	.081	.224*	.318*	.416	1.000		
Y2: Fidelity of Activity Judgments	.088	.325*	.011	.235*	.379*	.237	.615*	1.000	
Y3: Fidelity of Attribute Judgments	-.026	.216	-.201	.307*	.367*	.291	.488*	.589*	1.000

*Significant at $p < .05$.

Table 3 contains the results of the path analyses. Both the "constrained" (paths to fidelity coefficients were constrained to be equal for the three job component models) and the "unconstrained" (paths to fidelity coefficients were allow to assume different values) models show good fit, with the ratio of X^2/df equaling 1.21 and 1.28, respectively. The Tucker-Lewis goodness-of-fit indices were .94 and .97, respectively, indicating an adequate fit of the data to the model. The difference in X^2s between the constrained and unconstrained models was not significant. Multiple correlations between the judge characteristics and each of the three fidelity coefficients can be found in Table 4. These correlations are based on the constrained model. R was .47 for the task-based fidelity coefficient and .48 for the activity-based and attribute-based fidelity coefficients, indicating that the model predicts all three fidelity coefficients equally well. Figure 2 shows the standardized weights for the paths in the constrained model. The significant paths are:

- job tenure-knowledge of job rated-fidelity
- general aptitude-knowledge of job rated-fidelity
- general aptitude-knowledge own job-fidelity
- general aptitude-education-knowledge of own job-fidelity.

Table 3

Test of the Model's Goodness-of-Fit

Model	X^2	df	p	X^2/df	rho[a]	MSR[b]
Model 1: $Y_1 = Y_2 = Y_3$ (Constrained)	1.79	18	.24	1.21	.94	18.80
Model 2: $Y_1 \neq Y_2 \neq Y_3$ (Unconstrained)	12.75	10	.24	1.28	.97	16.13
Difference	9.04	8	ns[c]			

[a]rho = Tucker-Lewis goodness-of-fit index.
[b]Root Mean Squared Residual
[c]The two models did not differ significantly ($X^2 = 9.04$, df= 8, $p > .05$).

Table 4

Model's Prediction of Job Description Judgment Fidelity

Dependent Variable	Multiple-R
Fidelity Coefficient for Task-based Questionnaire	.47
Fidelity Coefficient for Activity-based Questionnaire	.48
Fidelity Coefficient for Attribute-based Questionnaire	.48

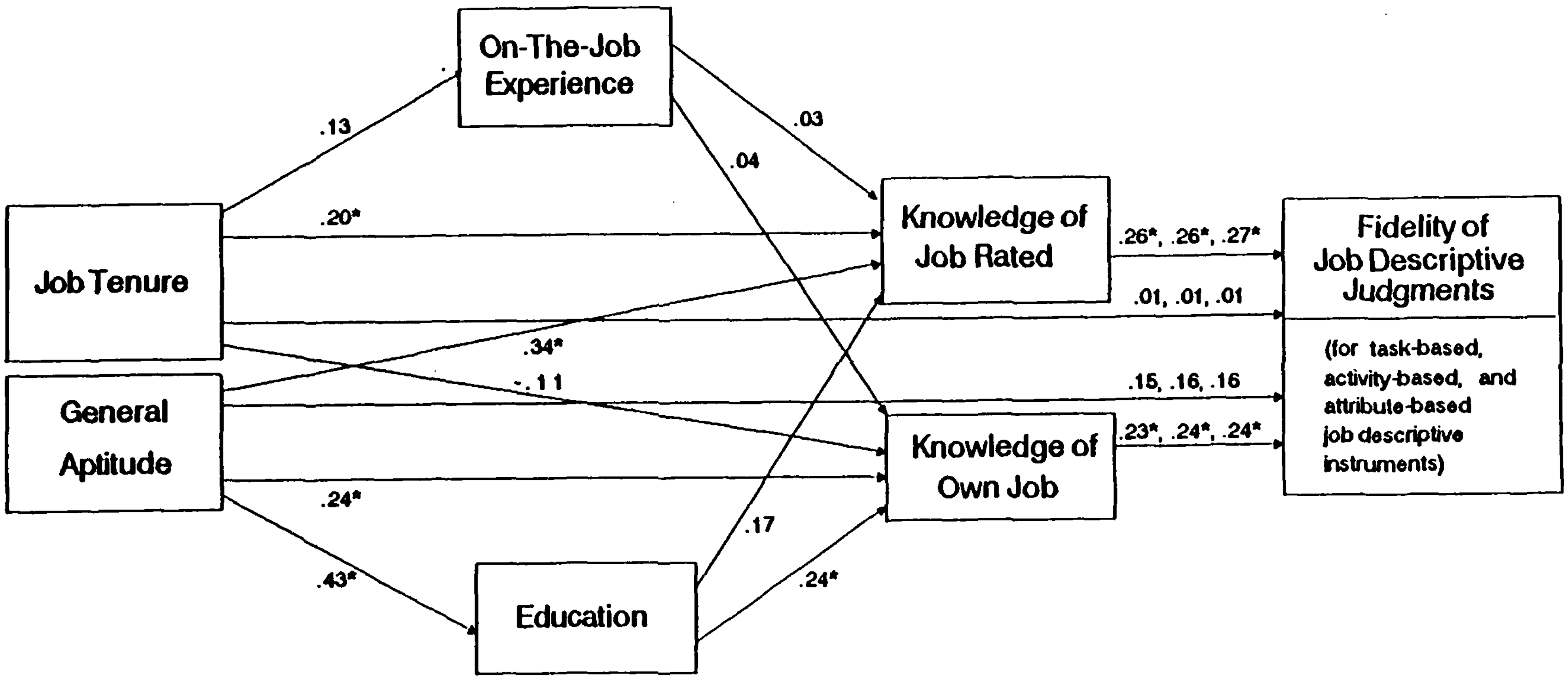

Figure 2. Standardized weights for paths in the constrained model.

Discussion

The purpose of the current research was to identify characteristics of individual raters who provide high-fidelity job description ratings. The following discussion addresses both theoretical and practical implications of the research findings. An important issue in this investigation was whether the process variables are the same (constrained model) or different (unconstrained model) across different job description instruments. The nonsignificant difference found between the two models suggest that the constrained model should be retained because the model provided a parsimonious explanation.

The results of this research support the following conclusions:

- the data fit the model very well
- the model showed a high correlation between the individual difference variables and the fidelity coefficients
- the same paths were significant for all three job description instruments.

The X^2/df and rho criteria suggest that the data fit the model very well. The R's of .47 and .48 are high compared to the correlations reported in the performance appraisal literature.

Several tentative statements can be made about the process variables involved in job description judgments. Job tenure affects rating fidelity only through its effect on the knowledge of the rated job. General aptitude, on the other hand, affects the fidelity of job description in several ways:

- through knowledge of job rated
- through knowledge of own job
- through education and then through knowledge of own job.

It is interesting to find that general aptitude did <u>not</u> significantly relate to fidelity except through job knowledge. The direct path coefficients from general aptitude to fidelity were relative large (.16), but not statistically significant for this sample. The clear conclusion is that job knowledge is a more direct determinant of fidelity than either general aptitude or job experience. The degree of independent contribution of general ability is still somewhat in question, with larger sample sizes required to confirm statistical significance.

In practical terms, the most important conclusion from the current research is that the quality of job description can be improved by screening judges on the basis of job knowledge. One benefit of this screening would be that fewer judges being needed to meet acceptable levels of reliability. These findings also have implications for the collection of validity estimates provided by expert judges. It seems plausible that both job knowledge and general aptitude are required for making reliable and valid estimations of the validity of predictors for jobs or job elements.

Several cautionary notes must be struck concerning the present research. First, the sample size used, and the number of jobs studied were fairly small. Second, the criteria focused on agreement between judge and group profile and did not address the accuracy/validity of the group profile. Finally, the job experience and job knowledge measures used were somewhat limited. It is quite possible that more comprehensive measures of the judge's own job performance may add to the prediction of judgment accuracy. Further research is planned to address these issues.

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CHAPTER 8:

Impact of Measurement Method on Standard Setting Results

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SUMMARY

Most recent standard setting research has involved determination of minimum passing scores for multiple choice tests. In setting job performance standards, minimum levels must be set for other types of measures such as job performance ratings or work samples. This chapter explores the relationship between the type of performance measure used and the standards that are based upon the measure. Results suggest that there are clear differences in the job performance standards set by using different methods.

CHAPTER 8:

Impact of Measurement Method on Standard Setting Results

The immediate objective of the SYNVAL project is to develop a method of establishing prediction equation for MOS for which no empirical measures of performance (yet) exist. Under the Army's current enlistment system, one more step is required after a performance prediction composite has been defined. A minimum qualifying score must be established.

Currently, qualifying scores are adjusted primarily as a function of training failure rates, with training success standards in turn linked to some aspects of on-the-job performance as measured by the Skill Qualification Test (SQT). While some potential linkages between enlistment standards and job performance exist, procedures for using these linkages in setting standards are far from uniform across MOS. The purpose of the research report here is to examine procedures for setting job performance standards that can be linked directly to enlistment test scores.

There has been considerable research on developing and evaluating procedures for setting standards in areas ranging from education to professional licensure. Review of the literature on setting standards for Army jobs has been completed by Pulakos et al. (1988). An important observation from the review was that standard setting has been concerned with establishing minimum scores for passing tests, especially multiple-choice tests. Virtually no research has attempted to apply standard setting methods to other types of measures such as job performance measures.

There are a variety of ways in which job performance is measured in different occupational fields. These include various types of scales for eliciting supervisor ratings of performance, direct measures of output (e.g., sales or units assembled), and work sample tests (including assessment centers). The use of multiple-choice, job knowledge tests is relatively rare.

In Phase I of the SYNVAL project we began to investigate ways of obtaining performance standards from job experts. For the past six years, we have been engaged in Project A, a massive project to develop job performance measures for different occupational specialties within the Army (Campbell, 1987). For the purpose of obtaining performance standards, we designed three methods for identifying these levels for specific categories of performance as defined by Project A measures. Army SMEs reviewed performance level definitions and used the three methods for describing performance levels. We then examined the level of agreement among judges for each method and the degree of convergence across the different methods.

Method

Project A Performance Measures

During the summer and fall of 1985, a total of 9,470 soldiers in 19 different military occupational specialties (MOS) underwent 1 to 2 days of job performance testing as part of the Project A Concurrent Validation (CV). Among the different types of job performance measures were written job knowledge tests, hands-on performance tests, and supervisor and peer performance ratings. The hands-on performance tests consisted of work samples (e.g., type a letter, adjust the clutch) where possible and "walk-through" simulations (e.g., describe how a task is performed) where actual task performance might be dangerous, expensive, or time-consuming. For most tasks, scores were derived from a checklist of critical steps each scored as pass or fail. The ratings included 11 common and 6 - 12 job-specific behavioral summary scales. These scales were developed through critical incident workshops that generated examples of specific effective and ineffective behaviors that were then sorted into dimensions and summarized to provide anchors.

Standard Setting Participants

Our initial exploration of standard setting methodology includes three of the occupational specialties from the CV. These are 71L (Administrative Specialist), 63B (Light-wheeled Vehicle Mechanic), and 11B (Infantryman). Table 1 shows the number of workshops and number of workshop participants for each occupational specialty. As shown in this table, both officers and enlisted personnel were used as judges. In addition, workshops were held in both field (FORSCOM) and training (DOTD) units.

Standard Setting Procedures

The focus of this chapter is a comparison of standards based on the hands-on test measures with standards based on the rating data. In comparing the results from each measurement method, we used the CV sample data to estimate the percent of current job incumbents who pass each standard. For comparison purposes, we also asked judges for a direct estimation of the percent of current incumbents who perform above or below each standard.

Table 1

Standard Setting Participants

		Officers		Enlisted Persons	
Occupational Specialty	Type of Unit	No. of Workshops	No. of Judges	No. of Workshops	No. of Judges
Infantryman	Field	2	35	2	42
	Training	1	2	1	6
Mechanic	Field	2	11	2	16
	Training	1	10	1	12
Admin Specialist	Field	2	16	2	17
	Training	1	8	1	10

Standards to be set. In comparing standards based on the different measurement methods, we examined multiple standards for several different performance dimensions. The different standards were linked to different possible organizational responses to the performance. The performance levels differentiated by the different standards were:

unacceptable = Soldiers who consistently perform like this do not belong in the Army. Their performance is hurting the Army, and they should be discharged early.

marginal = Soldiers who consistently perform like this need remedial training. Their performance is of little or no benefit to the Army. Unless they receive training and improve their performance, they should be barred from re-enlistment.

acceptable = Soldiers who consistently perform like this are doing an adequate job. They are making positive contributions to the Army. They should be allowed to re-enlist.

> this are doing extremely well. They are making exceptional contributions to the Army and are excellent examples to their peers. They should be encouraged to re-enlist and should be given special consideration for promotion or extra responsibilities.

Performance dimensions. Judges were asked to set standards for several different dimensions of performance on each job. Four different performance dimensions had been identified as common to all Army jobs, and up to three dimensions, specific to each job (Campbell, McHenry & Wise, 1987; Wise, Campbell, McHenry & Hanser, 1986).

No job-specific dimensions were selected for Infantryman (11B), because all of their tasks can be defined as general soldiering tasks. For mechanics and administrative specialists, we identified job components from the Task-Based Model that were rated as important by SMEs in the job. We grouped these components so that they could be more easily matched to specific hands-on task tests and to individual job component rating scales. Figure 1 shows the components with a mean importance rating of 4.0 (very important) or better. Figure 2 lists both the general and job-specific performance dimensions that we selected, and shows which dimensions were used for each of the three standard setting methods described below.

MOS	Job-Specific Task Components with "High" or "Extremely High" Mean Importance Ratings: Mean Rating	Component	Standard Setting Performance Dimensions
63B	4.2	Vehicle Main/Check/Services	Basic Maintenance
	4.1	Troubleshoot Mech. System	
	4.2	Operate Wheeled Vehicle	Vehicle Recovery and Operation
71L	4.8	Type	Typing
	4.3	Record, File Dispatch Information	Filing/Other Clerical
	4.0.	Prepare Tech. Forms and Documents	

<u>Figure 1</u>. Selection of performance dimensions for Phase I standard setting.

Performance	Soldier-Based			Incident-Based			Task-Based		
Dimension	11B	63B	71L	11B	63B	71L	11B	63B	71L
General Soldiering	X	X	X	X	X		X	X	X
Effort and Leadership	X	X	X	X	X	X			
Personal Discipline	X	X	X	X	X	X			
Physical Fitness and Military Bearing	X	X	X	X	X	X			
Basic Main-tenance		X			X			X	
Recover/ Vehicle Operation		X			X				
Administration and Plan-ning		X			X				
Typing			X			X			X
Filing/Other Clerical			X			X			X

Figure 2. Performance dimensions used with each standard setting method.

Variables

Task-based method. Ten different levels of performance were defined by dividing the sample of soldiers tested into deciles based on their overall hands-on score for each dimension. Two to five tasks were selected for each performance dimension and average scores (generally percent-GO) were computed for each decile group. For each of the ten performance levels, judges were told the average score for each task and also the percent passing critical steps in each of the sample tasks. Judges were then asked to rate the acceptability of each of the ten performance level descriptions using the four-point scale described above (Unacceptable to Outstanding). Judges also were asked to indicate the minimum percent correct for each of the performance levels. Figure 3 shows an example of the rating forms used in this exercise. Figure 4 shows an example of supplemental information about critical steps that was provided to the judges.

Critical incident-based method. In developing anchors for the different rating scales, several hundred critical incidents (behavioral examples) were collected and scaled with respect to the level of effectiveness that they indicated. We selected between 24 and 69 of these incidents for each performance dimension, spaced throughout the range of effectiveness. Judges were asked to rate the acceptability of the performance indicated in each of the selected incidents using the same four-level scale of performance acceptability. Figure 5 shows an example of this exercise. Cutting points were defined as the midpoint between the most effective incident judged to be in one acceptability category and the least effective incident judged to be in the next highest category.

Soldier-based method. For each performance dimension, judges were asked to estimate the percent of current job incumbents at each level of performance. Figure 6 shows and example of the exercise used to obtain soldier-based judgments.

Percent of Steps Passed for Soldiers at
Different Performance Levels

LEV1	LEV2	LEV3	LEV4	LEV5	LEV6	LEV7	LEV8	LEV9	LEV10	Task
61	70	73	76	78	80	82	84	87	90	Average for Both Tasks
57	68	70	72	74	76	78	80	83	86	Apply Pressure Dressing
66	72	77	81	83	85	87	89	91	93	Load, Reduce, Clear M60

Perf. Level		Your Rating of this Performance Level:			
#	% steps Passed	Unacceptable	Marginal	Acceptable	Outstanding
1.	61%	____	____	____	____
2.	70%	____	____	____	____
3.	73%	____	____	____	____
4.	76%	____	____	____	____
5.	78%	____	____	____	____
6.	80%	____	____	____	____
7.	82%	____	____	____	____
8.	84%	____	____	____	____
9.	87%	____	____	____	____
10.	90%	____	____	____	____

1. What is the minimum percent of steps passed that you would rate as marginal? ______%

2. What is the minimum percent of steps passed that you would rate as acceptable? ______%

3. What is the minimum percent of steps passed that you would rate as outstanding? ______%

Figure 3. Task-based approach to standard setting.

EXAMPLES OF DIFFICULT HANDS-ON TEST STEPS
11B: General Soldiering Tasks
Form A

Here are examples of the more difficult hands-on test steps. These steps were often failed by poor performers, but were usually passed by the best performers.

For each of the 10 performance levels, we show the percent of soldiers at the level who correctly perform steps like those shown. In the first example, 75% of the soldiers at performance level 1 maintained the sterility of the dressing properly. At performance level 9, 96% of the soldiers performed this step correctly.

Percent of Soldiers at Each Performance Level Who Pass Specific Steps in the Hands-on Tests

Hands-On Test Steps	Performance Level									
	1	2	3	4	5	6	7	8	9	10
Apply Pressure Dressing										
5. Maintained sterility of dressing.	75	87	89	91	92	93	94	95	96	97
6. Tied the tails in a non-slip knot (square knot).	39	53	58	63	69	71	72	74	76	83
8. Sealed edges of dressing with the tails (with at least 1/2" overlap).	28	31	33	36	39	42	45	49	53	57
Prepare a Dragon for Firing										
8. Correctly secured tracker receptacle cover.	26	32	38	43	48	55	62	69	76	83
10. Correctly locked tracker in place	59	62	69	73	77	82	85	88	91	94
14. Completed preparing the Dragon within 2 minutes.	68	71	74	77	80	83	86	89	93	96
Load, Reduce, Clear M60										
14. Pulled cocking handle to the rear, locking the bolt to rear. (To eject round after stoppage.)	74	81	91	93	94	95	96	97	98	99
23. Placed safety in SAFE after clearing.	58	63	75	80	82	86	87	88	90	95
29. Performed clear steps in proper sequence.	23	30	49	54	59	63	68	73	77	82

Figure 4. Examples of difficulty hands-on test steps.

CRITICAL INCIDENT-BASED APPROACH TO STANDARD SETTING

EXAMPLE

	% Who Meet or Exceed Example	Unacceptable	Marginal	Acceptable	Outstanding
This soldier spent many duty and non-duty hours learning his new MOS. In a few months, he was tops in his MOS and was selected as the first E-4 to evaluate other soldiers in the MOS.	1	___	___	___	X

The rater read the example and noticed that only 1% of Infantrymen consistently perform as well as or better than the soldier in the example. The rater decided the performance of the soldier in this example was outstanding, and placed an "X" under Outstanding.

Figure 5. Critical incident-based approach to standard setting.

SOLDIER-BASED APPROACH

TO STANDARD SETTING

EXAMPLE

EFFORT AND LEADERSHIP

This refers to how hard a soldier tries on the job, especially under adverse or dangerous conditions. It also refers to the support and leadership a soldier provides for peers.

Unacceptable	10	%
Marginal	10	%
Acceptable	75	%
Outstanding	5	%
TOTAL		100%

The rater in this case was a 94B NCO. He read the definition of Effort and Leadership, then thought about the cooks with 18 months on-the-job experience that he was supervising. He decided 10% were doing an unacceptable job, 10% were doing a marginal job, 75% were doing an acceptable job, and 5% were doing an outstanding job on Effort and Leadership. He then checked his percents to make sure they added up to 100%.

Figure 6. Soldier-based approach to standard setting.

Results

Army SMEs found the four performance level definitions to be reasonable. Most reported that the definitions were clear and practical. However, a few SMEs expressed some reservations for the consequence of "unacceptable." They questionned if barring a soldier from re-enlisting might be too harsh for a performing a task unacceptably.

Table 2 shows the percent of current job incumbents with performance classified as outstanding for each performance dimension based on standards from each of the three methods. Table 2 also shows the standard deviation across judges in these percents. For the soldier-based method, these percentages were supplied by the judges. For the other two methods, these percentages were estimated by applying the cutting points supplied by each judge to distributional information from the CV sample.

Table 2

Methods of Judging Implied Percent of Soldiers Performing at Each Level

Occupational Specialty	Performance Dimension	Method	N	Percent Unacceptable Mean	SD	Percent Outstanding Mean	SD
Infantryman	General	Soldier	80	8.0	5.3	12.4	9.6
	Soldiering	Task	81	21.0	14.9	7.7	9.4
	Ratings		80	6.3	13.3	11.6	15.0
Mechanic	General	Soldier	49	8.4	6.9	16.3	18.6
	Soldiering	Task	50	23.0	14.6	11.0	12.1
	Basic	Soldier	49	12.6	12.8	11.0	10.5
	Maintenance	Task	50	6.0	7.4	34.4	20.8
	Ratings		49	4.4	16.3	8.8	12.6
Clerk	General	Soldier	47	10.7	10.5	10.7	9.7
	Soldiering	Task	51	18.9	12.6	11.9	11.6
	Typing	Soldier	47	8.1	5.5	12.0	13.8
		Task	51	35.7	15.6	7.3	7.6
		Incident	52	10.8	14.7	9.2	12.2
	Other	Soldier	47	10.3	13.0	10.8	14.4
	Clerical	Task	50	35.7	18.7	8.0	7.9
		Incident	52	4.6	12.4	4.8	5.6

The different methods of identifying job performance standards led to significantly different results. The critical incident-based method resulted in very lenient standards for minimal performance with very few soldiers falling in the unacceptable category. By comparison, the task-based method led to considerably higher failure rates. The direct, soldier-based, approach led to estimates of failure rates that were generally between these two extremes.

At the upper end of the scale, the critical incident-based method led to very strict standards, with relatively few soldiers classified as outstanding. The overall effect of the critical incident-based approach was a compressed scale with most job incumbents classified as either marginal or acceptable. The task-based method had mixed results at the upper end, but on average also showed relatively few incumbents classified as outstanding in comparison to the soldier-based results. The overall effect of the task-based approach was relatively strict standards.

The task-based approach led to greater variation across judges in comparison to the other two methods. The critical incident-based approach had slightly greater agreement (lower variance) in comparison to the direct estimates of soldier performance.

Discussion

There was general agreement among SMEs that the four performance level definitions (for unacceptable, marginal, acceptable, and outstanding) were useful distinctions. Results also supported that, for each standard setting method, the SMEs could make meaningful descriptions according to the four definitions. However, the three different measurement methods did lead to different standards and also to some difference in the degree of consensus that was achieved in setting the standards. The critical incident-based method yielded results that were generally consistent with the judges direct estimation of the distribution of job performance in comparison to the task-based method. These results provide support for further exploration of the critical incident-based method which used specific behavioral examples as anchors in describing different levels of job performance.

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CHAPTER 9:

Combining Individual Standards into an Overall Standard: Modeling the Judgment Process and Investigating Differences among Judges

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SUMMARY

This chapter examined the conjoint measurement approach to setting overall job performance standards. The conjoint measurement approach attempts to mathematically model the <u>qualitative laws</u> that judges use to combine information and make judgments.

Judges were provided information about the component level job performance of 40 hypothetical soldiers. These judges were then asked to combine this information into an overall job performance judgment. The overall job performance standards were then regressed onto rescaled values of the component standards in order to model the judges' "policies." Group differences in judgment strategies were also investigated.

The results of these analyses suggest that: (1) the average judgments were highly linear, but a more accurate model shows that a configural effect was found (leniency; standard deviation of components); and (2) that different judge strategies were found across rank, across command, and across job.

CHAPTER 9:

Combining Individual Standards into an Overall Standard: Modeling the Judgment Process and Investigating Differences among Judges

Much of the literature on standard setting concerns a single measure or a single dimension of performance. Project A and the Army Synthetic Validation Project, however, take a multidimensional perspective of job performance. A central issue to be considered when taking a multidimensional approach is that an employee's job performance may be quite satisfactory in some areas, but not satisfactory in others. Thus, decisions must be made regarding the extent to which more effective performance in some areas compensates for less effective performance in others. These decisions will dictate how standards for individual dimensions of performance should be combined into an overall performance standard.

The question of how to set an overall standard for job performance must necessarily be preceded by the development of a scale for assessing overall job performance. Several different approaches for developing such an overall performance scale, ranging from a simple linear composite to more complex conjoint measurement techniques, were examined as part of the Project A research (Sadacca, Park & White, 1986). A conjoint measurement approach (e.g., Luce & Tukey, 1964; Green & Srinivasan, 1978) asks judges to evaluate tradeoffs among increments and decrements along different dimensions. For example, two soldiers, one having a slightly higher level of proficiency and a slightly lower level of motivation than the other, might be compared in terms of their overall contribution to the organization.

In its general form, the conjoint measurement model would not assume that the value of a performance increment is necessarily the same for different parts of different dimensions. It is possible, for example, that small decrements below minimum levels in some areas are balanced only by large increments above minimum levels in other areas. There are two special cases of interest in setting an overall performance standard. In the first case, no amount of increment in other areas can compensate for below standard performance on any other dimension. Using this model, known as the multiple hurdles model, an examinee fails the overall standard if he or she fails any of the individual standards. The other special case of interest is a strictly linear model, when overall performance is measured by a weighted sum of the individual performance measures. Using this model, known as the compensatory model, a decrement in one performance area could be compensated for by an equal increment in another area.

This paper examines the conjoint measurement approach to setting overall job performance standards. The conjoint measurement approach attempts to mathematically model the qualitative laws that judges use to combine information and make judgments. The advantage of this approach is that it allows for nonlinear variations of the multiple hurdles and compensatory models to be discovered. The disadvantage of this approach is that it relies on the ability of the judges to combine multiple sources of information in order to make judgments. The general procedure is as follows: judges are provided with information about performance standards on several job dimensions and are asked to combine this information and provide an overall job performance standard. A mathematical model is then constructed to capture the judge's policy. This model is then used to transform information on individual dimensions into an overall score that can be compared with the overall standard.

If we employ the conjoint measurement approach, we must be aware of some of the findings on decision making and social cognition. Research on decision making has demonstrated the power of the linear model in explaining conjoint judgments. Slovic and Lichtenstein (1971) have conducted a comprehensive review of the approaches to the study of information processing in judgments and showed that although judges have difficulty weighting and combining information, their responses are highly predictable using the linear model. Yntema and Torgerson (1961; cited in Slovic & Lichtenstein, 1971) demonstrated that 94% of the variance of a truly configural function could be predicted from an additive combination of main effects. In research using the conjoint measurement technique for Project A, Sadacca et al. (1986) found that linear composites provided reasonable approximations to the conjoint scaling results.

There is also research in social cognition that suggests that extreme information has a tendency to become particularly salient and receive a greater weight when used in combination with other dimensions in order to form an overall evaluation. For example, Fiske (1980) found that a extreme stimuli are more salient than moderate stimuli. It is quite possible that judges may provide lower ratings for ratees who show either a single extreme value on a dimension, or a wide variation in behavior across dimensions.

Keeping these issues in mind, the purpose of this paper is to develop a mathematical model that captures the strategy that judges use when combining individual standards on three job performance dimensions into an overall standard. These three dimensions are: Core Technical Proficiency (CTP; performance on core job-specific tasks), Effort and Leadership (ELS), and Maintaining Personal Discipline (MPD). These dimensions were developed rationally and confirmed empirically for 19 diverse jobs as a part of large criterion development effort (Wise, Campbell, McHenry, & Hanser, 1986). We will compare the strict compensatory model vs. the strict multiple hurdles model, and several alternative intermediate models. We will address the issues concerning the use of judges to combine multiple sources of information for making judgments. We will also investigate the notion that different judge characteristics may be correlated with different strategies.

Method

Subjects

One hundred eighty-one judges from five sites and representing three military occupational specialties (MOS) provided the standard setting judgments. The judges consisted of 93 Non-Commissioned Officers (NCOs), 74 Officers, and 11 Civilians; there were 156 males and 22 females. Table 1 shows demographic information for the sample. Regression equations were computed for each judge by regressing overall judgments onto the three performance dimensions. Mean ratings for the three regression weights (CTP, ELS, & MPD), along with the mean intercept value, were used to screen outliers. Two judges were eliminated from further analyses. The first judge's regression weight for the CTP dimension was 4.2 standard deviations above the mean. The second judge's regression weight for the MPD dimension was 5.2 standard deviations above the mean. These judges were two white males, one was an Infantry Officer from a field (FORSCOM) site while the other was a Vehicle Mechanic NCO from a training (DOTD) site.

Procedure

The data were collected in a series of five site visits during the months of March and April, 1988. Each workshop lasted six hours and the exercise described in this paper was always the last exercise of the one-day workshops.

A conjoint measurement approach was used to determine how the judges evaluated the tradeoffs between different increments and decrements of performance on different dimensions when setting overall performance standards. Subjects were provided information on 40 hypothetical soldiers that varied in their performance on three dimensions: Core Technical Proficiency (CTP; performance on MOS-specific tasks), Effort and Leadership (ELS), and Maintaining Personal Discipline (MPD). The soldier's performance on each dimension was described as unacceptable (U), marginal (M), acceptable (A), or outstanding (O). The judges were asked to provide an overall performance rating (Rating Scale: U - unacceptable, M - marginal, A - acceptable, O - outstanding) for each of the 40 hypothetical soldiers. For example, hypothetical soldier number 13 was marginal on the core technical dimension, unacceptable on the Effort and Leadership dimension, and outstanding on the maintaining personal discipline dimension. A copy of the research instrument can be found in Appendix F.

Table 1
Demographic Information On the Judge Sample

Demographic Variable	N
MOS	
11B: Infantryman	81
63B: Light Vehicle Mechanic	46
71L: Clerk Typist	52
Rank	
Non-Commissioned Officer (NCO)	93
Officer	74
Civilian	11
Command	
Training Site (DOTD)	55
Field Site (FORSCOM)	124
Gender	
Female	22
Male	156
Race	
Black	45
American Indian	1
Hispanic	15
White	104
Other	13

Results

Reliability of Judgments

A variance component analysis of the mean ratings of the 40 hypothetical soldiers by the 179 judges showed a single-rater reliability of .66.

Scaling

The first issue addressed in the analyses was how to scale the ratings. It was believed that the psychological distance between unacceptable and marginal, for example, could be different from the distance between acceptable and outstanding. In the first step, the responses were simply scaled as integers (1, 2, 3, and 4 representing the response options: unacceptable, marginal, acceptable, and outstanding). Regression equations were then computed using the mean rating for each of the 40 hypothetical soldiers across all judges and the integer scaling of each dimension. The results of this analysis suggested that a better scaling of the performance levels could be achieved. When a nonlinear regression model was used to fit the data, the R^2 increased from .939 to .963. The results of the nonlinear analysis produced four different point estimates (.66, 1.95, 2.94, and 3.62) and showed that the psychological distance between the performance levels were different (i.e., unacceptable-marginal = 1.29, marginal-acceptable = .99, and acceptable-outstanding = .68). Both the original integer values and the revised scale values were used in the remainder of the analyses.

Evaluation of Different Models

Four models were investigated using both the integer scale values and the rescaled values described above, for a total of eight approaches to the modeling of the judges' policy. The results of these analyses can be found in Table 2. A more detailed description of the four models using the rescaled values follows.

Pure multiple hurdles model. In order to determine if judges used a pure multiple hurdles model, the mean ratings for the 40 hypothetical soldiers were regressed onto the lowest value across the three dimensions. This model assumes that a soldier's overall evaluation is equal to his or her lowest dimension score. The results of this analysis showed that $R^2 = .589$, $p < .01$, for the model with the regression coefficient equal to .61, $p < .01$ and the intercept equal to 1.30, $p < .01$.

Purely compensatory model with unit weights. This model has two assumptions: First, that any decrement in performance on one dimension can be compensated for by an equal increment in another dimension. Second, each dimension of job performance contributes equally to overall job performance. This model was evaluated by regressing the mean ratings onto a simple additive composite of the three dimensions. The R^2 for this model was .963, $p < .01$. The coefficient for the composite was .35, $p < .01$, and the intercept for the model was -.25, $p < .01$.

Compensatory model with differential weights. This model also assumes a compensatory relationship among dimensions but it allows the separate dimensions to differ in their contribution to the overall standard. For the evaluation of this model, the mean ratings were regressed onto the three job performance dimensions. The results showed an $R^2 = .968$, $p < .01$. The weights for the three regression variables and intercept were .37, .31, .37, and -.25 respectively. All estimates were significant at $p < .01$.

Table 2

Comparison of the Different Models: Regression Coefficients and R^2s

Model	CTP	ELS	MPD	Single Coefficient	Intercept	Std. Dev.	R^2
1: Pure Multiple Hurdle w/ Integer Scale Values	--	--	--	.69*	1.16*	--	.650*
2: Pure Multiple Hurdle w/ Rescaled Values	--	--	--	.61*	1.30*	--	.588*
3: Compensatory w/Unit Weights & Integer Scale Values	--	--	--	.34*	-.22*	--	.939*
4: Compensatory w/Unit Weights & Rescaled Values	--	--	--	.36*	-.25*	--	.963*
5: Compensatory w/Differential Weights & Integer Scale Values	.33*	.32*	.35*	--	-.19*	--	.940*
6: Compensatory w/Differential Weights & Rescaled Values	.37*	.31*	.37*	--	-.25*	--	.968*
7: Nonlinear Model w/Penalty & Integer Scale Values	.33*	.29*	.34*	--	.12	-.23*	.969*
8: Nonlinear Model w/Penalty & Rescaled Values	.37*	.30*	.36*	--	-.09	-.11*	.974*

*Estimates are significant at $p < .01$.

Table 3

Comparison of the Eight Models: Regression Results and F-tests

Model	Source	DF	SS	MS	F	p <
1: Pure Multiple Hurdle w/ Integer Scale Values	Model	1	11.40	11.40	70.41	.01
	Error	38	6.15	0.16		
	Total	39	17.56			
2: Pure Multiple Hurdle w/ Rescaled Values	Model	1	11.40	11.40	54.35	.01
	Error	38	7.97	0.21		
	Total	39	19.79			
3: Compensatory w/ Unit Weights & Integer Values	Model	1	16.48	16.48	583.35	.01
	Error	38	1.07	0.03		
	Total	39	17.55			
4: Compensatory w/ Unit Weights & Rescaled Values	Model	1	18.65	18.65	982.83	.01
	Error	38	0.72	0.02		
	Total	39	19.37			
5: Compensatory w/ Differential Weights & Integer Values	Model	3	16.51	5.50	189.43	.01
	Error	36	1.05	0.03		
	Total	39	17.56			
6: Compensatory w/ Differential Weights & Rescaled Values	Model	3	18.75	6.25	365.04	.01
	Error	36	0.62	0.02		
	Total	39	19.37			
7: Nonlinear Model w/Penalty & Integer Values	Model	4	17.02	4.25	276.11	.01
	Error	35	0.54	0.02		
	Total	39	17.56			
8: Nonlinear Model w/Penalty & Rescaled Values	Model	4	18.87	4.72	327.46	.01
	Error	35	0.50	0.01		
	Total	39	19.37			

Nonlinear model: Penalty for inconsistent or extreme behavior. This model allows for variation in behavior to enter the equation. According to the linear model, extreme decrements in performance on one dimension can be compensated for by extreme increments in performance on another dimension. The linear model also assumes that decrements on several dimensions can be compensated for by increments on several dimensions or extreme increments on a few dimensions. The nonlinear model suggests that the overall evaluation is a function of not only the average performance across dimensions, but also the consistency of performance across dimensions. This model was tested by including the standard deviation of the three performance dimensions into the regression equation. If the coefficient for the standard deviation variable was significant, this would suggest a nonlinear relationship between the three dimensions and the overall standard. The R^2 for this model was .974, $p < .01$. The regression coefficients were .37, $p < .01$ for CTP, .30, $p < .01$ for ELS, .36, $p < .01$ for MPD, and -.09, $p < .01$ for the intercept. The estimate for the standard deviation variable was -.11, $p < .01$. Table 2 contains the regression weights and the R^2s for the different models, Table 3 shows the F-tests for the significance of each model.

