EXAMINING ACCESSION AND RETENTION AND THE ROLE OF RELATIONSHIP MARKETING IN PUBLIC SERVICE ORGANIZATIONS: THREE STUDIES

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ABSTRACT

Karen A.F. Landale: Examining Accession and Retention
and the Role of Relationship Marketing in Public Service Organizations:
Three Studies
(Under the direction of Jan-Benedict E.M. Steenkamp)

Employee accession and retention are important topics, particularly in post-industrial countries like the United States, where service-based organizations are a large segment of the overall market. Those in the services industry rely on talented employees to bolster their brand image and market value by providing exceptional service and creating exciting innovations.

Despite the plethora of studies regarding employee accession and retention, very few studies have examined which service competencies and service inclinations are essential for high quality *public servants*. Public servants are employees of governmental and non-governmental organizations whose jobs involve a high level of personal risk. For example, the military services of the Department of Defense (i.e., the Army, Navy, Marines, and Air Force), Doctors Without Borders, the Red Cross, and the World Health Organization are all public service organizations that operate in hostile environments. For these organizations, performance quality is a matter of life and death, and poor performance in particular can have far-reaching political, social, and economic effects.

This paper uses Army Special Forces as a case study organization to examine the effects of both service competencies (e.g., cognitive ability, navigational ability, and physical abilities) and service inclinations (e.g., general likeability) on training success and retention. Specifically, the results show that cognitive ability, navigational ability, physical strength, and likeability are important for Special Forces training success. When it comes to retention, the results show that cognitively- and navigationally-gifted soldiers are the first to leave Army service, while those with less physical ability remain until retirement.

Finally, a new, internally-focused conceptualization of relationship marketing is developed to examine how workplace relationships affect employee commitment and retention. The meta-analytic structural equation modeling results show that organizational commitment and retention are increased when organizations foster strong interpersonal relationships among their employees, when they provide ample opportunity for training and development, and when they exhibit goals, values, and beliefs that are similar to those of their employees. The results of the studies are combined to provide overall results and recommendations.

This work is dedicated to two brave souls:

Lindsay A. Gena, a friend from my hometown, succumbed to alveolar soft part sarcoma on June 24, 2013. At just 25 years old, she had battled her disease for seven years. Despite being in and out of hospitals for treatment, Lindsay used her profound determination to finish her degree. I often thought of her during the low points of my research, and her strength encouraged my own. Thank you, Lindsay.

My sweet golden retriever, Molly, succumbed to osteosarcoma on April 24, 2014, shortly before I defended my work. At 12 years old, she had moved with me six different times to four different states. She had traveled across the country twice, taken several flights, hiked many trails, swam in both the Atlantic and Pacific Oceans, and waited patiently for me to return from my deployments. She helped me collect new friends, and was there for me when there were no familiar faces to be found. She sat quietly with me as I typed every single word in this paper, never once leaving my side. I sorely miss turning away from my computer to see her sleeping in her favorite chair. Thank you, Molly, for making this effort so much more enjoyable.

ACKNOWLEDGEMENTS

There are a number of people and entities to thank for helping make my doctoral dreams come true. First, my husband, Gordon, not only supported me in taking this “off-the-beaten-path” assignment, he also offered encouragement and a quiet home for me to do my work. Thank you, Love. Second, Professor Jan-Benedict Steenkamp kindly offered his mentorship and time, without which this work would certainly not have been as rigorous or as interesting. Many thanks, Sir, for providing a good example of what an accomplished scholar should do for the academic community. Third, I would like to thank my committee members for their feedback and support. I am honored to have been mentored by such a distinguished group of Professors. Fourth, thanks to Army Special Forces, particularly the folks at the Special Warfare Center and School at Fort Bragg, for their assistance with data collection and for their patience in helping me understand how our elite soldiers are trained and selected. Finally, many thanks to the United States Air Force, especially the folks in the Contracting command structure, for providing me such wonderful opportunities to pursue formal education during my career—I am extremely grateful.

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LIST OF ABBREVIATIONS

ACOMMIT	Affective commitment
ASVAB	Armed Services Vocational Aptitude Battery
B2B	Business-to-business
B2C	Business-to-consumer
B2E	Business-to-employee
BOSS	Better Opportunities for Single Soldiers
CCOMMIT	Continuance commitment
CFI	Comparative fit index
COGNIT	Cognitive ability
DOD	Department of Defense
DV	Dependent variable
DYR	Dummy year
ENDURLT	Long-term endurance
ENDURST	Short-term endurance
ETS	Expiration term of service
FEMA	Federal Emergency Management Agency
FLE	Frontline employee
FRG	Family Readiness Group
IDEOL	Ideological relationship marketing
IM	Internal marketing
INTSTAY	Intent to stay
IV	Independent variable
MA-SEM	Meta-analytic structural equation modeling
MNAR	Missing not at random
MOS	Military occupational specialty
NATO	North Atlantic Treaty Organization
NAVIG	Navigational ability

NCOMMIT	Normative commitment
OCCUP	Occupational relationship marketing
ODA	Operational Detachment Alpha
OEF	Operation ENDURING FREEDOM
OIF	Operation IRAQI FREEDOM
ORG	Organizational relationship marketing
PAF	Principal axis factoring
PCA	Principal components analysis
PEEREVAL	Peer evaluations
RBNL	Raju, Burke, Normand, & Langlois
RGRDUM	Ranger status dummy variable
RJP	Realistic job preview
RM	Relationship marketing
RMSEA	Root mean square error of approximation
RMSR	Root mean square residual
SAMD	Sample-adjusted meta-analytic deviancy
SEM	Structural equation modeling
SERE	Survival, Evasion, Resistance, & Escape
SF	Special Forces
SFAS	Special Forces Assessment & Selection
SFQC	Special Forces Qualification Course
SOCIAL	Social relationship marketing
STATDUM	Status dummy variable
STRENG	Physical strength
THOR3	Tactical Human Optimization, Rapid Rehabilitation & Reconditioning
TSSEM	Two-stage structural equation modeling
UCMJ	Uniform Code of Military Justice
US	United States

VA	Veterans Affairs
VIF	Variance inflation factor

CHAPTER I – INTRODUCTION

1.1 Accessions, Retention, and the Role of Relationship Marketing

This dissertation examines employee accession and retention in public service organizations, and the role relationship marketing plays in employee commitment and retention. Accession and retention are important topics for service organizations, as service employees are an integral part of their organization's brand image. Selecting and retaining the right employees—those with excellent service competencies and a natural service inclination—is essential to success. This is particularly true for organizations located in post-industrialized countries like the United States (US), where service industries account for 68% of the gross domestic product and four out of five jobs (Office of the United States Trade Representative, 2013). For these organizations, the ability to attract and keep good employees provides a significant competitive advantage in such areas as service quality, innovation, and intellectual property. Conversely, poor performing employees are a detriment to the organization, tarnishing the brand's image with each customer interaction.

Which service competencies best predict employee performance? How is service inclination related to performance? How can service organizations screen for these attributes during their hiring process? Further, how are these factors related to retention? Clearly, a service organization's most talented employees are the most vulnerable to voluntary turnover, as they have more employment options than less talented employees. How can organizations use relationship marketing tools and techniques to satisfy these talented employees and keep them committed to the organization?

The answers to these questions are important for all service organizations, however they are arguably most important for *public service organizations* whose missions are often dangerous and take place in hostile environments—organizations like the military, police forces, fire departments, the World Health Organization, the International Red Cross, and Doctors Without Borders. For these public service organizations, the penalty for poor service performance is very high—up to and including loss of life.

While these organizations must also be concerned with their brand image, they face much larger and farther-reaching implications than their non-public counterparts. For instance, the performance of the US military can have significant political, economic, and social impacts on the US as a whole. Along those same lines, police and fire department performance affects the safety and security of the residents in the community they serve. Finally, the performance of international health organizations greatly affects the quality of life and lifespan of the citizens they support. Despite higher costs of poor performance, accession and retention in public service organizations has rarely been studied. The three studies that make up this dissertation comprehensively examine accession and retention in public service organizations by (1) investigating ways to use relationship marketing tools and techniques to increase employee commitment and boost intent to stay in the organization, (2) determining which service competencies and service inclinations predict positive service performance, and (3) determining how those service competencies and service inclinations are related to employee retention.

1.2 Empirical Context

The first study uses meta-data gathered from hundreds of empirical studies in order to determine which relationship marketing tools and techniques best influence employee commitment and employee intent to stay. I use the results of this study to make recommendations for improving retention in public service organizations.

The second and third studies use members of a Department of Defense organization, US Army Special Forces (SF) soldiers, to examine accession and retention in a public service organization. The Department of Defense is the largest employer of public servants in the US, thus it is a prime organization for examining the roles service competencies and service inclination play in soldier performance and retention. Soldiers who desire to be part of Army SF must pass through a series of grueling training "examinations," where their mental, physical, and psychosocial skills are extensively screened. Their scores provide the data necessary to determine which attributes make a successful SF soldier (i.e., public servant), and which are important for retention.

1.3 Dissertation Structure & Preview

Short previews of each study are provided below. These previews are purposely brief, as each study contains its own introduction, literature review, data set, and detailed presentation of the methods and results.

1.2.1 Study 1 – The Role of Relationship Marketing in Service Employee Retention

To examine the role that relationship marketing plays in service employee retention, I developed a model that tests an *internally-focused* conceptualization of relationship marketing. This model uses tools and techniques designed to foster *employee* commitment and intent to stay, which is different from the more prevalent *externally-focused* relationship marketing models that seek to improve *customer* loyalty and retention, business-to-business relationships, or improve the financial bottom-line. I used meta-analytic structural equation modeling (MA-SEM) techniques to test the internally-focused model. I gathered 2,658 effects from 254 empirical studies to create a meta-analytic correlation matrix, which was then used as input for the SEM analysis. I tested the mediating role that commitment plays between the relationship marketing factors and intent to stay, and, finally, I used a series of individual-level and macro-level substantive and methodological factors to test for the presence of moderation. The results and insights garnered from this study are used to inform how RM can be implemented in the SF context.

1.2.2 Study 2 – Accession in Public Service Organizations

To study retention in a public service organization, I used data gathered from 23,070 soldiers who went through SF training from 2006 to 2013. First, principal components analysis consolidated 49 variables into six overarching components. Five of those components assessed the soldier's service competencies: cognitive ability, navigational ability, physical strength, short-term endurance, and long-term endurance. One component, peer evaluations, assessed his service inclination. Second, I used logistic regression to examine the likelihood of success or failure through two phases of training: Special Forces Assessment and Selection (SFAS) and the Special Forces Qualification Course (SFQC). Using this method, I was able to determine how the service competencies and service inclination affect soldier success/failure (i.e., soldier performance). Finally, several different robustness tests confirm the stability of the results.

1.2.3 Study 3 – Retention in Public Service Organizations

To study retention in a public service organization, I matched data gathered from Study 2[1] to retention data that showed whether the soldier left the service prior to retirement, whether he served until retirement, or whether he remained in service after retirement eligibility. The matching process resulted in a total of 23,340 soldiers who successfully completed both SFAS and SFQC *and* served in Army SF for a certain amount of time between 1991 and 2013. I used survival analysis (i.c., Cox regression) to determine how each service competency and service inclination from Study 2 affected the outcomes of (1) leaving service prior to retirement and (2) leaving service via retirement. Finally, I used a piecewise exponential model to examine the robustness of the results.

[1]For Study 3, I used the full set of training data available to me for Study 2, which contained a total of 53,408 SF training cases from 1991 to 2013. I chose to use only cases from 2006 to 2013 for Study 2 because more recent collection years contained more complete cases.

REFERENCE

Office of the United States Trade Representative. (n.d.). Services & Investment. Retrieved October 30, 2013, from Services: http://www.ustr.gov/trade-topics/services-investment/services

CHAPTER II – STUDY 1:
EXAMINING THE EFFECTS OF RELATIONSHIP MARKETING ON EMPLOYEE COMMITMENT AND RETENTION

2.1 Introduction

Relationship Marketing (RM) refers to the strategies and techniques used to develop relational exchanges between an organization and its customers and/or its employees. In general, the goal of RM is to "position" and "sell" the organization (or its services) to customers and employees in a way that fulfills their needs and wants, similar to the way firms position and sell their products and services to fulfill customer needs and wants.

Typically, developing relational exchanges with *customers* is referred to as RM, while developing relational exchanges with *employees* is referred to as Internal Marketing (IM). However, RM and IM are used somewhat interchangeably, with RM being a sort of "catch all" term that refers to relationship development both internal and external to the organization. In the marketing literature, customer-based RM is much more frequently studied than employee-based RM. *Customer-based* RM asks, "Why do customers stay or leave? What creates value for them?" (Berry, 1995, p.239). Arguably equally important, *employee-based* RM asks, why do *employees* stay or leave? What creates value for *them*? These answers are particularly important to service organizations that rely on highly skilled and knowledgeable workers to create and enhance the organization's brand.

Recruiting and selecting skilled service employees[2] is a fairly long process, whereby the company spends ample money and time selecting service employees with the right "fit" to the organization—employees who will best represent the brand's image and who have a positive service orientation.

[2] Naturally, it is more important for organizations to retain highly skilled service employees (i.e., those in knowledge-creation fields whose talents are unique and, therefore, more difficult to replace) than less-skilled service employees (i.e., fast-food employees). This study is crafted with highly skilled service employees in mind, although the basic concepts can be applied to any employee, whether in the service industry or not.

In many service organizations, the most highly skilled employees are knowledge workers. Their work output consists of new ideas and innovations meant to propel the organization to the forefront of its industry. Knowledge workers specialize in non-routine tasks that require creative thinking and problem-solving skills. These workers bring large amounts of intellectual capital to their companies. Their skills are unique and non-transferrable, making them valuable – and difficult to replace – assets. Once on board, it greatly behooves the company to retain them so it can (1) leverage the knowledge, skills, and experience these workers garner while on the job, and so it can (2) avoid frequently performing the recruitment and selection process.

Retaining highly skilled service employees requires strategies that are different from the strategies used to retain less skilled service employees or even non-service employees (i.e., those who do not offer the unique knowledge, skills, and abilities of highly skilled service workers). For example, design and programming employees at Apple require a different retention strategy than, say, Apple store employees or Apple's manufacturing employees, because design and programming employees have highly marketable skills and abilities. It is easier for these employees to leave Apple if another organization offers a better deal—financial (pay and benefits) or otherwise (work environment, social atmosphere, value alignment, etc.). Clearly, a comprehensive retention plan is needed to retain highly skilled employees. The skills of Apple's store and manufacturing employees, on the other hand, are not as highly coveted and are easier to replace, therefore the retention plan for these employees need not be as comprehensive. Organizations that want to retain skilled and talented knowledge workers must adopt new strategies *aimed at creating distinctive value for these employees*.

As the service industry continues to expand, the "war for talent" will increase, highlighting the need to use comprehensive RM strategies to retain knowledgeable and talented employees. Organizations in the US and other post-industrial nations must change their retention plans to suit this new era of service dominance. Specifically, retention plans must go beyond pay and benefit incentives to entice knowledgeable, skilled, and talented employees to join *and stay* in an organization. Comprehensive retention plans—ones that use RM strategies that account for the multitude of ways employees relate to their organization—help make an organization an "employer of choice" (Zeithaml et al., 2013). This distinction improves the organization's ability to attract and retain the best talent in its industry, which, in turn, improves the organization's service and/or product offering.

This research takes a marketing perspective by turning what is known about customer retention *inward*, focusing successful methods on *employees*. I believe RM offers a valid and important way to examine employee retention. This study aims to answer the question, how do RM factors affect employees' intent to stay? I will answer these questions using a combination of meta-analysis and structural equation modeling, a procedure that is especially useful for testing new concepts and theories.

The remainder of this paper proceeds as follows. Relevant literature is reviewed in section 2.2, and section 2.3 provides details about this new, employee-focused conceptualization of RM. Section 2.4 describes the methods used to gather and analyze the data. Section 2.5 presents the results, and section 2.6 discusses practical implications and study limitations. Finally, section 2.7 concludes the research.

2.2 Literature Review

2.2.1 Relationship Marketing

Grönroos (1995, 1994) was one of the first to write about the "paradigm shift" that began happening in marketing in the late-1980s and continued throughout the 1990s. During this timeframe, marketers began to look beyond the transactional perspective (i.e., how to continually attract more customers) to a more relational perspective (i.e., how to *get and keep* customers). The concept of RM was developed and defined as "all marketing activities directed towards establishing, developing, and maintaining successful relational exchanges" and "exchanges between a firm and its employees" (Morgan & Hunt, 1994, p.22).

Leonard Berry, a pioneer in the RM field, created several theoretical papers outlining how organizations can retain customers by marketing *internally* to their employees and other stakeholders. His arguments center around the idea that "RM allows service providers to become more knowledgeable about the customers' requirements and needs" thereby creating an atmosphere of customization and tailoring that ultimately increases customer satisfaction and retention (1995, p.238). Notably, Berry takes the RM concept further, advocating the importance of *employee* satisfaction and retention to *customer* satisfaction and retention:

> High employee turnover discourages management from investing in hiring, training, and other commitment-building activities; this, in turn, leads to ineffective performance and/or the perception of dull or dead-end work, which feeds employee turnover. High employee turnover negatively affects service quality and customer retention, thus hurting profitability and further reducing resources available to invest in employees' success. (Berry, 1995, p.241)

In other words, to establish good relationships and provide quality service to important customers, organizations *must first look internally* and focus on the development and satisfaction of their *employees*. Berry and Parasuraman also advocate "attracting, developing, motivating, and retaining qualified employees through job-products that satisfy their needs" (1991, p.151). It follows that satisfied employees stay with the organization, thus reducing turnover and allowing the organization to capitalize on employee talent, knowledge, and experience.

Antecedents of RM found in the literature tend to be relationship-building concepts aimed at either employees or customers (e.g., investments in the employee or customer, programs whose goals are to develop closer ties with the employee or customer). Consequences of RM tend to be either relationship-specific (e.g., development of trust, commitment, or loyalty), or financial in nature (e.g., sales, profit, or growth). Berry (2002) captures the open-ended nature of RM best:

> Relationship marketing at its best is a philosophy, not just a strategy, a way of thinking about customers, marketing, and value-creation, not just a set of techniques, tools, and tactics. RM is holistic, a sum of integrated parts that drive a firm's marketing competencies. (p.73)

The successful use of RM requires an all-encompassing approach, satisfying the needs and requirements of important stakeholders—internal to and external of—the organization. In this study, I focus on *internal* relationships, the lesser-studied side of RM that examines relationships between organizations and employees.

2.2.1.1 Past Studies: External RM for Financial and Behavioral Success

Past RM research focuses primarily on financial rewards (e.g., increased sales, profit, and/or growth) as the outcome variable. The simple logic is that happy customers return (i.e., are retained), thus improving financial success (i.e., a better bottom line). Similarly, strengthening relationships between two firms (i.e., business-to-business relationships) leads to streamlined operations, customized offerings, and special discounts—all of which also improve the bottom line (Palmatier et al., 2007; Palmatier et al., 2006; Jap, 2001; Iacobucci & Ostrom, 1996). See Table 2.1 for a small sampling of empirical studies in the RM literature.

Small Sample of Existing Empirical RM Studies	
Outcome Variable	**Studies**
Seller Financial Outcomes -- Sales growth -- Customer share -- Price premium	Jap (2001) Palmatier, Scheer, Houston, Evans, & Gopalakrishna (2007) Palmatier, Dant, & Grewal (2007)
B2B Behavioral Outcomes --Cooperation --Conflict --Commitment	Anderson & Narus (1990) Morgan & Hunt (1994) Geyskens, Steenkamp, Scheer, & Kumar (1996) Jap (2001) Palmatier, Dant, Grewal, & Evans (2006) Palmatier, Dant, & Grewal (2007)
Employee & Customer Behavioral Outcomes --Advocacy --Performance --Withdrawal/Turnover	Reynolds & Beatty (1999) Schweitzer & Lyons (2008)
Customer Perceived Service Quality	Myhal, Kang, & Murphy (2008)
Predictor Variables	**Studies**
B2B Dependence --Dependency --Dependency asymmetry	Anderson & Narus (1990) Kumar, Scheer, & Steenkamp (1995) Iacobucci & Ostrom (1996) Palmatier, Dant, Grewal, & Evans (2006) Palmatier, Dant, & Grewal (2007) Myhal, Kang, & Murphy (2008)
B2B & B2C Relationship Termination Costs --Foregone relationship benefits --Foregone Relationship	Morgan & Hunt (1994) Reynolds & Beatty (1999) Jap (2001) Palmatier, Dant, Grewal, & Evans (2006) Palmatier, Dant, & Grewal (2007)
B2B Trust	Anderson & Narus (1990) Geyskens, Steenkamp, Scheer, & Kumar (1996)
B2B Shared Values / Similarity	Morgan & Hunt (1994) Iacobucci & Ostrom (1996) Jap (2001) Palmatier, Dant, Grewal, & Evans (2006) Myhal, Kang, & Murphy (2008)
B2B Relationship Duration	Palmatier, Dant, Grewal, & Evans (2006)
Employee/Employer Expectations	Schweitzer & Lyons (2008)
B2B Communication	Anderson & Narus (1990) Morgan & Hunt (1994) Palmatier, Dant, Grewal, & Evans (2006)

Table 2.1 – Small Sample of Existing Empirical RM Studies

Clearly, the main focus for most RM studies involves improving external relationships (i.e., those with customers or other businesses) in order to reap financial and behavioral rewards. My research focuses on improving internal relationships (i.e., those with an organization's employees) in order to reap retention rewards. Ultimately, talent retention can also amount to financial rewards for the organization

(Harter et al., 2002), particularly when talented employees develop innovations that catapult their employer to the head of the market, or when talented employees provide unmatched customer service, or, in the case of publicly traded companies, when the reputation of the employees increases the demand and/or price of the company's stock (Milbourn, 2003). In the next section, I review how RM can be used internally, to improve employee retention.

2.2.1.2 This Study: RM for Employee Retention

Despite the fact that several theoretical papers exist advocating the use of employee-focused RM to improve an organization's service quality[3] (c.f., Schweitzer & Lyons, 2008; Berry 2002 & 1995; Grönroos, 1995 & 1994), few empirical studies examine which forms of RM are most successful. Further, to my knowledge, no studies *comprehensively* and *simultaneously* examine the effects of RM tools on employee retention.[4] In other words, this study takes Berry's theorizing one step further, by investigating which "job products" (i.e., aspects of the job that employees value and desire) are most important for employee retention.[5]

I argue that strong RM strategies can create distinct value for employees that cannot be matched by competitors. This value serves as a competitive advantage for top service organizations. Organizations consistently on Fortune's list of the best companies to work for, such as Google, The SAS Institute, and even Wegmans grocery stores, have mastered the use of RM as a means of attracting and maintaining talented and innovative employees—by feeding their employees' social, psychological, and economic needs, these organizations strengthen the trust, loyalty, and commitment of their employees, thereby reducing turnover and creating a competitive advantage in employee talent (Fortune, 2013).

While the ultimate goal is to use RM strategies to improve retention, I believe an intermediary step exists, whereby RM strategies inspire employee commitment to the organization, which then leads to retention. Next, I delve into the commitment literature and its connection to RM and retention.

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[3]Key to improving service quality is hiring and retaining talented employees.

[4]Using the unique capabilities of meta-analytic structural equation modeling (MA-SEM), I am able to comprehensively and simultaneously model factors that do not exist together in any one study. This process is explained in detail in Section 2.4.

[5]MA-SEM analysis serves as a platform for theory testing and focusing future empirical research. By using large amounts of data from many different samples, I can pinpoint which RM factors are most important to retention. Using this information, future empirical studies can dig deeper into the antecedents of the most important factors.

2.2.2 Commitment

Organizational commitment is "the relative strength of an individual's identification with and involvement in a particular organization. It is characterized by: (1) a strong belief in and acceptance of the organization's goals and values; (2) a willingness to exert considerable effort on behalf of the organization; and (3) a strong desire to maintain membership in the organization" (Tannenbaum et al., 1991, p.759).

Morgan and Hunt's (1994) Commitment-Trust Theory of Relationship Marketing, the most popular theory in RM literature, proposes that the higher the relational commitment between an employee and his/her organization, the less propensity there is to leave the organization. Morgan and Hunt show that certain tangible and intangible variables affect the amount of commitment that exists. Perceived relationship benefits, shared values, and communication increase commitment; while relationship termination costs and opportunistic behavior decrease commitment.

When a healthy relationship exists between an organization and its employees, commitment can serve to reduce workplace stress and uncertainty, as well as increase employees' intent to stay (Meyer et al., 2002; Hackett et al., 1994; Mathieu, 1991; Mathieu and Zajac, 1990; Randall, 1990). Work experiences are by far the main drivers of employee commitment, which suggests that *an organization can control the commitment level of its employees to a certain extent by shaping the relationships it has with its employees*. If the relationship between the organization and its employees is strong, employees are likely to have positive work experiences, thus increasing commitment and intent to stay. The opposite is also possible—if the relationship between the organization and its employees is weak, employees are likely to have negative work experiences, thus decreasing commitment and intent to stay.

Tangible and intangible RM tools used and espoused by an organization affect the organization's relationship with its employees. The signals the organization emits by using (or not using) RM tools can inspire (or degrade) employee commitment. The literature clearly suggests that the effects of employee-focused RM activities on intent to stay work through commitment. Therefore, I examine the meditating role of commitment, as depicted in Figure 2.1.

