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# An Assessment of Factors That Affect the Performance of Air Force O-3 (Captain) Logisticians Working in a Joint Operations Environment

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# AN ASSESSMENT OF FACTORS THAT AFFECT THE PERFORMANCE OF AIR FORCE O-3 (CAPTAIN) LOGISTICIANS WORKING IN A JOINT OPERATIONS ENVIRONMENT

**THESIS**

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The views expressed in this Thesis are those of the authors and do not reflect the official policy or position of the Department of Defense or the US Government.

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THESIS

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## Abstract

Joint operations will likely continue to become more prevalent in the future due to defense spending cuts and the nature of modern warfare. Currently, Air Force O-3 (Captain) logisticians, working in the joint operations environment, receive little if any initial training. Exploratory research, by the authors, indicated that these members felt uncertain about their jobs and how they related to the organization, which has been described in the literature as role ambiguity. Consequently, this research project was designed to determine if AF O-3 logisticians serving in the joint operations environment experience more role ambiguity than their counterparts serving in the single service AF environment.

With this aim in mind, a mail survey was administered to all Air Force Captains in the Supply, Transportation and Logistics Plans career fields. Of the 695 surveys distributed, 380 were returned (resulting in a 55% return rate), including 332 non-joint and 48 joint responses. Data analysis of joint returns revealed that role ambiguity responses exhibited a bimodal distribution, based on previous joint operations exercise experience. Those members with no exercise experience exhibited statistically higher levels of role ambiguity than their single service counterparts, while those with exercise experience exhibited significantly lower levels.

# AN ASSESSMENT OF FACTORS THAT AFFECT THE PERFORMANCE OF AIR FORCE O-3 (CAPTAIN) LOGISTICIANS WORKING IN A JOINT OPERATIONS ENVIRONMENT

## I. Introduction

### Purpose

The Department of Defense (DoD) has continually downsized since the military build-up of the Reagan Administration. Since this time, the number of active duty Air Force personnel has been reduced from 608,199 in FY 1986 to a projected 371,409 by the end of FY 1998. Furthermore, an additional 7.3% reduction in uniformed members is projected by the year 2003 (Air Force News Service, 1998). The new breed of military forces challenged to fill the void created by cutbacks will need to be more flexible and knowledgeable than ever before. Part of this flexibility will be the necessity to work in joint operations environments, as the DoD will no longer be able to support the level of overlapping competencies of single service activities that has been present in the past and still exists to a lesser extent today. All signs point to an increasing future dependence upon joint activities, and some extremists argue that future DoD forces will predominantly wear "purple" suits.

Given that joint operations will likely play an increasingly important role in the future, it is necessary to evaluate our current level of preparedness to meet the challenges of this unique environment. Due to the complexity of the issue, there is no easy way to address such a question in its entirety. A feasible approach, however, is to start with

some smaller aspect of the question. Since this research is being conducted in conjunction with a Master's Degree program at the Air Force Institute of Technology, School of Logistics and Acquisition Management (AFIT/LA), it is appropriate that this initial focus is on a logistics related issue.

Air Force O-3 (Captain) logisticians are currently assigned to positions in the joint operations environment without first receiving any mandatory training. Although such training exists in various forms, exploratory research by the authors revealed that few officers in this category receive any training prior to assignment. While it may be common for individuals to feel ill prepared for their initial duties on any new assignment, field research by the authors has shown that the peculiarities of the joint service environment compound the initial learning process, resulting in a higher level of discomfort with new duties. This discomfort with new duties and feelings of uncertainty about ones job, and how it fits within the organization, has been described in research as the construct "role ambiguity." As a result of role ambiguity, newcomers to the job experience longer "spin-up" times and may be initially less competent. The object of this research is to examine whether or not AF O-3 logisticians, assigned to joint operations environments, experience a greater degree of role ambiguity and consequently feel less prepared for their duties than AF O-3 logisticians in traditional single service Air Force positions. Furthermore, this study will help identify what type of training these individuals feel would help prepare them to perform their duties as joint operations logisticians.

## Background

**Future Emphasis on Joint Operations.** Joint operations are essential to the success of today's military. As modern warfare continues to evolve, all signs point to the need for an increasingly integrated force structure. According to former Chairman of the Joint Chiefs of Staff, General Shalikashvili, "The nature of modern warfare demands that we fight as a joint team" (Joint Chiefs of Staff, 1997). Furthermore, the changing world climate dictates a greater need to engage in nontraditional missions, resulting in increased joint and combined operations (Atzhorn et al., 1996). In addition to changes in the nature of warfare, several other current trends underscore the future emphasis on joint operations. Amongst these trends are increased budget cutbacks, the Goldwater-Nichols Act, and the rise of information technology.

Since the culmination of the military build-up of the Reagan Administration, the US defense budget has been a prime target for budget cuts. As one of the largest discretionary portions of federal budget, it is likely to remain an expendable asset (Hammond, 1996). In a recent Congressional Budget Office (CBO) report on spending cuts, director June E. O'Neill stated that to meet the level of defense spending included in the 1998 Congressional budget resolution, the DoD may have to cut $11 billion from current annual spending on operations and maintenance by 2002 (Congressional Budget Office, 1997). As a result of these cutbacks forces will continue to shrink, making a leaner, more integrated force necessary. The distinctive lines that once separated single-service roles and missions are becoming blurred. In a recent paper prepared for Air Command and Staff College (ACSC), Colonel Leonard Kaplan points out the blurred

nature of current doctrine. He ultimately concludes, "all of the services recognize they will fight jointly in the future" (Kaplan, 1993).

In addition to budget cutbacks, the Goldwater-Nichols Act is a prime force in the transition to a heightened state of joint operations. According to an excerpt from AF-2025, "The fact that jointness is enshrined in legislation in the form of the Goldwater-Nichols Bill makes it more difficult to overcome" (Hammond, 1996). Meeting the intent of the act, however, is complicated by force reductions, as fewer officers are available to fill increasing joint requirements (Young, 1992). As a result, it is increasingly likely that in the future more officers will participate in joint assignments at some point in their careers.

While budget cutbacks and the Goldwater-Nichols Act make joint operations inevitable, technological advancements make them increasingly possible. As technology continues to advance, particularly in the area of communications, interconnectivity with outside organizations is enhanced. This strengthening of communications allows organizations to work more closely with one another. From a military logistics standpoint, integration of information systems across the DoD will allow integration of logistics functions and processes across the services (Brandt et al., 1996). It seems inevitable that this trend will encapsulate many other DoD areas beyond logistics.

Recent trends point to the increased importance of joint operations, and few would argue that going joint is the wave of the future. Comprehensive studies, like AF 2025 and Joint Vision 2010 (JV 2010), recognize that a smaller, more unified force is essential to meet future defense needs. As former Chief of Staff of the AF, General Ronald Fogleman said in an excerpt from JV 2010, "All military services will have to

work together to meet the challenges of the new vision" (Katzaman, 1998). To better understand the future role of the AF in joint operations, however, it is helpful to first gain a perspective of the current joint operations structure.

**Joint Operations Structure.** The Air Force has been actively involved in joint operations since its inception. Figure 1 depicts the current joint operations structure.

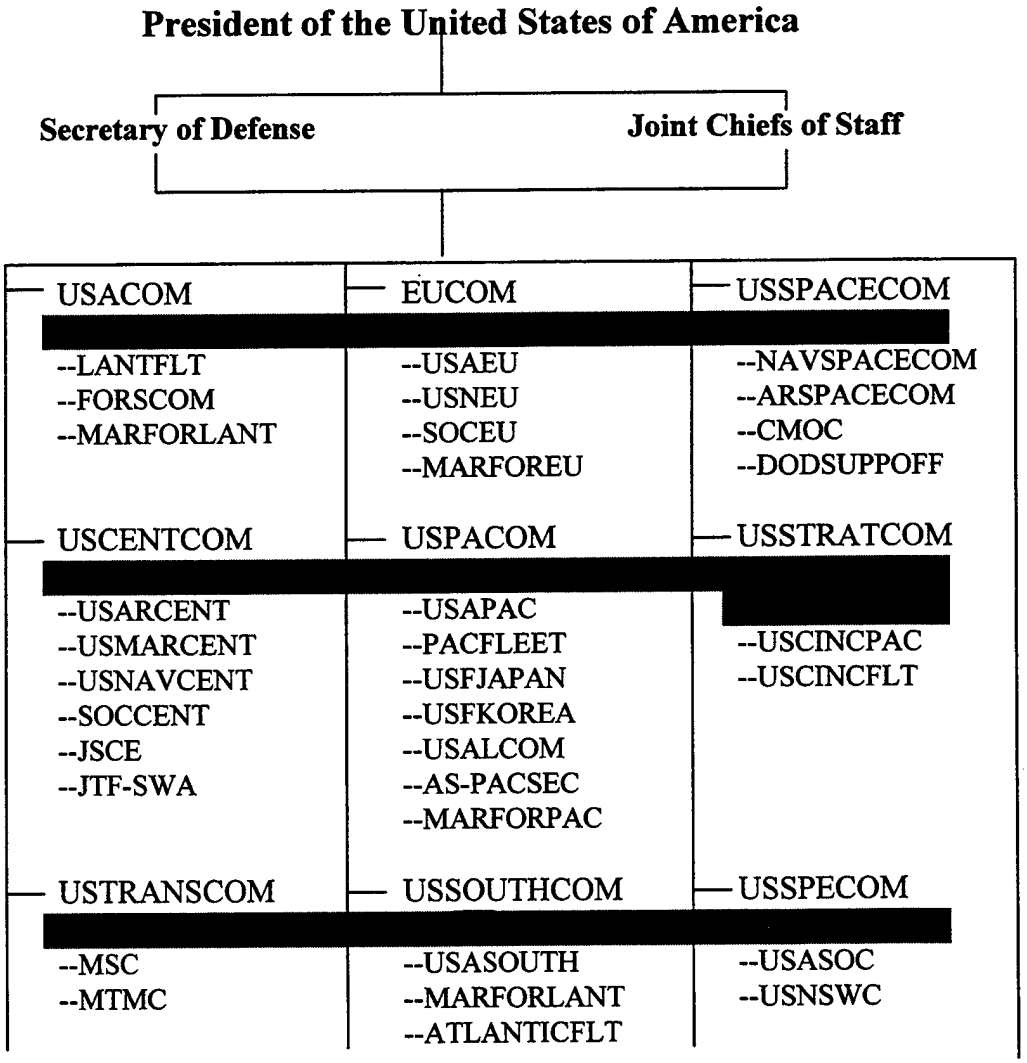



Figure 1. Joint Operations Structure

Note that AF agencies, which fall directly under the joint chain at the component command level, are shaded for distinction. To meet the challenges of operations in the joint world, training is an important consideration.

**Joint Operations Training Issues.** Joint operations have been extremely important to the DoD in the past, and will certainly play a vital future role in the nation's defense. To ensure effectiveness in these operations, however, it is important to examine the way in which we train our people for joint involvement. The unique nature of joint positions encompasses a host of training issues and problems, including a lack of training for Company Grade Officers (CGOs), and a lack of central organization for joint training.

The AF traditionally assigns Field Grade Officers (FGOs) and above to official joint operations billets. Officers serving in these billets are officially recognized as joint officers and, therefore, receive credit for such positions in personal assignment records. As part of this formal assignment process, officers in this category generally receive some type of in-residence training, for example Air Command and Staff College (ACSC), associated with the joint service environment prior to assuming joint operations positions. Air Force CGOs (primarily O-3s), on the other hand, are assigned to joint operations positions in a more informal manner. These officers are assigned only to joint "positions," which are not considered joint "billets." For this reason, they receive no official credit for serving in a joint capacity and therefore are not given any formal training prior to assuming their duties. Exploratory research, by the authors, has shown that these officers are often overlooked, as positions of this nature are not officially recognized as joint billets. Many FGOs in Joint Headquarters jobs are not aware that the

AF assigns company grade officers to joint service environment positions, as CGOs in these positions generally work at the component command level. On the surface, these positions seem rare due to their dispersion across component commands; however, a closer look revealed apparently more than 55 positions occupied by AF O-3 logisticians alone. When including CGOs of other specialties and service affiliations, it seems logical that this number is substantially larger.

The final joint operations training issue involves the manner in which joint training courses are organized. Due to the complexity of cross-service involvement, no central joint training structure exists. A variety of joint training courses are available, but the lack of central organization, along with an often informal manner of course selection, results in merely "hit and miss" training.

**AF O-3 (Captain) Logistician Focus**

Thus far the increasing emphasis on joint environment operations and apparent deficiencies in joint training have been discussed. For this research, a specific focus on AF O-3 (Captain) logisticians is desirable as they represent a relatively homogeneous group with a manageable initial population. Furthermore, logistics is a more general field that will necessarily be tied to future military operations in some capacity. In the joint warfighting force of the future, logistics is likely to be one of the most integrated areas. Finally, this study may be easily replicated, with subjects from other specializations across the DoD, to gain insight into training issues and the level of effectiveness of the company grade officer joint fighting force.

**Summary of Research Objectives**

Given the background to the general problem, it is necessary to revisit the specific objectives of the study prior to delving deeper into the research. The overarching research question is:

> Do AF O-3 logisticians serving in a joint operations environment experience more role ambiguity and consequently feel less prepared for their duties than AF O-3 logisticians serving in a single service environment?

Prior to breaking this research question down into specific investigative questions, it is first necessary to define some terms. A "joint service environment" does not necessarily mean a joint "billet," but rather an organization comprised of members of more than one service. Additionally, based on definitions from Khan and Rizzo et al., role ambiguity is experienced uncertainty about one's job and how it fits within an organization, leading to a lack of clarity of the affects of personal actions (Pearce, 1981:666). Role ambiguity, which is discussed at length in the following chapter, has been shown to impair the effectiveness of newcomers to the job. The transition from the traditional single service environment to the joint environment represents a drastic change in work duties as well as service socialization, and therefore potentially results in a greater degree of role ambiguity than is ordinarily experienced with a typical in-service assignment transfer. The authors of this Thesis developed a model, based on research by John P. Wanous (1980), describing the effectiveness of newcomers to a job. This model, which is also discussed in more depth in the next chapter, is used as a basis for the investigative questions of the study. According to Wanous, a newcomer's effectiveness

hinges upon the knowledge, skills and abilities (KSAs) possessed by the individual, as well as his or her motivation level, and degree of experienced role ambiguity (1980). Because O-3 logisticians assigned to a joint environment are selected from a relatively homogenous pool of candidates in a non-systematic manner, it is assumed they possess the same relative level of KSAs and motivation as their peers. It is hypothesized, however, that they are likely to experience a much greater level of role ambiguity based on factors previously mentioned.

The specific investigative questions, therefore, are:

1. Do Air Force O-3 logisticians serving in a joint operations environment possess the same level of motivation as single service AF O-3 logisticians?
2. Do Air Force O-3 logisticians serving in a joint operations environment possess the same level of KSAs as single service AF O-3 logisticians?
3. Do Air Force O-3 logisticians serving in a joint operations environment experience the same level of role ambiguity as single service AF O-3 logisticians?

The answer to these questions will contribute to the ultimate goal of the research, and assist in providing insight into the problem of preparing our people for the future of joint operations.

