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An Evaluation of Organizational and Experience Factors Affecting the Perceived Transfer of U.S. Air Force Basic Combat Skills Training

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AN EVALUATION OF ORGANIZATIONAL AND EXPERIENCE FACTORS AFFECTING THE PERCEIVED TRANSFER OF U.S. AIR FORCE BASIC COMBAT SKILLS TRAINING

THESIS

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Abstract

The United States Air Force is in a state of transformation. Due to ongoing operations in Iraq and Afghanistan, the focus of Basic Military Training is shifting to basic combat skills, or the skills needed to survive and operate in a hostile environment. In this study, basic combat skills training was evaluated using a number of training factors that potentially affect trainees' perception of training transfer, or their ability to apply the skills they learned in training on the job or in a hostile environment. The analysis used structural equation modeling to evaluate the paths between each of the factors and perceived training transfer. Of the factors analyzed, transfer enhancing activities and perceived utility were found to positively influence perceived training transfer for all training types, while organizational support for training was positive for Law of Armed Conflict training only. Deployment experience was positive for weapons training, but negative for Self-Aid and Buddy Care. Realistic job preview was positively related to training transfer, but was only significant with respect to Self-Aid and Buddy Care training. The results of this research may help enhance basic combat skills training and do so at little or no cost.

Dedicated to the memory of Staff Sergeant Dustin W. Peters, the first Air Force vehicle operator killed in action in Operation Iraqi Freedom while supporting Army convoy operations.

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I would like to thank my parents and my brother for their support throughout my Air Force career. I would not be who or where I am today without them.

I would also like to express my sincere appreciation to my faculty advisor and my readers for their guidance and support throughout the course of this thesis effort. The insight and experience were certainly appreciated.

No one goes his way alone, so my final thanks are to my friends. I have never had such a large circle of friends or had so much fun in so little time. So, “as cliché as it may sound, I'd like to raise another round. And if your bottle’s empty, help yourself to mine. Thank you for your time, and here's to life!” (Clyne, 1994).

Shirley D. Crow

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AN EVALUATION OF ORGANIZATIONAL AND EXPERIENCE FACTORS AFFECTING THE PERCEIVED TRANSFER OF U.S. AIR FORCE BASIC COMBAT THE SYSTEM'S EFFECTIVENESS

I. Introduction

The United States Air Force (USAF) is facing "a new way of war" (Hebert, 2006, para. 3). The USAF's role in conflicts is the air war. In the past, the support personnel needed to generate air power missions were located in relatively secure locations far from the front line. Since September 11, 2001, that has not been the case. More support personnel have been required in theater, and in the Global War on Terror, there is no easily defined front line; airmen are at risk every day. The USAF has also assumed new missions such as combat convoy support and prison guard duty to relieve the burden on the Army (Hebert, 2006). Joint training to fill these "in-lieu-of" taskings is only one facet of the Air Force's evolving approach to training. USAF Basic Military Training (BMT) is undergoing a transformation to focus on warfighting skills and a combat culture (Hebert, 2006) to better prepare airmen for the roles they will be expected to fill.

Budget cuts and the need to develop and procure new aircraft to replace the USAF's aging fleet are forcing the reduction of 40,000 personnel by 2009 (Moseley, 2006). With fewer troops, more taskings, and a focus on warfighting skills, it is becoming critical for the USAF to maximize the training experience. It has been estimated that only 10% of the content of training courses is manifested through changes

in on-the-job behavior (Georgenson, 1982). With the potential for airmen to deploy earlier in their careers to more hazardous locations, they need to retain more than 10% of the skills they are taught. Therefore, the USAF should evaluate airmen's perceived training transfer, defined as how effectively they can apply what they learned in training to their jobs (Facteau, Dobbins, Russell, Ladd & Kudisch, 1995).

Evaluation of training effectiveness and perceived training transfer has been the subject of numerous studies throughout the twentieth century. As early as 1911, Frederick Taylor was performing workplace studies to determine the most efficient way to perform a task (Gibson, Ivancevich, Donnelly & Konopaske, 2006). In a series of articles published in 1959 and 1960, Kirkpatrick proposed a model for evaluating training programs (Kirkpatrick, 1996). From that basic model, numerous studies have proposed models that tied individual and situational characteristics such as organizational commitment, organizational support for training, pre-training motivation, perceived utility of training, and transfer enhancing activities to training effectiveness (e.g. Clark, Dobbins & Ladd, 1993; Facteau et al., 1995; Hicks & Klimoski, 1987; Mathieu & Martineau, 1997; Noe, 1986; Noe & Schmitt, 1986; Thayer & Teachout, 1995). These studies will be discussed more fully in the literature review.

Previous USAF studies have evaluated training effectiveness with respect to job skills training (e.g., Beck, 2004; Hobbs, 2005). In a study of USAF communications and information officers, Beck (2004) found that (a) training motivation, (b) organizational commitment, (c) task-related self-efficacy, (d) organizational support, and (e) opportunity to perform all had positive effects on training outcomes. Hobbs (2005) studied USAF logistics readiness officers and determined that (a) intrinsic incentives, (b) organizational

commitment, (c) pre-training motivation, (d) training reputation, (e) task constraints, (f) subordinate/supervisor support, and (g) transfer enhancing activities were significantly related to training transfer.

McCraine's (2006) research was the first step in evaluating the effectiveness of USAF combat skills training. McCraine (2006) surveyed active duty USAF support personnel regarding their perceptions of the combat skills training they had received in preparation for deployment, specifically (a) Anti-terrorism/Force Protection (Level I), (b) Chemical Warfare Defense, (c) Law of Armed Conflict, (d) Self-Aid and Buddy Care, and (e) Small Arms training. The five types of training were analyzed primarily as an aggregate, not as independent skills. McCraine (2006) identified two training factors, transfer enhancing activities and organizational support for training, which explained a significant amount of variance in predicting perceived training transfer.

This study expands on McCraine's (2006) research by evaluating factors that affect each of the combat skill training types individually using structural equation modeling, rather than as a single construct using regression analysis, to evaluate the factor relationships McCraine (2006) proposed. Regression analysis is a sequential analysis in which the variables are evaluated one at a time, and the order in which they are entered affects the strength of the relationships among the variables, while structural equation modeling evaluates a proposed latent variable model as a whole to determine how well it fits the data it represents and examines concurrently the relationships of latent variables (Byrne, 2001). McCraine's (2006) regression analysis indicated that the training factors did not affect all training types equally, but it did not allow for

simultaneous evaluation of all paths in the model. This analysis will highlight the factors that significantly impact perceived training transfer that are specific to training type.

Although the survey and analysis were limited to active duty USAF personnel, contractors and Department of Defense (DOD) civilians have been, and will continue to be, deployed to hazardous regions in support of military operations. Therefore, effective training for survival in hostile environments has a civilian as well as military application. This study will also add to the body of research on training effectiveness and factors that affect training transfer.

The current environment of increased deployment responsibilities for a wider range of USAF and affiliated civilian personnel to more hazardous locations coupled with the reduction in active duty military personnel has increased the need for effective, efficient combat skills training. To this end, the USAF should evaluate the effectiveness of existing combat skills training programs to maximize training benefits while minimizing time and money spent on ineffective training scenarios. This research should provide insight into what personal and organizational factors have the most influence on trainees' ability to transfer skills developed in the classroom to the war zone.

II. Literature Review

Overview

This chapter provides a definition of combat skills and review of the literature relevant to training, perceived training transfer, and key factors in the training process. Following the review of the research literature, the research model and hypotheses for the current study will be presented.

Definitions

In the absence of a formal USAF definition, McCraine (2006) operationally defined basic combat skills as "a collection of skills used to survive and operate on the battlefield" (McCraine, 2006, p. 6). Air Force Instruction (AFI) 36-2201, *Training Development, Delivery, and Evaluation*, Volume 1, section 2.4.1.1.4 identifies "field training requirements" that will be taught to USAF recruits in Basic Military Training (BMT). Those requirements include "self-aid and buddy care, anti-terrorism measures, basic field tactics, security, etc." (Department of the Air Force (DAF), 2002a). AFI 10-403, *Deployment Planning and Execution*, section 1.6.2.2 identifies the minimum training requirements for all personnel identified to deploy as: (a) Law of Armed Conflict (LOAC); (b) Self-Aid and Buddy Care (SABC); (c) Anti-Terrorism/Force Protection (AT/FP) Level I; (d) small arms (weapons) training; and (e) Nuclear, Biological, Chemical, and Conventional (NBCC, or chemical warfare) Defense, which also includes Explosive Ordnance Recognition in most cases (DAF, 2005a). The initial and periodic refresher training requirements and timelines for each skill are outlined in the respective AFIs.

Law of Armed Conflict (LOAC) training, as governed by AFI 51-401, *Training and Reporting to Ensure Compliance with the Law of Armed Conflict*, describes the requirements of the Geneva and Hague Conventions with respect to treatment of prisoners and war victims and respect for the laws and customs of foreign lands where U.S. military members participate in conflict (DAF, 1994).

The objective of Self-Aid and Buddy Care (SABC) training, as outlined in AFI 36-2238, *Self-Aid and Buddy Care Training*, section 5.1 is to "provide basic life and limb-saving techniques to help wounded or injured personnel survive in medical emergencies until medical help is available" (DAF, 2006).

Anti-Terrorism/Force Protection (AT/FP) Level I awareness training teaches situational awareness and reporting to prevent personnel from becoming victims of terrorist activity. Topics covered are outlined in AFI 10-245, *Air Force Antiterrorism (AT) Standards*, and include (a) terrorist operations, (b) individual protective measures, (c) surveillance techniques, (d) improvised explosive device attacks, and (e) kidnapping and hostage survival (DAF, 2002b).

Small arms training timelines and required course material are identified in AFI 36-2226, *Combat Arms Program*, AFI 36-2227 Volume 1, *Combat Arms Training Programs Individual Use Weapons*, and AFI 36-2227 Volume 2, *Combat Arms Training Programs Crew Served Weapons* (DAF, 2003; DAF, 2004a; DAF, 2004b). AFI 31-207, *Arming and Use of Force by Air Force Personnel*, provides greater detail on war and peacetime requirements for arming USAF personnel and the use of deadly force although it does not apply in combat zones in times of war, designated hostile areas, or to certain training or contingency operations (DAF, 1999).

Nuclear, Biological, Chemical, and Conventional (NBCC) Defense training, also known as Chemical Warfare Defense training, provides practical techniques for surviving and operating in a chemically or biologically contaminated environment and is outlined in AFI 10-2501, *Full Spectrum Threat Response (FSTR) Planning and Operations* (DAF, 2005b) as well as Air Force Manual (AFMAN) 10-100, the *Airman's Manual*.

Those five basic combat skills training types were the subject of McCraine's (2006) survey and analysis, as well as that of the current research effort. The evaluation of the effectiveness of the training was based on theory presented in training-related literature. The discussion of the literature will start with training in general and proceed to specific training-related topics that provide the foundational material on which the theoretical model was built.

Training

According to Webster's Dictionary, to train is "to make proficient with special instruction and practice" (Webster, 1999, p. 1169). Literature on training reaches back to the turn of the twentieth century with studies involving safety training in industrial work environments such as mines and railroads. Much of the early literature, as described by Ford, Kozlowski, Kraiger, Salas, and Teachout (1997), focused on training from a management perspective such as Taylor's principles of scientific management, which involved breaking a task into its component steps to maximize worker efficiency (Taylor, 1911, as cited by Ford, et al., 1997).

Three comprehensive reviews of training literature were completed in the twentieth century: (a) McGehee in 1949, (b) Campbell in 1971, and (c) Tannenbaum and Yukl in 1992 (Ford et al., 1997). As cited by Ford et al. (1997), the focus of McGehee's

1949 review was a comparison of pre-World War II literature from the years 1934-1938 with the literature from the period 1944-1948. McGehee (1949, as cited by Ford, et al., 1997) found that training was narrowly defined in the literature and only pertained to the process of gaining proficiency in a specific skill. He expanded the definition to include programs to initiate new employees and to improve the performance of both experienced workers and managers (Ford et al., 1997). The 1944-1948 literature indicated an increased emphasis on determining appropriate training content and the importance of training evaluation. The focus was on the issues of who should receive training, who should provide the training, what the content and methods of training should be, and how the outcomes should be evaluated (Ford et al., 1997). At that time, there had been a lack of training evaluation due in large part to a lack of managerial support for controlled studies in the workplace that interfered with daily operations.

In contrast to the 1949 McGehee review, the 1971 Campbell review expressed that the training field was too diverse, and there were no clear boundaries. Campbell's (1971) evaluation of the body of literature at that time indicated that models were needed to predict the circumstances in which different types of training activities would lead to better training outcomes in terms of skills acquired, retained, and transferred (Campbell, 1971).

One often-cited model is Kirkpatrick's hierarchical model for evaluating training programs (Kirkpatrick, 1959a, 1959b, 1960a and 1960b as cited by Kirkpatrick, 1996). The model was presented as a series of articles, each of which focused on one of the four steps (later designated as "levels") in the model. The first or lowest level is reaction, which indicates how well the trainee liked the training program. The second level,

learning, is a measurement of the principles, facts, or techniques trainees understood and absorbed. The third level, behavior, involves observing the application of the facts and skills learned in training to change behavior on the job. The final level is results, or the achievement of the training objectives in terms of increased productivity, reduced absenteeism, or other measurable goals (Kirkpatrick, 1996). This was the first model to provide a framework upon which to evaluate the effectiveness of a training program.