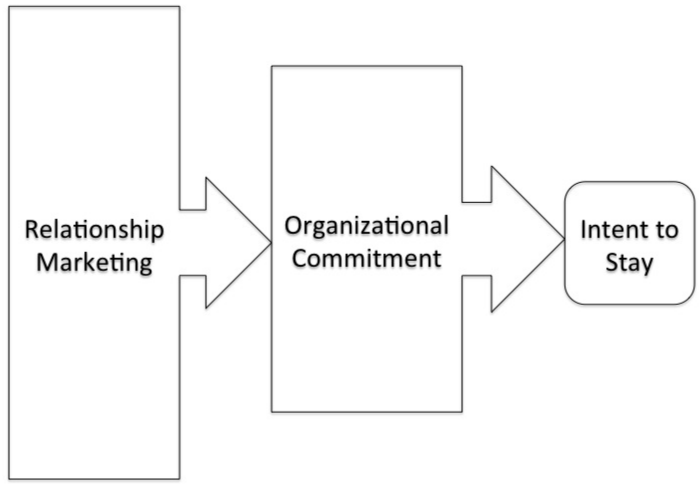

Figure 2.1 – Relationship Marketing Process

2.2.2.1 Meyer & Allen's (1991) Conceptualization of Commitment

The most influential conceptualization of commitment is Meyer and Allen's (1991) three-component model. Their model separates commitment into affective, continuance, and normative components.

Affective commitment is an emotional attachment to the organization gained through the process of employment. Employees with high affective commitment identify strongly with the organization and tend to be highly *emotionally attached* to the organization. Mowday et al. (1984) posited that the antecedents of affective commitment include structural characteristics (i.e., decentralization in decision-making, formalization of policies and procedures), and job/work related characteristics (i.e., feeling competent within the work role, feeling physically and psychological comfortable at work).

Continuance commitment is a *rational attachment* to the organization that is characterized by a series of cost-benefit tradeoffs. Mowday et al. (1984) also posited antecedents of continuance commitment, which include variables that increase perceived costs of leaving the organization, such as losing attractive benefits, giving up seniority privileges, having to uproot the family to move to a new job, and wasting time and effort on skills that are not transferrable. Employees consider tangible items (e.g. pay and benefits) as well as intangible items (e.g., foregone training and promotion opportunities) to arrive at their level of continuance commitment. Naturally, if the benefits outweigh the costs, the employee is considered more committed to the organization.

Meyer and Allen's model adds a very important *moral dimension* to commitment that is not examined in other commitment models. The third component, normative commitment, captures commitment that goes beyond attitudes and behaviors and "is a psychological state that (a) characterizes the employee's relationship with the organization, and (b) has implications for the decision to continue or discontinue membership in the organization" (Meyer and Allen, 1991, p.67). Psychologically, employees may feel obligated to an organization in order to achieve reciprocity (e.g., the organization paid the employee's college tuition, therefore he/she feels pressure to remain committed to the organization), or they may feel morally committed to the cause or mission of the organization (e.g., answering an internal "calling" to maintain membership in an organization). This type of commitment is highly relevant for public service organizations (e.g., the US military, state and local police departments, fire departments, the World Health Organization, the International Red Cross, Doctors Without Borders, etc.) whose missions are inherently dangerous and therefore rely heavily on a "calling," or sense of duty, to fill their ranks.

Succinctly stated, affective commitment assesses how much the employee *wants* to stay in the organization, continuance commitment assesses how much the employee *needs* to stay in the organization, and normative commitment assess how much the employee believes they *ought* to stay in the organization. Employees are likely to feel all components of commitment at once and/or in varying degrees—they are not mutually exclusive. I believe this operationalization allows for a clearer understanding (relative to previous studies) of *how* or *in which ways* RM affects commitment. In other words, by simultaneously examining how the RM factors affect the different components of commitment, I can more thoroughly understand the nature of the relationship between RM and commitment. This is a major contribution provided by this study, as existing studies examine these relationships in a piecemeal fashion.

2.2.2.2 Commitment's Effect on Work Outcomes

Previous studies have shown that all three forms of commitment have a negative effect on turnover (conversely, a positive effect on intent to stay), with affective commitment having the strongest effect, followed by normative commitment, and finally continuance commitment (Meyer et al., 2002;

Randall, 1990). This suggests that carefully managing *emotional* and *psychological* relationships with employees is critical to retention.

2.2.3 Retention

2.2.3.1 Competitive and Financial Advantages

Employee retention is one of the most studied topics in the fields of Industrial Organizational Psychology and Organizational Behavior. As mentioned, retaining talented employees (particularly knowledge workers) is becoming more important as post-industrial countries continue to move toward service-based economies (vice product or manufacturing-based economies). Further, advances in technology, coupled with lower costs of acquiring technological assets, have caused reductions in, or even the disappearance of, capability gaps that once provided clear competitive advantages to leading-edge organizations. With a more level technological playing field, organizations must find new ways to gain advantages. In post-industrial nations, the advantage lies in attracting and retaining talented employees. Indeed, Holtom et al. (2008) estimate that as much as 30 to 40 percent of an organization's market value is attributable to intangible factors, such as the ability to attract and retain talent. Therefore, to maintain competitive advantage, organizations need both cutting-edge technology *and* a talented workforce.

Beyond potential competitive advantages, retaining talented employees (i.e., lower employee churn) is good for an organization's bottom line. Recruiting, selecting, and training costs can run as much as 100 percent of the annual salary for the position being filled (Allen et al., 2010). Further, work disruptions, loss of organizational memory, the learning curve associated with training a new employee, the time required for new and existing employees to bond, and the inferior quality of employee-customer interactions among newer employees silently decay an organization's service quality, efficiency, and bottom line (Allen et al., 2010; Ferguson & Brohaugh, 2009; Holtom et al., 2008). Clearly, retaining talented employees is critical to an organization's success.

2.2.3.2 RM and Retention

As previously mentioned, commitment is a well-researched predictor of retention (Jaros et al., 1993; Mathieu and Zajac, 1990; Randall, 1990; Porter et al., 1974), however studies examining RM as a predictor of employee retention are surprisingly rare. Mossholder et al.'s (2005) examination of exchange relationships (such as those between an organization and its employees that deal in social/relational capital) is an exception. They show that social/relational capital builds attachments that increase employees' intent to stay, suggesting "relational predictors may contain unique information about withdrawal and hold promise for solving another piece of the turnover puzzle" (Mossholder et al., 2005, p.616).

The few empirical examples of the effects of relationships on retention that do exist tend to focus solely on human-to-human relationships (e.g., supervisor-subordinate relationships, coworker relationships) while excluding the *relational signals* emitted by organizations (e.g., advancement/promotion opportunities offered by the organization, work-life balance policies, flexible work schedule policies, values and goals of the organization, etc.).[6] Relational signals speak to how the organization values (or does not value) its employees, and the extent to which the organization is interested in fulfilling employee needs in order to keep them on the job. I argue that creative RM tactics can shape employee perceptions, increase their commitment, and improve retention. I simultaneously examine interpersonal work relationships as well as the relational signals emitted by the organization in order to determine which RM tools have the greatest effect on intent to stay.

2.3 Conceptual Models & Hypotheses

To examine RM's effect on employee commitment and retention, I begin by providing details of my new conceptualization. Given that the intent of this study is to test a broader, internally focused conceptualization of RM, I develop a comprehensive model and 17[7] hypotheses to test the relationships between RM, commitment, and retention. The fit of the model will demonstrate whether or not I accurately capture RM's effect on commitment and retention.

[6]Some retention studies include "relationships" as one of several predictor variables, but do not specify the type of relationship or delineate who the partners are in the relationship. Where the variable is delineated, the focus is typically on supervisor and/or coworker relationships.

[7]Hypotheses are broken down into seven main categories, some with multiple, related predictions (H1a, H1b, etc.).

2.3.1 New Conceptualization: RM for Employee Retention

The new conceptualization of RM capitalizes on the notion that employees seek more than economic value from their jobs. Specifically, employees value job security, meaningful work, work friendships, a sense of belonging, training opportunities, etc. (Ahmed and Rafiq, 2003; Varey, 1995). I attempt to encompass all of the relationships an employee might have in the workplace, going beyond simple human-to-human relationships. Examining the vast literature on employee commitment and retention, I distill the wide range of workplace relationships into those that occur with other employees, relationships employees have with their specific occupation, and relationships employees have with the policies and ideology of the organization. Specifically, I posit that each employee has unique (1) social, (2) occupational, (3) organizational, and (4) ideological relationship experiences with the organization. Each of these relationships can benefit from marketing techniques—techniques that focus on creating value for employees and highlight the positive aspects of working for a particular organization. I develop and provide details about each proposed RM factor below.

2.3.1.1 Social Relationship Marketing

Social RM encompasses all the processes *set up by the organization* to encourage interpersonal, human-to-human interactions. This study examines organizational policies and practices related to: (1) new employee socialization protocols, (2) the frequency of supervisor-subordinate interactions, and (3) the level of collaboration and support in coworker relationships (i.e., the level of social-psychological support encouraged by the organization).

Organizations that have well-defined socialization processes that seek to familiarize new employees with the organization's history, social norms, language, goals, and values, signal to new employees the organization's desire to set them up for success, both professionally and socially. Further, organizations with policies and practices that encourage frequent supervisor-subordinate interactions in the form of open door policies, mandatory timeframes for providing feedback and mentoring, etc., help to open the lines of communication across levels of the organization. Finally, policies and practices that encourage the development of positive coworker-coworker relationships, such as free social events during work hours and off-site events that focus almost exclusively on relationship development and team building, can help employees build interpersonal trust and cohesion and, subsequently, relational capital.

If an employee experiences positive workplace relationships, he/she is likely to feel more committed to the organization and, subsequently, have a stronger desire to stay (Meyer et al., 1993; Meyer & Allen, 1991). This type of supportive social atmosphere has been shown to improve employee retention, as it buffers employees from negative work shocks, heavy workloads, and stressful operating environments (Holtom et al., 2008; Mossholder et al., 2005). Essentially, social RM deals with any organization-sponsored activity meant to establish a positive web of human-to-human relationships in the workplace.

2.3.1.2 Occupational Relationship Marketing

Occupational RM[8] deals with aspects of the employee's job that make it meaningful, interesting, and rewarding. This study examines organizational policies and practices related to: (1) task variety, (2) job complexity (i.e., ensuring appropriate job complexity), (3) role clarity, (4) employee participation and voice in major projects, (4) opportunities to attend professional training and development, (5) the level of autonomy in the work environment, and (6) workload (i.e., ensuring a suitable workload). All of these factors contribute to the valence of an employee's relationship with his/her occupation (D'Amato & Herzfeldt, 2008; Mayfield & Mayfield, 2007; Caldwell & O'Reilly, 1985). Naturally, a positive relational valence leads to increased commitment and desire to stay, while a negative relational valence leads to decreased commitment and a desire to leave.

Organizations can enhance occupational RM by performing job rotations, by offering skill development and education opportunities, and by communicating the *meaningfulness* and *necessity* of the position to both the employee and other members of the organization. Further, these activities show the organization is willing to invest in the employee in order to fulfill his/her professional needs (Berry, 2002).[9] When an employee feels that his/her job is important, and that he/she has the right amount, type, and complexity of work, he/she will feel competent in his/her position. These feelings, combined with opportunities to learn and develop new professional skills, can encourage commitment to the organization

[8]Occupational commitment (i.e., commitment to a profession or career) and organizational commitment (i.e., commitment to an employer) contribute independently to the prediction of work behavior (Meyer et al., 1993). Logically, it is possible to be pleased with a type of career or profession, but not be satisfied performing career duties in a particular organization.

[9]It is important to note that the occupational RM factors examined in this study are those that are controlled and molded by the organization. For example, organizations determine the type and amount of professional training and development opportunities that are available to their employees, and not all organizations offer the same opportunities to improve professionally.

and a desire to stay in order to improve professionally. At its core, occupational RM encompasses all activities that an organization performs in order to encourage employees to be comfortable in their work position as well as provide opportunities to learn and develop professionally.

2.3.1.3 Organizational Relationship Marketing

Organizational RM encompasses how the organization's policies and procedures fulfill employee needs and convey a desire to be supportive. McCall (1966) discussed how buyer and seller relationships can sometimes appear like a marriage, whereby each participant goes *beyond* economic satisfaction to the more complex realm of *satisfying personal wants and desires*. These relationships are deeper, and more committed than simple economic relationships. My conceptualization of organizational RM is similar to the relationship that McCall discusses, and includes both simple economic relationships and more meaningful non-economic relationships. Specifically, organizational RM seeks to establish a deeper, more committed relationship between the organization and the employee by offering policies and practices that fulfill the employee's tangible and intangible needs and desires.

Policies that support employees' tangible and intangible needs and desires are important for commitment and retention (Mitchell et al., 2001). Specifically, organizational policies that provide tangible support include: (1) economic remuneration (i.e., pay and benefits); while organizational policies that provide intangible support include: (2) the potential for promotion opportunities, (3) the ability to trust the organization (in the sense that the organization is consistent with its policies and actions, that it does not "pull any punches" on its employees), (4) the organization's stance on equity and justice, and (5) the organization's view of work/life balance. These factors were chosen because they are generalizable to most organizations and they serve as clear signals of how the organization values its employees' time, the organization's attunement to the personal life demands faced by its employees, and the desire of the organization to treat their employees with respect.

Naturally, economic remuneration is a main reason why people choose to work—to fulfill basic needs. As Shaw et al. (1998) note, "Compensation and benefits are tangible inducements—the rewards against which alternative employment opportunities are directly assessed" (p. 512). Less tangible factors, such as the opportunity and availability of promotions (Mitchell et al., 2001), the ability to trust the organization (Shaw et al., 1998), the organization's stance on equity and justice (meta-analysis by

Colquitt et al., 2001; Shaw et al., 1998), and work/life balance policies (Aryee et al., 1998; Grover & Crooker, 1995; Rothausen, 1994) have all been shown to increase commitment and retention.

Schweitzer and Lyons (2008) note that the *intangible* offerings are not universally available. Their rarity helps establish an organization's reputation as an "employer of choice" (Zeithaml et al., 2013), which attracts top talent. For example, Google's onsite job perks (i.e., free meals, free haircuts, free dry cleaning, etc.) and their policy of allowing employees 20 percent of their work time to pursue special projects help create Google's reputation as a preferred employer. In short, organizational RM encompasses the policies and practices that convey the extent and valence of the relationship the organization desires to have with its employees.

2.3.1.4 Ideological Relationship Marketing

Finally, ideological RM encompasses the level of congruency between an organization's and its employees' values, ideals, and goals. In this study, I examine variables such as: (1) person-organization fit, (2) goal and value congruency, (3) organizational credibility, (4) perceived prestige of the organization, (5) perceived meaningfulness of the organization's mission, and (6) the sense of identity, self-esteem, and pride the employee gets from being part of the organization.

Gouldner (1960) shows that when properly managed, these fundamental factors can be used to "win the hearts and minds" of employees and inspire commitment and retention. In their meta-analysis, Verquer et al. (2003) show that a good fit between the organization's and the employee's goals and values is essential to work outcomes like commitment and retention. Conversely, employees who do not feel connected to the intrinsic ideologies of the organization are not likely to feel committed or to stay.

Naturally, ideological RM starts during the hiring process. Organizations screen potential employees for positive person-organization fit, or compatibility with the organization. While person-organization fit has been shown to increase employee commitment and intent to stay (O'Reilly et al., 1991), it cannot simply be ignored once the hiring process is over. Instead, organizations must cultivate fit by using ideological RM techniques, such as reiterating the mission and values of the organization, and reminding employees that their work contributes to an overall cause. Further, ideological RM can stimulate feelings of pride and meaningfulness in work, feelings which link employees' identities to the mission of the organization.

In his early work, Steers mentioned the importance of identifying with the organization in order to inspire feelings of commitment (Steers, 1977). Bhattacharya and his colleagues (2003, 1995) use social identity theory[10] to show that when customers identify with an organization (through its products, services, affiliations, or social responsibility acts it espouses), they are more loyal and more likely to view the organization as trustworthy and socially salient to their own self-image. Woodruff (2012) reports similar findings between employees and their employer, and shows that programs aimed at increasing identification with the organization do, in fact, work. He recommends, "managers should actively seek to increase the perceptions of organizational distinctiveness and prestige and promote social satisfaction in order to grow and then maintain high levels of identification with the organization" (p.275). After a while, individuals may even begin to define themselves in terms of the organization to which they identify (Mael & Ashforth, 1992). These links encourage commitment, and, subsequently, retention. Identification can also help employees weather workplace storms by keeping them committed to the organization despite instances of negativity (Witt et al., 2002).

The basic ideologies of an organization are not easily mutable, nor is it possible to simply "install" an organization's ideology into its employees. Ideological connection, however, is essential for commitment and retention. Ideological RM assesses whether or not organizations communicate important cultural principles meant to intrinsically engage employees.

2.3.1.5 Summary of New Conceptualization

Employees' perceptions of each of these four relationships are influenced by the organization itself, and thus they serve as RM tools an organization can use to affect employees' commitment and intent to remain in the organization. This sort of workforce management is especially useful in today's fast-paced business environment where other types of competitive advantages (e.g., technological advantages) are easily imitable and therefore less sustainable than in the past (Pfeffer, 1994). *Employees are the new competitive advantage.*

[10] Social identification is "the perception of belonging to a group with the result that a person identifies with that group. Identification enables the person to partake vicariously of accomplishments beyond his or her powers" (Bhattacharya et al., 1995).

2.3.2 Conceptual Models

Turning to the models, I expect RM, commitment, and retention to align in a logical pattern. Specifically, each RM factor (i.e., social RM, occupational RM, organizational RM, and ideological RM) will affect certain components of commitment (i.e., affective commitment, continuance commitment, and normative commitment). I expect each component of commitment to be positively related to intent to stay, however I anticipate different magnitudes. Figure 2.2 presents a general depiction of the conceptual framework for this study. Detailed hypotheses are presented below.

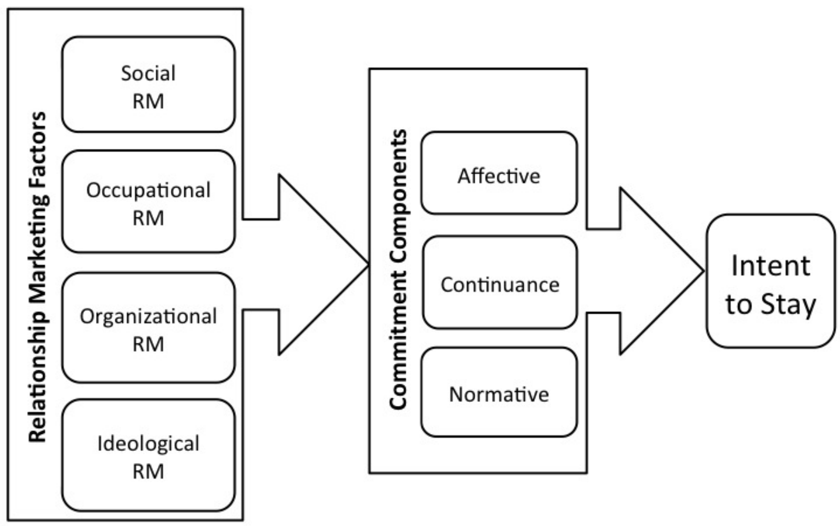

Figure 2.2 – General Conceptual Model

2.3.2.1 Effects of Commitment on Retention

Like Meyer et al. (2002) and Randall (1990), I expect all three components of commitment will have positive relationships with the outcome variable, intent to stay. Further, I expect the magnitudes of the effects will align in the same order, such that affective commitment has the largest effect on intent to stay, followed by normative commitment, then continuance commitment. Therefore, I hypothesize:

> *H1a: Affective, continuance, and normative commitment have a positive effect on intent to stay.*
>
> *H1b: Affective commitment has a larger effect on intent to stay than normative commitment, normative commitment has a larger effect on intent to stay than continuance commitment (AC > NC > CC → Intent to Stay).*

2.3.2.2 Effects of RM on Commitment

2.3.2.2.1 Social Relationship Marketing

Supportive social relationships in the work environment foster organizational commitment (Meyer et al., 2002; Becker, 1992; Meyer & Allen, 1991). Supportive work relationships also fulfill employees' need for social interaction and their psychological need to feel comfortable at work. These relationships embed employees in a protective "web" which shields them from negative work shocks that might otherwise damage their commitment to the organization (Mitchell et al., 2001).

Supervisor, coworker, and subordinate relationships developed via social RM should make employees more comfortable and connected at work, thus increasing their emotional commitment to the organization. Therefore, I hypothesize that:

H2a: Social RM is positively related to affective commitment.

Beyond supportive social networks, employees may also establish a significant amount of social capital during their tenure in an organization. Social capital, as defined by Bourdieu (1986), is "the aggregate of the actual or potential resources which are linked to…a…network of…relationships of mutual acquaintance and recognition" (p.248). Bourdieu notes that while social capital cannot be distilled into an economic value, it is often related to economic resources, such that individuals who have large, well-connected social networks are more apt to be financially successful.

Similar to financial capital, social capital is an investment. Employees must carefully create and "save" social capital by building positive work relationships and displaying consistent behaviors and attitudes at work. Over time, employees who build their work relationships and work reputation create a "bank" of social capital. While the employee's reputation can typically be transported to a new organization, the majority of his/her social capital remains in the organization. In other words, if an employee with a lot of social capital chose to leave their existing organization to go to a new organization, he/she would be giving up (i.e., sacrificing) his/her existing social capital. The employee would have to begin anew, building new work relationships and establishing a new "bank" of social capital at their new organization. Sacrificing social capital can make the decision to leave very unappealing. Employees may feel the *need* to be committed to an organization because they are unwilling to give up years and years of social capital accumulation. Therefore, I hypothesize:

H2b: Social RM is positively related to continuance commitment.

2.3.2.2.2 Occupational Relationship Marketing

Occupational RM is used to engage employees in their work role through work rotation and development plans, occupation-specific training, developmental education, and ensuring role and task clarity. Occupational RM can also be used to understand employees' work goals so the organization can fulfill those goals as opportunities arise. When an organization offers opportunities related to employees' career goals, employees feel committed to the organization in order to achieve those goals. Conversely, if opportunities offered by an organization do not align well the employees' career goals, they are less likely to feel committed (i.e., less *need* to stay with the organization in order to achieve their professional goals). Therefore, I hypothesize:

H3a: Occupational RM is positively related to continuance commitment.

Understanding one's work role, a key component of occupational RM, provides a level of comfort and self-confidence that inspires commitment to the organization. In fact, Mowday et al. (1984) posited that one of the antecedents of affective commitment is job/work related psychological comfort—a feeling of self-confidence that exists once the employee has mastered his/her role in the organization. Beyond needing to be part of an organization in order to fulfill their goals, employees *want* to be part of that organization in order to capitalize on the good feelings associated with work role mastery. Therefore, I hypothesize:

H3b: Occupational RM is positively related to affective comment.

2.3.2.2.3 Organizational Relationship Marketing

Organizational support theory holds that employees weigh their perceptions of how the organization values their socio-economic needs and personal well being when making work performance and organizational commitment decisions (Rhoades & Eisenberger, 2002; Eisenberger et al., 2001; Eisenberger et al., 1986). In other words, if the employees feel that the organization values their contributions and cares about their well being, they will reciprocate with commitment to the organization.

The policies espoused by an organization "signal" to its employees how much the organization values their contributions and understands the demands of their personal lives. For instance, economic remuneration policies (e.g., pay scales, benefits, bonuses, allowances) espoused by an organization signal how much the organization thinks its employees' efforts and time are worth. The availability of promotion opportunities signal the employee's ability to grow and develop within the organization—that there will be room for him/her to progress professionally. When the organization is consistent and forthright with their employees, employees learn to trust that the organization has their best interest at heart and will not "pull any punches" or keep them in the dark. Finally, the availability of work/life balance policies (e.g., on-site health clubs, telework options, on-site daycare options, etc.) and fair and equitable policies signal the organization's interest in the wellness and happiness of its employees.

If employees are satisfied with an organization's policies, they will be committed to the organization in order to receive the economic and non-economic benefits. The more unique or rare those benefits are, the more committed the employee will be, since the opportunity costs associated with leaving the organization is higher with rare offerings. Therefore, I hypothesize:

H4: Organizational RM is positively related to continuance commitment.

2.3.2.2.4 Ideological Relationship Marketing

An organization's ideology is likely to be the first relationship marketing effort the employee experiences. Ideology is an overarching term that includes the organization's ideals (e.g., patriotism, heroism, social justice, being part of something "bigger than self," desire to maintain the top position in the industry), values (e.g., ethicality, morality, respect, honesty), and beliefs (e.g., sacrifices are worth the costs, doing good for good's sake). An organization's ideology signals to its employees which attitudes and behaviors the organization considers appropriate and valuable. The stronger the ideological stance, the more congruency matters. Employees may enter an organization with ideological congruency, or they may be socialized into the ideologies of the organization during initial training and/or on the job over time (Woodruff, 2012; Mathieu & Zajac, 1990).

Person-organization fit studies demonstrate that ideological congruence is significantly related to organizational commitment (Posner, 2010; Van Vianen et al., 2007; Posner, 1992). When employees' ideologies are tightly aligned to those of the organization, they may feel devoted to the organization and committed for moral reasons. Therefore, I hypothesize:

H5a: Ideological RM is positively related to normative commitment.