Tables 4 and 5 test for differences among the models. Table 4 tests for differences between the four models that used integer scale values and the four models using the revised scale values. In all cases, except the multiple hurdles model, the revised scaled models had significantly larger R^2s. Table 5 tests for differences among the two compensatory models and the nonlinear model for the revised scale values only. The multiple hurdles model could not be compared with the other models because the explicit assumption of the model did not fit the assumptions of the other three models. The table shows that the compensatory model with differential weights had a significantly larger R^2 than the compensatory model with unit weights. The table also shows that the nonlinear model with penalty had a significantly larger R^2 than either of the two compensatory models.

Rater Characteristics and Rater Strategy

Cluster analysis. A cluster analysis was conducted to investigate whether judges could be classified into different judgment strategies. The variables used to cluster the judges were the regression weights for CTP, ELS, and MPD and the intercept from each judge's individual regression equation. The results of the cluster analysis supported a three cluster solution. The mean regression equations across judges within cluster can be found in Table 6. Figure 1 shows a plot of these regression equations. Cluster 1 was composed of judges who were strict in setting overall standards. The large negative intercept value for this group means that their overall ratings were lower than a weighted average of the individual ratings. In contrast, Cluster 3 appears to be made up of judges whose standards were lenient. This was evident by a positive intercept value. Cluster 2, by far the largest group, was composed of judges that used a linear approach with slightly different weights for the three dimensions.

Table 4

Comparison Among Four Models: Integer vs. Noninteger Scaling

Comparison	Source	DF	SS	MS	F	$p <$
Models 1 & 2	Total	179	179.00			
	Error	174	73.79	0.42		
	Model 1	2	105.25			
	Model 2	5	116.35			
	Difference	3	11.10	3.70	8.81	.01
Models 3 & 4	Total	179	179.00			
	Error	174	6.62	0.04		
	Model 3	2	167.19			
	Model 4	5	172.34			
	Difference	3	5.18	1.73	43.25	.01
Models 5 & 6	Total	179	179.00			
	Error	172	5.73	0.06		
	Model 5	4	168.26			
	Model 6	7	173.27			
	Difference	3	5.01	1.67	50.15	.01
Models 7 & 8	Total	179	179.00			
	Error	171	4.65	0.03		
	Model 7	5	173.45			
	Model 8	8	174.35			
	Difference	3	.90	.30	11.03	.01

Table 5

Comparison Among Three Models: Compensatory w/Unit Weights, Compensatory w/Differential Weights, & Nonlinear w/ Penalty

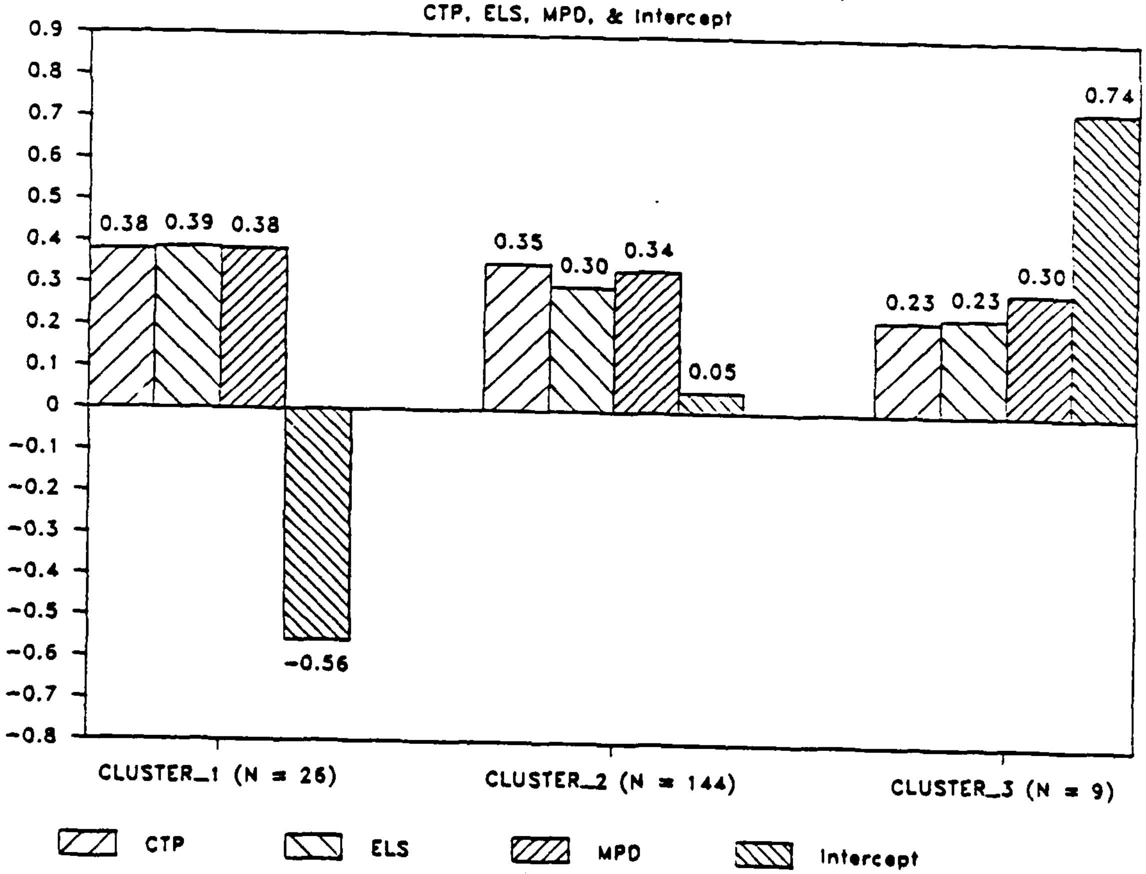
Comparison	Source	DF	SS	MS	F	p <
Models 4 & 6	Total	179	179.00			
	Error	172	5.73	0.03		
	Model 4	5	172.38			
	Model 6	7	173.27			
	Difference	2	0.89	.45	13.39	.01
Models 4 & 8	Total	179	179.00			
	Error	171	4.65	0.05		
	Model 4	5	172.38			
	Model 8	8	174.35			
	Difference	3	1.97	.66	24.01	.01
Models 6 & 8	Total	179	179.00			
	Error	171	4.65	0.03		
	Model 6	7	173.27			
	Model 8	8	174.35			
	Difference	3	1.08	1.08	39.71	.01

Table 6
Cluster Analysis Results

Cluster	N	CTP	ELS	MPD	Intercept
		Mean Regression Estimates			
Cluster 1	26	.38	.39	.38	-.56
Cluster 2	144	.35	.30	.34	.05
Cluster 3	9	.23	.23	.30	.74

Figure 1. Regression Weights by Cluster

CTP, ELS, MPD, & Intercept



Characteristics of judges within cluster. Chi-squared analyses were conducted to determine if membership in five judge categories (rank, command, MOS, gender, and race) and membership in the three clusters were independent. The results can be found in Table 7. The X^2 values for rank, command, and MOS were significant, suggesting that membership in these groups is not independent from membership in the three clusters. Gender and race membership appear to be independent from membership in the clusters.

Table 7

Chi-Squared Analysis of Rater Characteristics and Cluster Membership

Rater Characteristic	N	Strict Cluster 1	Moderate Cluster 2	Lenient Cluster 3	X^2	*p*
Rank						
NCO	93	18	73	2	27.80	.01
Officer	74	2	65	7		
Civilian	11	6	5	0		
Command						
Training Sites	55	18	37	0	23.82	.01
Field Site	124	8	107	9		
MOS						
11B	81	22	59	0	37.56	.01
63B	46	0	38	8		
71L	52	4	47	1		
Gender						
Female	22	2	18	2	1.34	.51
Male	156	24	125	7		
Race						
Black	45	6	38	1	10.42	.24
American Indian	1	1	0	0		
Hispanic	15	2	13	0		
White	104	14	82	8		
Other	13	3	10	0		

Discussion

The results of the present research support several conclusions: First, that the average judgments are highly linear. This finding is consistent with the review of information processing in judgment conducted by Slovic and Lichtenstein (1971), as well as the conjoint measurement analysis conducted by Sadacca, Park, and White (1986) to investigate the weighting of performance constructs.

Second, although the linear model fits very well, a small but statistically significant weight was found for the inclusion of the standard deviation variable into the regression equation; and the R^2 for the model with the standard deviation was significantly larger than the R^2 for the model without the standard deviation. This finding shows a small, but significant nonlinearity in the judges' judgment policies. Two explanations can be made for this nonlinear finding: (1) judges are overly influenced by extreme values on one of the three dimensions (i.e., the largest standard deviations are found when two of the dimensions have a high value and the remaining dimension has a low). This explanation is supported by the research conducted by Fiske (1980) who found that extreme information was more salient in the overall judgment. (2) judges may have penalized the hypothetical soldiers for inconsistent behavior. Therefore, greater inconsistencies among the performance dimensions, i.e., larger standard deviations resulted in larger penalties.

The third conclusion that is supported by the results, concerns the weighting of the three dimensions. It appears that judges tend to weight each of the three dimensions equally. This finding contradicts previous research by Dawes and Corrigan (1979) and Slovic and Lichtenstein (1971) who found that, for somewhat more complex stimuli, the overall judgments were often driven by information on a single dimension. Project A research (Sadacca, et al. 1986) while using five performance dimensions (the three used in the current research plus General Soldiering Proficiency (GSP), and Physical Fitness and Military Bearing (PFB) found significant differences among the dimensions.

The fourth conclusion that can be drawn from the results concerns the scaling of the stimulus items. Table 5 shows that the R^2s for the rescaled models are higher than the simple integer scaling in all cases except the multiple hurdles model. This finding suggests that the conjoint measurement approach should always be accompanied with a rescaling of the stimulus values unless a multiple hurdles model is assumed. This also shows that the psychological distance between the performance standards is not necessarily the same.

The final conclusion is that judges differ in their leniency, and leniency is related to the job, command, and rank of the judge. The results suggest that overall standards should be set within a job. Also, the largest proportion of moderate judges comes from the Officers and the field (FORSCOM) sites.

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CHAPTER 10:

CONCLUSIONS AND RECOMMENDATIONS

Synthetic Validation

At the completion of Phase I of the research project, we have shown that synthetic validation can be successfully conducted. Chapters 3 and 4 documented that Army SMEs were able to use the three job component models to describe the content of the jobs. We also found that SMEs were consistent in identifying the critical components of their jobs. We also found that the types of judges (i.e. of different rank and/or assignment) yielded highly similar job descriptions. In using the Task and Activity job component models to describe jobs, SMEs reported that the instruments provided adequate coverage of the job content.

Results in Chapter 5 provided additional support that testing and measurement experts can reliably and accurately estimate validities of predictor measures for job performance. We found that the judged validities were very similar to empirical validities from Project A. There was some indication that the judged validities underestimated empirical validities that have been corrected for range restriction.

Chapter 6 showed that there is more than one way to synthesize the component validities to obtain a prediction composite for each job. The job component models, in combination with various weighting schemes, yielded validities with different properties. For example, the highest absolute validities were obtained by the Task Category Model, whereas the highest differential prediction was offered by the Job Activity Model.

Results reported in Chapter 7 showed that judges who are more knowledgeable about their jobs provided more accurate judgments. We will continue to obtain additional data in Phase II to confirm or disconfirm that finding.

While there are additional research issues to contend with, the Phase I results are very positive. Job performance in the each of the three Phase I MOS can be predicted accurately with predictor batteries determined by synthetic procedures.

As indicated in the Introduction, these Phase I results were reviewed by the Scientific Advisory Committee. A number of issues were raised by the SAC. In the next section, we will address how each of these issues affects our plans for data collection and analysis during Phase II of the project. These issues include:

- the nature of the job description ratings,
- the level of specificity for the job component models,
- the type of raters to be used,
- the details of the attribute model,
- optimal procedures for development of predictor composites, and
- replication of Phase I results to additional jobs.

Job description ratings. During Phase I, we asked SMEs to rate each Task and Activity job component in terms of the frequency of performance, the importance for Core Technical, General Soldiering, and overall performance. As noted earlier, the importance ratings for Core Technical Proficiency were used in weighting the synthetically derived composites. Two suggestions were made by the scientific advisors that warrant further investigation. The first suggestion was to redefine criticality by combining frequency and importance. There is a theoretical rationale for forming a product of frequency and importance as a measure of each component's contribution to overall job performance.

A second suggestion was to revisit the use of difficulty information. A limited investigation of difficulty ratings was conducted during the Pilot Test. One concern with obtaining difficulty information was that it may depend on the individual soldier--what is difficult for one soldier may be trivial for another. Asking SMEs to focus on average training difficulty might be meaningful. In other words, they might consider the duration and resources for training enlistees on a particular component of performance.

A related suggestion was to investigate the importance of particularly good performance (or the cost of a particularly bad performance), rather than just asking for the importance of a task or an activity in general. Then more weight would be given to predictors of job component performance where the difference between good and bad performance matters the most (and where job incumbents do vary in the level of their performance).

As a result of these suggestions, we will examine alternative ways of rating the criticality of job components and of using this information to obtain weights for the different job component prediction equations.

Level of specificity in the job component models. There were two questions that the SAC raised concerning the relationship among instrument length and reliability and discriminability. The first issue centers on the degree to which instrument length (i.e., the number of components) affected the reliability of the component ratings and the validity of the resulting prediction equations. One suggestion was that differences between the task and activity model reliabilities may be partly due to differences in the number of items (job components) in these two models. This argument suggests that increasing the number of items would lead to greater job description reliability.

The second concern was that the high correlation among profiles generated by the task model, in comparison to the activity model, may be an artifact because of the greater number of categories in the task model. Any two jobs sharing a larger number of categories rated not relevant can result in high profile correlations and perhaps also a reduction in discriminant validity.

However, improving discriminant validity through reducing the number of categories might threaten instrument reliability. Given this tradeoff, some systematic investigation of the effects of varying the number of categories in the task and activities models is warranted and will be addressed in Phase II.

Types of raters. In general, the mean job description profiles generated by different groups of raters were highly correlated. Overall, there was somewhat less agreement for NCO ratings in comparison to officer ratings. The lower agreement among NCOs may reflect their proximity to the job. NCOs may be more familiar with specific variation in job duties for an MOS, while Officers may focus more on the "stereotypic" elements of the job that are common to different duty areas.

The larger differences between NCOs and officers for the 63B (mechanic) job descriptions was a cause for some concern. There may well be greater agreement for some types of jobs than for others and, so far, we have only examined three different jobs. Continued investigation of differences between different types of raters for the seven additional Phase II jobs is warranted.

Attribute model. A number of suggestions were made concerning possible changes to the attribute model. These included:

- drop the attribute "closure"
- drop interests or obtain validities against overall job performance only
- instead of focusing on component validities, obtain validities for the five Project A performance constructs of Core Technical, General Soldiering, etc.
- if obtaining component validities was essential, those judgments should be made on an abbreviated list of tasks and/or activities

Further investigation of these options will be pursued during Phase II.

Development of predictor composites. Phase I analyses showed that different approaches to developing attribute and component weights led to noticeable differences in absolute and discriminant validities. Further exploration of these differences across a wider range of jobs in Phase II will be needed. Further investigation of the Phase I data will suggest re-scaling of the attribute ratings and component weights. Phase II data would verify the feasibility of such re-scaling. With the addition of different types of job description ratings (difficulty as well as frequency and importance), a number of exploratory analyses also will be required during Phase II.

Replication. The scientific advisors endorsed the importance of using the Phase II data collection to replicate Phase I findings. The Phase I results are impressive. However, until more evidence of generalization to more jobs, we have to be cautious about the results. In Phase II, we will investigate generalization to seven additional jobs bringing the total sample of jobs up to ten.

Standard Setting

There are three major issues to be addressed by the standard setting research: (1) setting standards for individual performance dimensions; (2) setting overall performance standards; and (3) linking selection test standards to overall performance expectancies. The first two issues were addressed in Phase I and are also included in the plans for Phase II; the third issue will be addressed later in the project.

Phase I progress in investigating standard setting methodology includes:

- defining four performance levels (unacceptable, marginal, acceptable, and outstanding),
- designing three standard setting approaches for obtaining component level standard (these approaches are soldier-based, task-based, and critical incident-based),
- designing one method for obtaining overall standard
- developing the initial judgment protocols for the four exercises, and
- testing the protocols on three MOS.

As planned, the standard setting research in Phase I was not as well-developed as the synthetic validation work. Field testing of standard setting procedures did not occur until Phase I. Thus, the Phase I data collection on standard setting may be viewed as a pilot effort. However, the results of this pilot effort were informative for future endeavors.

For the definition of the four performance standards, we found that SMEs had no difficulty in understanding and in working with these definitions. In Chapter 8, we reported that SMEs found that the outcomes of the performance standards were meaningful and not improbable.

Phase I results documented in Chapter 8 also indicated that SMEs experienced some difficulties with the task-based descriptions. In particular, judges were confused by descriptions of the probability of passing particular steps that were scored go or no-go. Some judges wanted more step-level information and others felt that step-level information did not help. Judgments based on the task description resulted in stricter standards in comparison with the other two approaches. Stricter standards meant that there was a higher proportion of unacceptable performance among incumbents. Few significant difference in levels of agreement were found between methods or between normative and practice conditions.

On the overall judgment exercise reported in Chapter 9, results indicated judges' strategies could be described very well with a linear (compensatory) model. Nonetheless, statistically significant improvements in the model were achieved by differential spacing of the different levels of performance and by adding a "penalty" for inconsistent performance across different dimensions.

As with the synthetic validation research, the Phase I standard setting results pointed to areas for further investigation for Phase II of this project. These areas are:

- clarification of acceptable performance
- simplification of task-based rating protocol
- generalization across jobs
- combining multiple standards

Clarification of acceptable performance. The scientific advisors expressed concern that the definition of "acceptable" may not be positive enough and if it were consistent with the Army's position. They were assured that the Army does encourage the "acceptable" soldiers to re-enlist. However, owing to the limited resources, the extra effort should be directed at encouraging "outstanding" soldiers to re-enlist.

Simplification of the task-based rating protocols. At the Phase I standard setting workshops, it was evident that the task-based rating protocols could be improved. One suggestion was to provide less detailed information. For example, it might be sufficient to list the tasks for a performance dimension and to ask SMEs to judge the percent of steps in these tasks soldiers would have to pass to meet a particular standard. This suggestion reflects the view that SMEs are familiar with the tasks and their critical steps, and the Soldiers' Manuals contain sufficient information for such judgments.

An opposing point of view was that more information might yield more accurate judgments. In fact, several of the Phase I judges requested more information. One approach that would both provide more and also clearer information would be to provide complete hands-on score sheets for a carefully constructed group of hypothetical examinees. A question that requires careful monitoring is whether judges would get bogged down evaluating tradeoffs between tasks and task-steps and would not complete the ratings of these hypothetical soldiers reliably.

There are a number of possible approaches to generating more detailed information about task performance levels. First, we could sample from the data provided by Project A soldiers. This approach would allow us to build on other information that is known about these soldiers, but might require ratings on relatively large samples of soldiers to compensate for detailed individual differences. An alternative approach would be to generate hypothetical data, so that the task-step scores formed a perfect Guttman scale (where a hypothetical soldier would pass a particular step only if he or she also passed all easier steps).

Given opposing suggestions for modifications to the task-based standard setting instruments, it is reasonable to introduce planned variations in the level of task and step information provided during Phase II. This will allow us to test whether better agreement and more or less lenient standards result from more or less detailed information.

<u>Generalization across jobs</u>. The three jobs analyzed in Phase I were quite different and did not share many common components in the core technical area. An issue to be investigated in Phase II is whether standard setting exercises can be generated for specific components or dimensions that generalize across jobs. This question is particularly important for the incident-based approach because job-specific incidents were only collected for nine jobs in Project A. Specific critical incidents are available for only three of the seven Phase II jobs. We will have to "borrow" incidents from related jobs or jcb components in creating incident-based instruments for the other four Phase II jobs.

<u>Combining multiple standards</u>. In Phase I, we examined the way in which judges rated the overall performance of soldiers when provided with information about performance on three general

dimensions. In Phase II, we will focus on combining standards for multiple dimensions within Core Technical Proficiency. Planned variation in the number of different dimensions rated by each judge will be introduced.

Replication. As with the synthetic validation research, replication of Phase I results for a larger number of jobs will be a primary objective for Phase II. Nonsignificant differences between rater types and methods may or may not be replicated for additional samples.

Steps for Further Research

The iterative design of the Army Synthetic Validation Project will allow us to address the issues raised above during Phases II and III of the project. Phase II of the project is scheduled to run from November 1988 through June 1989, with data collection workshops scheduled for January through March 1989. Seven different MOS will be examined during Phase II.

During Phase II, further exploratory variation in procedures will be examined. For synthetic validation, we will examine the use of different levels of specificity in the job component models and of different ratings for deriving the job component weights. In the standard setting area, we also will examine different levels of specificity in the performance domains for which standards will be set and also will examine the generalizability of particular standards across different jobs.

Current plans call for Phase III to be used primarily to cross-validate exploratory findings from Phase I and Phase II. Phase III will include 13 additional jobs, some of which will be outside of the Project A sample. Phase III will also provide a final opportunity to test hypotheses concerning optimal procedures for selecting and training the judges.

APPENDIX A

Minutes of Scientific Advisory Committee Meeting

Notes From the Synthetic Validity Project Scientific Advisory Committee Meeting held on November 9 and 10, 1988 in Washington, DC

Attendees: Phil Bobko, Bob Guion, Dick Jaeger, Bob Linn, and Joyce Shields of the SAC; project advisor Ron Hambleton; Jane Arabian and Larry Hanser of ARI; Wei Jing Chia, Phil Szenas, and Laurie Wise of AIR; Cyndi Owens-Kurtz and Norm Peterson of PDRI; and John Campbell and Gene Hoffman of HumRRO.

Day 1: Job Component Models, Expert Judgment Research, and Synthetic Equations

Update and Overview of Meeting

Jane Arabian welcomed everyone to the meeting and reviewed plans for the meeting. The first day of the meeting would be devoted to review of analyses of data gathered for the job component models, expert validity estimation, and synthetic validation. The group would spend the next half day reviewing initial standard setting results. Jane also asked SAC members to suggest ways of consolidating or modifying models for future testing and to provide options and directions for the project staff for the remainder of the project.

Laurie Wise described progress made since the November 1987 SAC meeting. He listed the Pilot Test of job component models, the Phase I data collection, and the expert validity data collection, as major project accomplishments during the course of the last year. Laurie also pointed out that there was a considerable list of results for the SAC to review.

Major activities for the coming year will include revising models and procedures for Phase II data collection in January-March 1989. In Phase II, 7 more Project A jobs will be studied. Another SAC meeting is planned for next July or August.

Task and Activity Models: Pilot and Phase I Test Results

Wei Jing Chia presented results of the Pilot and Phase I Test results. In both field tests, three MOS (Infantryman, Vehicle Mechanic, and Administrative Specialist) were studied. The results indicated that both the Task and Activity job component models produced reliable job descriptions from Army SMEs. There was adequate discriminability among jobs using importance ratings for Core Technical Proficiency. Although Officers as a group were more consistent in their ratings than NCOs, the groups shared very similar ordering of the components in terms of the importance ratings. Based on evaluation of the two job component instruments provided by the SMEs, about 70% of the key duties for the three jobs were contained in the instruments. When asked to supply components that were missing, these SMEs were unable to do so or identity components that were clearly contained in the existing instruments. Norm Peterson stated that the 70% level of coverage is about what is usually found when judges are asked to compare job component instruments.

A number of issues were raised during the presentation. Phil Bobko suggested a multiplicative model that weighted job components by the product of importance and frequency of performance might provide better discrimination. Phil and Joyce Shields also suggested including some measure of difficulty in terms of time to train into measuring criticality of a job component. Phil stated that it is important to take the "individual" out of the difficulty ratings (e.g., what is difficult for one soldier may not be for another).

Ron Hambleton, Dick Jaeger, and Norm recommended that in computing single rater reliability, the variance due to MOS should be considered error variance. Ron asked about how the role of instrument length might influence the reliabilities. Phil responded that it depends on the number of "Not Part of Job" responses. Laurie added that the "Not Part of Job" also plays an important role in the instrument's ability to discriminate among jobs. Dick concluded by saying that "the instrument is the instrument" and should be evaluated more-or-less "as is".

The next discussion concerned the cause and implication of the lower reliabilities for the NCOs as compared to the Officers. Laurie stated that the lower NCO reliabilities may be due to the fact that these NCO entered the Army during the period of the mis-norming of the ASVAB that occurred in the late 1970's and early 1980's. Norm suggested that Officers may share a common stereotype that would tend to inflate the reliabilities suggesting that the NCOs more accurately reflect the real job. John Campbell pointed out that the stereotype might be the correct (organizational policy) view of the job. Jane stated that maybe we do not want the reliabilities to be too high because we want to sample SMEs that have a wide range of duty experience. Phil suggested that the NCO-Officer distinction may make more of a difference for some MOS than for others. Jane said that we were taking this into account by using Warrant Officers as SMEs for some MOS because they are more involved with the direct supervision of soldiers performing job duties. The lower co-officer agreement for 63B warrants further investigation.

Attribute Model: Pilot and Phase I Test Results (Soldier Method)

Cyndi Owens-Kurtz presented results of Army SME ratings and rankings of the validity of attributes for predicting job performance. Despite the apparent complexity of the task, the results indicated that the SMEs understood the materials and provided useful data. Inter-rater reliabilities were acceptable and indicated that 15 raters should supply sufficiently reliable results in most cases. Again, she reported that Officers have better inter-rater agreement than NCOs do. The pattern of judged validities of attributes for job performance corresponded to the pattern found in Project A research. There was validity differentiation across jobs for Core Technical Proficiency, but validity generalization of the attributes for General Soldiering, Effort and Leadership, Personal Discipline, and Physical Fitness and Military Bearing.

Dick raised a concern about the readability of the attribute definitions by SMEs. He speculated that the complexity of the definitions might steer the SMEs to select the middle point of the rating scale. Cyndi disagreed and pointed out that the pattern of validities of the Army SMEs corresponded well to that of the psychologists.

Judge Screening: Rater Characteristics and Rating Fidelity

Phil Szenas presented a causal model of individual difference variables on rating accuracy. Individual difference variables included general aptitude, job experience, years of education, knowledge of own job, and knowledge of job rated. Rating accuracy was defined as the correlation of individual ratings with the mean ratings of the target group. He found that the same path model accounted for the rating accuracy of the Task, Activity, and Attributes rating accuracy. Knowledge of own job and knowledge of job rated were key determinants of rating accuracy. Therefore, he suggested that judge selection might be predicated on job knowledge.

Although the analysis was exploratory, the results drew a lot of interest. General aptitude had a relatively minor role on rating accuracy apart from its relationship to job knowledge. According to Bob Guion, general aptitude should still serve as a good screen even though its influence on rating accuracy was indirect. Larry Hanser suggested modifying the model by keeping only the direct effects of general aptitude on rating accuracy. John also pointed out that the causal order of the individual difference variables may not be as critical if judge selection is based on all those variables. Bob Linn indicated that the pattern of correlations of knowledge of own job with fidelity coefficients of the three models suggested different paths. Despite limited data, Laurie stated that the results indicated a simple minded conclusion: a good judge is one who is knowledgeable of the job.

Summary of the Job Component Models

Laurie provided a summary of the three presentations given in the morning. Reliabilities found for the three job component models were fairly consistent. The resulting job descriptions and attribute patterns for the different jobs made sense. There was some indication that officers were somewhat more reliable than NCOs. Some differences were also observed between FORSCOM and DOTD judges. DOTD judges were more reliable with Activities job description. Laurie suggested that perhaps they were more familiar with dealing with components at that level of abstraction. Overall, there was no significant differences between descriptions of the groups of judges as evident from the high correlations of the mean rating profiles. Therefore, the job component models have passed the first hurdle in providing reliable job descriptions. More work will be undertaken to see if frequency information leads to higher validities and discriminability.

As the three job component models yielded comparable data, a decision to drop one or two models will not be easy. Norm argued that the choice should be based on the synthetic validities. Ron suggested data collection effort might be another criterion. Laurie agreed that we should monitor data collection time requirements more closely in Phase II. Norm, however felt that the half-day to gather data for all three models does not present an operational problem.

Norm added that the end of Phase I marks a major accomplishment for the project. We now have a set of procedures for deriving synthetic equations which will predict performance on a small set of jobs. Larry raised a concern whether these research procedures will also work under operational conditions.

Phil Bobko questioned the application of synthetic validation procedures for a job that is being created. Joyce suggested that it might be worthwhile to include new jobs that are being planned, e.g. 11B Bradley and compare job descriptions from the judges who are knowledgeable and those who are not knowledgeable about the vehicle. Laurie pointed out that the iterative approach of the project can allow us to address that issue. Not much can be done about the Phase II design as troop support requests have been filed, but in Phase III, we will attempt to study new jobs and/or jobs that are undergoing significant changes.

Gene raised the issue of focussing on average importance ratings versus obtaining a product as a result of group effort. Laurie pointed out that the single rater reliabilities have remained high from field test to field test. John speculated what difference might be observed in the ratings obtained by averaging across 10 judges, by a delphi procedure of 10 judges, or by 10 highly selected judges. Norm did not like the delphi approach because of time and cost considerations. Bob Guion didn't think the group problem solving research would necessarily generalize to a task like job description.

Expert Judgment of Validities (psychologist method)

Norm outlined the "psychologist" method for obtaining predictor-job component validities. The sample of 69 judges included a large number of personnel psychologists with excellent credentials. He also described his rationale for forming subgroups of experts on the basis of psychological expertise and military familiarity. There was acceptable levels of inter-rater reliabilities for the group of judges as a whole as well as by MOS, and by instrument. There was little support for differences in reliabilities by grouping according to expertise and military familiarity.

The pattern of judged validities for the three jobs made sense and was as expected. For example, Mechanical Comprehension received a higher validity for 63B than either of the other jobs. Mean validities for core technical performance were highest for cognitive abilities and lowest for interests; mean validities for psychomotor and physical abilities had intermediate values. The psychologists' mean validities show excellent correspondence to those by soldiers. The psychologists' validities in most instances underestimated the "true" validities.

If there was a need to gather expert validity judgments again, Norm proposed the following changes:

- drop closure
- drop interests or obtain validities against overall job performance only
- instead of focussing on component validities, obtain validities for the five Project A performance constructs of Core Technical, General Soldiering, etc.
- if obtaining component validities was essential, we should settle on an abbreviated list of tasks and/or activities

According to Norm, one judge made a distinction between performance and proficiency. Bob Guion said that the term "job performance" connotes a more global description of work to include attendance. Phil Bobko added that a typical-maximal performance continuum might describe the performance/proficiency distinction.

Comparison of Empirical and Synthetic Prediction Equations

Laurie described the two steps for forming the synthetic equations. The first step involves weighting attributes to form a performance prediction composite for each job component. Each of the performance component prediction composite is then standardized. In the second step, each performance component prediction composite is weighted by the job component importance weights obtained for each job. The second step is not needed for the attribute model.

Empirical equations using Project A data served as the benchmark for the synthetic equations. Two criteria were critical: (a) absolute validities by job and (b) the degree of differential prediction across the three jobs in Phase I. Three types of weights were tried for weighting attributes and they were validity, regression, and unit weights. Two types of weights were tested for weighting job components, and they were total and adjusted weights. All synthetic equations yielded useful validities and synthetic validities using some combination of weights approached the empirical validities. Regression attribute weights produced the lowest validities. The highest validities were obtained from unit attribute weights. Adjusted component weights produced the best differential validity. The attribute model worked better with psychologists than with soldiers. The Task model yielded higher absolute validities and lower differential validities compared to the Activity Model.

A number of issues were raised during the presentation. Bob Guion suggested restricting the predictor battery to the five best predictors. Norm related his experience in the LOMA study where he was successful in limiting the test battery to five predictors for each job without sacrificing overall predictability. Norm suggested setting a maximum amount of reduction in R^2 that can be tolerated, and then use backward stepwise regression to remove predictors until this criterion is met. John noted that it is important to examine the content of the equations. Upon examining the weights of the synthetic equations, Bob Linn pointed out the 63B and 71L had very different equations.

Bob Guion also questioned if the small amounts of improvement in differential validity were worthwhile. Larry pointed out that the small gains do accrue significantly for a large organization like the Army.

Synthetic Validation Summary and Plans

John led the discussion of the project progress up through Phase I and plans for Phase II of the project. He reminded us that the overall goal was to identify prediction equations for jobs for which empirical validation is not possible. Two solutions are investigated: validity generalization (VG) and synthetic validation. Traditional validation has been carried out on a prototypic job in a job family. The efficacy of synthetic validation for generalizing validity to the other jobs in the family would be compared to generalizing validity by VG procedures from the prototypic job.

To obtain generalized validity via synthetic validation, a number of key issues must be addressed: (a) what is the unit of analysis? (b) what judgments are required; (c) who makes the judgments? (d) what is the procedure for deriving judgment-based prediction equations? and (e) what is the evidence for empirical verification?

Some of the issues have been address by the Phase I data. Further analyses of Phase I data should focus on:

- comparison of subgroups on accuracy of judged validities for the attribute model
- comparison of judged validities v. empirical validities
- conducting sensitivity analyses on differential prediction on realistic selection and classification system using five or six predictors

Phase II plans should be primarily directed at replication and extension of Phase I findings. Replication of the same procedures with new MOS should be conducted. Extensions should explore comparison of different levels of job element taxonomies. A number of sensitivity analyses of equation discriminability should be conducted by varying (a) job similarity; (b) number of predictors; (c) predictor content; (d) predictor weights; (e) judge type; (f) level of taxonomy; and (g) types of criticality judgments.

A number of issues were raised by SAC members during the discussion. One issue had to do with the testing procedure. John's suggestion of testing applicants on only a small set of predictor measures elicited questions from Bob Linn and Bob Guion about the number of predictors to administer. Some variant of "adaptive" test selection was proposed by Larry. Joyce suggested a multiple hurdles approach to sequencing tests.

When John discussed the option of dropping interests from further study, Joyce wanted to know what the Army's position was with regards to using interests in selection. Larry felt that Project A longitudinal validation on interest was not far along enough to inform a policy on the use of interests. Jane added that the preliminary findings are that interests can compensate for deficits in some general aptitude.

Another issue which drew some discussion was the selection of SMEs for job description. John was concerned about the mix of judges with regards to their experience of the job. Ron suggested examining the specific duties the judges had in the MOS. Jane agreed that we might ask judges to list the duty positions they had supervised in the MOS. John proposed comparing high and low ability judges in terms of their reliability, discriminability, and fidelity. Joyce felt that judge heterogeneity depends on the MOS. For example, there were more varied assignments for 63B. Jane mentioned that too high inter-rater reliabilities may not be desirable because that implies capturing a limited perspective of the MOS.

Another issue discussed was the level of specificity in job description. So far, job description has proceeded at one level. John proposed to describe jobs at a more abstract level. An attempt at a higher level abstraction might be the results of a factor analyses of the job elements based on their pattern of attribute validities. Norm ran the analyses and results were distributed at the meeting. The results revealed six interpretable factors with a good mix of tasks and activities defining each factor.

Joyce Shields reminded the group of the issued concerning measuring the "difficulty" of performing job components. Bob Guion said that there is a difference between how important a job component is for a job and how important it is to do the job component well. Laurie said that if number of component in the questionnaire can be reduced, that "importance," "frequency," and "difficulty" judgments can each be collected.

Day 2: Standard Setting Results and Phase II Plans

Overview of Standard Setting Research

Laurie described the three major issue to be address by the standard setting research: (1) setting standards for individual performance dimensions; (2) setting overall performance standards; and (3) linking selection test standards to overall performance expectancies. The first two issues were addresed in Phase I and are also included in the plans for Phase II, while the third issue will be addressed later in the project. Laurie provided a summery of the progress to date which included the identification of the four performance levels (unacceptable, marginal, acceptable, and outstanding), the three initial standard setting approaches (soldier-based, task-based, and critical incident-based), the development of the initial judgment protocols, and the Phase I workshops that tried out these protocol on three MOS.

Bob Guion expressed concern that the definition of "acceptable" may not be positive enough and wanted to know what the Army's policy was concerning encouraging these soldiers to re-enlist. Jane said that although the Army encourages the "acceptable" soldiers to re-enlist,it is more concerned with targeting extra effort and limited resources should be directed at encouraging "outstanding" soldiers to re-enlist.

Setting Individual Standards

Laurie defined two major issues that concerned setting individual standards and two major issues that addressed combining multiple standards. The four issues were: (1) do different methods of describing performance levels affect the setting of performance standards?; (2) does providing practice and/or normative information affect the leniency of performance standards?; (3) how do we combine standards set for individual performance elements into standards for overall performance; and (4) are there judge characteristic that are correlated with different judgment strategies/outcomes? Laurie then presented result that addressed the first two issue and Phil Szenas presented results that addressed the final two issues.