Tannenbaum and Yukl's 1992 review also focused on the subjects of training needs assessment (to answer the questions of who and what to train), design and methods (how to train), and evaluation (how to evaluate the training provided). In the time between Campbell's 1971 review and the Tannenbaum and Yukl 1992 study, a number of models had been developed to provide a more clear understanding of factors that affect how trainees acquire, retain, and transfer skills (Ford et al., 1997). The factors divided into two categories, trainee characteristics and pre-training/post-training work environments (Tannenbaum & Yukl, 1992). Trainee characteristics included trainee abilities and skills and trainee motivation, attitudes, and expectations. Although factors had been identified as affecting training transfer, Tannenbaum and Yukl (1992) indicated that "additional research on motivational antecedents to training is needed…we have barely scratched the surface here" (Tannenbaum & Yukl, 1992, p. 416).

Noe (1986) proposed a model that linked individual characteristics such as the trainee's attitudes, interests, values and expectations to his or her pre-training motivation, post-training motivation and training success. Noe and Schmitt (1986) found that trainees who reacted positively to the training needs assessment process were more likely to be satisfied with the training program. They also found that trainees with a high level

of personal involvement in their jobs and those with a clear career strategy were more likely to apply the skills learned in training to their jobs.

Mathieu and Martineau (1997) proposed a model to evaluate two types of characteristics, termed individual and situational characteristics, that influence pre-training motivation. Individual characteristics include (a) age, (b) gender, (c) ethnicity, (d) personality, (d) knowledge, (e) skills, and (f) abilities. Situational characteristics include (a) situational constraints (the adequacy of job-related information, tools, supplies, financial support and time availability); (b) social-psychological influences (work center climate, culture, and interpersonal relations among employees); and (c) maintenance systems (efforts specifically aimed at facilitating and maintaining training transfer) (Mathieu & Martineau, 1997). The conceptual model proposed by Mathieu and Martineau (1997) indicated individual and situational characteristics affected pre-training motivation, which then influenced training outcomes (reactions, learning and behavior displayed by trainees), which impacted work outcomes (post-training motivation, job behavior, and utility) (Mathieu & Martineau, 1997).

Studies such as Hobbs (2005) and Beck (2004) proposed models to determine the individual and situational characteristics that directly or indirectly influenced the outcome of USAF basic officer job skills training. In her study of USAF logistics readiness officers, Hobbs (2005) found a number of factors to be significantly related to training transfer, to include: (a) intrinsic incentives, (b) organizational commitment, (c) pre-training motivation, (d) training reputation, (e) task constraints, (f) subordinate/supervisor support, and (g) transfer enhancing activities. Beck (2004) found that (a) training motivation, (b) organizational commitment, (c) task-related self-efficacy, (d)

organizational support, and (e) opportunity to perform all had positive effects on training outcomes in a study of USAF communications and information officers. These studies provide a foundation on which to evaluate the effectiveness of USAF training. Based on these USAF studies, as well as studies in the training-related literature, McCraine (2006) proposed a model to determine individual and situational characteristics that influence the outcome of basic combat skills training.

Existing Research Model

McCraine's (2006) model, as depicted in Figure 1, proposed six training-related constructs that were positively related to perceived training transfer and pertinent to evaluate the effectiveness of combat skills training. A definition and explanation of each construct will be presented.

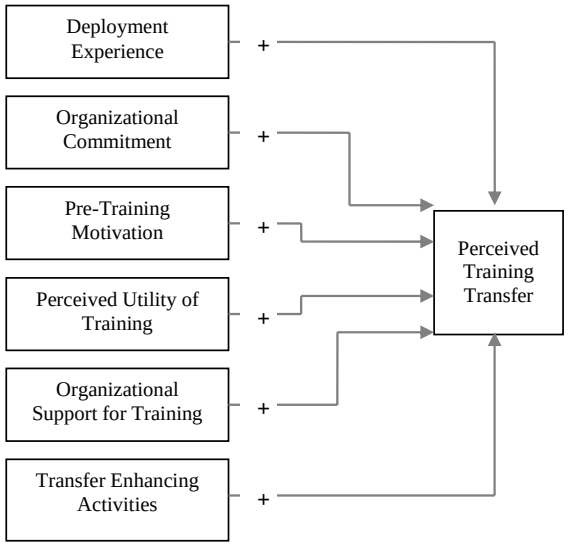

Figure 1. Influences on Perceived Training Transfer (McCraine, 2006)

Perceived Training Transfer

A measurement of training effectiveness is perceived training transfer, or the measure of the extent to which knowledge, skills, and attitudes developed in a training program are applied and maintained on the job (Baldwin & Ford, 1988). Baldwin and Ford (1988) identified three categories of factors affecting the transfer process. The first category was trainee inputs, which included trainee characteristics, training design, and work environment. The second category, trainee outputs, was comprised of learning and retention. The third category was conditions of transfer, particularly the trainee's ability to generalize and maintain the knowledge, skills and attitudes developed in training (Yamnill & McLean, 2001). These categories and the factors provided a framework for further studies of training transfer such as Facteau, Dobbins, Russell, Ladd, and Kudisch (1995) and are outlined in the next section.

Pre-training Motivation

Noe (1986) identified two types of pre-training motivation, motivation to learn and motivation to transfer. He defined the motivation to learn as "a specific desire of the trainee to learn the content of the training program," and the motivation to transfer as "the trainees' desire to use the knowledge and skills on the job" (Noe, 1986, p. 743). Facteau et al. (1995) analyzed the extent that trainees' attitudes influenced their motivation and subsequent ability to transfer training to the job. Of the various factors studied, the following were found to be positively related to pre-training motivation: (a) the reputation of the training program with respect to quality and applicability on the job, (b) the trainee's commitment to the organization, and (c) support from the trainee's supervisor (Facteau et al., 1995). Attending training for compliance rather than for an

intrinsic or extrinsic incentive was negatively related to pre-training motivation (Facteau et al., 1995). Pre-training motivation was positively related to perceived training transfer: trainees who were motivated to attend and learn from training received more benefits from that training.

Using correlation analysis, McCraine (2006) found a positive relationship between pre-training motivation and perceived training transfer of basic combat skills that was significant at $p < .01$. However, further analysis of the relationship using linear regression indicated that pre-training motivation was not a significant predictor of perceived training transfer, possibly due to the fact that basic combat skills training is mandatory for USAF personnel.

Perceived Utility

Clark, Dobbins, and Ladd's 1993 model proposed a positive relationship between a trainee's perception of the utility, or usefulness, of the training utility to his job and his pre-training motivation. Utility was divided into two variables, job utility and career utility. Job utility is the trainee's perception of the training to enhance job goals such as increased productivity or better problem-solving skills. Career utility is the usefulness of the training with respect to attainment of career goals such as promotions or pay raises. The results of the Clark et al. (1993) study indicated that both job and career utility significantly predicted training motivation, thereby indirectly influencing training transfer. Studies have found relationships between perceived utility and job performance (e.g. Alliger, Tannenbaum, Bennett, Traver & Shotland, 1997; Clark et al., 1993), but McCraine was the first to link perceived utility directly to training transfer (McCraine, 2006).

McCraine (2006) found perceived utility of training to be positively related to perceived training transfer ($r = .51$, $p < .01$). His initial regression analysis also showed perceived utility to be a significant indicator of perceived training transfer, but it was purposely not considered in the final regression model due to potential suppression problems resulting from relatively high correlations in the following pairs of factors: (a) perceived utility and transfer enhancing activities ($r = .48$ $p < .01$); (b) perceived utility and perceived training transfer ($r = .51$, $p < .01$); and (c) transfer enhancing activities and perceived training transfer ($r = .61$, $p < .01$).

Organizational Commitment

As Facteau et al. (1995) discussed, the trainee's organizational commitment, or the extent to which the trainee identifies with and is involved in the organization, was found to be positively related to pre-training motivation, and, therefore, indirectly related to perceived training transfer (Facteau et al., 1995). The results of McCraine's 2006 study also found organizational commitment to be positively related to perceived training transfer in the correlation analysis, but not significant in the regression analysis.

Transfer-Enhancing Activities

Thayer and Teachout (1995) developed a model to evaluate the organization's climate for training transfer. The model included transfer enhancing activities supported by other studies such as goal setting (setting goals in training to implement on the job (Wexley & Baldwin, 1986)), relapse prevention (helping trainees identify post-training situations that may inhibit the trainee from doing what he was trained to do (Tziner, Haccoun & Kadish, 1991)), and overlearning (practicing a new skill repeatedly until it becomes automatic (Rogers, Maurer, Salas & Fisk, as cited by Ford et al., 1997)). Hobbs

(2005) used three transfer-enhancing activities from Thayer and Teachout's (1995) work and applied them to a military sample. Those activities were relapse prevention, feedback cues (training the employee to be aware of their performance so he knows whether he is performing the task correctly) and principles-meaningfulness (instruction that explains why things work the way they do) (Hobbs, 2005; Machin & Fogarty, 2003). Hobbs (2005) found those activities to have a significant relationship to perceived training transfer of occupational skills.

McCraine (2006) subsequently linked transfer-enhancing activities, as used by Hobbs (2005), to basic combat skills and found them to be positively related. Transfer enhancing activities was the only construct found to be a significant predictor of perceived training transfer in both the initial and final regression analyses.

Organizational Support for Training

Noe (1986) evaluated trainees' impressions of "environmental favorability" and its effect on their learning motivation. Environmental favorability consists of task and social components. The task component measures the organization's material support for training in terms of supplies, equipment, and funds available and dedicated to the training effort. The social component is the organization's supervisory and peer support for the training effort. Environmentally favorable work environments were shown to positively affect trainees' motivation to learn, which in turn positively affects the transfer process (Noe, 1986). Hobbs (2005) found significant relationships between supervisor and subordinate support constructs on training transfer and McCraine (2006) found a positive relationship between organizational support and training transfer significant. Organizational support for training was also removed from the final regression analysis

due to high shared variance with transfer enhancing activities and perceived utility of training.

Deployment Experience

McCraine (2006) evaluated a variable he termed deployment experience that had not previously been evaluated in studies of training effectiveness or training transfer. He suggested that evaluating deployment experience should provide some insight to the effect actual experience in deployed environments, particularly combat environments, would have on the training process. McCraine (2006) linked training and experience factors to basic military combat skills, but the results did not produce a statistically significant finding.

Although not included in McCraine's (2006) model, the survey instrument captured data on another factor, realistic job preview, which will be tested in the current study to determine if an individual's perception of training transfer is influenced by his understanding of his potential for deployment to hazardous locations.

Realistic Job Preview

A realistic job preview is the disclosure of positive, neutral, and negative job-related information to a candidate prior to employment, as contrasted with traditional job previews, which tend to inflate favorable aspects of the job and generally neglect to disclose negative aspects (Hicks & Klimoski, 1987). Hicks and Klimoski (1987) related realistic job preview to training with respect to mastery of the training material, motivation to learn, training commitment, and satisfaction. They predicted that employees who received realistic job previews and who attended training by choice rather than because of external pressure would be more motivated to learn and would

benefit more from the training program (Hicks & Klimoski, 1987). Results of the study showed that the combination of realistic job preview and high degree of choice in selecting or attending training received more benefit from the training.

Brose (1999), Brooks and Evans (1996), Pond, Powell, Norton, and Thayer (1992), and Horner, Mobley, and Meglino (1979) have all studied realistic job preview with respect to the U.S. military. Brose (1999) and Horner et al. (1979) evaluated the effects of realistic job preview on reducing attrition for U.S. Navy and U.S. Marine Corps recruits, respectively. They found that realistic job previews were effective in reducing first-term enlisted turnover and the costs associated with turnover. Brooks and Evans (1996) evaluated a realistic job preview booklet for soldiers and their families interested in Special Forces in terms of the soldiers' decision-making process, knowledge level, and commitment to joining Special Forces. They found that the realistic job preview provided information that the soldiers and their families sought, and the realistic job preview was used as part of the decision process (Brooks & Evans, 1996). Pond et al. (1992) examined the use of realistic job preview with U.S. Army recruiters to determine if using realistic job preview would improve the recruiters' performance, retention, or ability to handle the stress of the job. Their results showed that realistic job preview would help attract and retain recruiters (Pond et al., 1992).

Neither the civilian (Hicks & Klimoski, 1987) nor military (Brooks & Evans, 1996; Brose, 1999; Horner et al., 1979; Pond et al., 1992) studies on realistic job preview tied realistic job preview directly to perceived training transfer. At best, they linked realistic job preview to factors such as reducing attrition and pre-training motivation that indirectly affected perceived training transfer. Because the literature supports indirect

relationships, realistic job preview is included in the current study to determine if a direct positive relationship between realistic job preview and perceived training transfer exists.

Proposed Research Model

McCraine's (2006) analysis did not entirely support the proposed model (deployment experience, for example, was not found to be a significant predictor of training transfer); thus, I propose a more robust test of the model using structural equation modeling, which will allow a test of the entire system of variables simultaneously to determine the extent of the model's fit to the data (Byrne, 2001). First, the paths of the entire model will be evaluated with combined data from all five basic combat skills. Second, the model paths will be tested with data from each of the five basic combat skills. Finally, an extension of the model (as depicted in Figure 2) will be tested, including realistic job preview, using data from each of the five basic combat skills. Hypotheses corresponding to the aforementioned tests are as follows:

Hypothesis 1 -- Hypotheses to support relationships between individual and organizational training factors and perceived training transfer:

H1a: Pre-training motivation is positively related to perceived training transfer.

H1b: Perceived utility of training is positively related to perceived training transfer.

H1c: Organizational commitment is positively related to perceived training transfer.

H1d: Organizational support for training is positively related to perceived training transfer.

H1e: Transfer enhancing activities are positively related to perceived training transfer.

H1f: Deployment experience is positively related to perceived training transfer.

Hypothesis 2 -- Hypotheses to support relationships between individual and organizational training factors and perceived training transfer with realistic job preview added to the model (as shown in Figure 2):

H2a: Pre-training motivation is positively related to perceived training transfer.