As Meyer and Allen (1991) theorized, normative commitment may also come about as a sort of reciprocity. In other words, the employee may show his/her loyalty and commitment as a result of the positive benefits the organization has given the employee. Meyer and Allen note that this reciprocity comes in two forms: (1) reciprocity by obligation, a give-and-take notion whereby an employee ought to show his/her commitment; and (2) reciprocity by desire, an *affective* response whereby the employee *wants* to give back to the organization. Further, when an employee experiences strong ideological congruency with an organization, it follows that he/she likely has a strong affective commitment to the organization, or a desire to be part of the organization. Therefore, I hypothesize:

H5b: Ideological RM is positively related to affective commitment.

Taken together, the hypothesized effects of RM on organizational commitment are shown in Figure 2.3. All paths are hypothesized to be positive in nature.

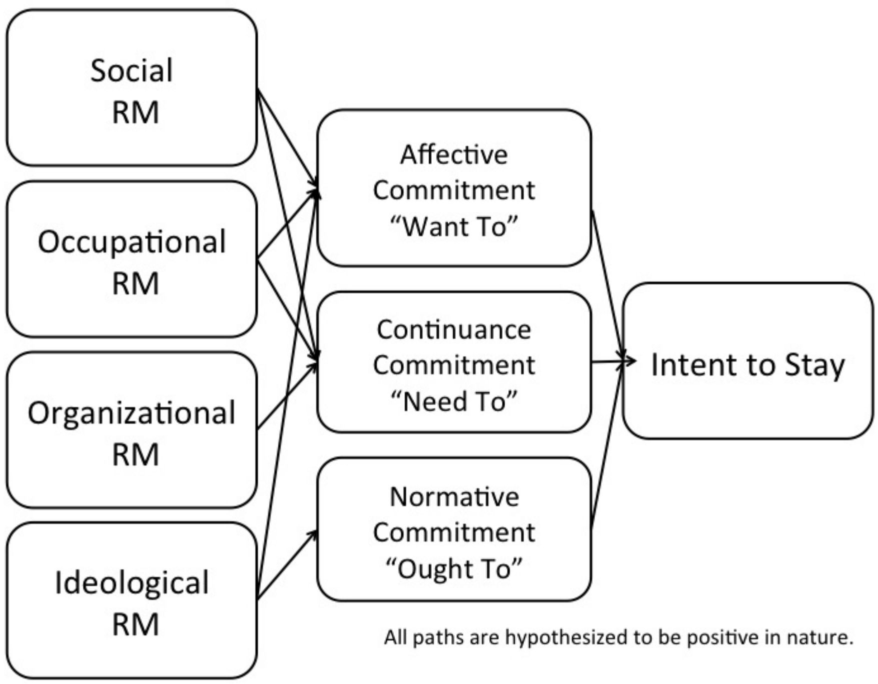

Figure 2.3 –Effects of RM on Organizational Commitment

2.3.2.3 Total Effects of RM Factors on Intent to Stay

Consistent with theory, I expect the total effect of RM on intent to stay to be mediated by organizational commitment. Specifically, I expect the total effects of all four RM factors on intent to stay to be positive, and for those effects to be mediated by organizational commitment. In this section, I provide details of the hypothesized total effects.

2.3.2.3.1 Social Relationship Marketing

The number and nature of workplace connections is associated with employee retention. In particular, supervisors and leaders play key role in an organization's retention. As agents of the organization, their actions craft the opinions and views of the employees who work for them (Eisenberger et al., 2002). Supervisors and leaders also play a role in establishing supportive work relationships, which are known to help employees manage large workloads and reduce felt stress, which ultimately improves retention (Holtom et al., 2008; Mitchell et al., 2001). Therefore, I hypothesize:

H6a: Social RM is positively related to intent to stay.

2.3.2.3.2 Occupational Relationship Marketing

Occupational RM starts before employees are hired. Realistic job previews are necessary to properly set employees' expectations. Once on board, on-the-job learning, training and educational opportunities, mentoring, feedback, and recognition for outstanding performance are key to encouraging retention (D'Amato & Herzfeldt, 2008; Mayfield & Mayfield, 2007; Caldwell & O'Reilly, 1985). Understanding employees' career goals and paving the way for goal attainment increases their intent to stay. Therefore, I hypothesize:

H6b: Occupational RM is positively related to intent to stay.

2.3.2.3.3 Organizational Relationship Marketing

In the "War for Talent," organization RM may be an organization's most effective weapon. The policies and procedures espoused (or not espoused) by an organization serve to endear or alienate employees. Organizations that offer new and exciting benefits, employee-friendly work environments, and policies that support work/life balance are able to attract and retain highly talented employees.

Surprisingly, competitive pay is only a baseline factor for retaining employees (Messmer, 2004). Employees desire competitive pay in order to consider staying in the position, but competitive pay alone is *not enough* to retain employees. I believe that the combination of economic and non-economic policies encompassed by organizational RM is the key to retention. Therefore, I hypothesize:

H6c: Organizational RM is positively related to intent to stay.

2.3.2.3.4 Ideological Relationship Marketing

An organization's ideology plays a major role in recruiting like-minded employees; however employees need to be consistently reminded of how they contribute to the overall ideals, values, and culture of the organization. As mentioned, this sort of esprit de corps is particularly important in public service organizations. Employees need to feel personally connected to and vested in the mission in order to face the risks assumed by the organization. Making this connection stronger with consistent priming of the organization's ideals, values, and culture can result in increased retention. Therefore, I hypothesize:

H6d: Ideological RM is positively related to intent to stay.

Taken together, the hypothesized total effects between RM factors and intent to stay are shown in Table 2.2.

Hypothesized Total Effects Between RM & Intent to Stay				
	Social RM	**Occupational RM**	**Organizational RM**	**Ideological RM**
Intent to Stay	**+**	**+**	**+**	**+**

Table 2.2 – Hypothesized Total Effects Between RM and Intent to Stay

2.3.2.4 Commitment as a Mediator

Table 2.2 suggests that RM tools have a positive total relationship with intent to stay, however I believe that commitment fully mediates this effect. Previous studies have consistently shown that *commitment mediates* the association between relational norms and retention (Meyer et al., 2002; Meyer & Allen, 1991; Mathieu & Zajac, 1990). Logically, it follows that employees do not stay simply because of clever or targeted marketing. Instead, effective RM practices *evoke feelings of commitment* that entice employees to stay. I draw on previous work by hypothesizing that commitment mediates the relationship between RM and intent to stay, such than an employee who is positively effected by RM techniques feels more committed to the organization; and having more commitment to the organization increases intent to stay.

Most previous studies use a generalized notion of commitment. I am interested in a deeper understanding of *how* each of the three aspects of commitment espoused by Meyer and Allen (1991) mediate the relationships between the RM factors and intent to stay. Therefore, to give these relationships the attention they deserve, I hypothesize:

H7a: The relationship between social RM and intent to stay is mediated by affective and continuance commitment.

H7b: The relationship between occupational RM and intent to stay is mediated by affective and continuance commitment.

H7c: The relationship between organizational RM and intent to stay is mediated by continuance commitment

H7d: The relationship between ideological RM and intent to stay is mediated by affective and normative commitment.

2.3.2.5 Summary of Hypothesized Effects

Table 2.3 provides a summary of the hypothesized effects. In the next section, I discuss potential moderators of these effects.

Summary of Hypothesized Effects	
H#	**Hypothesis**
H1a	Affective, continuance, and normative commitment have a positive effect on intent to stay.
H1b	Affective commitment has a larger effect on intent to stay than normative commitment, normative commitment has a larger effect on intent to stay than continuance commitment (AC > NC > CC → Intent to Stay).
H2a	Social RM is positively related to affective commitment.
H2b	Social RM is positively related to continuance commitment.
H3a	Occupational RM is positively related to continuance commitment.
H3b	Occupational RM is positively related to affective commitment.
H4	Organizational RM is positively related to continuance commitment.
H5a	Ideological RM is positively related to normative commitment.
H5b	Ideological RM is positively related to affective commitment.
H6a	Social RM is positively related to intent to stay.
H6b	Occupational RM is positively related to intent to stay.
H6c	Organizational RM is positively related to intent to stay.
H6d	Ideological RM is positively related to intent to stay.
H7a	The relationship between social RM and intent to stay is mediated by affective and continuance commitment.
H7b	The relationship between occupational RM and intent to stay is mediated by affective and continuance commitment.
H7c	The relationship between organizational RM and intent to stay is mediated by continuance commitment.
H7d	The relationship between ideological RM and intent to stay is mediated by affective and normative commitment.

Table 2.3 – Summary of Hypothesized Effects

2.3.3 Moderators

Because this study uses data gathered from 254 different studies across 34 countries, I expect to find differences in the interpretation and response to each of the constructs based on a number of factors. I have the ability to examine whether or not the relationships between the constructs vary based on certain variables available in the data. Like Farley and Lehmann (1998) and Geyskens et al. (1998), I use both substantive and methodological factors to test for the presence of moderation.

For substantive factors at the individual level, I use (1) age and (2) gender, as these factors have consistently attracted interest in the fields of relationships, commitment, and retention and are available in the majority of the empirical studies that make up my data set. At the macro level, I examine how Hofstede's famous cultural dimensions moderate my results (based on the country from which the respondents hailed): (3a) individualism v. collectivism, (3b) power distance, (3c) uncertainty avoidance, (3d) masculinity v. femininity, and (3e) long- v. short-term orientation. Social and psychological literatures suggest that relationship formation can be affected by cultural variables, therefore I expect Hofstede's dimensions will highlight interesting differences. Finally, I examine how (4) the commitment scale used by the researchers (a methodological factor) affects results.

2.3.3.1 Age

As employees age, their roles, particularly their social roles within an organization's hierarchy, change. Biological and psychological aging also causes differences in a person's needs, expectations, and what they deem most important in their life. Rhodes' (1983) thorough review of the literature available at the time demonstrates how age can affect work attitudes and values, needs, and preferences. Specifically, she shows that age is positively related to organizational commitment and negatively related to intent to turnover, such that older workers tend to be more committed and have a stronger desire to stay with their organization than younger workers.[11] Hackett et al. (1994) show that age is positively related to each of Meyer and Allen's (1991) three components of commitment, and Porter et al. (1974) confirm that age is positively related to intent to stay (conversely, negatively related to intent to turnover).

[11] She reports that some studies find non-significant results, however for the studies with significant results, the relationships between age and commitment and age and intent to stay are positive.

I believe I may find differences in the structural paths of the full model due to average employee age. In other words, I believe age may moderate some of the structural paths such that the relationships between RM and commitment and RM and intent to stay are stronger for older workers.

2.3.3.2 Gender

Several studies show that differences exist in the way women and men perceive their work environment. Marsden et al. (1993) find that men tend to be slightly more committed to the organization than women, however when the authors control for job attributes, career-related variables, and family ties, women experience slightly more commitment than men. Scandura and Lankau (1997) show that women often feel more committed to their organization when the organization offers work-life balance policies (i.e., flexible work hours, telework options, etc.) that allow them to tend to both work and family needs. These differences speak directly to the effects organizational RM can have on employee commitment. I may find differences in the relationship between organizational RM and continuance commitment based on gender.

Regarding social interactions, the general notion is that women tend to engage socially at a higher frequency and with a deeper depth than men. Therefore, I expect to find gender differences in the relationship between social RM and affective commitment such that women experience a stronger relationship between interpersonal interactions and the desire to stay in an organization than their male counterparts.

Finally, for turnover, Lyness and Judiesch (2001) and Miller and Wheeler (1992) show that women leave organizations at a lower rate than men, but perhaps only when certain job characteristics are controlled (e.g., meaningful work and opportunities for promotion). I expect to find that women experience a stronger relationship between affective (emotional) commitment and intent to stay than men, while men experience a stronger relationship between continuance (rational) commitment and intent to stay than women. I believe the effect of normative commitment on intent to stay will be the same for both men and women (i.e., not significantly different). I examine the data for gender differences by coding the percentage of males in the sample population (i.e., higher percentage = more males in the sample).

2.3.3.3 Commitment Scale

In the commitment literature, the most prominent measurement scales used are those by Meyer and Allen (1991) and Mowday, Steers, and Porter (1979). I am interested in examining whether or not the structural paths of the model differ based on the commitment scales used in the empirical studies. I look for moderation using each of these scales, as well as a conglomerate of "other" scales (i.e., those studies that use scales other than Meyer & Allen (1991) or Mowday et al., (1979) to measure commitment).

2.3.3.4 Hofstede's Cultural Dimensions

Geert Hofstede developed the most popular conceptualization of cultural values in his seminal work, *Culture's Consequences* (1980). In it, Hofstede defines culture as, "the collective programming of the mind which distinguishes the members of one human group from another" (p.25). Values are viewed as the "central tenets of a society's culture" that "influence behavior by providing nonspecific guidelines toward pursuing end goals" (Fernandez et al., 1997, p.44).

Research using several different frameworks in several different fields of study has shown that Hofstede's cultural values dimensions are excellent indicators of workplace behaviors, attitudes, and organizational outcomes (Kirkman et al., 2006). Hofstede's research is extremely robust. He indexes 85 countries and regions based on their society's demographic, geographic, economic, and political aspects (Soares et al., 2007). He developed his cultural values framework in the late 1960s and early 1970s using data from 116,000 surveys completed by 88,000 IBM employees living in 72 countries and regions (Taras et al., 2010). Since then, Hofstede's conceptualization has become very popular, inspiring literally thousands of empirical studies.

Despite being developed for country-level analyses, the dimensions have been used in many empirical studies to examine dimensions of culture at the individual level. Hofstede's original work classified the countries of the world based on four dimensions: (1) individualism v. collectivism, (2) power distance, (3) uncertainty avoidance, and (4) masculinity v. femininity. In 1988, Hofstede and Bond developed a fifth dimension that is formally known as *Confucian dynamism*, and informally dubbed "long- v. short-term orientation." In this study, I examine differences among construct relationships for all five of these dimensions. First, I provide a description of each of the dimensions.

2.3.3.4.1 Individualism v. Collectivism

The first dimension, individualism v. collectivism, is defined as “the degree to which people in a country prefer to act as individuals rather than as members of groups” (Hofstede, 1994, p.6). Individualistic societies prefer “a loosely knit social framework in which people are supposed to take care of themselves and their immediate families only,” whereas collectivist societies prefer “a tight social framework in which people distinguish between ingroups and outgroups, they expect their ingroup to look after them, and in exchange for that they feel they owe absolute loyalty to it” (Hofstede, 1980, p.45). In this sense, individualism and collectivism are two extremes on the same scale, and the countries Hofstede examined fall somewhere along the sliding scale. As Hofstede and Bond (1984) put it, “The basic anthropological/societal issue to which [individualism versus collectivism] relates is the individual’s dependence on the group; his or her self-concept as ‘I’ or ‘we’” (p.419). In this study, individualism v. collectivism may be related to employees’ desires for close, interpersonal relationships (i.e., social RM) as well as the commitment they feel to the organization.

2.3.3.4.2 Power Distance

The second dimension, power distance, is defined as “the extent to which a society accepts the fact that power in institutions and organizations is distributed unequally” (Hofstede, 1980, p.45). It is also defined in terms of supervisors and subordinates such that in cultures with high power distance, it is not socially acceptable for subordinates to question or disagree with their supervisors, or for supervisors to consult with their subordinates during the decision-making process. From his website, Hofstede explains power distance in the following manner:

> The fundamental issue here is how a society handles inequalities among people. People in societies exhibiting a large degree of power distance accept a hierarchical order in which everybody has a place and which needs no further justification. In societies with lower power distance, people strive to equalise the distribution of power and demand justification for inequalities of power. (Hofstede, 2014)

Power distance clearly has an effect in the workplace, as some cultures have a high tolerance for power inequity, while others have very little tolerance and prefer a more equitable environment (i.e., organizational RM), which can ultimately affect employee commitment and intent to stay.

2.3.3.4.3 Uncertainty Avoidance

The third dimension, uncertainty avoidance, is defined as, “the extent to which people feel threatened by ambiguous situations, and have created beliefs and institutions that try to avoid these” (Hofstede & Bond, 1984, p.419). The underlying issue to which uncertainty avoidance relates is societies’ stance on whether or not they can control what happens in the future. Countries with high uncertainty avoidance prefer rules and regulations and are intolerant of unorthodox behavior. On the other hand, countries with low uncertainty avoidance prefer more relaxed rules and regulations, whereby historical practices matter more than written laws and principles. Uncertainty avoidance helps determine the amount and type of rules and regulations (i.e., organizational RM) desired by employees, as well as the level of role ambiguity (i.e., occupational RM) they can tolerate.

2.3.3.4.4 Masculinity v. Femininity

The fourth dimension is masculinity v. femininity. Masculinity is defined as, “a situation in which the dominant values in society are success, money, and things,” whereas femininity is described as “a situation in which the dominant values in society are caring for others and the quality of life” (Hofstede & Bond, 1984, p.419-420). Masculinity v. femininity deals with sex roles and how those roles affect an individual’s self-concept. Countries high on masculinity have a preference for achievement, heroism, assertiveness, competitiveness, and the collection and display of material possessions. Countries high on femininity are more consensus-oriented, preferring cooperation, modesty, caring for the weak, and improving quality of life. A culture’s level of masculinity v. femininity may affect social relationships in the work environment (social RM), the importance of pay and benefits (organizational RM), and even ideological connection to the organization (ideological RM).

2.3.3.4.5 Long- v. Short-Term Orientation

Hofstede’s fifth cultural values dimension is long- v. short-term orientation. Long-term orientation refers to “future-oriented values such as persistence and thrift,” and short-term orientation refers to “past- and present-oriented values such as respect for tradition and fulfilling social obligations” (Taras et al., 2010). Again, from his website, Hofstede explains long- v. short-term orientation in the following manner:

> The long-term orientation dimension can be interpreted as dealing with society's search for virtue. [P]eople believe that truth depends very much on the situation, context and time. They show an ability to adapt traditions to changed conditions, a strong propensity to save and invest, thriftiness, and perseverance in achieving results. Societies with a short-term orientation generally have a strong concern with establishing the absolute Truth. They are normative in their thinking. They exhibit great respect for traditions, a relatively small propensity to save for the future, and a focus on achieving quick results. (Hofstede, National Culture Dimensions, 2014)

Long- v. short-term orientation speaks directly to the employees' commitment and intent to stay. Cultures with a long-term orientation are more interested in the process than the result, and vice versa for cultures with a short-term orientation. With the conceptual foundation laid and the hypotheses ready for testing, I move next to the method and data used in this study.

2.4 Methodology & Data

This study employs a method that is useful for theory testing and combines the principles of meta-analysis and structural equation modeling (SEM), known as MA-SEM, to test the relationships between the RM factors, the mediator variables (three components of commitment), and the outcome variable (intent to stay). Lin and Zeng (2010) showed that the use of summary statistics in meta-analysis produces results that are just as reliable as the results of empirical studies that use original, individual-level data. In particular, "there is no asymptotic efficiency gain by analyzing original data if the parameter of main interest has a common value across studies" (p. 321). In short, MA-SEM is a reliable and efficient method for testing my model.

Viswesvaran and Ones (1995) provide an excellent summary of this method as well as step-by-step instructions on how to perform an MA-SEM. They note that using this method

> [T]he estimated true score correlations between the constructs of interest are established through the application of meta-analysis, and structural equation modeling is then applied to the matrix of estimated true score correlations…[this] approach enables researchers to test complex theories involving several constructs that cannot all be measured in a single study. (p. 865)

It also allows researchers to combine available evidence from potentially disparate literatures (Landis, 2013), and has been employed in several theory-testing studies in the social sciences. Recently, Christian et al. (2011) used this method to test the role of work engagement as a moderator between several antecedents and two measures of job performance: task performance and contextual performance. Palmatier et al. (2006) looked at factors that influence external relationship marketing from the views of both the customer and the seller. Their thorough work examined five potential RM outcomes as well as several relational mediators and moderators. Harrison et al. (2006) examined how overall job attitude predicted integrative behavioral criteria, such as focal performance, contextual performance, lateness, absence, and turnover. Geyskens, Steenkamp, and Kumar (1999) examined satisfaction in marketing channel relationships. Using this method, they were able to integrate the economic and noneconomic facets of channel member satisfaction and marry the commitment and trust literatures, two concepts that had not previously been studied simultaneously. Later, in 2006, the Geyskens, Steenkamp, and Kumar team collaborated to meta-analytically examine the large body of literature associated with transaction cost theory and make/buy/ally decisions, again integrating and testing a comprehensive model that no individual empirical work had examined. Clearly, MA-SEM is useful for testing theories and combining disparate literatures.

2.4.1 MA-SEM

To perform a MA-SEM, one follows a series of 7 steps, as shown in Table 2.4. Landis (2013) warns against drawing causal inferences, since most meta-analytic data is gathered from cross-sectional data; however these models can serve as foundations for which future longitudinal studies can test causal predictions.

Steps for Testing a Theory Using Meta-Analytic SEM	
Measurement Model	
1	Identify important constructs and relationships.
2	Identify different measures used to operationalize each construct.
3	Obtain all studies reporting either (a) correlations between conceptually distinct operational measures or (b) artifact information on any of the conceptually distinct operational measures (identified in step 2)
4	Conduct psychometric meta-analyses and estimate the true score correlations between the measures (identified in step 2)
5	Use factor analysis to test the measurement model
Causal Model	
6	Estimate the correlations between the constructs (forming composites of the different operationalizations of the same construct)
7	Use path analysis with the estimated true score correlations to test proposed theory
Table and steps from Viswesvaran & Ones, 1995, p.867.	

Table 2.4 – Steps for Testing a Theory Using Meta-Analytic SEM

Finally, there are a host of decisions a researcher must make when working his/her way through the MA-SEM process. Landis (2013) outlines three main decision points and gives recommendations for each: (1) whether to use two-stage SEM (TSSEM) or MA-SEM, (2) what to do about blank cells in the meta-analytic correlation/covariance matrix, and (3) which sample size is the most appropriate for conducting SEM.

2.4.1.1 TSSEM or MA-SEM?

While MA-SEM is the predominant approach in the existing literature, Cheung and Chan (2005) offer an insightful paper regarding the superior benefits of TSSEM.[12] However, TSSEM requires very large samples and it requires that *at least one study* contain all the correlations for the constructs of interest. This requirement may not be possible in all studies, necessitating the use of MA-SEM. Given that none of the empirical studies contains all the necessary correlations, I use MA-SEM.

2.4.1.2 Blank Cells

If the correlation/covariance matrix has blank cells (i.e., the correlations were not found in any existing studies), Landis (2013) recommends selecting values that provide the strongest evidence for the "true" relationship between the variables using (1) values previously reported in other meta-analyses (but not found in the studies included in the current meta-analysis), (2) performing a "mini" meta-analysis using available data from the current studies, or (3) meta-analytic values from relevant primary studies previously excluded from the current meta-analysis. In this study, all correlations were found in the database of studies pulled for this meta-analysis, therefore blank cells are not an issue.

2.4.1.3 Sample Size

Given that every empirical study used in a meta-analysis has a different sample size, and the fact that each set of correlations come from studies with different sample sizes, which sample size should a researcher choose for estimating their SEM? In this case, it depends on whether the researcher used TSSEM or MA-SEM. In TSSEM, Cheung and Chan (2005) recommend using the total sample size. For researchers using MA-SEM, the harmonic mean provides the most conservative estimate, given that it limits the influence of very large values and increases the influence of smaller values, "thus the resulting

[12] TSSEM and MA-SEM are virtually identical until the point where the researcher must create the correlation/covariance matrix. In MA-SEM, the researcher uses the meta-analyzed correlation matrix and maximum likelihood to test the structural model. In TSSEM, the asymptotic covariance matrix is used to estimate the model, using the asymptotically distribution free method.

value will be larger than the smallest sample size, but almost certainly less than the arithmetic mean" (Landis, 2013, p.258). This study uses the harmonic mean in the SEM analysis.

With the process of conducting and MA-SEM thoroughly explained, I move next to the literature search used to create my database of empirical studies.

2.4.2 Literature Search

To gather as many studies as possible, an extensive search was performed. I searched computerized databases from 1980[13] to 2013, including: Business Source Complete (EBSCOHost and NCLive), JSTOR, PsycInfo, Academic Search Complete, Academic OneFile, Web of Science (ISI), Google Scholar, and ProQuest Dissertation and Theses. The conceptual search terms included: *relationship marketing*, *employee relationship marketing*, *relationship building*, *internal marketing*, *commitment*, *trust*, *retention*, *intent to stay*, and *turnover*. To ensure I was only capturing empirical studies, I further screened the studies using the following terms: *data*, *empirical*, *test*, *statistic*, *finding*, *evidence*, and *result*. Finally, I manually searched for studies in the journals most likely to publish studies related to my conceptual model (in alphabetical order): *Academy of Management Journal*, *Academy of Management Review*, *Administrative Science Quarterly*, *Human Relations*, *International Journal of Research in Marketing*, *Journal of Applied Psychology*, *Journal of Applied Social Psychology*, *Journal of Business and Psychology*, *Journal of Management*, *Journal of Marketing*, *Journal of Marketing Research*, *Journal of Organizational Behavior*, *Journal of Services Marketing, Journal of the Academy of Marketing Science, Journal of Vocational Behavior*, *Marketing Science*, *Organizational Behavior and Human Decision Making,* and *Personnel Psychology*. This process yielded over 500 empirical studies.

2.4.3 Inclusion Criteria

Naturally, I sought to find and analyze studies that were as substantively similar as possible. This process relies on the subjectivity of the researcher, of course, but it is in the best interest of my research to avoid analyzing substantively different empirical studies. Hunter and Schmidt (2004) warn against including substantively different studies due to the fact that their aggregation leads the researcher to compare "apples to oranges," making the results "difficult or impossible to interpret" (p.457).