Much discussion was generated concerning the task-based standard setting protocol. Everyone agreed that improvements could be made to the way the information was presented. Ron Hambleton suggesting eliminating the "specific steps in the hands-on tests" information because it only served to confuse the judges. Joyce and Laurie suggested provide mock hands-on score sheets and asking SMEs to provide standard setting judgment on these tasks. John suggested simply listing the tasks covered and showing only overall percent-go scores.

Laurie presented three conclusions from the analyses of the affects of using different methods of describing performance levels on setting of performance standards: (1) the different description methods had a dramatic effect on the setting of standards; (2) the rating-based method resulted in somewhat more lenient standards for minimal performance; and (3) the task-based method resulted in very strict standards for minimal performance on many dimensions.

Laurie then presented the results of the analyses conducted to investigate the affects of providing practice and normative information may have had on the leniency of performance standards. The conclusion drawn from these analyses was that practice and normative information did not have an effect on the setting of performance standards. A caution was made concerning this conclusion due to the small sample sizes used and the limitation of the manipulation.

Combining Multiple Standards

Phil Szenas presented results that addressed two issues: (1) how do we combine multiple standards; and (2) are there judge characteristics that are correlated with different judgment strategies/outcomes. He described the conjoint approach used in the workshops and presented results on the modeling of judges' decision strategies.

Four conclusions were put forward relating the modeling of the judges' decision strategies: (1) judgments of overall performance ratings are well represented by simple linear unit weighted combination of equal interval performance area ratings; (2) rescaling the performance area ratings to non-equal interval performance area ratings improves the modeling of raters' judgments; (3) differential weighting of the performance areas leads to further improvement in the modeling; and (4) the addition of a term to capture the spread in performance ratings further improves the modeling of raters' judgments.

Next, the results of the investigation of judge characteristics and different judgment strategies were presented. The conclusions drawn from the results were: (1) that Officers have stricter standards than NCOs; (2) that judges from training sites have stricter standards than judges from field sites; and (3) that 11Bs have stricter standards than 63Bs and 71Ls.

Phil Bobko suggested going back and conducting the rescaling within the three separate categories in order to determine if the same decision models would apply across these groups.

Linking Enlistment Standards to Job Performance Standards

Jane presented a proposed approach to linking job-specific selection standards to job-specific performance. She pointed out that other screens (e.g. AFQT medical, possible ABLE scores) were linked to more general components of job performance. She showed how empirical data could be used to build expectancy tables and how the expected performance level mix would vary as a result of different selection standards.

Phase II Data Collection Plans

Laurie and John summarized the plans for the Phase II field test as follows:

Job Component Models

- the main focus of the Phase II data collection is to see if the encouraging results found for the three MOS studies could be replicated for seven additional MOS;

- explore the possibility of constructing a Job Component model based on a higher level of generality (fewer components) using the task-based and activity-based (or both) job component models;

- explore alternative methods of collection relevance ratings beyond importance;

- explore difficulty, especially as it is related to training difficulty and standard setting; and

- developing a questionnaire to measure the judge's exposure to different duty areas.

Standard Setting

- Modify the task-based approach to included a simpler presentations and clear presentation of step information;

- explore developing a critical incident based instrument that can generalize across jobs; and

- re-evaluate the presentation of normative data.

Phil Bobko reminded the group that it is not too early to be thinking about selection of MOS and judges for Phase III.

APPENDIX B

Phase I Task Category Taxonomy

Name: ____________________

MOS TASK QUESTIONNAIRE

There are 96 tasks in this questionnaire. For each task, we would like you to make four ratings. First, indicate how FREQUENTLY each task is performed by soldiers in this MOS, using the following FREQUENCY rating scale:

0 = Never; this task is not part of the job.

1 = Least Often; this task is performed much less often than most other tasks.

2 = Not Very Often; this task is performed less often than most other tasks.

3 = Often; this task is performed about as often as other tasks.

4 = Very Often; this task is performed more often than most other tasks.

5 = Most Often; this task is performed much more often than most other tasks.

> As you make your ratings, think about soldiers who have about 18 months of service in this MOS after Basic and AIT. Also keep in mind all that you know about the full range of duty assignments for this MOS.

After you have made FREQUENCY ratings for all 96 tasks, go through the list again, this time rating the IMPORTANCE of each task for successful performance in three different areas of the job: Core Technical Area, General Soldiering Area, and Overall Performance. The definitions of these performance areas are on a separate sheet, entitled PERFORMANCE AREA DEFINITIONS. Please read these definitions carefully before making your IMPORTANCE ratings.

You will make IMPORTANCE ratings using the following rating scale:

0 = No Importance

1 = Extremely Low Importance

2 = Low Importance

3 = Moderate Importance

4 = High Importance

5 = Extremely High Importance

NOTE: If you decided that a particular task is not part of this MOS (so you gave it a FREQUENCY rating of 0), you should leave all three IMPORTANCE ratings blank.

Please look at the EXAMPLES below and read through their explanations before starting to make your ratings.

EXAMPLES:

FREQUENCY	IMPORTANCE
0 = Never	0 = No Importance
1 = Least Often	1 = Extremely Low Importance
2 = Not Very Often	2 = Low Importance
3 = Often	3 = Moderate Importance
4 = Very Often	4 = High Importance
5 = Most Often	5 = Extremely High Importance

	Frequency	Importance: Core Technical	Importance: General Soldiering	Importance: Overall Performance
a. Perform medical laboratory procedures -- conduct various types of blood tests, urinalysis, cultures, etc.	0			
b. Perform operator checks and services on weapons -- check, disassemble, assemble, clean, lubricate, and adjust weapons, including pistols, rifles, machineguns, hand grenades, and breechblocks.	1	2	4	4

Joe supervises 94B (Cooks). He went through the list of tasks and made FREQUENCY ratings of each one, then returned to the beginning of the list and, after carefully reading the PERFORMANCE AREA DEFINITIONS, has started making his ratings of how IMPORTANT each task is for successful performance in three different areas of the job.

1. Since he felt that Task a., "Perform medical laboratory procedures," was not part of the job for 94B, he gave this task a FREQUENCY rating of 0, and left all three IMPORTANCE ratings blank.

2. Joe felt that Task b., "Perform operator checks and services on weapons," was performed much less often than most tasks in MOS 94B, so he gave it a FREQUENCY rating of 1, for Least Often.

Joe decided that this task was of Low Importance for Core Technical Area, so he gave it an IMPORTANCE rating of 2.

For General Soldiering, Joe felt that this task was of High Importance, so he gave it an IMPORTANCE rating of 4 for this performance area.

For overall performance, Joe gave this task a rating of 4 indicating the task was of High Importance for overall job performance.

Keep the PERFORMANCE AREA DEFINITIONS handy and refer to them as often as necessary while making your IMPORTANCE ratings.

NOTE: Many of the task definitions in this questionnaire contain specific examples to help explain and clarify the task. Please keep in mind that these are just some of the possible examples; it was not practical to list every possible example.

TASK QUESTIONNAIRE

FREQUENCY	IMPORTANCE
0 = Never	0 = No Importance
1 = Least Often	1 = Extremely Low Importance
2 = Not Very Often	2 = Low Importance
3 = Often	3 = Moderate Importance
4 = Very Often	4 = High Importance
5 = Most Often	5 = Extremely High Importance

I. MAINTENANCE

A. Mechanical Systems Maintenance

	Frequency	Importance: Core Technical	Importance: General Soldiering	Importance: Overall Performance
1. Perform operator maintenance checks and services -- follow directions in Operator's Manual; conduct before, during, after, and weekly operator checks and services on vehicles, trailers, generators, construction equipment, or other kinds of mechanical apparatus.	___	___	___	___
2. Perform operator checks and services on weapons -- check, disassemble, assemble, clean, lubricate, and adjust weapons, including pistols, rifles, machineguns, hand grenades, and breechblocks.	___	___	___	___
3. Troubleshoot mechanical systems -- measure, use specialized test equipment and manuals, and observe mechanical equipment (for example, engines, transmissions, brakes, hydraulics, refrigeration systems, etc.) to detect and diagnose problems and malfunctions.	___	___	___	___
4. Repair weapons -- after the cause of a problem in a weapon has been found, fix it using the appropriate tools and necessary replacement parts by following directions in the weapon's technical manual.	___	___	___	___
5. Repair mechanical systems -- after the cause of a problem in a mechanical part has been found, fix it using the appropriate tools (for example, wrenches, screwdrivers, gauges, hammers, soldering equipment, etc.) and necessary replacement parts by following directions in the equipment's technical manual.	___	___	___	___
6. Troubleshoot weapons -- find the cause of malfunctions in weapons using technical manuals, tools, and test equipment.	___	___	___	___

B. Electrical and Electronic Systems Maintenance

	Frequency	Importance: Core Technical	Importance: General Soldiering	Importance: Overall Performance
7. Install electronic components -- connect electronic and communications equipment (for example, radios, antennas, telephones, teletypewriters, radar, power supplies, etc.) and check system for operation.	___	___	___	___

FREQUENCY	IMPORTANCE
0 = Never	0 = No Importance
1 = Least Often	1 = Extremely Low Importance
2 = Not Very Often	2 = Low Importance
3 = Often	3 = Moderate Importance
4 = Very Often	4 = High Importance
5 = Most Often	5 = Extremely High Importance

	Frequency	Importance: Core Technical	Importance: General Soldiering	Importance: Overall Performance
8. Inspect electrical systems -- measure, use specialized test equipment and manuals, and observe electrical systems (for example, generators, wiring harnesses, switches, relays, circuit breakers, etc.) to detect and diagnose problems and malfunctions.	___	___	___	___
9. Inspect electronic systems -- measure, use specialized test equipment and manuals, and observe electronic systems (for example, communications equipment, radar, missile and tank ballistics computer, etc.) to detect and diagnose problems and malfunctions.	___	___	___	___
10. Repair electrical systems -- after the cause of an electrical problem has been found, fix it with the appropriate tools (for example, wire strippers, pliers, soldering irons, etc.) and necessary replacement parts by following directions in the equipment's technical manual.	___	___	___	___
11. Repair electronic components -- after the cause of an electronics problem has been found, fix it with appropriate tools (for example, test sets, screwdrivers, pliers, soldering guns, etc.) and necessary replacement parts by following directions in the equipment's technical manual.	___	___	___	___

II. GENERAL OPERATIONS

C. Pack and Load

	Frequency	Importance: Core Technical	Importance: General Soldiering	Importance: Overall Performance
12. Pack and load materials -- load and lash materials onto transport vehicles (land, sea, or air) to secure and protect from damage or loss during shipment.	___	___	___	___
13. Prepare parachutes -- inspect cargo and personnel parachutes, repair or replace faulty components, and pack parachutes for air drop.	___	___	___	___
14. Prepare equipment and supplies for air drop -- build or assemble platforms, cushions, and riggings for parachuting supplies, equipment, and vehicles.	___	___	___	___

FREQUENCY	IMPORTANCE
0 = Never	0 = No Importance
1 = Least Often	1 = Extremely Low Importance
2 = Not Very Often	2 = Low Importance
3 = Often	3 = Moderate Importance
4 = Very Often	4 = High Importance
5 = Most Often	5 = Extremely High Importance

		Importance		
	Frequency	Core Technical	General Soldiering	Overall Performance

D. Vehicle and Equipment Operations

	Frequency	Core Technical	General Soldiering	Overall Performance
15. Operate power excavating equipment -- use air hammers and drills, paving breakers, grinders, backfill tampers, or other hand operated power equipment in building concrete, stone, or other structures (for example, roads, fortifications, buildings, etc.).	___	___	___	___
16. Operate wheeled vehicles -- drive wheeled vehicles over roads and cross-country in response to mission, terrain, and traffic regulations.	___	___	___	___
17. Operate track vehicles -- drive track vehicles (for example, tank, APC, BFV, etc.) in response to mission, terrain, and traffic controls.	___	___	___	___
18. Operate boats -- drive boats and rafts.	___	___	___	___
19. Operate lifting, loading, and grading equipment -- operate fork lifts, cranes, back-hoes, graders, and other heavy equipment to load, unload, or move heavy equipment, supplies, construction materials (for example, culvert pipe, building and bridge parts), or terrain (for example, earth, rocks, trees, etc.).	___	___	___	___

E. Construct/Assemble

	Frequency	Core Technical	General Soldiering	Overall Performance
20. Paint -- prepare surfaces (clean, remove old paint, sand) and apply paint with brush, roller, or spray.	___	___	___	___
21. Install wire and cables -- string or lay, and connect electrical wire or communications cables.	___	___	___	___
22. Repair plastic and fiberglass -- fix plastic or fiberglass parts and structures by cutting, sawing, drilling, sanding, filling, gluing, and painting.	___	___	___	___
23. Repair metal -- fix metal structures or parts by bending, cutting, drilling, welding, hammering, grinding, soldering, and painting.	___	___	___	___
24. Assemble steel structures -- erect bridges, antennas, and other steel structures. May require the assistance of others and use of heavy equipment.	___	___	___	___

FREQUENCY	IMPORTANCE
0 = Never	0 = No Importance
1 = Least Often	1 = Extremely Low Importance
2 = Not Very Often	2 = Low Importance
3 = Often	3 = Moderate Importance
4 = Very Often	4 = High Importance
5 = Most Often	5 = Extremely High Importance

	Frequency	Importance: Core Technical	Importance: General Soldiering	Importance: Overall Performance
25. Install pipe assemblies -- place, connect, and test pipe assemblies and fixtures (for example, plumbing, POL pipelines and pumps, etc.).	___	___	___	___
26. Construct wooden buildings and other structures -- measure, saw, nail or plane to frame, sheath, and roof buildings, or erect trestles, bridges, and piers.	___	___	___	___
27. Construct masonry buildings and structures -- measure, lay brick or concrete blocks, or build forms and pour concrete to construct walls, columns, field fortifications, and other concrete or masonry structures.	___	___	___	___

F. Technical Procedures

	Frequency	Importance: Core Technical	Importance: General Soldiering	Importance: Overall Performance
28. Operate gas and electric powered equipment -- operate electric generators, air compressors, smoke generators, quarry machines, mobile washing machines, water pumps, etc., to produce power or process materials.	___	___	___	___
29. Select, layout, and clean medical or dental equipment and supplies -- prepare treatment areas for use by following prescribed procedures for laying-out instruments and equipment; clean equipment and area for future use.	___	___	___	___
30. Use audiovisual equipment -- use cameras and videotape to record sights and sounds for intelligence analysis, training, or documentation.	___	___	___	___
31. Reproduce printed material -- operate duplicating machines, offset presses, and similar equipment to reproduce printed materials; collate and bind materials using various types of bindery equipment.	___	___	___	___
32. Operate electronic equipment -- set and adjust the controls to operate electronic equipment (for example, radio, computer hardware, missile ballistics controls, etc.).	___	___	___	___
33. Operate radar -- operate radar equipment and interpret signals.	___	___	___	___
34. Operate computer hardware -- operate computer hardware such as tape and disk drives, optical scanners, terminals, and other input/output devices. (Does not include programming.)	___	___	___	___

FREQUENCY	IMPORTANCE
0 = Never	0 = No Importance
1 = Least Often	1 = Extremely Low Importance
2 = Not Very Often	2 = Low Importance
3 = Often	3 = Moderate Importance
4 = Very Often	4 = High Importance
5 = Most Often	5 = Extremely High Importance

Task	Frequency	Importance: Core Technical	Importance: General Soldiering	Importance: Overall Performance
35. <u>Cook</u> -- prepare food and beverages according to recipes and meal plans (measure, mix, bake, etc.); inspect fresh food and staples for freshness; clean equipment and work area.	___	___	___	___
36. <u>Perform medical laboratory procedures</u> -- conduct various types of blood tests, urinalysis, cultures, etc.	___	___	___	___
37. <u>Conduct land surveys</u> -- survey terrain to determine elevations, azimuths, and distances of terrain features; record information.	___	___	___	___
38. <u>Provide medical or dental treatment</u> -- give medical attention to soldiers in the field or in medical or dental clinics, or give veterinary treatment to animals (for example, administer injections, take blood pressure, change sterile dressings, etc.); does not include first aid.	___	___	___	___
G. Make Technical Drawings				
39. <u>Sketch maps, overlays, or range cards</u> -- use standard symbols to make sketches of terrain, including locations of buildings and other objects, targets, avenues of approach, and maneuver areas.	___	___	___	___
40. <u>Produce technical drawings</u> -- use drafting and drawing equipment to make technical drawings and blueprints.	___	___	___	___
41. <u>Draw maps and overlays</u> -- use drafting, graphics, and related techniques to draw and revise maps from aerial photographs.	___	___	___	___
42. <u>Draw illustrations</u> -- use pen, pencil, paint, or other media to make free hand technical drawings and illustrations. (Does not include range cards, sketched maps or other field expedient drawings.)	___	___	___	___

III. ADMINISTRATIVE

Task	Frequency	Importance: Core Technical	Importance: General Soldiering	Importance: Overall Performance
H. Clerical				
43. <u>Type</u> -- type information using a typewriter, teletypewriter, keypunch, or computer terminal.	___	___	___	___

FREQUENCY	IMPORTANCE
0 = Never	0 = No Importance
1 = Least Often	1 = Extremely Low Importance
2 = Not Very Often	2 = Low Importance
3 = Often	3 = Moderate Importance
4 = Very Often	4 = High Importance
5 = Most Often	5 = Extremely High Importance

		Importance		
	Frequency	Core Technical	General Soldiering	Overall Performance
44. Prepare technical forms and documents -- follow standardized procedures to prepare or complete forms and documents (for example, personnel records, legal briefs, requisition requests, inspection records, etc.).	___	___	___	___
45. Record, file, and dispatch information -- collect, copy, update, sort, index, file, and retrieve information (for example, mail, training rosters, personnel statistics, supply inventories, etc.).	___	___	___	___
46. Receive, store, and issue supplies, equipment, and other materials -- inspect materials and review paperwork when receiving materials; sort, transport, and store materials; issue or ship materials to authorized personnel or units.	___	___	___	___
I. Communication				
47. Use hand and arm signals -- communicate messages and instructions using hand and arm signals.	___	___	___	___
48. Read technical manuals, field manuals, regulations, and other publications -- use index and table of contents to find location of needed information; locate information; read instructions, diagrams, charts, and tables.	___	___	___	___
49. Use maps -- read and interpret map symbols and identify terrain features in order to orient map to your position in the field; determine grid coordinates; determine directions; identify roads, towns, etc.	___	___	___	___
50. Send and receive radio messages -- use standardized radio codes and procedures to transmit and receive messages and other information.	___	___	___	___
51. Give short oral reports -- use standard communication procedures to organize and deliver information (for example, SALUTE, call for and adjust indirect fire, status reports, etc.).	___	___	___	___
52. Receive clients, patients, guests -- schedule, greet, and give routine information to persons seeking medical, dental, legal, or counseling services.	___	___	___	___
53. Give directions and instructions -- give verbal information, instructions, or directions to others.	___	___	___	___

FREQUENCY	IMPORTANCE
0 = Never	0 = No Importance
1 = Least Often	1 = Extremely Low Importance
2 = Not Very Often	2 = Low Importance
3 = Often	3 = Moderate Importance
4 = Very Often	4 = High Importance
5 = Most Often	5 = Extremely High Importance

		Importance		
	Frequency	Core Technical	General Soldiering	Overall Performance
54. Write and deliver presentations -- make formal presentations, for example, briefings, radio and television broadcasts, etc.	___	___	___	___
55. Interview -- gather information from clients, patients, witnesses, prisoners, or other persons.	___	___	___	___
56. Provide counseling and other interpersonal interventions -- conduct personal adjustment counseling with individuals and groups; use interpersonal relations skills to solve relationship problems.	___	___	___	___
57. Write documents and correspondence -- draft letters, reports, memos, etc.; proofread and edit.	___	___	___	___
J. Analyze Information				
58. Decode data -- use coding systems and rules to decipher and interpret coded information (for example, use CEOI, interpret symbols/signs, etc.).	___	___	___	___
59. Analyze electronic signals -- analyze electronics signals to detect threat transmitters and electronic countermeasures.	___	___	___	___
60. Analyze weather conditions -- determine weather conditions and analyze their effects on tactical operators.	___	___	___	___
61. Order equipment and supplies -- determine needs and requisition needed supplies, materials, and equipment.	___	___	___	___
62. Estimate time and cost of maintenance operations -- estimate equipment downtime and cost of repairs, including parts and labor.	___	___	___	___
63. Plan placement or use of tactical equipment -- using maps and on-site inspection, identify positions and areas to be used for cover and concealment and to place weapons, fortifications, mines, and detectors.	___	___	___	___
64. Translate foreign languages -- translate written or spoken foreign language communications.	___	___	___	___

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FREQUENCY	IMPORTANCE
0 = Never	0 = No Importance
1 = Least Often	1 = Extremely Low Importance
2 = Not Very Often	2 = Low Importance
3 = Often	3 = Moderate Importance
4 = Very Often	4 = High Importance
5 = Most Often	5 = Extremely High Importance

Task	Frequency	Importance: Core Technical	Importance: General Soldiering	Importance: Overall Performance
65. Analyze intelligence data -- determine importance and reliability of information; use information to determine identity, capabilities, disposition, and movement of enemy forces.	___	___	___	___
K. Applied Math and Data Processing				
66. Control money -- keep accounting records; disperse and collect money and money orders.	___	___	___	___
67. Determine firing data for indirect fire weapons -- use maps, firing charts, and targeting and ballistics information to determine elevation and azimuth needed for engaging targets.	___	___	___	___
68. Compute statistics or other mathematical calculations -- select formulas and make mathematical calculations, with or without using calculators or computers; report results.	___	___	___	___
69. Provide programming and data processing support for computer operations -- analyze data processing needs; select or prepare, edit, test, and run computer programs; document process and results.	___	___	___	___
L. Control Air Traffic				
70. Control air traffic -- coordinate departing, en route, arriving, and holding aircraft by monitoring radar equipment, communicating with aircraft and other air traffic control units.	___	___	___	___

IV. COMBAT

Task	Frequency	Importance: Core Technical	Importance: General Soldiering	Importance: Overall Performance
M. Individual Combat				
71. Use hand grenades -- identify, inspect, arm, throw, and secure hand grenades.	___	___	___	___
72. Protect against NBC hazards -- use protective clothing, masks, and decontamination equipment to protect self, others, equipment, and supplies from nuclear, biological, and chemical hazards.	___	___	___	___

FREQUENCY	IMPORTANCE
0 = Never	0 = No Importance
1 = Least Often	1 = Extremely Low Importance
2 = Not Very Often	2 = Low Importance
3 = Often	3 = Moderate Importance
4 = Very Often	4 = High Importance
5 = Most Often	5 = Extremely High Importance

Item	Frequency	Importance: Core Technical	Importance: General Soldiering	Importance: Overall Performance
73. Handle demolitions or mines -- store, place, charge, discharge, and disarm explosives, demolition devices, or mines.	___	___	___	___
74. Engage in hand-to-hand combat -- use offensive and defensive maneuvers to overcome hostile individuals.	___	___	___	___
75. Fire individual weapons -- aim, track and fire individual weapons, such as rifles, pistols, machineguns, and LAW, at designated targets; load, reduce a stoppage, and clear weapons.	___	___	___	___
76. Control individuals and crowds -- perform guard duty, including challenge and password; apprehend and search suspected criminals or enemy soldiers; guard prisoners; participate in riot control.	___	___	___	___
77. Customs and laws of war -- use knowledge of Geneva convention and military SOP concerning treatment of enemy personnel, engagement of the enemy, conduct of military protocol and ceremony, guard duty, and physical readiness.	___	___	___	___
78. Navigate -- during the day or night, with or without a map, locate positions and move from point to point in response to terrain features (for example, for cover or concealment), battle conditions, and mission.	___	___	___	___
79. Survive in the field -- select, prepare and occupy individual tactical positions (for example, battle positions, overwatch positions, observation posts), camouflage self and equipment, observe security procedures.	___	___	___	___
80. Move and react in the field -- move on foot in the battlefield as a member of a tactical operation; react to threats, including direct and indirect fire.	___	___	___	___
N. Crew-served Weapons				
81. Load and unload field artillery or tank guns -- operate breech controls and handle ammunition (stow and load) to prepare guns for firing; unload or extract unused rounds or misfires.	___	___	___	___

FREQUENCY	IMPORTANCE
0 = Never	0 = No Importance
1 = Least Often	1 = Extremely Low Importance
2 = Not Very Often	2 = Low Importance
3 = Often	3 = Moderate Importance
4 = Very Often	4 = High Importance
5 = Most Often	5 = Extremely High Importance

	Frequency	Importance: Core Technical	Importance: General Soldiering	Importance: Overall Performance
82. <u>Fire heavy direct fire weapons</u> **(for example, tank main guns, TOW missile, IFV cannon, etc.)** -- using weapon sights, manipulate weapon controls to aim, track, and fire on targets.	___	___	___	___
83. <u>Prepare heavy weapons for tactical use</u> -- position and prepare for firing heavy tactical weapons, such as missiles, field artillery, and anti-aircraft systems.	___	___	___	___
84. <u>Place and camouflage tactical equipment and materials in the field</u> -- place mines, detectors, chemicals, and camouflage materials into position in the battlefield.	___	___	___	___
85. <u>Fire indirect fire weapons</u> **(for example, field artillery and heavy mortars)** -- lay weapon by adjusting azimuth and elevation controls in response to fire commands.	___	___	___	___

O. Give First Aid

86. <u>Give first aid</u> -- carry out first aid procedures (for example, CPR, put on field dressing, prevent shock, etc.).	___	___	___	___

P. Identify Targets

87. <u>Detect and identify targets</u> -- with or without optical devices (for example, night sights, weapon sights, binoculars, etc.), locate possible targets, and identify type (for example, troops, tanks, aircraft, etc.) and nomenclature.	___	___	___	___

Q. Supervision

88. <u>Plan operations</u> -- plan, prepare, and develop orders for team operations, including combat, support, and technical operations.	___	___	___	___
89. <u>Direct/lead teams</u> -- direct combat and security team activities in the field (for example, lead reconnaissance teams, set up offensive and defensive positions, carry out a fire mission, etc.).	___	___	___	___

FREQUENCY	IMPORTANCE
0 = Never	0 = No Importance
1 = Least Often	1 = Extremely Low Importance
2 = Not Very Often	2 = Low Importance
3 = Often	3 = Moderate Importance
4 = Very Often	4 = High Importance
5 = Most Often	5 = Extremely High Importance

	Frequency	Importance: Core Technical	Importance: General Soldiering	Importance: Overall Performance
90. Monitor/inspect -- monitor subordinates to ensure that they are carrying out their duties properly, that they have the correct equipment, that supply levels are adequate for the mission, and that records are complete, etc.).	___	___	___	___
91. Lead -- influence subordinates by setting goals, maintaining good lines of communication, sharing hardships, building trusts, etc.	___	___	___	___
92. Act as a model -- show subordinates correct way to perform technical tasks, maintain a positive attitude under adverse conditions, demonstrate proper military bearing, etc., on a day-to-day basis.	___	___	___	___
93. Counsel -- provide individual subordinates with support, assistance, and feedback on specific performance, personal, or disciplinary problems.	___	___	___	___
94. Communicate -- compose orders, brief subordinates on things that are happening in the unit; keep superiors and peers informed, etc.	___	___	___	___
95. Train -- schedule, plan, and conduct training for subordinates.	___	___	___	___
96. Personnel Administration -- prepare and conduct performance appraisals, recommend various personnel actions, keep and maintain personnel and administrative records, etc.	___	___	___	___

APPENDIX C

Initial Job Activity Taxonomy

A. Interpersonal Behaviors.

1. Participation in work teams.

    a. Behaviors facilitating group maintenance and morale (e.g., being humorous, showing support for other team members, offering encouragement, etc.).
    b. Behaviors facilitating accomplishment of group goals (e.g., keeping group on path toward goal, frequently restating goal, making substantive suggestions, etc.).

    c. Behaviors facilitating conflict resolution.

2. Peer leadership and support (one-on-one).

    a. Coaching peers.
    b. Giving direction/goal setting.
    c. Giving reinforcement, support, encouragement.

3. Leadership and supervision.

    a. Instructing/coaching. (one-on-one)
    b. Goal setting/planning. (one-on-one)
    c. Administering rewards/punishments. (one-on-one)
    d. Counseling on personal problems. (one-on-one)
    e. Leading/directing/managing the team.
    f. Resolving conflicts among subordinates.

B. Speaking behaviors.

1. Making oral reports.

    a. Informal/one-on-one.
    b. To groups.

2. Selling or persuading via oral communication.

    a. One-on-one.
    b. To groups.

3. Instructing via oral communication.

    a. One-on-one.
    b. To groups.

4. Spontaneous contribution to group discussions/problem solving.

C. Writing.

1. Writing reports, memos, etc.

    a. Short messages - frequently.

b. Longer formal reports - infrequently.

2. Writing persuasive/sales messages.

   a. On an informal daily basis.
   b. Formal documents for clients, vendors, other parts of the organization, etc.

3. Creating journalistic or literary written products (e.g., Army Times).

D. Information Processing

1. Process verbal information.

   a. Monitor/recognize/identify verbal message.
      -single source
      -multiple source

   b. Edit, proof, check verbal message

   c. Recall verbal information

   d. Interpret/evaluate verbal information
      -single source
      -multiple source

2. Process numerical/quantitative information.

   a. Monitor/recognize/identify quantitative information.
      -single source
      -multiple source

   b. Edit, proof, check quantitative message.

   c. Recall quantitative information.

   d. Interpret/evaluate quantitative information
      -single source
      -multiple source

3. Processing figural information (Images, pictures, graphs, etc.)

   a. Monitor/recognize/identify figural information
      -single source
      -multiple source

   b. Edit, proof, check figural information

   c. Recall figural information

   d. Interpret/evaluate figural information

4. Processing static spatial relations (configural) information (the

parts are not moving - e.g., _If_ truck cab moves, where will trailer go?).

a. Monitor/recognize/identify spatial information

b. Recall spatial information

c. Interpret/evaluate

5. Processing dynamic spatial information (the parts are moving - e.g., two vehicles are converging).

   a. Monitor/recognize/identify dynamic spatial information.

   b. Recall dynamic spatial iní mation.

   c. Interpret/evaluate dynamic spatial information

E. Complex Problem Solving/Troubleshooting Behavior

1. Electrical equipment problems

   a. Identify problem
   b. Generate possible solutions
   c. Evaluate and choose solution

2. Mechanical equipment problems

   a. Identify problem
   b. Generate possible solutions
   c. Evaluate and choose solution

3. Tactical maneuver problems

   a. Identify problem
   b. Generate possible solutions
   c. Evaluate and choose solution

4. Logistical problems

   a. Identify problem
   b. Generate possible solutions
   c. Evaluate and choose solution

5. Administrative problems

   a. Identify problem
   b. Generate possible solutions
   c. Evaluate and choose solution

6. Leadership/supervision problems

   a. Identify problem
   b. Generate possible solutions

c. Evaluate and choose solution

7. Mental/physical health problems

   a. Identify problem
   b. Generate possible solutions
   c. Evaluate and choose solution

8. Communication problems

   a. Identify problem
   b. Generate possible solutions
   c. Evaluate and choose solution

F. Operating Equipment

1. Operating hand held equipment

   a. Precision tools/equipment/weapons
   b. Non-precision tools/equipment/weapons

2. Operating keyboard device

   a. Numeric keyboard
   b. Full typewriter or computer keyboard

3. Adjusting control devices

   a. Single limb
   b. Multiple limb

4. Operating large power assisted equipment
   a. Single limb
   b. Multiple limb

5. Driving heavy equipment

   a. Wheeled vehicles
   b. Tracked vehicles

6. Driving light vehicles (car, jeep, quarter ton).

   a. Frequently or over long distances
   b. Infrequently

7. Operating aircraft

   a. Helicopter
   b. Fixed wing

G. Physical Activities

1. Walking long distances

a. Carrying weight
b. Without weight

2. Running short to middle distances

3. Pushing, pulling, lifting heavy weights

4. Throwing hand held objects

5. Using hands to fold, sort, feed, etc.

6. Aiming at stationary objects

    a. Without electronic aids
    b. With electronic aids

7. Aiming at moving objects

    a. Without electronic aids
    b. With electronic aids

8. Working long hours without rest

9. Working under adverse or dangerous conditions.

APPENDIX D

Phase I Job Activity Taxonomy

Name: ______________________

MOS ACTIVITY QUESTIONNAIRE

There are 53 activities in this questionnaire. For each activity, we would like you to make four ratings. First, indicate how FREQUENTLY each activity is performed by soldiers in this MOS, using the following FREQUENCY rating scale:

0 = Never; this activity is not part of the job.

1 = Least Often; this activity is performed much less often than most other activities.

2 = Not Very Often; this activity is performed less often than most other activities.

3 = Often; this activity is performed about as often as other activities.

4 = Very Often; this activity is performed more often than most other activities.

5 = Most Often; this activity is performed much more often than most other activities.

> As you make your ratings, think about soldiers who have about 18 months of service in this MOS after Basic and AIT. Also keep in mind all that you know about the full range of duty assignments for this MOS.

After you have made FREQUENCY ratings for all 53 activities, go through the list again, this time rating the IMPORTANCE of each activity for successful performance in three different areas of the job: Core Technical Area, General Soldiering Area, and Overall Performance. The definitions of these performance areas are on a separate sheet, entitled PERFORMANCE AREA DEFINITIONS. Please read these definitions carefully before making your IMPORTANCE ratings.

You will make IMPORTANCE ratings using the following rating scale:

0 = No Importance

1 = Extremely Low Importance

2 = Low Importance

3 = Moderate Importance

4 = High Importance

5 = Extremely High Importance

NOTE: If you decided that a particular activity is not part of this MOS (so you gave it a FREQUENCY rating of 0), you should leave all three IMPORTANCE ratings blank.

Please look at the EXAMPLES below and read through their explanations before starting to make your ratings.

EXAMPLES:

FREQUENCY	IMPORTANCE
0 = Never	0 = No Importance
1 = Least Often	1 = Extremely Low Importance
2 = Not Very Often	2 = Low Importance
3 = Often	3 = Moderate Importance
4 = Very Often	4 = High Importance
5 = Most Often	5 = Extremely High Importance

		Importance		
	Frequency	Core Technical	General Soldiering	Overall Performance
a. Interview – ask frequent questions, as in interviewing and investigating.	0	___	___	___
b. Record information – record information using paper and pencil or keyboard.	1	2	4	2

Joe supervises 94B. He went through the list of activities and made FREQUENCY ratings of each one, then returned to the beginning of the list and, after carefully reading the PERFORMANCE DEFINITIONS, has started making his ratings of how IMPORTANT each activity is for successful performance in three different areas of the job.

1. Since he felt that Activity a., "Interview," was not part of the job for 94B, he gave this activity a FREQUENCY rating of 0, and left all three IMPORTANCE ratings blank.

2. Joe felt that Activity b., "Record Information" was performed much less often than most activities, so he gave it a FREQUENCY rating of 1, for Least Often.

Joe decided that this activity was of Low Importance for Core Technical Area, so he gave it an IMPORTANCE rating of 2.

For General Soldiering, Joe felt that this activity was of High Importance, so he gave it an IMPORTANCE rating of 4 for this performance area.

For overall performance, Joe gave this activity a rating of 2 indicating the activity was of Low Importance for overall job performance.

Keep the PERFORMANCE DEFINITIONS handy and refer to them as often as necessary while making your IMPORTANCE ratings.