**Research Plan**

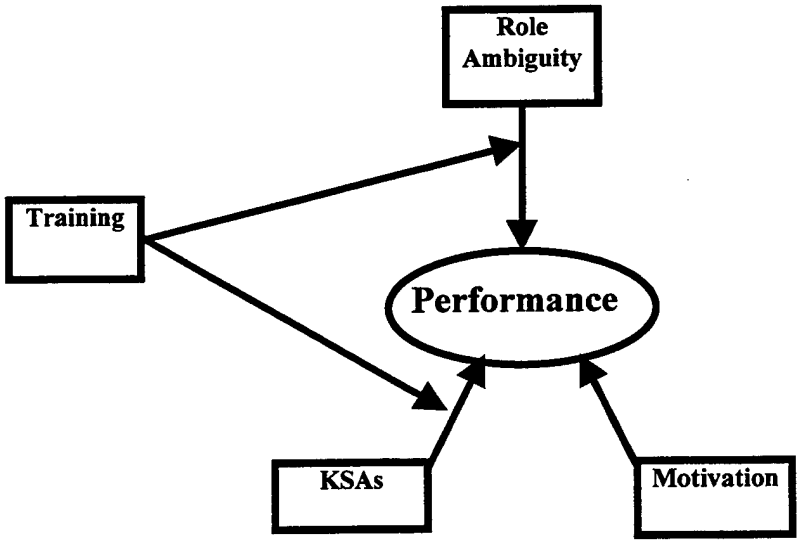
To answer the investigative questions, that ultimately provide insight into the research question, interviews with subject matter experts (SMEs) were conducted, and a survey was administered to O-3 logisticians. The literature supporting the theory behind the research approach is discussed in Chapter II. In this chapter an outline of the

theoretical model is presented, and each aspect of the model is discussed in detail. The methodology behind the survey construction and implementation is located in Chapter III, while Chapters IV and V present a discussion of the data and final results of the study.

## II. Literature Review

### Introduction

The model used in this research, depicted in Figure 2, identifies three independent factors related to the performance of individuals in their work environment. A new worker's effectiveness can be considered according to knowledge, skills and abilities (KSAs), motivation, and level of role ambiguity associated with the job (Goldstein, 1993:327). In addition, a further important consideration is that these factors may be modified by other variables. For example, training has been shown to modify KSAs and possibly affect socialization issues such as role ambiguity.




Based on Goldstein, 1993:327

Figure 2. Job Performance Model
(Factors Affecting Initial Job Performance)

Due to the widely accepted relationship between training and KSAs, training programs have generally focused in this area. Recent studies, however, have indicated a relationship between training and decreased role ambiguity, which may be leading training programs in a new direction (Goldstein, 1993:327). A detailed review of each factor of the model, based on the literature, will further emphasize the relationship that each has with performance. Additionally, a review of the research will show the modifying effect that training has on KSAs and role ambiguity.

## Newcomer Effectiveness Model

**Performance.** The focus of the model is the dependent variable performance. For the purpose of this research, performance is defined as behaviors or actions that support the mission and goals of the organization (McCloy et al., 1994:493). The factors that influence the level of performance attained by an individual interact differently according to the situation. For example, according to Goldstein, "most researchers agree that motivational level affects performance through an energizing function" (1993:113). In a model of performance determinants, the relationship of performance with motivation is clearly demonstrated when an individual freely chooses to work on a task with a high level of effort. In other words, motivation leads to hard work and improved performance. Furthermore, the model also includes the critical aspects of knowledge and skill as performance determinants, which indicates that along with choosing to work on a task, an individual must possess the knowledge and skill to perform the task (McCloy et al., 1994:494). In addition to these factors, cognitive ability has been shown to be a valid predictor of job performance (Hunter and Hunter, 1984:72).

Although little controversy surrounds the relationship between motivation, KSAs, and job performance, some studies, such as Schreisheim and Murphy [1976], Schuler, Aldag and Brief [1977] and Schuler [1977] were not able to support the relationship between role ambiguity and job performance. In contrast, other studies, such as Schuler [1975] and Szilagyi, Sims, and Keller [1976], have shown a significant negative relationship between the two factors.

To this point several factors, affecting the dependent variable performance, have been briefly discussed. A more in-depth examination of each factor, however, is necessary to further emphasize these relationships.

**Motivation.** A key factor that has been shown to influence performance in the workplace is motivation. Motivation is the willingness or desire to accomplish a specific task. Due to a high correlation between motivation and behavior, the two are often not distinguished. However, an individual may indicate a willingness to work, but not exert the required effort necessary to complete the task (Price and Mueller, 1986:172). Job performance, therefore, is dependent upon both motivation and behavior. In a related performance function, motivation was considered a critical element in determining performance (McCloy et al., 1994:494). Other authors have also established the relationship between motivation and job performance. For example, personality has been linked to an individual's motivation to do a job, and the interaction between ability and personality has been shown to be a predictor of performance (Hollenbeck and Whitener, 1988:81).

Over the years, the DoD has sought to improve the job performance of its members. In the early 1970s, David Packard, Former Deputy Secretary of Defense, focused on motivation to accomplish this task. In Packard's words, "since only people make progress, it is necessary to establish a managerial environment that will not only facilitate their efforts, but motivate our managers to be alert and responsive to their assigned responsibilities, and challenge those individuals at the operating levels to strive for increases productivity" (Cochran and Sconyers, 1974:2). Although motivation is a necessary component of performance, individuals must also possess KSAs to fulfill the responsibilities of the job.

**Knowledge, Skills and Abilities (KSAs).** Knowledge, skills and abilities (KSAs) have been the focus of performance studies in many fields. Recently, the business community has shown interest in this research due to its apparent ability to predict job performance. As mentioned earlier, a model of performance determinants, based on knowledge, skills and motivation, focuses mainly on predicting an individual's performance in a job, which has obvious benefits for organizations concerned with hiring or promoting the appropriate individuals. The proposed model is PC= f (DK,PK,M), where PC is job performance, DK is declarative knowledge, PK is procedural knowledge and skill and M is motivation. It is important to note that knowledge is divided into two distinct categories, declarative and procedural. Declarative knowledge is simply the prerequisite knowledge that allows future learning, and procedural knowledge is specific knowledge of the task to be completed (McCloy et al., 1994:494). Additionally, recent research of factors considered to be useful in predicting job performance focuses on

ability in two forms, known as cognitive and specific. Cognitive ability, which is similar to declarative knowledge, is a general ability that allows the individual to acquire a specific ability. Specific ability, on the other hand, is the acquired ability necessary to accomplish a certain task . According to research, both cognitive and specific abilities are useful in predicting job performance criteria. Specific ability, however, added to the accuracy of prediction by only a small amount (Ree, Earles and Teachout, 1994:520). In other words, the evidence shows that ability is a useful factor in predicting job performance, although cognitive ability far outweighs specific ability in degree of importance. Additionally, cognitive ability has been shown to be a consistent and valid predictor of job performance. In fact, cognitive ability has been shown to be the strongest predictor of job performance among the many selection techniques examined (Wright et al., 1995:1131).

To this point, the literature review has been focused primarily on the more common factors that impact performance. Another factor, however, that has been shown to affect performance is role ambiguity.

**Role Ambiguity.** Job performance research has generally focused on common factors such as KSAs and motivation. Role ambiguity, however, has recently gained attention as a possible determinant of job performance. Although some research has not been able to support the relationship between role ambiguity and job performance, other studies have shown a significant negative relationship between the two factors. Role ambiguity and role conflict were initially defined as, "intervening variables between the structural characteristics of an individual's organizational position and personal,

behavioral, and affective consequences" (Pearce, 1981:665). A second component was later added to this definition to include, "[the absence of] clarity of behavioral requirements" (Rizzo, House Lirtzman, 1970:155-156).

For the purpose of this research, role ambiguity is defined as experienced uncertainty about one's job and how it fits within an organization, leading to a lack of clarity in the effects of personal actions. In other words, the absence of role ambiguity means, "the person must be able to anticipate with fair accuracy the consequences of his own actions" (Pearce, 1981:665). As a result of role ambiguity, individuals experience uncertainty in their jobs, and lack understanding of how their jobs affect the mission of the organization. Ultimately, this leads to anxiety and consequently lower job performance. In his article, "Role Conflict and Ambiguity in Complex Organizations," Rizzo supported the hypothesis that "ambiguity should increase the probability that a person will be dissatisfied with his role, will experience anxiety, will distort reality and will thus perform less effectively" (Rizzo et al., 1970:151). As mentioned earlier, other studies, focusing on the relationship between job performance and self-reported attitudes, have uncovered indirect evidence of a negative relationship between role ambiguity and individual performance. Additionally, other studies have indicated a negative statistical link between role ambiguity and worker motivation (Margolis, Kroes, and Quinn, 1974), as well as job involvement (Drory, 1981; and Morris and Koch, 1979).

The disabling effects of role ambiguity may also reach beyond the individual to others in the organization, as it has also been linked to reduced personal and horizontal communications throughout the workplace. This unfavorable situation is created when organizational leadership assumes that employees understand their jobs and how they

interact to support the mission. It is further complicated when employees don't acknowledge experienced role ambiguity, or fail to communicate it to others in the organization. Consequently, this leads to an underestimation of the level of role ambiguity that is present. National studies have shown, however, that a large number of employees are unclear about the scope and responsibility of their jobs, resulting in increased tension, anxiety, fear and hostility, decreased job satisfaction and loss of self-confidence, and lower productivity (Rizzo, House and Lirtzman 1970:154). Role ambiguity, however, is not likely experienced equally across all organizational positions. For example, an assembly line worker, with a specific job requiring few decisions, is less likely to experience role ambiguity than the production manager of the assembly line. Also, for lower level jobs, role ambiguity will have a lessor impact on the individual and his or her performance, and consequently the mission of the company. Three properties of a job which tend to lead to increased role ambiguity are "those in which the incumbents must (1) cross boundaries, (2) produce innovative solutions to non-routine problems, and (3) be responsible for the work of others" (Pearce, 1981:666). Often researchers concerned with role ambiguity focus on new employees, who are generally more likely to experience ambiguity than established workers. However, many organizations, such as the DoD, promote from within and move people between jobs frequently. In this situation, the effects of role ambiguity may be magnified because the organization tends to expect the individual to move into the position and begin performing to the standards maintained in previous positions. With little or no time to learn the aspects of the new job, the individual is likely to experience a high level of role ambiguity (Goldstein, 1989:395). As with new employees, the promoted or cross-trained

individual may not be willing to admit there is a problem because it may appear to be a sign of weakness. These individuals are also not as likely to receive training, as management is not as sensitive to training needs in this situation. The military, for example, goes to great lengths to reduce role ambiguity for individuals entering the organization through basic training, officer training schools and service academies. These training environments are designed to indoctrinate individuals into the organization by teaching the structure and chain of command. The military does not, however, always ensure that its members receive additional training when moving from one job to another. Therefore, training which reduces role ambiguity is an important consideration for improving performance of new employees as well as that of transfers.

**Training.** Training has been considered for many years to be a modifier of the relationship between KSAs and performance. As mentioned earlier, however, socialization as a training objective has been gaining attention in recent literature. Socialization training issues are particularly relevant for new employees, as well as employees transferring within the organization. For example, organizations must provide training for individuals already in their organization, as well as for entry-level trainees, to be successful in integrating persons from diverse cultural groups (Schneier et al., 1994:21). In the case of the DoD, the obvious diverse culture of individuals entering the military has long been an issue of training and socialization. This need for socialization is not recognized, however, when military members are assigned to a joint environment comprised of members of an equally diverse cultural group. The level to which training modifies role ambiguity is still a subject of some contention; however, according to

Goldstein, "it is clear that the overall training program plays a major role in how individuals make sense of and adjust to their new job settings" (1989:399).

**Summary and Implications**

The primary goal of this research is not to demonstrate the positive effect that training has on reducing role ambiguity, as this has already been supported in the literature. Nor is it to show the effect that the independent variables (motivation, KSAs and role ambiguity) have on performance, as these issues have also received attention in past studies. Rather, the main objective is to emphasize the difference in the levels of the independent variables experienced by joint and non-joint environment logisticians. It is hypothesized that, due to the homogeneous nature of the population, the two groups will not differ with regard to motivation or KSAs. It is important to add that a necessary assumption, linked to this homogeneity, is that members are assigned to the joint environment in a non-systematic manner. The differing factor between the two groups, therefore, is perceived to be the higher level of role ambiguity likely experienced by joint environment participants, due to the complexities and peculiarities of the joint world, a factor that is further compounded by the apparent lack of initial training. According to the literature, motivation, KSAs and role ambiguity act as independent variables that affect performance. It can therefore be inferred that if joint members experience a higher level of role ambiguity than their non-joint counterparts, their performance will consequently suffer.

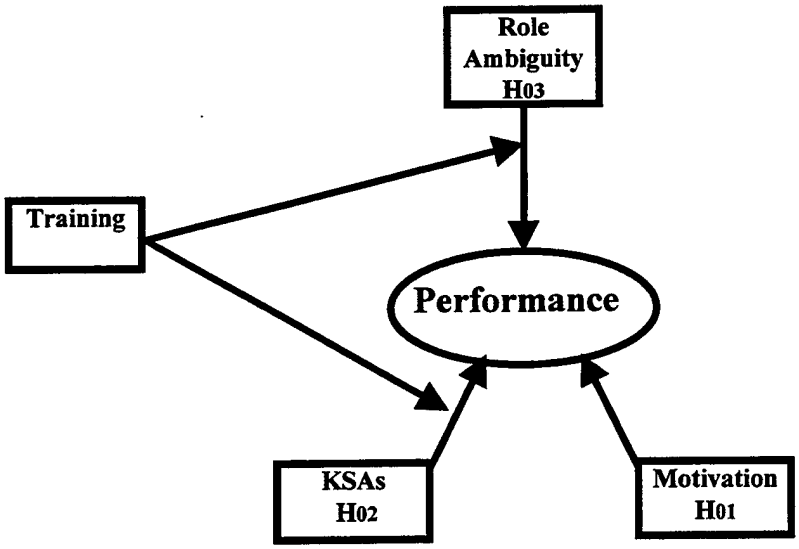
The qualitative and quantitative methodology employed to test the research hypotheses is discussed in detail in the following chapter. The final two chapters address the results and ultimate conclusions of the study.

# III. Methodology

## Overview

In this chapter the job performance model is revisited, followed by a discussion of the exploratory research used to assess the need for the research in question. Following the needs assessment, survey development and administration are discussed. Finally, the methods used for data processing and statistical analysis are presented.

The specific hypotheses tested were taken directly from the investigative questions introduced in Chapter I, and correspond to the constructs depicted in the Job Performance Model introduced in Chapter II.




Based on Goldstein, 1993:327

Figure 3. Job Performance Model With Hypotheses
(Factors Affecting Initial Job Performance)

$H_{01}$: There is no difference in motivation level between Air Force O-3 logisticians serving in the joint operations environment and AF O-3 logisticians serving in the single service Air Force Environment.

$H_{02}$: There is no difference in KSA levels between Air Force O-3 logisticians serving in the joint operations environment and AF O-3 logisticians serving in the single service Air Force Environment.

$H_{03}$: There is no difference in the level of experienced role ambiguity between Air Force O-3 logisticians serving in the joint operations environment and AF O-3 logisticians serving in the single service Air Force Environment.

Prior to addressing the quantitative analyses performed to test the hypotheses, a discussion of the qualitative factors employed in the exploratory research and survey development will be presented. The results of the hypothesis tests and final conclusions are addressed in Chapters IV and V.

**Exploratory Research**

Prior to the development of the research question and corresponding investigative questions, exploratory research was conducted to narrow the scope of the study and identify the specific research problem. Initial input was solicited from the field in an informal manner through conversations with numerous officers, ranging in grade from O-3 to O-5 (Captain to Lt Colonel). Included in this list of contacts were two AF O-5 logistics officers at the Air Staff level, including the Chief of Logistics Officers Career Development. Additionally, conversations were conducted with logistics training personnel from the Joint Course on Logistics at Ft. Lee, VA and the AF Maintenance Officer Technical Training School. Also, to obtain information on the selection of company grade officers to joint positions, contacts were made with logistics assignments personnel at the Air Force Personnel Assignment Center (AFPC). Finally, 14 logistics

officers from the Air Force Logistics Management Agency (AFLMA), Military Traffic Management Command (MTMC), US Atlantic Command (USACOM), and Special Operations Command Atlantic Command (SOCACOM) were contacted to gain further insight from a joint logistics operations perspective. In these unstructured conversations, subjects were asked to voice their opinions concerning joint environment experiences with specific regard to their feelings of preparedness to accomplish their jobs in the joint world. Additionally, subjects were asked to elaborate on the effectiveness of any training they might have received prior to assignment to the joint environment. Notes taken from these conversations were consequently reviewed to determine recurring themes. As a result of this initial feedback, it was anticipated that a lack of training might be a contributing factor to experienced role ambiguity.