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[13]The approximate time frame when the notions of Relationship Marketing and Internal Marketing were first examined by researchers.

To be eligible for inclusion, studies must have included measures of at least two of the variables included in the conceptual model. The measures must have been gathered at the individual level (i.e., the measures must have captured individual employee-level data, not group data or data related to buyer-supplier relationships) and must have provided the necessary information to compute a correlation between the two variables.[14] After screening all empirical studies for these criteria, my pool of eligible studies decreased to 254. In total, these studies yielded 2,658 total effects.

2.4.4 Coding Procedures

As the sole author, I coded all studies. To examine code-recode reliability, a natural research pause occurred after 50 studies were coded. After approximately a month away from the research, I re-coded the 50 previously coded studies and changed five percent of the previous codes, for a 95 percent coding agreement. These changes were made to tighten construct coding, and were the result of minor tweaks to previous construct definitions, as is natural when dealing with the subjectivity that arises in coding studies for meta-analysis. Further, after all of the studies were coded, I went back and examined a full 50 percent of the coded studies to ensure the coding was correct. This effort produced a 100 percent code-recode agreement. I used the definitions provided in section 2.3.1 to code the constructs.

Definitions for each RM factor and a complete list of codes are provided in Tables 2.5 and 2.6, respectively. Because I am expanding the notion of RM to examine ways organizations can internally market to their employees, the new RM concepts contain many different terms that apply to each concept.

Social RM includes interpersonal terms, such as “supervisor/peer interaction,” “peer cohesion,” “interpersonal trust,” and “familiarity/humor among coworkers.” It also includes social perceptions, such as “relationship capital,” “social benefits,” and “perceived supervisor support.” All of these items relate to the extent to which the employee is socially bonded to their coworkers and how socially comfortable they are in the organization, which is the essence of social RM.

Occupational RM includes terms that relate to the employee’s level of comfort with their particular job/profession and the opportunities for professional development within the organization. Terms such as

[14] I allowed individual measures from many different job types (i.e., leadership roles, administrative roles, managerial roles, labor roles, etc.) to be included in the sample. Hence, the sample is heterogeneous.

“role ambiguity,” “role conflict,” “empowerment,” “competence,” and “perceived under/overemployment” capture how well the employee fits the job; and terms such as “professional development,” “training,” “skills development,” “learning opportunities,” and “career support” indicate opportunities to develop professional skills in the organization.

Organizational RM includes terms such as “salary” and “benefits” to capture the tangible, remuneration-type policies espoused by the organization, and terms such as “work practices and policies,” “organizational justice,” “equity,” and “work-family balance” capture the intangible polices and practices espoused by the organization. Both the tangible and intangible policies and practices showcase the organization’s reputation for fairness, consistency, and how it understands and values its employees’ time and effort.

Finally, ideological RM terms such as “cultural fit,” “similarity,” “standards/goals,” and “norms” speak to how congruent the employees’ and organization’s goals and values are; while terms such as “perceived contribution/meaningfulness,” “organization credibility,” “belief/calling,” and “identity/self-esteem/pride” speak to the extent to which employees identify with the organization and its mission.

The terms associated with each RM factor represent my conceptualization and operationalization. I believe they serve as good starting place to examine how the factors relate to organizational commitment and intent to stay.[15] Next, I detail the steps I took to arrive at the meta-analyzed correlation matrix.

RM Factor Definitions	
Social RM	All the interpersonal, human-to-human interactions that occur in the workplace, including processes set up by the organization to encourage social interaction.
Occupational RM	Aspects of the job that make it meaningful, interesting, and rewarding, including job-specific tasks and the opportunity for professional development.
Organizational RM	The extent to which the policies and procedures of the organization fulfill the needs of, and convey a desire to be supportive of, employees. This includes both the tangible (e.g., pay and benefits) and intangible (e.g., work-life balance, equity and justice) policies and procedures.
Ideological RM	The level of congruency between the organization’s and the employee’s values, ideals, and culture (i.e., how closely the employee identifies with the mission of the organization).

Table 2.5 – RM Factor Definitions

[15]The terms associated with the three types of commitment and with intent to stay are more obvious and better known, since they are frequently used in the existing literature. Therefore, they are not discussed.

Meta-Analytic Codes							
Social RM	**Occupational RM**	**Organizational RM**	**Ideological RM**	**Affective Commitment**	**Continuance Commitment**	**Normative Commitment**	**Intent to Stay**
Supervisor/Peer Interaction	Professional Development	Salary	Cultural Fit	Job/Work Satisfaction#	Relational Investment	Personal Commitment to the Organization	Intent to Stay
Intra-Organization Communication	Training	Benefits	Social Responsibility	Organization/Unit Satisfaction#	Transfer / Switching Costs	Links to Organization / Community	Retention
Perceived Supervisor Support	Role Ambiguity*	Work Practices & Policies	Standards/Goals	Organizational Commitment^	Dependence	Insider Status	Intent to Remain
Peer Cohesion	Role Conflict*	Organizational Justice	Perceived Contribution/Meaningfulness	Attitudinal Commitment	Perceived Lack of Job Alternatives	Subjective Norms	Reenlistment
Interpersonal Relationships	Work Overload*	Perceived Organizational Support	Involvement		Professional / Personal Benefit		Propensity to Remain
Relationship Capital	Perceived Under/Over Employment*	Ability to Grow Within the Organization	Organization Credibility				Turnover*
Social Benefits	Empowerment	Promotions	P-O Fit				Intent to Leave*
Satis with Coworkers/Leadership	Job Control	Organizational Honesty	Organization Prestige/Referent/Reputation				
Interpersonal Trust	Self-Efficacy	Work-Family Balance	Community Fit				
Bonding	Skills Development	Work Environment	Belief/Calling				
Organizational Citizenship Behaviors Aimed at Fellow Employees	Competence	Organizational Citizenship Behaviors Aimed at the Organization	Similarity				
Psychological Support	Learning Opportunities	Trust in Organization	Norms				
Interaction Opportunities	Decision Participation	Equity	Embeddedness				
Familiarity/Humor Among Coworkers	P-J Fit		Identity/Self-Esteem/Pride				
	Career Support		Lifestyle				

*Negatively scored

^ In most of the studies, a generalized notion of "organizational commitment" was used. Reviewing the measurement scales showed that the concept being measured was affective commitment.

In many of the studies, the satisfaction measurement scales asked similar questions to those of the commitment scales. For instance, respondents were asked to rate on a Likert-type scale, "I would like to stay with this organization" or "I would like to stay in this job." These measures are very similar to those of the affective commitment scale from Meyer & Allen (1991), therefore they were coded as affective commitment.

Table 2.6 – Meta-Analytic Codes

2.4.5 Meta-Analytic Calculations

Prior to performing meta-analytic calculations, I screened the data for outlying observations using Huffcutt and Arthur's sample-adjusted meta-analytic deviancy (SAMD) statistic (1995). This method computes the difference between the primary study's effect size and the overall mean sample-weighted effect size without the study included. Because this method takes sample size into account, it is more appropriate than other methods (e.g., schematic plots) (Geyskens, Krishnan, Steenkamp, & Cunha, 2009). Overall, the model that excluded outlying observations fit the data worse than the model that included all observations; therefore I chose to keep all observations. Appendix A provides results for the model without outlying observations.

The RBNL (Raju, Burke, Normand, & Langlois, 1991) meta-analytic procedure was used to arrive at the correlations used in the SEM analysis. This procedure corrects for errors caused by artifacts[16] *by using sample-based data* as opposed to using hypothetical artifact distributions, which may or may not match the true, or population, distributions of the artifacts. Using sample-based artifact errors, appropriate standard errors are estimated and used to correct correlations. As in Christian et al. (2011), the Burke and Landis (2003) equation to estimate the standard error of the mean corrected correlation was used, which provides more accurate Type I error rates and confidence intervals because it assumes a random-effects (vice a fixed-effects) model (e.g., Overton, 1998; Erez, Bloom, & Wells, 1996). I also report confidence intervals of the corrected mean correlation to estimate the variability of the correlation due to sampling error;[17] and credibility intervals, which indicate the extent that individual correlations varied across studies (Hunter & Schmidt, 2004). Credibility intervals that do not include zero suggest good generalizability of the results, such that the direction of the meta-analytic correlation remains the same for a wide variety of samples. Wide credibility intervals suggest that a moderator of the main effects may exist, whereas narrow credibility intervals suggest that the effect does not vary across contexts (Taras et al., 2010).

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[16]Dichotomization was corrected using split information provided in the primary studies and the following formula from Hunter and Schmidt (2004): $\rho_o = a\rho$, where ρ_o is the observed (attenuated) population correlation, *a* marks the extremeness of the dichotomization split (or quantitative measurement of the attenuation), and ρ is the true population correlation.

[17]Sampling error is corrected for using frequency-weighted correlations and variances. The formulas for calculating these corrections are embedded in the meta-analytic spreadsheet, and follow the simple equations described by Hunter and Schmidt (2004): corrected mean correlation is $\bar{r} = \frac{\Sigma[N_i r_i]}{\Sigma N_i}$ where r_i is the correlation in study i and N_i is the sample size of study i; and the frequency-weighted average squared error is $s_r^2 = \frac{\Sigma[N_i(r_i-\bar{r})^2]}{\Sigma N}$.

All meta-analyses were performed using a spreadsheet encoded with the equations presented in Raju et al. (1991).[18] To use the spreadsheet, the researcher must first fill in any missing reliabilities in their effects database (i.e., blank spaces where empirical studies did not report coefficient alphas or other measures of reliability).[19] Once all the blank spaces are filled, the researcher simply sorts the data to align the effect sizes to be meta-analyzed. For example, to meta-analyze the relationship between social RM and affective commitment, I sorted the database of effects (harvested from the empirical studies) to align all the effects that concern only those two constructs. From there, I input the correlations, sample sizes, and reliabilities of each construct (r_{xx} and r_{yy}) into the meta-analytical spreadsheet. Through the encoded equations, the spreadsheet returns the total number of effects examined (k), the total sample size (N), the mean uncorrected correlation (Mr), the standard deviation of the mean uncorrected correlation (SDr), the mean corrected correlation (Mρ), the standard error of the mean corrected correlation ($SE_{M\rho}$), the lower and upper confidence intervals for the mean corrected correlation (I used 95%, however the spreadsheet can be adjusted to the researcher's preference), the standard deviation of the estimated corrected correlations (SD_{ρ}), and the lower and upper credibility intervals for the mean corrected correlation (which I set at 80%, to be adjusted based on the researcher's preference). This process was performed 28 times to capture the corrected correlations between all eight constructs.[20] In short, the spreadsheet is a powerful meta-analytic tool, as it rather easily corrects correlations for artifacts and computes the necessary meta-analytical statistics.

2.4.6 Moderator Analyses

I checked for potential moderators in four main categories: (1) average age of the respondents; (2) gender of the respondents; and (3) Hofstede's cultural dimensions of (a) individualism v. collectivism, (b) power distance, (c) uncertainty avoidance, (d) masculinity v. femininity, and (e) long- v. short-term orientation; and (4) commitment scale used in the empirical study. The age and gender of the

[18] Thanks to Mike Christian (Organizational Behavior Department, Kenan-Flagler Business School, University of North Carolina) for kindly offering this spreadsheet and for taking time to explain how it works.

[19] Where reliability information was not reported, I estimated it using the mean sample-size weighted estimate of internal consistency.

[20] This process was repeated for each group involved in each of the moderator analyses (for a total of 504 mean corrected correlations) in order to capture the corrected correlations associated with each moderator group. The correlations for each moderator are presented in Appendix B.

respondents and the type of commitment scale used were collected from the empirical studies. I used the country from which the sample was collected to assign scores for Hofstede's dimensions.[21]

Evidence of potential moderation was examined using the percentage of variance in the correlations accounted for by artifacts. Moderation is typically present if less than 75% of the variance is accounted for when artifacts are taken into account (Geyskens, Krishnan, Steenkamp, & Cunha, 2009; Hunter & Schmidt, 1990).[22] As noted by Colquitt et al. (2001), this rule only implies the existence of a moderator, it does not indicate which variable(s) is (are) acting as moderators. The variance attributed to artifacts was below 75% for all 28 correlations, therefore I checked for moderation by performing weighted least squares multiple regression analyses for each of the paths in the model (a total of 10 analyses). First, each effect size (r) was transformed to Fisher's *z* using the formula $z = .5\ln\frac{(1+r)}{(1-r)}$. Then, each effect was weighted by the inverse of its sample error variance, $weight = \frac{1}{SE^2}$ where $se = \frac{1}{\sqrt{n-3}}$ for z-transformed correlations. I regressed the individual, z-transformed effect size (*r*) on the potential moderators simultaneously. Those variables with statistically significant regression weights moderate the z-transformed effect size (*r*) (Geyskens, Krishnan, Steenkamp, & Cunha, 2009; Hunter & Schmidt, 2004).

2.5 Results

2.5.1 Descriptive Information & Meta-Analytic Results

Table 2.7 provides sample-weighted mean reliability coefficients for each construct in the analysis. Table 2.8 provides specific meta-analytic findings for each construct pair. A corrected mean correlation (*Mρ*) is statistically significant at p<.05 if its 95% confidence interval does not include zero. One correlation included zero (OCCUP-NCOMMIT, in italics below), and is therefore not significant at p<.05. The results, presented in Table 2.8, show that most of the credibility intervals are quite wide, and many include zero, which suggests the presence of moderators. The corrected mean correlations (*Mρ*) are used to build the input correlation matrix for the SEM.

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[21] I gathered Hofstede's score for each cultural dimension in each country using his very user-friendly website, The Hofstede Centre: http://geert-hofstede.com/.

[22] In studies where range restriction is not corrected, Hom, Caranikas-Walker, Prussia, & Griffeth (1992) and Mathieu & Zajac (1990) suggest looking for the presence of moderators if less than 60% of the variance is accounted for.

Sample-Weighted Mean Reliabilities			
Construct	***k***	**N**	**Mean Reliability Estimate**
Social Relationship Marketing	93	45,072	.855
Occupational Relationship Marketing	81	38,783	.802
Organizational Relationship Marketing	144	83,323	.882
Ideological Relationship Marketing	61	28,480	.809
Affective Commitment	152	87,762	.848
Continuance Commitment	51	28,124	.810
Normative Commitment	52	19,829	.805
Intent to Stay	181	119,159	.888

Table 2.7 – Sample-Weighted Mean Reliabilities

Construct Correlations	k	N	Mr	SDr	Mρ	$SE_{M\rho}$	95% Conf Interval L	95% Conf Interval U	SDρ	80% Cred Interval L	80% Cred Interval U	% Due to Artifacts
SOCIAL-OCCUP	110	59,196	.25	.30	**.30**	.03	.24	.36	.30	-.09	.69	2.3%
SOCIAL-ORG	172	85,128	.35	.35	**.42**	.03	.36	.47	.35	-.04	.87	1.6%
SOCIAL-IDEOL	67	31,037	.34	.28	**.41**	.03	.34	.48	.28	.05	.77	3.0%
SOCIAL-ACOMMIT	103	47,091	.33	.21	**.40**	.02	.36	.44	.21	.12	.67	5.3%
SOCIAL-CCOMMIT	22	12,908	.26	.26	**.28**	.06	.18	.39	.26	-.05	.62	3.6%
SOCIAL-NCOMMIT	23	10,242	.24	.19	**.29**	.04	.21	.37	.19	.05	.54	7.9%
SOCIAL-INTSTAY	158	61,699	.16	.19	**.19**	.02	.16	.21	.19	-.06	.43	8.6%
OCCUP-ORG	216	131,168	.38	.34	**.45**	.02	.40	.49	.34	.01	.89	1.4%
OCCUP-IDEOL	59	30,774	.31	.34	**.38**	.04	.29	.46	.34	-.06	.81	1.8%
OCCUP-ACOMMIT	99	69,256	.28	.25	**.35**	.03	.30	.40	.25	.02	.67	2.5%
OCCUP-CCOMMIT	24	14,840	.21	.27	**.26**	.05	.15	.37	.27	-.08	.61	3.1%
OCCUP-NCOMMIT	23	8,017	.10	.43	***.12***	.09	*-.05*	*.30*	.43	-.42	.67	1.9%
OCCUP-INTSTAY	133	76,472	.15	.20	**.18**	.02	.15	.21	.20	-.08	.44	4.9%
ORG-IDEOL	86	50,534	.39	.35	**.46**	.04	.38	.53	.35	.01	.91	1.4%
ORG-ACOMMIT	227	147,458	.28	.28	**.33**	.02	.29	.36	.28	-.03	.69	1.9%
ORG-CCOMMIT	57	22,134	.19	.29	**.22**	.04	.14	.29	.29	-.15	.59	4.0%
ORG-NCOMMIT	49	16,913	.22	.23	**.25**	.03	.19	.32	.23	-.04	.55	6.9%
ORG-INTSTAY	282	173,684	.15	.22	**.18**	.01	.15	.20	.22	-.10	.46	3.7%
IDEOL-ACOMMIT	67	31,829	.45	.28	**.55**	.03	.48	.62	.28	.18	.91	2.1%
IDEOL-CCOMMIT	22	6,217	.20	.25	**.23**	.05	.12	.33	.25	-.09	.55	6.7%
IDEOL-NCOMMIT	16	5,934	.29	.27	**.38**	.07	.25	.51	.27	.04	.72	4.4%
IDEOL-INTSTAY	82	34,581	.14	.28	**.16**	.03	.10	.22	.28	-.20	.52	3.3%
ACOMMIT-CCOMMIT	84	40,673	.19	.27	**.24**	.03	.18	.29	.27	-.10	.58	3.8%
ACOMMIT-NCOMMIT	46	15,570	.49	.22	**.59**	.03	.53	.65	.22	.32	.87	5.0%
ACOMMIT-INTSTAY	228	167,035	.33	.28	**.38**	.02	.35	.42	.28	.02	.36	1.6%
CCOMMIT-NCOMMIT	46	16,030	.14	.23	**.18**	.03	.11	.25	.23	-.12	.48	7.0%
CCOMMIT-INTSTAY	89	47,713	.16	.26	**.19**	.03	.14	.25	.26	-.14	.53	3.3%
NCOMMIT-INTSTAY	68	23,523	.26	.26	**.31**	.03	.24	.37	.26	-.03	.64	4.6%

k = number of effect sizes included in each analysis, N = sample size, Mr = mean uncorrected correlation, SDr = standard deviation of uncorrected correlation, Mρ = mean corrected correlation (corrected for unreliability in each variable), $SE_{M\rho}$ = standard error of Mρ, 95% Conf Interval = confidence interval for Mρ, SDρ = standard deviation of estimated ρ's, 80% Cred Interval = credibility interval of Mρ.

Table 2.8 – Meta-Analytic Results

2.5.1.1 Relationship Marketing Factors

Table 2.8 clearly shows that all the RM factors are positively related to each of the components of commitment (with the exception of occupational RM and normative commitment, as noted above); and with the outcome variable, intent to stay. All of the correlations between the RM factors are also positive.

2.5.1.2 Commitment Components

Each of the commitment components are positively correlated with the outcome variable, intent to stay, and are also positively correlated with each other. The correlation between affective commitment and normative commitment is similar to that of Meyer and Allen (1991), who find a high degree of correlation (.51) between the two constructs. The meta-analytic results show an uncorrected correlation of .49, and a correlation of .59 after correcting for artifacts.

<u>2.5.2 Meta-Analytic Correlations</u>

Next, I built the meta-analyzed correlation matrix and use SEM to test the models. The meta-analytic correlation matrix contains corrected correlations between each of the eight variables in the analysis. Table 2.9 presents the correlations between the variables, a total of 28 correlations. As recommended by Landis (2013) and Viswesvaran and Ones (1995), I computed the harmonic mean (N_h = 239)[23] to use for the SEM.

[23]Total N = 1,438,606, simple average sample size = 541.

Construct	SOCIAL Mr,**Mρ** (95% CI)	SOCIAL SDρ ($SE_{M\rho}$)	OCCUP Mr,**Mρ** (95% CI)	OCCUP SDρ ($SE_{M\rho}$)	ORG Mr,**Mρ** (95% CI)	ORG SDρ ($SE_{M\rho}$)	IDEOL Mr,**Mρ** (95% CI)	IDEOL SDρ ($SE_{M\rho}$)	ACOMMIT Mr,**Mρ** (95% CI)	ACOMMIT SDρ ($SE_{M\rho}$)	CCOMMIT Mr,**Mρ** (95% CI)	CCOMMIT SDρ ($SE_{M\rho}$)	NCOMMIT Mr,**Mρ** (95% CI)	NCOMMIT SDρ ($SE_{M\rho}$)
SOCIAL	---													
k, N														
OCCUP	.25, **.30**	.30	---											
	(.24, .36)	(.03)												
k, N	110	59,196												
ORG	.35, **.42**	.35	.38, **.45**	.34	---									
	(.36, .47)	(.03)	(.40, .49)	(.02)										
k, N	172	85,128	216	131,168										
IDEOL	.34, **.41**	.28	.31, **.34**	.34	.39, **.46**	.35	---							
	(.34, .48)	(.03)	(.29, .46)	(.04)	(.38, .53)	(.04)								
k, N	67	31,037	59	30,774	86	50,534								
ACOMMIT	.33, **.40**	.21	.28, **.35**	.25	.28, **.33**	.28	.45, **.55**	.28	---					
	(.36, .44)	(.02)	(.30, .40)	(.03)	(.29, .36)	(.02)	(.48, .62)	(.03)						
k, N	103	47,091	99	69,256	227	147,458	67	31,829						
CCOMMIT	.26, **.28**	.26	.21, **.26**	.27	.19, **.22**	.28	.20, **.23**	.25	.19, **.24**	.27	---			
	(.18, .39)	(.06)	(.15, .37)	(.05)	(.14, .29)	(.04)	(.12, .33)	(.05)	(.18, .29)	(.03)				
k, N	22	12,908	24	14,840	57	22,134	22	6,217	84	40,673				
NCOMMIT	.24, **.29**	.19	.10, **.12**	.43	.22, **.25**	.23	.29, **.38**	.27	.49, **.59**	.22	.14, **.18**	.23	---	
	(.21, .37)	(.04)	(-.05, .30)	(.09)	(.19, .32)	(.03)	(.25, .51)	(.07)	(.53, .65)	(.03)	(.11, .25)	(.03)		
k, N	23	10,242	23	8,017	49	16,913	16	5,934	46	15,570	46	16,030		
INTSTAY	.16, **.19**	.19	.15, **.18**	.20	.15, **.18**	.22	.14, **.16**	.28	.33, **.38**	.28	.16, **.19**	.26	.26, **.31**	.26
	(.16, .21)	(.02)	(.15, .21)	(.02)	(.15, .20)	(.01)	(.10, .22)	(.03)	(.35, .42)	(.02)	(.14, .25)	(.03)	(.24, .37)	(.03)
k, N	158	61,699	133	76,472	282	173,684	82	34,581	228	167,035	89	47,713	68	23,523

Table 2.9 – Meta-Analyzed Correlations for SEM

2.5.3 SEM Results

SEM analyses were performed using Stata version 12.1. I evaluated the fit of the model using the comparative fit index (CFI), the root mean squared residual (RMSR), and the root mean square error of approximation (RMSEA).[24] The CFI compares the model being tested to the null model. The fit is typically considered to good if CFI >.90. The RMSR is the "standardized difference between the observed correlation and the predicted correlation" (Kenny, 2014, no page). A value of .08 or less is typically considered good fit (Hu & Bentler, 1999). The RMSEA is a popular measure of model fit and is based on the non-centrality parameter. It works particularly well for large samples, as is the case with these models. A value of .01 is considered excellent fit, .05 is considered good fit, and .08 is considered mediocre fit, however some consider .10 to be the cutoff for decent fit (Kenny, 2014; MacCallum et al., 1996). Because I make directional hypotheses, I use one-tailed tests of significance for each hypothesized path. Finally, I report standardized coefficients, however the unstandardized results can be found in Appendix C.

The model is shown in Figure 2.4. The RM factors (SOCIAL, OCCUP, ORG, and IDEOL) are exogenous variables which are allowed to correlate, the components of commitment (ACOMMIT, CCOMMIT, and NCOMMIT) are endogenous variables, and intent to stay (INTSTAY) is the outcome variable. The error variances of affective and normative commitment are allowed to covary, as suggested by the modification index of a previous model that omitted the relationship.[25] Very good fit, as is achieved here, suggests that this model is a good representation of the role RM plays in employee commitment and intent to stay (χ^2 (11) = 13.31, p=.274; CFI = .995; RMSR = .03; RMSEA = .03).

[24] Reliability estimates for each of the factors were included in the estimation.

[25] Allowing the error variances of the constructs to correlate significantly improves model fit, however the modest percentage of total variance captured by the constructs (conversely, the large percentage of total variance captured by the errors) suggests there are missing variables not specified in the model. I will revisit this issue in future research.