NOTE: Many of the activity definitions in this questionnaire contain specific examples to help explain and clarify the activity. Please keep in mind that these are just some of the possible examples; it was not practical

JOB ACTIVITY QUESTIONNAIRE

FREQUENCY	IMPORTANCE
0 = Never	0 = No Importance
1 = Least Often	1 = Extremely Low Importance
2 = Not Very Often	2 = Low Importance
3 = Often	3 = Moderate Importance
4 = Very Often	4 = High Importance
5 = Most Often	5 = Extremely High Importance

		Importance		
	Frequency	Core Technical	General Soldiering	Overall Performance
A. Leadership/Teamwork				
1. Work in a team -- participate in work or combat teams by helping resolve conflicts, keeping the team moving toward its goals, and maintaining morale of other group members.	___	___	___	___
2. Lead a team -- lead or direct a team or unit as it tries to accomplish a prescribed mission or goal.	___	___	___	___
3. Support/advise peers -- support and/or advise peers when they have difficulty.	___	___	___	___
4. Support/advise subordinates -- support and/or advise subordinates when they have difficulty.	___	___	___	___
5. Coach peers -- instruct/train peers on specific job tasks.	___	___	___	___
6. Coach subordinates -- instruct/train subordinates on specific job tasks.	___	___	___	___
B. Communication				
7. Make oral reports (to individuals) -- make oral reports to other individuals.	___	___	___	___
8. Make oral reports (to groups) -- give oral briefings to a group.	___	___	___	___
9. Relay oral instructions -- relay oral instructions on job tasks or job procedures to other individuals or to groups.	___	___	___	___
10 Interview -- ask frequent questions, as in interviewing and investigating.	___	___	___	___
11. Record information -- record information using paper and pencil or keyboard.	___	___	___	___
12. Write brief messages -- write brief messages (for example, memos, day-to-day instructions, business letters, etc.).	___	___	___	___
13. Write longer reports -- compose and write longer formal reports or articles (that is, longer than one or two pages).	___	___	___	___

FREQUENCY	IMPORTANCE
0 = Never	0 = No Importance
1 = Least Often	1 = Extremely Low Importance
2 = Not Very Often	2 = Low Importance
3 = Often	3 = Moderate Importance
4 = Very Often	4 = High Importance
5 = Most Often	5 = Extremely High Importance

	Frequency	Importance: Core Technical	Importance: General Soldiering	Importance: Overall Performance

C. Use Information

14. Monitor/interpret verbal messages -- monitor, identify, and/or interpret verbal messages (oral or written, obtained from radio, teletype, computer terminal, correspondences, etc.) ___ ___ ___ ___

15. Recall verbal information -- recall verbal information. (That is, to perform the required job tasks, the individual must rely on memory for necessary verbal information that was communicated more than a few hours ago. However, this item does not refer to information presented during formal training.) ___ ___ ___ ___

16. Monitor/interpret numerical information -- monitor, identify, and/or interpret numerical/quantitative information that is presented via written reports, radio, CRT, or other electronic equipment. ___ ___ ___ ___

17. Recall numerical information -- recall numerical/quantitative information. (Again, "recall" refers to the fact that the job requires the use of memory to have the necessary information to perform the job tasks. However, it is not memory for training content but memory for information acquired as part of the job.) ___ ___ ___ ___

18. Monitor/interpret figural information -- monitor, identify, and/or interpret figural information (for example, CRT images, pictures, graphs, schematics, sketches, terrain features, etc.). ___ ___ ___ ___

19. Recall figural information -- recall figural information (for example, CRT images, pictures, graphs, terrain features, etc.). ___ ___ ___ ___

20. Follow oral directions -- follow oral directions (for example, directions for how to complete documents, move from point A to point B, or schedule repairs on a variety of equipment, etc.). ___ ___ ___ ___

21. Follow written directions -- follow written directions/instructions as part of normal job duties (for example, follow written orders, SOP protocols, technical manuals, etc.). ___ ___ ___ ___

FREQUENCY	IMPORTANCE
0 = Never	0 = No Importance
1 = Least Often	1 = Extremely Low Importance
2 = Not Very Often	2 = Low Importance
3 = Often	3 = Moderate Importance
4 = Very Often	4 = high Importance
5 = Most Often	5 = Extremely High Importance

	Frequency	Importance: Core Technical	Importance: General Soldiering	Importance: Overall Performance
D. Perceptual Judgements				
22. Judge size and distance -- for example, make judgments of relative size and distance, which of two objects is closer/larger, the distance to a target, etc.	___	___	___	___
23. Judge location -- orient oneself relative to location and direction from physical objects or terrain features and maintain the proper orientation while moving from point to point.	___	___	___	___
24. Judge paths of moving objects -- make judgments about the relative position of moving objects (for example, Where will two vehicles converge? As the truck cab moves, where will the trailer go?).	___	___	___	___
E. Problem Solving/Troubleshooting				
25. Solve electrical system problems -- troubleshoot electrical equipment problems (that is, identify the problem and suggest solution).	___	___	___	___
26. Solve mechanical system problems -- troubleshoot mechanical equipment problems (that is, identify the problem and suggest solution).	___	___	___	___
27. Solve logistical problems -- identify and solve logistical problems.	___	___	___	___
28. Solve tactical maneuver problems -- identify and solve tactical maneuver problems (for example, positioning of teams in the field, countering moves of the enemy, etc.).	___	___	___	___
29. Solve administrative problems -- identify and solve administrative problems (for example, correct record keeping errors, personnel scheduling, etc.).	___	___	___	___
30. Solve leadership problems -- identify and solve leadership/supervision problems (for example, involving discipline, training needs, conflicts between people, motivation of team members, etc.).	___	___	___	___
31. Solve medical problems -- identify and solve physical health problems (that is, problems that require special training beyond basic first aid).	___	___	___	___

FREQUENCY	IMPORTANCE
0 = Never	0 = No Importance
1 = Least Often	1 = Extremely Low Importance
2 = Not Very Often	2 = Low Importance
3 = Often	3 = Moderate Importance
4 = Very Often	4 = High Importance
5 = Most Often	5 = Extremely High Importance

	Frequency	Importance: Core Technical	Importance: General Soldiering	Importance: Overall Performance
32. Solve communication problems -- identify and solve communication problems (that is, not technical/equipment problems, but problems resulting from inaccurate or non-existent communication).	___	___	___	___
F. Operate Equipment				
33. Operate precision hand-held equipment -- operate hand-held equipment requiring great precision (for example, syringe, calipers, soldering or welding equipment, etc.).	___	___	___	___
34. Operate hand-held tools -- operate hand-held equipment that does not require great precision (for example, hammer, wrench, etc.).	___	___	___	___
35. Operate hand-held power equipment -- operate hand-held power assisted equipment (for example, electric saw, electric wrench, etc.).	___	___	___	___
36. Operate large power equipment -- operate large power assisted equipment (for example, forklift, bulldozer, backhoe, etc.).	___	___	___	___
37. Operate full keyboard -- operate full typewriter or computer keyboard.	___	___	___	___
38. Operate numeric keyboard -- operate a numeric keyboard only (that is, just 10 basic keys, 0-9).	___	___	___	___
G. Adjust and Control				
39. Adjust device using one limb -- make adjustments in control devices by using just one hand or one foot (for example, a dial, a lever, a foot pedal, etc.).	___	___	___	___
40. Adjust control device using multiple limbs -- make adjustments in control devices by using more than one limb (for example, twist a cylinder with one hand while setting a dial with the other, depress a footpedal while moving equipment into proper alignment with hands, etc.).	___	___	___	___

FREQUENCY	IMPORTANCE
0 = Never	0 = No Importance
1 = Least Often	1 = Extremely Low Importance
2 = Not Very Often	2 = Low Importance
3 = Often	3 = Moderate Importance
4 = Very Often	4 = High Importance
5 = Most Often	5 = Extremely High Importance

Item	Frequency	Importance: Core Technical	Importance: General Soldiering	Importance: Overall Performance
H. Drive				
41. Drive tracked vehicle -- drive heavy vehicles (tracked).	___	___	___	___
42. Drive heavy wheeled vehicle -- drive heavy vehicles (wheeled).	___	___	___	___
43. Drive light wheeled vehicle -- drive light wheeled vehicles.	___	___	___	___
I. Aiming				
44. Aim: stationary target -- aim at a stationary object.	___	___	___	___
45. Aim: moving target -- manually track a moving target.	___	___	___	___
J. Physical Actions				
46. Walk long distances -- walk long distances carrying significant weight.	___	___	___	___
47. Run short distances -- run short to middle distances.	___	___	___	___
48. Push, pull, lift heavy weights -- push, pull, or lift heavy weights.	___	___	___	___
49. Throw objects -- throw hand-held objects.	___	___	___	___
50. Sort, fold, feed by hand -- use hands to fold objects, sort objects, or feed objects into a machine.	___	___	___	___
51. Make coordinated movements -- use well coordinated hand, arm, and upper body movements (for example, as in setting up equipment, moving hazardous material quickly, etc.).	___	___	___	___
52. Work long hours -- work long hours without rest.	___	___	___	___
53. Work under adverse conditions -- work under adverse or dangerous conditions.	___	___	___	___

APPENDIX E

Detailed Results for Task Category and Job Activity Analyses

Phase I Field Test
Summary of Single-rater Reliability Estimates
for Task Category and Job Activity Relevance Ratings
Across 3 MOS

	Task Category				Job Activity			
	CTP	GSP	OJP	Pilot	CTP	GSP	OJP	Pilot
All Ratings								
Overall	0.55	0.46	0.52	0.58	0.43	0.30	0.37	0.45
Within Rank	0.60	0.48	0.54	0.62	0.51	0.32	0.41	0.48
Within Command	0.72	0.52	0.59	0.63	0.50	0.32	0.41	0.47
Within Rank & Command	0.74	0.53	0.60	0.65	0.54	0.32	0.43	0.50
NCO Ratings								
Overall	0.58	0.50	0.53	0.61	0.37	0.30	0.35	0.49
Within Command	0.59	0.52	0.54	0.63	0.37	0.30	0.35	0.49
Officer Ratings								
Overall	0.72	0.50	0.59	0.63	0.62	0.33	0.47	0.58
Within Command	0.85	0.52	0.61	0.64	0.63	0.33	0.48	0.59
FORSCOM Ratings								
Overall	0.72	0.55	0.60	0.65	0.39	0.31	0.37	0.52
Within Rank	0.75	0.55	0.61	0.66	0.43	0.32	0.39	0.53
DOTD Ratings								
Overall	0.51	0.47	0.51	0.63	0.46	0.29	0.38	0.47
Within Rank	0.54	0.48	0.53	0.64	0.50	0.29	0.39	0.48

Note CTP - Core Technical Proficiency
GSP - General Soldiering Proficiency
OJP - Overall Job Proficiency

Variance Components Tables Combining all 3 MOS

Task and Activity Ratings for:

Core Technical Proficiency (CTP)
General Soldiering Proficiency (GSP)
Overall Job Performance (OJP)

CTP for NCOs
CTP for Officers
CTP for FORSCOM
CTP for DOTD

GSP for NCOs
GSP for Officers
GSP for FORSCOM
GSP for DOTD

OJP for NCOs
OJP for Officers
OJP for FORSCOM
OJP for DOTD

Phase I Test
Variance Components for Importance Ratings
for Core Technical Proficiency
(All 3 MOS)

Components	Task Variance	Task Percent	Activity Variance	Activity Percent
Component	0.562	18.40%	0.113	3.50%
MOS	0.230	7.53%	0.238	7.38%
Component x MOS	0.897	29.36%	1.040	32.24%
Rank	0.029	0.95%	0.082	2.54%
Command	0.018	0.59%	0.076	2.36%
Rank x Command	0.000	0.00%	0.000	0.00%
Rank x MOS	0.000	0.00%	0.000	0.00%
Command x MOS	0.045	1.47%	0.032	1.00%
Rank x Command x MOS	0.155	5.07%	0.328	10.17%
Component x Rank	0.047	1.54%	0.096	2.98%
Component x Command	0.005	0.16%	0.000	0.00%
Comp x Rank x Command	0.000	0.00%	0.000	0.00%
Comp x Rank x MOS	0.000	0.00%	0.011	0.34%
Comp x Command x MOS	0.474	15.52%	0.032	0.99%
Cp x Rk x Cd x M	0.000	0.00%	0.000	0.00%
Rater(Rk Cd M)	0.030	0.98%	0.000	0.00%
Component x Rater	0.563	18.43%	1.178	36.51%
Total	3.055	100.00%	3.226	100.00%

RELIABILITY

	Task	Activity
Overall	0.55	0.43
Within Rank	0.60	0.51
Within Command	0.72	0.50
Within Rank & Command	0.74	0.54

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Phase I Test
Variance Components for Importance Ratings
for General Soldiering Proficiency
(All 3 MOS)

	Task		Activity	
Components	Variance	Percent	Variance	Percent
Component	1.380	41.21%	0.700	22.75%
MOS	0.048	1.43%	0.046	1.49%
Component x MOS	0.115	3.43%	0.163	5.30%
Rank	0.014	0.42%	0.015	0.49%
Command	0.013	0.39%	0.000	0.00%
Rank x Command	0.000	0.00%	0.037	1.20%
Rank x MOS	0.000	0.00%	0.000	0.00%
Command x MOS	0.000	0.00%	0.000	0.00%
Rank x Command x MOS	0.044	1.31%	0.086	2.79%
Component x Rank	0.000	0.00%	0.037	1.20%
Component x Command	0.062	1.85%	0.000	0.00%
Comp x Rank x Command	0.000	0.00%	0.000	0.00%
Comp x Rank x MOS	0.064	1.91%	0.008	0.26%
Comp x Command x MOS	0.236	7.05%	0.079	2.57%
Cp x Rk x Cd x M	0.000	0.00%	0.018	0.58%
Rater(Rk Cd M)	0.267	7.97%	0.346	11.24%
Component x Rater	1.106	33.02%	1.542	50.11%
Total	3.349	100.00%	3.077	100.00%

RELIABILITY

Overall	0.46	0.30
Within Rank	0.48	0.32
Within Command	0.52	0.32
Within Rank & Command	0.53	0.32

Phase I Test
Variance Components for Importance Ratings
for Overall Job Performance
(All 3 MOS)

Components	Task Variance	Task Percent	Activity Variance	Activity Percent
Component	1.190	35.63%	0.430	14.48%
MOS	0.080	2.41%	0.087	2.93%
Component x MOS	0.468	14.00%	0.579	19.51%
Rank	0.021	0.63%	0.046	1.56%
Command	0.019	0.57%	0.022	0.75%
Rank x Command	0.000	0.00%	0.000	0.00%
Rank x MOS	0.000	0.00%	0.000	0.00%
Command x MOS	0.000	0.00%	0.000	0.00%
Rank x Command x MOS	0.091	2.73%	0.173	5.82%
Component x Rank	0.010	0.29%	0.067	2.25%
Component x Command	0.000	0.00%	0.022	0.74%
Comp x Rank x Command	0.000	0.00%	0.000	0.00%
Comp x Rank x MOS	0.019	0.57%	0.000	0.00%
Comp x Command x MOS	0.292	8.75%	0.075	2.53%
Cp x Rk x Cd x M	0.000	0.00%	0.004	0.13%
Rater(Rk Cd M)	0.151	4.52%	0.137	4.62%
Component x Rater	0.999	29.92%	1.327	44.67%
Total	3.341	100.00%	2.970	100.00%

RELIABILITY

	Task	Activity
Overall	0.52	0.37
Within Rank	0.54	0.41
Within Command	0.59	0.41
Within Rank & Command	0.60	0.43

Phase I Test
Variance Components for Importance Ratings for Core Technical Proficiency
(NCO ratings for all 3 MOS)

	Task Category		Job Activity	
	Variance	Percent	Variance	Percent
Component	0.71	24.97%	0.29	9.29%
MOS	0.16	5.47%	0.06	1.94%
Component*MOS	0.79	27.47%	0.81	25.83%
Command	0.05	1.82%	0.00	0.00%
Component*Command	0.02	0.53%	0.00	0.00%
MOS*Command	0.00	0.00%	0.01	0.37%
Rater(Cmd MOS)	0.31	10.86%	0.55	17.51%
Component*Rater(Cmd MOS)	0.82	28.86%	1.42	45.06%
	2.86	100.00%	3.15	100.00%

	Reliability	Reliability
Overall	0.58	0.37
Within Command	0.59	0.37

Phase I Test
Variance Components for Importance Ratings for Core Technical Proficiency
(Officer ratings for all 3 MOS)

	Task Category		Job Activity	
	Variance	Percent	Variance	Percent
Component	0.45	19.85%	0.08	2.84%
MOS	0.16	7.10%	0.29	9.92%
Component*MOS	1.03	45.02%	1.44	49.18%
Command	0.00	0.00%	0.01	0.28%
Component*Command	0.00	0.00%	0.00	0.00%
MOS*Command	0.35	15.15%	0.05	1.63%
Rater(Cd M)	0.00	0.00%	0.07	2.55%
Component*Rater(Cd M)	0.29	12.87%	0.98	33.60%
	2.29	100.00%	2.93	100.00%

	Reliability	Reliability
Overall	0.72	0.62
Within Command	0.85	0.63

Phase I Test
Variance Components for Importance Ratings for Core Technical Proficiency
(FORSCOM ratings for all 3 MOS)

	Task Category		Job Activity	
	Variance	Percent	Variance	Percent
Component	0.58	18.49%	0.12	3.98%
MOS	0.23	7.36%	0.00	0.00%
Component*MOS	1.45	46.27%	1.08	35.29%
Rank	0.00	0.00%	0.00	0.00%
Component*Rank	0.02	0.59%	0.06	1.88%
MOS*Rank	0.08	2.69%	0.22	7.23%
Rater(Rk M)	0.23	7.49%	0.38	12.50%
Component*Rater(Rk M)	0.53	17.09%	1.19	39.13%
	3.13	100.00%	3.05	100.00%

	Reliability	Reliability
Overall	0.72	0.39
Within Rank	0.75	0.43

Phase I Test
Variance Components for Importance Ratings for Core Technical Proficiency
(DOTD ratings for all 3 MOS)

	Task Category		Job Activity	
	Variance	Percent	Variance	Percent
Component	0.48	19.14%	0.04	1.62%
MOS	0.09	3.57%	0.18	6.46%
Component*MOS	0.72	28.61%	1.03	37.85%
Rank	0.01	0.20%	0.00	0.00%
Component*Rank	0.10	3.94%	0.16	5.76%
MOS*Rank	0.04	1.64%	0.06	2.10%
Rater(Rk M)	0.19	7.75%	0.17	6.10%
Component*Rater(Rk M)	0.88	35.15%	1.09	40.11%
	2.51	100.00%	2.73	100.00%

	Reliability	Reliability
Overall	0.51	0.46
Within Rank	0.54	0.50

Phase I Test
Variance Components for Importance Ratings for General Soldiering
(NCO ratings only for all 3 MOS)

	Task Category		Job Activity	
	Variance	Percent	Variance	Percent
Component	1.29	41.01%	0.69	22.07%
MOS	0.04	1.25%	0.00	0.00%
Component*MOS	0.26	8.19%	0.25	7.96%
Command	0.05	1.54%	0.00	0.00%
Component*Command	0.04	1.32%	0.00	0.00%
MOS*Command	0.00	0.00%	0.02	0.59%
Rater(Cmd MOS)	0.32	10.22%	0.58	18.79%
Component*Rater(Cmd MOS)	1.14	36.46%	1.57	50.59%
	3.13	100.00%	3.11	100.00%

	Reliability	Reliability
Overall	0.50	0.30
Within Command	0.52	0.30

Phase I Test
Variance Components for Importance Ratings for General Soldiering
(Officer ratings for all 3 MOS)

	Task Category		Job Activity	
	Variance	Percent	Variance	Percent
Component	1.49	47.47%	0.81	28.85%
MOS	0.00	0.00%	0.06	2.06%
Component*MOS	0.07	2.09%	0.05	1.88%
Command	0.00	0.00%	0.06	1.98%
Component*Command	0.08	2.41%	0.00	0.00%
MOS*Command	0.09	2.74%	0.00	0.00%
Rater(Cmd MOS)	0.27	8.65%	0.29	10.37%
Component*Rater(Cmd MOS)	1.15	36.64%	1.55	54.86%
	3.14	100.00%	2.82	100.00%

	Reliability	Reliability
Overall	0.50	0.33
Within Command	0.52	0.33

Phase I Test
Variance Components for Importance Ratings for General Soldiering
(FORSCOM ratings for all 3 MOS)

	Task Category		Job Activity	
	Variance	Percent	Variance	Percent
Component	1.45	42.34%	0.69	22.17%
MOS	0.04	1.22%	0.00	0.00%
Component*MOS	0.38	11.18%	0.27	8.81%
Rank	0.00	0.00%	0.06	1.99%
Component*Rank	0.00	0.00%	0.02	0.67%
MOS*Rank	0.01	0.32%	0.05	1.56%
Rater(Rnk MOS)	0.36	10.42%	0.48	15.51%
Component*Rater(Rnk MOS)	1.19	34.53%	1.53	49.28%
	3.44	100.00%	3.10	100.00%

	Reliability	Reliability
Overall	0.55	0.31
Within Rank	0.55	0.32

Phase I Test
Variance Components for Importance Ratings for General Soldiering
(DOTD ratings for all 3 MOS)

	Task Category		Job Activity	
	Variance	Percent	Variance	Percent
Component	1.34	44.85%	0.78	28.15%
MOS	0.00	0.00%	0.02	0.66%
Component*MOS	0.06	2.10%	0.00	0.12%
Rank	0.04	1.17%	0.00	0.00%
Component*Rank	0.00	0.00%	0.00	0.00%
MOS*Rank	0.05	1.52%	0.02	0.78%
Rater(Rnk MOS)	0.22	7.20%	0.32	11.72%
Component*Rater(Rnk MOS)	1.29	43.15%	1.62	58.58%
	2.99	100.00%	2.77	100.00%

	Reliability	Reliability
Overall	0.47	0.29
Within Rank	0.48	0.29

Phase I Test
Variance Components for Importance Ratings for Overall Job Performance
(NCO ratings for all 3 MOS)

	Task Category		Job Activity	
	Variance	Percent	Variance	Percent
Component	1.19	36.35%	0.53	17.14%
MOS	0.04	1.15%	0.00	0.00%
Component*MOS	0.52	15.82%	0.54	17.55%
Command	0.05	1.49%	0.00	0.00%
Component*Command	0.00	0.00%	0.00	0.00%
MOS*Command	0.00	0.00%	0.02	0.63%
Rater(Cd M)	0.30	9.23%	0.45	14.50%
Component*Rater(Cd	1.17	35.97%	1.55	50.18%
	3.26	100.00%	3.09	100.00%

	Reliability	Reliability
Overall	0.53	0.35
Within Command	0.54	0.35

Phase I Test
Variance Components for Importance Ratings for Overall Job Performance
(Officer ratings for all 3 MOS)

	Task Category		Job Activity	
	Variance	Percent	Variance	Percent
Component	1.22	42.79%	0.45	17.99%
MOS	0.02	0.82%	0.14	5.71%
Component*MOS	0.44	15.41%	0.59	23.47%
Command	0.00	0.00%	0.02	0.78%
Component*Command	0.00	0.00%	0.04	1.51%
MOS*Command	0.11	3.98%	0.00	0.00%
Rater(Cd M)	0.19	6.76%	0.06	2.38%
Component*Rater(Cd	0.86	30.23%	1.20	48.15%
	2.85	100.00%	2.49	100.00%

	Reliability	Reliability
Overall	0.59	0.47
Within Command	0.61	0.48

Phase I Test
Variance Components for Importance Ratings for Overall Job Performance
(FORSCOM ratings for all 3 MOS)

	Task Category		Job Activity	
	Variance	Percent	Variance	Percent
Component	1.18	35.00%	0.46	14.95%
MOS	0.03	1.03%	0.00	0.00%
Component*MOS	0.81	24.02%	0.67	21.80%
Rank	0.00	0.00%	0.03	0.98%
Component*Rank	0.01	0.21%	0.04	1.16%
MOS*Rank	0.04	1.11%	0.13	4.11%
Rater(Rk M)	0.31	9.27%	0.43	14.12%
Component*Rater(Rk	0.99	29.35%	1.32	42.88%
	3.36	100.00%	3.07	100.00%

	Reliability	Reliability
Overall	0.60	0.37
Within Command	0.61	0.39

Phase I Test
Variance Components for Importance Ratings for Overall Job Performance
(DOTD ratings for all 3 MOS)

	Task Category		Job Activity	
	Variance	Percent	Variance	Percent
Component	1.19	38.61%	0.40	14.89%
MOS	0.02	0.50%	0.08	3.01%
Component*MOS	0.36	11.77%	0.53	19.81%
Rank	0.04	1.41%	0.00	0.00%
Component*Rank	0.02	0.62%	0.08	2.87%
MOS*Rank	0.05	1.56%	0.02	0.82%
Rater(Rk M)	0.18	5.94%	0.15	5.52%
Component*Rater(Rk	1.22	39.59%	1.42	53.08%
	3.08	100.00%	2.68	100.00%

	Reliability	Reliability
Overall	0.51	0.38
Within Command	0.53	0.39

Phase I Field Test
Summary of Single-rater Reliability Estimates By MOS
for Task Category and Job Activity Importance Ratings
for Core Technical Proficiency

	Task Category			Job Activity		
	11B	63B	71L	11B	63B	71L
All Ratings						
Overall	0.52	0.36	0.40	0.36	0.23	0.43
Within Rank	0.52	0.37	0.41	0.36	0.24	0.44
Within Command	0.52	0.37	0.41	0.36	0.23	0.46
Within Rank & Command	0.54	0.41	0.42	0.40	0.25	0.47
Pilot Overall	0.51	0.59	0.51	0.40	0.36	0.43
NCO Ratings						
Overall	0.50	0.35	0.47	0.34	0.24	0.39
Within Command	0.50	0.37	0.48	0.35	0.25	0.40
Pilot Overall	0.49	0.57	0.47	0.38	0.39	0.39
Officer Ratings						
Overall	0.54	0.34	0.51	0.40	0.48	0.54
Within Command	0.55	0.36	0.51	0.41	0.48	0.55
Pilot Overall	0.57	0.63	0.56	0.49	0.41	0.46
FORSCOM Ratings						
Overall	0.52	0.34	0.49	0.33	0.25	0.44
Within Rank	0.53	0.36	0.49	0.36	0.27	0.44
Pilot Overall	0.51	0.56	0.56	0.40	0.35	0.44
DOTD Ratings						
Overall	0.59	0.41	0.48	0.45	0.32	0.46
Within Rank	0.59	0.43	0.48	0.45	0.35	0.47
Pilot Overall	0.55	0.64	0.48	0.42	0.45	0.41

Phase I Field Test
Summary of Single-rater Reliability Estimates
for Task Category and Job Activity Importance Ratings
for Overall Job Performance by MOS

	Task Category			Job Activity		
	11B	63B	71L	11B	63B	71L
All Ratings						
Overall	0.52	0.43	0.44	0.36	0.25	0.34
Within Rank	0.52	0.44	0.45	0.36	0.26	0.34
Within Command	0.52	0.44	0.46	0.36	0.25	0.36
Within Rank & Command	0.52	0.46	0.48	0.39	0.27	0.36
Pilot Overall	0.51	0.59	0.51	0.40	0.36	0.43
NCO Ratings						
Overall	0.49	0.40	0.49	0.33	0.27	0.33
Within Command	0.49	0.41	0.52	0.34	0.28	0.34
Pilot Overall	0.49	0.57	0.47	0.38	0.39	0.39
Officer Ratings						
Overall	0.55	0.52	0.48	0.39	0.30	0.38
Within Command	0.55	0.52	0.48	0.39	0.30	0.40
Pilot Overall	0.57	0.63	0.56	0.49	0.41	0.46
FORSCOM Ratings						
Overall	0.52	0.44	0.49	0.33	0.24	0.35
Within Rank	0.52	0.44	0.49	0.35	0.25	0.35
Pilot Overall	0.51	0.56	0.56	0.40	0.35	0.44
DOTD Ratings						
Overall	0.55	0.44	0.51	0.40	0.27	0.39
Within Rank	0.55	0.46	0.53	0.40	0.30	0.41
Pilot Overall	0.55	0.64	0.48	0.42	0.45	0.41

Variance Components Tables By Each MOS

Task Ratings for:
- Core Technical Proficiency (CTP)
- Overall Job Performance (OJP)

Activity Ratings for:
- CTP
- OJP

Task Ratings for:
- CTP for NCOs
- CTP for Officers
- CTP for FORSCOM
- CTP FOR DOTD

Activity Ratings for:
- CTP for NCOs
- CTP for Officers
- CTP for FORSCOM
- CTP FOR DOTD

Task Ratings for:
- OJP for NCOs
- OJP for Officers
- OJP for FORSCOM
- OJP FOR DOTD

Activity Ratings for:
- OJP for NCOs
- OJP for Officers
- OJP for FORSCOM
- OJP FOR DOTD

Phase I Test
Task Category Questionnaire
Variance Components for Importance Ratings for Core Technical Proficiency
(By MOS)

	11B		63B		71L	
Components	Variance	Percent	Variance	Percent	Variance	Percent
Task	2.35	51.77%	1.09	35.95%	1.02	39.89%
Rank	0.04	0.89%	0.00	0.00%	0.00	0.14%
Command	0.01	0.19%	0.00	0.01%	0.00	0.00%
Rank x Command	0.03	0.70%	0.23	7.67%	0.00	0.00%
Rater	0.33	7.30%	0.26	8.70%	0.14	5.57%
Task x Rater	1.67	36.79%	1.31	43.27%	1.25	48.82%
Task x Rank	0.00	0.00%	0.09	2.89%	0.07	2.68%
Task x Command	0.00	0.00%	0.05	1.51%	0.07	2.90%
Task x Rank x Command	0.11	2.36%	0.00	0.00%	0.00	0.00%
Total	4.55	100.00%	3.02	100.00%	2.56	100.00%

RELIABILITY

	11B	63B	71L
Overall	0.52	0.36	0.40
Within Rank	0.52	0.37	0.41
Within Command	0.52	0.37	0.41
Within Rank & Command	0.54	0.41	0.42

Phase I Test
Task Category Questionnaire
Variance Components for Importance Ratings for Overall Job Performance
(By MOS)

Components	11B Variance	11B Percent	63B Variance	63B Percent	71L Variance	71L Percent
Task	2.16	51.54%	1.49	43.44%	1.38	44.08%
Rank	0.01	0.26%	0.00	0.00%	0.00	0.00%
Command	0.00	0.00%	0.00	0.00%	0.00	0.00%
Rank x Command	0.02	0.43%	0.09	2.51%	0.08	2.43%
Rater	0.34	8.00%	0.35	10.14%	0.09	2.94%
Task x Rater	1.63	38.95%	1.42	41.57%	1.40	44.56%
Task x Rank	0.00	0.00%	0.01	0.32%	0.08	2.55%
Task x Command	0.00	0.00%	0.07	2.02%	0.11	3.45%
Task x Rank x Command	0.03	0.81%	0.00	0.00%	0.00	0.00%
Total	4.19	100.00%	3.42	100.00%	3.13	100.00%

RELIABILITY

	11B	63B	71L
Overall	0.52	0.43	0.44
Within Rank	0.52	0.44	0.45
Within Command	0.52	0.44	0.46
Within Rank & Command	0.52	0.46	0.48

Phase I Test
Job Activity Questionnaire
Variance Components for Importance Ratings for Core Technical Proficiency
(By MOS)

	11B		63B		71L	
Components	Variance	Percent	Variance	Percent	Variance	Percent
Activity	1.45	36.08%	0.77	22.90%	1.29	43.25%
Rank	0.00	0.00%	0.00	0.02%	0.00	0.14%
Command	0.01	0.13%	0.04	1.16%	0.01	0.50%
Rank x Command	0.36	9.00%	0.04	1.08%	0.00	0.01%
Rater	0.22	5.42%	0.32	9.37%	0.33	11.07%
Activity x Rater	1.98	49.16%	1.98	58.81%	1.10	36.97%
Activity x Rank	0.00	0.08%	0.22	6.47%	0.08	2.58%
Activity x Command	0.00	0.00%	0.01	0.18%	0.16	5.48%
Act. x Rank x Command	0.01	0.13%	0.00	0.00%	0.00	0.00%
Total	4.03	100.00%	3.37	100.00%	2.98	100.00%

RELIABILITY

	11B	63B	71L
Overall	0.36	0.23	0.43
Within Rank	0.36	0.24	0.44
Within Command	0.36	0.23	0.46
Within Rank & Command	0.40	0.25	0.47

Phase I Test
Job Activity Questionnaire
Variance Components for Importance Ratings for Overall Job Performance
(By MOS)

	11B		63B		71L	
Components	Variance	Percent	Variance	Percent	Variance	Percent
Activity	1.36	35.86%	0.66	24.69%	1.06	33.88%
Rank	0.00	0.00%	0.04	1.64%	0.00	0.03%
Command	0.00	0.00%	0.01	0.48%	0.01	0.42%
Rank x Command	0.25	6.62%	0.00	0.00%	0.00	0.00%
Rater	0.28	7.39%	0.26	9.80%	0.41	13.01%
Activity x Rater	1.89	49.76%	1.57	58.62%	1.49	47.60%
Activity x Rank	0.01	0.37%	0.09	3.31%	0.03	0.80%
Activity x Command	0.00	0.00%	0.00	0.00%	0.13	4.26%
Act. x Rank x Command	0.00	0.00%	0.04	1.45%	0.00	0.00%
Total	3.80	100.00%	2.69	100.00%	3.12	100.00%

RELIABILITY

	11B	63B	71L
Overall	0.36	0.25	0.34
Within Rank	0.36	0.26	0.34
Within Command	0.36	0.25	0.36
Within Rank & Command	0.39	0.27	0.36

Phase I Test: Task Category Questionnaire
Variance Components for Importance for Core Technical Proficiency
(NCO Ratings By MOS)

	11B Variance	11B Percent	63B Variance	63B Percent	71L Variance	71L Percent
Task	2.10	50.01%	1.13	35.48%	1.03	47.09%
Command	0.00	0.00%	0.11	3.31%	0.00	0.00%
Rater(Command)	0.45	10.73%	0.51	15.97%	0.13	5.75%
Task*Rater	1.65	39.26%	1.44	45.24%	1.00	45.79%
Task*Command	0.00	0.00%	0.00	0.00%	0.03	1.37%
	4.20	100.00%	3.18	100.00%	2.18	100.00%

RELIABILITY

	11B	63B	71L
Overall	0.50	0.35	0.47
Within Command	0.50	0.37	0.48

Phase I Test: Task Category Questionnaire
Variance Components for Importance for Core Technical Proficiency
(Officer Ratings By MOS)

	11B Variance	11B Percent	63B Variance	63B Percent	71L Variance	71L Percent
Task	2.56	54.26%	1.28	34.38%	1.16	51.42%
Command	0.03	0.69%	0.12	3.18%	0.00	0.06%
Rater(Command)	0.27	5.70%	0.23	6.27%	0.17	7.40%
Task*Rater	1.86	39.35%	2.10	56.18%	0.93	41.12%
Task*Command	0.00	0.00%	0.00	0.00%	0.00	0.00%
	4.73	100.00%	3.74	100.00%	2.26	100.00%

RELIABILITY

	11B	63B	71L
Overall	0.54	0.34	0.51
Within Command	0.55	0.36	0.51

Phase I Test: Task Category Questionnaire
Variance Components for Importance for Core Technical Proficiency
(FORSCOM Ratings By MOS)

	11B		63B		71L	
	Variance	Percent	Variance	Percent	Variance	Percent
Task	2.29	51.96%	1.11	33.83%	1.12	48.90%
Rank	0.07	1.66%	0.16	4.76%	0.00	0.03%
Rater(Rank)	0.36	8.09%	0.47	14.19%	0.15	6.71%
Task*Rater	1.69	38.28%	1.55	47.23%	1.02	44.36%
Task*Rank	0.00	0.00%	0.00	0.00%	0.00	0.00%
	4.41	100.00%	3.28	100.00%	2.30	100.00%

RELIABILITY

	11B	63B	71L
Overall	0.52	0.34	0.49
Within Rank	0.53	0.36	0.49

Phase I Test: Task Category Questionnaire
Variance Components for Importance for Core Technical Proficiency
(DOTD Ratings By MOS)

	11B		63B		71L	
	Variance	Percent	Variance	Percent	Variance	Percent
Task	2.46	59.02%	1.22	41.12%	1.03	48.05%
Rank	0.00	0.01%	0.07	2.52%	0.01	0.57%
Rater(Rank)	0.25	5.91%	0.29	9.68%	0.13	5.99%
Task*Rater	1.46	35.06%	1.35	45.61%	0.97	45.40%
Task*Rank	0.00	0.00%	0.03	1.07%	0.00	0.00%
	4.16	100.00%	2.97	100.00%	2.15	100.00%

RELIABILITY

	11B	63B	71L
Overall	0.59	0.41	0.48
Within Rank	0.59	0.43	0.48

Phase I Test: Job Activity Questionnaire
Variance Components for Importance for Core Technical Proficiency
(NCO Ratings By MOS)

	11B		63B		71L	
	Variance	Percent	Variance	Percent	Variance	Percent
Act	1.33	33.62%	0.70	24.09%	1.21	38.94%
Command	0.12	3.00%	0.10	3.51%	0.01	0.24%
Rater(Command)	0.53	13.31%	0.41	14.12%	0.53	17.08%
Act*Rater	1.99	50.07%	1.68	57.68%	1.26	40.79%
Act*Command	0.00	0.00%	0.02	0.60%	0.09	2.95%
	3.97	100.00%	2.92	100.00%	3.10	100.00%

RELIABILITY

	11B	63B	71L
Overall	0.34	0.24	0.39
Within Command	0.35	0.25	0.40

Phase I Test: Job Activity Questionnaire
Variance Components for Importance for Core Technical Proficiency
(Officer Ratings By MOS)