H2b: Perceived utility of training is positively related to perceived training transfer.

H2c: Organizational commitment is positively related to perceived training transfer.

H2d: Organizational support for training is positively related to perceived training transfer.

H2e: Transfer enhancing activities are positively related to perceived training transfer.

H2f: Deployment experience is positively related to perceived training transfer.

H2g: Realistic job preview is positively related to perceived training transfer.

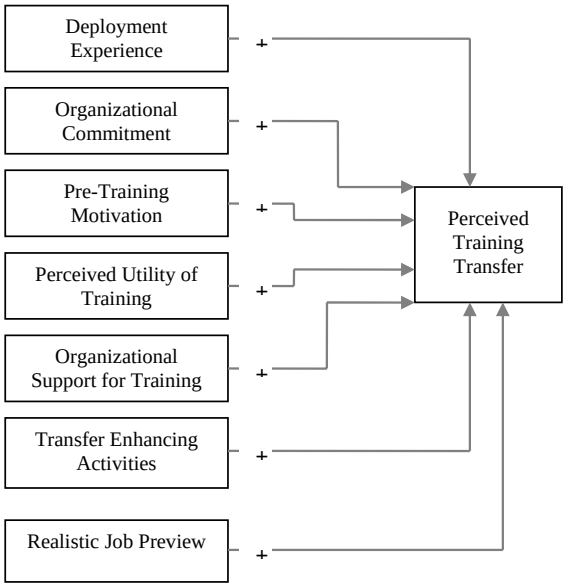

Figure 2. Proposed Research Model with Realistic Job Preview Added

Summary

The body of training literature from the twentieth century focused on the issues of what training is needed and by whom, who should provide the training, what the content and methods of training should be, and how to evaluate training outcomes (Ford et al., 1997). Kirkpatrick provided a basic model for measuring training effectiveness, and subsequent studies have expanded that model with a variety of other individual and organizational factors that influence the training transfer process. This study examines the relationships between (a) deployment experience, (b) organizational commitment, (c) pre-training motivation, (d) perceived utility of training, (e) organizational support, (f) transfer enhancing activities, and (g) realistic job preview and their effects on perceived training transfer.

III. Methodology

Overview

This chapter will provide a brief summary of the data collection technique and discuss the reliability of the measures used. The methodology for this research uses structural equation modeling of existing survey data to evaluate the models described in the previous chapter. This chapter will also define structural equation modeling and explain the benefits of its use.

Data Collection Procedures

Data were collected by McCraine (2006) in his assessment of perceived training transfer of combat skills training. The sponsor of his study, HQ AF/A4RF, was interested in the perceptions of individuals in specific support career fields, indicated in Table 1.

Table 1, Officer and Enlisted Career Fields Surveyed

Officer Career Fields Surveyed		Enlisted Career Fields Surveyed	
Specialty	Code	Specialty	Code
Intelligence	14N	Intelligence	1N
Weather	15W	Fuels	2F
Aircraft Maintenance	21A	Logistics Plans	2G
Missile Maintenance	21M	Supply	2S
Logistics Readiness	21R	Transportation	2T
Security Forces	31P	Communications	3C
Engineer	32E	Engineering	3E
Communications	33S	Services	3M
Manpower	34M	Security Forces	3P
Band	35B	Personnel	3S
Services	35P	Paralegal	5J
Personnel	36P	Chaplain Assistant	5R
Judge Advocate	51J	Contracting	6C
Chaplain	52R	Finance	6F
Contracting	64P	Special Investigations	7S
Finance	65F		
Special Investigations	71S		

The Air Force Personnel Center (AFPC) provided a stratified, random sample of names from the targeted career fields. From an original list of 6,374 names provided by AFPC, 4 were randomly removed and the remaining names were randomly assigned to one of five equal-size groups, representing each of the five combat skill training types. Five surveys were generated, identically worded except for the training type addressed; respondents were asked 32 training-type specific questions, 18 demographic questions, and two free-response demographic questions. Each potential respondent was sent an e-mail on 19 December 2005 with a cover letter and imbedded hyperlink to the survey instrument. A follow-up e-mail was sent on 4 January 2006, and the survey was removed from the internet on 11 January 2006. The survey generated 2,168 useable responses, from which McCraine randomly selected 50%. Of that group of 1,084, McCraine analyzed only those cases whose respondents had complete responses from which all variables could be calculated. The resulting pool was 932 complete cases (McCraine, 2006; personal communication, January 9, 2007). An analysis of the demographic data and free response questions was performed by McCraine (2006); only demographic data pertaining to the variables in the model was analyzed in the current study.

The initial dataset for this study consisted of 2,168 cases; all cases that were missing data were eliminated, as structural equation modeling analysis requires complete data in order to perform analysis. The resulting sample was 1,933 cases. The number of cases by training type breaks down as follows:

Table 2, Number of Cases by Training Type

Training Type	*n*
Overall	1,933
Anti-terrorism/Force Protection	368
Chemical Warfare	388
Law of Armed Conflict	362
Self-Aid and Buddy Care	422
Weapons	393

Survey Measures

Survey measures are evaluated in terms of their validity and reliability. Validity is the extent to which a survey measures what it was designed to measure, and reliability is the extent to which a survey generates consistent results (Leedy & Ormrod, 2005). Consistent with the research performed by Hobbs (2005) and McCraine (2006), reliability for this study is reported in terms of internal consistency. Cronbach's alpha reports internal consistency in terms of how well different survey items measure the same construct. A Cronbach's alpha value of .70 or greater is generally considered acceptable (Nunnally, 1978).

The survey instrument fielded by McCraine (2006) consisted of 52 items broken down as follows: (a) 32 training-type specific items using a 5-point Likert-type scale with anchors of (1) strongly disagree and (5) strongly agree; (b) 18 demographic items including age, gender, educational background, rank, career field, time in service, deployment experience, reasons for not deploying, and impression of likelihood to deploy to dangerous locations; and (c) two free-response items that allowed respondents to state their opinions and provide recommendations regarding combat skills training. The

following are the internal consistency results based on the 32 training-type specific items and three demographic items.

Perceived Training Transfer. McCraine (2006) assessed perceived training transfer using a 4-item scale originally used by Hobbs (2005) and developed from Facteau et al. (1995). The four items are as follows:

Table 3, Perceived Training Transfer Survey Items (α = .73, n = 1,933)

1	Based on the formal skills training received in *training type* training courses, I feel I could perform the skills effectively in a hostile environment.
2	I am not able to transfer the skills learned in *training type* formal training courses to a hostile environment. (Reverse coded)
3	I have changed the way I perform *training type* training skills in order to be consistent with material taught in the formal *training type* training course.
4	My actual *training type* training performance has improved due to the skills that I learned in the *training type* formal training course.

Facteau et al. (1995) reported an internal consistency of .87 for a civilian sample; Hobbs (2005) and McCraine (2006) reported internal consistencies of .92 and .72, respectively, for military samples. Although the overall reliability statistic for all training types in this study was .73, Cronbach's alphas by individual training type ranged from a low of .64 to a high of .78, and are depicted in Table 4 in the column identified as "N = 4", meaning the scale was made up of 4 items..

Table 4, Perceived Training Transfer

Training Type	α N = 4	α N = 3	*n*
Overall	.73	.76	1933
Anti-terrorism/Force Protection	.78	.79	368
Chemical Warfare	.74	.77	388
Law of Armed Conflict	.65	.69	362
Self-Aid and Buddy Care	.72	.75	422
Weapons	.72	.78	393

Removing one or more items from the scale may improve the internal consistency and improve the alpha value. In this case, removing item 3 ("I have changed the way I perform *training type* training skills in order to be consistent with material taught in the formal *training type* training course") improved the alpha values for all training types except AT/FP, which remained the same at .78. Removing this item increased the alpha value for LOAC training from .65 to .69, as depicted in Table 4 in the column identified as N = 3 (scale made up of 3 items).

Reliability is not the only measure that should be considered before removing an item from a scale; validity should be taken into consideration as well. Face validity is "the extent to which, on the surface, an instrument looks like it's measuring a particular characteristic" (Leedy & Ormrod, 2005, p. 92). Items 1 and 2 addressed performing skills learned in training in hostile environments. Item 4 addressed improvement in the trainee's task performance as a result of training. Item 3, however, addressed a potential change in how a trainee performs combat skills to be consistent with the training material. Combat skills are not performed on a regular basis by personnel who are not deployed. They are also skills that are not generally required outside the military. Therefore, with the possible exceptions of SABC (First Aid) and weapons training, most AF members would not possess skills in these areas without the AF combat skills training. This item did not appear to be measuring the same construct as the other items in this section, which further justifies its removal from the scale. Based on both the reliability and validity issues, item 3 was deleted from the perceived training transfer scale.

Removing item 4 further improved the internal consistency of the scale to .78 overall, with values ranging from a low of .72 (LOAC) to a high of .83 (Weapons); however, according to Garson (2006), three observed variables per latent variable is acceptable and found to be common practice, but models with only two observed variables per latent variable may be problematic and generate unreliable error estimates. For that reason, the perceived training transfer scale for this study was based on three items.

Pre-training Motivation. McCraine (2006) assessed pre-training motivation with an 8-item scale, depicted in Table 5, developed by modifying a 9-item scale used by Facteau et al. (1995) and Hobbs (2005). Facteau et al. (1995) reported an internal consistency of .71 for a civilian sample, and Hobbs (2005) reported an internal consistency of .87 for a military sample. McCraine selected four of the nine items used by Facteau et al. (1995) and Hobbs (2005) determined to be applicable to the subject of combat skills training and asked them in a general sense and with respect to the training type being addressed.

Table 5, Pre-training Motivation Survey Items (α = .82, n = 1,933)

1	If I have trouble understanding the material presented in the training course, I try harder.
2	I get more out of training than most of my peers.
3	I look forward to actively participating in training programs.
4	Doing well in training programs is important to me.
5	If I have trouble understanding the material presented in a formal *training type* training course, I try harder.
6	I get more out of formal *training type* training courses than most of my peers.
7	I look forward to actively participating in formal *training type* training courses.
8	Doing well in formal *training type* training courses is important to me.

The Cronbach's alpha values for this study ranged by individual training type from a low of .78 (LOAC) to a high of .83 (AT/FP) as follows:

Table 6, Pre-training Motivation

Training Type	α	*n*
Overall	.82	1,933
Anti-terrorism/Force Protection	.83	368
Chemical Warfare	.82	388
Law of Armed Conflict	.78	362
Self-Aid and Buddy Care	.82	422
Weapons	.81	393

Perceived Utility. McCraine (2006) developed a 4-item scale, as depicted in Table 7, to assess perceived utility of combat skills training and reported an internal consistency of .82. The following are the four items used:

Table 7, Perceived Utility Survey Items (α = .84, n = 1,933)

1	*Training type* training will affect my ability to survive and operate in a hostile environment.
2	The training I received in *training type* is relevant in a hostile environment.
3	I find *training type* skills training useful in a hostile environment.
4	The content of *training type* training courses is appropriate for situations encountered in a hostile environment.

The scale was also found to be very reliable for this study. Cronbach's alpha values ranged from .81 (Weapons) to .89 (Chemical Warfare), and were as follows:

Table 8, Perceived Utility

Training Type	α	*n*
Overall	.84	1,933
Anti-terrorism/Force Protection	.87	368
Chemical Warfare	.89	388
Law of Armed Conflict	.82	362
Self-Aid and Buddy Care	.84	422
Weapons	.81	393

Organizational Commitment. The organizational commitment scale was originally created by Porter and Smith (1970). Facteau et al. (1995) used the scale for a civilian sample with an internal consistency of .80. McCraine (2006) assessed

organizational commitment with the 4-item scale depicted in Table 9 as modified by Hobbs (2005) from the Facteau et al. (1995) study for use with a military sample:

Table 9, Organizational Commitment Survey Items (α = .82, n = 1,933)

1	I am willing to put in a great deal of effort beyond that normally expected in order to help the Air Force be successful.
2	I "talk up" the Air Force to my friends as a great organization to work for.
3	I find that my values and the Air Force's values are very similar.
4	For me, the Air Force is the best of all possible organizations to work for.

Hobbs (2005) and McCraine (2006) reported internal consistencies of .86 and .84, respectively. Results in this study ranged from .80 (LOAC) to .85 (Chemical Warfare) and are as follows:

Table 10, Organizational Commitment

Training Type	α	*n*
Overall	.82	1,933
Anti-terrorism/Force Protection	.83	368
Chemical Warfare	.85	388
Law of Armed Conflict	.80	362
Self-Aid and Buddy Care	.82	422
Weapons	.83	393

Transfer Enhancing Activities. Thayer and Teachout's (1995) Transfer Enhancing Activities Questionnaire (TEAQ) was the basis for the assessment of transfer enhancing activities. Hobbs (2005) achieved an internal consistency of .87 using nine items from the TEAQ. McCraine (2006) used six of the nine TEAQ items used by Hobbs (2005) and added two items specific to the transfer of combat skills training to use in a hostile environment. The eight items are as follows:

Table 11, Transfer Enhancing Activities Survey Items (α = .85, n = 1,933)

1	During formal *training type* training courses I have taken, the instructors explained why things worked the way they did.
2	During formal *training type* training courses I have taken, the instructor(s)/ computer based/video training explained why it was necessary to do things a certain way.
3	The content of the *training type* training we received really made things clear as to why things worked the way they did.
4	The course material for *training type* training really emphasized how to recognize my mistakes as I applied them in a hostile environment.
5	During *training type* training, we talked about situations that might prevent us from using our new skills and ways to deal with those situations.
6	During *training type* training, we talked about how to develop good work habits, so we would remember what we were taught in a hostile environment.
7	The way *training type* training courses are taught makes it easy to use the skills in a hostile environment.
8	The time between formal *training type* training classes is too long for me to use the skills in a hostile environment.