In addition to AF members with joint operations experience, assignment officers at AFPC were contacted to determine the training pre-requisites for Captains filling positions in the joint environment. It was determined that members are selected for joint duty in a relatively informal manner based on "strong records," with no specific training requirements.

The final aspects of exploratory research involved discussions with Air Staff and AFLMA personnel concerning ongoing research relating to joint operations environment training issues. Based on these conversations, it became apparent that the training of our joint operations personnel was an ongoing concern.

**Population**

Based on the exploratory research it was determined that the issue, relating to the perceived preparedness of AF O-3 logisticians in the joint environment, was worth investigating. The next consideration, therefore, was to define the population to be studied. The AF logistics career field is comprised of the following five specializations: Transportation, Supply, Logistics Plans, Contracting, and Aircraft Maintenance. Based on a similarity in roles, it was determined that Supply, Transportation and Logistics Plans could be studied as a single homogenous population, as these areas directly relate to the functions of supply chain management. Contracting and Aircraft Maintenance, on the other hand, were deemed peripheral as Contracting personnel acquire resources for the supply chain, while Maintenance personnel are essentially its customers. To obtain a roster of all AF Captains in the Supply, Transportation and Logistics Plans career fields, the Air Force Personnel Center (AFPC) master database was queried based on rank (O-3), and primary Air Force Specialty Code (AFSC-21SX, 21TX, and 21GX). The resultant population consisted of 695 officers. To ensure an adequate sample from both joint and non-joint personnel, it was first necessary to determine the size of each sub-population. It was not possible, however, to determine this information based on AFPC records, as AF O-3s receive no joint billet credit and therefore are not officially recognized as joint personnel. Because the sub-populations could not be delineated, it was necessary to survey the entire population to ensure an adequate return rate for each group, as well as to approximate the size of each.

**Survey Development**

To achieve maximum input from the field, a mail survey approach was chosen over other research methods. Mail surveys are considered valuable means to reach members of a large, dispersed population in a cost-effective manner (Erdos and Morgan, 1970:5-6). Furthermore, many qualitative aspects of the exploratory research could be incorporated into the survey development.

To incorporate subject matter expert (SME) input, field interviews were conducted with Army, Navy, and Air Force O-3s at Headquarters Military Traffic Management Command (MTMC), and Air Force O-3s at Special Operations Command Atlantic Command (SOCACOM) from 9-12 December, 1997.

Each visit initially consisted of an informal group meeting, followed by individual interviews. In the group meetings, members were invited to share experiences relating to feelings of preparedness for joint service duties, as well as perceptions of training effectiveness. In this sense, these meetings served as an extension of the initial exploratory research. Additionally, members were encouraged to openly discuss feelings regarding the appropriateness and content of potential initial joint environment training.

Additionally, individual SME interviews were conducted in which the members were provided a list of specific joint logistics tasks. In these sessions, individual SMEs were invited to comment on joint environment training experiences, and recommend beneficial training areas. The list of potential training areas was provided merely as a guide to induce thought about the topic.

Based on these interviews, it was determined that the potential training areas provided were too specific for initial training programs. Other trends in the qualitative

data, however, revealed a strong desire for general familiarization training in areas such as joint command structure, service modes of movement, and information system composition. Following a further review of interview notes, SMEs were contacted via e-mail with a revised list of potential training topics. This list was then modified a final time, based on subsequent input, before inclusion in the joint training portion of the survey (see Appendix A for a complete version of the survey).

The remaining survey development consisted of incorporating questions to test the research hypotheses regarding differences in motivation, KSAs, and experienced role ambiguity levels between members of the joint and non-joint operations environments. In essence, therefore, the survey was comprised of two distinct parts. The primary focus of the study was to examine factors that affect the performance of joint operations logisticians, and to identify potential discrepancies in the manner in which they are prepared for joint duties. Questions relating to possible training topics were included for follow-on research in the event that hypothesis testing revealed potential discrepancies.

As mentioned earlier, training content questions were constructed based on SME input. Questions relating to motivation and role ambiguity, on the other hand, were taken from the literature. Motivation questions were taken directly from the Handbook of Organizational Measurement, which is a popular reference used in the assessment of behavioral constructs relating to organizational effectiveness (Price and Mueller, 1976:174). Role ambiguity questions were selected from a widely used questionnaire developed by Rizzo, House and Lirtzman, as these questions have been statistically shown to be effective measures of this construct (1970:156). Furthermore, recent testing has shown that these questions continue to demonstrate validity (Smith, Tisak and

Schmieder, 1993). For the purpose of this study, KSAs are considered to be a function of general aptitude and experience. It is assumed that aptitude is relatively consistent across the population, as all officers must meet specific standards prior to commissioning. Experience, on the other hand, can be considered a function of time in service, as well as time in career field and time in current job. To measure these constructs, therefore, corresponding demographic questions were included in the survey (See Appendix A).

Following initial survey development, a pilot test was conducted with 15 AFIT students from the Supply, Transportation and Logistics Plans career fields. Each participant was instructed to take the final draft survey and offer suggestions for improvement. The primary purpose of the pilot survey was to test the usefulness of information requested and to gain feedback on how well questions were understood and answered. Based on the sensitive nature of questions relating to role ambiguity, motivation, and performance, there was a concern individuals would be reluctant to provide the requested information. The pilot survey, therefore, helped ensure only essential questions were included. Furthermore, it was necessary to ensure questions were presented in an unambiguous manner and that the instructions for completing the survey were clear. Finally, it was necessary to ensure that each close-ended question contained mutually exclusive and totally exhaustive response options (Dillman, 1978:156).

## Survey Administration

Once the survey instrument was finalized, it was distributed to 695 participants. Each potential respondent was mailed a package containing a cover letter addressing the purpose of the study, the survey questionnaire, an AFIT Form 11C (Data Collection Form) and a pre-addressed return envelope. Respondents were given a suspense date of two months following the mail-out. The quantitative methods employed to analyze the resultant survey data are discussed in the following section of this chapter.

## Data Processing and Statistical Tests

**Data Input and Processing.** At the closeout date, 380 surveys had been returned (resulting in a 55% return rate), including 332 non-joint and 48 joint. These responses were subsequently quality control checked to ensure acceptability for processing. Forms not filled out properly were corrected when possible, for example responses on torn data collection sheets were transferred to clean sheets and light marks were darkened to ensure scanner recognition. At this time, unusable responses were separated from the useable population. Unusable responses included such cases as more than one answer marked on a mutually exclusive question, or returns from members working in an AFSC outside of the intended population. Consequently, of the 332 non-joint returns, 325 were included in the final sample while 46 of the 47 joint returns were considered useable.

Useable survey returns were then scanned using a SCANTRON machine, and the subsequent file was transferred into a Microsoft Excel 4.0 spreadsheet and imported into a Statistical Package for the Social Sciences (SPSS) file. Once in SPSS, raw data were cleaned using built-in functions to ensure blank responses were recoded to reflect a non-

data point rather than a "zero." If left unchanged, a zero would inappropriately skew the data. Additionally, reverse coding of data was necessary to ensure that higher Likert Scale responses indicated a stronger presence of the construct. For example, questions 12, 15, 19, 25 and 27 relating to role ambiguity were reverse coded so a higher response on the Likert Scale would indicate a stronger presence of the role ambiguity construct. Additionally, for the motivation construct, question 9 was reverse coded.

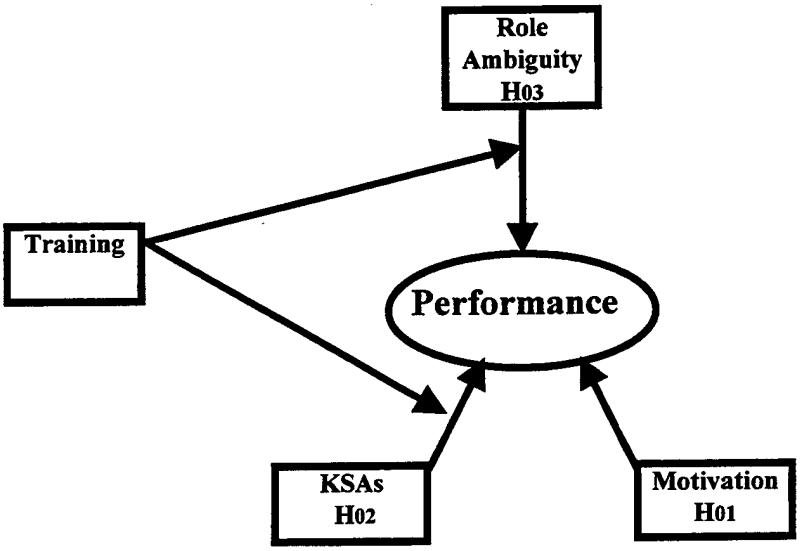
Once the data were consistently coded, a test of reliability was conducted for each construct. The role ambiguity construct, which consisted of questions 10, 12, 15, 19, 25 and 27, resulted in a Cronbach's Coefficient Alpha of .8073 (detailed calculation data are presented in Appendix B), while the motivation construct, consisting of questions 9, 13, 18, 21, 24 and 26, yielded an Alpha value of .6775. Alpha values of .7 or greater are generally considered acceptable (Hair, Anderson, Tatham and Black, 1992:471). As the Cronbach's Alpha value for the motivation construct did not meet these criteria, a factor analysis was performed to determine if more than one construct was being measured. For example, some of the questions may have been measuring commitment rather than motivation. Including these questions in the motivation construct, therefore, would result in inconsistencies in aggregate measures of the construct. In other words, a motivated individual is likely to answer all motivation questions in a similar manner (indicating high motivation), however, he or she may not be committed to the organization. The rationale for the factor analysis approach, therefore, was that questions measuring constructs other than motivation would be excluded, consequently raising the Alpha value. Factor analysis, however, failed to reveal additional construct measures, and

therefore it was determined that all motivation questions would be included in the motivation construct, despite the low Alpha value of .6775.

Once the final selection of questions to measure each construct was verified, it was possible to begin data analysis. All motivation and role ambiguity analyses were conducted using aggregate construct scores produced in SPSS. For example, each respondent answered six role ambiguity questions. A respondent's aggregate score, therefore, is the sum of these six questions. The first step in the subsequent data analysis was to examine the distributions of responses for each construct for all respondents combined, as well as joint and non-joint respondent groups individually. Based on the distributions, appropriate statistical procedures were conducted. The resultant data analysis is presented in detail in the following chapter.

# IV. Data Analysis

Prior to analyzing the data, it is important to revisit the Job Performance Model, which maps the relationships of the constructs.




Based on Goldstein, 1993:327

Figure 3. Job Performance Model With Hypotheses
(Factors Affecting Initial Job Performance)

Each construct was first examined using descriptive statistics, histograms and Wilk-Shapiro/Rakit Plots to determine the shape of the corresponding distributions and check for normality. Parametric statistics were then used as appropriate to test each hypothesis. The corresponding analyses are presented sequentially beginning with $H_{01}$.

$H_{01}$: There is no difference in motivation level between Air Force O-3 logisticians serving in the joint operations environment and AF O-3 logisticians serving in the single service Air Force Environment.

$H_{A1}$: There is a difference in motivation level between Air Force O-3 logisticians serving in the joint operations environment and AF O-3 logisticians serving in the single service Air Force Environment.

**Table 1. Motivation Construct Descriptive Statistics**

| | N | Range | Min | Max | Mean | Std. Dev |
|---|---|---|---|---|---|---|
| **Non-Joint** | 323 | 27 | 11 | 38 | 26.031 | 4.231* |
| **Joint** | 46 | 25 | 16 | 41 | 26.370 | 3.963* |

*** Indicates SD adjusted by Finite Population Correction Factor**

The data were first divided into non-joint and joint respondent groups. Histograms of the data, as well as descriptive statistics, revealed approximately normal distributions in both cases, which were confirmed with Wilk-Shapiro/Rakit values of .9863 and .9722 respectively. All statistical analyses of the motivation construct are located in Appendix C, while Table 1 depicts a brief summary of the descriptive statistics. To test the hypothesis that there was no difference between the mean responses of the two groups, a two-tailed, Two-Sample T-Test at an alpha level of .05 was performed, using standard deviation values adjusted with the finite population correction factor. The resultant test statistic had an absolute value of 0.5122, which was below the absolute critical value of 1.96, indicating there was not enough statistical evidence to suggest a difference in the means. In other words, AF O-3 logisticians in non-joint

positions exhibited the same level of motivation as their counterparts in the joint service environment.

The second hypothesis in question dealt with the knowledge, skills and abilities (KSAs) of AF O-3 logisticians in both non-joint and joint operations environments. The null and alternate hypotheses are shown below.

$H_{02}$: There is no difference in KSA levels between Air Force O-3 logisticians serving in the joint operations environment and AF O-3 logisticians serving in the single service Air Force Environment.

$H_{A2}$: There is a difference in KSA levels between Air Force O-3 logisticians serving in the joint operations environment and AF O-3 logisticians serving in the single service Air Force Environment.

**Table 2. Experience Descriptive Statistics (Relative Time)**

| | N | Range | Min | Max | Mean | Std. Dev |
|---|---|---|---|---|---|---|
| **Time in Service** | | | | | | |
| **Non-Joint** | 323 | 6 | 4 | 10 | 8.573 | 1.728 |
| **Joint** | 45 | 5 | 5 | 10 | 8.978 | 1.530 |
| **Time in Current Assignment** | | | | | | |
| **Non-Joint** | 325 | 8 | 1 | 9 | 4.708 | 2.406 |
| **Joint** | 46 | 8 | 1 | 9 | 4.948 | 2.476 |
| **Time in Career Field** | | | | | | |
| **Non-Joint** | 324 | 9 | 1 | 10 | 5.426 | 3.202 |
| **Joint** | 46 | 9 | 1 | 9 | 5.870 | 3.317 |

For the purpose of this study, KSAs are considered to be a function of general aptitude and experience. It is assumed that aptitude is relatively consistent across the population, as all officers must meet specific standards prior to commissioning. Experience, on the other hand, can be considered a function of time in service, as well as time in career field and time in current job (See Table 2 for a summary of experience descriptive statistics). To measure these constructs, therefore, corresponding demographic questions were included in the survey. An examination of the distribution of each measure was performed using descriptive statistics and histograms. This data, which is presented in detail in Appendix D, indicates no difference between the two sub-populations in all three cases.

The third hypothesis considered the level of role ambiguity experienced by AF O-3 logisticians in both non-joint and joint operations environments. The null and alternate hypotheses are shown below.

$H_{03}$: There is no difference in the level of experienced role ambiguity between Air Force O-3 logisticians serving in the joint operations environment and AF O-3 logisticians serving in the single service Air Force Environment.

$H_{A3}$: There is difference in the level of experienced role ambiguity between Air Force O-3 logisticians serving in the joint operations environment and AF O-3 logisticians serving in the single service Air Force Environment.

The data once again were first divided into the sub-populations of joint and non-joint respondents. Histograms of the data revealed a bi-modal distribution for joint respondents, while the distribution for non-joint respondents appeared normal. The Wilk-Shapiro/Rakit value for the joint respondent population was .9406, however, the

plot reveals two irregular patterns supporting the findings of a bi-modal distribution. The Wilk-Shapiro/Rakit value for the non-joint respondent population, on the other hand, was .9561, with no irregular patterns in the plot. In other words, while the non-joint respondent group appeared to be a single, normally distributed population, the distribution of joint service respondents, shown in Figure 4, reflected two distinct populations with modes centered to the right and left of a neutral response.