	11B		63B		71L	
	Variance	Percent	Variance	Percent	Variance	Percent
Act	1.40	40.14%	1.51	47.79%	1.59	53.85%
Command	0.08	2.29%	0.00	0.03%	0.02	0.64%
Rater(Command)	0.17	4.97%	0.22	7.08%	0.16	5.52%
Act*Rater	1.84	52.61%	1.43	45.09%	1.11	37.73%
Act*Command	0.00	0.00%	0.00	0.00%	0.07	2.25%
	3.50	100.00%	3.16	100.00%	2.95	100.00%

RELIABILITY

	11B	63B	71L
Overall	0.40	0.48	0.54
Within Command	0.41	0.48	0.55

Phase I Test: Job Activity Questionnaire
Variance Components for Importance for Core Technical Proficiency
(FORSCOM Ratings By MOS)

	11B		63B		71L	
	Variance	Percent	Variance	Percent	Variance	Percent
Act	1.21	33.11%	0.73	24.67%	1.56	44.20%
Rank	0.31	8.40%	0.00	0.00%	0.00	0.00%
Rater(Rank)	0.30	8.18%	0.46	15.44%	0.42	12.00%
Act*Rater	1.83	50.05%	1.56	52.68%	1.54	43.79%
Act*Rank	0.01	0.26%	0.21	7.21%	0.00	0.00%
	3.66	100.00%	2.97	100.00%	3.52	100.00%

RELIABILITY

	11B	63B	71L
Overall	0.33	0.25	0.44
Within Rank	0.36	0.27	0.44

Phase I Test: Job Activity Questionnaire
Variance Components for Importance for Core Technical Proficiency
(DOTD Ratings By MOS)

	11B		63B		71L	
	Variance	Percent	Variance	Percent	Variance	Percent
Act	1.95	44.82%	0.98	31.92%	1.21	45.80%
Rank	0.00	0.00%	0.09	2.94%	0.00	0.00%
Rater(Rank)	0.43	9.96%	0.19	6.26%	0.22	8.39%
Act*Rater	1.97	45.21%	1.62	52.62%	1.13	43.12%
Act*Rank	0.00	0.00%	0.19	6.26%	0.07	2.69%
	4.36	100.00%	3.09	100.00%	2.63	100.00%

RELIABILITY

	11B	63B	71L
Overall	0.45	0.32	0.46
Within Rank	0.45	0.35	0.47

Phase I Test: Task Category Questionnaire
Variance Components for Importance for Overall Job Performance
(NCO Ratings By MOS)

	11B		63B		71L	
	Variance	Percent	Variance	Percent	Variance	Percent
Task	2.06	49.13%	1.43	40.37%	1.55	48.80%
Command	0.00	0.00%	0.06	1.76%	0.05	1.64%
Rater(Command)	0.39	9.23%	0.48	13.60%	0.09	2.87%
Task*Rater	1.75	41.64%	1.57	44.27%	1.35	42.29%
Task*Command	0.00	0.00%	0.00	0.00%	0.14	4.39%
	4.19	100.00%	3.54	100.00%	3.18	100.00%

RELIABILITY

	11B	63B	71L
Overall	0.49	0.40	0.49
Within Command	0.49	0.41	0.52

Phase I Test: Task Category Questionnaire
Variance Components for Importance for Overall Job Performance
(Officer Ratings By MOS)

	11B		63B		71L	
	Variance	Percent	Variance	Percent	Variance	Percent
Task	2.25	54.66%	1.64	51.61%	1.39	47.61%
Command	0.01	0.29%	0.03	0.91%	0.04	1.21%
Rater(Command)	0.31	7.46%	0.27	8.39%	0.17	5.67%
Task*Rater	1.55	37.59%	1.24	39.08%	1.33	45.51%
Task*Command	0.00	0.00%	0.00	0.00%	0.00	0.00%
	4.12	100.00%	3.17	100.00%	2.91	100.00%

RELIABILITY

	11B	63B	71L
Overall	0.55	0.52	0.48
Within Command	0.55	0.52	0.48

Phase I Test: Task Category Questionnaire
Variance Components for Importance for Overall Job Performance
(FORSCOM Ratings By MOS)

	11B		63B		71L	
	Variance	Percent	Variance	Percent	Variance	Percent
Task	2.12	51.69%	1.54	43.71%	1.49	49.00%
Rank	0.03	0.71%	0.01	0.26%	0.02	0.65%
Rater(Rank)	0.35	8.52%	0.47	13.31%	0.17	5.56%
Task*Rater	1.60	39.08%	1.51	42.72%	1.37	44.79%
Task*Rank	0.00	0.00%	0.00	0.00%	0.00	0.00%
	4.10	100.00%	3.53	100.00%	3.05	100.00%

RELIABILITY

	11B	63B	71L
Overall	0.52	0.44	0.49
Within Rank	0.52	0.44	0.49

Phase I Test: Task Category Questionnaire
Variance Components for Importance for Overall Job Performance
(DOTD Ratings By MOS)

	11B		63B		71L	
	Variance	Percent	Variance	Percent	Variance	Percent
Task	2.26	55.05%	1.55	44.04%	1.48	51.47%
Rank	0.00	0.00%	0.11	3.04%	0.08	2.64%
Rater(Rank)	0.25	6.11%	0.28	8.06%	0.07	2.28%
Task*Rater	1.59	38.84%	1.56	44.11%	1.26	43.60%
Task*Rank	0.00	0.00%	0.03	0.74%	0.00	0.00%
	4.10	100.00%	3.53	100.00%	2.88	100.00%

RELIABILITY

	11B	63B	71L
Overall	0.55	0.44	0.51
Within Rank	0.55	0.46	0.53

Phase I Test: Job Activity Questionnaire
Variance Components for Importance for Overall Job Performance
(NCO Ratings by MOS)

	11B		63B		71L	
	Variance	Percent	Variance	Percent	Variance	Percent
Act	1.31	33.15%	0.74	27.02%	1.10	32.79%
Command	0.11	2.77%	0.01	0.35%	0.01	0.31%
Rater(Command)	0.53	13.41%	0.27	9.83%	0.50	15.10%
Act*Rater	2.01	50.68%	1.66	60.44%	1.66	49.69%
Act*Command	0.00	0.00%	0.06	2.36%	0.07	2.11%
	3.97	100.00%	2.75	100.00%	3.34	100.00%

RELIABILITY

	11B	63B	71L
Overall	0.33	0.27	0.33
Within Command	0.34	0.28	0.34

Phase I Test: Job Activity Questionnaire
Variance Components for Importance for Overall Job Performance
(Officer Ratings by MOS)

	11B		63B		71L	
	Variance	Percent	Variance	Percent	Variance	Percent
Act	1.28	39.19%	0.80	30.22%	1.13	38.46%
Command	0.02	0.47%	0.01	0.50%	0.01	0.35%
Rater(Command)	0.22	6.61%	0.33	12.28%	0.34	11.47%
Act*Rater	1.75	53.73%	1.52	57.01%	1.37	46.76%
Act*Command	0.00	0.00%	0.00	0.00%	0.09	2.96%
	3.26	100.00%	2.66	100.00%	2.93	100.00%

RELIABILITY

	11B	63B	71L
Overall	0.39	0.30	0.38
Within Command	0.39	0.30	0.40

Phase I Test: Job Activity Questionnaire
Variance Components for Importance for Overall Job Performance
(FORSCOM Ratings by MOS)

	11B		63B		71L	
	Variance	Percent	Variance	Percent	Variance	Percent
Act	1.19	32.76%	0.60	24.02%	1.23	34.93%
Rank	0.21	5.69%	0.04	1.79%	0.00	0.00%
Rater(Rank)	0.33	9.18%	0.26	10.55%	0.53	15.10%
Act*Rater	1.89	51.97%	1.49	59.83%	1.75	49.98%
Act*Rank	0.01	0.39%	0.09	3.81%	0.00	0.00%
	3.63	100.00%	2.49	100.00%	3.51	100.00%

RELIABILITY

	11B	63B	71L
Overall	0.33	0.24	0.35
Within Rank	0.35	0.25	0.35

Phase I Test: Job Activity Questionnaire
Variance Components for Importance for Overall Job Performance
(DOTD Ratings by MOS)

	11B		63B		71L	
	Variance	Percent	Variance	Percent	Variance	Percent
Act	1.75	39.68%	0.82	27.33%	1.10	39.36%
Rank	0.00	0.00%	0.04	1.28%	0.00	0.00%
Rater(Rank)	0.52	11.82%	0.30	10.00%	0.24	8.47%
Act*Rater	2.14	48.50%	1.65	55.03%	1.36	48.60%
Act*Rank	0.00	0.00%	0.19	6.36%	0.10	3.56%
	4.41	100.00%	3.00	100.00%	2.80	100.00%

RELIABILITY

	11B	63B	71L
Overall	0.40	0.27	0.39
Within Rank	0.40	0.30	0.41

Phase I Test

Mean Fidelity Coefficients for 4 Ratings with

Frequency of Performance

		Task Category			Job Activity		
MOS	Rating Type	11B (n=88)	63B (n=50)	71L (n=52)	11B (n=88)	63B (n=50)	71L (n=52)
	Frequency	0.76	0.47	0.28	0.67	0.30	0.21
	Core Technical	0.75	0.44	0.25	0.66	0.27	0.18
11B	Gen. Soldiering	0.75	0.46	0.28	0.66	0.28	0.25
	Overall	0.75	0.46	0.26	0.66	0.27	0.23
	Frequency	0.49	0.74	0.35	0.33	0.62	0.05
	Core Technical	0.43	0.73	0.35	0.21	0.59	-0.02
63B	Gen. Soldiering	0.67	0.66	0.38	0.57	0.49	0.17
	Overall	0.59	0.72	0.36	0.41	0.60	0.05
	Frequency	0.27	0.33	0.79	0.19	0.03	0.72
	Core Technical	0.18	0.27	0.77	0.10	-0.02	0.69
71L	Gen. Soldiering	0.63	0.48	0.56	0.49	0.19	0.58
	Overall	0.47	0.41	0.73	0.31	0.06	0.69

Phase I Test

Mean Fidelity Coefficients for 4 Ratings with

Importance for Core Technical Proficiency

		Task Category			Job Activity		
MOS	Rating Type	11B (n=88)	63B (n=50)	71L (n=52)	11B (n=87)	63B (n=50)	71L (n=51)
	Frequency	0.77	0.38	0.17	0.64	0.19	0.11
	Core Technical	0.77	0.35	0.14	0.65	0.16	0.09
11B	Gen. Soldiering	0.77	0.37	0.17	0.64	0.18	0.17
	Overall	0.77	0.37	0.15	0.65	0.17	0.14
	Frequency	0.47	0.67	0.28	0.28	0.56	-0.02
	Core Technical	0.41	0.69	0.29	0.16	0.59	-0.04
63B	Gen. Soldiering	0.67	0.57	0.27	0.55	0.39	0.08
	Overall	0.58	0.64	0.26	0.37	0.54	-0.03
	Frequency	0.25	0.31	0.73	0.16	-0.01	0.71
	Core Technical	0.15	0.27	0.75	0.07	-0.02	0.74
71L	Gen. Soldiering	0.63	0.40	0.44	0.46	0.10	0.53
	Overall	0.46	0.36	0.64	0.29	0.00	0.68

Phase I Test

Mean Fidelity Coefficients for 4 Ratings with

Importance for General Soldiering

		Task Category			Job Activity		
		11B	63B	71L	11B	63B	71L
MOS	Rating Type	(n=88)	(n=50)	(n=52)	(n=87)	(n=50)	(n=50)
	Frequency	0.74	0.64	0.60	0.61	0.47	0.45
	Core Technical	0.75	0.62	0.59	0.62	0.47	0.45
11B	Gen. Soldiering	0.75	0.64	0.61	0.62	0.48	0.49
	Overall	0.75	0.63	0.60	0.62	0.47	0.47
	Frequency	0.47	0.65	0.47	0.27	0.42	0.19
	Core Technical	0.41	0.60	0.43	0.17	0.35	0.09
63B	Gen. Soldiering	0.66	0.73	0.64	0.54	0.55	0.41
	Overall	0.58	0.71	0.57	0.36	0.48	0.24
	Frequency	0.27	0.36	0.52	0.21	0.14	0.50
	Core Technical	0.17	0.27	0.43	0.14	0.07	0.45
71L	Gen. Soldiering	0.63	0.64	0.72	0.49	0.37	0.62
	Overall	0.47	0.52	0.66	0.33	0.22	0.57

Phase I Test

Mean Fidelity Coefficients for 4 Ratings with

Importance for Overall Performance

		Task Category			Job Activity		
		11B	63B	71L	11B	63B	71L
MOS	Rating Type	(n=88)	(n=50)	(n=52)	(n=87)	(n=50)	(n=51)
	Frequency	0.76	0.57	0.46	0.64	0.34	0.31
	Core Technical	0.76	0.55	0.44	0.65	0.33	0.30
11B	Gen. Soldiering	0.76	0.56	0.47	0.65	0.33	0.36
	Overall	0.77	0.56	0.45	0.65	0.33	0.34
	Frequency	0.48	0.72	0.41	0.28	0.55	0.07
	Core Technical	0.42	0.69	0.39	0.17	0.52	-0.01
63B	Gen. Soldiering	0.67	0.71	0.53	0.55	0.51	0.26
	Overall	0.59	0.74	0.48	0.37	0.57	0.10
	Frequency	0.26	0.34	0.69	0.20	0.04	0.65
	Core Technical	0.16	0.26	0.63	0.12	-0.02	0.61
71L	Gen. Soldiering	0.63	0.57	0.68	0.49	0.22	0.62
	Overall	0.47	0.47	0.74	0.32	0.08	0.67

Tables of Component Rating Means, Standard Deviations, and N

Task Category Instrument
- 11B
- 63B
- 71L
- All 3 MOS combined

Job Activity Instrument
- 11B
- 63B
- 71L
- All 3 MOS combined

TASK CATEGORY

Frequency and Importance Ratings Descriptive Statistics

MOS=11B

Task Categories	Frequency MEAN	STD	N	Core Technical MEAN	STD	N	Gen. Soldiering MEAN	STD	N	Overall Job MEAN	STD	N
Perf operator maint chks and services	3.75	1.42	88	3.89	1.41	88	3.56	1.46	87	3.87	1.37	86
Perf operator chks & services on weapons	4.24	0.90	88	4.50	0.86	88	4.19	1.12	88	4.41	0.87	88
Troubleshoot mechanical systems	1.72	1.75	88	1.92	1.84	88	1.74	1.73	88	1.93	1.88	88
Repair weapons	1.40	1.38	87	1.86	1.75	87	1.69	1.68	87	1.85	1.76	87
Repair mechanical systems	1.64	1.61	88	1.80	1.73	88	1.80	1.73	88	1.93	1.83	88
Troubleshoot weapons	2.26	1.62	88	2.82	1.82	88	2.51	1.72	88	2.65	1.71	88
Install electronic components	2.33	1.72	88	2.45	1.84	88	2.33	1.78	88	2.35	1.81	88
Inspect electrical systems	0.49	1.11	88	0.57	1.30	87	0.52	1.15	87	0.52	1.15	87
Inspect electronic systems	0.57	1.15	88	0.61	1.27	87	0.52	1.09	87	0.55	1.18	87
Repair electrical systems	0.45	0.99	88	0.47	1.08	87	0.48	1.06	87	0.54	1.15	87
Repair electronic components	0.39	0.94	88	0.40	1.02	88	0.41	1.00	88	0.42	0.98	88
Pack and load materials	2.03	1.58	88	2.10	1.58	87	1.93	1.52	87	1.95	1.55	87
Prepare parachutes	0.34	0.94	87	0.36	1.00	87	0.37	0.98	87	0.37	1.00	87
Prepare equip and supplies for air drop	0.57	0.99	88	0.69	1.30	88	0.72	1.33	88	0.72	1.35	88
Operate power excavating equipment	0.17	0.61	87	0.16	0.55	87	0.14	0.55	87	0.16	0.59	87
Operate wheeled vehicles	2.53	1.52	88	2.68	1.43	87	2.57	1.48	87	2.74	1.53	87
Operate track vehicles	2.74	2.01	88	2.77	2.02	88	2.43	1.85	88	2.67	1.95	88
Operate boats	0.45	0.92	88	0.60	1.19	88	0.49	1.05	88	0.52	1.02	88
Operate lifting,loading,&grading equip	0.15	0.67	88	0.11	0.56	87	0.10	0.48	87	0.10	0.48	87
Paint	1.70	1.23	88	1.07	1.20	86	1.27	1.22	86	1.22	1.18	86
Install wire and cables	1.52	1.49	88	1.84	1.70	86	1.65	1.62	85	1.66	1.64	85
Repair plastic and fiberglass	0.22	0.73	88	0.16	0.57	88	0.18	0.60	88	0.13	0.42	88
Repair metal	0.23	0.66	88	0.16	0.52	88	0.20	0.65	88	0.24	0.69	88
Assemble steel structures	0.22	0.69	88	0.26	0.80	88	0.26	0.80	88	0.27	0.81	88
Install pipe assemblies	0.13	0.60	88	0.15	0.67	88	0.14	0.59	88	0.15	0.67	88
Construct wooden bldgs & other struct	0.28	0.79	88	0.24	0.75	87	0.29	0.78	87	0.28	0.80	87
Construct masonry bldgs & structures	0.10	0.50	88	0.10	0.50	88	0.10	0.50	88	0.11	0.60	88
Operate gas & electric powered equip	0.64	0.98	88	0.60	1.01	88	0.61	1.02	88	0.64	1.08	88
Select,layout,&clean med/dental equip	0.07	0.45	88	0.06	0.35	88	0.07	0.45	88	0.07	0.45	88
Use audiovisual equipment	0.63	0.97	88	0.66	1.18	87	0.72	1.16	87	0.71	1.18	87
Reproduce printed material	0.86	1.27	88	0.53	0.95	87	0.74	1.19	87	0.70	1.11	87
Operate electronic equipment	1.27	1.64	88	1.41	1.76	88	1.26	1.64	88	1.36	1.78	87
Operate radar	0.13	0.64	88	0.10	0.50	88	0.11	0.53	88	0.11	0.60	88
Operate computer hardware	0.40	0.85	88	0.35	0.88	88	0.47	1.04	88	0.50	1.13	88
Cook	0.40	1.13	87	0.36	1.05	87	0.38	1.11	87	0.39	1.07	87
Perform medical laboratory procedures	0.18	0.77	88	0.18	0.81	88	0.17	0.75	88	0.18	0.81	88
Conduct land surveys	0.94	1.65	87	1.02	1.76	86	0.87	1.56	86	0.90	1.59	86
Provide medical or dental treatment	0.26	0.84	87	0.33	0.96	86	0.34	1.01	86	0.30	0.98	86
Sketch maps, overlays, or range cards	3.33	1.45	88	3.61	1.53	87	3.09	1.59	87	3.41	1.55	87
Produce technical drawings	0.15	0.60	88	0.17	0.68	88	0.17	0.73	88	0.15	0.65	88
Draw maps and overlays	0.89	1.43	88	1.13	1.71	88	0.95	1.50	88	0.98	1.52	88
Draw illustrations	0.56	1.13	88	0.66	1.35	87	0.61	1.25	87	0.54	1.17	87
Type	0.70	1.10	88	0.55	0.99	88	0.68	1.23	87	0.52	0.97	88
Prepare technical forms and documents	1.03	1.41	88	0.99	1.53	87	1.02	1.52	87	0.95	1.45	87
Record, file, and dispatch information	0.91	1.28	88	0.80	1.27	87	0.90	1.35	87	0.89	1.34	87
Receive,store,&issue supp, equip, etc	0.91	1.37	88	0.92	1.40	87	0.94	1.43	87	1.01	1.47	87
Use hand and arm signals	4.10	0.98	88	4.28	1.10	87	3.82	1.28	87	4.05	1.12	87
Read tech/field manuals, reg etc	3.67	1.10	88	3.86	1.14	87	3.80	1.18	87	3.85	1.14	87

TASK CATEGORY (Contd)

Frequency and Importance Ratings Descriptive Statistics

MOS=11B

Task Categories	Frequency			Core Technical			Gen. Soldiering			Overall Job		
	MEAN	STD	N	MEAN	STD	N	MEAN	STD	N	MEAN	STD	N
Use maps	4.02	1.11	88	4.45	0.82	87	3.98	1.13	87	4.10	1.07	87
Send and receive radio messages	3.58	1.14	88	4.20	0.96	87	3.78	1.14	87	3.90	1.05	87
Give short oral reports	3.77	1.14	88	4.21	1.08	87	3.74	1.32	87	3.97	1.09	87
Receive clients, patients, guests	0.32	0.89	88	0.28	0.84	87	0.30	0.85	87	0.31	0.89	87
Give directions and instructions	2.78	1.56	87	3.07	1.66	86	2.87	1.68	86	2.99	1.70	[illegible]
Write and deliver presentations	0.58	1.17	88	0.66	1.40	87	0.61	1.24	87	0.64	1.34	87
Interview	0.53	1.18	88	0.61	1.31	88	0.60	1.32	88	0.61	1.31	88
Provide counseling	1.18	1.63	88	1.28	1.78	87	1.26	1.70	87	1.32	1.86	87
Write documents and correspondence	0.67	1.25	88	0.80	1.52	88	0.78	1.53	88	0.70	1.37	88
Decode data	2.15	1.44	88	2.80	1.70	86	2.53	1.61	86	2.52	1.66	85
Analyze electronic signals	0.33	0.88	88	0.50	1.22	88	0.41	1.02	88	0.43	1.09	88
Analyze weather conditions	0.90	1.41	88	1.14	1.82	87	0.90	1.49	87	0.97	1.62	87
Order equipment and supplies	1.02	1.40	88	1.27	1.74	86	1.15	1.62	86	1.13	1.60	86
Estimate time & cost of maint ops	0.55	1.41	88	0.45	1.28	86	0.34	1.11	85	0.41	1.18	85
Plan placement/use of tactical equip	1.78	1.85	88	2.12	2.08	86	1.77	1.85	86	1.99	1.94	86
Translate foreign languages	0.25	0.86	88	0.21	0.78	87	0.26	0.96	87	0.22	0.78	87
Analyze intelligence data	1.13	1.53	88	1.40	1.76	86	1.22	1.59	86	1.28	1.64	86
Control money	0.78	1.44	88	0.80	1.58	87	0.82	1.57	87	0.86	1.62	87
Determine firing data-indirect weapons	1.05	1.55	88	1.24	1.79	86	1.05	1.60	86	1.14	1.70	86
Compute statistics/other math	0.48	1.05	88	0.52	1.21	86	0.52	1.15	86	0.52	1.17	86
Provide programming & DP support	0.22	0.65	88	0.26	0.91	86	0.23	0.79	86	0.17	0.62	86
Control air traffic	0.16	0.57	88	0.25	0.86	88	0.18	0.64	88	0.20	0.76	88
Use hand grenades	3.38	1.23	88	4.22	1.07	86	3.80	1.28	86	4.06	1.06	86
Protect against NBC hazards	3.81	1.10	88	4.63	0.55	86	4.35	0.88	86	4.42	0.87	86
Handle demolitions or mines	2.42	1.53	88	3.34	1.72	87	2.83	1.67	87	3.07	1.70	87
Engage in hand-to-hand combat	2.31	1.49	88	3.38	1.66	87	3.07	1.67	87	3.22	1.57	87
Fire individual weapons	4.19	1.02	88	4.67	0.56	87	4.44	0.96	87	4.52	0.76	87
Control individuals and crowds	2.97	1.41	88	3.34	1.50	87	3.11	1.60	87	3.38	1.47	87
Customs and laws of war	3.03	1.43	88	3.54	1.44	85	3.48	1.36	86	3.47	1.39	86
Navigate	3.68	1.27	88	4.30	1.06	87	3.90	1.29	87	4.05	1.17	87
Survive in the field	4.05	1.29	88	4.33	1.14	87	3.98	1.39	86	4.16	1.25	87
Move and react in the field	4.27	1.00	88	4.60	0.72	87	4.06	1.21	87	4.38	0.93	87
Load & unload field artillery/tank guns	0.62	1.39	87	0.71	1.58	87	0.60	1.35	87	0.68	1.50	87
Fire heavy direct fire weapons	1.58	1.80	88	2.03	2.12	88	1.65	1.89	88	1.86	2.02	88
Prepare heavy weapons for tactical use	0.60	1.37	88	0.70	1.57	88	0.60	1.39	88	0.63	1.45	88
Place & camoufl tactical equip and mat	2.97	1.73	88	3.51	1.74	88	3.10	1.67	88	3.38	1.72	88
Fire indirect fire weapons	0.81	1.53	88	0.84	1.63	87	0.86	1.66	87	0.85	1.64	87
Give first aid	3.41	1.17	88	4.35	0.96	86	4.28	0.93	86	4.31	0.80	86
Detect and identify targets	3.64	1.19	88	4.28	0.95	87	3.86	1.18	87	4.05	1.07	87
Plan operations	1.67	1.74	88	2.22	2.09	87	2.06	2.01	87	2.11	2.05	87
Direct/lead teams	2.10	1.82	88	2.70	2.10	87	2.28	1.93	87	2.41	2.02	87
Monitor/inspect	2.35	1.88	88	2.69	1.98	87	2.57	1.94	87	2.68	2.00	87
Lead	2.56	1.79	88	3.00	1.99	86	2.84	1.96	86	3.02	1.97	86
Act as a model	2.78	1.80	88	3.15	1.95	86	3.09	1.90	86	3.17	1.93	86
Counsel	2.11	1.88	88	2.53	2.07	87	2.46	2.04	87	2.53	2.10	87
Communicate	2.75	1.95	88	3.14	2.04	87	2.91	2.02	87	3.07	2.03	86
Train	2.03	1.96	88	2.45	2.18	87	2.33	2.09	87	2.41	2.17	87
Personnel Administration	1.58	1.94	88	1.66	2.02	87	1.59	1.96	87	1.64	2.01	87

TASK CATEGORY

Frequency and Importance Ratings Descriptive Statistics

MOS=63B

Task Categories	Frequency MEAN	Frequency STD	Frequency N	Core Technical MEAN	Core Technical STD	Core Technical N	Gen. Soldiering MEAN	Gen. Soldiering STD	Gen. Soldiering N	Overall Job MEAN	Overall Job STD	Overall Job N
Perf operator maint chks and services	4.02	1.06	50	4.18	1.06	50	3.78	1.15	50	4.16	0.93	50
Perf operator chks & services on weapons	2.64	1.14	50	2.68	1.68	50	3.84	1.20	50	3.76	1.25	50
Troubleshoot mechanical systems	3.66	1.27	50	4.10	1.16	50	2.64	1.24	50	3.72	1.16	50
Repair weapons	0.84	1.27	50	0.86	1.46	50	1.04	1.50	50	1.10	1.62	50
Repair mechanical systems	4.12	0.94	50	2.78	1.30	50	2.78	1.30	50	3.90	0.99	50
Troubleshoot weapons	0.90	1.28	50	0.90	1.50	49	1.20	1.62	50	1.14	1.62	49
Install electronic components	1.36	1.35	50	1.59	1.61	49	1.43	1.51	49	1.78	1.57	49
Inspect electrical systems	3.38	1.23	50	3.60	1.26	50	1.98	1.29	50	3.16	1.31	50
Inspect electronic systems	1.34	1.70	50	1.50	1.78	50	0.94	1.35	50	1.44	1.75	50
Repair electrical systems	2.96	1.26	50	3.46	1.30	50	1.84	1.36	50	3.02	1.36	50
Repair electronic components	1.78	1.61	50	2.16	1.80	50	1.26	1.48	50	1.86	1.74	50
Pack and load materials	1.68	1.33	50	1.44	1.39	50	1.92	1.50	50	1.84	1.45	50
Prepare parachutes	0.06	0.42	50	0.08	0.57	50	0.08	0.57	50	0.08	0.57	50
Prepare equip and supplies for air drop	0.24	0.56	50	0.32	0.79	50	0.34	0.85	50	0.32	0.79	50
Operate power excavating equipment	0.26	0.63	50	0.38	0.95	50	0.24	0.74	50	0.24	0.74	50
Operate wheeled vehicles	3.92	0.94	50	4.16	0.84	50	3.90	0.95	50	4.20	0.90	50
Operate track vehicles	1.40	1.43	50	1.80	1.69	50	1.50	1.64	50	1.70	1.72	50
Operate boats	0.06	0.31	50	0.16	0.79	50	0.16	0.79	50	0.16	0.79	50
Operate lifting,loading,&grading equip	1.42	1.36	50	1.56	1.50	50	1.16	1.42	50	1.54	1.49	50
Paint	1.66	1.32	50	1.84	1.43	50	1.68	1.53	50	1.82	1.48	49
Install wire and cables	1.20	1.16	50	1.41	1.48	49	1.47	1.43	49	1.59	1.50	49
Repair plastic and fiberglass	0.66	0.89	50	0.98	1.39	49	0.55	1.12	49	0.96	1.43	49
Repair metal	1.56	1.09	50	1.94	1.42	50	0.88	1.08	50	1.68	1.38	50
Assemble steel structures	0.20	0.57	50	0.20	0.73	50	0.20	0.73	50	0.24	0.74	50
Install pipe assemblies	0.18	0.44	50	0.34	0.98	50	0.14	0.61	50	0.32	0.96	50
Construct wooden bldgs & other struct	0.18	0.44	50	0.26	0.85	50	0.24	0.85	50	0.26	0.85	50
Construct masonry bldgs & structures	0.06	0.31	50	0.16	0.79	50	0.16	0.79	50	0.16	0.79	50
Operate gas & electric powered equip	2.78	1.27	50	3.14	1.32	50	2.34	1.35	50	2.90	1.36	50
Select,layout,&clean med/dental equip	0.06	0.31	50	0.08	0.57	50	0.08	0.57	50	0.08	0.57	50
Use audiovisual equipment	0.40	0.83	50	0.38	0.95	50	0.54	1.16	50	0.48	1.03	50
Reproduce printed material	0.80	1.14	50	0.78	1.25	50	0.84	1.25	50	0.88	1.26	50
Operate electronic equipment	0.92	1.12	50	1.06	1.43	49	1.04	1.37	49	1.10	1.42	49
Operate radar	0.12	0.48	50	0.16	0.68	50	0.16	0.68	50	0.16	0.68	50
Operate computer hardware	0.48	0.86	50	0.64	1.31	50	0.60	1.09	50	0.66	1.22	50
Cook	0.22	0.76	50	0.28	0.97	50	0.38	1.07	50	0.38	1.14	50
Perform medical laboratory procedures	0.16	0.82	50	0.16	0.82	50	0.16	0.82	50	0.16	0.82	50
Conduct land surveys	0.80	1.16	50	0.90	1.47	50	1.12	1.62	50	1.10	1.61	50
Provide medical or dental treatment	0.16	0.74	50	0.20	0.90	50	0.22	0.91	50	0.22	0.91	50
Sketch maps, overlays, or range cards	1.38	1.26	50	1.04	1.38	50	2.08	1.82	50	1.78	1.59	50
Produce technical drawings	0.28	0.90	50	0.28	0.97	50	0.30	1.02	50	0.28	0.97	50
Draw maps and overlays	0.40	0.97	50	0.48	1.16	50	0.68	1.43	50	0.52	1.22	50
Draw illustrations	0.52	1.25	50	0.54	1.27	50	0.54	1.25	50	0.54	1.27	50
Type	0.74	1.01	50	0.80	1.21	50	0.88	1.30	50	0.94	1.22	50
Prepare technical forms and documents	2.48	1.52	50	2.64	1.68	50	2.02	1.42	50	2.46	1.54	50
Record, file, and dispatch information	2.12	1.61	50	2.18	1.60	50	1.82	1.52	50	2.16	1.61	50
Receive,store,&issue supp, equip, etc	1.74	1.48	50	2.02	1.67	50	1.58	1.53	50	2.00	1.68	50
Use hand and arm signals	2.56	1.28	50	2.66	1.55	50	2.74	1.26	50	2.82	1.27	50
Read tech/field manuals, reg etc	4.10	1.05	50	4.36	0.80	50	3.76	1.02	50	4.14	0.90	50

TASK CATEGORY (Contd)

Frequency and Importance Ratings Descriptive Statistics

MOS=63B

Task Categories	Frequency MEAN	STD	N	Core Technical MEAN	STD	N	Gen. Soldiering MEAN	STD	N	Overall Job MEAN	STD	N
Use maps	2.72	1.29	50	2.78	1.52	50	3.64	1.12	50	3.54	1.01	50
Send and receive radio messages	2.24	1.27	50	2.10	1.69	50	3.18	1.57	50	2.94	1.45	50
Give short oral reports	2.06	1.36	50	1.94	1.52	50	2.54	1.61	50	2.50	1.46	50
Receive clients, patients, guests	0.24	0.82	50	0.28	1.01	50	0.32	1.04	50	0.32	1.04	50
Give directions and instructions	2.34	1.32	50	2.61	1.27	49	2.71	1.35	49	2.69	1.33	49
Write and deliver presentations	0.34	0.75	50	0.52	1.16	50	0.60	1.25	50	0.58	1.26	50
Interview	0.48	0.95	50	0.66	1.30	50	0.66	1.26	50	0.68	1.28	50
Provide counseling	0.68	1.30	50	0.70	1.31	50	0.78	1.36	50	0.78	1.39	50
Write documents and correspondence	0.60	1.20	50	0.58	1.26	50	0.66	1.30	50	0.66	1.33	50
Decode data	0.96	1.32	50	0.88	1.36	50	1.44	1.74	50	1.26	1.58	50
Analyze electronic signals	0.26	0.72	50	0.28	0.81	50	0.38	0.99	50	0.30	0.84	50
Analyze weather conditions	0.42	0.91	50	0.44	1.03	50	0.52	1.07	50	0.48	1.05	50
Order equipment and supplies	1.94	1.46	50	2.44	1.69	50	1.76	1.51	50	2.28	1.63	50
Estimate time & cost of maint ops	1.56	1.54	50	1.76	1.66	50	1.12	1.49	50	1.58	1.60	50
Plan placement/use of tactical equip	1.22	1.43	50	1.14	1.53	50	1.56	1.69	50	1.48	1.62	50
Translate foreign languages	0.24	0.82	50	0.22	0.74	50	0.32	0.96	50	0.30	0.89	50
Analyze intelligence data	0.50	0.97	50	0.46	0.97	50	0.64	1.26	50	0.68	1.35	50
Control money	0.56	1.47	50	0.42	1.21	50	0.58	1.50	50	0.56	1.49	50
Determine firing data-indirect weapons	0.40	1.03	50	0.42	1.18	50	0.60	1.40	50	0.56	1.33	50
Compute statistics/other math	0.38	0.90	50	0.58	1.28	50	0.50	1.15	50	0.56	1.20	50
Provide programming & DP support	0.26	0.75	50	0.33	1.11	49	0.29	0.91	49	0.35	1.11	49
Control air traffic	0.04	0.20	50	0.14	0.70	50	0.14	0.70	50	0.14	0.70	50
Use hand grenades	1.56	1.30	50	1.39	1.63	49	2.92	1.80	49	2.61	1.62	49
Protect against NBC hazards	2.86	1.13	50	2.36	1.78	50	4.20	0.90	50	3.88	1.00	50
Handle demolitions or mines	0.80	0.93	50	0.84	1.40	50	1.50	1.71	50	1.42	1.59	50
Engage in hand-to-hand combat	1.12	1.04	50	1.04	1.34	50	2.30	1.72	50	1.94	1.58	50
Fire individual weapons	2.84	1.17	50	2.34	1.92	50	4.18	0.94	50	4.02	0.96	50
Control individuals and crowds	1.38	1.38	50	1.14	1.47	50	2.00	1.93	50	1.78	1.72	50
Customs and laws of war	1.86	1.26	50	1.54	1.62	50	3.14	1.57	50	2.84	1.56	50
Navigate	1.88	1.21	50	1.76	1.62	50	3.10	1.59	50	2.90	1.57	50
Survive in the field	2.26	1.38	50	1.88	1.78	50	3.52	1.61	50	3.34	1.52	50
Move and react in the field	1.94	1.24	50	1.78	1.69	50	3.32	1.43	50	3.16	1.46	50
Load & unload field artillery/tank guns	0.22	0.62	50	0.27	0.97	49	0.29	0.98	49	0.29	0.98	49
Fire heavy direct fire weapons	0.10	0.42	50	0.22	0.89	50	0.14	0.70	50	0.16	0.79	50
Prepare heavy weapons for tactical use	0.14	0.64	50	0.22	0.89	50	0.20	0.81	50	0.22	0.89	50
Place & camoufl tactical equip and mat	1.86	1.40	50	1.80	1.70	50	2.72	1.78	50	2.48	1.69	50
Fire indirect fire weapons	0.08	0.34	49	0.16	0.72	49	0.16	0.72	49	0.16	0.72	49
Give first aid	2.60	1.11	50	2.50	1.79	50	4.04	0.92	50	4.00	0.86	50
Detect and identify targets	1.58	1.30	50	1.46	1.61	50	2.82	1.67	50	2.62	1.61	50
Plan operations	0.70	1.33	50	0.70	1.34	50	0.82	1.53	50	0.88	1.56	50
Direct/lead teams	0.64	0.96	50	0.88	1.38	50	1.18	1.67	50	1.16	1.65	50
Monitor/inspect	1.70	1.57	50	1.86	1.68	50	1.84	1.72	50	1.90	1.68	50
Lead	2.04	1.64	50	2.22	1.76	49	2.63	1.93	49	2.49	1.83	49
Act as a model	2.64	1.44	50	2.92	1.67	49	3.45	1.54	49	3.24	1.52	49
Counsel	1.52	1.55	50	1.58	1.72	50	2.00	1.90	50	1.84	1.74	50
Communicate	2.32	1.56	50	2.56	1.55	50	2.96	1.62	50	2.88	1.59	50
Train	1.56	1.69	50	1.88	2.00	50	2.00	1.99	50	1.98	2.06	50
Personnel Adminstration	1.00	1.54	50	1.12	1.72	50	1.26	1.79	50	1.24	1.78	50