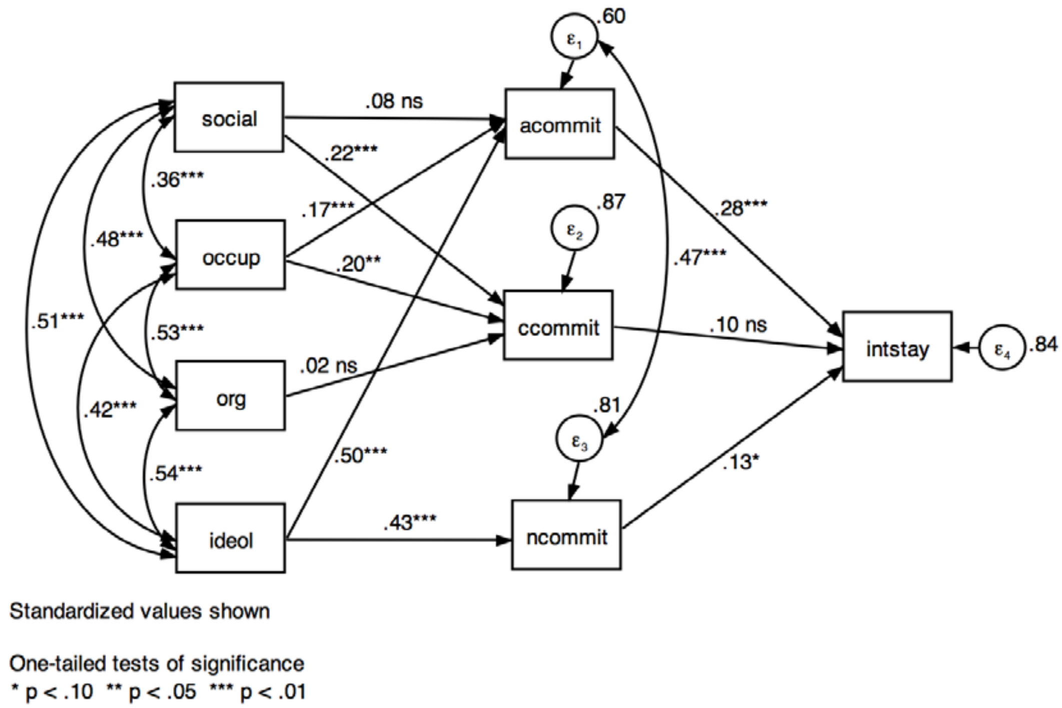


Figure 2.4 –Model Results

2.5.3.1 Effects of Commitment on Intent to Stay

Examining the model, I find some interesting results. The paths between the three components of commitment and the outcome variable, intent to stay, are all positive, but the relationship between continuance commitment and intent to stay is not significant. Therefore, H1a is only partially supported. Further, I find support for H1b, which predicted that affective commitment would have the largest effect on intent to stay (β_{41} = .28, p<.01), followed by normative commitment (β_{43} = .13, p<.10), and finally continuance commitment (β_{42} = .10 ns). T-tests show that the effect of affective commitment on intent to stay (β_{41}) is significantly different from the effect of continuance commitment on intent to stay (β_{42}) (t = 1.78, p<.05 one-tailed), but that the effect of affective commitment on intent to stay (β_{41}) is not significantly different from the effect of normative commitment on intent to stay (β_{43}) (t = 1.21, ns), and that the effect of continuance commitment on intent to stay (β_{42}) is not significantly different from the effect of normative commitment on intent to stay (β_{43}) (t = .27, ns).[26]

[26] The t-tests were performed using the equation $\cong t_{(N-1)} = \frac{\beta_1-\beta_2}{\sqrt{var(\beta_{1)}+var(\beta_{2)}-2cov(\beta_1\beta_{2)}}}$. See Appendix D for the covariance matrix of the coefficients of the full SEM model.

2.5.3.2 Effects of RM Factors on Commitment

Interestingly, I find that, counter to H2a, social RM is not significantly related to affective commitment (γ_{11} = .08, ns). H2b hypothesized that social RM was positively related to continuance commitment, which is supported (γ_{21} = .22, p<.01). A t-test confirms the two results are significantly different (t = 1.46, p < .10).[27]

H3a and H3b hypothesized that occupational RM was positively related to continuance and affective commitment, respectively. The results support these hypotheses (γ_{22} = .20, p<.05 and γ_{12} = .17, p<.01), however a t-test confirms the parameters are not significantly different from each other (t = .34, ns).

Turning to the hypothesis associated with organizational RM, I predicted in H4 that organizational RM is positively related to continuance commitment, however this relationship is not statistically significant (γ_{23} = .02, ns). Thus, H4 is not supported.[28]

Finally, H5a predicted that ideological RM is positively related to normative commitment, while H5b predicted that ideological RM is positively related to affective commitment. The results support these hypotheses, as both relationships are positive and significant (γ_{34} = .43, p<.01 and γ_{14} = .50, p<.01, respectively). A t-test shows these path parameters are significantly different from each other (t = 1.29, p<.10, one-tailed).

2.5.3.3 Effects of RM Factors on Intent to Stay

Hypotheses H6a through H6d predicted that all of the RM factors would be positively related to the outcome variable, intent to stay. The total effects for these variables are positive, but not significant (γ_{41} = .08, ns; γ_{42} = .14, ns; γ_{43} = .08, ns; and γ_{44} = .05, ns). Therefore H6a through H6d are not supported. These results set the stage for testing the mediated paths between each RM factor and intent to stay.

[27]The t-tests were performed using the equation $\cong t_{(N-1)} = \frac{\gamma_1-\gamma_2}{\sqrt{var(\gamma_1)+var(\gamma_2)-2cov(\gamma_1\gamma_2)}}$.

[28]Even when the paths are freed between organizational RM and affective commitment and organizational RM and normative commitment, none of the relationships are significant. This suggests that organizational RM may not be a valid predictor of employee commitment and retention. This may be because my conceptualization and operationalization of organization RM contains a myriad of different economic and non-economic policies and practices. Perhaps a more specific notion of organizational RM, one where economic and non-economic facets are broken down into individual factors, would be more appropriate and lead to better results.

2.5.4 Mediation Effects of Commitment

In the mediation analyses, I test whether the commitment mediators found in the full model mediate the relationships between the RM factors and intent to stay. Specifically, I add the highlighted paths presented in Figure 2.5.

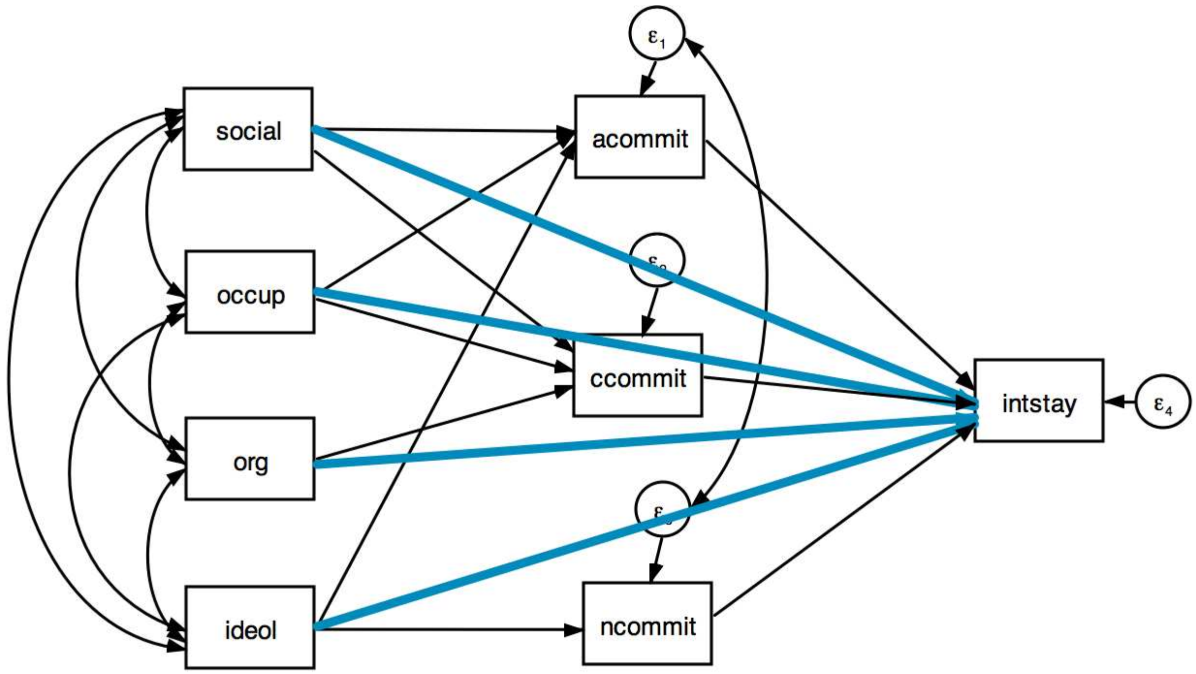


Figure 2.5 – Mediation Model

Following Baron and Kenny (1986), Table 2.10 clearly shows that, for social and occupational RM, the direct effects have been reduced to zero and that the indirect effects are significant. This means that the commitment factors completely mediate the effects of the RM factors on intent to stay for social and occupational RM. For organizational RM, neither the direct nor indirect effects are significant, thus no mediation exists. Finally, for ideological RM, both the direct and the indirect effect are significant, however the direct effect is opposite in sign from the indirect effect. This is referred to as *inconsistent mediation* by MacKinnon, Fairchild, and Fritz (2007), and is a case where the mediators (normative and affective commitment) are acting as suppressor variables on the relationship between ideological RM and intent to stay. Essentially, the direct and indirect effects are canceling each other out, leading to a rather small total effect. The authors note that this is especially prevalent when multiple mediators are used, as is the case in this model. This inconsistent mediation suggests that employees whose ideologies/goals/values do not align well with the organization may be swayed to stay with the organization out of a sense of moral obligation, or feeling that they *ought to* stay, or even a desire to stay, likely for other desirable reasons (e.g., to maintain workplace social relationships, to improve professionally, etc.). In short, H7a and H7b are fully supported, H7c is not supported, and H7d is partially supported, as partial mediation is present.

Mediation Results – Full Model					
		Direct Effect	Sig	Indirect Effect	Sig
Intent to Stay	Social RM	.032	ns	.049	*
	Occupational RM	.062	ns	.080	**
	Organizational RM	.077	ns	.002	ns
	Ideological RM	-.203	*	.250	***

Table 2.10 – Mediation Results – Full Model

2.5.4.1 Piecemeal Mediation Effects: Ideological RM on Intent to Stay

Because of the contradictory effect of ideological RM, I drill deeper into Figure 2.5 and perform a supplementary analysis to determine exactly *how* the effects play out when they are isolated from the complete model. I feel this simplifies the analyses and makes understanding the effects clearer. I test two models: (1) a total effects model, which associates the RM factor directly to the outcome variable, and (2) an indirect effects model, which incorporates the commitment components.

Figures 2.6 and 2.7 show the direct and indirect effects of ideological RM on intent to stay. As in the complete model, I allow the affective and normative commitment errors to covary. In Figure 2.7, the model is just identified, therefore no fit information is available. The total path between ideological RM and intent to stay is .18 ($p<.05$). The direct effect between ideological RM and intent to stay has been dramatically reduced, to the point of non-significance (-.081, ns). Here again, this is the result of inconsistent mediation (suppression), whereby the direct effect has changed from a positive value to a negative value with the addition of the mediator variables. The indirect effect is significant (indirect effect = .241, $p<.01$), however, these results should be interpreted with caution, as they were derived out of the context of the full model.

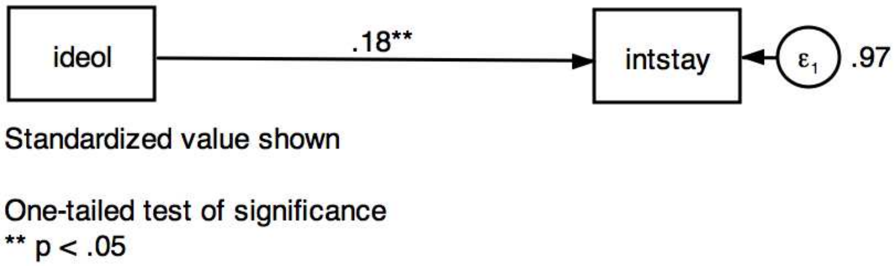
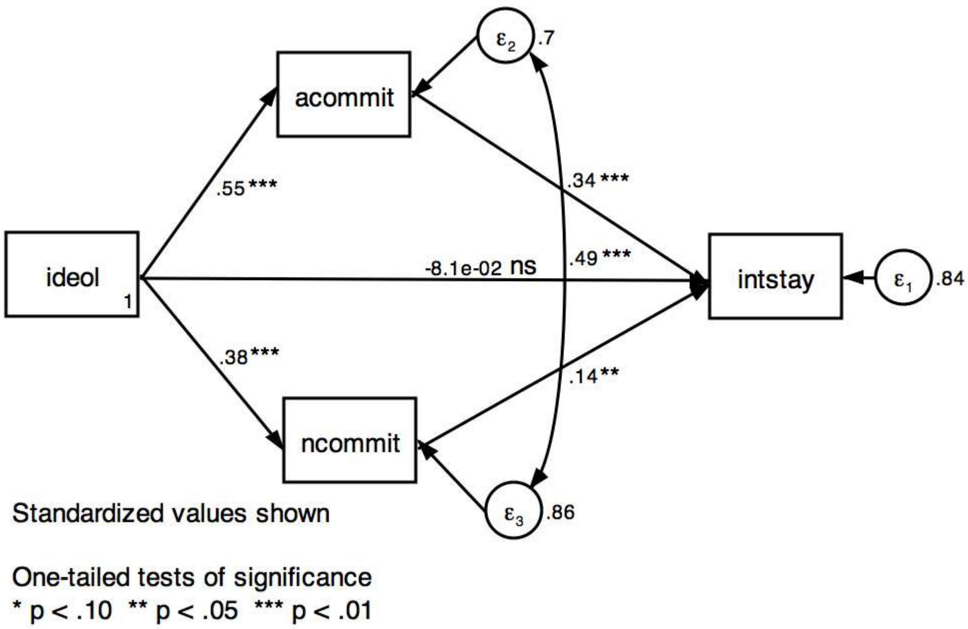


Figure 2.6 – Total Effect of Ideological RM on Intent to Stay



Model Fit:
Model just identified.

Figure 2.7 – Direct and Indirect Effects of Ideological RM on Intent to Stay

2.5.4.2 Summary of Results

Overall, I found full support for 8 of my hypotheses, partial support for 2 of my hypotheses, and no support for 7 of my hypotheses. Table 2.11 provides a summarized version of the hypotheses and their results.

Summary of Results		
H#	**Hypothesis**	**Supported?**
H1a	Affective, continuance, and normative commitment have a positive effect on intent to stay.	Partially
H1b	Affective commitment has a larger effect on intent to stay than normative commitment, normative commitment has a larger effect on intent to stay than continuance commitment (AC > NC > CC → Intent to Stay).	Yes
H2a	Social RM is positively related to affective commitment.	No
H2b	Social RM is positively related to continuance commitment.	Yes
H3a	Occupational RM is positively related to continuance commitment.	Yes
H3b	Occupational RM is positively related to affective commitment.	Yes
H4	Organizational RM is positively related to continuance commitment.	No
H5a	Ideological RM is positively related to normative commitment.	Yes
H5b	Ideological RM is positively related to affective commitment.	Yes
H6a	Social RM is positively related to intent to stay.	No
H6b	Occupational RM is positively related to intent to stay.	No
H6c	Organizational RM is positively related to intent to stay.	No
H6d	Ideological RM is positively related to intent to stay.	No
H7a	The relationship between social RM and intent to stay is mediated by affective and continuance commitment.	Yes
H7b	The relationship between occupational RM and intent to stay is mediated by affective and continuance commitment.	Yes
H7c	The relationship between organizational RM and intent to stay is mediated by continuance commitment.	No
H7d	The relationship between ideological RM and intent to stay is mediated by affective and normative commitment.	Partially

Table 2.11 – Summary of Results

2.5.5 Moderator Analyses

To look for the presence of moderators, I performed ten weighted least squares regressions, one for each structural path in the model.[29] Specifically, I regressed the z-transformed effect-level correlations on the individual scores of each of the potential moderating variables: (1) respondents' age (mean age of the respondents in the empirical study); (2) respondents' gender (measured by the percentage of males in the empirical study); (3) Hofstede's score for the respondents' country on (a) individualism v. collectivism, (b) power distance, (c) uncertainty avoidance, (d) masculinity v. femininity, and (e) long- v. short-term orientation; and (4) type of commitment scale used in the study (1 = Meyer & Allen (1991), 2 = Mowday, Steers, and Porter (1979), and 3 = other)[30]. I used the equation:

$$\begin{aligned} z_{r_{xy}} = {} & a_0 + b_1 Mean\ Age + b_2 Gender + b_3 Individualism\ v.Collectivism + b_4 Power\ Distance \\ & + b_5 UncertaintyA\ voidance\ + b_6 Masculinity\ v.Femininity \\ & + b_7 Long\ v.Short\ Term\ Orientation\ + b_8 MSP\ Scale\ Dummy + b_9 Other\ Scale\ Dummy \end{aligned}$$

The basic descriptive statistics for each moderator variable are given in Appendix E, while the results of the moderator analyses are provided in Table 2.12. It is important to note that the age and gender variables were not available in each empirical study. Because of these missing variables, listwise deletion reduced the number of effect sizes (k) dramatically for some of the structural paths. Therefore, I performed the analyses twice—once with the age and gender variables, and once without. Removing age and gender altered the results for 10 structural paths, as the results in Appendix E demonstrate. Higher instances of moderation occurred with the age and gender variables included, therefore I discuss the results of the first analysis only.

A brief explanation of Table 2.12: only significant results are provided, "—" indicates non-significant results. Significant results list both the t-value (in parentheses) and the effect size [in brackets]. I use Cohen's d for effect size, where .10 is considered a small effect size, .30 is considered a medium effect size, and .50 is considered a large effect size (Cohen, 1988). In each instance of moderation, the coefficient shows the direction and magnitude that the z-transformed correlation changes

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[29] Weight used was the inverse of each effect's sample error variance $weight = \frac{1}{SE^2}$ where $se = \frac{1}{\sqrt{n-3}}$.

[30] I chose to omit Meyer & Allen (1991) in order to use it as a comparison for both the Mowday, Steers, and Porter (1979) scale and the "other" scales.

with a one unit increase in the moderator variable. For instance, for each year increase in average age, the z-transformed correlation between occupational RM and affective commitment increases by .02 ($p<.10$), which is a medium effect size of .61. Next, I provide the results for each moderator variable.

Moderator Results										
	Moderator Variables								Total # of Effect Sizes (k) Available (k after Listwise Deletion)	Adj. R^2
Structural Relationship	Age *(b1)*	Gender[a] *(b2)*	Indiv v. Collect *(b3)*	Power Distance *(b4)*	Uncertainty Avoidance *(b5)*	Masc v.Fem *(b6)*	Long- v. Short-Term Orientation *(b7)*	Commit Scale[b] *(b8-b9)*		
SOCIAL-ACOMMIT	--	**-.00***** (-2.84) [.80]	--	--	--	--	--	--	103 (60)	.04
SOCIAL-CCOMMIT	--	--	Omitted	Omitted	Omitted	--	Omitted	Omitted	21 (8)	--
OCCUP-ACOMMIT	**.02*** (1.99) [.61]	--	--	--	--	--	--	**-.32**c** (-2.32) [.71]	99 (53)	.09
OCCUP-CCOMMIT	--	--	Omitted	Omitted	Omitted	--	Omitted	Omitted	24 (5)	--
ORG-CCOMMIT	--	--	Omitted	Omitted	**-.01**** (-2.04) [.76]	Omitted	Omitted	**.48*d** (1.83) [.68]	57 (39)	.09
IDEOL-ACOMMIT	**.03**** (2.56) [1.14]	**.01*** (1.89) [.85]	**.02*** (1.73) [.77]	**.03*** (2.02) [.90]	**.11***** (4.90) [2.19]	**.15***** (5.32) [2.38]	**.03***** (3.77) [1.69]	**-.37*c** (-2.01) [.90]	67 (30)	.64
IDEOL-NCOMMIT	--	**.01*** (1.90) [1.90]	Omitted	Omitted	--	Omitted	--	--	16 (14)	--
ACOMMIT-INTSTAY	--	--	**-.01***** (-2.77) [.47]	**-.01**** (-2.30) [.39]	--	--	--	**-.18*c** (-1.89) [.32]	228 (151)	.07
CCOMMIT-INTSTAY	--	--	--	--	--	--	--	--	89 (60)	.02
NCOMMIT-INTSTAY	--	--	**-.03**** (-2.04) [.62]	Omitted	--	--	**-.03**** (-2.40) [.73]	--	68 (53)	.13

* p<.10 ** p<.05 *** p<.01; (t-value) [effect size r, Cohen's d]; a – based on % of males in the study, higher value = more males b – Omitted (comparison) scale is Meyer & Allen (1991) c – Significant difference between Meyer & Allen (1991) and Mowday et al. (1979) d – Significant difference between Meyer & Allen (1991) and "Other" scales

Table 2.12 – Moderator Results

2.5.5.1 Age of Respondents

For the age of the respondents, the average age of each sample was analyzed. Age moderates the relationship between occupational RM and affective commitment and ideological RM and affective commitment such that older workers experience a stronger affective commitment from their occupational roles and value congruency than younger workers do (b_1=.02, p<.10, d=.61; b_1=.03, p<.05, d=1.14). This means that for every year increase in mean age, the z-transformed correlation between occupational RM and affective commitment increases by .02 and the z-transformed correlation between ideological RM and affective commitment increases by .03. This may be because older workers have presumably spent more time in their job roles and have had a longer time to establish an ideological connection, thus they feel more emotionally connected to their organization.

2.5.5.2 Gender of Respondents

For the gender of the respondents, the percentage of males in the sample population was analyzed.[31] The results show that gender moderates the relationship between social RM and affective commitment (b_2=-.003, p<.01, d =.80) such that females experience a stronger emotional connection to the organization through the social relationships developed in the workplace. For every one percent increase of males in the sample, the z-transformed correlation between social RM and affective commitment decreases by .003.

Males, on the other hand, experience stronger emotional and normative commitment to the organization through their congruent ideas, values, and beliefs (i.e., the relationship between ideological RM and affective commitment is moderated at b_2=.01, p<.10, d =.85; and the relationship between ideological RM and normative commitment is moderated at b_2=.01, p<.10, d =1.90). The z-transformed correlations between ideological RM and affective commitment and ideological RM and normative commitment both increase by .01 for every one percent increase of males in the sample. This suggests that congruency between personal goals and values and the goals and values of the organization affects male workers' sense of emotional and moral obligation more than female workers'.

[31]Higher percentage = more males in the study sample.

2.5.5.3 Hofstede's Cultural Dimensions

2.5.5.3.1 Individualism v. Collectivism

Individualism v. collectivism moderated three relationships in the model. The results suggest that workers from more individualistic countries have less of a connection between their emotional (affective commitment) and obligatory (normative commitment) ties to the organization and their intent to stay (b_3=-.01, p<.01, d =.47, and b_3=-.03, p<.05, d =.62, respectively). For every one-point increase on Hofstede's scale, the z-transformed correlations decrease by .01 and .03, respectively. These results make sense, as workers from individualistic countries come from more loosely knit societal frameworks and are more likely to be concerned about themselves and their immediate family than they are about their workplace or their greater social network. This "concern for self" makes developing deep commitments to an organization harder and less rewarding for workers from more individualistic countries.

In contrast, workers from more individualistic countries experience a stronger connection between ideological RM and affective commitment (b_3=.02, p<.10, d =.77). For every one-point increase in Hofstede's scale, the z-transformed correlation increases by .02. This result also makes sense, because when the employee's personal values and goals are aligned with the organization, they feel their individual needs are being met, and are thus more emotionally connected to the organization.

2.5.5.3.2 Power Distance

Power distance moderated two relationships in the model. Employees in higher power distance countries experience a stronger connection between ideological RM and affective commitment than employees in lower power distance countries (b_4=.03, p<.10, d =.90). Specifically, the z-transformed correlation is .03 higher for every one-point increase on Hofstede's scale. This may be because, in high power distance countries, workers understand and accept their position in the hierarchy and tend to work for organizations that are congruent to their status, and thus have similar values and goals that make them more emotionally attached.

In contrast, workers in high power distance countries have less connection between their emotional attachment to the organization (affective commitment) and their intent to stay (b_4=-.01, p<.05, d =.39). For every one-point increase on Hofstede's scale, the z-transformed correlation decreases by.

01. This may be because workers from high power distance countries tend to accept “what is” and therefore are less emotionally involved than their counterparts from low power distance countries (i.e., those countries that strive to equalize the distribution of power), even when it concerns the decision to stay or leave their organization.

2.5.5.3.3 Uncertainty Avoidance

Uncertainty avoidance moderated two relationships in the model. Workers from high uncertainty avoidance countries (i.e., those that are intolerant of unorthodox behavior or ideas) experience a smaller relationship between organizational RM and continuance commitment than their counterparts who maintain a more relaxed attitude (b_5=-.01, p<.05, d =.76). For every one-point increase on Hofstede’s scale, the z-transformed correlation decreases by .01. This suggests that the tangible and intangible benefits offered by the organization inspire less of a need to stay among those with high uncertainty avoidance. This may be because those with high uncertainty avoidance typically plan for all contingencies on their own, which makes them less dependent on the organization to fulfill their needs (e.g., pay and benefits, work/life balance, etc.).

In contrast, workers from high uncertainty avoidance countries experience a stronger relationship between ideological RM and affective commitment (b_5=.11, p<.01, d=2.19) than those from low uncertainty avoidance countries. For every one-point increase on Hofstede’s scale, the z-transformed correlation increases by .11. This result makes sense, as those who dislike uncertainty are more likely to ensure their goals and values align to the goals and values of the organization, thus making them more emotionally committed to the organization.