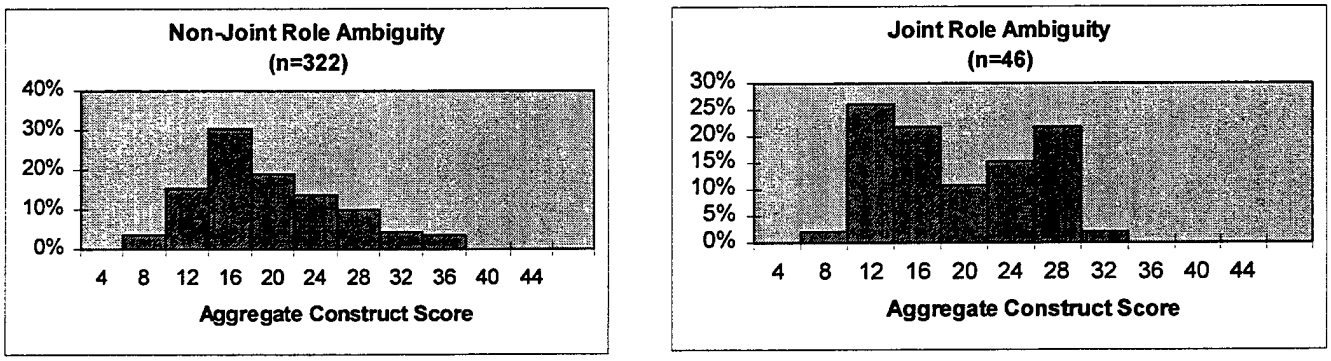



Figure 4. Role Ambiguity Response Distributions

Consequently, correlation analysis was conducted to determine possible characteristics that may differentiate the two sub-populations within the joint respondents. It was theorized that the bi-modal distribution could be related to factors such as time, experience and training. In other words, it was suspected that respondents with more experience or training may exhibit lower levels of role ambiguity. A correlation matrix was produced that included questions relating to length of time in the military (Q3), length of time in current assignment (Q6), length of time in career field (Q8), length of time in joint service environment (Q28), number of joint exercises participated in (Q29), and amount of joint service training (Q30). The correlation

analysis, illustrated in Appendix E, revealed a correlation of -. 364 (significant at the alpha level of .01), between the role ambiguity construct and number of joint exercises attended. The negative correlation is logical, as it can be interpreted to mean that higher participation in exercises results in lower levels of role ambiguity. No other significant correlations were found. To further support the relationship between exercise participation and degree of experienced role ambiguity, regression analysis was performed. The resultant P-value was .0151, indicating a statistically significant relationship.

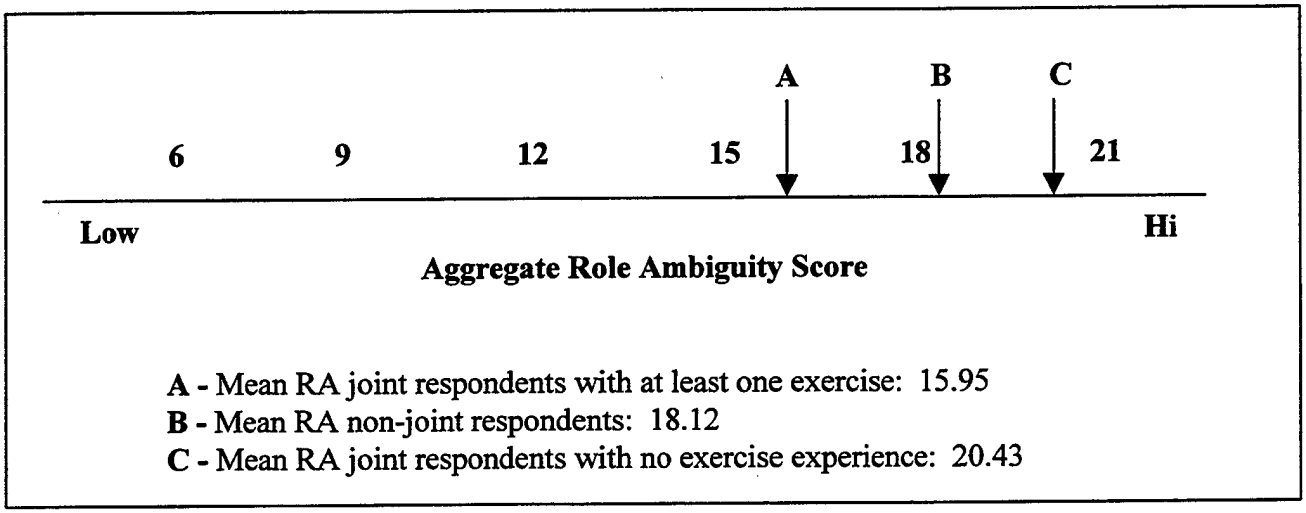
**Table 3. Role Ambiguity (RA) Construct Descriptive Statistics**

| | N | Range | Min | Max | Mean | Std. Dev |
|---|---|---|---|---|---|---|
| **Non-Joint** | 323 | 29 | 7 | 36 | 18.121 | 4.231* |
| **Joint With No Exercise Exp.** | 23 | 11 | 9 | 30 | 20.435 | 4.502* |
| **Joint With Exercise Exp.** | 21 | 19 | 8 | 27 | 15.952 | 4.025* |

*** Indicates SD adjusted by Finite Population Correction Factor**

Based on correlation and regression analyses, joint respondents were divided into two sub-populations consisting of members who have never participated in a joint exercise, and those who have participated in at least one (See Table 3 for a summary of role ambiguity construct descriptive statistics). Separate two-tailed, Two-Sample T-Tests, at an alpha level of .05, were performed to compare the mean of each joint sub-population to the mean of the non-joint population. The resultant test statistic for the comparison of joint respondents with no exercise experience to the non-joint population

was -2.24. The absolute value of the test statistic was higher than the critical value of 1.96, indicating there was enough statistical evidence to suggest a difference in the means. In other words, as depicted in Figure 5, AF O-3 logisticians in the joint service environment, with no joint exercise experience, exhibited a higher level of role ambiguity than their counterparts in non-joint positions.




* Aggregate means are based on the summation of responses to individual construct questions

Figure 5. Differences in Mean Role Ambiguity (RA)

A second two-tailed, Two-Sample T-Test at an alpha level of .05 was performed to compare the means of joint respondents with exercise experience to their counterparts in non-joint positions. The resultant test statistic of 2.02 was higher than the critical value of 1.96, indicating there was enough statistical evidence to suggest a difference in the means. In other words, as depicted in Figure 5, AF O-3 logisticians in the joint service environment, with joint exercise experience, exhibited a lower level of role ambiguity than their counterparts in non-joint positions.

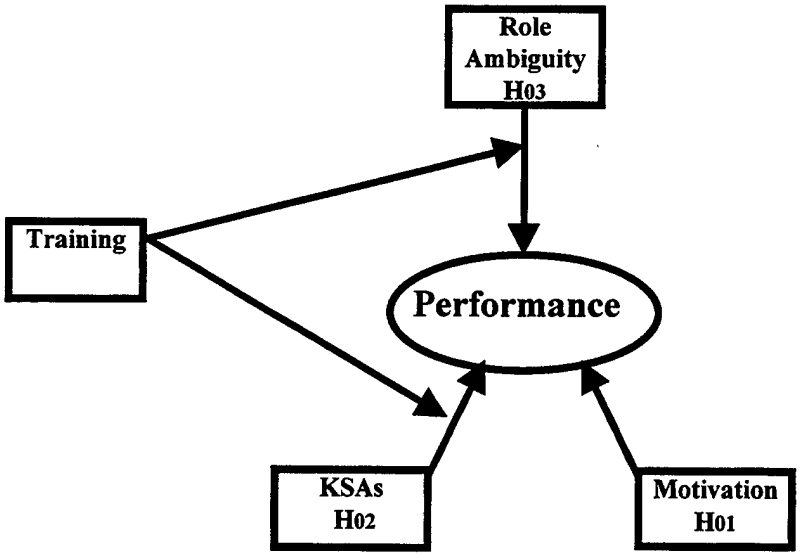
To this point, the data analyses have been shown in detail. A discussion of the analysis results, along with conclusions and recommendations for further research is presented in the final chapter.

# V. Conclusions and Recommendations

## Introduction

Joint operations will likely continue to become more prevalent in the future due to a number of factors, including defense spending cuts and the nature of modern warfare. According to former Chairman of the Joint Chiefs of Staff, General Shalikashvili, "The nature of modern warfare demands that we fight as a joint team" (Joint Chiefs of Staff, 1997). Historically, however, no official joint billets have existed for AF O-3s (Captains). This omission has resulted in an underestimation of the number of officers in these positions. Consequently, the AF has failed to focus on the preparation of these officers, resulting in a general feeling of ill preparedness.

Initial exploratory research, by the authors, indicated a need to investigate these feelings of ill preparedness experienced by AF O-3s in the joint service environment. The issue was further clarified through an in-depth review of literature relating to factors affecting job performance. As a result of the literature review, a model relating factors that affect job performance was developed. This model, depicted in Figure 3, formed the basis for the research question and supporting hypotheses.




Based on Goldstein, 1993:327

Figure 3. Job Performance Model With Hypotheses
(Factors Affecting Initial Job Performance)

Based on this model, job performance is considered to be a function of motivation, knowledge, skills and abilities (KSAs), and the experienced level of role ambiguity. It was expected that there would be no difference between the non-joint and joint respondents with regard to motivation levels or KSAs. Motivation was not considered to be a differing factor due to a lack of evidence to suggest otherwise. Furthermore, due to the homogeneity of the population, as it relates to KSAs (described in Chapters III and IV), it was anticipated that there would be no difference in KSAs throughout the population of AF O-3 logisticians as a whole. Role ambiguity within the joint population, on the other hand, was evident throughout the exploratory research. As described in Chapter II, role ambiguity is the experienced uncertainty about one's job and how it fits within an organization, leading to a lack of clarity of the effects of personal

actions. Interviews with officers, serving in the joint service environment, revealed feelings of uncertainty and ill preparedness that are characteristics of role ambiguity. Consequently, the following overarching research question was developed:

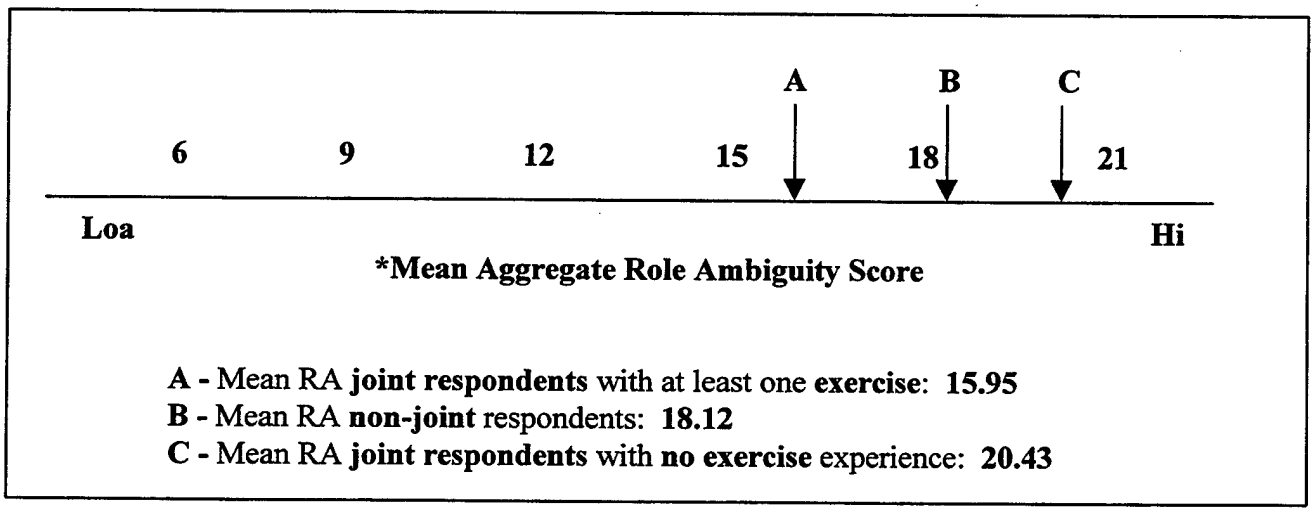
> Do AF O-3 logisticians serving in a joint operations environment experience more role ambiguity and consequently feel less prepared for their duties than AF O-3 logisticians serving in a single service environment?

To gain insight into the research question and ensure control for all components of the Job Performance Model, the following hypotheses were formulated:

> $H_{01}$: There is no difference in motivation level between Air Force O-3 logisticians serving in the joint operations environment and AF O-3 logisticians serving in the single service Air Force Environment.
>
> $H_{02}$: There is no difference in KSA levels between Air Force O-3 logisticians serving in the joint operations environment and AF O-3 logisticians serving in the single service Air Force Environment.
>
> $H_{03}$: There is no difference in the level of experienced role ambiguity between Air Force O-3 logisticians serving in the joint operations environment and AF O-3 logisticians serving in the single service Air Force Environment.

Data analyses, as anticipated, indicated there was not enough evidence to suggest a difference between the non-joint and joint populations with regard to motivation and KSAs. With regard to the role ambiguity construct, the joint service population exhibited a bimodal distribution, precluding a direct comparison with their single service counterparts. Based on the Job Performance Model, it was anticipated that this bi-modal distribution could be explained by differing levels of training, as it is considered a modifier of role ambiguity. Furthermore, it was suspected that experience might also

have been a contributing factor. To identify possible relationships, therefore, correlation analysis was conducted considering these factors. The resultant analysis indicated that a statistically significant correlation existed only between role ambiguity and participation in joint exercises. Consequently, the joint population was divided into two sub-populations; respondents with and without joint exercise experience. It was then possible to conduct two separate hypothesis tests, comparing non-joint respondents with the two joint sub-populations. Joint respondents, with no exercise experience, exhibited statistically higher mean role ambiguity than non-joint respondents, while those with exercise experience exhibited statistically lower role ambiguity than their non-joint counterparts. In Figure 5, mean aggregate role ambiguity scores for each sub-population are depicted.




* Aggregate means are based on the summation of responses to individual construct questions

Figure 5. Differences in Mean Role Ambiguity (RA)

Based on the authors' exploratory research, and a review of the organizational training development literature, it was expected that formal classroom training would significantly interact with role ambiguity. On the contrary, data analysis resulted in insufficient evidence to support this relationship, as role ambiguity did not correlate statistically with formal training in this study (See Appendix E Q30). However, only 10 of the 46 joint respondents indicated that they received some formal joint training prior to working in the joint environment. While the joint exercise environment differs from the formal classroom setting, it can be considered a form of training and a means of building practical experience, as well as evaluating combat readiness.

**Recommendations**

This study began with the recognition of the potential problem that some AF O-3 (Captain) logisticians, in the joint environment, felt ill prepared to perform their duties. Research data supported this suspicion by revealing that a large segment of the joint logistician population experienced statistically higher levels of role ambiguity than their counterparts in the non-joint environment. Furthermore, this group was found to differ from other joint logisticians surveyed only in that they had no joint exercise experience prior to working in the joint environment. According to the literature, discussed in Chapter II, increased levels of role ambiguity have been shown to affect performance in a negative manner. Therefore, this research indicates that the AF can improve the level of performance of its joint O-3 logisticians by providing them with joint exercise experience prior to their assumption of joint duties. Additionally, this course of action is relatively

inexpensive, in that it relies on existing exercises and therefore would require no additional funding. It is merely incumbent upon the AF to fully recognize the training value of joint exercises and ensure the proper mix of inexperienced and experienced personnel that would capitalize on the training opportunity and ensure mission success.

To consistently provide joint exercise training to the appropriate individuals, it is necessary to track them in some manner. The current system provides no means for identifying AF O-3 joint logistics positions. It is recommended, therefore, that these positions be identified as "joint," with a prerequisite of joint exercise experience.