TASK CATEGORY

Frequency and Importance Ratings Descriptive Statistics

MOS=71L

Task Categories	Frequency MEAN	Frequency STD	Frequency N	Core Technical MEAN	Core Technical STD	Core Technical N	Gen. Soldiering MEAN	Gen. Soldiering STD	Gen. Soldiering N	Overall Job MEAN	Overall Job STD	Overall Job N
Perf operator maint chks and services	1.56	1.26	52	1.18	1.32	50	2.37	1.70	51	2.12	1.60	51
Perf operator chks & services on weapons	1.77	1.23	52	1.22	1.19	51	3.47	1.55	51	2.96	1.48	51
Troubleshoot mechanical systems	0.31	0.67	52	0.27	0.66	52	0.54	1.15	52	0.46	1.00	52
Repair weapons	0.25	0.59	52	0.17	0.51	52	0.52	1.20	52	0.42	1.04	52
Repair mechanical systems	0.21	0.46	52	0.37	0.86	52	0.37	0.86	52	0.35	0.81	52
Troubleshoot weapons	0.21	0.54	52	0.19	0.53	52	0.48	1.20	52	0.44	1.11	52
Install electronic components	0.85	1.16	52	0.75	1.14	52	1.10	1.42	52	1.08	1.41	52
Inspect electrical systems	0.40	0.85	52	0.41	0.96	51	0.41	1.02	51	0.53	1.16	51
Inspect electronic systems	0.27	0.72	52	0.21	0.64	52	0.33	0.92	52	0.35	0.88	52
Repair electrical systems	0.27	0.66	52	0.23	0.61	52	0.25	0.71	52	0.25	0.65	52
Repair electronic components	0.29	0.80	52	0.17	0.51	52	0.21	0.70	52	0.25	0.71	52
Pack and load materials	1.00	1.17	52	0.67	1.02	52	1.40	1.52	52	1.27	1.42	52
Prepare parachutes	0.08	0.33	52	0.06	0.31	52	0.17	0.81	52	0.13	0.71	52
Prepare equip and supplies for air drop	0.12	0.32	52	0.08	0.27	52	0.19	0.60	52	0.13	0.40	52
Operate power excavating equipment	0.02	0.14	52	0.02	0.14	52	0.06	0.42	52	0.06	0.42	52
Operate wheeled vehicles	1.79	1.14	52	1.31	1.39	51	2.44	1.50	52	2.27	1.50	52
Operate track vehicles	0.15	0.46	52	0.06	0.24	51	0.19	0.66	52	0.17	0.62	52
Operate boats	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52
Operate lifting,loading,&grading equip	0.08	0.34	51	0.08	0.44	51	0.10	0.57	51	0.10	0.57	51
Paint	0.87	0.97	52	0.23	0.51	52	0.60	0.75	52	0.54	0.83	52
Install wire and cables	0.46	0.83	52	0.43	0.88	51	0.71	1.29	52	0.63	1.09	52
Repair plastic and fiberglass	0.08	0.27	52	0.02	0.14	51	0.08	0.33	52	0.08	0.33	52
Repair metal	0.12	0.32	52	0.04	0.20	51	0.08	0.27	51	0.08	0.27	51
Assemble steel structures	0.12	0.43	52	0.10	0.50	51	0.19	0.72	52	0.17	0.65	52
Install pipe assemblies	0.04	0.19	52	0.02	0.14	51	0.02	0.14	51	0.02	0.14	51
Construct wooden bldgs & other struct	0.08	0.27	52	0.04	0.20	51	0.12	0.43	52	0.12	0.43	52
Construct masonry bldgs & structures	0.02	0.14	52	0.00	0.00	51	0.04	0.28	52	0.04	0.28	52
Operate gas & electric powered equip	0.92	1.03	52	0.78	1.14	51	1.31	1.44	52	1.12	1.29	52
Select,layout,&clean med/dental equip	0.04	0.28	52	0.00	0.00	51	0.10	0.69	52	0.10	0.69	52
Use audiovisual equipment	0.73	1.12	52	0.55	1.03	51	0.62	1.07	52	0.79	1.18	52
Reproduce printed material	3.04	1.57	52	2.69	1.77	51	1.33	1.46	52	2.63	1.67	52
Operate electronic equipment	1.92	1.77	52	1.94	1.93	51	1.48	1.64	52	2.10	1.81	52
Operate radar	0.02	0.14	52	0.00	0.00	51	0.08	0.55	52	0.08	0.55	52
Operate computer hardware	3.08	1.57	52	2.88	1.66	51	1.59	1.63	51	2.88	1.68	52
Cook	0.10	0.36	52	0.04	0.19	52	0.06	0.24	52	0.04	0.19	52
Perform medical laboratory procedures	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52
Conduct land surveys	0.29	0.67	52	0.10	0.36	51	0.55	1.25	51	0.39	0.98	51
Provide medical or dental treatment	0.08	0.33	52	0.08	0.39	52	0.23	0.94	52	0.19	0.79	52
Sketch maps, overlays, or range cards	0.83	0.98	52	0.43	0.83	51	1.44	1.66	52	1.17	1.40	52
Produce technical drawings	0.13	0.53	52	0.06	0.31	51	0.21	0.78	52	0.13	0.53	52
Draw maps and overlays	0.19	0.53	52	0.13	0.53	52	0.25	0.79	52	0.19	0.63	52
Draw illustrations	0.17	0.51	52	0.17	0.55	52	0.25	0.76	52	0.17	0.51	52
Type	4.77	0.61	52	4.75	0.56	51	1.94	1.67	52	4.19	1.14	52
Prepare technical forms and documents	4.15	1.13	52	4.02	1.08	52	2.00	1.57	52	3.69	1.12	51
Record, file, and dispatch information	4.46	0.83	52	4.25	0.84	52	2.15	1.61	52	3.92	1.01	52
Receive,store,&issue supp, equip, etc	2.83	1.52	52	2.56	1.41	52	2.08	1.48	52	2.71	1.26	52
Use hand and arm signals	1.06	0.92	52	0.63	0.87	51	2.13	1.73	52	1.63	1.39	52
Read tech/field manuals, reg etc	3.52	1.35	52	3.63	1.34	52	3.48	1.26	52	3.65	1.25	52

TASK CATEGORY (Contd)

Frequency and Importance Ratings Descriptive Statistics

MOS=71L

Task Categories	Frequency			Core Technical			Gen. Soldiering			Overall Job		
	MEAN	STD	N	MEAN	STD	N	MEAN	STD	N	MEAN	STD	N
Use maps	1.87	1.16	52	1.37	1.40	51	3.52	1.38	52	2.88	1.46	52
Send and receive radio messages	1.22	1.01	51	0.84	1.13	50	2.41	1.80	51	1.92	1.55	51
Give short oral reports	1.37	1.09	52	1.37	1.28	51	2.38	1.60	52	2.19	1.53	52
Receive clients, patients, guests	1.54	1.72	52	1.25	1.53	52	0.79	1.43	52	1.35	1.57	52
Give directions and instructions	3.00	1.31	52	2.82	1.29	51	2.77	1.48	52	3.19	1.17	52
Write and deliver presentations	1.08	1.33	52	1.08	1.41	51	0.86	1.33	51	1.18	1.38	51
Interview	1.31	1.54	52	1.35	1.57	52	1.31	1.52	52	1.48	1.54	52
Provide counseling	0.88	1.35	52	0.86	1.40	51	1.04	1.53	52	1.17	1.61	52
Write documents and correspondence	2.75	1.67	52	2.90	1.64	51	1.73	1.57	52	2.84	1.65	51
Decode data	0.58	0.72	52	0.48	0.96	52	1.23	1.54	52	1.13	1.43	52
Analyze electronic signals	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52
Analyze weather conditions	0.06	0.31	52	0.02	0.14	52	0.08	0.44	52	0.06	0.42	52
Order equipment and supplies	1.88	1.34	52	1.51	1.24	51	1.35	1.36	52	1.71	1.32	52
Estimate time & cost of maint ops	0.27	0.60	52	0.14	0.53	51	0.38	1.03	52	0.35	0.95	52
Plan placement/use of tactical equip	0.27	0.53	52	0.16	0.46	51	0.60	1.27	52	0.44	0.98	52
Translate foreign languages	0.19	0.53	52	0.16	0.73	51	0.21	0.64	52	0.25	0.68	52
Analyze intelligence data	0.06	0.24	52	0.02	0.14	52	0.10	0.41	52	0.06	0.31	52
Control money	0.50	0.85	52	0.55	1.19	51	0.50	1.00	52	0.63	1.24	52
Determine firing data-indirect weapons	0.10	0.41	52	0.08	0.39	52	0.12	0.51	52	0.08	0.39	52
Compute statistics/other math	0.71	1.07	52	0.83	1.28	52	0.50	0.96	52	0.85	1.26	52
Provide programming & DP support	1.15	1.70	52	1.18	1.58	51	0.69	1.18	52	1.12	1.44	52
Control air traffic	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52
Use hand grenades	1.13	0.91	52	0.64	1.01	50	2.65	1.67	52	2.25	1.60	52
Protect against NBC hazards	2.04	1.07	52	1.24	1.39	49	4.02	1.13	52	3.37	1.36	52
Handle demolitions or mines	0.33	0.68	52	0.12	0.38	52	0.69	1.42	52	0.52	1.18	52
Engage in hand-to-hand combat	0.69	1.02	52	0.29	0.67	51	1.52	1.89	52	1.25	1.69	52
Fire individual weapons	1.98	1.02	52	1.18	1.40	50	4.31	0.90	52	3.56	1.19	52
Control individuals and crowds	0.98	1.04	52	0.45	0.90	51	1.96	1.84	52	1.65	1.64	52
Customs and laws of war	1.38	1.07	52	0.90	1.30	50	3.10	1.50	52	2.54	1.46	52
Navigate	1.40	1.05	52	0.82	1.13	49	3.25	1.71	51	2.71	1.50	51
Survive in the field	1.77	1.02	52	1.24	1.51	50	3.98	1.20	52	3.35	1.33	52
Move and react in the field	1.60	1.14	52	0.98	1.24	50	3.56	1.66	52	3.06	1.55	52
Load & unload field artillery/tank guns	0.02	0.14	52	0.00	0.00	52	0.06	0.42	52	0.06	0.42	52
Fire heavy direct fire weapons	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52
Prepare heavy weapons for tactical use	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52
Place & camoufl tactical equip and mat	0.92	1.08	52	0.57	1.19	51	1.84	1.94	51	1.51	1.74	51
Fire indirect fire weapons	0.04	0.28	52	0.04	0.28	52	0.06	0.42	52	0.06	0.42	52
Give first aid	1.88	1.00	52	1.22	1.39	50	4.17	0.81	52	3.54	1.09	52
Detect and identify targets	1.06	0.98	52	0.60	0.95	50	2.37	1.84	52	1.94	1.60	52
Plan operations	0.44	1.06	52	0.41	1.08	51	0.63	1.31	52	0.60	1.29	52
Direct/lead teams	0.46	0.73	52	0.35	0.71	52	1.04	1.55	52	0.90	1.45	52
Monitor/inspect	1.38	1.66	52	1.39	1.78	51	1.85	1.96	52	1.75	1.86	52
Lead	1.94	1.81	52	1.94	1.89	50	2.47	2.03	51	2.37	2.05	52
Act as a model	2.52	1.85	52	2.44	1.88	50	2.87	1.87	52	2.98	1.82	52
Counsel	1.85	1.73	52	1.75	1.81	51	2.17	1.97	52	2.15	1.99	52
Communicate	2.50	1.93	52	2.37	1.94	51	2.63	1.99	52	2.65	1.96	52
Train	1.62	1.72	52	1.73	1.95	51	2.10	2.01	52	2.12	2.01	52
Personnel Adminstration	2.38	1.90	52	2.41	1.99	51	1.98	1.95	52	2.38	1.89	52

TASK CATEGORY

Frequency and Importance Ratings Descriptive Statistics

MOS=ALL

Task Categories	Frequency			Core Technical			Gen. Soldiering			Overall Job		
	MEAN	STD	N	MEAN	STD	N	MEAN	STD	N	MEAN	STD	N
Perf operator maint chks and services	3.22	1.65	190	3.24	1.80	188	3.30	1.56	188	3.47	1.57	187
Perf operator chks & services on weapons	3.14	1.50	190	3.13	1.84	189	3.90	1.30	189	3.85	1.31	189
Troubleshoot mechanical systems	1.84	1.87	190	2.04	2.00	190	1.65	1.65	190	2.00	1.92	190
Repair weapons	0.94	1.27	189	1.13	1.59	189	1.20	1.58	189	1.26	1.66	189
Repair mechanical systems	1.90	1.90	190	1.66	1.68	190	1.66	1.68	190	2.02	1.92	190
Troubleshoot weapons	1.34	1.58	190	1.60	1.89	189	1.61	1.79	190	1.65	1.81	189
Install electronic components	1.67	1.62	190	1.76	1.76	189	1.76	1.70	189	1.85	1.72	189
Inspect electrical systems	1.23	1.68	190	1.34	1.82	188	0.88	1.33	188	1.22	1.67	188
Inspect electronic systems	0.69	1.29	190	0.74	1.38	189	0.58	1.14	189	0.73	1.36	189
Repair electrical systems	1.06	1.51	190	1.20	1.71	189	0.78	1.24	189	1.12	1.59	189
Repair electronic components	0.73	1.28	190	0.80	1.44	190	0.58	1.16	190	0.75	1.34	190
Pack and load materials	1.66	1.47	190	1.53	1.51	189	1.78	1.53	189	1.74	1.51	189
Prepare parachutes	0.20	0.71	189	0.20	0.77	189	0.24	0.85	189	0.23	0.84	189
Prepare equip and supplies for air drop	0.36	0.78	190	0.43	1.01	190	0.47	1.07	190	0.45	1.05	190
Operate power excavating equipment	0.15	0.54	189	0.18	0.63	189	0.14	0.58	189	0.15	0.59	189
Operate wheeled vehicles	2.69	1.51	190	2.70	1.65	188	2.89	1.49	189	2.99	1.57	189
Operate track vehicles	1.68	1.90	190	1.78	1.98	189	1.57	1.81	190	1.73	1.92	190
Operate boats	0.23	0.68	190	0.32	0.94	190	0.27	0.85	190	0.28	0.83	190
Operate lifting,loading,&grading equip	0.47	1.02	189	0.49	1.10	188	0.38	0.97	188	0.48	1.09	188
Paint	1.46	1.24	190	1.04	1.27	188	1.19	1.27	188	1.19	1.27	187
Install wire and cables	1.15	1.32	190	1.34	1.57	186	1.34	1.53	186	1.35	1.53	186
Repair plastic and fiberglass	0.29	0.73	190	0.34	0.90	188	0.25	0.74	189	0.33	0.88	189
Repair metal	0.55	0.95	190	0.60	1.15	189	0.35	0.79	189	0.58	1.09	189
Assemble steel structures	0.18	0.59	190	0.20	0.71	189	0.23	0.75	190	0.24	0.75	190
Install pipe assemblies	0.12	0.48	190	0.16	0.69	189	0.11	0.52	189	0.16	0.68	189
Construct wooden bldgs & other struct	0.20	0.60	190	0.19	0.68	188	0.23	0.72	189	0.23	0.73	189
Construct masonry bldgs & structures	0.07	0.39	190	0.09	0.53	189	0.10	0.55	190	0.11	0.59	190
Operate gas & electric powered equip	1.28	1.40	190	1.32	1.57	189	1.26	1.42	190	1.36	1.54	190
Select,layout,&clean med/dental equip	0.06	0.37	190	0.05	0.38	189	0.08	0.55	190	0.08	0.55	190
Use audiovisual equipment	0.59	0.99	190	0.55	1.08	188	0.65	1.13	189	0.67	1.14	189
Reproduce printed material	1.44	1.65	190	1.18	1.59	188	0.93	1.30	189	1.28	1.56	189
Operate electronic equipment	1.36	1.60	190	1.46	1.75	188	1.26	1.57	189	1.49	1.74	188
Operate radar	0.09	0.51	190	0.09	0.49	189	0.12	0.58	190	0.12	0.61	190
Operate computer hardware	1.15	1.61	190	1.11	1.65	189	0.80	1.32	189	1.19	1.68	190
Cook	0.27	0.88	189	0.25	0.88	189	0.29	0.95	189	0.29	0.95	189
Perform medical laboratory procedures	0.13	0.67	190	0.13	0.69	190	0.12	0.66	190	0.13	0.69	190
Conduct land surveys	0.72	1.34	189	0.74	1.48	187	0.85	1.51	187	0.81	1.47	187
Provide medical or dental treatment	0.19	0.71	189	0.22	0.83	188	0.28	0.96	188	0.25	0.91	188
Sketch maps, overlays, or range cards	2.13	1.71	190	2.06	1.97	188	2.37	1.81	189	2.37	1.81	189
Produce technical drawings	0.18	0.67	190	0.17	0.70	189	0.22	0.82	190	0.18	0.72	190
Draw maps and overlays	0.57	1.16	190	0.68	1.40	190	0.69	1.35	190	0.64	1.29	190
Draw illustrations	0.44	1.05	190	0.49	1.17	189	0.49	1.14	189	0.44	1.07	189
Type	1.83	2.05	190	1.75	2.07	189	1.08	1.48	189	1.64	1.92	190
Prepare technical forms and documents	2.27	1.88	190	2.26	1.94	189	1.56	1.58	189	2.10	1.80	188
Record, file, and dispatch information	2.20	1.95	190	2.12	1.91	189	1.49	1.57	189	2.06	1.84	189
Receive,store,&issue supp, equip, etc	1.65	1.64	190	1.66	1.63	189	1.42	1.54	189	1.74	1.64	189
Use hand and arm signals	2.86	1.65	190	2.86	1.92	188	3.07	1.58	189	3.06	1.60	189
Read tech/field manuals, reg etc	3.74	1.18	190	3.93	1.15	189	3.70	1.17	189	3.87	1.12	189

TASK CATEGORY (Contd)

Frequency and Importance Ratings Descriptive Statistics

MOS=ALL

Task Categories	Frequency MEAN	STD	N	Core Technical MEAN	STD	N	Gen. Soldiering MEAN	STD	N	Overall Job MEAN	STD	N
Use maps	3.09	1.49	190	3.17	1.77	188	3.76	1.21	189	3.62	1.28	189
Send and receive radio messages	2.59	1.52	189	2.74	1.90	187	3.25	1.56	188	3.11	1.54	188
Give short oral reports	2.66	1.59	190	2.84	1.80	188	3.05	1.61	189	3.09	1.55	189
Receive clients, patients, guests	0.63	1.29	190	0.54	1.19	189	0.44	1.10	189	0.60	1.24	189
Give directions and instructions	2.72	1.45	189	2.88	1.47	186	2.80	1.54	187	2.97	1.48	187
Write and deliver presentations	0.65	1.15	190	0.73	1.35	188	0.68	1.26	188	0.77	1.35	188
Interview	0.73	1.28	190	0.83	1.41	190	0.81	1.39	190	0.87	1.41	190
Provide counseling	0.97	1.48	190	1.01	1.58	188	1.07	1.58	189	1.14	1.68	189
Write documents and correspondence	1.22	1.65	190	1.31	1.77	189	1.01	1.54	190	1.27	1.73	189
Decode data	1.41	1.43	190	1.65	1.79	188	1.88	1.73	188	1.80	1.70	187
Analyze electronic signals	0.22	0.72	190	0.31	0.95	190	0.29	0.88	190	0.28	0.87	190
Analyze weather conditions	0.54	1.13	190	0.65	1.42	189	0.57	1.22	189	0.59	1.30	189
Order equipment and supplies	1.50	1.46	190	1.65	1.67	187	1.37	1.53	188	1.60	1.60	188
Estimate time & cost of maint ops	0.74	1.37	190	0.72	1.40	187	0.56	1.24	187	0.71	1.35	187
Plan placement/use of tactical equip	1.22	1.61	190	1.32	1.82	187	1.39	1.73	188	1.43	1.75	188
Translate foreign languages	0.23	0.77	190	0.20	0.75	188	0.26	0.88	189	0.25	0.78	189
Analyze intelligence data	0.67	1.24	190	0.77	1.42	188	0.76	1.35	188	0.78	1.41	188
Control money	0.65	1.32	190	0.63	1.39	188	0.67	1.41	189	0.72	1.49	189
Determine firing data-indirect weapons	0.62	1.26	190	0.70	1.46	188	0.67	1.38	188	0.69	1.42	188
Compute statistics/other math	0.52	1.02	190	0.62	1.25	188	0.51	1.09	188	0.62	1.20	188
Provide programming & DP support	0.48	1.13	190	0.53	1.24	186	0.37	0.96	187	0.48	1.10	187
Control air traffic	0.08	0.40	190	0.15	0.69	190	0.12	0.56	190	0.13	0.63	190
Use hand grenades	2.28	1.55	190	2.50	2.04	185	3.25	1.62	187	3.18	1.60	187
Protect against NBC hazards	3.07	1.32	190	3.12	1.91	185	4.22	0.96	188	3.98	1.14	188
Handle demolitions or mines	1.42	1.52	190	1.79	2.01	189	1.89	1.85	189	1.93	1.89	189
Engage in hand-to-hand combat	1.55	1.45	190	1.92	1.94	188	2.44	1.85	189	2.34	1.81	189
Fire individual weapons	3.23	1.42	190	3.11	1.98	187	4.33	0.94	189	4.12	1.03	189
Control individuals and crowds	2.01	1.59	190	1.97	1.87	188	2.50	1.84	189	2.48	1.79	189
Customs and laws of war	2.27	1.48	190	2.29	1.87	185	3.28	1.46	188	3.04	1.50	188
Navigate	2.58	1.58	190	2.70	1.98	186	3.51	1.53	188	3.38	1.51	188
Survive in the field	2.95	1.62	190	2.85	2.00	187	3.86	1.41	188	3.72	1.40	189
Move and react in the field	2.93	1.67	190	2.88	2.02	187	3.72	1.44	189	3.69	1.42	189
Load & unload field artillery/tank guns	0.35	1.03	189	0.40	1.22	188	0.37	1.09	188	0.40	1.18	188
Fire heavy direct fire weapons	0.76	1.46	190	1.00	1.79	190	0.80	1.55	190	0.91	1.69	190
Prepare heavy weapons for tactical use	0.32	1.02	190	0.38	1.20	190	0.33	1.06	190	0.35	1.12	190
Place & camoufl tactical equip and mat	2.12	1.72	190	2.26	2.02	189	2.66	1.85	189	2.63	1.88	189
Fire indirect fire weapons	0.41	1.13	189	0.44	1.23	188	0.46	1.26	188	0.45	1.25	188
Give first aid	2.78	1.28	190	3.01	1.88	186	4.19	0.90	188	4.02	0.96	188
Detect and identify targets	2.39	1.65	190	2.54	2.02	187	3.17	1.65	189	3.09	1.66	189
Plan operations	1.08	1.57	190	1.32	1.87	188	1.34	1.84	189	1.37	1.87	189
Direct/lead teams	1.27	1.59	190	1.57	1.94	189	1.65	1.85	189	1.67	1.90	189
Monitor/inspect	1.92	1.79	190	2.12	1.93	188	2.18	1.92	189	2.22	1.92	189
Lead	2.25	1.77	190	2.51	1.95	185	2.68	1.97	186	2.70	1.97	187
Act as a model	2.67	1.72	190	2.90	1.87	185	3.12	1.81	187	3.14	1.79	187
Counsel	1.88	1.77	190	2.06	1.95	188	2.26	1.98	189	2.24	1.99	189
Communicate	2.57	1.85	190	2.78	1.92	188	2.85	1.91	189	2.90	1.90	188
Train	1.79	1.83	190	2.10	2.09	188	2.18	2.04	189	2.22	2.09	189
Personnel Administration	1.65	1.89	190	1.72	1.99	188	1.61	1.92	189	1.74	1.96	189

JOB ACTIVITY

Frequency and Importance Ratings Descriptive Statistics

MOS=11B

Job Activities	Frequency MEAN	Frequency STD	Frequency N	Core Technical MEAN	Core Technical STD	Core Technical N	Gen. Soldiering MEAN	Gen. Soldiering STD	Gen. Soldiering N	Overall Job MEAN	Overall Job STD	Overall Job N
Work in a team	4.18	0.90	88	4.37	0.98	87	4.22	1.11	87	4.46	0.83	87
Lead a team	2.28	1.47	88	3.07	1.66	87	2.89	1.60	87	3.14	1.63	87
Support/advise peers	2.94	1.46	88	3.26	1.51	87	3.20	1.43	87	3.32	1.43	87
Support/advise subordinates	2.60	1.58	88	2.94	1.67	87	2.98	1.67	87	3.03	1.71	87
Coach peers	2.70	1.44	88	2.97	1.56	87	3.01	1.56	87	3.08	1.54	87
Coach subordinates	2.67	1.57	86	2.99	1.64	84	3.01	1.65	84	3.15	1.71	84
Make oral reports (to individuals)	2.70	1.54	88	2.76	1.69	87	2.82	1.65	87	2.84	1.61	87
Make oral reports (to groups)	1.51	1.41	88	1.74	1.74	87	1.82	1.73	87	1.91	1.74	87
Relay oral instructions	3.07	1.51	88	3.26	1.57	87	3.16	1.55	87	3.31	1.50	87
Interview	1.38	1.51	88	1.54	1.70	87	1.52	1.67	87	1.54	1.67	87
Record information	2.49	1.41	88	2.67	1.51	87	2.68	1.57	87	2.80	1.58	87
Write brief messages	1.95	1.55	88	2.06	1.74	87	2.17	1.78	87	2.22	1.79	87
Write longer reports	0.64	1.01	87	0.88	1.40	86	0.79	1.29	86	0.84	1.33	86
Monitor/interpret verbal messages	2.13	1.77	88	2.38	1.78	86	2.26	1.75	85	2.32	1.75	85
Recall verbal information	2.70	1.63	88	2.84	1.71	86	2.69	1.59	85	2.78	1.61	85
Monitor/interpret numerical information	1.44	1.49	88	1.57	1.55	86	1.54	1.52	85	1.59	1.60	85
Recall numerical information	1.74	1.58	88	1.79	1.65	86	1.85	1.63	85	1.86	1.66	85
Monitor/interpret figural information	1.64	1.41	88	2.00	1.74	86	1.84	1.62	85	1.82	1.60	85
Recall figural information	1.68	1.50	88	1.88	1.75	86	1.71	1.58	85	1.88	1.73	85
Follow oral directions	3.86	1.45	88	3.84	1.49	86	3.84	1.44	85	4.00	1.39	85
Follow written directions	3.41	1.31	88	3.65	1.36	86	3.72	1.35	85	3.84	1.38	85
Judge size and distance	3.00	1.37	88	3.55	1.42	86	2.94	1.34	86	3.26	1.29	86
Judge location	3.00	1.41	88	3.71	1.56	86	3.08	1.54	86	3.35	1.49	86
Judge paths of moving objects	2.20	1.57	88	2.65	1.83	86	2.19	1.61	86	2.38	1.65	86
Solve electrical system problems	0.97	1.35	88	1.08	1.53	87	1.01	1.42	87	1.01	1.40	87
Solve mechanical system problems	1.51	1.49	88	1.79	1.77	86	1.57	1.59	86	1.69	1.66	86
Solve logistical problems	0.80	1.22	88	0.94	1.39	86	0.91	1.34	86	0.93	1.38	86
Solve tactical maneuver problems	1.75	1.64	88	2.27	1.92	86	1.87	1.74	86	2.15	1.89	86
Solve administrative problems	1.00	1.29	88	1.23	1.61	86	1.28	1.67	86	1.36	1.71	86
Solve leadership problems	1.65	1.63	88	2.01	1.86	86	1.88	1.81	86	2.07	1.92	86
Solve medical problems	0.85	1.22	88	0.98	1.46	86	0.93	1.43	86	1.02	1.56	86
Solve communication problems	1.58	1.48	88	1.87	1.68	87	1.84	1.66	87	1.91	1.73	87
Operate precision hand-held equipment	0.69	1.43	88	0.72	1.43	88	0.66	1.35	88	0.72	1.43	88
Operate hand-held tools	2.38	1.56	87	2.30	1.60	86	2.16	1.47	86	2.29	1.54	86
Operate hand-held power equipment	0.86	1.25	87	0.88	1.22	86	0.93	1.28	86	0.88	1.23	86
Operate larger power equipment	0.59	1.27	86	0.60	1.28	86	0.51	1.17	86	0.57	1.22	86
Operate full keyboard	0.53	0.91	87	0.46	0.96	87	0.51	0.99	87	0.51	0.97	87
Operate numeric keyboard	0.32	0.74	87	0.34	0.78	87	0.34	0.79	87	0.38	0.84	87
Adjust control device using one limb	2.01	1.76	87	2.09	1.87	87	1.80	1.73	87	2.09	1.86	87
Adj control device using mult limbs	1.89	1.82	87	1.95	1.85	86	1.81	1.77	86	1.94	1.82	86
Drive tracked vehicle	2.54	1.86	87	2.68	1.89	87	2.25	1.70	87	2.59	1.79	87
Drive heavy wheeled vehicle	1.52	1.61	87	1.67	1.75	87	1.63	1.66	87	1.68	1.68	87
Drive light wheeled vehicle	2.20	1.46	87	2.46	1.59	87	2.34	1.51	87	2.47	1.50	87
Aim:stationary target	4.10	1.00	87	4.56	0.85	86	4.15	1.13	86	4.40	0.95	86
Aim:moving target	3.66	1.35	87	4.32	1.12	87	3.91	1.30	87	4.16	1.16	87
Walk long distances	4.10	1.12	87	4.17	1.21	86	3.65	1.45	86	4.01	1.16	86
Run short distances	4.22	1.05	87	4.24	1.03	86	3.83	1.30	86	4.13	1.03	86
Push, pull, lift heavy weights	3.48	1.33	87	3.51	1.47	86	3.09	1.47	86	3.37	1.39	86
Throw objects	3.23	1.36	87	3.45	1.46	86	3.00	1.53	86	3.22	1.45	86
Sort, fold, feed by hand	1.48	1.72	87	1.47	1.82	87	1.41	1.73	87	1.47	1.79	87
Make coordinated movements	2.69	1.73	87	2.92	1.75	86	2.51	1.75	86	2.71	1.80	86
Work long hours	4.21	0.86	87	3.74	1.36	86	3.36	1.46	86	3.64	1.32	86
Work under adverse conditions	4.07	1.11	86	3.95	1.34	85	3.56	1.47	85	3.99	1.17	85

JOB ACTIVITY

Frequency and Importance Ratings Descriptive Statistics

MOS=63B

Job Activities	Frequency MEAN	STD	N	Core Technical MEAN	STD	N	Gen. Soldiering MEAN	STD	N	Overall Job MEAN	STD	N
Work in a team	3.32	1.38	50	3.34	1.32	50	3.70	1.27	50	3.58	1.21	50
Lead a team	2.08	1.55	50	2.34	1.64	50	2.76	1.62	50	2.64	1.56	50
Support/advise peers	2.44	1.49	50	2.48	1.54	50	2.84	1.61	50	2.68	1.52	50
Support/advise subordinates	2.26	1.58	50	2.50	1.58	50	2.90	1.57	50	2.74	1.52	50
Coach peers	2.10	1.39	50	2.30	1.49	50	2.56	1.58	50	2.36	1.47	50
Coach subordinates	2.12	1.62	50	2.38	1.65	50	2.66	1.77	50	2.42	1.63	50
Make oral reports (to individuals)	2.38	1.37	50	2.54	1.42	50	2.68	1.32	50	2.66	1.30	50
Make oral reports (to groups)	1.42	1.18	50	1.64	1.35	50	1.88	1.45	50	1.68	1.35	50
Relay oral instructions	2.52	1.25	50	2.70	1.33	50	2.74	1.31	50	2.64	1.24	50
Interview	1.08	1.37	50	1.24	1.52	50	1.18	1.37	50	1.22	1.50	50
Record information	2.58	1.36	50	2.82	1.48	49	2.41	1.26	49	2.67	1.33	49
Write brief messages	1.82	1.38	50	1.94	1.41	50	1.90	1.28	50	1.96	1.32	50
Write longer reports	0.58	0.97	50	0.70	1.13	50	0.80	1.23	50	0.70	1.16	50
Monitor/interpret verbal messages	1.54	1.59	50	1.74	1.79	50	1.76	1.78	50	1.74	1.77	50
Recall verbal information	2.58	1.57	50	2.68	1.66	50	2.70	1.67	50	2.74	1.61	50
Monitor/interpret numerical information	1.48	1.25	50	1.78	1.54	50	1.66	1.44	50	1.72	1.49	50
Recall numerical information	2.06	1.35	50	2.36	1.56	50	2.26	1.51	50	2.20	1.47	50
Monitor/interpret figural information	1.74	1.66	50	2.12	1.88	50	1.82	1.56	50	1.94	1.72	50
Recall figural information	1.68	1.38	50	2.08	1.66	50	1.92	1.43	50	1.96	1.55	50
Follow oral directions	3.74	1.07	50	3.70	1.05	50	3.72	1.01	50	3.88	0.98	50
Follow written directions	3.88	0.98	50	3.94	1.11	50	3.74	1.03	50	3.94	1.11	50
Judge size and distance	2.40	1.26	50	2.52	1.49	50	2.76	1.33	50	2.76	1.35	50
Judge location	2.45	0.82	49	2.45	1.21	49	3.10	1.10	49	2.98	0.99	49
Judge paths of moving objects	2.68	1.02	50	2.90	1.25	50	2.86	1.01	50	3.00	1.05	50
Solve electrical system problems	3.22	1.25	50	3.92	1.26	50	2.10	1.46	50	3.36	1.26	50
Solve mechanical system problems	3.62	1.07	50	4.12	1.00	50	2.36	1.21	50	3.50	1.20	50
Solve logistical problems	1.56	1.50	50	1.88	1.67	50	1.48	1.49	50	1.74	1.58	50
Solve tactical maneuver problems	1.20	1.18	50	1.26	1.45	50	1.82	1.77	50	1.60	1.58	50
Solve administrative problems	1.32	1.53	50	1.26	1.51	50	1.30	1.49	50	1.34	1.52	50
Solve leadership problems	1.36	1.59	50	1.44	1.64	50	1.76	1.72	50	1.62	1.60	50
Solve medical problems	0.68	1.15	50	0.66	1.19	50	1.00	1.56	50	0.90	1.40	50
Solve communication problems	1.10	1.16	50	1.24	1.36	50	1.54	1.58	50	1.40	1.43	50
Operate precision hand-held equipment	2.92	1.52	50	3.52	1.54	50	2.18	1.30	50	2.94	1.46	50
Operate hand-held tools	4.18	1.00	50	4.38	0.88	50	2.54	1.34	50	3.80	1.20	50
Operate hand-held power equipment	3.62	1.18	50	4.04	1.03	50	2.34	1.35	50	3.44	1.33	50
Operate larger power equipment	1.82	1.52	50	2.12	1.65	50	1.26	1.37	50	2.00	1.77	50
Operate full keyboard	0.76	0.94	50	0.92	1.14	50	0.84	1.22	50	0.94	1.22	50
Operate numeric keyboard	0.56	0.84	50	0.72	1.11	50	0.56	0.99	50	0.70	1.13	50
Adjust control device using one limb	2.88	1.55	50	3.10	1.59	50	2.08	1.26	50	2.68	1.56	50
Adj control device using mult limbs	3.02	1.46	50	3.30	1.56	50	2.24	1.32	49	2.86	1.51	49
Drive tracked vehicle	1.36	1.35	50	1.76	1.70	50	1.56	1.58	50	1.64	1.56	50
Drive heavy wheeled vehicle	2.80	1.60	50	3.16	1.71	50	2.46	1.45	50	2.94	1.60	50
Drive light wheeled vehicle	3.94	1.11	50	4.02	1.19	50	3.16	1.25	50	3.74	1.12	50
Aim:stationary target	2.26	1.21	50	1.78	1.71	50	3.50	1.52	50	3.00	1.36	50
Aim:moving target	1.70	1.37	50	1.72	1.76	50	3.00	1.82	50	2.56	1.58	50
Walk long distances	2.38	1.24	50	2.04	1.63	50	2.98	1.45	50	2.82	1.37	50
Run short distances	3.54	1.07	50	2.32	1.77	50	3.88	1.06	50	3.52	1.16	50
Push, pull, lift heavy weights	3.42	0.97	50	3.26	1.31	50	3.20	1.12	50	3.38	1.01	50
Throw objects	1.48	1.37	50	1.12	1.30	50	1.86	1.60	50	1.68	1.50	50
Sort, fold, feed by hand	1.64	1.59	50	1.76	1.64	50	1.52	1.54	50	1.70	1.61	50
Make coordinated movements	2.86	1.28	50	3.10	1.43	50	2.66	1.27	50	2.98	1.29	50
Work long hours	3.22	1.15	50	3.28	1.39	50	3.30	1.37	50	3.38	1.19	50
Work under adverse conditions	2.94	1.39	50	3.14	1.58	50	2.98	1.49	50	3.14	1.50	50