2.5.5.3.4 Masculinity v. Femininity

Masculinity v. femininity moderated one relationship in the model. Employees from more masculine countries experience a stronger relationship between ideological RM and affective commitment (b_6=.15, p<.01, d=2.38) than those from more feminine countries. For every one-point increase on Hofstede’s scale, the z-transformed correlation increases by .15. This suggests that employees from countries with more assertiveness and a penchant for competition are more likely to ensure their goals and values align to those of the organization, thus making them more emotionally committed to the organization.

2.5.5.3.5 Long-Term v. Short-Term Orientation

Finally, long- v. short-term orientation moderated two relationships in the model. For every one-point increase on Hofstede's scale, the z-transformed correlation between ideological RM and affective commitment increases by .03 (b_7=.03, p<.01, d=1.69). This suggests that employees from countries with a long-term orientation tend to choose organizations that have similar goals and values, thus increasing their emotional commitment.

In contrast, for every one point increase in Hofstede's scale, the z-transformed correlation between normative commitment and intent to stay decreases by .03 (b_7=-.03, p<.05, d=.73). This may be because employees from countries with a more long-term view feel less obligation to remain in the organization, particularly if it does not meet their long-term goals.

2.5.5.4 Scale Used to Measure Commitment

I performed analyses to examine whether or not the scale used to measure commitment affects the correlation between each of the variables. Specifically, I examined whether there were differences in the correlations of the constructs when Meyer and Allen's (1991) commitment scale was used, when Mowday, Steers, and Porter (1979) commitment scale was used, or when another commitment scale was used (i.e., commitment scales other than Meyer & Allen (1991) or Mowday, Steers, & Porter (1979)).

The results show that the type of commitment scale used moderates the relationship between occupational RM and affective commitment such that the relationship is smaller when measured by Mowday, Steers, and Porter than when it is measured by Meyer and Allen (b_8=-.34, p<.05, d =.71). This means that when the Mowday et al. scale is used, the z-transformed correlation between occupational RM and affective commitment decreases by .34. A similar relationship exists between ideological RM and affective commitment (b_8=-.37, p<.10, d =.90), such that when the Mowday et al. scale is used, the z-transformed correlation between ideological RM and affective commitment decreases by .37. Finally, the relationship between affective comment and intent to stay is smaller when measured by Mowday, Steers, and Porter than by Meyer and Allen (b_8=-.18, p<.10, d =.32), decreasing the z-transformed correlation by .18.

The relationship between organizational RM and continuance commitment is larger when measured by other commitment scales than when measured by Meyer and Allen (1991) (b_9=.48, p<.10, d =.68). The z-transformed correlation between organizational RM and continuance commitment increases by .48 when other scales are used.

No conjectures as to why the differences exist are made here, however it is particularly interesting to note that the differences between Meyer and Allen and Mowday, Steers, and Porter involve relationships with affective commitment. Studies have shown both scales to be good measures of affective commitment, therefore the differences found here may be the result of noticeable differences in occupational RM and intent to stay within the empirical studies (i.e., the variables correlated with affective commitment). Further, the changes in the z-transformed correlation are quite large, and should be verified in future moderation analyses.

2.6 Discussion

The goal of this study was to test a new, employee-focused conceptualization of RM using MA-SEM. Specifically, I sought to determine how each of the proposed RM factors affected the different components of commitment and, in turn, how the different components of commitment affected the outcome variable, intent to stay. Overall, I found that the full model fit the data quite well, which suggests it is an accurate conceptualization of how the RM factors affect employees' commitment and intent to stay.

RM is important for understanding employee retention, but the effects I found were complex and often involved commitment as a mediating variable. Social RM clearly plays a strong role in employee commitment and retention. While social RM had no effect on the emotional, or affective, commitment to the organization, it did, however, affect employee need to stay in the organization, or continuance commitment. The social capital gained by highly skilled service employees can help them flourish in their work roles and could also help propel them to new heights in the organization. Social capital increases their need to stay in the organization, as it is most valuable in the organization in which it is invested.

That is to say that while reputation and connections can be “taken” with the employee to a different organization, they may not be as powerful in the new organization as they were in the old organization. Organizations should ensure positive social experiences for all their employees, right from the start. Proper socialization workshops and processes can help quickly establish a connection to the organization and cast the organization in a positive light. From there, team-building practices or even allotting time for collaborations during the workday help maintain a positive social environment in which social capital can be built. The relationships between social and intent to stay was fully mediated by affective and continuance commitment. Clearly, social RM can strongly influence employee commitment, which, in turn, influences retention. Social connection and social capital may be particularly important for knowledge workers, who rely on reputation and connections to market their “brand” worth.

Occupational RM also plays a strong role in employee commitment and retention. It had positive effects on both affective and continuance commitment, which suggests that when it comes to their jobs, employees feel both a desire and a need to stay in the organization. In other words, to fulfill their professional goals, employees’ commitment is based on both emotional feelings about the opportunities offered by the organization and rational thoughts concerning the profession “payoff” of remaining with the organization. This highlights the importance employees place on their job tasks and opportunities for professional development. Ensuring the employee’s role and tasks are clear, balancing the proper amount of task complexity, and offering opportunities for professional development and skills enhancement are means organizations can use to increase employee commitment and intent to stay. This is particularly important for highly skilled knowledge workers in the service industry who desire challenging jobs that provide opportunities to hone their hard-won skills so they can shine in their organization. The job-products offered by the organization can serve as a means of attracting—and keeping—the best and brightest in the industry. Constantly inspiring these employees with new challenges will keep them committed to the organization. The relationship between occupational RM and intent to stay was fully mediated by affective and continuance commitment. This means that occupational RM techniques are great tools for inspiring commitment and increasing retention among highly skilled employees.

The relationship between ideological RM and intent to stay was partially mediated by affective and normative commitment. The commitment factors acted as suppressors, suggesting that employees whose ideologies/goals/values do not align well with those of the organization may be swayed to stay with the organization out of a sense of moral obligation, or even a desire to stay for other reasons. After all, ideological RM had the greatest impact on affective and normative commitment. This relationship requires further analysis to fully understand how ideological RM affects intent to stay, as one could argue that ideological congruency would be highly desired by the most talented knowledge workers. To keep highly skilled employees committed, organizations should appeal to their emotional and moral connections to the organization by consistently reminding employees how their work contributes to the greater goals and ideals of the organization.

The results of my model suggest that organizational RM may not be a valid predictor of organizational commitment or intent to stay. These results should be interpreted with great caution, as several studies have clearly shown that both economic and non-economic factors *are*, in fact, important predictors of employee retention (Ferguson & Brohaugh, 2009; D'Amato & Herzfeldt, 2008; Holtom et al., 2008; Dupre & Day, 2007; Maynard et al., 2006). It is likely that my conceptualization and operationalization of organizational RM is too varied, and contains too many disparate variables. Perhaps breaking down the factor into more distinct economic and non-economic components would provide a cleaner, more understandable picture of organizational RM's effect on commitment and intent to stay. In a future study, I will separate the components and re-estimate the relationships.

To retain talented knowledge workers, service organizations should focus on developing social, occupational, and ideological RM strategies and tools, as they have the most effect on organizational commitment and intent to stay. Developing internally focused relationships between the organization and its employees—relationships that go beyond simple human-to-human interactions and encompass the myriad of ways organizations "speak" to employees through relational signals—can help organizations win the "war for talent," and gain a talent competitive advantage.

2.6.1 Limitations

There are a couple of limitations associated with this study. First, the models are based on the author's conceptualization of the RM constructs. Others may disagree with the categorization of variables within each construct, or with the importance of the constructs in general. Second, meta-analysis inherently involves a series of informed decisions regarding which studies and which correlations to include in the meta-analytic database. While I tried at all times to be thorough and consistent when making these decisions, I recognize that other reasonable researchers may have come to different conclusions. Finally, my conceptualization of organizational RM likely encompasses too many disparate variables. I discuss how to remedy this problem in the next section.

2.6.2 Future Research Directions

Clearly, a deeper look into the variables that comprise each social, occupational, and ideological RM tool is necessary to pinpoint variables that are most important to the overall construct, and measurement scales are necessary to accurately and consistently capture the conceptual tools. Further, a closer look at organizational RM is necessary to determine how it might be made more useful for inspiring and predicting commitment and intent to stay. Perhaps breaking down the component into economic and non-economic factors (c.f., Woodruff, 2012) would enhance its usability. Finally, the model should be tested on specific jobs in specific industries, as the magnitude of importance of the RM tools might vary based on industry or type of work performed.

2.7 Conclusions

In conclusion, the goal of this research project was to understand how RM can be used to influence employees' intent to stay in an organization. I created a new, internally focused conceptualization of RM, and used MA-SEM to analyze the conceptual models. Using Meyer and Allen's (1991) three-component conceptualization of commitment provided a deeper understanding of how different types of RM affect each of the components of commitment, and, in turn, how each component of commitment affects intent to stay. I hope this new conceptualization will help solve some of the mystery that still surrounds employee retention, perhaps helping to create new ways to incentivize talented knowledge workers in the growing services sector.

REFERENCES

Ahmed, P. K., & Rafiq, M. (2003). Internal Marketing Issues and Challenges. *European Journal of Marketing, 37* (9), 1177-1186.

Alexander, S. G. (2007). *Predicting Long Term Job Performance Using a Cognitive Ability Test.* University of North Texas. Ann Arbor: ProQuest Information and Learning Company.

Allemand, M., Steiger, A. E., & Hill, P. L. (2013). Stability of Personality Traits in Adulthood. *The Journal of Gerontopsychology and Geriatric Psychiatry, 26* (1), 5-13.

Allen, D. G., Bryant, P. C., & Vardaman, J. M. (2010). Retaining talent: Replacing misconceptions with evidence-based strategies. *Academy of Management Perspectives, 24* (2), 48-64.

Allen, N. J., & Meyer, J. P. (1996). Affective, Continuance, and Normative Commitment to the Organization: An Examination of Construct Validity. *Journal of Vocational Behavior, 49* (3), 252-276.

Allen, N. J., & Meyer, J. P. (1990). The measurement and antecedents of affective, continuance and normative commitment to the organization. *Journal of Occupational Psychology, 63*, 1-18.

Almlund, M., Duckworth, A. L., Heckman, J. J., & Kautz, T. D. (2011). Personality Psychology and Economics. *National Bureau of Economic Research Working Paper Series* (pp. 1-252). Cambridge: National Bureau of Economic Research.

American Special Ops. (n.d.). *American Special Ops: United States Military and Law Enforcement Special Operations*. Retrieved August 29, 2013, from Special Forces Selection and Training: http://www.americanspecialops.com/special-forces/selection/

Anderson, J. C., & Narus, J. A. (1990). A Model of Distributor Firm and Manufacturer Firm Working Partnerships. *Journal of Marketing, 54* (1), 42-58.

Apasu, Y. (1987). The Importance of Value Structures in the Perception of Rewards by Industrial Salespersons. *Academy of Marketing Science*, 1-10.

Armed Forces Press Service. (2012, March 22). *Officials Extend Deadline to Apply for "Stop Loss" Pay*. Retrieved March 26, 2014 , from U.S. Department of Defense: http://www.defense.gov/news/newsarticle.aspx?id=67650

Armstrong-Stassen, M., & Ursel, N. D. (2009). Perceived orgnaizational support, career satisfaction, and the retention of older workers. *Journal of Occupational and Organizational Psychology, 82*, 201-220.

Aryee, S., Luk, V., & Stone, R. (1998). Family-Responsive Variables and Retention-Relevant Outcomes Among Employed Parents. *Human Relations, 51* (1), 73-87.

Ashill, N. J., Rod, M., Thirkell, P., & Carruthers, J. (2009). Job Resourcefulness, Symptoms of Burnout and Service Recovery Performance: An Examination of Call Centre Frontline Employees. *Journal of Services Marketing, 23* (5), 338-350.

Auh, S., Menguc, B., Fisher, M., & Haddad, A. (2011). The Contingency Effect of Service Employee Personalities on Service Climate: Getting Employee Perceptions Aligned Can Reduce Personality Effects. *Journal of Services Research, 14* (4), 426-442.

Baron, R. M., & Kenny, D. A. (1986). The Moderator-Mediator Variable Distinction in Social-Psychological Research: Conceptual, Strategic, and Statistical Considerations. *Journal of Personality & Social Psychology, 51* (6), 1173-1182.

Barrick, M. R., & Mount, M. K. (1991). The Big Five Personality Dimensions and Job Performance: A Meta-Analysis. *Personnel Psychology, 44* (1), 1-26.

Becker, T. E. (1992). Foci and bases of commitment: Are they distinctions worth making? *Academy of Management Journal, 35* (1), 232-244.

Berntson, E., Sverke, M., & Marklund, S. (2006). Predicting Perceived Employability: Human Capital or Labour Market Opportunities? *Economic and Industrial Democracy, 27* (2), 233-244.

Berry, L. L. (2002). Relationship marketing of services perspectives from 1983 to 2000. *Relationship Marketing, 1* (1), 59-77.

Berry, L. L. (1995). Relationship marketing of services--growing interest, emerging perspectives. *Marketing Science, 23* (4), 236-245.

Berry, L. L., & Parasuraman, A. (1991). *Marketing Services--Competing Through Quality.* New York: Free Press.

Berry, L. L., Hensel, J. S., & Burke, M. C. (1976). Improving Retailer Capability for Effective Consumerism Response. *Journal of Retailing, 52* (3), 3-14.

Bhattacharya, C. B., & Sen, S. (2003). Consumer-Company Identification: A Framework for Understanding Consumers' Relationships with Companies. *Journal of Marketing, 67* (2), 76-88.

Bhattacharya, C. B., Rao, H., & Glynn, M. (1995). Understanding the Bond of Identification: An Investigation of Its Correlates among Art Museum Members. *Journal of Marketing, 59* (4), 46-57.

Bienstock, C. C., DeMoranville, C. W., & Smith, R. K. (2003). Organizational Citizenship Behavior and Service Quality. *Journal of Services Marketing, 17* (4), 357-378.

Bloom, M., & Michel, J. G. (2002). The Relationships among Organizational Context, Pay Dispersion, and Managerial Turnover. *The Academy of Management Journal, 45* (1), 33-42.

Borman, W. C. (1982). Validity of Behavioral Assessment for Predicting Military Recruiter Performance. *Journal of Applied Psychology, 67* (1), 3-9.

Bourdieu, P. (1986). *The forms of capital. In: The handbook of theory and research for the sociology of education.* New York: Greenwood Press.

Bradley, J. P. (1997). *Predicting Basic Military Officer Training Performance With Three Types of Personality Measures: Self-Reports, Interviewer Ratings and Reference Ratings.* University of Western Ontario, Department of Psychology. London: National Library of Canada.

Brown, S. P., & Peterson, R. A. (1993). Antecedents and consequences of salesperson job satisfaction: Meta-analysis and assessment of causal effects. *Journal of Marketing Research, 30* (1), 63-77.

Brown, W. A., & Yoshioka, C. F. (2003). Mission Attachment and Satisfaction as Factors in Employee Retention. *Non-Profit Management & Leadership, 14* (1), 5-18.

Burke, M. J., & Landis, R. S. (2003). Methodological and conceptual challenges in conducting and interpreting meta-analyses. In K. R. Murphy, *Validity generalization: A critical review* (pp. 287-309). Mahwah, NJ: Erlbaum.

Burrell, L., Briley Durand, D., & Fortado, J. (2003). Military Community Integration and Its Effect on Well-Being and Retention. *Armed Forces & Society, 30* (7), 7-24.

Caldwell, D. F., & O'Reilly III, C. A. (1985). The Impact of Information on Job Choices and Turnover. *Academy of Management Journal, 28* (4), 934-943.

Caldwell, D. F., & O'Reilly III, C. A. (1985). The Impact of Information on Job Choices and Turnover. *Academy of Management Journal, 28* (4), 934-943.

Chaffin, L. G., Hamilton, C. H., & Czerw, M. J. (2008). Army Dental Officer Retention. *Military Medicine, 173* (10), 1014-1018.

Cheung, M. W., & Chan, W. (2005). Meta-analytic structural equation modeling: A two-stage approach. *Psychological Methods, 10* (1), 40-64.

Christian, M. S., Garza, A. S., & Slaughter, J. E. (2011). Work engagement: A quantitative review and test of its relations with task and contextual performance. *Personnel Psychology, 64*, 89-136.

Coates, H. R., Silvernail, T. S., Fulton, L. V., & Ivanitskaya, L. (2011). The Effectiveness of the Recent Army Captain Retention Program. *Armed Forces & Society, 37* (1), 5-18.

Cobb-Clark, D. A., & Schurer, S. (2011). The Stability of Big-Five Personality Traits. *Economic Letters, 115*, 11-15.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Colquitt, J. A., Wesson, M. J., Porter, C. O., Conlon, D. E., & Ng, K. (2001). Justice at the Millenium: A Meta-Analytic Review of 25 Years of Organizational Justice Research. *Journal of Applied Psychology, 86* (3), 425-445.

Conley, J. J. (1985). Longitudinal Stability of Personality Traits: A Multitrait-Multimethod-Multioccasion Analysis. *Journal of Personality and Social Psychology, 49* (5), 1266-1282.

Cortina, J. M. (2003). Apples and Oranges (and Pears, Oh My!): The Search for Moderators in Meta-Analysis. *Organizational Research Methods, 6*, 415-439.

Cotton, J. L., & Tuttle, J. M. (n.d.). Employee turnover: A meta-analysis and review with implications for research. *Academy of Management Review*, 55-70.

Cotton, J. L., & Tuttle, J. M. (1986). Employee Turnover: A Meta-Analysis and Review with Implications for Research. *Academy of Management Review, 11* (1), 55-70.

Dagger, T. S., Danaher, P. J., Sweeney, J. C., & McColl-Kennedy, J. R. (2013). Selective Halo Effects Arising from Improving the Interpersonal Skills of Frontline Employees. *Journal of Service Research, 16* (4), 488-502.

Dalton, D. R., Krackhardt, D. M., & Porter, L. W. (1981). Functional Turnover: An Empirical Assessment. *Journal of Applied Psychology, 66* (6), 716-721.

D'Amato, A., & Herzfeldt, R. (2008). Learning orientation, organizational commitment and talent retention across generations: A study of European managers. *Journal of Managerial Psychology, 23* (8), 929-953.

Department of Defense (DoD). (n.d.). *About the Department of Defense (DOD)*. Retrieved August 29, 2013, from US Department of Defense: http://www.defense.gov/about/

Department of Defense. (2010). *Joint Publication 1-02: Department of Defense Dictionary of Military and Associated Terms.* Washington, DC: Department of Defense.

Dupre, K. E., & Day, A. L. (2007). The Effects of Supportive Management and Job Quality on the Turnover Intentions and Health of Military Personnel. *Human Resource Management, 46* (2), 185-201.

Eisenberger, R., Armeli, S., Rexwinkel, B., Lynch, P. D., & Rhoades, L. (2001). Reciprocation of Perceived Organizational Support. *Journal of Applied Psychology, 86* (1), 42-51.

Eisenberger, R., Huntington, R., Hutchison, S., & Sowa, D. (1986). Perceived organizational support. *Journal of Applied Psychology, 71* (3), 500-507.

Eisenberger, R., Stinglhamber, F., Vandenberg, C., Sucharski, I. L., & Rhoades, L. (2002). Perceived Supervisor Support: Contributions to Perceived Organizational Support and Employee Retention. *Journal of Applied Psychology, 87* (3), 565-573.

Enns, J. H., Nelson, G. R., & Warner, J. T. (1984). Retention and Retirement: The Case of the U.S. Military. *Policy Sciences, 17*, 101-121.

Erez, A., Bloom, M. C., & Wells, M. T. (1996). On a proper meta-analytic model for corrections: New approaches to situational specificity and validity generalization. *Personnel Psychology, 49*, 275-306.

Farley, J. U., Lehmann, D. R., & Mann, L. H. (1998). Designing the Next Study for Maximum Impact. *Journal of Marketing Research, 35*, 496-501.

FEMA. (2013, August 26). *US Fire Administration*. Retrieved August 29, 2013, from National Fire Department Census Quick Facts: http://apps.usfa.fema.gov/census/summary.cfm

Ferguson, R., & Brohaugh, B. (2009). The talent wars. *Journal of Consumer Marketing, 26* (5), 358-362.

Ferguson, R., & Brohaugh, B. (2009). The Talent Wars. *Journal of Consumer Marketing, 26* (5), 358-362.

Fernandez, D. R., Carlson, D. S., Stepina, L. P., & Nicholson, J. D. (1997). Hofstede's country classification 25 years later. *The Journal of Social Psychology, 137* (1), 43-54.

Finkelstein, L. M., Burke, M. J., & Raju, N. S. (1995). Age Discrimination in Simulated Employment Contexts: An Integrative Analysis. *Journal of Applied Psychology, 80* (6), 652-663.

Fojt, M. (1996). Service Excellence: Lessons from the Banking Industry. *Journal of Services Marketing, 10* (5), 54-57.

Fortune. (2013). *100 best companies to work for in 2013*. Retrieved January 10, 2013, from http://money.cnn.com.libproxy.lib.unc.edu/magazines/fortune/best-companies/2012/full_list/

Geyskens, I., Krishnan, R., Steenkamp, J.-B. E., & Cunha, P. V. (2009). A Review and Evaluation of Meta-Analysis Practices in Management Research. *Journal of Management , 35* (2), 393-419.

Geyskens, I., Kumar, N., & Steenkamp, J.-B. E. (2006). Make, buy, or ally: A transaction cost theory meta-analysis. *The Academy of Management Journal, 49* (3), 519-543.

Geyskens, I., Steenkamp, J.-B. E., & Kumar, N. (1999). A Meta-Analysis of Satisfaction in Marketing Channel Relationships. *Journal of Marketing Research, 36*, 223-238.

Geyskens, I., Steenkamp, J.-B. E., & Kumar, N. (1998). Generalizations about Trust in Marketing Channel Relationships Using Meta-Analysis. *International Journal of Research in Marketing, 15*, 223-248.

Geyskens, I., Steenkamp, J.-B. E., & Kumar, N. (2006). Make, Buy, or Ally: A Transaction Cost Theory Meta-Analysis. *Academy of Management Journal, 49* (3), 519-543.

Geyskens, I., Steenkamp, J.-B. E., Scheer, L. K., & Kumar, N. (1996). The effects of trust and interdependence on relationship commitment: A trans-Atlantic study. *International Journal of Research in Marketing, 13*, 303-317.

Glorfeld, L. W. (1995). An Improvement on Horn's Parallel Analysis Methodology for Selecting the Correct Number of Factors to Retain. *Educational and Psychological Measurement, 55* (337), 377-393.

Goffman, J. M. (1975). Predicting Academic Success For Military Paramedical Personnel. *Journal of Medical Education, 50*, 797-804.

Gouldner, H. P. (1960). Dimensions of Organizational Commitment. *Administrative Science Quarterly, 4* (4), 468-490.

Gounaris, S. (2008). The Notion of Internal Market Orientation and Employee Job Satisfaction: Some Preliminary Evidence. *Journal of Services Marketing, 22* (1), 68-90.

Gronroos, C. (1994). From marketing mix to relationship marketing: Towards a paradigm shift in marketing. *Management Decision, 32* (2), 4-20.

Gronroos, C. (1994). Quo vadis, marketing? Toward a relationship marketing paradigm. *Journal of Marketing Management, 10* (5), 347-360.

Gronroos, C. (1995). Relationship marketing: The strategy continuum. *Marketing Science, 23* (4), 252.

Grover, S. L., & Crooker, K. J. (1995). Who appreciates family-responsive human resource policies: The impact of family-friendly policies on the organizational attachment of parents and non-parents. *Personnel Psychology, 48*, 271-288.

Guo, S. (2010). *Survival Analysis.* New York: Oxford University Press, Inc.

Hackett, R. D., Bycio, P., & Hausdorf, P. A. (1994). Further assessments of Meyer and Allen's (1991) three-component model of organizational commitment. *Journal of Applied Psychology, 79* (1), 15-23.

Harrell, M. C., Nataraj Kirby, S., Sloan, J. S., Graf II, C. M., McKelvey, C. J., & Sollinger, J. M. (1999). *Barriers to Minority Participation in Special Operations.* National Defense Research Institute. Santa Monica, CA: RAND Corporation.

Harrison, D. A., Newman, D. A., & Roth, P. L. (2006). How important are job attitudes? Meta-analytic comparisons of integrative behavioral outcomes and time sequences. *Academy of Management Journal, 49* (2), 305-325.

Harter, J. K., Schmidt, F. L., & Hayes, T. L. (2002). Business-Unit-Level Relationship Between Employee Satisfaction, Employee Engagement, and Business Outcomes: A Meta-Analysis. *Journal of Applied Psychology, 87* (2), 268-279.

Hartline, M. D., & Ferrell, O. C. (1996). The Management of Customer-Contact Service Employees: An Empirical Investigation. *Journal of Marketing, 60* (4), 52-70.

Hartmann, E., Sunde, T., Kristensen, W., & Martinussen, M. (2003). Psychological Measures As Predictors of Military Training Performance. *Journal of Personality Assessment, 80* (1), 87-98.

Haworth, C. M., Wright, M. J., Luciano, M., Martin, N. G., de Geus, E. J., van Beijsterveldt, C. E., et al. (2010). The heritability of general cognitive ability increases linearly from childhood to young adulthood. *Molecular Psychiatry, 15* (11), 1112-1120.