Results in this study were consistent with McCraine (2006) with a Cronbach's alpha value of .85 for all training types combined as well as three of the five individual training types. The low value was .83 (LOAC) and the high was .87 (Weapons).

Table 12, Transfer Enhancing Activities

Training Type	**α**	***n***
Overall	.85	1,933
Anti-terrorism/Force Protection	.85	368
Chemical Warfare	.85	388
Law of Armed Conflict	.83	362
Self-Aid and Buddy Care	.86	422
Weapons	.87	393

Organizational Support for Training. McCraine (2006) created the 4-item scale depicted in Table 13 to assess organizational support for training based on modifications of scales used by Facteau et al. (1995) and Hobbs (2005):

Table 13, Organizational Support for Training Survey Items (α = .77, n = 1,933)

1	My supervisor believes that *training type* training is important and s/he attends relevant courses.
2	If a last minute work center crisis arose, my supervisor would still allow me to attend *training type* training as scheduled.
3	The benefits of *training type* training courses are highly valued by my unit.
4	The requirement for individuals to attend *training type* training courses are widely supported in my unit.

McCraine reported an internal consistency of .78 for this modified scale. Values for this study ranged from a low of .71 (AT/FP) to a high of .82 (Weapons) as follows:

Table 14, Organizational Support for Training

Training Type	α	*n*
Overall	.77	1,933
Anti-terrorism/Force Protection	.71	368
Chemical Warfare	.80	388
Law of Armed Conflict	.76	362
Self-Aid and Buddy Care	.75	422
Weapons	.82	393

Deployment Experience. Deployment experience was measured with a single item (question 8a) in the demographic section of the survey instrument: "How many times have you been deployed since September 11th 2001?" Possible responses ranged from "0-1" to "8+".

Realistic Job Preview. Realistic job preview was measured with two items in the demographic section of the survey instrument as depicted in Table 15.

Table 15, Realistic Job Preview Survey Items (α = .83, n = 1,933)

8e	When you first entered the military, how likely did you think it was that you would be deployed to dangerous places in the first 4 years?
8f	When you first entered the military, how likely did you think it was that you would be deployed to dangerous places in your career?

McCraine (2006) did not include this construct in the model, therefore no internal consistency was previously reported. The overall Cronbach's alpha value for this study was .83, with values ranging from .81 to .85, as reported in Table 16. As previously discussed, however, there may be unreliable error estimates that arise from this scale due to its being based on only two items.

Table 16, Realistic Job Preview

Training Type	α	*n*
Overall	.83	1,933
Anti-terrorism/Force Protection	.85	368
Chemical Warfare	.81	388
Law of Armed Conflict	.83	362
Self-Aid and Buddy Care	.83	422
Weapons	.82	393

Structural Equation Modeling

The term structural equation modeling (SEM) refers to a family of statistical procedures commonly used in the behavioral sciences (Kline, 2005). The SEM family includes the general linear model (GLM), which in turn includes analysis of variance (ANOVA) and regression analysis (Kline, 2005). SEM is a priori, meaning that the researcher formulates a model and then applies SEM analysis to determine whether the data support the model. For this reason, SEM is usually considered confirmatory rather than exploratory.

There are three general types of SEM applications: (a) strictly confirmatory, (b) alternative models, and (c) model generating (Jöreskog, 1993, as cited by Byrne, 2001). Strictly confirmatory analysis occurs when a researcher tests a single model and rejects or fails to reject it based on the data. The researcher does not perform any further analysis or modify the model. Alternative models analysis involves testing multiple existing

alternative models and rejecting or failing to reject them, again without any modification of any of the models. Model generating is the most common application and occurs when a researcher modifies a rejected model and then tests the modified model against the same data with the goal of arriving at a theoretically meaningful and statistically well-fitting model (Byrne, 2001).

According to Byrne (2001), there are two important aspects of the SEM process: a series of structural (i.e., regression) equations represent the causal processes under study, and these structural equations can be modeled graphically to allow a better understanding of the theoretical model. The entire system of equations is analyzed simultaneously to determine the extent of its consistency, or "fit", to the data (Byrne, 2001).

SEM models include two types of variables, latent and observed. Latent variables are constructs such as perceived training transfer and organizational commitment that cannot be observed or measured directly. These latent, or unobserved, variables are linked to representative observed variables, often referred to as indicators. Observed variables are directly measured by the researcher such as items in a survey instrument that indicate the construct they are supposed to represent (Byrne, 2001). SEM models have two components, a measurement model and structural model. The measurement model defines the relationships between the observed and unobserved variables, while the structural model identifies relationships between unobserved (latent) variables (Byrne, 2001). SEM has gained popularity in behavioral science studies because of this ability to analyze latent variables.

The hypotheses outlined in chapter 2 were tested by evaluating the fit of each model as a whole and through path analysis. Path analysis examines the significance of paths between latent variables. Goodness of fit was assessed with a number of tests, the first of which is the chi-square (χ^2) test for absolute fit. A statistically non-significant χ^2 ($p > .05$) indicates a good model fit (Byrne, 2001). The χ^2 test is sensitive to sample size, however, and with a sample size of 1,933, the test may not indicate good fit with any proposed model. Therefore, an additional test, the normed χ^2, in which the χ^2 is divided by the degrees of freedom, will be incorporated to attempt to reduce the sensitivity of the χ^2 index to sample size. Generally, normed χ^2 values between 2 and 3 indicate good fit, although values as high as 5 have been considered reasonable (Kline, 2005).

Three additional fit tests were used to evaluate the model in this study. The Tucker-Lewis index (TLI), also known as the non-normed fit index (NNFI), compares a proposed model's fit to a null model and also measures parsimony by comparing the degrees of freedom of the proposed and null models. It is resilient to sample size variations, has values ranging from 0 to 1, with values of .90 or higher indicating a good model fit (Garver & Mentzer, 1999). The comparative fit index (CFI) also compares the model fit to a null model in which the constructs are not related, is resilient to sample size, and has values from 0 to 1, with values greater than .90 indicating good fit (Garver & Mentzer, 1999). The Root Mean Square Error of Approximation (RMSEA) is the final goodness of fit test that will be used in this study. It measures model parsimony, measuring the discrepancy between the observed and estimated covariance in terms of the population, not the sample, and is sensitive to the complexity of the model (Byrne, 2001;

Garver & Mentzer, 1999). RMSEA values range from 0 to 1, with values less than .08 indicating good model fit.

Analysis of Moment Structures (AMOS) Software

AMOS is the SEM software package marketed by SPSS Inc., as a companion program to the SPSS statistical package. AMOS is a Microsoft Windows-based program that offers the user two approaches to model specification, AMOS graphics and AMOS basic (Byrne, 2001). As the name implies, AMOS graphics is a graphical representation of the SEM path diagram. AMOS basic uses equation statements to specify the model. AMOS version 6.0 graphics was used for this analysis.

In AMOS graphics, variables are represented by rectangles and circles or ellipses. Rectangles indicate observed variables, such as the survey items outlined in the previous sections, while circles or ellipses represent the latent variables (Byrne, 2001). Each observed variable also has an associated error term, representing measurement error, or how well the observed variables measure the latent variable. The error terms are not directly observed and therefore are also shown as latent variables (circles) in the model. The dependent variable also has an associated residual term that indicates the error in the prediction of the dependent variables by the independent variables. Paths in the diagram are indicated by arrows from independent to dependent variables. The graphical representation of the basic model for this study is shown in Figure 3.

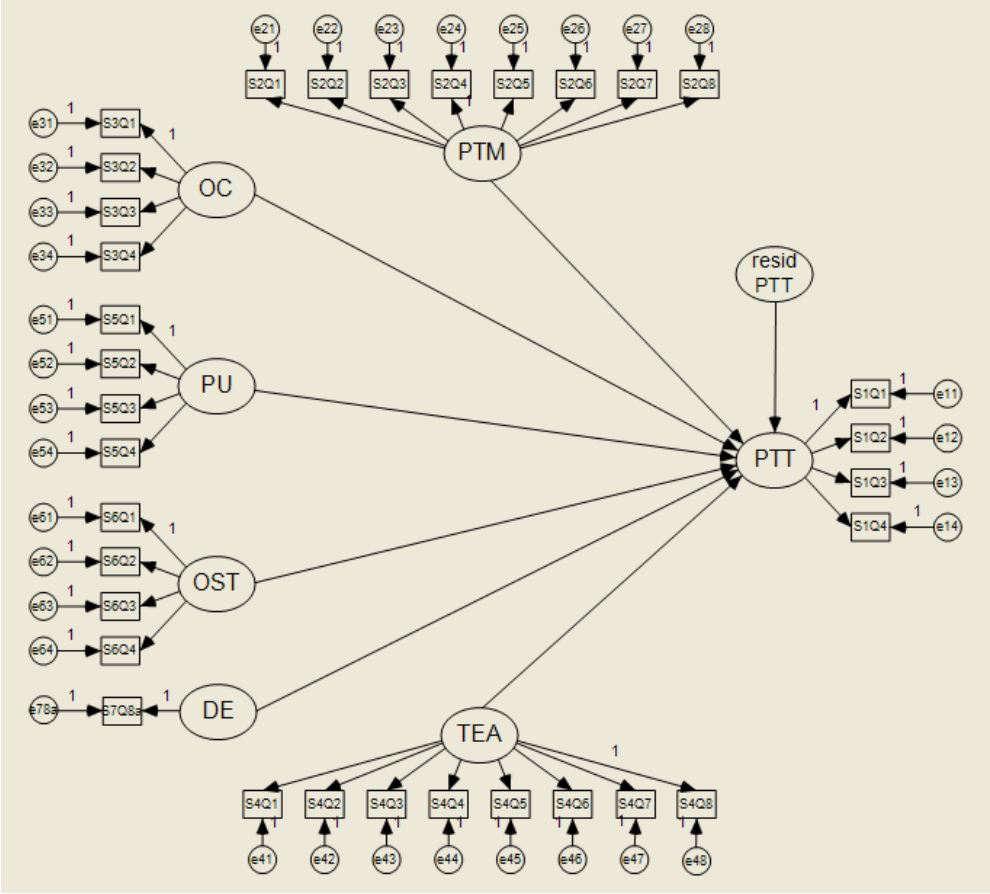

Figure 3, Initial Structural Equation Model (AMOS Graphics)

The dependent latent variable, perceived training transfer (PTT) is shown on the right side of the diagram with the associated survey items (observed variables) and their error terms as well as the residual term (resid PTT). The independent latent variables pre-training motivation (PTM), transfer enhancing activities (TEA), organizational commitment (OC), perceived utility (PU), organizational support for training (OST), and deployment experience (DE) are at the top, bottom, and left side of the diagram, respectively, along with their associated survey items, error terms, and path indicators.

Summary

The methodology of this study uses SEM to evaluate the strength of the relationships in the proposed research models using survey data. A description of the data collection process was provided, as well as the reliabilities of the measures used to build the models. In terms of internal consistency, the scales used in this study are generally reliable. The initial path diagram as developed in AMOS was also presented. The next chapter will report the results of the data analysis.

IV. Data Analysis and Results

Overview

This chapter presents the results of the analysis of the data. The previous chapter specified the initial path diagram as developed in AMOS. This chapter describes modifications made to the AMOS path diagram and provides a detailed analysis of the hypotheses. Results of the SEM analysis for all training types combined and each training type individually will be presented.

Construction of the Model

The estimation methods used in SEM assume that the measures are multivariately normally distributed (Kline, 2005). If the measures are not normally distributed, there is an increased risk of biased standard errors and an inaccurate χ^2 index. Raykov and Marcoulides (2000) suggest that while normal data has skewness and kurtosis coefficients of 0, values ranging from -1 to 1 are acceptable values. Measures of skewness and kurtosis, as well as means and standard deviations for all measures are shown in Table 17. All constructs demonstrated acceptable skewness and kurtosis coefficients except pre-training motivation, which displayed a kurtosis of 1.1, which is slightly outside the acceptable range, but not a significant enough deviation to justify removing it from the model. Deployment experience is a non-continuous variable, and is therefore not included in this analysis.

Table 17, Descriptive Statistics for Survey Measures (n=1,933)

Measure	M	SD	Skewness	Kurtosis
Pretraining Motivation	3.64	0.53	-0.19	1.11
Organizational Commitment	4.07	0.7	-0.74	0.81
Perceived Utility	3.74	0.75	-0.68	0.97
Organizational Support for Training	3.6	0.71	-0.36	0.59
Transfer Enhancing Activities	3.26	0.65	-0.4	0.23
Perceived Training Transfer	3.56	0.78	-0.82	0.52

The first step in analyzing the full structural equation model as shown in chapter 3 was to perform a confirmatory factor analysis (CFA) to test the unidimensionality and discriminant validity of the measurement model (Byrne, 2001; Garver & Mentzer, 1999). Unidimensionality indicates how well the observed variables form a single, underlying construct; discriminant validity indicates how effectively the scales that measure different constructs are actually measuring different constructs (Garver & Mentzer, 1999). To accomplish the CFA, the dataset was randomly split into two datasets, with the first half composed of 967 cases, and the second half composed of 966 cases. The CFA was performed with the first half of the data. The deployment experience construct was removed from the model to perform this initial analysis due to the fact that it is an index of reported actual experience rather than a true latent variable. The initial goodness-of-fit statistics for the CFA (represented in Table 18) resulted in a χ^2 value of 2867.15 with 340 degrees of freedom and probability of less than .001. The initial normed χ^2 value was 8.43. The initial CFA also resulted in a Tucker-Lewis Index (TLI) of .77, a comparative fit index (CFI) of .80, and root mean square of approximation (RMSEA) of .09. The measurement model was therefore not a good fit to the data.