JOB ACTIVITY

Frequency and Importance Ratings Descriptive Statistics

MOS=71L

Job Activities	Frequency MEAN	STD	N	Core Technical MEAN	STD	N	Gen. Soldiering MEAN	STD	N	Overall Job MEAN	STD	N
Work in a team	2.94	1.36	52	3.08	1.38	52	3.73	1.29	52	3.52	1.21	52
Lead a team	1.67	1.59	52	1.80	1.70	51	2.39	1.78	51	2.37	1.71	51
Support/advise peers	2.65	1.27	52	2.88	1.31	51	3.33	1.16	51	3.24	1.12	51
Support/advise subordinates	2.17	1.69	52	2.45	1.76	51	2.65	1.80	51	2.57	1.69	51
Coach peers	2.38	1.30	52	2.59	1.30	51	2.76	1.42	51	2.69	1.30	51
Coach subordinates	2.12	1.69	52	2.41	1.73	51	2.55	1.84	51	2.53	1.75	51
Make oral reports (to individuals)	2.62	1.47	52	2.58	1.47	52	2.67	1.41	52	2.75	1.43	52
Make oral reports (to groups)	1.69	1.50	52	1.73	1.54	52	1.94	1.66	52	2.10	1.65	52
Relay oral instructions	2.79	1.32	52	3.18	1.20	51	3.24	1.41	51	3.31	1.24	51
Interview	1.73	1.56	52	1.92	1.62	52	1.56	1.61	52	1.87	1.60	52
Record information	3.52	1.43	52	3.62	1.30	52	2.73	1.56	52	3.42	1.35	52
Write brief messages	3.04	1.63	52	3.21	1.39	52	2.56	1.55	52	3.13	1.39	52
Write longer reports	1.44	1.39	52	1.53	1.36	51	1.16	1.29	51	1.57	1.42	51
Monitor/interpret verbal messages	2.54	1.42	52	2.88	1.53	51	2.53	1.47	51	2.80	1.51	51
Recall verbal information	2.96	1.30	52	3.24	1.27	51	3.10	1.32	51	3.22	1.30	51
Monitor/interpret numerical information	1.83	1.41	52	2.08	1.56	52	1.67	1.46	52	2.02	1.54	52
Recall numerical information	1.98	1.31	52	2.28	1.53	50	2.04	1.50	50	2.36	1.50	50
Monitor/interpret figural information	1.25	1.33	52	1.38	1.36	52	1.56	1.63	52	1.58	1.55	52
Recall figural information	1.15	1.14	52	1.33	1.38	51	1.80	1.76	51	1.63	1.48	51
Follow oral directions	3.90	1.29	52	4.20	1.11	51	4.00	1.30	51	4.20	1.10	51
Follow written directions	4.12	0.94	52	4.41	0.90	51	4.10	1.15	51	4.37	0.85	51
Judge size and distance	1.13	1.07	52	0.92	1.15	51	2.15	1.78	52	1.67	1.46	52
Judge location	1.33	0.86	52	1.02	1.15	50	2.96	1.56	51	2.28	1.50	50
Judge paths of moving objects	0.79	0.94	52	0.69	1.03	51	1.51	1.69	51	1.16	1.39	51
Solve electrical system problems	0.60	1.05	52	0.48	0.87	52	0.78	1.32	51	0.61	1.02	51
Solve mechanical system problems	0.75	1.08	52	0.63	0.99	52	0.83	1.26	52	0.75	1.12	52
Solve logistical problems	0.71	1.05	52	0.67	1.17	52	0.90	1.36	52	0.75	1.20	52
Solve tactical maneuver problems	0.40	0.75	52	0.25	0.62	52	0.73	1.34	52	0.52	0.98	52
Solve administrative problems	3.00	1.41	52	3.43	1.50	51	2.37	1.67	51	3.20	1.47	51
Solve leadership problems	1.52	1.55	52	1.73	1.79	51	1.90	1.85	51	1.92	1.78	51
Solve medical problems	0.38	0.95	52	0.31	0.85	52	0.46	1.09	52	0.44	1.07	52
Solve communication problems	1.52	1.53	52	1.67	1.70	51	1.75	1.83	51	1.78	1.74	51
Operate precision hand-held equipment	0.27	0.74	52	0.29	0.87	52	0.37	0.93	52	0.31	0.78	52
Operate hand-held tools	0.71	0.89	52	0.56	0.87	52	1.15	1.38	52	0.92	1.13	52
Operate hand-held power equipment	0.37	0.77	52	0.25	0.62	52	0.42	0.82	52	0.31	0.64	52
Operate larger power equipment	0.27	0.66	52	0.17	0.51	52	0.27	0.72	52	0.23	0.65	52
Operate full keyboard	4.58	0.78	52	4.54	0.93	50	2.22	1.74	49	4.02	1.22	50
Operate numeric keyboard	2.16	1.72	51	2.29	1.79	51	1.22	1.52	50	2.18	1.75	51
Adjust control device using one limb	1.00	1.22	51	0.96	1.22	51	1.14	1.40	51	1.20	1.36	51
Adj control device using mult limbs	1.00	1.34	51	1.04	1.34	51	1.20	1.54	51	1.24	1.53	51
Drive tracked vehicle	0.19	0.53	52	0.06	0.31	52	0.21	0.64	52	0.13	0.44	52
Drive heavy wheeled vehicle	0.48	0.78	52	0.21	0.54	52	0.65	1.20	52	0.48	1.00	52
Drive light wheeled vehicle	1.62	1.21	52	1.15	1.27	52	2.08	1.61	52	1.75	1.53	52
Aim:stationary target	1.65	1.25	52	0.75	1.18	51	3.15	1.83	52	2.58	1.59	52
Aim:moving target	1.00	1.25	52	0.49	0.99	51	1.90	1.99	52	1.69	1.73	52
Walk long distances	1.46	0.85	52	0.88	0.95	49	2.90	1.55	51	2.33	1.40	51
Run short distances	2.71	1.51	52	1.29	1.45	51	3.43	1.39	51	2.90	1.30	51
Push, pull, lift heavy weights	1.46	1.09	52	0.83	0.96	52	2.17	1.59	52	1.90	1.35	52
Throw objects	0.69	0.90	52	0.37	0.69	52	1.29	1.60	52	1.13	1.43	52
Sort, fold, feed by hand	2.58	1.45	52	2.55	1.55	51	1.63	1.55	51	2.45	1.45	51
Make coordinated movements	1.33	1.37	52	1.25	1.48	52	2.06	1.69	52	1.88	1.59	52
Work long hours	2.31	1.25	52	1.94	1.45	51	2.86	1.46	51	2.63	1.36	51
Work under adverse conditions	1.40	1.09	52	1.37	1.40	51	2.57	1.85	51	2.27	1.72	51

JOB ACTIVITY

Frequency and Importance Ratings Descriptive Statistics

MOS=ALL

Job Activities	Frequency MEAN	Frequency STD	Frequency N	Core Technical MEAN	Core Technical STD	Core Technical N	Gen. Soldiering MEAN	Gen. Soldiering STD	Gen. Soldiering N	Overall Job MEAN	Overall Job STD	Overall Job N
Work in a team	3.22	1.65	190	3.24	1.80	188	3.30	1.56	188	3.47	1.57	187
Lead a team	3.14	1.50	190	3.13	1.84	189	3.90	1.30	189	3.85	1.31	189
Support/advise peers	1.84	1.87	190	2.04	2.00	190	1.65	1.65	190	2.00	1.92	190
Support/advise subordinates	0.94	1.27	189	1.13	1.59	189	1.20	1.58	189	1.26	1.66	189
Coach peers	1.90	1.90	190	1.66	1.68	190	1.66	1.68	190	2.02	1.92	190
Coach subordinates	1.34	1.58	190	1.60	1.89	189	1.61	1.79	190	1.65	1.81	189
Make oral reports (to individuals)	1.67	1.62	190	1.76	1.76	189	1.76	1.70	189	1.85	1.72	189
Make oral reports (to groups)	1.23	1.68	190	1.34	1.82	188	0.88	1.33	188	1.22	1.67	188
Relay oral instructions	0.69	1.29	190	0.74	1.38	189	0.58	1.14	189	0.73	1.36	189
Interview	1.06	1.51	190	1.20	1.71	189	0.78	1.24	189	1.12	1.59	189
Record information	0.73	1.28	190	0.80	1.44	190	0.58	1.16	190	0.75	1.34	190
Write brief messages	1.66	1.47	190	1.53	1.51	189	1.78	1.53	189	1.74	1.51	189
Write longer reports	0.20	0.71	189	0.20	0.77	189	0.24	0.85	189	0.23	0.84	189
Monitor/interpret verbal messages	0.36	0.78	190	0.43	1.01	190	0.47	1.07	190	0.45	1.05	190
Recall verbal information	0.15	0.54	189	0.18	0.63	189	0.14	0.58	189	0.15	0.59	189
Monitor/interpret numerical information	2.69	1.51	190	2.70	1.65	188	2.89	1.49	189	2.99	1.57	189
Recall numerical information	1.68	1.90	190	1.78	1.98	189	1.57	1.81	190	1.73	1.92	190
Monitor/interpret figural information	0.23	0.68	190	0.32	0.94	190	0.27	0.85	190	0.28	0.83	190
Recall figural information	0.47	1.02	189	0.49	1.10	188	0.38	0.97	188	0.48	1.09	188
Follow oral directions	1.46	1.24	190	1.04	1.27	188	1.19	1.27	188	1.19	1.27	187
Follow written directions	1.15	1.32	190	1.34	1.57	186	1.34	1.53	186	1.35	1.53	186
Judge size and distance	0.29	0.73	190	0.34	0.90	188	0.25	0.74	189	0.33	0.88	189
Judge location	0.55	0.95	190	0.60	1.15	189	0.35	0.79	189	0.58	1.09	189
Judge paths of moving objects	0.18	0.59	190	0.20	0.71	189	0.23	0.75	190	0.24	0.75	190
Solve electrical system problems	0.12	0.48	190	0.16	0.69	189	0.11	0.52	189	0.16	0.68	189
Solve mechanical system problems	0.20	0.60	190	0.19	0.68	188	0.23	0.72	189	0.23	0.73	189
Solve logistical problems	0.07	0.39	190	0.09	0.53	189	0.10	0.55	190	0.11	0.59	190
Solve tactical maneuver problems	1.28	1.40	190	1.32	1.57	189	1.26	1.42	190	1.36	1.54	190
Solve administrative problems	0.06	0.37	190	0.05	0.38	189	0.08	0.55	190	0.08	0.55	190
Solve leadership problems	0.59	0.99	190	0.55	1.08	188	0.65	1.13	189	0.67	1.14	189
Solve medical problems	1.44	1.65	190	1.18	1.59	188	0.93	1.30	189	1.28	1.56	189
Solve communication problems	1.36	1.60	190	1.46	1.75	188	1.26	1.57	189	1.49	1.74	188
Operate precision hand-held equipment	0.09	0.51	190	0.09	0.49	189	0.12	0.58	190	0.12	0.61	190
Operate hand-held tools	1.15	1.61	190	1.11	1.65	189	0.80	1.32	189	1.19	1.68	190
Operate hand-held power equipment	0.27	0.88	189	0.25	0.88	189	0.29	0.95	189	0.29	0.95	189
Operate larger power equipment	0.13	0.67	190	0.13	0.69	190	0.12	0.66	190	0.13	0.69	190
Operate full keyboard	0.72	1.34	189	0.74	1.48	187	0.85	1.51	187	0.81	1.47	187
Operate numeric keyboard	0.19	0.71	189	0.22	0.83	188	0.28	0.96	188	0.25	0.91	188
Adjust control device using one limb	2.13	1.71	190	2.06	1.97	188	2.37	1.81	189	2.37	1.81	189
Adj control device using mult limbs	0.18	0.67	190	0.17	0.70	189	0.22	0.82	190	0.18	0.72	190
Drive tracked vehicle	0.57	1.16	190	0.68	1.40	190	0.69	1.35	190	0.64	1.29	190
Drive heavy wheeled vehicle	0.44	1.05	190	0.49	1.17	189	0.49	1.14	189	0.44	1.07	189
Drive light wheeled vehicle	1.83	2.05	190	1.75	2.07	189	1.08	1.48	189	1.64	1.92	190
Aim:stationary target	2.27	1.88	190	2.26	1.94	189	1.56	1.58	189	2.10	1.80	188
Aim:moving target	2.20	1.95	190	2.12	1.91	189	1.49	1.57	189	2.06	1.84	189
Walk long distances	1.65	1.64	190	1.66	1.63	189	1.42	1.54	189	1.74	1.64	189
Run short distances	2.86	1.65	190	2.86	1.92	188	3.07	1.58	189	3.06	1.60	189
Push, pull, lift heavy weights	3.74	1.18	190	3.93	1.15	189	3.70	1.17	189	3.87	1.12	189
Throw objects	3.09	1.49	190	3.17	1.77	188	3.76	1.21	189	3.62	1.28	189
Sort, fold, feed by hand	2.59	1.52	189	2.74	1.90	187	3.25	1.56	188	3.11	1.54	188
Make coordinated movements	2.66	1.59	190	2.84	1.80	188	3.05	1.61	189	3.09	1.55	189
Work long hours	0.63	1.29	190	0.54	1.19	189	0.44	1.10	189	0.60	1.24	189
Work under adverse conditions	2.72	1.45	189	2.88	1.47	186	2.80	1.54	187	2.97	1.48	187

Tables of Component Rating Means, Standard Deviations, and N
Ordered by CTP Mean Rating

Task Category Instrument
- 11B
- 63B
- 71L

Job Activity Instrument
- 11B
- 63B
- 71L

TASK CATEGORY
Frequency and Importance Ratings Descriptive Statistics
Ordered by Core Technical Rating Means
MOS=11B

Task Categories	Frequency MEAN	STD	N	Core Technical MEAN	STD	N	Gen. Soldiering MEAN	STD	N	Overall Job MEAN	STD	N
Fire individual weapons	4.19	1.02	88	4.67	0.56	87	4.44	0.96	87	4.52	0.76	87
Protect against NBC hazards	3.81	1.10	88	4.63	0.55	86	4.35	0.88	86	4.42	0.87	86
Move and react in the field	4.27	1.00	88	4.60	0.72	87	4.06	1.21	87	4.38	0.93	87
Perf operator chks & services on weapons	4.24	0.90	88	4.50	0.86	88	4.19	1.12	88	4.41	0.87	88
Use maps	4.02	1.11	88	4.45	0.82	87	3.98	1.13	87	4.10	1.07	87
Give first aid	3.41	1.17	88	4.35	0.96	86	4.28	0.93	86	4.31	0.80	86
Survive in the field	4.05	1.29	88	4.33	1.14	87	3.98	1.39	86	4.16	1.25	87
Navigate	3.68	1.27	88	4.30	1.06	87	3.90	1.29	87	4.05	1.17	87
Use hand and arm signals	4.10	0.98	88	4.28	1.10	87	3.82	1.28	87	4.05	1.12	87
Detect and identify targets	3.64	1.19	88	4.28	0.95	87	3.86	1.18	87	4.05	1.07	87
Use hand grenades	3.38	1.23	88	4.22	1.07	86	3.80	1.28	86	4.06	1.06	86
Give short oral reports	3.77	1.14	88	4.21	1.08	87	3.74	1.32	87	3.97	1.09	87
Send and receive radio messages	3.58	1.14	88	4.20	0.96	87	3.78	1.14	87	3.90	1.05	87
Perf operator maint chks and services	3.75	1.42	88	3.89	1.41	88	3.56	1.46	87	3.87	1.37	86
Read tech/field manuals, reg etc	3.67	1.10	88	3.86	1.14	87	3.80	1.18	87	3.85	1.14	87
Sketch maps, overlays, or range cards	3.33	1.45	88	3.61	1.53	87	3.09	1.59	87	3.41	1.55	87
Customs and laws of war	3.03	1.43	88	3.54	1.44	85	3.48	1.36	86	3.47	1.39	86
Place & camoufl tactical equip and mat	2.97	1.73	88	3.51	1.74	88	3.10	1.67	88	3.38	1.72	88
Engage in hand-to-hand combat	2.31	1.49	88	3.38	1.66	87	3.07	1.67	87	3.22	1.57	87
Handle demolitions or mines	2.42	1.53	88	3.34	1.72	87	2.83	1.67	87	3.07	1.70	87
Control individuals and crowds	2.97	1.41	88	3.34	1.50	87	3.11	1.60	87	3.38	1.47	87
Act as a model	2.78	1.80	88	3.15	1.95	86	3.09	1.90	86	3.17	1.93	86
Communicate	2.75	1.95	88	3.14	2.04	87	2.91	2.02	87	3.07	2.03	86
Give directions and instructions	2.78	1.56	87	3.07	1.66	86	2.87	1.68	86	2.99	1.70	86
Lead	2.56	1.79	88	3.00	1.99	86	2.84	1.96	86	3.02	1.97	86
Troubleshoot weapons	2.26	1.62	88	2.82	1.82	88	2.51	1.72	88	2.65	1.71	88
Decode data	2.15	1.44	88	2.80	1.70	86	2.53	1.61	86	2.52	1.66	85
Operate track vehicles	2.74	2.01	88	2.77	2.02	88	2.43	1.85	88	2.67	1.95	88
Direct/lead teams	2.10	1.82	88	2.70	2.10	87	2.28	1.93	87	2.41	2.02	87
Monitor/inspect	2.35	1.88	88	2.69	1.98	87	2.57	1.94	87	2.68	2.00	87
Operate wheeled vehicles	2.53	1.52	88	2.68	1.43	87	2.57	1.48	87	2.74	1.53	87
Counsel	2.11	1.88	88	2.53	2.07	87	2.46	2.04	87	2.53	2.10	87
Install electronic components	2.33	1.72	88	2.45	1.84	88	2.33	1.78	88	2.35	1.81	88
Train	2.03	1.96	88	2.45	2.18	87	2.33	2.09	87	2.41	2.17	87
Plan operations	1.67	1.74	88	2.22	2.09	87	2.06	2.01	87	2.11	2.05	87
Plan placement/use of tactical equip	1.78	1.85	88	2.12	2.08	86	1.77	1.85	86	1.99	1.94	86
Pack and load materials	2.03	1.58	88	2.10	1.58	87	1.93	1.52	87	1.95	1.55	87
Fire heavy direct fire weapons	1.58	1.80	88	2.03	2.12	88	1.65	1.89	88	1.86	2.02	88
Troubleshoot mechanical systems	1.72	1.75	88	1.92	1.84	88	1.74	1.73	88	1.93	1.88	88
Repair weapons	1.40	1.38	87	1.86	1.75	87	1.69	1.68	87	1.85	1.76	87
Install wire and cables	1.52	1.49	88	1.84	1.70	86	1.65	1.62	85	1.66	1.64	85
Repair mechanical systems	1.64	1.61	88	1.80	1.73	88	1.80	1.73	88	1.93	1.83	88
Personnel Administration	1.58	1.94	88	1.66	2.02	87	1.59	1.96	87	1.64	2.01	87
Operate electronic equipment	1.27	1.64	88	1.41	1.76	88	1.26	1.64	88	1.36	1.78	87
Analyze intelligence data	1.13	1.53	88	1.40	1.76	86	1.22	1.59	86	1.28	1.64	86
Provide counseling	1.18	1.63	88	1.28	1.78	87	1.26	1.70	87	1.32	1.86	87
Order equipment and supplies	1.02	1.40	88	1.27	1.74	86	1.15	1.62	86	1.13	1.60	86
Determine firing data-indirect weapons	1.05	1.55	88	1.24	1.79	86	1.05	1.60	86	1.14	1.70	86

TASK CATEGORY (Contd.)

Frequency and Importance Ratings Descriptive Statistics

Ordered by Core Technical Rating Means

MOS=11B

Task Categories	Frequency MEAN	STD	N	Core Technical MEAN	STD	N	Gen. Soldiering MEAN	STD	N	Overall Job MEAN	STD	N
Analyze weather conditions	0.90	1.41	88	1.14	1.82	87	0.90	1.49	87	0.97	1.62	87
Draw maps and overlays	0.89	1.43	88	1.13	1.71	88	0.95	1.50	88	0.98	1.52	88
Paint	1.70	1.23	88	1.07	1.20	86	1.27	1.22	86	1.22	1.18	86
Conduct land surveys	0.94	1.65	87	1.02	1.76	86	0.87	1.56	86	0.90	1.59	86
Prepare technical forms and documents	1.03	1.41	88	0.99	1.53	87	1.02	1.52	87	0.95	1.45	87
Receive,store,&issue supp, equip, etc	0.91	1.37	88	0.92	1.40	87	0.94	1.43	87	1.01	1.47	87
Fire indirect fire weapons	0.81	1.53	88	0.84	1.63	87	0.86	1.66	87	0.85	1.64	87
Record, file, and dispatch information	0.91	1.28	88	0.80	1.27	87	0.90	1.35	87	0.89	1.34	87
Control money	0.78	1.44	88	0.80	1.58	87	0.82	1.57	87	0.86	1.62	87
Write documents and correspondence	0.67	1.25	88	0.80	1.52	88	0.78	1.53	88	0.70	1.37	88
Load & unload field artillery/tank guns	0.62	1.39	87	0.71	1.58	87	0.60	1.35	87	0.68	1.50	87
Prepare heavy weapons for tactical use	0.60	1.37	88	0.70	1.57	88	0.60	1.39	88	0.63	1.45	88
Prepare equip and supplies for air drop	0.57	0.99	88	0.69	1.30	88	0.72	1.33	88	0.72	1.35	88
Use audiovisual equipment	0.63	0.97	88	0.66	1.18	87	0.72	1.16	87	0.71	1.18	87
Draw illustrations	0.56	1.13	88	0.66	1.35	87	0.61	1.25	87	0.54	1.17	87
Write and deliver presentations	0.58	1.17	88	0.66	1.40	87	0.61	1.24	87	0.64	1.34	87
Interview	0.53	1.18	88	0.61	1.31	88	0.60	1.32	88	0.61	1.31	88
Inspect electronic systems	0.57	1.15	88	0.61	1.27	87	0.52	1.09	87	0.55	1.18	87
Operate boats	0.45	0.92	88	0.60	1.19	88	0.49	1.05	88	0.52	1.02	88
Operate gas & electric powered equip	0.64	0.98	88	0.60	1.01	88	0.61	1.02	88	0.64	1.08	88
Inspect electrical systems	0.49	1.11	88	0.57	1.30	87	0.52	1.15	87	0.52	1.15	87
Type	0.70	1.10	88	0.55	0.99	88	0.68	1.23	87	0.52	0.97	88
Reproduce printed material	0.86	1.27	88	0.53	0.95	87	0.74	1.19	87	0.70	1.11	87
Compute statistics/other math	0.48	1.05	88	0.52	1.21	86	0.52	1.15	86	0.52	1.17	86
Analyze electronic signals	0.33	0.88	88	0.50	1.22	88	0.41	1.02	88	0.43	1.09	88
Repair electrical systems	0.45	0.99	88	0.47	1.08	87	0.48	1.06	87	0.54	1.15	87
Estimate time & cost of maint ops	0.55	1.41	88	0.45	1.28	86	0.34	1.11	85	0.41	1.18	85
Repair electronic components	0.39	0.94	88	0.40	1.02	88	0.41	1.00	88	0.42	0.98	88
Prepare parachutes	0.34	0.94	87	0.36	1.00	87	0.37	0.98	87	0.37	1.00	87
Cook	0.40	1.13	87	0.36	1.05	87	0.38	1.11	87	0.39	1.07	87
Operate computer hardware	0.40	0.85	88	0.35	0.88	88	0.47	1.04	88	0.50	1.13	88
Provide medical or dental treatment	0.26	0.84	87	0.33	0.96	86	0.34	1.01	86	0.30	0.98	86
Receive clients, patients, guests	0.32	0.89	88	0.28	0.84	87	0.30	0.85	87	0.31	0.89	87
Assemble steel structures	0.22	0.69	88	0.26	0.80	88	0.26	0.80	88	0.27	0.81	88
Provide programming & DP support	0.22	0.65	88	0.26	0.91	86	0.23	0.79	86	0.17	0.62	86
Control air traffic	0.16	0.57	88	0.25	0.86	88	0.18	0.64	88	0.20	0.76	88
Construct wooden bldgs & other struct	0.28	0.79	88	0.24	0.75	87	0.29	0.78	87	0.28	0.80	87
Translate foreign languages	0.25	0.86	88	0.21	0.78	87	0.26	0.96	87	0.22	0.78	87
Perform medical laboratory procedures	0.18	0.77	88	0.18	0.81	88	0.17	0.75	88	0.18	0.81	88
Produce technical drawings	0.15	0.60	88	0.17	0.68	88	0.17	0.73	88	0.15	0.65	88
Operate power excavating equipment	0.17	0.61	87	0.16	0.55	87	0.14	0.55	87	0.16	0.59	87
Repair plastic and fiberglass	0.22	0.73	88	0.16	0.57	88	0.18	0.60	88	0.13	0.42	88
Repair metal	0.23	0.66	88	0.16	0.52	88	0.20	0.65	88	0.24	0.69	88
Install pipe assemblies	0.13	0.60	88	0.15	0.67	88	0.14	0.59	88	0.15	0.67	88
Operate lifting,loading,&grading equip	0.15	0.67	88	0.11	0.56	87	0.10	0.48	87	0.10	0.48	87
Construct masonry bldgs & structures	0.10	0.50	88	0.10	0.50	88	0.10	0.50	88	0.11	0.60	88
Operate radar	0.13	0.64	88	0.10	0.50	88	0.11	0.53	88	0.11	0.60	88
Select,layout,&clean med/dental equip	0.07	0.45	88	0.06	0.35	88	0.07	0.45	88	0.07	0.45	88

TASK CATEGORY

Frequency and Importance Ratings Descriptive Statistics

Ordered by Core Technical Rating Means

MOS=63B

Task Categories	Frequency MEAN	STD	N	Core Technical MEAN	STD	N	Gen. Soldiering MEAN	STD	N	Overall Job MEAN	STD	N
Read tech/field manuals, reg etc	4.10	1.05	50	4.36	0.80	50	3.76	1.02	50	4.14	0.90	50
Perf operator maint chks and services	4.02	1.06	50	4.18	1.06	50	3.78	1.15	50	4.16	0.93	50
Operate wheeled vehicles	3.92	0.94	50	4.16	0.84	50	3.90	0.95	50	4.20	0.90	50
Troubleshoot mechanical systems	3.66	1.27	50	4.10	1.16	50	2.64	1.24	50	3.72	1.16	50
Inspect electrical systems	3.38	1.23	50	3.60	1.26	50	1.98	1.29	50	3.16	1.31	50
Repair electrical systems	2.96	1.26	50	3.46	1.30	50	1.84	1.36	50	3.02	1.36	50
Operate gas & electric powered equip	2.78	1.27	50	3.14	1.32	50	2.34	1.35	50	2.90	1.36	50
Act as a model	2.64	1.44	50	2.92	1.67	49	3.45	1.54	49	3.24	1.52	49
Repair mechanical systems	4.12	0.94	50	2.78	1.30	50	2.78	1.30	50	3.90	0.99	50
Use maps	2.72	1.29	50	2.78	1.52	50	3.64	1.12	50	3.54	1.01	50
Perf operator chks & services on weapons	2.64	1.14	50	2.68	1.68	50	3.84	1.20	50	3.76	1.25	50
Use hand and arm signals	2.56	1.28	50	2.66	1.55	50	2.74	1.26	50	2.82	1.27	50
Prepare technical forms and documents	2.48	1.52	50	2.64	1.68	50	2.02	1.42	50	2.46	1.54	50
Give directions and instructions	2.34	1.32	50	2.61	1.27	49	2.71	1.35	49	2.69	1.33	49
Communicate	2.32	1.56	50	2.56	1.55	50	2.96	1.62	50	2.88	1.59	50
Give first aid	2.60	1.11	50	2.50	1.79	50	4.04	0.92	50	4.00	0.86	50
Order equipment and supplies	1.94	1.46	50	2.44	1.69	50	1.76	1.51	50	2.28	1.63	50
Protect against NBC hazards	2.86	1.13	50	2.36	1.78	50	4.20	0.90	50	3.88	1.00	50
Fire individual weapons	2.84	1.17	50	2.34	1.92	50	4.18	0.94	50	4.02	0.96	50
Lead	2.04	1.64	50	2.22	1.76	49	2.63	1.93	49	2.49	1.83	49
Record, file, and dispatch information	2.12	1.61	50	2.18	1.60	50	1.82	1.52	50	2.16	1.61	50
Repair electronic components	1.78	1.61	50	2.16	1.80	50	1.26	1.48	50	1.86	1.74	50
Send and receive radio messages	2.24	1.27	50	2.10	1.69	50	3.18	1.57	50	2.94	1.45	50
Receive,store,&issue supp, equip, etc	1.74	1.48	50	2.02	1.67	50	1.58	1.53	50	2.00	1.68	50
Repair metal	1.56	1.09	50	1.94	1.42	50	0.88	1.08	50	1.68	1.38	50
Give short oral reports	2.06	1.36	50	1.94	1.52	50	2.54	1.61	50	2.50	1.46	50
Survive in the field	2.26	1.38	50	1.88	1.78	50	3.52	1.61	50	3.34	1.52	50
Train	1.56	1.69	50	1.88	2.00	50	2.00	1.99	50	1.98	2.06	50
Monitor/inspect	1.70	1.57	50	1.86	1.68	50	1.84	1.72	50	1.90	1.68	50
Paint	1.66	1.32	50	1.84	1.43	50	1.68	1.53	50	1.82	1.48	49
Operate track vehicles	1.40	1.43	50	1.80	1.69	50	1.50	1.64	50	1.70	1.72	50
Place & camoufl tactical equip and mat	1.86	1.40	50	1.80	1.70	50	2.72	1.78	50	2.48	1.69	50
Move and react in the field	1.94	1.24	50	1.78	1.69	50	3.32	1.43	50	3.16	1.46	50
Estimate time & cost of maint ops	1.56	1.54	50	1.76	1.66	50	1.12	1.49	50	1.58	1.60	50
Navigate	1.88	1.21	50	1.76	1.62	50	3.10	1.59	50	2.90	1.57	50
Install electronic components	1.36	1.35	50	1.59	1.61	49	1.43	1.51	49	1.78	1.57	49
Counsel	1.52	1.55	50	1.58	1.72	50	2.00	1.90	50	1.84	1.74	50
Operate lifting,loading,&grading equip	1.42	1.36	50	1.56	1.50	50	1.16	1.42	50	1.54	1.49	50
Customs and laws of war	1.86	1.26	50	1.54	1.62	50	3.14	1.57	50	2.84	1.56	50
Inspect electronic systems	1.34	1.70	50	1.50	1.78	50	0.94	1.35	50	1.44	1.75	50
Detect and identify targets	1.58	1.30	50	1.46	1.61	50	2.82	1.67	50	2.62	1.61	50
Pack and load materials	1.68	1.33	50	1.44	1.39	50	1.92	1.50	50	1.84	1.45	50
Install wire and cables	1.20	1.16	50	1.41	1.48	49	1.47	1.43	49	1.59	1.50	49
Use hand grenades	1.56	1.30	50	1.39	1.63	49	2.92	1.80	49	2.61	1.62	49
Plan placement/use of tactical equip	1.22	1.43	50	1.14	1.53	50	1.56	1.69	50	1.48	1.62	50
Control individuals and crowds	1.38	1.38	50	1.14	1.47	50	2.00	1.93	50	1.78	1.72	50
Personnel Adminstration	1.00	1.54	50	1.12	1.72	50	1.26	1.79	50	1.24	1.78	50
Operate electronic equipment	0.92	1.12	50	1.06	1.43	49	1.04	1.37	49	1.10	1.42	49

TASK CATEGORY (Contd.)