**Recommendations for Future Research**

The purpose of this study was to examine factors that affect the performance of AF O-3 logisticians in the joint operations environment. This study, however, could also be replicated for other AF officer specialties involved in joint operations. Furthermore, it would be interesting to examine performance differences between members with and without joint exercise experience, as this study measured experienced levels of role ambiguity and not the relationship that role ambiguity has with performance. Finally, further examination into the need and means for formal classroom training is warranted, as joint respondents surveyed generally expressed a desire for some type of joint familiarization training (See Appendix F).

## Conclusions

The new breed of military forces challenged to fill the void created by budget cutbacks will need to be more flexible and knowledgeable than ever before. An essential aspect of this flexibility will be the necessity to work in joint operations environments. Currently, only a small percentage of AF O-3 logisticians work in the joint operations environment; however, it is evident that these positions will multiply in the near future. Furthermore, members assigned to these positions generally receive little if any initial training. Field research, by the authors, has shown that the peculiarities of the joint service environment compound the initial learning process, resulting in a higher level of discomfort with new duties. This discomfort has been described in research as role ambiguity. Additionally, past research has shown that higher levels of role ambiguity can be linked with lower levels of performance. In this study, AF O-3 (Captain) logisticians with no joint exercise experience exhibited statistically higher levels of role ambiguity than their counterparts in the single service AF environment. Furthermore, those with joint exercise experience exhibited statistically lower levels of role ambiguity than their counterparts in the single service AF environment. Therefore, to effectively meet the challenges of this unique and increasingly important environment, it is recommended that the AF provides joint exercise experience to AF O-3 (Captain) logisticians prior to assigning them to joint operations positions.

A primary way for the AF to ensure it is able to keep pace with the joint world is to prepare its people for joint jobs through appropriate training programs. An excerpt from AF 2025 mentions that training to do the right task is "essential in order to minimize wasted effort and expenses and to ensure potential capability is not deteriorated"

(Sikes et al., 1996). Furthermore, in a special report within AF 2025 entitled, "Paths to Extinction," Dr. Grant T. Hammond criticizes AF leadership for not taking the initiative to cement the AF's role within the joint DoD structure (1996). The essay warns that a failure on the part of leadership to strengthen its joint stance may result in future AF extinction. To gain a stronger presence in the joint world, the authors feel the AF must start with the lower echelon of officers and begin grooming and preparing them for future joint leadership. According to AF Officer Assignment personnel, the AF currently selects bright, motivated Captains for joint positions, assuming these attributes will enable them to accomplish their duties with little or no additional training. This lack of preparation, however, results in increased levels of role ambiguity, leading to officers that are initially less effective than their counterparts in single service organizations. Joint exercise experience prior to assignment to the joint environment, however, has been shown to significantly reduce experienced role ambiguity, ultimately leading to increased performance. Consequently, the authors of this research feel the AF should select talented Captains for joint duty and ensure proper orientation through participation in an at least one joint exercise prior to assignment. These officers, after serving a more effective and fulfilling joint tour, would be better prepared for assignments to joint billets later in their careers, where they could more effectively use the wealth of experience gained on their previous positions to strengthen AF leadership in joint issues.

# Appendix A: Cover Letter and Survey Questionnaire

**DEPARTMENT OF THE AIR FORCE**
**HEADQUARTERS UNIT STATES AIR FORCE**
**WASHINGTON DC**

16 April 1998

MEMORANDUM FOR SURVEY RESPONDENT

FROM: HQ USAF/ILXS
1030 Air Force Pentagon
Washington DC 20330-1030

SUBJECT: Logistics Training For Company Grade Officers

We are investigating the potential advantages of providing additional training for company grade logistics officers. Please take the time (approximately 10 minutes) to complete the attached questionnaire and return it in the enclosed envelope by 25 May 1998.

The survey measures your perceptions and attitudes toward your job and job environment. The data we gather will become part of an AFIT Thesis and may influence existing or future training if we find any significant issues. Your individual responses will be combined with others and will not be attributed to you personally.

Your participation is completely voluntary, but we would certainly appreciate your help. For further information, please contact Capt Bergdolt at DSN 255-7777 ext. 2109.

ELIZABETH MOORE, Lt Col, USAF
Chief Logistics Officer Career Development

Attachments:
1. Questionnaire
2. Return Envelope
3. AFIT Form 11C

**INSTRUCTIONS:** Please annotate the survey identification number, located on the top right hand corner of this page, in the identification number block of the data collection form provided. This survey is anonymous, so no further personal information is necessary in the general information block of the AFIT Form 11C. Please proceed with the following questions.

**PRELIMINARY INFORMATION:** Please answer the following questions with regard to your AF job experience:

Please write in your official Duty Title:

_____

1. I am currently serving in the Joint Service Environment in my present job:

(Note: For the purpose of this survey the "Joint Service Environment" does not necessarily mean a joint "billet", but rather working in a unit comprised of members of more than one service.)

| | |
|---|---|
| Yes | 1 |
| No | 2 |

**Note:** If you answered "**NO**" to Question 1, please complete **Questions 2-27 ONLY**. Otherwise, please complete the **ENTIRE** survey.

**BACKGROUND INFORMATION:** Please answer the following questions with regard to your current/previous AF job experience:

2. What Command are you currently assigned to (if your Command is not listed, please mark "Other" and specify):

| | |
|---|---|
| U.S. European Command | 1 |
| U.S. Pacific Command | 2 |
| U.S. Atlantic Command | 3 |
| U.S. Southern Command | 4 |
| U.S. Central Command | 5 |
| U.S. Space Command | 6 |
| U.S. Special Ops Command | 7 |
| U.S. Transportation Command | 8 |
| Other (Please Specify) | 9 _____ |

3. How long have you been in the military?

| | |
|---|---|
| Less than 1 year | 1 |
| 1 but less than 2 years | 2 |
| 2 but less than 3 years | 3 |
| 3 but less than 4 years | 4 |
| 4 but less than 5 years | 5 |
| 5 but less than 6 years | 6 |
| 6 but less than 7 years | 7 |
| 7 but less than 8 years | 8 |
| 8 but less than 9 years | 9 |
| 9 year or greater | 10 |

4. Have you completed the basic officer technical school for your AFSC?

| | |
|---|---|
| Yes | 1 |
| No | 2 |

5. Have you completed any additional formal Air Force technical training in your AFSC?

| | |
|---|---|
| Yes | 1 |
| No | 2 |

6. How long have you been in your current assignment?

| | |
|---|---|
| Less than 4 months | 1 |
| 4 but less than 8 months | 2 |
| 8 but less than 12 months | 3 |
| 12 but less than 16 months | 4 |
| 16 but less than 20 months | 5 |
| 20 but less than 24 months | 6 |
| 24 but less than 28 months | 7 |
| 28 but less than 32 months | 8 |
| 32 months or greater | 9 |

7. Please indicate your current AFSC:

| | | |
|---|---|---|
| 21T1 | 1 | |
| 21T3 | 2 | |
| 21S1 | 3 | |
| 21S3 | 4 | |
| 21G1 | 5 | |
| 21G3 | 6 | |
| Other (Please Specify): | 7 | _____ |

8. How long have you been in your current Career Field?

| | |
|---|---|
| Less than 1 year | 1 |
| 1 but less than 2 years | 2 |
| 2 but less than 3 years | 3 |
| 3 but less than 4 years | 4 |
| 4 but less than 5 years | 5 |
| 5 but less than 6 years | 6 |
| 6 but less than 7 years | 7 |
| 7 but less than 8 years | 8 |
| 8 but less than 9 years | 9 |
| 9 year or greater | 10 |

**JOB ATTITUDE INFORMATION:** Please answer questions 9-27 using the scale below:

| Strongly Disagree | Disagree | Slightly Disagree | Neutral | Slightly Agree | Agree | Strongly Agree |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**9.** My job is only a small part of who I am:

**10.** I have to "feel my way" in performing my duties:

**11.** I thoroughly comprehend relevant issues and policies which influence my Command's environment:

**12.** I feel certain of how much authority I have:

**13.** I am involved personally in my job:

**14.** I strategically and effectively manage organizational resources:

**15.** I know what my responsibilities are:

**16.** I am able to quickly analyze problems on my current job:

**17.** I feel the training I received prepared me for my duties:

**18.** I have very strong ties with my current job which would be very difficult to break:

**19.** I know that I have divided my time properly on my current job:

**20.** I am able to accomplish my duties in a timely manner:

**21.** Most of my personal life goals are job oriented:

**22.** I feel my previous experience initially prepared me for my current job:

**23.** I find it difficult to develop solutions to challenging problems on my current job:

**24.** Usually, I feel detached from my job:

**25.** I receive assignments that are within my training on my current job:

**26.** I like to be absorbed in my job most of the time:

**27.** I know exactly what is expected of me on my current job:

**Note:** The remaining questions are only for respondents who are **currently** serving in the **Joint Service Environment**. If the following questions don't pertain to you, please stop completing this survey now and return it in the self addressed envelop. **Thank You!**

**JOINT TRAINING INFORMATION:** Please answer the following questions regarding your Joint Service Environment experience:

**28.** How long have you worked in the Joint Service Environment:

| | |
|---|---|
| Less than 1 year | **1** |
| 1 but less than 2 years | **2** |
| 2 but less than 3 years | **3** |
| 3 but less than 4 years | **4** |
| 4 but less than 5 years | **5** |
| 5 but less than 6 years | **6** |
| 6 but less than 7 years | **7** |
| 7 but less than 8 years | **8** |
| 8 but less than 9 years | **9** |
| 9 year or greater | **10** |

**29.** Please indicate the number of joint environment exercises you have participated in, prior to serving in the Joint Service Environment:

| | |
|---|---|
| Zero | **1** |
| One | **2** |
| Two | **3** |
| Three | **4** |
| Four | **5** |
| Five | **6** |
| More than five | **7** |

**30.** Please indicate the number of formal training days, concerning the Joint Service Environment, you received prior to working in the Joint Service Environment:

| | |
|---|---|
| No training | **1** |
| Less than 1 full day | **2** |
| 1 but less than 5 days | **3** |
| 5 but less than 10 days | **4** |
| More than 10 days | **5** |

If you answered other than zero on the above question, please list formal coursed attended on the lines below:

_____

_____

31. Some form of Joint Service Environment familiarization training, immediately prior to working in the Joint Service Environment, would be useful:

| | |
|---|---|
| Strongly Disagree | 1 |
| Disagree | 2 |
| Slightly Disagree | 3 |
| Neutral | 4 |
| Slightly Agree | 5 |
| Agree | 6 |
| Strongly Agree | 7 |

Assume you were given a choice to enroll in one of the following methods of joint environment familiarization training. Please **rank order** them, according to your preference, from 1-4. (Please use each number only once, i.e. your **first preference** will be **1** and your **lowest preference** will be **4**).

32. Formal classroom training (short course, TDY)

33. Computer-based, self-paced training (CD ROM, Internet)

34. Video, self paced training (VHS tape)

35. Self study of joint materials (i.e. Purple Book)

Please rank order each of the following potential Joint Service Environment Familiarization Training subjects, based on your perception of their usefulness for inclusion in Joint Service Environment Familiarization training, with 1 being the most useful subject and 6 being the least useful subject. (Please use each number only once, i.e. your first preference will be 1 and your lowest preference will be 6).

36. Training in the Joint Command Structure

37. Familiarization training on the missions of Individual Services (i.e. Army, Navy, Marines)

38. Familiarization/overview of computer systems used in the Joint Service Environment (ex. JOPES, GCCS, GTN, JFAST)

39. Familiarization/overview of a Time Phased Force Deployment Document (TPFDD)

40. Familiarization training on service modes of movement (ex. Air, Ship, Rail)

41. Familiarization training on Deployment/Redeployment procedures

This completes the survey, please return it in the self addressed envelope. **Thank You!**

# Appendix B: Construct Reliability Tests

## Motivation Construct Reliability – Final Accepted Alpha

****** Method 2 (covariance matrix) will be used for this analysis ******

R E L I A B I L I T Y  A N A L Y S I S  -  S C A L E  (A L P H A)

Correlation Matrix

| | Q9 | Q13 | Q18 | Q21 | Q24 | Q26 |
|---|---|---|---|---|---|---|
| Q9 | 1.0000 | | | | | |
| Q13 | .1714 | 1.0000 | | | | |
| Q18 | .2081 | .2535 | 1.0000 | | | |
| Q21 | .3331 | .1208 | .2300 | 1.0000 | | |
| Q24 | .2738 | .5272 | .2868 | .1756 | 1.0000 | |
| Q26 | .2282 | .2293 | .2909 | .3001 | .2610 | 1.0000 |

N of Cases = 369.0

| Item Means | Mean | Minimum | Maximum | Range | Max/Min | Variance |
|---|---|---|---|---|---|---|
| | 4.3455 | 3.2195 | 6.0244 | 2.8049 | 1.8712 | 1.3920 |

| Item Variances | Mean | Minimum | Maximum | Range | Max/Min | Variance |
|---|---|---|---|---|---|---|
| | 2.4440 | 1.1760 | 3.6871 | 2.5110 | 3.1352 | .7437 |

Item-total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Squared Multiple Correlation | Alpha if Item Deleted |
|---|---|---|---|---|---|
| Q9 | 22.6694 | 22.1784 | .3850 | .1709 | .6313 |
| Q13 | 20.0488 | 27.2694 | .3870 | .2946 | .6317 |
| Q18 | 22.8537 | 23.8807 | .3899 | .1619 | .6234 |
| Q21 | 22.6558 | 23.8622 | .3810 | .1763 | .6270 |
| Q24 | 20.7100 | 24.8749 | .4560 | .3363 | .6045 |
| Q26 | 21.4282 | 23.9140 | .4122 | .1785 | .6151 |

R E L I A B I L I T Y  A N A L Y S I S  -  S C A L E  (A L P H A)

Reliability Coefficients 6 items

Alpha = .6640 **Standardized item alpha = .6775**

# Appendix B: Construct Reliability Tests
(Continued)

## Motivation Construct Reliability Factor Analysis Unrotated

Extraction 1 for analysis 1, Principal Components Analysis (PC)

Initial Statistics:

| Variable | Communality | * | Factor | Eigenvalue | Pct of Var | Cum Pct |
|---|---|---|---|---|---|---|
| | | * | | | | |
| Q9 | 1.00000 | * | 1 | 2.30572 | 38.4 | 38.4 |
| Q13 | 1.00000 | * | 2 | 1.07908 | 18.0 | 56.4 |
| Q18 | 1.00000 | * | 3 | .81538 | 13.6 | 70.0 |
| Q21 | 1.00000 | * | 4 | .70883 | 11.8 | 81.8 |
| Q24 | 1.00000 | * | 5 | .63025 | 10.5 | 92.3 |
| Q26 | 1.00000 | * | 6 | .46074 | 7.7 | 100.0 |

PC extracted 2 factors.