The AMOS output provides tools to assist in improving the fit of the model. One such tool is the Modification Index (MI), which enables the user to address

unidimensionality. MIs indicate additional paths that could be added to the model and the expected decrease in the χ^2 with one degree of freedom associated with each additional path (Byrne, 2001). In the initial CFA, the MI output indicated decreases in χ^2 of greater than 100 associated with adding covariances between error terms on the following pairs of items: (a) transfer enhancing activities (TEA) questions 1 and 3, (b) TEA questions 2 and 3, (c) TEA questions 5 and 6, (d) pre-training motivation (PTM) questions 1 and 5, (e) PTM questions 2 and 6, and (f) PTM questions 3 and 7. Arbuckle (2005) cautions against what he considers the misuse of MIs. He recommends only incorporating a recommended change only if it makes theoretical or common sense. Evaluating the MI changes based on the constructs themselves generated two major changes to the measurement model.

The first change to improve unidimensionality of the model was the addition of covariances among the error terms of TEA questions 1 through 3. Covarying error terms is appropriate if there is the potential for the same influence other than the latent variable or random error to affect the respondent's response to two or more questions. TEA questions 1 through 3 concern why things work the way they do or why it is necessary to do things a certain way. The questions that answer "why" make up a sub-construct, or facet, of TEA. As a result, the covariances of the error terms among all three of these indicators were added to the model. Although the MI indicated a significant χ^2 change from adding the covariance of the error terms of TEA questions 5 and 6, the questions were distinct enough to address different facets of the training. Therefore, despite the MI, the error terms were not covaried.

The second change to improve unidimensionality of the model concerned the pre-training motivation construct. In the survey, McCraine (2006) asked a set of four questions pertaining to respondents' pre-training motivation in general, and then asked the same four questions in exactly the same words with the exception of the specific training type being added. The survey instructions directed respondents to respond to the survey based on their experience with one of the five training types; therefore the two sets of questions were redundant. Three of the four pairs of questions resulted in significant MIs. As a result, one set of questions was removed. The two possible revised measures were evaluated for internal consistency: as expected, the internal consistency for the measure decreased with the removal of the items that were very closely related to one another. Removing items 5 through 8 resulted in an overall Cronbach's alpha value of .64, with individual training type values ranging from a low of .55 (LOAC) to a high of .67 (ATFP). Removing items 1 through 4 resulted in an overall Cronbach's alpha value of .71, with individual training type values ranging from .68 (Weapons) to .73 (ATFP). Therefore, PTM questions 1 through 4 were removed from the model.

Testing for discriminant validity involves creating a theoretical model, in which the correlations between latent variables are set at 1 and comparing the χ^2 values to those of the measurement model, in which the correlations are freely estimated. A χ^2 difference test is performed on the correlations, and if the χ^2 test results are significant, the constructs demonstrate discriminant validity (Garver & Mentzer, 1999). The χ^2 difference was calculated for all 10 pairs of latent variables in the measurement model; the PU-TEA pair generated the lowest difference at 543.09 for 1 degree of freedom. At a significance level of $p < .001$, the χ^2 associated with 1 degree of freedom is 10.83. Since

all pairs have χ^2 difference values far exceeding this value, all factors are demonstrating discriminant validity.

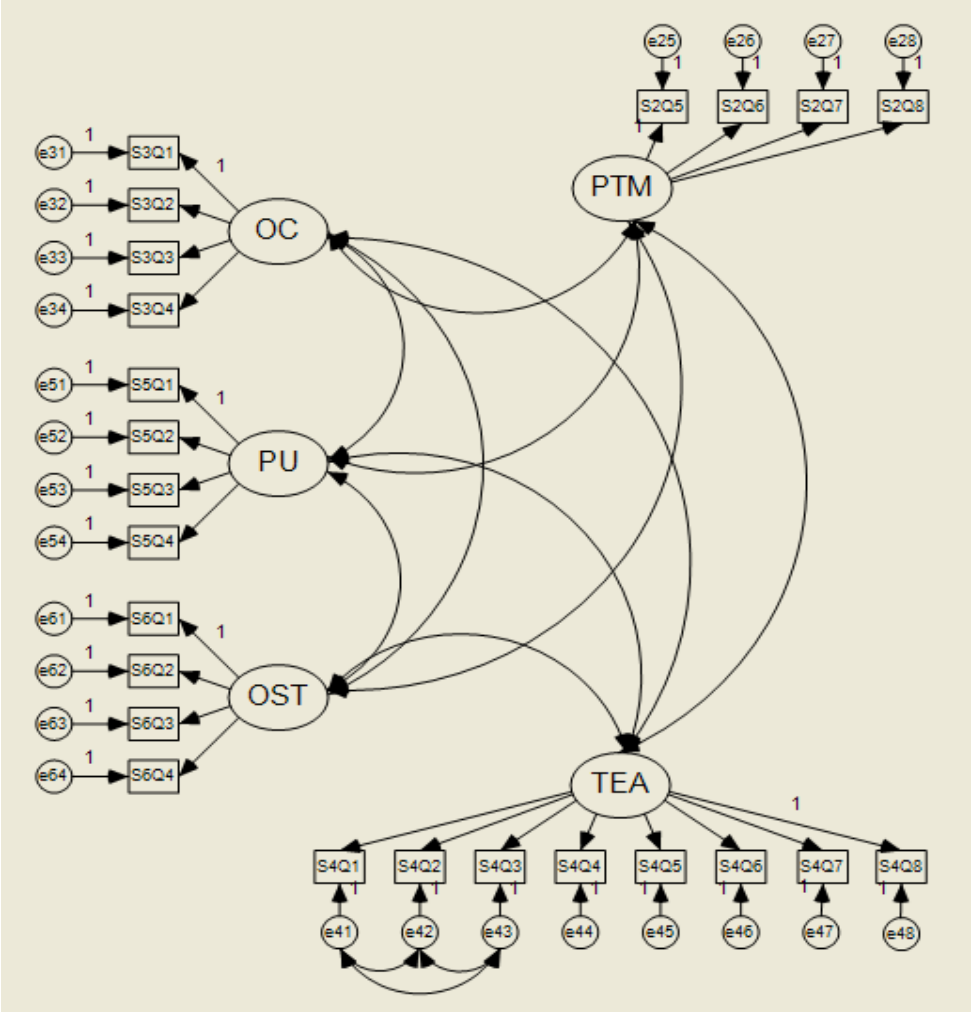

Figure 4, Final Measurement Model

Once the changes were made, the resulting measurement model, as shown in Figure 4, was confirmed by comparing the goodness-of-fit indices from the first half

dataset to those from the second half dataset. Table 18 represents the results of this comparison.

Table 18, Model Confirmation by Half Dataset Comparison

Index	Data		
	Initial	Modified First Half	Modified Second Half
TLI	.77	.92	.91
CFI	.80	.93	.92
RMSEA	.09	.06	.06
$\chi^2_{(df)}$	$2867.15_{(340)}$	$929.49_{(239)}$	$1034.95_{(239)}$
Normed χ^2	8.43	3.89	4.33

The results of the confirmation analysis indicated that the model was generating consistent results, and therefore was implemented in the structural model.

An additional change was made to the deployment experience index in the structural model. McCraine (2006) measured deployment experience with a single item (question 8a) in the demographic section of the survey instrument: "How many times have you been deployed since September 11th 2001?" McCraine (2006) identified the response scale associated with this question as a limitation in his analysis. The scale was a 5-point, Likert-type scale with the following possible responses: (a) "0-1", (b) "2-3", (c) "4-5", (d) "6-7", and (e) "8+". The survey instrument included a second question concerning deployment experience. Question 8b in the demographic section asked, "If you have deployed, were you involved in hostile actions?" Possible responses were "Yes", "No", and "N/A" (not applicable).

For this study, responses to question 8a were analyzed in conjunction with responses to question 8b to ascertain a more accurate picture of deployment experience. Question 8a addresses deployments between September 11, 2001, and January, 2006,

when the data were collected. Based on the Air and Space Expeditionary Force (AEF) rotational deployment schedule, USAF support personnel were vulnerable to deploy once every 15 months prior to September 1, 2004, or once every 20 months after that date (AEF Center Factsheet, 2006). Therefore, individuals who deployed four or more times were deploying on an accelerated schedule, while those who deployed two or three times deployed in accordance with the schedule set forth in the AEF rotation. The response range for question 8a was adjusted from five categories to three: (a) 1 = "0-1", indicating little or no deployment experience; (b) 2 = "2-3", indicating expected deployment experience; and (c) 3 = "4+", indicating greater than expected deployment experience. The category 1 responses were then evaluated in conjunction with responses to question 8b. Individuals who answered "1" (0-1 deployments) to question 8a, but who had not been deployed should have answered "N/A" to question 8b; the response to question 8a for cases with the response combination of "1" and "N/A" was recoded to "0". Individuals who answered "1" to question 8a and had been deployed should have answered either "2" for no involvement in hostile actions or "3" for involvement in hostile actions; the response to question 8a for cases with those response combinations was maintained as a response of "1". Therefore, the final adjusted deployment experience scale consisted of four categories: (a) "0" for zero deployments, (b) "1" for a single deployment, (c) "2" for two or three deployments, and (d) "3" for four or more deployments.

Unlike the other independent variables in the model, deployment experience was an observed variable. Therefore, the deployment experience construct and error term were eliminated from the structural model. Deployment experience shows in the final

structural model as an observed variable with a direct path to perceived training transfer.

Figure 5 depicts the final structural model with all modifications.

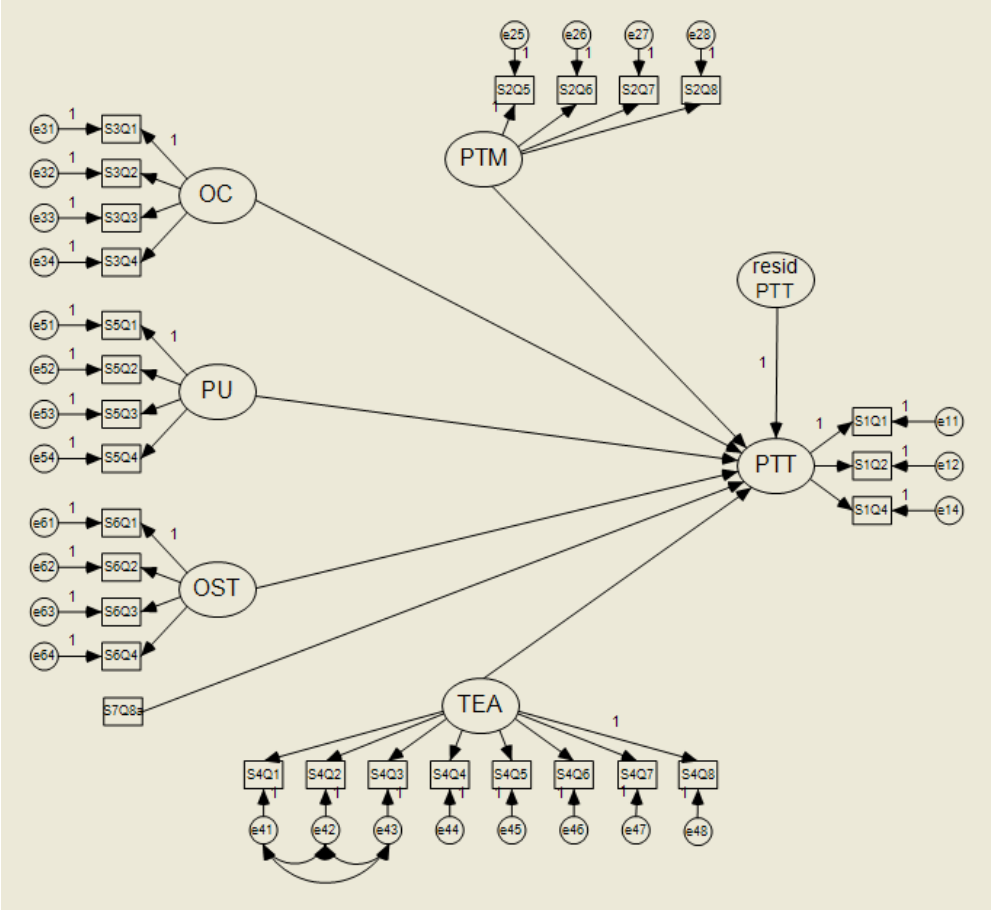

Figure 5, Modified Structural Equation Model (Hypothesis 1)

Hypothesis 1 Analysis

Hypothesis 1 tested McCraine's (2006) model to determine whether a positive relationship existed between (a) pre-training motivation (PTM) and perceived training transfer (PTT), (b) perceived utility and PTT, (c) organizational commitment and PTT,

(d) organizational support for training and PTT, (e) transfer enhancing activities and PTT, and (f) deployment experience and PTT.

Overall Analysis. Table 19 provides the fit statistics for the analysis of Hypothesis 1. The normed χ^2 value was high (6.76) for all training types combined, but the sample size was 1,933, and the data was non-homogeneous because the combined dataset includes the data from the individual training type datasets. The normed χ^2 values for the individual training types were well within the acceptable range, varying from a low of 2.11 (ATFP) to a high of 2.44 (Chemical Warfare), with sample sizes ranging from 322 to 422. The TLI and CFI values for all training types and each individual training type also indicated good fit, with all values at .90 or higher except the TLI for LOAC training, which was .89. All RMSEA values were also in the acceptable range at either .05 or .06.