Heilmann, S. G., Bell, J. E., & McDonald, G. K. (2009). Work-Home Conflict: A Study of the Effects of Role Conflict on Military Officer Turnover Intention. *Journal of Leadership & Organizational Studies, 16* (1), 85-96.

Henderson, N. D. (2010). Predicting Long-Term Firefighter Performance from Cognitive and Physical Ability Measures. *Personnel Psychology, 63*, 999-1039.

Hofstede, G. (1980). *Culture's consequences: International differences in work-related values.* London: Sage Publications.

Hofstede, G. (2014). *National Culture Dimensions*. Retrieved January 13, 2014, from The Hofstede Centre: http://geert-hofstede.com/national-culture.html

Hofstede, G. (1994). *Values survey module 1994 manual.* Maastrict, The Netherlands: Institute for Research on Intercultural Cooperation.

Hofstede, G., & Bond, M. H. (1984). Hofstede's culture dimensions: An independent validation using Rokeach's Value Survey. *Journal of Cross-Cultural Psychology, 15*, 417-433.

Holtom, B. C., Mitchell, T. R., Lee, T. W., & Eberly, M. B. (2008). Turnover and Retention Research. *The Academy of Management Annals, 2* (1), 231-274.

Holtom, B. C., Mitchell, T. R., Lee, T. W., & Eberly, M. B. (2008). Turnover and retention research: A glance at the past, a closer review of the present, and a venture into the future. *Academy of Management Annals, 2* (1), 231-274.

Hom, P. W., Caranikas-Walker, F., Prussia, G. E., & Griffeth, R. W. (1992). A meta-analytical structural equations analysis of a model of employee turnover. *Journal of Applied Psychology, 77* (6), 890-909.

Hom, P. W., Caranikas-Walker, F., Prussia, G. F., & Griffeth, R. W. (1992). A Meta-Analytical Structural Equation Analysis of a Model of Employee Turnover. *Journal of Applied Psychology, 77* (6), 890-909.

Hopwood, C. J., Morey, L. C., Donnellan, M. B., Samuel, D. B., Grilo, C. M., McGlashan, T. H., et al. (2013). Ten-Year Rank-Order Stability of Personality Traits and Disorders in a Clinical Sample. *Journal of Personality, 81* (3), 335-344.

House of Representatives Committee on the Budget. (2013, December 10). *The Need to Reform Military Compensation*. Retrieved March 5, 2014, from House Budget Committee Publications: http://budget.house.gov/news/documentsingle.aspx?DocumentID=364048

Hu, L.-t., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6* (1), 1-55.

Huffcutt, A. I., & Arthur, W. (1995). Development of a New Outlier Statistic for Meta-Analytic Data. *Journal of Applied Psychology, 80* (2), 327-334.

Hunter, J. E., & Schmidt, F. L. (2004). *Methods of Meta-Analysis: Correcting Error and Bias in Research Findings* (2nd ed.). Thousand Oaks, CA: Sage Publications, Inc.

Huselid, M. A., & Day, N. E. (1991). Organizational Commitment, Job Involvement, and Turnover: A Substantive and Methodological Analysis. *Journal of Applied Psychology, 76* (3), 380-391.

Iacobucci, D., & Ostrom, A. (1996). Commercial and interpersonal relationships; Using the structure of interpersonal relationships to understand individual-to-individual, individual-to-firm, and firm-to-firm relationships in commerce. *International Journal of Research in Marketing, 13*, 53-72.

Jap, S. D. (2001). Perspectives on joint competitive advantages in buyer-supplier relationships. *International Journal of Research in Marketing, 18*, 19-35.

Jaros, S. J., Jermier, J. M., Koehler, J. W., & Sincich, T. (1993). Effects of Continuance, Affective, and Moral Commitment on the Withdrawal Process: An Evaluation of Eight Structural Equation Models. *The Academy of Management Journal, 36* (5), 951-995.

Judge, T. A., Cable, D. M., Boudreau, J. W., & Bretz, R. D. (1995). An Empirical Investigation of the Predictors of Executive Career Success. *Personnel Psychology, 48*, 485-519.

Kalns, J., Baskin, J., Reinert, A., Darren, M., Santos, A., Daugherty, S., et al. (2011). Predicting Success in the Tactical Air Combat Party Training Pipeline. *Military Medicine, 176* (4), 431-437.

Karter, M. J., & Stein, G. P. (2013). *US Fire Department Profile 2012.* National Fire Protection Association, Fire Analysis and Research Division. Quincy: National Fire Protection Association.

Kelly, T. K., Masi, R., Walker, B., Knapp, S., & Leuschner, K. J. (2013). *An Assessment of the Army's Tactical Human Optimization, Rapid Rehabilitation and Reconditioning Program.* Santa Monica: RAND Corporation.

Kenny, D. A. (2014, January 11). *Measuring Model Fit*. Retrieved January 13, 2014, from David A Kenny: http://davidakenny.net/cm/fit.htm

King, C., & Grace, D. (2010). Building and Measuring Employee-Based Brand Equity. *European Journal of Marketing, 44* (7/8), 938-971.

Kirby, S. N., & Naftel, S. (2000). The Impact of Deployments on the Retention of Military Reservists. *Armed Forces & Society, 26* (2), 259-284.

Kirkman, B. L., Lowe, K. B., & Gibson, C. B. (2006). A quarter century of "Culture's Consequences": A review of empirical research. *Journal of International Business Studies, 37* (3), 285-320.

Kluemper, D. H., DeGroot, T., & Choi, S. (2013). Emotion Management Ability: Predicting Task Performance, Citizenship, and Deviance. *Journal of Management, 39* (4), 878-905.

Kruger, L. G. (2013). *United States Fire Administration: An Overview.* Washington, DC: Congressional Research Service.

Kumar, N., Scheer, L. K., & Steenkamp, J.-B. E. (1995). The Effects of Supplier Fairness on Vulnerable Resellers. *Journal of Marketing Research, 32* (1), 54-65.

Kutner, M. H., Nachtsheim, C. J., & Neter, J. (2004). *Applied Linear Regression Models.* New York, NY: McGraw-Hill Irwin.

Landis, R. S. (2013). Successfully combining meta-analysis and structural equation modeling: Recommendations and strategies. *Journal of Business Psychology, 28*, 251-261.

Lievens, F., & Sackett, P. R. (2011). The Validity of Interpersonal Skills Assessment Via Situational Judgment Tests for Predicting Academic Success and Job Performance. *Journal of Applied Psychology, 97* (2), 460-468.

Lin, D.Y., & Zeng, D. (2010). On the relative efficiency of using summary statistics versus individual-level data in meta-analysis. *Biometrika*, *97* (2), 321-332.

Luk, S. T., Lu, K., & Liu, B. (2013). SERV*OR in China: Testing the Effect of Service Orientation on Service Skills Performance. *Journal of Services Marketing, 27* (1), 25-39.

Lyness, K. S., & Judiesch, M. K. (2001). Are Female Managers Quitters? The Relationships of Gender, Promotions, and Family Leaves of Absence to Voluntary Turnover. *Journal of Applied Psychology, 86* (6), 1167-1178.

MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods, 1* (2), 130-149.

MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation Analysis. *Annual Review of Psychology, 58*, 593-614.

Maddi, S. R., Matthews, M. D., Kelly, D. R., Villarreal, B., & White, M. (2012). The Role of Hardiness and Grit in Predicting Performance and Retention of USMA Cadets. *Military Psychology, 24*, 19-28.

Mael, F., & Ashforth, B. E. (1992). Alumni and Their Alma Mater: A Partial Test of the Reformulated Model of Organizational Identification. *Journal of Organizational Behavior, 13* (2), 103-123.

Maltarich, M. A., Nyberg, A. J., & Reilly, G. (2010). A Conceptual and Empirical Analysis of the Cognitive Ability-Voluntary Turnover Relationship. *Journal of Applied Psychology, 95* (6), 1058-1070.

Manigart, P., & Prensky, D. (1982). Recruitment and Retention of Volunteers: Problems in the Belgian Armed Forces. *Armed Forces & Society, 9* (1), 98-114.

Marsden, P. V., Kalleberg, A. L., & Cook, C. R. (1993). Gender Differences in Organizational Commitment: Influences of Work Positions and Family Roles. *Work and Occupations, 20* (3), 368-390.

Mathieu, J. E. (1991). A cross-level nonrecursive model of the antecedents of organizational commitment and satisfaction. *Journal of Applied Psychology, 76* (5), 607-618.

Mathieu, J. E., & Zajac, D. M. (1990). A review and meta-analysis of the antecedents, correlates, and consequences of organizational commitment. *Psychological Bulletin, 108* (2), 171-194.

Mayfield, J., & Mayfield, M. (2007). The effects of leader communication on a worker's intent to stay: An investigation using structural equation modeling. *Human Performance, 20* (2), 85-102.

Maynard, D. C., Joseph, T. A., & Maynard, A. M. (2006). Underemployment, Job Attitudes, and Turnover Intentions. *Journal of Organizational Behaviour, 27*, 509-536.

McCall, M. M. (1966). Courtship as social exchange: Some historical comparisons. In B. Farber, *Kinship and Family Organization* (pp. 190-210). New York: John Wiley & Sons, Inc.

McEvoy, G. M., & Cascio, W. F. (1985). Strategies for Reducing Employee Turnover: A Meta-Analysis. *Journal of Applied Psychology, 70* (2), 342-353.

McEvoy, G. M., & Cascio, W. F. (1985). Strategies for Reducing Employee Turnover: A Meta-Analysis. *Journal of Applied Psychology, 70* (2), 342-353.

McHenry, J. J., Hough, L. M., Toquam, J. L., Hanson, M., & Ashworth, S. (1990). Project A Validity Results: The Relationship Between Predictor and Criterion Domains. *Personnel Psychology, 43*, 335-354.

Messmer, M. (2004, April). Retaining Your Top Performers. *Strategic Finance*, 11-12.

Meyer, J. P., & Allen, N. J. (1991). A three-component conceptualization of organizational commitment. *Human Resource Management Review, 1* (1), 61-89.

Meyer, J. P., & Allen, N. J. (1986). Development and Consequences of Three Components of Commitment. *Administrative Sciences Association of Canada.* Whistler, BC.

Meyer, J. P., Allen, N. J., & Smith, C. A. (1993). Commitment to Organizations and Occupations: Extension and Test of a Three-Component Conceptualization. *Journal of Applied Psychology, 78* (4), 538-551.

Meyer, J. P., Stanley, D. J., Herscovitch, L., & Topolnytsky, L. (2002). Affective, continuance, and normative commitment to the organization: A meta-analysis of antecedents, correlates, and consequences. *Journal of Vocational Behavior, 61* (1), 20-52.

Milbourn, T. T. (2003). CEO reputation and stock-based compensation. *Journal of Financial Economics, 68* (2), 233-262.

Milkovich, G. T., Newman, J. M., & Gerhart, B. (2014). *Compensation* (11th ed.). New York: McGraw-Hill Higher Education.

Miller, J. G., & Wheeler, K. G. (1992). Unraveling the mysteries of gender differences in intentions to leave the organization. *Journal of Organizational Behavior, 13*, 465-478.

Mitchell, T. R., Holtom, B. C., Lee, T. W., & Graske, T. (2001). How to Keep Your Best Employees: Developing an Effective Retention Policy. *The Academy of Management Executive (1993-2005), 15* (4), 96-109.

Mitchell, T. R., Holtom, B. C., Lee, T. W., Sablynski, C. J., & Erez, M. (2001). Why People Stay: Using Job Embeddedness to Predict Voluntary Turnover. *The Academy of Management Journal, 44* (6), 1102-1121.

Morgan, R. M., & Hunt, S. D. (1994). The commitment-trust theory of relationship marketing. *Journal of Marketing, 58* (3), 20-38.

Mossholder, K. W., Settoon, R. P., & Henagan, S. C. (2005). A relational perspective on turnover: Examining structural, attitudinal, and behavioral predictors. *Academy of Management Journal, 48* (4), 607-618.

Mowday, R. T., Koberg, C. S., & McArthur, A. W. (1984). The Psychology of the Withdrawal Process: A Cross-Validational Test of Mobley's Intermediate Linkages Model of Turnover in Two Samples. *Academy of Management Journal, 27* (1), 79-94.

Mowday, R. T., Steers, R. M., & Porter, L. W. (1979). The Measurement of Organizational Commitment. *Journal of Vocational Behavior, 14*, 224-247.

Myhal, G. C., Kang, J., & Murphy, J. A. (2008). Retaining customers through relationship quality: a services business marketing case. *Journal of Services Marketing, 22* (6), 445-453.

Nunnally, J. C. (1978). *Psychometric Theory.* New York: McGraw-Hill.

Office of Justice Programs. (n.d.). *Bureau of Justice Statistics*. Retrieved August 29, 2013, from http://www.bjs.gov/index.cfm?ty=tp&tid=71

Office of the Deputy Under Secretary of Defense (Military Community and Family Policy). (2012, November). *2011 Demographics.* Retrieved March 12, 2014, from Profile of the Military Community: http://www.militaryonesource.mil/12038/MOS/Reports/2011_Demographics_Report.pdf

Office of the Deputy Under Secretary of Defense (Military Community and Family Policy). (2012). *2012 Demographics.* Retrieved March 12, 2014, from Profile of the Military Community: http://www.militaryonesource.mil/12038/MOS/Reports/2012_Demographics_Report.pdf

Office of the Under Secretary of Defense (Comptroller). (2012, February). *United States Department of Defense Fiscal Year 2013 Budget Request.* Retrieved March 2, 2014, from Office of the Deputy Chief Management Officer: http://dcmo.defense.gov/publications/documents/FY2013_Budget_Request_Overview_Book.pdf

Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer. (2012). *Fiscal Year 2013 Budget Request.* Washington, DC: Department of Defense.

Office of the United States Trade Representative. (n.d.). *Services & Investment*. Retrieved October 30, 2013, from Services: http://www.ustr.gov/trade-topics/services-investment/services

O'Reilly III, C. A., & Chatman, J. A. (1994). Working Smarter and Harder: A Longitudinal Study of Managerial Success. *Administrative Science Quarterly, 39* (4), 603-627.

O'Reilly III, C. A., Chatman, J., & Caldwell, D. F. (1991). People and Organizational Culture: A Profile Comparison Approach to Assessing Person-Organization Fit. *Academy of Management Journal, 34* (3), 487-516.

Overton, R. C. (1998). A comparison of fixed-effects and mixed (random-effects) models for meta-analysis tests of moderator variables effects. *Psychological Methods, 3*, 354-379.

Palmatier, R. W., Dant, R. P., Grewal, D., & Evans, K. R. (2006). Factors Influencing the Effectiveness of Relationship Marketing: A Meta-Analysis. *Journal of Marketing, 70* (4), 136-153.

Palmatier, R. W., Gopalakrishna, S., & Houston, M. B. (2006). Returns on Business-to-Business Relationship Marketing Investments: Strategies for Leveraging Profits. *Marketing Science, 25* (5), 477-493.

Palmatier, R. W., Scheer, L. K., Houston, M. B., Evans, K. R., & Gopalakrishna, S. (2007). Use of relationship marketing programs in building customer-salesperson and customer-firm relationships: Differential influences on financial outcomes. *International Journal of Research in Marketing, 24*, 210-223.

Pfeffer, J. (1994). Competitive advantage through people. *California Management Review*, 9-28.

Phillips, J. M. (1998). Effects of Realistic Job Previews on Multiple Organizational Outcomes: A Meta-Analysis. *The Academy of Management Journal, 41* (6), 673-690.

Porter, L. M., Steers, R. M., Mowday, R. T., & Boulian, P. V. (1974). Organizational commitment, job satisfaction, and turnover among psychiatric technicians. *Journal of Applied Psychology, 59* (5), 603-609.

Posner, B. Z. (2010). Another Look at the Impact of Personal and Organizational Values Congruency. *Journal of Business Ethics, 97*, 535-541.

Posner, B. Z. (1992). Person-Organization Values Congruence: No Support for Individual Differences as a Moderating Influence. *Human Relations, 45* (4), 351-361.

Rafiq, M., & Ahmed, P. K. (2000). Advances in the Internal Marketing Concept: Definition, Synthesis and Extension. *Journal of Services Marketing, 14* (6), 449-462.

Raju, N. S., Burke, M. J., Normand, J., & Langlois, G. M. (1991). A new meta-analytic approach. *Journal of Applied Psychology, 76*, 432-446.

Randall, D. M. (1990). The Consequences of Organizational Commitment: Methodological Investigation. *Journal of Organizational Behavior, 11* (5), 361-378.

Ree, M. J., Earles, J. A., & Teachout, M. S. (1994). Predicting Job Performance: Not Much More Than g. *Journal of Applied Psychology, 79* (4), 518-524.

Reynolds, K. E., & Beatty, S. E. (1999). Customer Benefits and Company Consequences of Customer-Salesperson Relationships in Retailing. *Journal of Retailing, 75* (1), 11-32.

Rhoades, L., & Eisenberger, R. (2002). Perceived Organizational Support: A Review of the Literature. *Journal of Applied Psychology, 87* (4), 698-714.

Rhodes, S. R. (1983). Age-Related Differences in Work Attitudes and Behavior: A Review and Conceptual Analysis. *Psychological Bulletin, 93* (2), 328-367.

Rodriguez, J. (2009). Predicting the Military Career Success of United States Air Force Academy Cadets. *Armed Forces & Society, 36* (1), 65-85.

Rosenthal, R. (1978). Combining Results of Independent Studies. *Psychological Bulletin*, 185-193.

Rothausen, T. J. (1994). Job satisfaction and the parent worker: The role of flexibility and rewards. *Journal of Vocational Behavior, 44*, 317-336.

Salgado, J. F. (1997). The Five Factor Model of Personality and Job Performance in the European Community. *Journal of Applied Psychology, 82* (1), 30-43.

Sawyerr, O. O., Srinivas, S., & Wang, S. (2009). Call Center Employee Personality Factors and Service Performance. *Journal of Services Marketing, 23* (5), 301-317.

Scandura, T. A., & Lankau, M. J. (1997). Relationships of Gender, Family Responsibility and Flexible Work Hours to Organizational Commitment and Job Satisfaction. *Journal of Organizational Behavior, 18* (4), 377-391.

Schmidt, F. L., & Hunter, J. (2004). General Mental Ability in the World of Work: Occupational Attainment and Job Performance. *Journal of Personality and Social Psychology, 86* (1), 162-173.

Schneider, B., & Bowen, D. E. (1995). *Winning the Service Game.* Boston: Harvard Business School Press.

Schweitzer, L., & Lyons, S. (2008). The market within: A marketing approach to creating and developing high-value employment relationships. *Business Horizons, 51*, 555-565.

Shaw, J. D., Delery, J. E., Jenkins, D., & Gupta, N. (1998). An Organization-Level Analysis of Voluntary and Involuntary Turnover. *The Academy of Management Journal, 41* (5), 511-525.

Singer, J. D., & Willett, J. B. (2003). *Applied Longitudinal Data Analysis: Modeling Change and Event Occurrence.* New York: Oxford University Press, Inc.

Singh, J. (2000). Performance Productivity and Quality of Frontline Employees in Service Organizations. *Journal of Marketing, 64* (2), 15-34.

Soares, A., Farhangmehr, M., & Shoham, A. (2007). Hofstede's dimensions of culture in international marketing studies. *Journal of Business Research, 60*, 277-284.

Spencer, D. G. (1986). Employee Voice and Employee Retention. *Academy of Management Journal, 29* (3), 488-502.

Steel, R. P., & Landon, T. E. (2010). Internal Employment Opportunity and External Employment Opportunity: Independent or Interactive Retention Effects? *Military Psychology, 22*, 282-300.

Steel, R. P., & Ovalle, N. K. (1984). A Review and Meta-Analysis of Research on the Relationship Between Behavioral Intentions and Employee Turnover. *Journal of Applied Psychology, 69* (4), 673-686.

Steers, R. M. (1977). Antecedents and Outcomes of Organizational Commitment. *Administrative Science Quarterly, 22* (1), 46-56.

Steers, R. M., & Mowday, R. T. (1981). Employee Turnover and Postdecision Accommodation Processes. In L. L. Cummings, & B. M. Staw, *Research in Organizational Behavior* (Vol. 3, pp. 235-281). Greenwich, CT: JAI Press.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics.* Boston, MA: Pearson Education, Inc.

Tannenbaum, S. I., Mathieu, J. E., Salas, E., & Cannon-Bowers, J. A. (1991). Meeting Trainees' Expectations: The Influence of Training Fulfillment on the Development of Commitment, Self-Efficacy, and Motivation. *Journal of Applied Psychology, 76* (6), 759-769.

Taras, V., Kirkman, B. L., & Steel, P. (2010). Examining the impact of "Culture's Consequences": A three-decade, multilevel, meta-analytic review of Hofstede's cultural value dimensions. *Journal of Applied Psychology, 95* (3), 405-439.

The World Bank. (n.d.). *The World Bank: Working for a World Free of Poverty*. Retrieved August 29, 2013, from United States Data: http://data.worldbank.org/indicator/MS.MIL.XPND.GD.ZS

Tice, J. (2012, February 19). *Earlier drawdowns give idea of what's to come*. Retrieved March 10, 2014, from Army Times: http://www.armytimes.com/article/20120219/NEWS/202190319/Earlier-drawdowns-give-idea-what-s-come

Triandis, H. C. (1979). Values, attitudes, and interpersonal behavior. *Nebraska Symposium on Motivation, 27*, 195-259.

Ueno, A. (2010). What are the Fundamental Features Supporting Service Quality? *Journal of Services Marketing, 24* (1), 74-86.

United States Army. (2009, August 10). *Officer Active Duty Service Obligations.* Retrieved March 10, 2014, from Army Regulation 350-100: http://www.apd.army.mil/jw2/xmldemo/r350_100/main.asp

United States Congress. (n.d.). *Uniform Code of Military Justice.* Retrieved March 5, 2014, from Uniform Code of Military Justice: http://www.au.af.mil/au/awc/awcgate/ucmj.htm

United States Department of Veterans Affairs. (2012, September 26). *Veteran Eligibility*. Retrieved March 12, 2014, from Health Benefits: http://www.va.gov/healthbenefits/apply/veterans.asp

US Army. (n.d.). *75th Ranger Regiment*. Retrieved September 10, 2013, from GoArmy.com: http://www.goarmy.com/ranger/training.html

US Government Spending. (n.d.). *Estimated FY 2013 Spending for Governments in the United States*. Retrieved August 29, 2013, from Government Spending: the Details: http://www.usgovernmentspending.com/current_spending

Van Vianen, A. E., De Pater, I. E., & Van Dijk, F. (2007). Work value fit and turnover intention: same-source or different-source fit. *Journal of Managerial Psychology, 22* (2), 188-202.

Varey, R. J. (1995). A Model of Internal Marketing for Building and Sustaining a Competitive Service Advantage. *Journal of Marketing Management, 11*, 41-54.

Verquer, M. L., Beehr, T. A., & Wagner, S. H. (2003). A meta-analysis of relations between person-organization fit and work attitudes. *Journal of Vocational Behavior, 63*, 473-489.

Viswesvaran, C., & Ones, D. S. (1995). Theory testing: Combining psychometric meta-analysis and structural equations modeling. *Personnel Psychology, 48*, 865-885.

Wayne, S. J., Liden, R. C., Kraimer, M. L., & Graf, I. K. (1999). The Role of Human Capital, Motivation and Supervisor Sponsorship in Predicting Career Success. *Journal of Organizational Behavior, 20* (5), 577-595.

Whiting, A., Donthu, N., & Baker, A. M. (2011). Investigating the Immediate and Long-Term Effects of Job Stressors on Frontline Service Employees. *International Journal of Research in Marketing, 28*, 319-331.

Witt, L. A., Patti, A. L., & Farmer, W. L. (2002). Organizational Politics and Work Identity as Predictors of Organizational Commitment. *Journal of Applied Social Psychology, 32* (3), 486-499.

Woodruff, T. W. (2012). *Goal Influence in Organizational Identification and Post-Choice Behavior.* University of North Carolina at Chapel Hill, Marketing Department. Chapel Hill: University of North Carolina.

Woodruff, T., Kelty, R., & Segal, D. R. (2006). Propensity to Serve and Motivation to Enlist among American Combat Soldiers. *Armed Forces & Society, 32*, 353-366.

Zeithaml, V. A., & Bitner, M. (1996). *Services Marketing.* New York, NY: McGraw-Hill College.

Zeithaml, V. A., Bitner, M. J., & Gremler, D. D. (2013). *Services Marketing: Integrating Customer Focus Across the Firm.* New York, NY: McGraw-Hill.

Zeithaml, V. A., Parasuraman, A., & Berry, L. L. (1990). *Delivering Quality Service: Balancing Customer Perceptions and Expectations.* New York, NY: The Free Press.

Zwick, W. R., & Velicer, W. F. (1986). Comparison of Five Rules for Determining the Number of Components to Retain. *Psychological Bulletin, 99* (3), 432-442.

CHAPTER III – STUDY 2:
SELECTING THE BEST: CHOOSING AMERICA'S ELITE SOLDIERS

3.1 Introduction

Over the past few decades, service-based industries have worked their way to the forefront of the United States' (US) economy and the economies of other developed countries. Previously manufacturing titans, they are now dominated by service-based industries and the never-ending desire to improve service quality. In fact, service industries (e.g., telecommunications, financial services, environmental services, etc.) now account for 68% of US gross domestic product and four out of five jobs in the US (Office of the United States Trade Representative, 2013). Services are, obviously, an extremely important part of the US economy.