Frequency and Importance Ratings Descriptive Statistics

Ordered by Core Technical Rating Means

MOS=63B

Task Categories	Frequency MEAN	Frequency STD	Frequency N	Core Technical MEAN	Core Technical STD	Core Technical N	Gen. Soldiering MEAN	Gen. Soldiering STD	Gen. Soldiering N	Overall Job MEAN	Overall Job STD	Overall Job N
Sketch maps, overlays, or range cards	1.38	1.26	50	1.04	1.38	50	2.08	1.82	50	1.78	1.59	50
Engage in hand-to-hand combat	1.12	1.04	50	1.04	1.34	50	2.30	1.72	50	1.94	1.58	50
Repair plastic and fiberglass	0.66	0.89	50	0.98	1.39	49	0.55	1.12	49	0.96	1.43	49
Conduct land surveys	0.80	1.16	50	0.90	1.47	50	1.12	1.62	50	1.10	1.61	50
Troubleshoot weapons	0.90	1.28	50	0.90	1.50	49	1.20	1.62	50	1.14	1.62	49
Decode data	0.96	1.32	50	0.88	1.36	50	1.44	1.74	50	1.26	1.58	50
Direct/lead teams	0.64	0.96	50	0.88	1.38	50	1.18	1.67	50	1.16	1.65	50
Repair weapons	0.84	1.27	50	0.86	1.46	50	1.04	1.50	50	1.10	1.62	50
Handle demolitions or mines	0.80	0.93	50	0.84	1.40	50	1.50	1.71	50	1.42	1.59	50
Type	0.74	1.01	50	0.80	1.21	50	0.88	1.30	50	0.94	1.22	50
Reproduce printed material	0.80	1.14	50	0.78	1.25	50	0.84	1.25	50	0.88	1.26	50
Provide counseling	0.68	1.30	50	0.70	1.31	50	0.78	1.36	50	0.78	1.39	50
Plan operations	0.70	1.33	50	0.70	1.34	50	0.82	1.53	50	0.88	1.56	50
Interview	0.48	0.95	50	0.66	1.30	50	0.66	1.26	50	0.68	1.28	50
Operate computer hardware	0.48	0.86	50	0.64	1.31	50	0.60	1.09	50	0.66	1.22	50
Write documents and correspondence	0.60	1.20	50	0.58	1.26	50	0.66	1.30	50	0.66	1.33	50
Compute statistics/other math	0.38	0.90	50	0.58	1.28	50	0.50	1.15	50	0.56	1.20	50
Draw illustrations	0.52	1.25	50	0.54	1.27	50	0.54	1.25	50	0.54	1.27	50
Write and deliver presentations	0.34	0.75	50	0.52	1.16	50	0.60	1.25	50	0.58	1.26	50
Draw maps and overlays	0.40	0.97	50	0.48	1.16	50	0.68	1.43	50	0.52	1.22	50
Analyze intelligence data	0.50	0.97	50	0.46	0.97	50	0.64	1.26	50	0.68	1.35	50
Analyze weather conditions	0.42	0.91	50	0.44	1.03	50	0.52	1.07	50	0.48	1.05	50
Control money	0.56	1.47	50	0.42	1.21	50	0.58	1.50	50	0.56	1.49	50
Determine firing data-indirect weapons	0.40	1.03	50	0.42	1.18	50	0.60	1.40	50	0.56	1.33	50
Operate power excavating equipment	0.26	0.63	50	0.38	0.95	50	0.24	0.74	50	0.24	0.74	50
Use audiovisual equipment	0.40	0.83	50	0.38	0.95	50	0.54	1.16	50	0.48	1.03	50
Install pipe assemblies	0.18	0.44	50	0.34	0.98	50	0.14	0.61	50	0.32	0.96	50
Provide programming & DP support	0.26	0.75	50	0.33	1.11	49	0.29	0.91	49	0.35	1.11	49
Prepare equip and supplies for air drop	0.24	0.56	50	0.32	0.79	50	0.34	0.85	50	0.32	0.79	50
Cook	0.22	0.76	50	0.28	0.97	50	0.38	1.07	50	0.38	1.14	50
Produce technical drawings	0.28	0.90	50	0.28	0.97	50	0.30	1.02	50	0.28	0.97	50
Receive clients, patients, guests	0.24	0.82	50	0.28	1.01	50	0.32	1.04	50	0.32	1.04	50
Analyze electronic signals	0.26	0.72	50	0.28	0.81	50	0.38	0.99	50	0.30	0.84	50
Load & unload field artillery/tank guns	0.22	0.62	50	0.27	0.97	49	0.29	0.98	49	0.29	0.98	49
Construct wooden bldgs & other struct	0.18	0.44	50	0.26	0.85	50	0.24	0.85	50	0.26	0.85	50
Translate foreign languages	0.24	0.82	50	0.22	0.74	50	0.32	0.96	50	0.30	0.89	50
Fire heavy direct fire weapons	0.10	0.42	50	0.22	0.89	50	0.14	0.70	50	0.16	0.79	50
Prepare heavy weapons for tactical use	0.14	0.64	50	0.22	0.89	50	0.20	0.81	50	0.22	0.89	50
Assemble steel structures	0.20	0.57	50	0.20	0.73	50	0.20	0.73	50	0.24	0.74	50
Provide medical or dental treatment	0.16	0.74	50	0.20	0.90	50	0.22	0.91	50	0.22	0.91	50
Fire indirect fire weapons	0.08	0.34	49	0.16	0.72	49	0.16	0.72	49	0.16	0.72	49
Operate boats	0.06	0.31	50	0.16	0.79	50	0.16	0.79	50	0.16	0.79	50
Construct masonry bldgs & structures	0.06	0.31	50	0.16	0.79	50	0.16	0.79	50	0.16	0.79	50
Operate radar	0.12	0.48	50	0.16	0.68	50	0.16	0.68	50	0.16	0.68	50
Perform medical laboratory procedures	0.16	0.82	50	0.16	0.82	50	0.16	0.82	50	0.16	0.82	50
Control air traffic	0.04	0.20	50	0.14	0.70	50	0.14	0.70	50	0.14	0.70	50
Prepare parachutes	0.06	0.42	50	0.08	0.57	50	0.08	0.57	50	0.08	0.57	50
Select,layout,&clean med/dental equip	0.06	0.31	50	0.08	0.57	50	0.08	0.57	50	0.08	0.57	50

TASK CATEGORY
Frequency and Importance Ratings Descriptive Statistics
Ordered by Core Technical Rating Means
MOS=71L

Task Categories	Frequency MEAN	Frequency STD	Frequency N	Core Technical MEAN	Core Technical STD	Core Technical N	Gen. Soldiering MEAN	Gen. Soldiering STD	Gen. Soldiering N	Overall Job MEAN	Overall Job STD	Overall Job N
Type	4.77	0.61	52	4.75	0.56	51	1.94	1.67	52	4.19	1.14	52
Record, file, and dispatch information	4.46	0.83	52	4.25	0.84	52	2.15	1.61	52	3.92	1.01	52
Prepare technical forms and documents	4.15	1.13	52	4.02	1.08	52	2.00	1.57	52	3.69	1.12	51
Read tech/field manuals, reg etc	3.52	1.35	52	3.63	1.34	52	3.48	1.26	52	3.65	1.25	52
Write documents and correspondence	2.75	1.67	52	2.90	1.64	51	1.73	1.57	52	2.84	1.65	51
Operate computer hardware	3.08	1.57	52	2.88	1.66	51	1.59	1.63	51	2.88	1.68	52
Give directions and instructions	3.00	1.31	52	2.82	1.29	51	2.77	1.48	52	3.19	1.17	52
Reproduce printed material	3.04	1.57	52	2.69	1.77	51	1.33	1.46	52	2.63	1.67	52
Receive,store,&issue supp, equip, etc	2.83	1.52	52	2.56	1.41	52	2.08	1.48	52	2.71	1.26	52
Act as a model	2.52	1.85	52	2.44	1.88	50	2.87	1.87	52	2.98	1.82	52
Personnel Adminstration	2.38	1.90	52	2.41	1.99	51	1.98	1.95	52	2.38	1.89	52
Communicate	2.50	1.93	52	2.37	1.94	51	2.63	1.99	52	2.65	1.96	52
Operate electronic equipment	1.92	1.77	52	1.94	1.93	51	1.48	1.64	52	2.10	1.81	52
Lead	1.94	1.81	52	1.94	1.89	50	2.47	2.03	51	2.37	2.05	52
Counsel	1.85	1.73	52	1.75	1.81	51	2.17	1.97	52	2.15	1.99	52
Train	1.62	1.72	52	1.73	1.95	51	2.10	2.01	52	2.12	2.01	52
Order equipment and supplies	1.88	1.34	52	1.51	1.24	51	1.35	1.36	52	1.71	1.32	52
Monitor/inspect	1.38	1.66	52	1.39	1.78	51	1.85	1.96	52	1.75	1.86	52
Use maps	1.87	1.16	52	1.37	1.40	51	3.52	1.38	52	2.88	1.46	52
Give short oral reports	1.37	1.09	52	1.37	1.28	51	2.38	1.60	52	2.19	1.53	52
Interview	1.31	1.54	52	1.35	1.57	52	1.31	1.52	52	1.48	1.54	52
Operate wheeled vehicles	1.79	1.14	52	1.31	1.39	51	2.44	1.50	52	2.27	1.50	52
Receive clients, patients, guests	1.54	1.72	52	1.25	1.53	52	0.79	1.43	52	1.35	1.57	52
Protect against NBC hazards	2.04	1.07	52	1.24	1.39	49	4.02	1.13	52	3.37	1.36	52
Survive in the field	1.77	1.02	52	1.24	1.51	50	3.98	1.20	52	3.35	1.33	52
Give first aid	1.88	1.00	52	1.22	1.39	50	4.17	0.81	52	3.54	1.09	52
Perf operator chks & services on weapons	1.77	1.23	52	1.22	1.19	51	3.47	1.55	51	2.96	1.48	51
Perf operator maint chks and services	1.56	1.26	52	1.18	1.32	50	2.37	1.70	51	2.12	1.60	51
Fire individual weapons	1.98	1.02	52	1.18	1.40	50	4.31	0.90	52	3.56	1.19	52
Provide programming & DP support	1.15	1.70	52	1.18	1.58	51	0.69	1.18	52	1.12	1.44	52
Write and deliver presentations	1.08	1.33	52	1.08	1.41	51	0.86	1.33	51	1.18	1.38	51
Move and react in the field	1.60	1.14	52	0.98	1.24	50	3.56	1.66	52	3.06	1.55	52
Customs and laws of war	1.38	1.07	52	0.90	1.30	50	3.10	1.50	52	2.54	1.46	52
Provide counseling	0.88	1.35	52	0.86	1.40	51	1.04	1.53	52	1.17	1.61	52
Send and receive radio messages	1.22	1.01	51	0.84	1.13	50	2.41	1.80	51	1.92	1.55	51
Compute statistics/other math	0.71	1.07	52	0.83	1.28	52	0.50	0.96	52	0.85	1.26	52
Navigate	1.40	1.05	52	0.82	1.13	49	3.25	1.71	51	2.71	1.50	51
Operate gas & electric powered equip	0.92	1.03	52	0.78	1.14	51	1.31	1.44	52	1.12	1.29	52
Install electronic components	0.85	1.16	52	0.75	1.14	52	1.10	1.42	52	1.08	1.41	52
Pack and load materials	1.00	1.17	52	0.67	1.02	52	1.40	1.52	52	1.27	1.42	52
Use hand grenades	1.13	0.91	52	0.64	1.01	50	2.65	1.67	52	2.25	1.60	52
Use hand and arm signals	1.06	0.92	52	0.63	0.87	51	2.13	1.73	52	1.63	1.39	52
Detect and identify targets	1.06	0.98	52	0.60	0.95	50	2.37	1.84	52	1.94	1.60	52
Place & camoufl tactical equip and mat	0.92	1.08	52	0.57	1.19	51	1.84	1.94	51	1.51	1.74	51
Use audiovisual equipment	0.73	1.12	52	0.55	1.03	51	0.62	1.07	52	0.79	1.18	52
Control money	0.50	0.85	52	0.55	1.19	51	0.50	1.00	52	0.63	1.24	52
Decode data	0.58	0.72	52	0.48	0.96	52	1.23	1.54	52	1.13	1.43	52
Control individuals and crowds	0.98	1.04	52	0.45	0.90	51	1.96	1.84	52	1.65	1.64	52

TASK CATEGORY (Contd.)
Frequency and Importance Ratings Descriptive Statistics
Ordered by Core Technical Rating Means
MOS=71L

Task Categories	Frequency MEAN	STD	N	Core Technical MEAN	STD	N	Gen. Soldiering MEAN	STD	N	Overall Job MEAN	STD	N
Install wire and cables	0.46	0.83	52	0.43	0.88	51	0.71	1.29	52	0.63	1.09	52
Sketch maps, overlays, or range cards	0.83	0.98	52	0.43	0.83	51	1.44	1.66	52	1.17	1.40	52
Inspect electrical systems	0.40	0.85	52	0.41	0.96	51	0.41	1.02	51	0.53	1.16	51
Plan operations	0.44	1.06	52	0.41	1.08	51	0.63	1.31	52	0.60	1.29	52
Repair mechanical systems	0.21	0.46	52	0.37	0.86	52	0.37	0.86	52	0.35	0.81	52
Direct/lead teams	0.46	0.73	52	0.35	0.71	52	1.04	1.55	52	0.90	1.45	52
Engage in hand-to-hand combat	0.69	1.02	52	0.29	0.67	51	1.52	1.89	52	1.25	1.69	52
Troubleshoot mechanical systems	0.31	0.67	52	0.27	0.66	52	0.54	1.15	52	0.46	1.00	52
Repair electrical systems	0.27	0.66	52	0.23	0.61	52	0.25	0.71	52	0.25	0.65	52
Paint	0.87	0.97	52	0.23	0.51	52	0.60	0.75	52	0.54	0.83	52
Inspect electronic systems	0.27	0.72	52	0.21	0.64	52	0.33	0.92	52	0.35	0.88	52
Troubleshoot weapons	0.21	0.54	52	0.19	0.53	52	0.48	1.20	52	0.44	1.11	52
Repair weapons	0.25	0.59	52	0.17	0.51	52	0.52	1.20	52	0.42	1.04	52
Repair electronic components	0.29	0.80	52	0.17	0.51	52	0.21	0.70	52	0.25	0.71	52
Draw illustrations	0.17	0.51	52	0.17	0.55	52	0.25	0.76	52	0.17	0.51	52
Plan placement/use of tactical equip	0.27	0.53	52	0.16	0.46	51	0.60	1.27	52	0.44	0.98	52
Translate foreign languages	0.19	0.53	52	0.16	0.73	51	0.21	0.64	52	0.25	0.68	52
Estimate time & cost of maint ops	0.27	0.60	52	0.14	0.53	51	0.38	1.03	52	0.35	0.95	52
Draw maps and overlays	0.19	0.53	52	0.13	0.53	52	0.25	0.79	52	0.19	0.63	52
Handle demolitions or mines	0.33	0.68	52	0.12	0.38	52	0.69	1.42	52	0.52	1.18	52
Assemble steel structures	0.12	0.43	52	0.10	0.50	51	0.19	0.72	52	0.17	0.65	52
Conduct land surveys	0.29	0.67	52	0.10	0.36	51	0.55	1.25	51	0.39	0.98	51
Operate lifting,loading,&grading equip	0.08	0.34	51	0.08	0.44	51	0.10	0.57	51	0.10	0.57	51
Prepare equip and supplies for air drop	0.12	0.32	52	0.08	0.27	52	0.19	0.60	52	0.13	0.40	52
Provide medical or dental treatment	0.08	0.33	52	0.08	0.39	52	0.23	0.94	52	0.19	0.79	52
Determine firing data-indirect weapons	0.10	0.41	52	0.08	0.39	52	0.12	0.51	52	0.08	0.39	52
Operate track vehicles	0.15	0.46	52	0.06	0.24	51	0.19	0.66	52	0.17	0.62	52
Produce technical drawings	0.13	0.53	52	0.06	0.31	51	0.21	0.78	52	0.13	0.53	52
Prepare parachutes	0.08	0.33	52	0.06	0.31	52	0.17	0.81	52	0.13	0.71	52
Repair metal	0.12	0.32	52	0.04	0.20	51	0.08	0.27	51	0.08	0.27	51
Construct wooden bldgs & other struct	0.08	0.27	52	0.04	0.20	51	0.12	0.43	52	0.12	0.43	52
Cook	0.10	0.36	52	0.04	0.19	52	0.06	0.24	52	0.04	0.19	52
Fire indirect fire weapons	0.04	0.28	52	0.04	0.28	52	0.06	0.42	52	0.06	0.42	52
Repair plastic and fiberglass	0.08	0.27	52	0.02	0.14	51	0.08	0.33	52	0.08	0.33	52
Install pipe assemblies	0.04	0.19	52	0.02	0.14	51	0.02	0.14	51	0.02	0.14	51
Operate power excavating equipment	0.02	0.14	52	0.02	0.14	52	0.06	0.42	52	0.06	0.42	52
Analyze weather conditions	0.06	0.31	52	0.02	0.14	52	0.08	0.44	52	0.06	0.42	52
Analyze intelligence data	0.06	0.24	52	0.02	0.14	52	0.10	0.41	52	0.06	0.31	52
Operate boats	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52
Construct masonry bldgs & structures	0.02	0.14	52	0.00	0.00	51	0.04	0.28	52	0.04	0.28	52
Select,layout,&clean med/dental equip	0.04	0.28	52	0.00	0.00	51	0.10	0.69	52	0.10	0.69	52
Operate radar	0.02	0.14	52	0.00	0.00	51	0.08	0.55	52	0.08	0.55	52
Perform medical laboratory procedures	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52
Analyze electronic signals	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52
Control air traffic	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52
Load & unload field artillery/tank guns	0.02	0.14	52	0.00	0.00	52	0.06	0.42	52	0.06	0.42	52
Fire heavy direct fire weapons	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52
Prepare heavy weapons for tactical use	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52	0.00	0.00	52

JOB ACTIVITY
Frequency and Importance Ratings Descriptive Statistics
Ordered by Core Technical Rating Means
MOS=11B

Job Activities	Frequency MEAN	STD	N	Core Technical MEAN	STD	N	Gen. Soldiering MEAN	STD	N	Overall Job MEAN	STD	N
Aim:stationary target	4.10	1.00	87	4.56	0.85	86	4.15	1.13	86	4.40	0.95	86
Work in a team	4.18	0.90	88	4.37	0.98	87	4.22	1.11	87	4.46	0.83	87
Aim:moving target	3.66	1.35	87	4.32	1.12	87	3.91	1.30	87	4.16	1.16	87
Run short distances	4.22	1.05	87	4.24	1.03	86	3.83	1.30	86	4.13	1.03	86
Walk long distances	4.10	1.12	87	4.17	1.21	86	3.65	1.45	86	4.01	1.16	86
Work under adverse conditions	4.07	1.11	86	3.95	1.34	85	3.56	1.47	85	3.99	1.17	85
Follow oral directions	3.86	1.45	88	3.84	1.49	86	3.84	1.44	85	4.00	1.39	85
Work long hours	4.21	0.86	87	3.74	1.36	86	3.36	1.46	86	3.64	1.32	86
Judge location	3.00	1.41	88	3.71	1.56	86	3.08	1.54	86	3.35	1.49	86
Follow written directions	3.41	1.31	88	3.65	1.36	86	3.72	1.35	85	3.84	1.38	85
Judge size and distance	3.00	1.37	88	3.55	1.42	86	2.94	1.34	86	3.26	1.29	86
Push, pull, lift heavy weights	3.48	1.33	87	3.51	1.47	86	3.09	1.47	86	3.37	1.39	86
Throw objects	3.23	1.36	87	3.45	1.46	86	3.00	1.53	86	3.22	1.45	86
Support/advise peers	2.94	1.46	88	3.26	1.51	87	3.20	1.43	87	3.32	1.43	87
Relay oral instructions	3.07	1.51	88	3.26	1.57	87	3.16	1.55	87	3.31	1.50	87
Lead a team	2.28	1.47	88	3.07	1.66	87	2.89	1.60	87	3.14	1.63	87
Coach subordinates	2.67	1.57	86	2.99	1.64	84	3.01	1.65	84	3.15	1.71	84
Coach peers	2.70	1.44	88	2.97	1.56	87	3.01	1.56	87	3.08	1.54	87
Support/advise subordinates	2.60	1.58	88	2.94	1.67	87	2.98	1.67	87	3.03	1.71	87
Make coordinated movements	2.69	1.73	87	2.92	1.75	86	2.51	1.75	86	2.71	1.80	86
Recall verbal information	2.70	1.63	88	2.84	1.71	86	2.69	1.59	85	2.78	1.61	85
Make oral reports (to individuals)	2.70	1.54	88	2.76	1.69	87	2.82	1.65	87	2.84	1.61	87
Drive tracked vehicle	2.54	1.86	87	2.68	1.89	87	2.25	1.70	87	2.59	1.79	87
Record information	2.49	1.41	88	2.67	1.51	87	2.68	1.57	87	2.80	1.58	87
Judge paths of moving objects	2.20	1.57	88	2.65	1.83	86	2.19	1.61	86	2.38	1.65	86
Drive light wheeled vehicle	2.20	1.46	87	2.46	1.59	87	2.34	1.51	87	2.47	1.50	87
Monitor/interpret verbal messages	2.13	1.77	88	2.38	1.78	86	2.26	1.75	85	2.32	1.75	85
Operate hand-held tools	2.38	1.56	87	2.30	1.60	86	2.16	1.47	86	2.29	1.54	86
Solve tactical maneuver problems	1.75	1.64	88	2.27	1.92	86	1.87	1.74	86	2.15	1.89	86
Adjust control device using one limb	2.01	1.76	87	2.09	1.87	87	1.80	1.73	87	2.09	1.86	87
Write brief messages	1.95	1.55	88	2.06	1.74	87	2.17	1.78	87	2.22	1.79	87
Solve leadership problems	1.65	1.63	88	2.01	1.86	86	1.88	1.81	86	2.07	1.92	86
Monitor/interpret figural information	1.64	1.41	88	2.00	1.74	86	1.84	1.62	85	1.82	1.60	85
Adj control device using mult limbs	1.89	1.82	87	1.95	1.85	86	1.81	1.77	86	1.94	1.82	86
Recall figural information	1.68	1.50	88	1.88	1.75	86	1.71	1.58	85	1.88	1.73	85
Solve communication problems	1.58	1.48	88	1.87	1.68	87	1.84	1.66	87	1.91	1.73	87
Recall numerical information	1.74	1.58	88	1.79	1.65	86	1.85	1.63	85	1.86	1.66	85
Solve mechanical system problems	1.51	1.49	88	1.79	1.77	86	1.57	1.59	86	1.69	1.66	86
Make oral reports (to groups)	1.51	1.41	88	1.74	1.74	87	1.82	1.73	87	1.91	1.74	87
Drive heavy wheeled vehicle	1.52	1.61	87	1.67	1.75	87	1.63	1.66	87	1.68	1.68	87
Monitor/interpret numerical information	1.44	1.49	88	1.57	1.55	86	1.54	1.52	85	1.59	1.60	85
Interview	1.38	1.51	88	1.54	1.70	87	1.52	1.67	87	1.54	1.67	87
Sort, fold, feed by hand	1.48	1.72	87	1.47	1.82	87	1.41	1.73	87	1.47	1.79	87
Solve administrative problems	1.00	1.29	88	1.23	1.61	86	1.28	1.67	86	1.36	1.71	86
Solve electrical system problems	0.97	1.35	88	1.08	1.53	87	1.01	1.42	87	1.01	1.40	87
Solve medical problems	0.85	1.22	88	0.98	1.46	86	0.93	1.43	86	1.02	1.56	86
Solve logistical problems	0.80	1.22	88	0.94	1.39	86	0.91	1.34	86	0.93	1.38	86
Write longer reports	0.64	1.01	87	0.88	1.40	86	0.79	1.29	86	0.84	1.33	86
Operate hand-held power equipment	0.86	1.25	87	0.88	1.22	86	0.93	1.28	86	0.88	1.23	86
Operate precision hand-held equipment	0.69	1.43	88	0.72	1.43	88	0.66	1.35	88	0.72	1.43	88
Operate larger power equipment	0.59	1.27	86	0.60	1.28	86	0.51	1.17	86	0.57	1.22	86
Operate full keyboard	0.53	0.91	87	0.46	0.96	87	0.51	0.99	87	0.51	0.97	87
Operate numeric keyboard	0.32	0.74	87	0.34	0.78	87	0.34	0.79	87	0.38	0.84	87

JOB ACTIVITY

Frequency and Importance Ratings Descriptive Statistics

Ordered by Core Technical Rating Means

MOS=63B

	Frequency			Core Technical			Gen. Soldiering			Overall Job		
Job Activities	MEAN	STD	N	MEAN	STD	N	MEAN	STD	N	MEAN	STD	N
Operate hand-held tools	4.18	1.00	50	4.38	0.88	50	2.54	1.34	50	3.80	1.20	50
Solve mechanical system problems	3.62	1.07	50	4.12	1.00	50	2.36	1.21	50	3.50	1.20	50
Operate hand-held power equipment	3.62	1.18	50	4.04	1.03	50	2.34	1.35	50	3.44	1.33	50
Drive light wheeled vehicle	3.94	1.11	50	4.02	1.19	50	3.16	1.25	50	3.74	1.12	50
Follow written directions	3.88	0.98	50	3.94	1.11	50	3.74	1.03	50	3.94	1.11	50
Solve electrical system problems	3.22	1.25	50	3.92	1.26	50	2.10	1.46	50	3.36	1.26	50
Follow oral directions	3.74	1.07	50	3.70	1.05	50	3.72	1.01	50	3.88	0.98	50
Operate precision hand-held equipment	2.92	1.52	50	3.52	1.54	50	2.18	1.30	50	2.94	1.46	50
Work in a team	3.32	1.38	50	3.34	1.32	50	3.70	1.27	50	3.58	1.21	50
Adj control device using mult limbs	3.02	1.46	50	3.30	1.56	50	2.24	1.32	49	2.86	1.51	49
Work long hours	3.22	1.15	50	3.28	1.39	50	3.30	1.37	50	3.38	1.19	50
Push, pull, lift heavy weights	3.42	0.97	50	3.26	1.31	50	3.20	1.12	50	3.38	1.01	50
Drive heavy wheeled vehicle	2.80	1.60	50	3.16	1.71	50	2.46	1.45	50	2.94	1.60	50
Work under adverse conditions	2.94	1.39	50	3.14	1.58	50	2.98	1.49	50	3.14	1.50	50
Adjust control device using one limb	2.88	1.55	50	3.10	1.59	50	2.08	1.26	50	2.68	1.56	50
Make coordinated movements	2.86	1.28	50	3.10	1.43	50	2.66	1.27	50	2.98	1.29	50
Judge paths of moving objects	2.68	1.02	50	2.90	1.25	50	2.86	1.01	50	3.00	1.05	50
Record information	2.58	1.36	50	2.82	1.48	49	2.41	1.26	49	2.67	1.33	49
Relay oral instructions	2.52	1.25	50	2.70	1.33	50	2.74	1.31	50	2.64	1.24	50
Recall verbal information	2.58	1.57	50	2.68	1.66	50	2.70	1.67	50	2.74	1.61	50
Make oral reports (to individuals)	2.38	1.37	50	2.54	1.42	50	2.68	1.32	50	2.66	1.30	50
Judge size and distance	2.40	1.26	50	2.52	1.49	50	2.76	1.33	50	2.76	1.35	50
Support/advise subordinates	2.26	1.58	50	2.50	1.58	50	2.90	1.57	50	2.74	1.52	50
Support/advise peers	2.44	1.49	50	2.48	1.54	50	2.84	1.61	50	2.68	1.52	50
Judge location	2.45	0.82	49	2.45	1.21	49	3.10	1.10	49	2.98	0.99	49
Coach subordinates	2.12	1.62	50	2.38	1.65	50	2.66	1.77	50	2.42	1.63	50
Recall numerical information	2.06	1.35	50	2.36	1.56	50	2.26	1.51	50	2.20	1.47	50
Lead a team	2.08	1.55	50	2.34	1.64	50	2.76	1.62	50	2.64	1.56	50
Run short distances	3.54	1.07	50	2.32	1.77	50	3.88	1.06	50	3.52	1.16	50
Coach peers	2.10	1.39	50	2.30	1.49	50	2.56	1.58	50	2.36	1.47	50
Monitor/interpret figural information	1.74	1.66	50	2.12	1.88	50	1.82	1.56	50	1.94	1.72	50
Operate larger power equipment	1.82	1.52	50	2.12	1.65	50	1.26	1.37	50	2.00	1.77	50
Recall figural information	1.68	1.38	50	2.08	1.66	50	1.92	1.43	50	1.96	1.55	50
Walk long distances	2.38	1.24	50	2.04	1.63	50	2.98	1.45	50	2.82	1.37	50
Write brief messages	1.82	1.38	50	1.94	1.41	50	1.90	1.28	50	1.96	1.32	50
Solve logistical problems	1.56	1.50	50	1.88	1.67	50	1.48	1.49	50	1.74	1.58	50
Monitor/interpret numerical information	1.48	1.25	50	1.78	1.54	50	1.66	1.44	50	1.72	1.49	50
Aim:stationary target	2.26	1.21	50	1.78	1.71	50	3.50	1.52	50	3.00	1.36	50
Drive tracked vehicle	1.36	1.35	50	1.76	1.70	50	1.56	1.58	50	1.64	1.56	50
Sort, fold, feed by hand	1.64	1.59	50	1.76	1.64	50	1.52	1.54	50	1.70	1.61	50
Monitor/interpret verbal messages	1.54	1.59	50	1.74	1.79	50	1.76	1.78	50	1.74	1.77	50
Aim:moving target	1.70	1.37	50	1.72	1.76	50	3.00	1.82	50	2.56	1.58	50
Make oral reports (to groups)	1.42	1.18	50	1.64	1.35	50	1.88	1.45	50	1.68	1.35	50
Solve leadership problems	1.36	1.59	50	1.44	1.64	50	1.76	1.72	50	1.62	1.60	50
Solve tactical maneuver problems	1.20	1.18	50	1.26	1.45	50	1.82	1.77	50	1.60	1.58	50
Solve administrative problems	1.32	1.53	50	1.26	1.51	50	1.30	1.49	50	1.34	1.52	50
Interview	1.08	1.37	50	1.24	1.52	50	1.18	1.37	50	1.22	1.50	50
Solve communication problems	1.10	1.16	50	1.24	1.36	50	1.54	1.58	50	1.40	1.43	50
Throw objects	1.48	1.37	50	1.12	1.30	50	1.86	1.60	50	1.68	1.50	50
Operate full keyboard	0.76	0.94	50	0.92	1.14	50	0.84	1.22	50	0.94	1.22	50
Operate numeric keyboard	0.56	0.84	50	0.72	1.11	50	0.56	0.99	50	0.70	1.13	50
Write longer reports	0.58	0.97	50	0.70	1.13	50	0.80	1.23	50	0.70	1.16	50
Solve medical problems	0.68	1.15	50	0.66	1.19	50	1.00	1.56	50	0.90	1.40	50

JOB ACTIVITY

Frequency and Importance Ratings Descriptive Statistics

Ordered by Core Technical Rating Means

MOS=71L

Job Activities	Frequency MEAN	Frequency STD	Frequency N	Core Technical MEAN	Core Technical STD	Core Technical N	Gen. Soldiering MEAN	Gen. Soldiering STD	Gen. Soldiering N	Overall Job MEAN	Overall Job STD	Overall Job N
Operate full keyboard	4.58	0.78	52	4.54	0.93	50	2.22	1.74	49	4.02	1.22	50
Follow written directions	4.12	0.94	52	4.41	0.90	51	4.10	1.15	51	4.37	0.85	51
Follow oral directions	3.90	1.29	52	4.20	1.11	51	4.00	1.30	51	4.20	1.10	51
Record information	3.52	1.43	52	3.62	1.30	52	2.73	1.56	52	3.42	1.35	52
Solve administrative problems	3.00	1.41	52	3.43	1.50	51	2.37	1.67	51	3.20	1.47	51
Recall verbal information	2.96	1.30	52	3.24	1.27	51	3.10	1.32	51	3.22	1.30	51
Write brief messages	3.04	1.63	52	3.21	1.39	52	2.56	1.55	52	3.13	1.39	52
Relay oral instructions	2.79	1.32	52	3.18	1.20	51	3.24	1.41	51	3.31	1.24	51
Work in a team	2.94	1.36	52	3.08	1.38	52	3.73	1.29	52	3.52	1.21	52
Support/advise peers	2.65	1.27	52	2.88	1.31	51	3.33	1.16	51	3.24	1.12	51
Monitor/interpret verbal messages	2.54	1.42	52	2.88	1.53	51	2.53	1.47	51	2.80	1.51	51
Coach peers	2.38	1.30	52	2.59	1.30	51	2.76	1.42	51	2.69	1.30	51
Make oral reports (to individuals)	2.62	1.47	52	2.58	1.47	52	2.67	1.41	52	2.75	1.43	52
Sort, fold, feed by hand	2.58	1.45	52	2.55	1.55	51	1.63	1.55	51	2.45	1.45	51
Support/advise subordinates	2.17	1.69	52	2.45	1.76	51	2.65	1.80	51	2.57	1.69	51
Coach subordinates	2.12	1.69	52	2.41	1.73	51	2.55	1.84	51	2.53	1.75	51
Operate numeric keyboard	2.16	1.72	51	2.29	1.79	51	1.22	1.52	50	2.18	1.75	51
Recall numerical information	1.98	1.31	52	2.28	1.53	50	2.04	1.50	50	2.36	1.50	50
Monitor/interpret numerical information	1.83	1.41	52	2.08	1.56	52	1.67	1.46	52	2.02	1.54	52
Work long hours	2.31	1.25	52	1.94	1.45	51	2.86	1.46	51	2.63	1.36	51
Interview	1.73	1.56	52	1.92	1.62	52	1.56	1.61	52	1.87	1.60	52
Lead a team	1.67	1.59	52	1.80	1.70	51	2.39	1.78	51	2.37	1.71	51
Make oral reports (to groups)	1.69	1.50	52	1.73	1.54	52	1.94	1.66	52	2.10	1.65	52
Solve leadership problems	1.52	1.55	52	1.73	1.79	51	1.90	1.85	51	1.92	1.78	51
Solve communication problems	1.52	1.53	52	1.67	1.70	51	1.75	1.83	51	1.78	1.74	51
Write longer reports	1.44	1.39	52	1.53	1.36	51	1.16	1.29	51	1.57	1.42	51
Monitor/interpret figural information	1.25	1.33	52	1.38	1.36	52	1.56	1.63	52	1.58	1.55	52
Work under adverse conditions	1.40	1.09	52	1.37	1.40	51	2.57	1.85	51	2.27	1.72	51
Recall figural information	1.15	1.14	52	1.33	1.38	51	1.80	1.76	51	1.63	1.48	51
Run short distances	2.71	1.51	52	1.29	1.45	51	3.43	1.39	51	2.90	1.30	51
Make coordinated movements	1.33	1.37	52	1.25	1.48	52	2.06	1.69	52	1.88	1.59	52
Drive light wheeled vehicle	1.62	1.21	52	1.15	1.27	52	2.08	1.61	52	1.75	1.53	52
Adj control device using mult limbs	1.00	1.34	51	1.04	1.34	51	1.20	1.54	51	1.24	1.53	51
Judge location	1.33	0.86	52	1.02	1.15	50	2.96	1.56	51	2.28	1.50	50
Adjust control device using one limb	1.00	1.22	51	0.96	1.22	51	1.14	1.40	51	1.20	1.36	51
Judge size and distance	1.13	1.07	52	0.92	1.15	51	2.15	1.78	52	1.67	1.46	52
Walk long distances	1.46	0.85	52	0.88	0.95	49	2.90	1.55	51	2.33	1.40	51
Push, pull, lift heavy weights	1.46	1.09	52	0.83	0.96	52	2.17	1.59	52	1.90	1.35	52
Aim:stationary target	1.65	1.25	52	0.75	1.18	51	3.15	1.83	52	2.58	1.59	52
Judge paths of moving objects	0.79	0.94	52	0.69	1.03	51	1.51	1.69	51	1.16	1.39	51
Solve logistical problems	0.71	1.05	52	0.67	1.17	52	0.90	1.36	52	0.75	1.20	52
Solve mechanical system problems	0.75	1.08	52	0.63	0.99	52	0.83	1.26	52	0.75	1.12	52
Operate hand-held tools	0.71	0.89	52	0.56	0.87	52	1.15	1.38	52	0.92	1.13	52
Aim:moving target	1.00	1.25	52	0.49	0.99	51	1.90	1.99	52	1.69	1.73	52
Solve electrical system problems	0.60	1.05	52	0.48	0.87	52	0.78	1.32	51	0.61	1.02	51
Throw objects	0.69	0.90	52	0.37	0.69	52	1.29	1.60	52	1.13	1.43	52
Solve medical problems	0.38	0.95	52	0.31	0.85	52	0.46	1.09	52	0.44	1.07	52
Operate precision hand-held equipment	0.27	0.74	52	0.29	0.87	52	0.37	0.93	52	0.31	0.78	52
Solve tactical maneuver problems	0.40	0.75	52	0.25	0.62	52	0.73	1.34	52	0.52	0.98	52
Operate hand-held power equipment	0.37	0.77	52	0.25	0.62	52	0.42	0.82	52	0.31	0.64	52
Drive heavy wheeled vehicle	0.48	0.78	52	0.21	0.54	52	0.65	1.20	52	0.48	1.00	52
Operate larger power equipment	0.27	0.66	52	0.17	0.51	52	0.27	0.72	52	0.23	0.65	52
Drive tracked vehicle	0.19	0.53	52	0.06	0.31	52	0.21	0.64	52	0.13	0.44	52

APPENDIX F

Overall Performance Standard Instrument

DERIVING AN OVERALL PERFORMANCE STANDARD

You have just completed several exercises designed to set standards for specific aspects of performance. In this last exercise, we want your judgment about a soldier's overall performance. Specifically, we want to know the extent to which substandard performance in one area might be balanced by performance in another area that is well above the standard for that area.

For this exercise, assume that there are three major areas of performance:

- Core Technical Proficiency (performance on MOS-specific tasks)
- Effort and Leadership
- Personal Discipline

Assume that 40 soldiers were assigned performance ratings for each of the three areas. We want you to tell us what overall rating you think should be given to each of these soldiers. In the Overall Rating column, put a U for Unacceptable, an M for Marginal, an A for Acceptable, and an O for Outstanding.

Example:

	Performance Area Ratings			
Soldier No.	Core Technical Proficiency	Effort and Leadership	Personal Discipline	Overall Performance Rating
99	A	A	A	A

In the example, Soldier 99 received Acceptable ratings for all three performance areas, and the rater gave the soldier an overall rating of A for Acceptable.

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OVERALL PERFORMANCE RATING EXERCISE

RATING SCALE:
U - Unacceptable
M - Marginal
A - Acceptable
O - Outstanding

Soldier No.	Performance Areas Ratings: Core Technical Proficiency	Effort and Leadership	Personal Discipline	Overall Performance Rating
01	U	U	M	______
02	M	A	U	______
03	A	U	M	______
04	U	M	A	______
05	U	U	U	______
06	O	U	U	______
07	U	M	U	______
08	M	M	U	______
09	M	U	M	______
10	U	A	A	______
11	A	U	A	______
12	U	A	U	______
13	M	U	O	______
14	O	M	U	______
15	U	O	M	______
16	M	M	M	______
17	M	M	A	______
18	A	M	M	______
19	A	A	M	______
20	M	A	A	______

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RATING SCALE:
U - Unacceptable
M - Marginal
A - Acceptable
O - Outstanding

OVERALL PERFORMANCE RATING EXERCISE

	Performance Areas Ratings			
Soldier No.	Core Technical Proficiency	Effort and Leadership	Personal Discipline	Overall Performance Rating
21	U	A	A	____
22	A	U	A	____
23	U	A	U	____
24	U	A	O	____
25	O	U	A	____
26	A	O	U	____
27	A	A	A	____
28	A	M	O	____
29	O	A	M	____
30	M	O	A	____
31	M	O	M	____
32	M	M	O	____
33	O	O	M	____
34	O	U	U	____
35	O	U	O	____
36	O	O	O	____
37	U	A	A	____
38	A	O	O	____
39	A	A	O	____
40	A	O	A	____