Table 19, Fit Statistics for Hypothesis 1

Fit Measure	All Training Types	ATFP	Chemical Warfare	LOAC	SABC	Weapons
$\chi^2_{(df)}$	$2210.84_{(327)}$	$689.86_{(327)}$	$796.17_{(327)}$	$699.14_{(327)}$	$703.59_{(327)}$	$774.29_{(327)}$
Normed χ^2	6.76	2.11	2.44	2.14	2.15	2.37
TLI	.91	.91	.90	.89	.91	.91
CFI	.92	.92	.91	.90	.92	.92
RMSEA	.06	.06	.06	.06	.05	.06

all χ^2 values significant at $p < .001$

Table 20 depicts the path coefficients for the Hypothesis 1 path analysis, and will be interpreted by training type.

Table 20, Path Coefficients for Hypothesis 1

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Path	All Training Types	ATFP	Chemical Warfare	LOAC	SABC	Weapons
PTM--PTT (H1a)	-.13**	-.09	-.08	-.06	-.25**	-.05
PU--PTT (H1b)	.48***	.44***	.18**	.44***	.55***	.70***
OC--PTT (H1c)	.01	.16	-.01	.13	.03	-.27*
OST--PTT (H1d)	.00	-.05	.02	.19*	-.02	-.02
TEA--PTT (H1e)	1.55***	2.58***	1.86***	.74*	1.27***	1.92***
DE--PTT (H1f)	.03	-.03	.02	.06	-.06	.13**

*p < .10, **p < .05, ***p < .001

All Training Types. For all training types combined, the relationships in all paths were generally positive except the path between PTM and PTT, which was negative. The only statistically significant paths in the analysis of all training types were those between (a) PU and PTT (β = .48, $p < .001$), (b) TEA and PTT (β = 1.55, $p < .001$), and (c) PTM and PTT (β = -.13, $p < .05$). Therefore for all training types combined, the results are as follows:

Table 21, Hypothesis Support for All Training Types Combined

All Training Types Combined		
H1a	PTM - PTT	Not supported
H1b	PU - PTT	Supported
H1c	OC - PTT	Not supported
H1d	OST - PTT	Not supported
H1e	TEA - PTT	Supported
H1f	DE - PTT	Not supported

ATFP Training. In the analysis of ATFP training, three relationships were negative (PTM-PTT, OST-PTT, and DE-PTT) but not statistically significant. The statistically significant relationships were PU-PTT (β = .44, $p < .001$) and TEA-PTT (β = 2.58, $p < .001$). Therefore, the results for ATFP are as follows:

Table 22, Hypothesis Support for ATFP Training

Anti-terrorism/Force Protection		
H1a	PTM - PTT	Not supported
H1b	PU - PTT	Supported
H1c	OC - PTT	Not supported
H1d	OST - PTT	Not supported
H1e	TEA - PTT	Supported
H1f	DE - PTT	Not supported

Chemical Warfare. For Chemical Warfare training, two relationships were statistically significant, PU-PTT (β = .18, p = .05) and TEA-PTT (β = 1.86, p < .001). Two relationships were negative but not statistically significant, PTM-PTT and OC-PTT. The results by sub-hypothesis are as follows:

Table 23, Hypothesis Support for Chemical Warfare Training

Chemical Warfare		
H1a	PTM - PTT	Not supported
H1b	PU - PTT	Supported
H1c	OC - PTT	Not supported
H1d	OST - PTT	Not supported
H1e	TEA - PTT	Supported
H1f	DE - PTT	Not supported

LOAC. In the analysis of LOAC training, three paths were statistically significant: (a) PU-PTT (β = .44, p = .001); (b) OST-PTT (β = .19, p = .09); and TEA-PTT (β = .74, p = .06). The PTM-PTT path was negative but not significant. The results by sub-hypothesis are as follows:

Table 24, Hypothesis Support for LOAC Training

Law of Armed Conflict		
H1a	PTM - PTT	Not supported
H1b	PU - PTT	Supported
H1c	OC - PTT	Not supported
H1d	OST - PTT	Supported at $p < .10$
H1e	TEA - PTT	Supported at $p < .10$
H1f	DE - PTT	Not supported

SABC. In the SABC training analysis, two paths were positive and significant, PU-PTT (β = .55, $p < .001$) and TEA-PTT (β = 1.27, $p < .001$). The PTM-PTT path was negative and significant (β = -.25, $p = .05$). The DE-PTT relationship was negative but not statistically significant. The sub-hypothesis results for SABC training are as follows:

Table 25, Hypothesis Support for SABC Training

Self-Aid and Buddy Care		
H1a	PTM - PTT	Not supported
H1b	PU - PTT	Supported
H1c	OC - PTT	Not supported
H1d	OST - PTT	Not supported
H1e	TEA - PTT	Supported
H1f	DE - PTT	Not supported

Weapons. Finally, the Weapons training results indicated three positive and statistically significant relationships: (a) PU-PTT (β = .70, $p < .001$), (b) TEA-PTT (β = 1.92, $p < .001$), and (c) DE-PTT (β = .13, $p = .005$). The OC-PTT path was negative and significant (β = -.27, $p = .07$), and two paths, PTM-PTT and OST-PTT were negative but not significant. Therefore, the results for Weapons training are as follows:

Table 26, Hypothesis Support for Weapons Training

Weapons		
H1a	PTM - PTT	Not supported
H1b	PU - PTT	Supported
H1c	OC - PTT	Not supported
H1d	OST - PTT	Not supported
H1e	TEA - PTT	Supported
H1f	DE - PTT	Supported

Summary for Hypothesis 1. Only two paths were statistically significant and supported their respective sub-hypotheses across all training types and for the training types combined: PU-PTT and TEA-PTT. The only other significant positive relationships were the OST-PTT path for Chemical Warfare training and the DE-PTT path for Weapons training. The OC-PTT path was not statistically significant for any training type, and the PTM-PTT and OC-PTT paths were only significant as negative relationships.

Hypothesis 2 Analysis

Hypothesis 2 tested the same path relationships as Hypothesis 1, but with RJP and the RJP-PTT path added to the model (H3g). Figure 6 is the graphical representation of the model with RJP added.

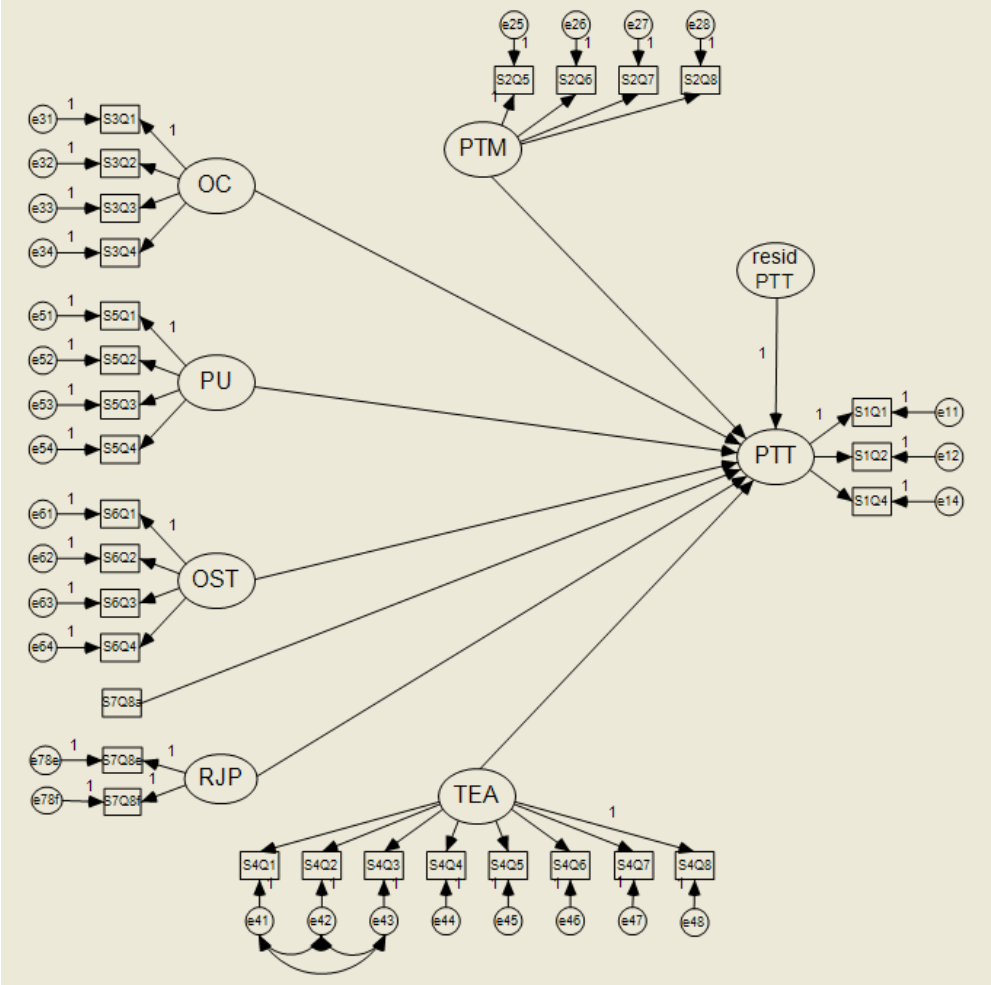

Figure 6. Modified Structural Equation Model with Realistic Job Preview Added (Hypothesis 2)

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Table 27 provides the fit statistics for the revised model with RJP added for all training types combined as well as for each training type.

Table 27, Fit Statistics for Hypothesis 2

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Fit Measure	All Training Types	ATFP	Chemical Warfare	LOAC	SABC	Weapons
$\chi^2_{(df)}$	$2348.71_{(376)}$	$780.61_{(376)}$	$886.54_{(376)}$	$766.21_{(376)}$	$769.26_{(376)}$	$852.60_{(376)}$
Normed χ^2	6.25	2.08	2.36	2.04	2.05	2.27
TLI	.91	.90	.90	.89	.91	.90
CFI	.92	.92	.91	.91	.93	.92
RMSEA	.05	.05	.06	.05	.05	.06

all χ^2 values significant at $p < .001$

As the results in Table 28 indicate, the model with RJP added was a better fit to the data than without RJP. The normed χ^2 value was 6.25 for all training types combined and ranged from 2.04 to 2.36 for the individual training types, showing an overall improvement over the previous model. The TLI and CFI were consistent with the results in Hypothesis 1. The TLI for Hypothesis 2 was .91 for all training types combined and ranged from .89 to .91 for the individual training types. The CFI for Hypothesis 2 was .92 for all training types combined and ranged from .91 to .93 for the individual training types. The RMSEA improved from .06 to .05 for all training types combined, ATFP, and LOAC and ranged from .05 to .06 for the individual training types.

Table 28, Path Coefficients for Hypothesis 2

Path	All Training Types	ATFP	Chemical Warfare	LOAC	SABC	Weapons
PTM--PTT (H3a)	-.14**	-.09	-.08	-.07	-.30**	-.02
PU--PTT (H3b)	.48***	.44***	.18**	.45***	.56***	.69***
OC--PTT (H3c)	.01	.15	-.01	.10	.04	-.27*
OST--PTT (H3d)	.01	-.05	.02	.20*	-.02	-.02
TEA--PTT (H3e)	1.55***	2.56***	1.86***	.70*	1.25***	1.92***
DE--PTT (H3f)	.02	-.03	.02	.06	-.05	.13**
RJP--PTT (H3g)	.02	.03	.01	.04	.07**	-.05

*p < .10, **p < .05, ***p < .001

In the path analysis, there were slight changes in the regression weights when RJP was added to the model. There were no changes to the support for the sub-hypotheses from the Hypothesis 1 analysis, and the RJP-PTT path was only significant for SABC training ($\beta = .07$, $p = .04$). A breakdown of Hypothesis 2 support by sub-hypothesis and training type is provided in Table 29.

Table 29, Hypothesis Support for Hypothesis 2

All Training Types Combined			Anti-terrorism/Force Protection		
H2a	PTM - PTT	Not supported	H2a	PTM - PTT	Not supported
H2b	PU - PTT	Supported	H2b	PU - PTT	Supported
H2c	OC - PTT	Not supported	H2c	OC - PTT	Not supported
H2d	OST - PTT	Not supported	H2d	OST - PTT	Not supported
H2e	TEA - PTT	Supported	H2e	TEA - PTT	Supported
H2f	DE - PTT	Not supported	H2f	DE - PTT	Not supported
H2g	RJP-PTT	Not supported	H2g	RJP-PTT	Not supported
Chemical Warfare			**Law of Armed Conflict**		
H2a	PTM - PTT	Not supported	H2a	PTM - PTT	Not supported
H2b	PU - PTT	Supported	H2b	PU - PTT	Supported
H2c	OC - PTT	Not supported	H2c	OC - PTT	Not supported
H2d	OST - PTT	Not supported	H2d	OST - PTT	Supported at $p < .10$
H2e	TEA - PTT	Supported	H2e	TEA - PTT	Supported at $p < .10$
H2f	DE - PTT	Not supported	H2f	DE - PTT	Not supported
H2g	RJP-PTT	Not supported	H2g	RJP-PTT	Not supported
Self-Aid and Buddy Care			**Weapons**		
H2a	PTM - PTT	Not supported	H2a	PTM - PTT	Not supported
H2b	PU - PTT	Supported	H2b	PU - PTT	Supported
H2c	OC - PTT	Not supported	H2c	OC - PTT	Not supported
H2d	OST - PTT	Not supported	H2d	OST - PTT	Not supported
H2e	TEA - PTT	Supported	H2e	TEA - PTT	Supported
H2f	DE - PTT	Not supported	H2f	DE - PTT	Supported
H2g	RJP-PTT	Supported at $p < .05$	H2g	RJP-PTT	Not supported

Summary

This chapter described the results generated by the SEM analysis of the data. The proposed structural model with all the original indicators was a poor fit as assessed in the

CFA of the latent variables. The model was modified based on the modification indices generated by AMOS after careful consideration of the implications of the changes to the content validity and internal consistency of the modified factors. Once the model was determined to have a good fit, the regression weights of the hypothesized paths were assessed for all training types combined and for each training type. RJP was then added to the structural model, and the regression weights of the hypothesized paths were assessed for all training types combined as well as for each training type. Chapter V will provide conclusions and recommendations based on the analysis.