- - - - - - - - - - - - FACTOR ANALYSIS - - - - - - - - - - -

Factor Matrix:

| | Factor 1 | Factor 2 |
|---|---|---|
| Q9 | .57868 | .37196 |
| Q13 | .64052 | -.58060 |
| Q18 | .60750 | |
| Q21 | .55150 | .59098 |
| Q24 | .71106 | -.45145 |
| Q26 | .61787 | |

Final Statistics:

| Variable | Communality | * | Factor | Eigenvalue | Pct of Var | Cum Pct |
|---|---|---|---|---|---|---|
| | | * | | | | |
| Q9 | .47323 | * | 1 | 2.30572 | 38.4 | 38.4 |
| Q13 | .74736 | * | 2 | 1.07908 | 18.0 | 56.4 |
| Q18 | .36955 | * | | | | |
| Q21 | .65341 | * | | | | |
| Q24 | .70941 | * | | | | |
| Q26 | .43184 | * | | | | |

Skipping rotation 1 for extraction 1 in analysis 1

# Appendix B: Construct Reliability Tests
(Continued)

## Motivation Construct Reliability – Factor Analysis Unrotated

Analysis number 1  Listwise deletion of cases with missing values

1-tailed Significance of Correlation Matrix:

' . ' is printed for diagonal elements.

| | Q9 | Q13 | Q18 | Q21 | Q24 |
|---|---|---|---|---|---|
| Q9 | . | | | | |
| Q13 | .00047 | . | | | |
| Q18 | .00003 | .00000 | . | | |
| Q21 | .00000 | .01014 | .00000 | . | |
| Q24 | .00000 | .00000 | .00000 | .00035 | . |
| Q26 | .00000 | .00000 | .00000 | .00000 | .00000 |

Extraction  1 for analysis  1, Principal Components Analysis (PC)

Initial Statistics:

| Variable | Communality* | * | Factor | Eigenvalue | Pct of Var | Cum Pct |
|---|---|---|---|---|---|---|
| Q9 | 1.00000 | * | 1 | 2.30572 | 38.4 | 38.4 |
| Q13 | 1.00000 | * | 2 | 1.07908 | 18.0 | 56.4 |
| Q18 | 1.00000 | * | 3 | .81538 | 13.6 | 70.0 |
| Q21 | 1.00000 | * | 4 | .70883 | 11.8 | 81.8 |
| Q24 | 1.00000 | * | 5 | .63025 | 10.5 | 92.3 |
| Q26 | 1.00000 | * | 6 | .46074 | 7.7 | 100.0 |

PC  extracted  2 factors.

VARIMAX  rotation  1 for extraction  1 in analysis  1 - Kaiser Normalization.

VARIMAX converged in 3 iterations.

Rotated Factor Matrix:

| | Factor 1 | Factor 2 |
|---|---|---|
| Q9 | .67388 | |
| Q13 | | .86290 |
| Q18 | .45007 | .40865 |
| Q21 | .80747 | |
| Q24 | | .81980 |
| Q26 | .59837 | |

# Appendix B: Construct Reliability Tests
(Continued)

## Role Ambiguity Construct Reliability

****** Method 2 (covariance matrix) will be used for this analysis ******

R E L I A B I L I T Y  A N A L Y S I S  -  S C A L E  (A L P H A)

Correlation Matrix

| | Q10 | Q12 | Q15 | Q19 | Q25 | Q27 |
|---|---|---|---|---|---|---|
| Q10 | 1.0000 | | | | | |
| Q12 | .4283 | 1.0000 | | | | |
| Q15 | .4199 | .6292 | 1.0000 | | | |
| Q19 | .2625 | .3031 | .3285 | 1.0000 | | |
| Q25 | .2892 | .3789 | .3135 | .2497 | 1.0000 | |
| Q27 | .4333 | .6384 | .7077 | .3753 | .4102 | 1.0000 |

N of Cases = 368.0

| Item Means | Mean | Minimum | Maximum | Range | Max/Min | Variance |
|---|---|---|---|---|---|---|
| | 3.0231 | 2.1902 | 4.1005 | 1.9103 | 1.8722 | .3958 |

| Item Variances | Mean | Minimum | Maximum | Range | Max/Min | Variance |
|---|---|---|---|---|---|---|
| | 2.3394 | 1.4351 | 3.3114 | 1.8763 | 2.3074 | .4256 |

Item-total Statistics

| | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Squared Multiple Correlation | Alpha if Item Deleted |
|---|---|---|---|---|---|
| Q10 | 14.0380 | 29.0449 | .4956 | .2510 | .7884 |
| Q12 | 15.2908 | 28.2504 | .6644 | .4976 | .7417 |
| Q15 | 15.9484 | 31.5259 | .6776 | .5622 | .7503 |
| Q19 | 15.2446 | 33.9836 | .4002 | .1670 | .8003 |
| Q25 | 14.8913 | 31.6394 | .4403 | .2076 | .7958 |
| Q27 | 15.2799 | 27.8969 | .7222 | .5973 | .7281 |

R E L I A B I L I T Y  A N A L Y S I S  -  S C A L E  (A L P H A)

Reliability Coefficients 6 items

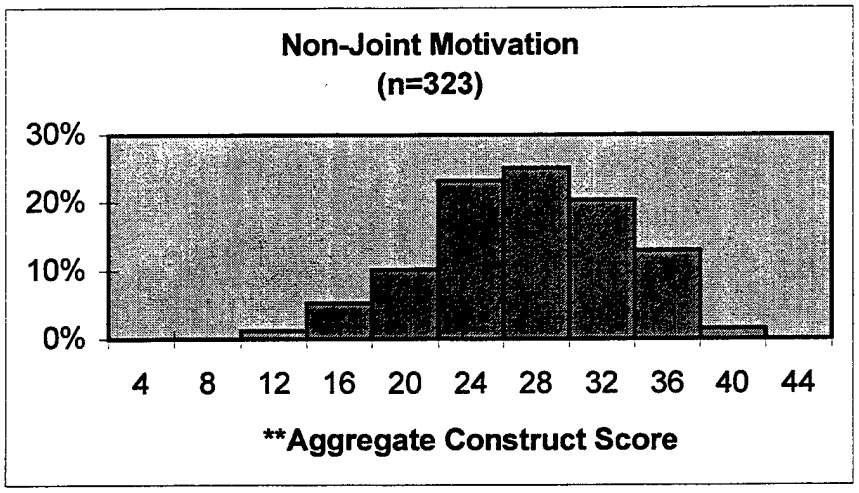
Alpha = .7997 **Standardized item alpha = .8073**

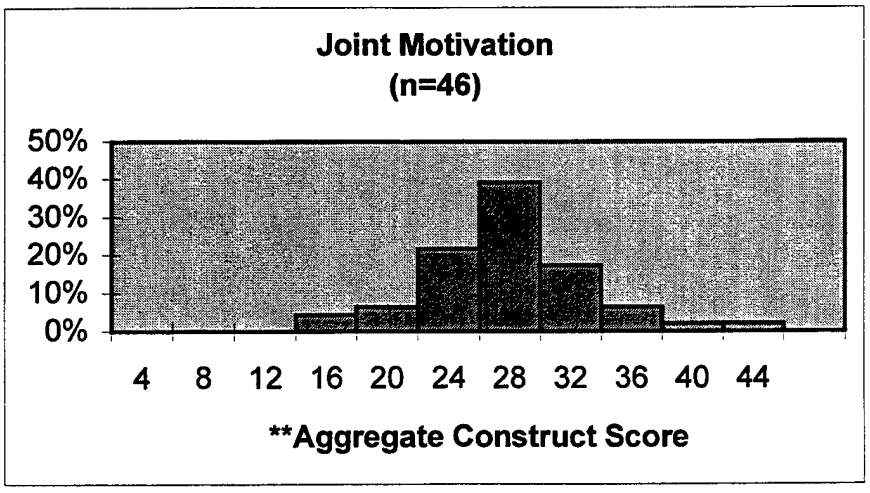
# Appendix C: Motivation Construct Statistical Analyses

## Descriptive Statistics of Mean Construct Scores

| | N | Range | Min | Max | Mean | Std. Dev |
|---|---|---|---|---|---|---|
| **Non-Joint** | 323 | 27 | 11 | 38 | 26.031 | 4.231* |
| **Joint** | 46 | 25 | 16 | 41 | 26.370 | 3.963* |

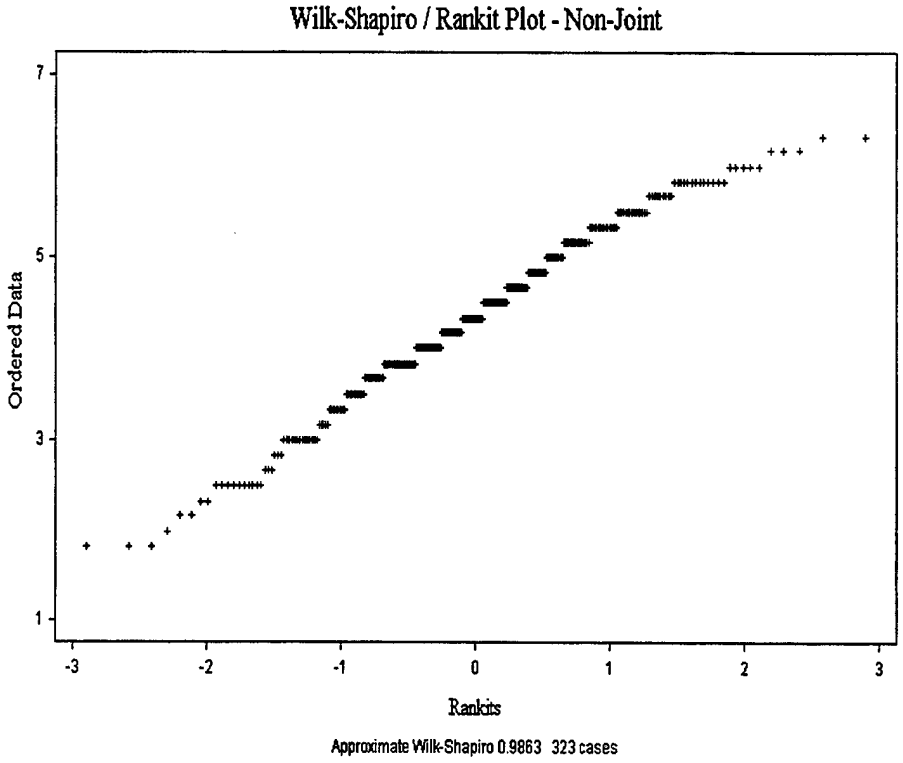
*** Indicates SD adjusted by Finite Population Correction Factor**

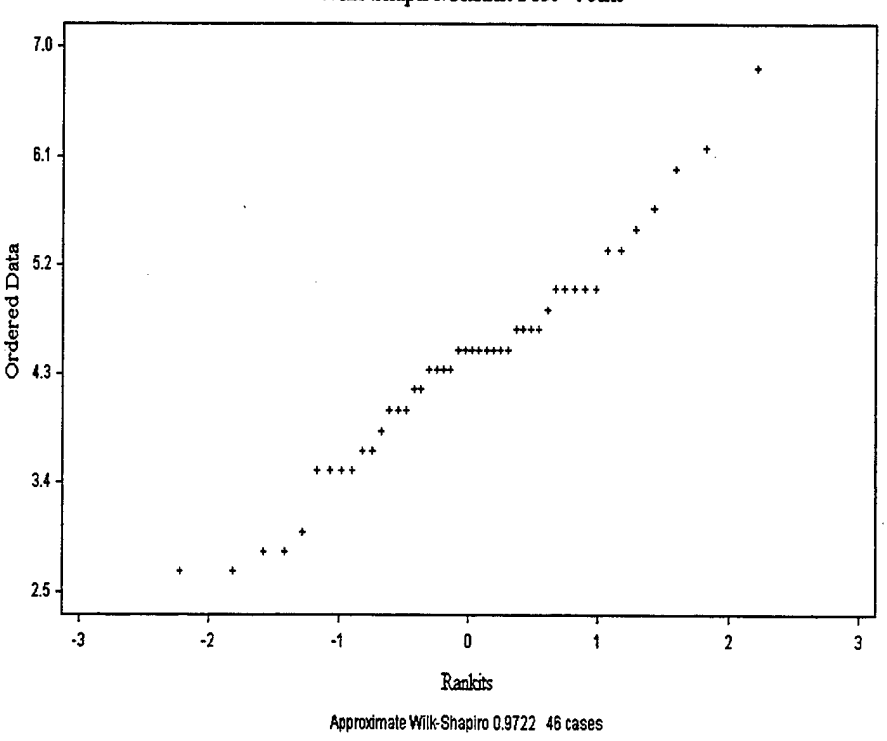



****Aggregate scores are based on the summation of responses to individual construct questions**

# Appendix C: Motivation Construct Statistical Analyses
(Continued)



# Appendix C: Motivation Construct Statistical Analyses
(Continued)

## Motivation Construct Two-Sample T-Test: Non-Joint Vs Joint Service

| VARIABLE | **MEAN | SAMPLE SIZE | S.D. |
|---|---|---|---|
| Non Joint | 26.031 | 323 | 4.2317* |
| Joint | 26.370 | 46 | 3.9631* |
| DIFFERENCE | -0.3386 | | |

NULL HYPOTHESIS: DIFFERENCE = 0
ALTERNATIVE HYP: DIFFERENCE <> 0

| ASSUMPTION | T-Stat | DF | T-Crit |
|---|---|---|---|
| EQUAL VARIANCES | -0.5122 | 367 | -1.96 |

95% CI FOR DIFFERENCE: (-1.6362, .9582)

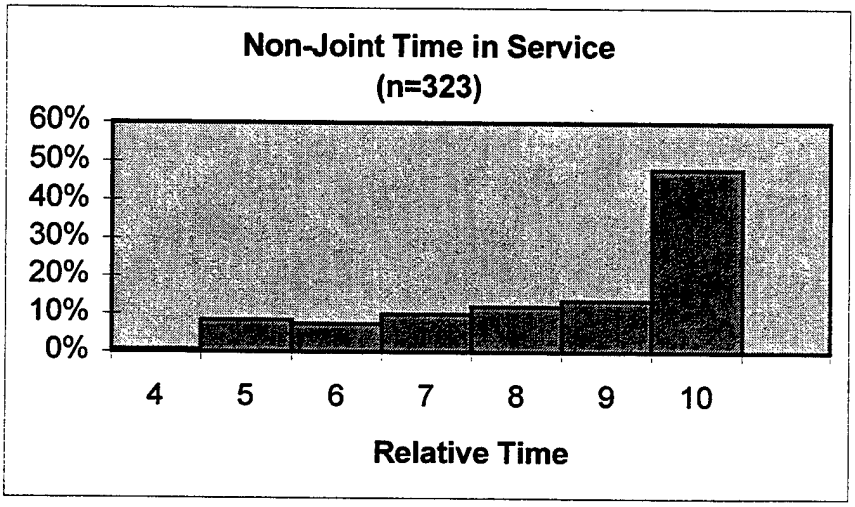
| | F-Stat | NUM DF | DEN DF | F-Crit |
|---|---|---|---|---|
| TESTS FOR EQUALITY OF VARIANCES | 1.140 | 322 | 45 | 1.48 |

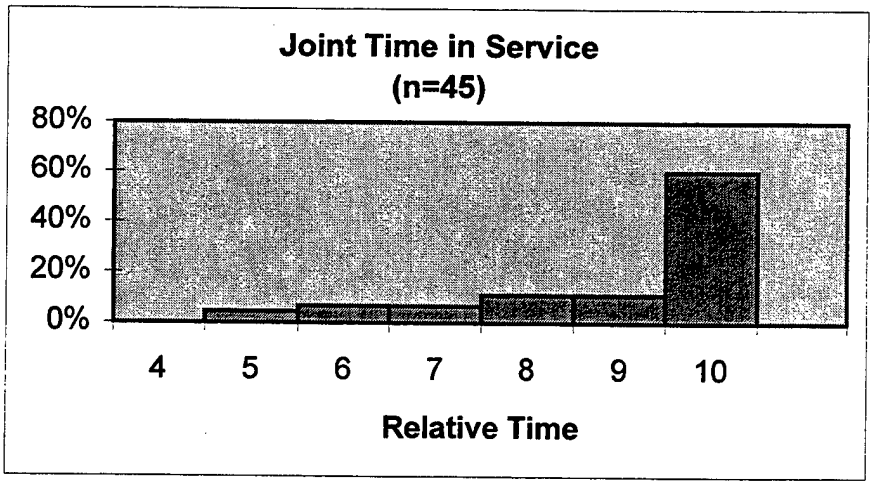
*** Indicates SD adjusted by Finite Population Correction Factor**
**** Aggregate means are based on the summation of responses to individual construct questions**