V. Conclusions

Overview

The purpose of this study was to expand on the basic combat skills training research performed by McCraine in 2006 by performing a more thorough analysis of the data collected using structural equation modeling. This study also expanded on the model McCraine (2006) presented by incorporating realistic job preview into the model, and testing it with structural equation modeling. Chapter 4 presented the results for each hypothesis; the discussion in this chapter will focus on the results by training type. Limitations of the study and recommendations for further research will also be presented.

Conclusions

Pre-training Motivation. Although not statistically significant, pre-training motivation was negatively related to perceived training transfer for each individual training type as well as all training types combined. This is consistent with results presented by Facteau et al. (1995), who observed that attending training for compliance rather than for an intrinsic or extrinsic incentive was negatively related to pre-training motivation. However, the survey items regarding pre-training motivation focused more on how the individual performed in the training than on how motivated the individual was to learn the material and utilize it on the job. This is similar to a student taking a class or focusing his study efforts on obtaining a certain grade rather than learning the course material to expand his knowledge. There is also a difference in incentives between military members attending combat skills training and the subjects of Facteau et al's (1995) research, who were civilians attending job skills training. The incentive for

USAF members is survival, and therefore, the results of the analysis may have been different if the survey items had been worded differently

Perceived Utility. Across all training types combined as well as each individual training type, perceived utility was positively related to perceived training transfer, and the relationship was statistically significant. In other words, when trainees believe that a class is useful, they are more likely to perceive that they can transfer the material learned to their jobs. Therefore, in order to enhance perceived training transfer, particularly with training that is mandatory, trainees need to feel that the content of the course is beneficial to them personally rather than simply meeting a unit requirement.

Organizational Commitment. The relationship between organizational commitment and perceived training transfer was not statistically significant. With respect to Chemical Warfare and Weapons training, the relationship was negative; for all other training types it was positive. Although organizational commitment is the reflection of the extent to which the individual feels connected to the organization, the individual's commitment to the organization usually depends to some extent on the individual's perception of the organization's commitment to him. At the time the data were collected (December, 2005, through January, 2006), the USAF was already facing budget issues due to the extensive burden operations Iraqi Freedom and Enduring Freedom placed on the Army and Marine Corps. Airmen were already "doing more with less", i.e. supporting more deployments as well as maintaining home station mission requirements with fewer resources and personnel. The USAF was in the process of identifying junior officers to face a reduction in force and enlisted members to involuntarily cross-train into another career field. Facing personnel actions such as those may cause the individual to

question the organization's commitment to him, and, as a result, reduces the individual's commitment to the organization, potentially explaining the less than significant relationship between organizational commitment and perceived training transfer.

Unfortunately with respect to personnel numbers, the USAF may be in a state of uncertainty for the next two years. The personnel reduction plan, as originally outlined by USAF Chief of Staff General T. Michael Moseley, required 40,000 personnel to be cut by 2011. The timeline was later shortened to 2009. President George W. Bush's proposal to add 22,500 Army and Marine Corps troops to those already on the ground in Iraq (Lubold, 2007), has caused the USAF to re-evaluate the personnel cuts to ensure support for the movement and sustainment of those additional soldiers and marines in theater (Rolfsen, 2007). Until this state of upheaval in the USAF ranks settles, individuals' organizational commitment may suffer, creating an additional challenge to training transfer. Therefore USAF leadership should make every effort to ensure that changes to plans involving personnel actions are communicated to the lowest level to reduce the uncertainty and garner the most organizational commitment possible.

Organizational Support for Training. Organizational support for training addresses whether the supervisor supports the training, whether training benefits are valued, and whether the training requirement is supported. With respect to some training types, the relationship was negative, with others it was positive, but it was only statistically significant (and positive) for LOAC training. This, however, is an area where the USAF could create a significant positive relationship, potentially at no cost. If supervisors make combat skills training a priority, not simply to avoid explaining a "no show" at the training class (the failure of a trainee to attend scheduled training), but

because the training is designed to help personnel survive and operate in a hostile environment, subordinates will have a better appreciation for the value of the training. As such, simple positive reinforcement, or "talking up" the training, may enable the subordinate to view it as useful and enhance his perception of his ability to incorporate the training on the job.

Transfer Enhancing Activities. Transfer enhancing activities, while already statistically significant and positively related to perceived training transfer, could also be enhanced, and again at little or no cost to the USAF. Transfer enhancing activities may extend beyond the training class. Exercises may reinforce all types of training in the way deployments reinforce weapons training. Extending transfer enhancing activities beyond the classroom might be something as simple as talking through an Anti-terrorism/Force Protection scenario in the work center or quizzing subordinates to be sure they understand the concepts covered in LOAC training.

Deployment Experience. Weapons training was the only training type in which deployment experience was statistically significant and positively related to perceived transfer. This indicates that either (a) the combination of more deployments and more exposure to hostile actions has a greater effect on the individual's perception of his ability to effectively use his primary duty weapon if needed, (b) the deployment experience enhances the individual's perceived utility and therefore his training transfer, or (c) a combination of the two effects. With the additional missions the USAF has taken over from the Army, and the lack of security even on U.S. installations in areas such as Iraq and Afghanistan, more USAF members are carrying weapons on a regular basis while deployed than in the past. This increases the members' comfort level with the weapon,

which, combined with the training, would increase their perception that they could effectively use them.

Realistic Job Preview. Overall, realistic job preview was not a significant predictor of perceived training transfer, with the exception of SABC training. The relationship between these factors could possibly be enhanced through open communication. Recruiters are the front line for enhancing the realistic job preview provided to potential recruits, and as such, recruiters should provide an accurate picture of USAF involvement in conflict. Air Force Academy, Reserve Officer Training Corps, Officer Training School, Basic Military Training, and technical training instructors can assist with reinforcing the job expectations as set forth by recruiters, but their influence occurs after the individual has made the decision to join the military. USAF support personnel are no longer participating in conflict in their assigned career field roles or staying in relative safety far from the front line on deployments. They may be deployed to any location where any sister service or military coalition partner has troops very early in their careers. They may also be deployed in a role other than their primary duty, such as convoy support or escorts to oversee third country nationals working on an American or coalition installation. With that understanding, support personnel may more quickly appreciate the value and applicability of their combat skills training.

Comparison to McCraine's (2006) Results

The results of this study were consistent with McCraine (2006) in some areas, and differed in others. In his regression analysis of basic combat skills as a single construct, McCraine found two factors, transfer enhancing activities and pre-training motivation, to be significant predictors of training transfer, although it should be noted that in the final

regression, perceived utility and organizational support for training were removed from the model due to high correlations with transfer enhancing activities. This study also found transfer enhancing activities to be significant for the basic combat skills as a single construct, but when the model was analyzed as a whole, pre-training motivation was not only non-significant, it was, in fact, a negative relationship. Perceived utility, however, was a significant predictor for all training types in the structural equation model.

In his regression analysis by training type, McCraine (2006) found two or three significant predictor variables, but not the same significant variables, for each training type. For Anti-terrorism/Force Protection, McCraine (2006) identified transfer enhancing activities and deployment experience as significant factors; this study found transfer enhancing activities and perceived utility to be significant. For Chemical Warfare, he found perceived utility and organizational support to be strong predictors; while this study again found transfer enhancing activities and perceived utility to predict training transfer. With Law of Armed Conflict, McCraine (2006) found that transfer enhancing activities and pre-training motivation predicted training transfer. Using the SEM analysis, pre-training motivation was negatively related to training transfer in all training types, including LOAC training. In the expanded model, transfer enhancing activities, perceived utility, and organizational support for training were significant predictors of training transfer for LOAC training. McCraine's (2006) Self-Aid and Buddy Care analysis identified transfer enhancing activities and deployment experience as significant; this study found transfer enhancing activities, perceived utility, and realistic job preview to predict training transfer. Finally, for Weapons training, the results of both McCraine's (2006) research and the current study indicated that transfer enhancing activities,

perceived utility, and deployment experience were significant predictors of training transfer.

Limitations

As with any research involving a self-reporting survey of individual perceptions, this research is subject to limitations presented by Podsakoff and Organ (1986). One such limitation is the consistency motif, which causes respondents to attempt to report consistent answers across a series of questions, rather than reporting honest responses to each question independent of answers to other questions. Another issue with self-reporting is that of social desirability, in which respondents answer in such a way to present themselves in a favorable light (Podsakoff & Organ, 1986). Social desirability may also cause a respondent to answer questions in such a way as to deflect blame for their own shortcomings.

As observed by McCraine (2006), one limitation of this study was the deployment experience scale on the survey instrument, which was a 5-point Likert-type scale with possible responses of (a) 1 = 0-1, (b) 2 – 2-3, (c) 3 = 4-5, (d) 4 = 6-7, and (e) 5 = 8+. This item should have been formatted to allow the respondent to fill in his actual number of deployments or select it from a drop-down menu. Using a combination of the times deployed question and the hostile actions question gave an estimate of the number of personnel who had never deployed as opposed to those who had deployed once, but that estimate also depended on the respondent's interpretation of the term "hostile actions". Because no definition was provided for the term hostile actions, respondents based their answers on their own definition. If the purpose of the question was to determine the location(s) respondents had deployed to (i.e. Iraq, Afghanistan, Kuwait, Qatar, or areas

outside the Middle East such as Africa), the question should have been worded to reflect that. If the purpose of the question was to determine whether individuals had actively engaged with enemy forces, a better definition of hostile actions should have been provided.

A limitation associated with the realistic job preview scale was that the survey only included two questions specific to realistic job preview. For SEM analysis, each latent variable should have at least three indicators, although four indicators would be preferable in the event that the internal consistency of the measure is low and a question needs to be removed to improve it. Realistic job preview was not part of McCraine's (2006) model, which may explain why only two very closely worded questions pertaining to realistic job preview were included in the survey.

Recommendations for Further Research

The completion of the USAF BMT transformation provides the opportunity for further research into airmen's perceptions of training transfer of the basic combat skills. To facilitate a better analysis, the survey instrument should be refined, taking into consideration the limitations outlined above as well as other training factors not addressed by McCraine's (2006) survey instrument. It could also evaluate the effects of the personnel cuts and realignment currently under way. Further research could also follow a more empirical approach, evaluating actual performance rather than the attitudes of the subject population, or incorporate a longitudinal study to determine the effects of the variables on perceived training transfer over time.

In his introduction, McCraine (2006) mentions an Integrated Process Team (IPT) activated to develop standardized combat skills training. A training program entitled

"Expeditionary Combat Skills Training" now exists and is outlined on the AEF Center website (AEFOnline, 2007). The program involves 19 hours of weapons, defense, and teamwork training in addition to the requisite deployment training that was the subject of this research effort. Further research efforts could evaluate the success of the Expeditionary Combat Skills Training program using any or all of the factors included in this research as well as other training-related constructs.

Summary

The results of this study enhance the work as well as the findings of McCraine (2006) and Hobbs (2005) and contribute to the overall body of research on training and training-related factors. Transfer enhancing activities and perceived utility were found to enhance perceptions of training transfer, while organizational commitment, organizational support for training, and realistic job preview could be improved to further enhance individuals' ability, or perception of their ability, to apply their training on the job. The USAF does not need to make significant capital investments to make progress in this area. Future research may enable leaders to evaluate the effectiveness of the recent changes in the focus of USAF training as well as the effects of ongoing personnel cuts and realignment.

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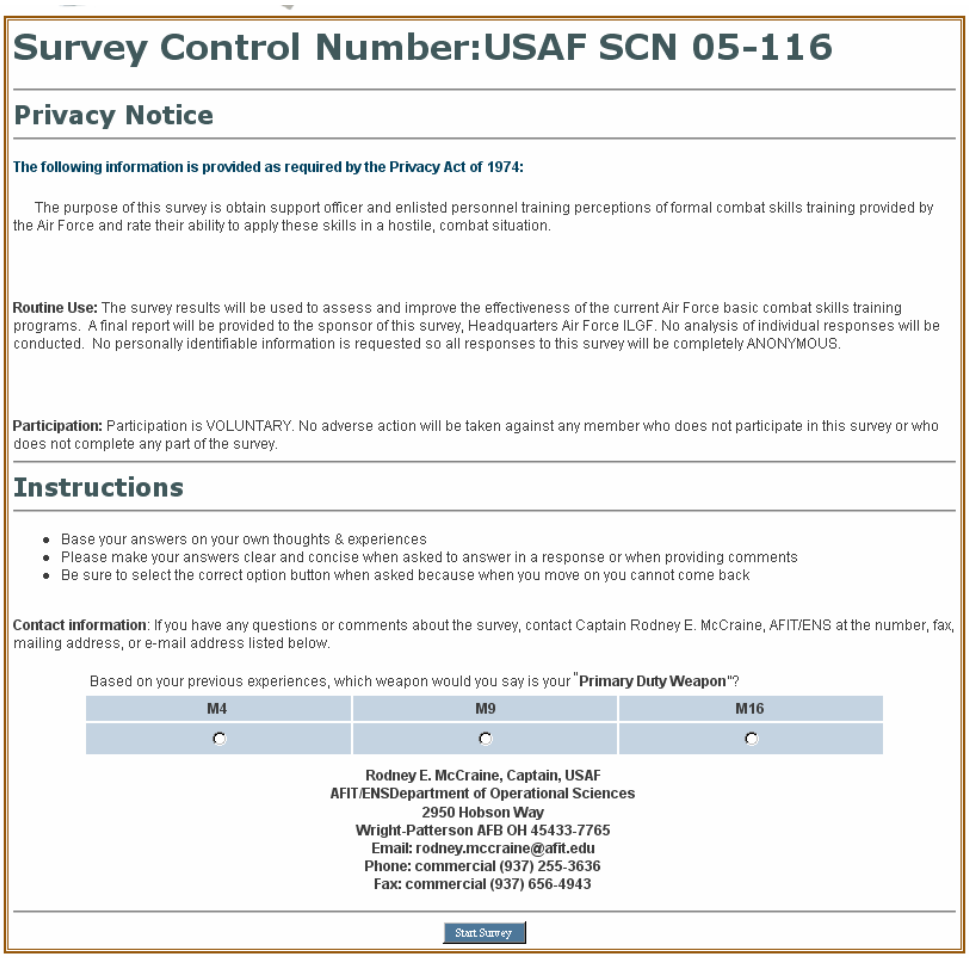
Appendix A: Screen Shots of the Web-Based Survey (McCraine, 2006)



Survey Control Number:USAF SCN 05-116

Privacy Notice

The following information is provided as required by the Privacy Act of 1974:

The purpose of this survey is obtain support officer and enlisted personnel training perceptions of formal combat skills training provided by the Air Force and rate their ability to apply these skills in a hostile, combat situation.

Routine Use: The survey results will be used to assess and improve the effectiveness of the current Air Force basic combat skills training programs. A final report will be provided to the sponsor of this survey, Headquarters Air Force ILGF. No analysis of individual responses will be conducted. No personally identifiable information is requested so all responses to this survey will be completely ANONYMOUS.

Participation: Participation is VOLUNTARY. No adverse action will be taken against any member who does not participate in this survey or who does not complete any part of the survey.

Instructions

- Base your answers on your own thoughts & experiences
- Please make your answers clear and concise when asked to answer in a response or when providing comments
- Be sure to select the correct option button when asked because when you move on you cannot come back

Contact information: If you have any questions or comments about the survey, contact Captain Rodney E. McCraine, AFIT/ENS at the number, fax, mailing address, or e-mail address listed below.

Based on your previous experiences, which weapon would you say is your "**Primary Duty Weapon**"?

M4	M9	M16
○	○	○

Rodney E. McCraine, Captain, USAF
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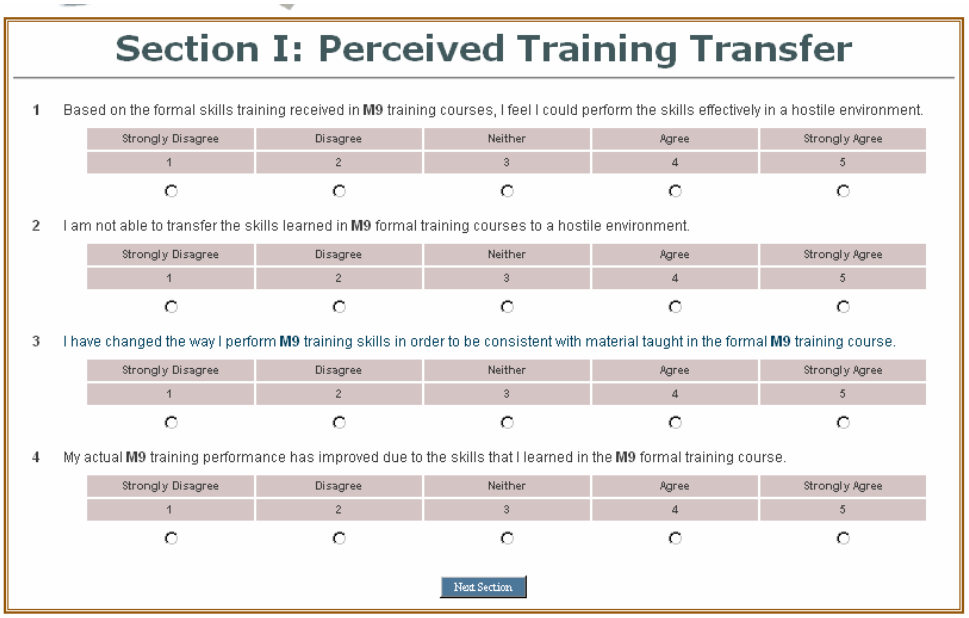
Start Survey



Section I: Perceived Training Transfer

1 Based on the formal skills training received in **M9** training courses, I feel I could perform the skills effectively in a hostile environment.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

2 I am not able to transfer the skills learned in **M9** formal training courses to a hostile environment.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

3 I have changed the way I perform **M9** training skills in order to be consistent with material taught in the formal **M9** training course.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

4 My actual **M9** training performance has improved due to the skills that I learned in the **M9** formal training course.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

Next Section

Section II: Pre-training Motivation

1 If I have trouble understanding the material presented in a training course, I try harder.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

2 I get more out of training programs than most of my peers.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

3 I look forward to actively participating in training programs.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

4 Doing well in training programs is important to me.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

5 If I have trouble understanding the material presented in a formal **M9** training course, I try harder.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

6 I get more out of formal **M9** training courses than most of my peers.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

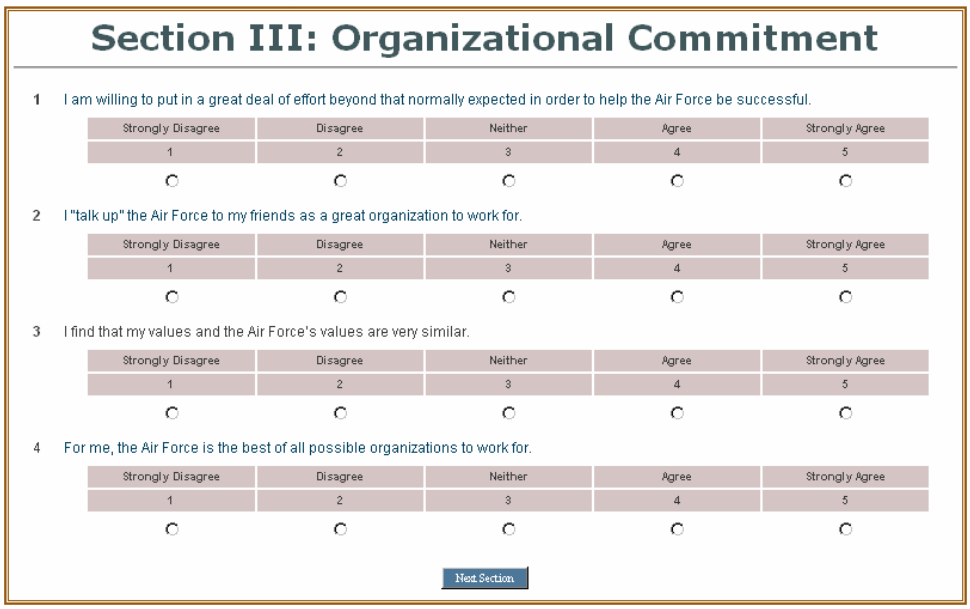
7 I look forward to actively participating in formal **M9** training courses.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

8 Doing well in formal **M9** training courses is important to me.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

Next Section



Section III: Organizational Commitment

1 I am willing to put in a great deal of effort beyond that normally expected in order to help the Air Force be successful.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

2 I "talk up" the Air Force to my friends as a great organization to work for.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

3 I find that my values and the Air Force's values are very similar.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

4 For me, the Air Force is the best of all possible organizations to work for.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

Next Section

Section IV: Transfer Enhancing Activities

1	2	3	4	5
Strongly Disagree	Disagree	Neither	Agree	Strongly Agree

1 During formal **M9** training courses I have taken, the instructors explained why things worked the way they did.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

2 During formal **M9** training courses I have taken, the ***instructor(s)/computer based/video training*** explained why it was necessary to do things a certain way.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

3 The content of the **M9** training we received really made things clear as to why things worked the way they did.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

4 The course material for **M9** training really emphasized how to recognize my mistakes as I applied them in a hostile environment.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

5 During **M9** training, we talked about situations that might prevent us from using our new skills and ways to deal with those situations.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

6. During **M9** training, we talked about how to develop good work habits, so we would remember what we were taught in a hostile environment.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

7. The way **M9** training courses are taught makes it easy to use the skills in a hostile environment.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

8. The time between formal **M9** training classes is too long for me to use the skills in a hostile environment.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

Next Section

Section V: Perceived Utility of Training

1 **M9** training will affect my ability to survive and operate in a hostile environment.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

2 The training I received in **M9** is relevant in a hostile environment.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

3. I find **M9** skills training useful in a hostile environment.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

4. The content of **M9** training courses is appropriate for situations encountered in a hostile environment.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

Next Section

Section VI: Organizational Support for Training

1 My supervisor believes that **M9** training is important and s/he attends relevant courses.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

2 If a last minute work center crisis arose, my supervisor would still allow me to attend **M9** training as scheduled.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

3 The benefits of **M9** training courses are highly valued by my unit.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

4 The requirement for individuals to attend **M9** training courses are widely supported in my unit.

Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1	2	3	4	5
○	○	○	○	○

Continue

Section VII: Demographics

1. **Age:** Years

2. **Gender:**

   Male ○ Female ○

3. **Highest Education Level**

   ○ High School ○ Bachelors

   ○ Some College ○ Masters

   ○ Associates ○ Post Graduate

4. **Rank**

5. **Air Force Specialty Code (Example: 21R, 36P, 2S0X1, 2F0X1,etc.)**

6. **Total years in Service (Years)**

7. **Prior Experience with Training**

   a. Approximately how many times have you **attended** formal **M9** training?

0 -1	2 - 3	4 - 5	6 - 7	8+
○	○	○	○	○

   b. Approximately how many times have you **taught** formal **M9** training?

0 -1	2 - 3	4 - 5	6 - 7	8+
○	○	○	○	○

8. **Deployment Experience**

a. How many times have you been deployed since September 11th 2001?

0 - 1	2 - 3	4 - 5	6 - 7	8+
○	○	○	○	○

b. If you have deployed, were you involved in hostile actions ?

Y	N	N/A
○	○	○

c. In the past 12 months, have you been **unable** to deploy due to (Select All that Apply):

Failed Fitness Test		Entry in the weight management program		Physical injury/medical profile		Other	
Y	N	Y	N	Y	N	Y	N
○	○	○	○	○	○	○	○

e. When you first entered the military, how likely did you think it was that you would be deployed to dangerous places in the first 4 years?

1	2	3	4	5
Very Unlikely	Unlikely	Neither	Likely	Very Likely
○	○	○	○	○

f. When you first entered the military, how likely did you think it was that you would be deployed to dangerous places in your career?

1	2	3	4	5
Very Unlikely	Unlikely	Neither	Likely	Very Likely
○	○	○	○	○

9. Have you received any other training in the use of **M9** principles other than required by your unit for basic deployment qualification?

Y	N
○	○

If Yes, please explain

10. Do you feel the Air Force needs to provide more training in basic combat skills?

Y	N
○	○

If Yes, please list the types of training you feel should be required.

Submit Survey

Vita

Captain Shirley D. Crow graduated from Albuquerque Academy in Albuquerque, New Mexico, in 1986. She entered undergraduate studies at the University of Puget Sound in Tacoma, Washington where she graduated with a Bachelor of Arts degree in English with a Professional Writing emphasis in May 1989. After seven years in the mortgage industry and two years working for a general contractor, she decided to join the Air Force. She was commissioned through Officer Training School at Maxwell Air Force Base, Alabama, in January, 1999.

After graduation from OTS, Captain Crow's first assignment was to the 43rd Supply Squadron at Pope Air Force Base, North Carolina, as a supply/fuels officer. In July, 2001, she was assigned to the 12th Space Warning Squadron at Thule Air Base, Greenland, where she served as the chief of logistics. In September, 2002, she was assigned to the 86th Logistics Readiness Squadron at Ramstein Air Base, Germany, as a logistics readiness officer. While stationed at Ramstein, she deployed to Kirkuk, Iraq, as the operations officer for the 506th Expeditionary Logistics Readiness Squadron and assumed command of the squadron under emergency circumstances. In August, 2005, she entered the Graduate School of Engineering and Management, Air Force Institute of Technology. Upon graduation, Captain Crow will be assigned to the Air Force Logistics Management Agency at Gunter Annex, Maxwell Air Force Base, Alabama.

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OMB No. 074-0188

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5c. PROGRAM ELEMENT NUMBER

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Crow, Shirley D., Captain, USAF

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13. SUPPLEMENTARY NOTES

14. ABSTRACT
The United States Air Force is in a state of transformation. Due to ongoing operations in Iraq and Afghanistan, the focus of Basic Military Training is shifting to basic combat skills, or the skills needed to survive and operate in a hostile environment. In this study, basic combat skills training was evaluated using a number of training factors that potentially affect trainees' perception of training transfer, or their ability to apply the skills they learned in training on the job or in a hostile environment. The analysis used structural equation modeling to evaluate the paths between each of the factors and perceived training transfer. Of the factors analyzed, transfer enhancing activities and perceived utility were found to positively influence perceived training transfer for all training types, while organizational support for training was positive for Law of Armed Conflict training only. Deployment experience was positive for weapons training, but negative for Self-Aid and Buddy Care. Realistic job preview was positively related to training transfer, but was only significant with respect to Self-Aid and Buddy Care training. The results of this research may help enhance basic combat skills training and do so at little or no cost.

15. SUBJECT TERMS
Training, Perceived Training Transfer, Organizational Commitment, Organizational Support for Training, Perceived Utility, Pre-training Motivation, Transfer Enhancing Activities, Deployment Experience, Basic Combat Skills, Structural Equation Modeling

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