# Appendix D: Knowledge, Skills and Abilities (KSAs) Statistical Analyses

## Descriptive Statistics of Relative Time in Service

| | N | Range | Min | Max | Mean | Std. Dev |
|---|---|---|---|---|---|---|
| **Non-Joint** | 323 | 6 | 4 | 10 | 8.573 | 1.728 |
| **Joint** | 45 | 5 | 5 | 10 | 8.978 | 1.530 |

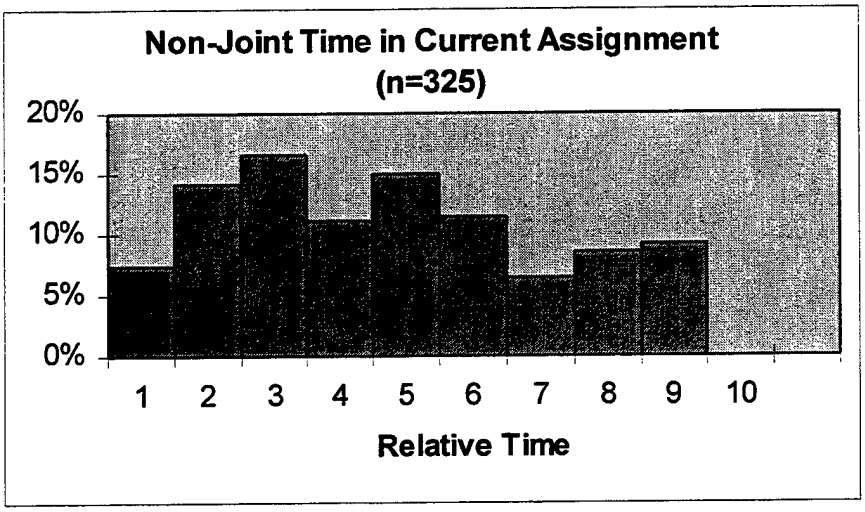


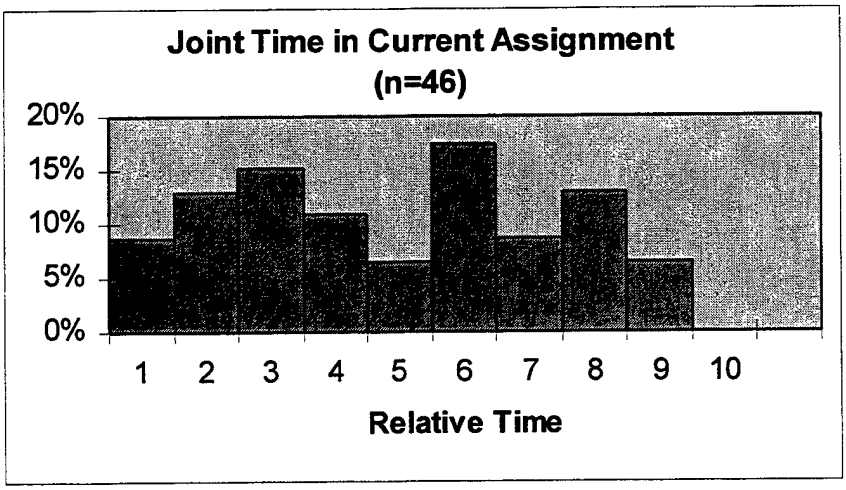



# Appendix D: Knowledge Skills and Abilities (KSAs) Statistical Analyses
(Continued)

**Descriptive Statistics of Relative Time in Current Assignment**

| | N | Range | Min | Max | Mean | Std. Dev |
|---|---|---|---|---|---|---|
| **Non-Joint** | 325 | 8 | 1 | 9 | 4.708 | 2.406 |
| **Joint** | 46 | 8 | 1 | 9 | 4.948 | 2.476 |

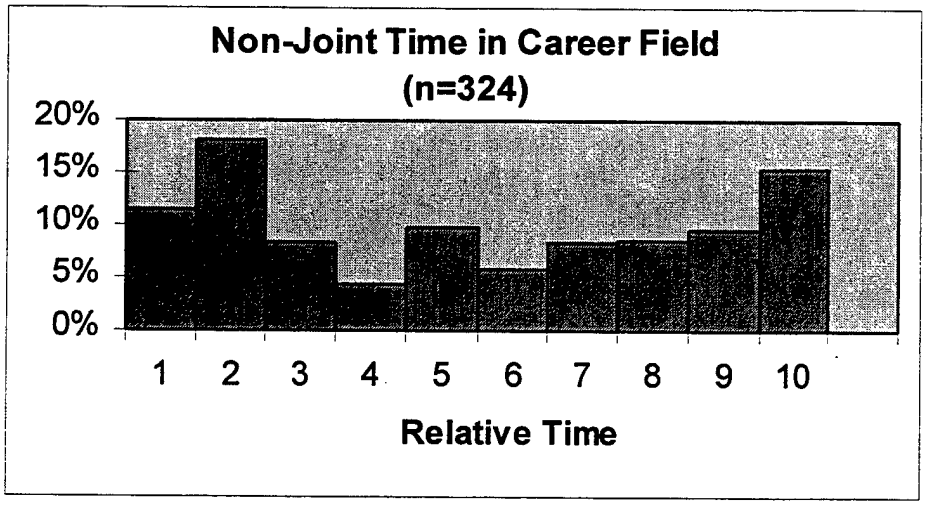


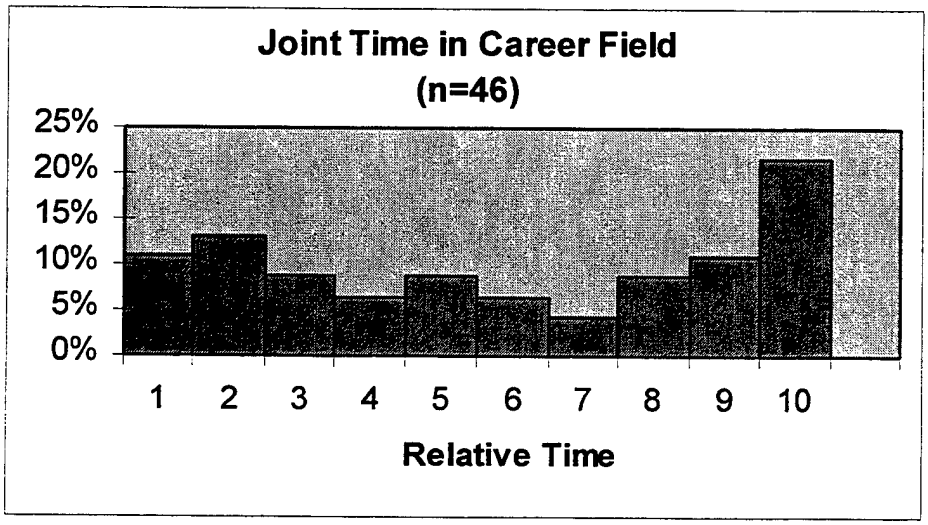



# Appendix D: Knowledge Skills and Abilities (KSAs) Statistical Analyses
(Continued)

**Descriptive Statistics of Relative Time in Career Field**

| | N | Range | Min | Max | Mean | Std. Dev |
|---|---|---|---|---|---|---|
| **Non-Joint** | 324 | 9 | 1 | 10 | 5.426 | 3.202 |
| **Joint** | 46 | 9 | 1 | 9 | 5.870 | 3.317 |



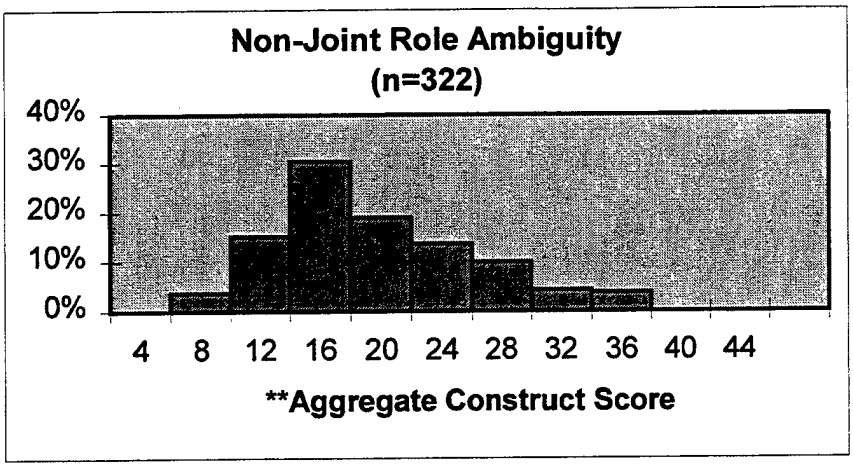



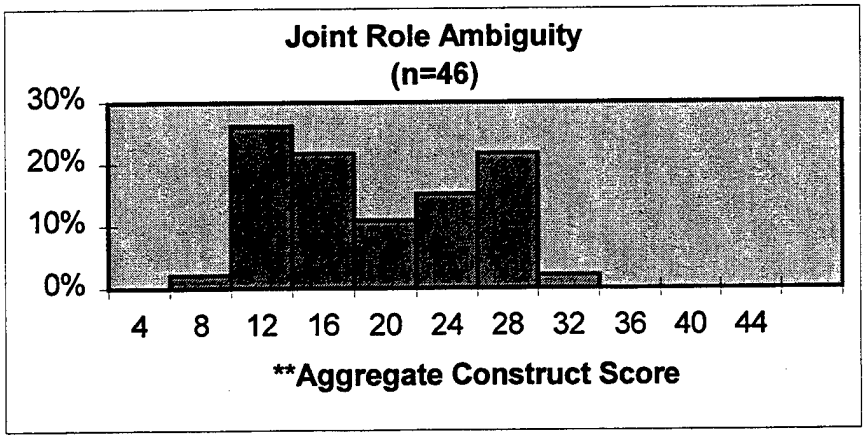
# Appendix E: Role Ambiguity Statistical Analyses

## Descriptive Statistics of Mean Construct Scores

| | N | Range | Min | Max | Mean | Std. Dev |
|---|---|---|---|---|---|---|
| **Non-Joint** | 322 | 29 | 7 | 36 | 18.121 | 6.553* |
| **Joint** | 46 | 22 | 8 | 30 | 18.261 | 6.141* |

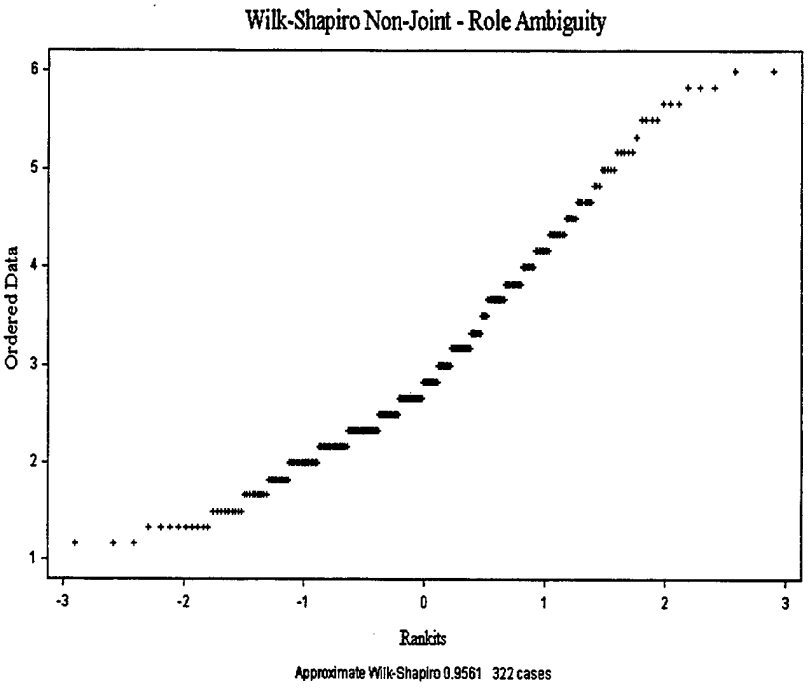
*** Indicates SD adjusted by Finite Population Correction Factor**

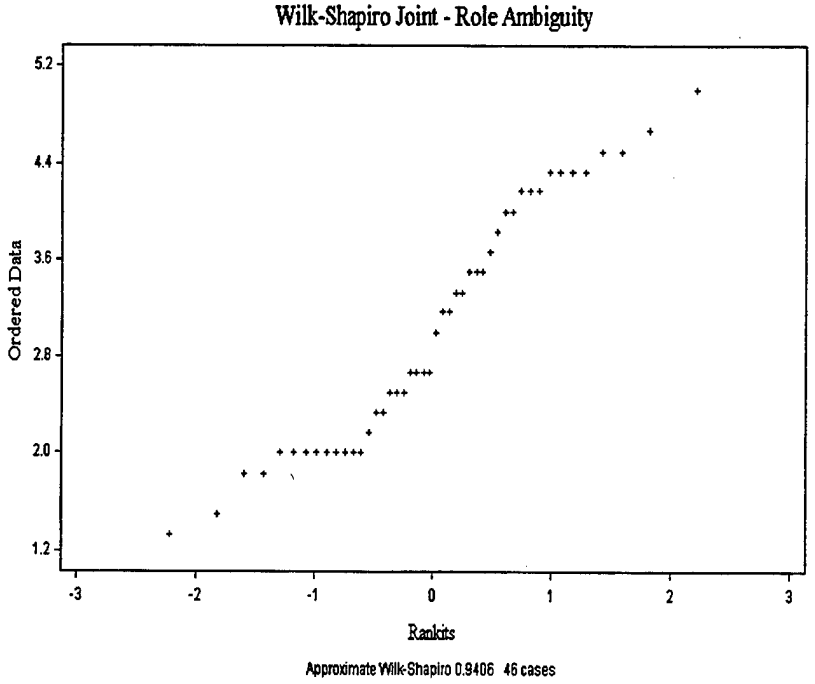



****Aggregate scores are based on the summation of responses to individual construct questions**

# Appendix E: Role Ambiguity Statistical Analyses
(Continued)



# Appendix E: Role Ambiguity Statistical Analyses
(Continued)

## Role Ambiguity Construct Correlations: Joint Sub-Population

| | | ROLEAMB |
|---|---|---|
| Pearson Correlation | ROLEAMB | 1.000 |
| | Q3 | .029 |
| | Q6 | .000 |
| | Q8 | -.069 |
| | Q28 | -.107 |
| | **Q29** | **-.364**** |
| | Q30 | .155 |
| Sig (1-tailed) | ROLEAMB | . |
| | Q3 | .423 |
| | Q6 | .499 |
| | Q8 | .325 |
| | Q28 | .245 |
| | **Q29** | **.008** |
| | Q30 | .158 |
| N | ROLEAMB | 46 |
| | Q3 | 46 |
| | Q6 | 46 |
| | Q8 | 46 |
| | Q28 | 44 |
| | Q29 | 44 |
| | Q30 | 44 |

****Correlation is significant at the 0.01 level (1-tailed)**

# Appendix E: Role Ambiguity Statistical Analyses
(Continued)

## Role Ambiguity Construct Correlations: Non-Joint Sub-Population

| | | ROLEAMB |
|---|---|---|
| Pearson Correlation | ROLEAMB | 1.000 |
| | Q3 | -.078 |
| | Q6 | -.064 |
| | Q8 | -.105 |
| Sig (1-tailed) | ROLEAMB | . |
| | Q3 | .163 |
| | Q6 | .255 |
| | Q8 | .061 |
| N | ROLEAMB | 322 |
| | Q3 | 322 |
| | Q6 | 322 |
| | Q8 | 321 |

# Appendix E: Role Ambiguity Statistical Analyses
(Continued)

## Regression Analysis of Joint Respondent's Role Ambiguity and Exercise Experience (Q29)

UNWEIGHTED LEAST SQUARES LINEAR REGRESSION OF RA

| PREDICTOR VARIABLES | COEFFICIENT | STD ERROR | STUDENT'S T | P |
|---|---|---|---|---|
| CONSTANT | 20.8755 | 1.34672 | 15.50 | 0.0000 |
| Q29 | -0.92293 | 0.36439 | -2.53 | 0.0151 |

| | | | |
|---|---|---|---|
| R-SQUARED | 0.1325 | RESID. MEAN SQUARE (MSE) | 34.1455 |
| ADJUSTED R-SQUARED | 0.1118 | STANDARD DEVIATION | 5.84341 |

| SOURCE | DF | SS | MS | F | P |
|---|---|---|---|---|---|
| REGRESSION | 1 | 219.050 | 219.050 | 6.42 | 0.0151 |
| RESIDUAL | 42 | 1434.11 | 34.1455 | | |
| TOTAL | 43 | 1653.16 | | | |

CASES INCLUDED 44 MISSING CASES 0

# Appendix E: Role Ambiguity Statistical Analyses
(Continued)

## Role Ambiguity Construct Two-Sample T-Test: Non-Joint Vs Joint with No Exercise Experience

| VARIABLE | **MEAN | SAMPLE SIZE | S.D. |
|---|---|---|---|
| Non Joint | 18.121 | 322 | 4.8038* |
| Joint No Exc | 20.435 | 23 | 4.5020* |
| DIFFERENCE | -2.3137 | | |

NULL HYPOTHESIS: DIFFERENCE = 0
ALTERNATIVE HYP: DIFFERENCE <> 0

| ASSUMPTION | T | DF | T-Crit |
|---|---|---|---|
| EQUAL VARIANCES | -2.24 | 343 | -1.96 |

95% CI FOR DIFFERENCE: (-4.3382, -.2898)

| TESTS FOR EQUALITY OF VARIANCES | F-Stat | NUM DF | DEN DF | F-Crit |
|---|---|---|---|---|
| | 1.139 | 321 | 22 | 1.78 |

*** Indicates SD adjusted by Finite Population Correction Factor**
**** Aggregate means are based on the summation of responses to individual construct questions**

# Appendix E: Role Ambiguity Statistical Analyses
(Continued)

## Role Ambiguity Construct Two-Sample T-Test: Non-Joint Vs Joint with Exercise Experience

| VARIABLE | **MEAN | SAMPLE SIZE | S.D. |
|---|---|---|---|
| Non Joint | 18.121 | 322 | 4.8038* |
| Joint With Exc | 15.952 | 21 | 4.0253* |
| DIFFERENCE | -2.3137 | | |

NULL HYPOTHESIS: DIFFERENCE = 0
ALTERNATIVE HYP: DIFFERENCE <> 0

| ASSUMPTION | T | DF | T-Crit |
|---|---|---|---|
| EQUAL VARIANCES | 2.02 | 341 | 1.96 |

95% CI FOR DIFFERENCE: (.0671, 4.2709)

| | F-Stat | NUM DF | DEN DF | F-Crit |
|---|---|---|---|---|
| TESTS FOR EQUALITY OF VARIANCES | 1.424 | 321 | 20 | 1.84 |

*** Indicates SD adjusted by Finite Population Correction Factor**
**** Aggregate means are based on the summation of responses to individual construct questions**

# Appendix F: Summary Statistics for Potential Joint Training Methods

## Descriptive Statistics Of Desire For Joint Service Environment Familiarization Training (Q31)

| N | Range | Min | Max | Mean | Std. Dev |
|---|---|---|---|---|---|
| 44 | 6 | 1 | 7 | 5.705 | 1.760 |

## Descriptive Statistics Of Desire For Type Of Joint Service Environment Familiarization Training (Q32-Q35):

Note: Training methods shown in order of preference as ranked by respondents, i.e. the most preferred form of training would have the lowest mean

| Q | Type of Training Desired | N | Mean | Std. Dev |
|---|---|---|---|---|
| 32 | Formal Classroom Training | 44 | 1.432 | .974 |
| 33 | Computer Based Training | - | 2.455 | .791 |
| 34 | Video Self Paced Training | - | 2.886 | .941 |
| 35 | Self Study of Joint Materials | - | 3.227 | .985 |

## Descriptive Statistics Of Perceived Usefulness of Joint Training Topics (Q32-Q35):

Note: Training methods shown in order of preference as ranked by respondents, i.e. the most preferred form of training would have the lowest mean

| Q | Training Topic | N | Mean | Std. Dev |
|---|---|---|---|---|
| 36 | Joint Command Structure | 44 | 2.442 | 1.830 |
| 37 | Individual Service Missions | - | 3.372 | 1.890 |
| 38 | Computer System Familiarization | - | 3.465 | 1.564 |
| 41 | TPFDD Familiarization | - | 3.548 | 1.626 |
| 39 | Service Modes of Movement | - | 3.884 | 1.313 |
| 40 | Deployment/Redeployment Procedures | - | 4.116 | 1.531 |

# Appendix G: List of Acronyms

| | |
|---|---|
| **12TH AF:** | 12th Air Force |
| **14TH AF:** | 14th Air Force |
| **ACC:** | Air Combat Command |
| **ACSC:** | Air Command and Staff College |
| **AFIT:** | Air Force Institute of Technology |
| **AFLMA:** | Air Force Logistics Management Agency |
| **AFPC:** | Air Force Personnel Assignment Center |
| **AFSOC:** | Air Force Special Operations Command |
| **AMC:** | Air Mobility Command |
| **ARSPACECOM:** | Army Space Command |
| **AS-PACSEC:** | Asia-Pacific Center for Security Studies |
| **ATLANTICFLT:** | United States Atlantic Fleet |
| **CBO:** | Congressional Budget Office |
| **CGO:** | Company Grade Officer |
| **CMOC:** | Cheyenne Mountain Operations Center |
| **DoD:** | Department of Defense |
| **DODSUPPOFF:** | Department of Defense Manned Space Flight Support Office |
| **EUCOM:** | United States European Command |
| **FGO:** | Field Grade Officer |
| **FORSCOM:** | Forces Command |
| **JSCE:** | Joint Communications Support Element |
| **JTF-SWA:** | Joint Task Force-South West Asia |
| **KSAs:** | Knowledge, Skills and Abilities |

## Appendix G: List Of Acronyms
(Continued)

**LANTFLT:** United States Atlantic Fleet

**MARFOREU:** Marine Forces Europe

**MARFORLANT:** United States Marine Corps Forces Atlantic

**MARFORPAC:** United States Marine Corps Forces Pacific

**MSC:** Military Sealift Command

**MTMC:** Military Traffic Management Command

**NAVSPACECOM:** Naval Space Command

**PACAF:** Pacific Air Forces

**PACFLEET:** United States Pacific Fleet

**RA:** Role Ambiguity

**SME:** Subject Matter Expert

**SOCACOM:** Special Operations Command US Atlantic Command

**SOCCENT:** United States Special Operations Central Command

**SOCEU:** Special Operations Command Europe

**SPSS:** Statistical Package for the Social Sciences

**USACOM:** United States Atlantic Command

**USAEU:** United States Army Europe

**USAFEU:** United States Air Forces Europe

**USALCOM:** United States Alaskan Command

**USAPAC:** United States Army Pacific

**USARCENT:** United States Army Forces Central Command

**USASOC:** United States Army Special Operations Command

**USASOUTH:** United States Army South

## Appendix G: List Of Acronyms
(Continued)

**USCENTAF:** United States Central Air Forces

**USCENTCOM:** United States Central Command

**USCINCFLT:** United States Commander in Chief Fleet

**USCINCPAC:** United States Commander in Chief Pacific

**USFJAPAN:** United States Forces Japan

**USFKOREA:** United States Forces Korea

**USMARCENT:** United States Marine Forces Central Command

**USNAVCENT:** United States Naval Forces Central Command

**USNEU:** United States Navy Europe

**USNSWC:** United States Navy Special Operations Command

**USPACOM:** United States Pacific Command

**USSOUTHCOM:** United States Southern Command

**USSPACECOM:** United States Space Command

**USSPECOM:** United States Special Operations Command

**USSTRATCOM:** United States Strategic Command

**USTRANSCOM:** United States Transportation Command

## Bibliography


Abramis, David J. "Work Role Ambiguity, Job Satisfaction, and Job Performance: Meta-Analysis and Review," Psychological Reports, 75: 1411-1433 (1994).

Air Force News Service. "Past Personnel Cutbacks Produce Stable Force for Future," n.pag. WWWeb, http://www.af.mil/news/May1998/n19980529_980750.html. 29 May 1998.

Atzhorn, David, Laura DiSilverio, Kevin Joeckel, and Mark Ware. "Brilliant Force and the Expert Architecture that Supports It," in Air Force 2025. n.pag. WWWeb, http://www.au.af.mil/su/2025/index.htm. August 1996.

Brandt, Craig, Christopher Burke, Karen Currie, Alan Heminger, Terrance Pohlen, and Kirk Vaughan. "Dynamic Response Logistics: Changing Environments, Technologies, and Processes," in Air Force 2025. n.pag. WWWeb, http://www.au.af.mil/su/2025/index.htm. August 1996.

Cochran, Thomas and Allison Sconyers. Motivational Dimensions That May be Influential in Optimizing Job Performance of Air Force Officers. MS thesis, AFIT/SLSR/7-74A. School of Systems and Logistics, Air Force Institute of Technology (AU), Wright-Patterson AFB, OH September 1974 (AD-A775694).

Congressional Budget Office (United States Congress). Paying for Military Readiness and Upkeep: Trends in Operation and Maintenance Spending. Washington: GPO, September 1997 (AD-A329884).

Dillman, Don, A. Mail and Telephone Surveys: The Total Design Method. NY: John Wiley and Sons Inc., 1978.

Drory, A. "Organizational Stress and Job Attitudes: Moderating Effects of Organizational Level and Task Characteristics," Psychological Reports, 49: 139-146 (1974).

Erdos, Paul and Arthur Morgan. Professional Mail Surveys. NY: McGraw-Hill Book Company, 1970.

Goldstein, Irwin L. Training in Organizations. Pacific Grove CA: Brooks/Cole Publishing Company, 1993.

Goldstein, Irwin L. Training and Development in Organizations. San Francisco CA: Jossey-Bass Incorporated, 1989.

Hair, Joseph, Rolph Anderson, Ronald Tatham and William Black. Multivariate Data Analysis. NY: Macmillan Publishing Company, 1992.

Hammond, Grant T. "Paths to Extinction: The US Air Force in 2025," in Air Force 2025. n.pag. WWWeb, http://www.au.af.mil/su/2025/index.htm. 19 June 1997.

Hollenbeck, John and Ellen Whitener. "Reclaiming Personality Traits for Personnel Selection: Self Esteem as an Illustrative Case," Journal of Management, 14 No. 1: 81-91 (1988).

Hunter, John and Ronda Hunter. "Validity and Utility of Alternative Predictors of Job Performance," Psychological Bulletin, 96 No. 1: 72-98 (1984).

Joint Chiefs of Staff (Department of Defense). Joint Doctrine Capstone and Keystone Primer. Washington: July 1997 (AD-A331945).

Kahn, Robert, Donald Wolfe, Robert Quinn, and Diedrick Snoek. Organizational Stress: Studies in Role Conflict and Ambiguity. NY: J. Wiley and Sons Inc., 1964.

Kaplan, Leonard E. A Single Unified U.S. Military – A Modest Proposal. Maxwell AFB AL: Air War College, February 1993 (AD-A283231).

Katzaman, Jim "Joint Vision 2010: The Way Ahead." Excerpt from unpublished article, n. pag. WWWeb, http://www.af.mil/news/Sep1996/n19960903_960875.html. 26 May 98.

Margolis, B. L., W. H. Kroes, and R. P. Quinn. "Job Stress: An Unlisted Occupational Hazzard," Journal of Occupational Medicine, 16: 659-661 (1974).

McCloy, Rodney, John Campbell, and Robert Cudeck. "A Confirmatory Test of a Model of Performance Determinants," Journal of Applied Psychology, 79 No. 4: 493-505 (1994).

Morris, J. H., and J. L. Koch. "Impacts of Role Perceptions on Organizational Commitment, Job Involvement, and Psychosomatic Illness Among Three Vocational Groupings," Journal of Vocational Behavior, 14: 88-101 (1979).

Pearce, Jone L. "Bringing Some Clarity to Role Ambiguity Research," Academy of Management Review, 6 No. 4: 665-674 (1981).

Price, James L. and Charles W. Mueller. Handbook of Organizational Measurement. Marshfield MA: Pitman Publishing Inc, 1986.

Rizzo, John, Robert House and Sidney Lirtzman. "Role Conflict and Ambiguity in Complex Organizations," Administrative Science Quarterly, 15: 150-163 (1970).

Schneier, Craig, Craig Russell, Richard Beatty and Lloyd Baird. The Training and Development Sourcebook. Amherst MA: Human Resource Development Press Inc., 1994.

Schriesheim, Chester and Charles Murphy. "Relationships Between Leader Behavior and Subordinate Satisfaction and Performance: A Test of Some Situational Moderators," Journal of Applied Psychology, 61: 634-641 (1976).

Schuler, Randall S. "Role Perceptions, Satisfaction, and Performance: A Partial Reconciliation," Journal of Applied Psychology, 69: 683-687 (1975).

Schuler, Randall S. "Role Perceptions, Satisfaction, and Performance Moderated by Organizational Level and Participation in Decision Making," Academy of Management Journal, 20: 159-165 (1977).

Schuler, Randall, Raymond Aldag and Arthur Brief. "Role Conflict and Ambiguity: A Scale Analysis," Organizational Behavior and Human Performance, 20: 111-128 (1977).

Sikes, Carol, Adelaide Cherry, William Durall, Michael Hargrove, and Kenneth Tingman. "Brilliant Warrior: Information Technology Integration in Education and Training," in Air Force 2025. n.pag. WWWeb, http://www.au.af.mil/su/2025/index.htm. August 1996.

Smith, Carla, John Tisak, and Robert Schmieder. "The Measurement Properties of the Role Conflict and Role Ambiguity Scales: A Review and Extension of the Empirical Research," Journal of Organizational Behavior, 14: 37-48 (1993).

Szilagyi, Andrew, Henry Sims and Robert Keller. "Role Dynamics, Locus of Control, and Employee Attitudes and Behavior," Academy of Management Journal, 19: 259-276 (1976).

Wanous, J. P. Organizational Entry: Recruitment, Selection and Socialization of Newcomers. Reading MA: Addison-Wesley, 1980.

Wright, Patrick, Michelle Kacmar, Gary McMahan, and Kevin Deleeuw. "P=f(M x A): Cognitive Ability as a Moderator of the Relationship Between Personality and Job Performance," Journal of Management, 21 No. 6: 1129-1139 (1995).

Young, Terry J. Title IV – Joint Officer Personnel Policy: A Peace Dividend is Required Carlisle Barracks PA: US Army War College, March 1992 (AD-A247882).

## Vita

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Joint operations will likely continue to become more prevalent in the future due to defense spending cuts and the nature of modern warfare. Currently, Air Force O-3 (Captain) logisticians, working in the joint operations environment, receive little if any initial training. Exploratory research, by the authors, indicated that these members felt uncertain about their jobs and how they related to the organization, which has been described in the literature as role ambiguity. Consequently, this research project was designed to determine if AF O-3 logisticians serving in the joint operations environment experience more role ambiguity than their counterparts serving in the single service AF environment.

With this aim in mind, a mail survey was administered to all Air Force Captains in the Supply, Transportation and Logistics Plans career fields. Of the 695 surveys distributed, 380 were returned (resulting in a 55% return rate), including 332 non-joint and 48 joint responses. Data analysis of joint returns revealed that role ambiguity responses exhibited a bimodal distribution, based on previous joint operations exercise experience. Those members with no exercise experience exhibited statistically higher levels of role ambiguity than their single service counterparts, while those with exercise experience exhibited significantly lower levels.

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