Services are unique and distinct from the manufacturing and sale of consumer goods in that services involve personal interactions between the service provider and the customer. Services are intangible, heterogeneous, perishable, and involve simultaneous production and consumption, therefore they must be marketed to consumers differently than manufactured goods. To account for theses differences, services marketing experts expanded the traditional marketing mix factors (i.e., product, place, promotion, and price) to include people (employee recruitment, training, motivation, rewards, etc.), physical evidence (facility design, equipment, signage, employee dress, web pages, etc.), and processes (flow of activities, number of steps, customer involvement points) (Zeithaml et al., 2013). Arguably the most critical factor of this expanded marketing mix is people.

Service employees represent a company's brand as much as, or in some cases even more than, the more tangible elements of the transaction (i.e., a good that accompanies the service, such as a cell phone for telecommunications services, or the building where the service interaction takes place) (Zeithaml et al., 2013). Their actions (or inactions) influence the way the customer feels about the brand, and whether or not the customer will choose to stay with the service provider. This "human element" makes marketing services different from marketing consumer goods. Service employees hold a large amount of power to influence customer perceptions. For service providers, the challenge is to build a customer service-oriented culture that attracts the very best workers in the industry. Choosing the right employees creates competitive advantages in quality of service, customer satisfaction, etc., which then leads to repeat purchases and customer loyalty, and ultimately higher profits.

The ultimate goal of service providers is to attract and keep highly profitable customers by continually improving the relationship the company has with them. Key to this strategy is the notion that it is typically less expensive to retain an existing customer than it is to constantly attract new ones. The benefits of relationship marketing are felt on both sides. Firms receive economic benefits, of course, as well as customer behavior benefits (i.e., loyalty and positive word-of-mouth), and human resource management benefits (i.e., repeat customers who are familiar with the service provider's processes become more efficient customers, relieving some of the burden on the service employees). For customers, relationship marketing inspires feelings of trust and confidence in the brand. Familial, and sometimes even social, relationships may develop between the service provider and the customer, and the customer may receive some sort of special treatment for their loyalty, further bonding him/her to the organization (Zeithaml et al., 2013).

To develop strong service provider-customer relationships, it is critical that service employees provide high quality service and promote a customer-focused, service-based culture. But how can an employer know if potential employees are capable of providing excellent customer service, or if they have the right mix of skills and aptitudes to properly handle service problems as they arise? How can the employer know if the employees have the right interpersonal skills to both promote good service practices and deal with service failures? *The answer lies in the hiring and screening process.*

The new trend in hiring for service management jobs involves placing potential employees in environments and situations that they are likely to encounter on the job. Interviews start the usual way—with a review of the job candidate's resume, then a phone interview to get a better feel for his/her social and communication skills. That is where the usual process ends. After the phone interview, remaining candidates are typically brought to the workplace to take part in individual- and team-based exercises designed to mimic realistic situations employees may face while on the job. By monitoring potential employees' experience, personality, and reactions, the organization gets a better feel for how they will perform on the job. Hiring interviews for service management jobs now last up to a week and can be quite costly (in terms of both time and money) to organizations as they try to predict which potential employees will be the most effective and who fits best in the job and in the organization. Even after enduring the lengthy interview process, new employees are often subject to a probationary period, with a permanent employment decision made after their first year or so of performance. The organization is so committed to getting the right employee that they are willing to spend a substantial amount of time and money up front to make the best hiring decision. This type of hiring typically takes place in organizations where workforce quality is exceptionally important—service-based organizations.

While mainstream service organizations must choose their employees very carefully in order to avoid negative brand associations, greater risks exist for a unique subset of service organizations—public service organizations. Public service organizations, such as the armed forces, police forces, firefighters, etc., face crisis situations on a daily basis, many of which involve life-or-death decisions. The penalty for poor hiring decisions in these organizations is very steep, up to and including loss of life. In the case of the armed forces, which typically operate internationally, poor hiring decisions may incite negative brand images worldwide (e.g., the negative image of the US military for such incidents as the Abu Ghraib prisoner maltreatment and the video of US Marines urinating on dead Taliban fighters). The status of the US military's image affects the country politically, socially, and even economically. In short, the consequences of poor hiring tend to be much more costly for public service organizations. Despite these high costs, and the fact that these organizations account for 5.5 million employees[32] and 5.2% of the US' gross domestic product[33], the topic of accession decisions in public service organizations is, unfortunately, understudied.

Given the high cost of employee failure, how can public service organizations choose the best job candidates? Because of its political, social, and economic importance, and because it is the largest employer of public servants facing crises situations on a daily basis, the Department of Defense is the

[32]Total derived from census data taken during 2013 (Department of Defense), 2012 (FEMA, National Fire Department census), and 2008 (Office of Justice Programs, Census of State and Local Law Enforcement Agencies).

[33]Total spending is based on 2013 budget estimates, while GDP is from year 2012, the most current actual GDP available. $613B (Department of Defense (US Government Spending, 2013)) + $42B (US Fire Department (Karter & Stein, 2013)) + $161B (State and Local Police (US Government Spending, 2013) = $816B / $15,684.80B GDP = .052, or 5.2%.

prime organization to study to determine which attributes are associated with successful accession and retention in public service organizations.

In this case study, I examine how the most elite and exclusive unit in the United States Army, Army Special Forces (SF), assesses and selects new SF soldiers. I attempt to answer the question, "Which attributes of SF candidates are most predictive of SF training success?" The answer to this question is extremely important to Army leadership, as the SF career field has endured several years of unusually high operations tempo during Operations ENDURING FREEDOM (Afghanistan) and IRAQI FREEDOM (Iraq). Maintaining a high operations tempo calls for the recruitment and training of more SF soldiers. However, the rigorous and detailed nature of SF training takes several years and requires hundreds of thousands of dollars per soldier to complete. With less than a third of the candidates completing the entire training process, it is extremely important that the Army understand which attributes are most predictive of success to avoid wasting time and money on candidates who have little or no chance of making it through training. In fact, in research conducted among Norway's Naval Special Forces, Hartmann et al. (2003) stress the importance of being able to accurately predict success in the military training environment given the high cost of training (in terms of time and dollars spent), the human suffering that results from failure to complete training, and the need to recruit competent, well-suited people in order to maintain the number of servicemen required to maintain mission effectiveness.

The recent budget constraints placed on the Department of Defense only highlight the need for Army SF to be more efficient and effective in their recruitment process.[34] To be efficient, Army SF must become leaner, shedding any unnecessary steps in their training process. They must also reduce the number of training failures per class by selecting better, more qualified candidates. It is critical that they select only the best possible candidates (i.e., those with the best chance of making it through years of intense training) so that training slots are not wasted on unqualified candidates. To be effective, Army SF must remain on task to produce the required number of qualified candidates at the end of each training period in order to make up for any losses (i.e., soldiers who retire or separate from service) and to meet

[34]Because of the unique mission sets they are trained to perform, Army SF is typically protected from the large, sweeping budget cuts applied to more conventional units; however they are not completely immune to budget reductions. Additionally, I use the term "recruitment process" rather than "hiring process" because Army SF does not hire its personnel in the typical sense of the word. Most of the candidates who compete for the privilege of being selected for SF duty are already active duty soldiers serving in different military occupational specialties.

worldwide mission requirements. This process is made more complex by the fact that, unlike other organizations, Army SF cannot fill manpower gaps through the typical hiring process. In other words, if Army SF is in need of dozens of Staff Sergeants (mid-level enlisted soldiers), they cannot simply hire them from external sources. Soldiers must be built "from the ground up," starting at a low rank and systematically moving up through the hierarchy as they gain experience over time. The current recruitment process uses historical trends to estimate the number of new recruits required to sustain the force and maintain mission effectiveness, taking into account training failures and separations from service. Clearly, this process is a difficult balancing act. But by properly balancing efficiency and effectiveness, Army SF can continue their missions unhindered by budget reductions.

This study is different from most accession studies. In this study, Special Forces Assessment and Selection (SFAS, the first major phase of Army SF training) is viewed as a prolonged on-site interview to which candidates are invited after a thorough screening of their existing skills and aptitudes and previous Army performance (if applicable), which is gathered from their personnel file. Special Forces Qualification Course (SFQC, the second and final major phase of Army SF training) is viewed as a probationary period where candidates must prove their worth in order to maintain their job (i.e., become SF soldiers).

Naturally, many of the requirements to become an Army SF soldier are quite different from those of a normal service provider seeking employment. Given the life-or-death situations faced by SF soldiers, the requirements *must* be different. However, some requirements are universal (i.e., cognitive ability, personality characteristics, etc.). Army SF seeks candidates who possess mental and physical toughness and an aptitude for soldiering skills. Indeed, an unsponsored website[35] purports that Army SF training is

> [S]tructured to push the candidates to their limits of physical and mental endurance…[while the candidates are] purposefully deprived of sleep and kept under pressure. By the time the SFAS course is in its second week over half of the original 300 candidates will have either given up or been bounced[36] by the instructors. Those who remain…can now look forward to the grueling Special Forces Qualification Course. (American Special Ops)

Obviously, Army SF training is not for the weak-hearted. So who is it for? Which personal attributes are the largest drivers of Army SF training success? Is cognitive ability more important than

[35] The website is not sponsored by the US Army, however it gives accurate and detailed information regarding Army SF training: http://www.americanspecialops.com/special-forces/selection.

[36] Being "bounced" means being cut from further training.

physical ability, or vice versa? What roles do personality traits and soldiering skills play in achieving success? This study delves deep into the trenches of SF training to determine which attributes drive Army SF training success. The findings will prove insightful and useful for public service organizations (e.g., other armed forces units, police departments, and fire departments) whose job eligibility requirements lean more toward the bravery, mental acuity, and brawn of Army SF than toward the highly studied job hiring attributes of typical service organizations (e.g., product/service knowledge, prior service experience, interpersonal skills, etc.).

The remainder of this paper proceeds as follows: section 3.2 provides an overview of Army SF, section 3.3 reviews the relevant literature, section 3.4 presents the conceptual framework, section 3.5 details the data used in this case study, section 3.6 describes the measurement development process, section 3.7 details the methods, section 3.8 provides the results from the first data set (regarding SFAS training), section 3.9 provides the results from the second data set (regarding SFQC training), section 3.10 examines the robustness of the results, section 3.11 discusses implications, and section 3.12 concludes the paper.

3.2 Overview of Army Special Forces

3.2.1 Army Special Forces Missions

Army SF, known mostly by their nickname the “green berets” for the distinctive headgear they wear, consists of five main active duty combat groups (each with a headquarters company and five battalions, including a support battalion) whose specialties include unconventional warfare, foreign internal defense, special reconnaissance, direct action, and counter-terrorism.

3.2.1.1 Unconventional Warfare

Unlike conventional warfare, which seeks to diminish an enemy’s military capability in order to achieve victory, unconventional warfare employs small, agile, highly-trained units to “enable a resistance movement or insurgency to coerce, disrupt, or overthrow a government or occupying power by operating through or with an underground, auxiliary, and guerrilla force in a denied area” (Department of Defense, 2010). In today’s environment, unconventional warfare seeks to “win the hearts and minds” of the indigenous population (such as the Afghan citizens in Operation ENDURING FREEDOM) and turn the populace against "the enemy" (e.g., the Taliban and al-Qaeda forces operating in Afghanistan). Unconventional warfare typically uses covert actions that stress precision and accuracy, whereas conventional warfare is performed more openly, often with media attention. In order for unconventional warfare operations to be successful, soldiers must combine traditional and untraditional combat skills with proficient indigenous language skills in order to integrate into the culture of the local population and use persuasion and influence tactics to rally local forces. SF soldiers receive a large amount of language and cultural training both before and after they don the green beret.

3.2.1.2 Foreign Internal Defense

Foreign internal defense is typically used to combat a real or threatened insurgency in a foreign state. The ultimate goal of foreign internal defense is to "free and protect [a host nation's] society from subversion, lawlessness, insurgency, terrorism, and other threats to its security" (Department of Defense, 2010). Foreign internal defense involves cooperation and support between the host nation (i.e., where the insurgency is happening or is a threat) and a support nation (i.e., a nation who has an interest in keeping the existing government in power). Specifically, SF troops engaged in foreign internal defense train or support the host nation's military forces to suppress or counter an insurgent uprising. It is important to stress that the host nation's troops are the combative force in all foreign internal defense operations. Support typically comes in non-combative roles, such as force training, operation planning, etc. Foreign internal defense operations are meant to reestablish the legitimacy of the host nation's military and/or the existing government. The passing of leadership and responsibility from US and NATO forces in Afghanistan to Afghan National Security Forces is an example of a change of mission (for US and NATO forces) from unconventional and conventional warfare tactics to a more supportive foreign internal defense role.

3.2.1.3 Special Reconnaissance

Special reconnaissance typically takes place behind enemy lines and is designed to be a covert way to gather or confirm intelligence (typically human intelligence, or information gathered from human sources), scope out potential targets, direct air and missile attacks, or place remotely-monitored sensors to track movements in "hot" areas. These spy-like operations are used to better position friendly forces while avoiding direct combat action and enemy detection. Special reconnaissance is a tactic used to assist forces in target analysis and selection, and supports the performance of other SF missions (i.e., unconventional warfare, foreign internal defense, direct action, and counter-terrorism).

3.2.1.4 Direct Action

Direct action consists of "[s]hort-duration strikes and other small-scale offensive actions conducted as a special operation in hostile, denied, or politically sensitive environments and which employ specialized military capabilities to seize, destroy, capture, exploit, recover, or damage designated targets" (Department of Defense, 2010). Direct action differs from conventional offensive actions in the level of physical and political risk, operational techniques, and the degree of discriminate and precise use of force to achieve specific objectives. Direct action requires the use of small, agile teams (typically supported by air assets) to conduct rapid, covert hit-and-run strikes that capitalize on skill and the element of surprise. The failed Operation EAGLE CLAW, meant to end the Iran hostage crisis and free the occupied US Embassy in Tehran in 1980, is a popular example of direct action.

3.2.1.5 Counter-Terrorism

Counter-terrorism includes "actions taken directly against terrorist networks and indirectly to influence and render global and regional environments inhospitable to terrorist networks" (Department of Defense, 2010). Counter-terrorism uses many of the same tactics associated with other SF specialties (unconventional warfare, special reconnaissance, foreign internal defense, and direct action). The most obvious (and on-going) counter-terrorism mission is the fight against global terrorism.

<u>3.2.2 Army Special Forces Accession</u>

To become a green beret, a candidate must pass two main stages of training: Special Forces Assessment and Selection (SFAS) and the Special Forces Qualification Course (SFQC). Each stage consists of several intermediate tests meant to test the mental, physical, and psychosocial attributes of the candidate.

3.2.2.1 Special Forces Assessment and Selection (SFAS)

SFAS lasts 24 days[37] and is designed to weed out candidates not qualified to enter SFQC. Prior to the creation of SFAS, all candidates went directly to SFQC, with very little prior screening. SFAS was designed to be a short, intense assessment program that serves as a gate to stop wholly unqualified candidates from entering SFQC. To enter SFAS, a candidate must either submit a nomination package and be approved by a selection board (if the candidate is currently serving in the military), or he must enlist under the Army's 18X military occupational specialty, which designates the new enlistee as an SF candidate (if the candidate is *not* currently serving in the military).

While attending SFAS, each candidate is tested and evaluated on his mental, physical, psychomotor, and psychosocial capabilities. Soldiers go through a series of tests that measure their cognitive ability, physical challenges that test their strength and endurance (e.g., push-ups, sit-ups, pull-ups, short and long runs, and long marches with 65-pound packs, known as "rucks"), and challenges that test their navigational capabilities. Candidates are also given leadership opportunities and are judged by both their cadre and peers on their personal characteristics (e.g., how adaptable they are, how effective they are, whether or not they exercise good judgment, etc.). Candidates can be involuntary withdrawn from SFAS at any time for failing to meet standards. They may also voluntarily withdraw if they feel they will not make it through training or if they decide the SF career field is not for them. Other types of withdrawal include medical withdrawals (i.e., if the candidate is injured and cannot continue) and honor or integrity violations (e.g., instances of lying or cheating). On average, approximately 48% of candidates who enter SFAS are selected for the next phase, SFQC.

3.2.2.2 Special Forces Qualification Course (SFQC)

SFQC consists of five phases and takes anywhere from one and half to three years to complete.[38] In the first phase, Individual Skills Training, the candidate receives land navigation training, learns how to conduct small unit tactics, and participates in live-fire training exercises. In the second phase, Military Occupational Specialty Training, candidates attend training that delves deeper into the

[37] The duration of SFAS has fluctuated over time from between 14-24 days. I use 24 days in this study, as it pertains to the majority of cases.

[38] Differences in completion time are attributable to class availability and military occupational specialty assignments.

specific position they will hold in SF. Although all SF soldiers are expected to be minimally competent in all SF career fields, each soldier has an expert designation in one of the specific career fields shown in Table 3.1. SF teams operate in small units known as Operational Detachment-A, or ODAs. ODAs consist of twelve men from the specialties shown in Table 3.1.

SF Military Occupational Specialties		
Code	**Title**	**Description**
18A	Detachment Commander	Captain position with full command authority and responsibility for the ODA
18B	Weapons Sergeant	Domestic and foreign arms specialist
18C	Engineer Sergeant	Planning, construction, and destruction of buildings and bridges. Also a land mine warfare expert.
18D	Medical Sergeant	Preventive medicine and medical trauma expert for both humans and animals
18E	Communications Sergeant	Radio and cyber communications expert
18F	Operations and Intelligence Sergeant	Intelligence collection and processing, targeting specialist
18Z	Operations Team Sergeant	Senior non-commissioned officer responsible for all operational aspects of the ODA

Table 3.1 – Description of SF Military Occupational Specialty Codes

In the third phase, Collective Training, candidates receive classroom instruction on SF doctrine and organization, as well as training on SF missions: unconventional warfare, direct action, etc. Candidates also receive instruction on Airborne and airmobile operations and are given a chance to practice their skills as a member of a training ODA. The fourth phase, Language Training, consists of obtaining proficiency in at least one foreign language. Languages are assigned based on the candidates' native proficiencies, their aptitude for learning a foreign language, and/or the needs of the Army. Finally, candidates attend the last phase, Survival, Evasion, Resistance, and Escape (SERE) where they are put in a hunted position for five or six days. This is a solo exercise where each candidate must survive in the wilderness and avoid capture while attempting to get to his established rendezvous point. However, if/when he is captured, he must demonstrate that he is capable of withholding classified information under extreme physical and mental duress, all while attempting to escape his captors.

Candidates are evaluated for proficiency in each phase of SFQC. Failure to achieve proficiency may result in involuntary withdrawal from training. On the judgment of the leadership and cadre,[39] some

[39]SFAS and SFQC leadership and cadre are the officers and enlisted personnel in charge of planning and operating the training courses. The leadership plans the content of the courses and is ultimately responsible for day-to-day operations. The staff of cadre

candidates may be given a second chance (called being "recycled") to begin the failed phase anew. Whether the candidate is withdrawn or recycled depends on the level of proficiency demonstrated and any mitigating circumstances. On average, 25% of candidates who apply for SF training make it through all five phases of SFQC, which amounts to a failure rate of approximately 50% for both SFAS and SFQC. In more recent years, however, SFQC success has been in the 65-70% range.[40] Once a candidate completes SFQC, he is awarded the green beret and is a fully qualified SF soldier. It is important to note, however, that a soldier can have his SF designation revoked at any time if he commits a crime or an honor/integrity violation.

3.2.3 Special Forces Accession and Retention Dilemma

Army SF has been wrestling with the contradictory need to increase the number of SF soldiers to meet current and future demand while maintaining the high quality standards associated with elite SF units. The need for soldiers trained in these specialties has never been greater. Frequent, consistent deployment of Army SF troops has placed stress on the existing force and caused an unusually high turnover rate (conversely, a low retention rate).[41]

Further, history has shown that the further removed the US gets from a full-scale operation (e.g., OEF and OIF), the more difficult it becomes to fill military quotas. Patriotism-inducing events (e.g., the September 11th attacks) cause a spike in military enlistments, however as patriotism wanes, enlistments decline. As an all-volunteer force, the US military—including Army SF—can expect to see fewer enlistments in the near future. These forthcoming changes highlight the need to create an effective sustainment plan for Army SF.

The cyclical nature of accession and retention is evident in Army SF: when accession goals and quality criteria are not met, stress on the existing force increases (i.e., too few soldiers to perform

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works closely with the candidates each day to monitor and assess their progress and behavior. The leadership and cadre both sit on the board at the end of each training session to determine which candidates pass and which fail, with leadership having the final decision authority. The vast majority of leadership and cadre has been in the SF career field for over 10 years and has several years of experience in the training environment.

[40]This difference is believed to be attributable to changes in the way SFAS evaluates and selects candidates for SFQC, essentially selecting better candidates to enter SFQC, thus resulting in a higher success rate. However, no analyses have been performed to confirm this anecdotal evidence.

[41]Although Army SF's retention rate is higher than the conventional Army's, this rate is considered low compared to historical Army SF retention rates.

missions). Increased stress leads to higher turnover, which calls for higher accession rates. The cycle continues unabated unless changes are made to increase the *quality* and *retainability* of incoming SF candidates. One of the goals of this research trilogy is to determine which personal characteristics and performance indicators best predict SF training success and retention in the force.[42] How can Army SF best intervene or change this cycle? Is it best to focus on recruiting men who possess superior cognitive ability, or is physical superiority best? Is it a combination of the two, or perhaps something else, like personality or behavioral characteristics? Is it possible to reasonably predict SF soldier retention using data collected during their training, or are additional data necessary?

The goal of this study is to develop an SF accession model that can accurately predict whether or not candidates would make successful SF soldiers using only information that can be gathered prior to attending SFAS (e.g., descriptive and demographic data) or information that is gathered while attending SFAS and SFQC (e.g., physical assessment scores, personality and leadership traits, performance under pressure, selection/non-selection, etc.). Using this information, I hope to learn more about which characteristics are important to recruitment decisions in public service organizations. Factors affecting retention are examined and discussed in the next study, Chapter 4.

3.3 Literature Review

In this section, I review several literatures related to service performance. Specifically, I examine how realistic job previews can help reduce the service performance gap by testing employees' service competencies and service inclination prior to hiring. I also discuss the role that internal marketing plays in building employees' service competencies and service inclination once hired. This section is kept short in this study, as details were provided in Study 1 (Chapter 2). Figure 3.1 depicts the integration of the literatures that follow.

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[42] As Bernston, Sverke, and Marklund (2006) note, employability is a mix of individual (i.e., skills and aptitudes) and contextual (i.e., environmental and economic) factors. The Army naturally sees higher enlistment rates during economic downturns and national security events, such as the attacks on the World Trade Centers. This study focuses on individual factors and uses year dummies to account for contextual time factors.

Figure 3.1 – Literature Integration

3.3.1 The Service Performance Gap

For service organizations, maintaining consistent, quality service is a challenge. Service organizations rely on their front-line employees (FLEs, or boundary-spanners) to provide reliable, superior service at each interaction. FLEs represent their organization, directly performing marketing functions each time they come to work. The performance of an organization's FLEs signals to those outside the organization the level of quality they can expect from the organization. When FLEs perform well, the organization benefits; however, when FLEs perform poorly, it is to the organization's detriment (Zeithaml et al., 2013, p.315-316).

In service organizations, employees play an enormous role in brand management—indeed in some organizations (e.g., independently-owned service organizations), employees *are* the brand. When employees understand their role in delivering the brand's promise, the organization is able to achieve a significant competitive advantage over organizations whose employees are not attuned to their brand management role (King & Grace, 2010). Indeed, *employees* hold the power to deliver the caliber of service the customer expects from the organization—it is their duty to limit and reduce gaps in service performance.

The service performance gap is well known in the services literature, and represents possibly the largest area where service organizations can fail to provide high quality service. Organizations with low performance variability (i.e., high service consistency) are said to enjoy a small service performance gap, whereas organizations with high performance variability (i.e., low service consistency) suffer from a large service performance gap. The desired amount of service consistency varies by organization and type of service. Clearly, fast food restaurants are able (and expected) to provide more standardized performance than hairstyling services or financial services, which necessarily cater more idiosyncratically to their clients' needs (Bienstock et al., 2003).

It is important, however, to note that the term "high quality service" is subjective and varies by customer. This is the quandary of service organizations: How do you consistently deliver high quality service if the concept of high quality differs by customer? Service organizations need talented, conscientious employees who are able to read, understand, and flex to the individual needs and desires of each customer. While service performance can never be completely standardized due to the human-to-human nature of service interactions, performance can be made more consistent by hiring employees whose values, personality, and service orientation match those desired by the organization. The closer this alignment, the more natural it will be for the employee to deliver quality service, thus increasing service consistency and decreasing the service performance gap. In short, finding the right FLEs is critical to service consistency. As Ueno (2010) astutely noted, "[a] fundamental reason for the occurrence of gap 3 [the service performance gap] stems from HR issues, because the service is delivered and performed by employees" (p.76).

Several on-the-job factors have been shown to affect the service performance gap, including role ambiguity, role conflict, poor employee-job fit, inappropriate supervisory controls, lack of perceived control, and lack of teamwork (Whiting et al., 2011; Singh, 2000; Hartline & Ferrell, 1996; Zeithaml et al., 1990). Unfortunately, FLEs are often underappreciated by their organizations. They are typically lower-level employees—underpaid, undertrained, over-worked, and highly stressed (Dagger et al., 2013). FLEs must navigate the unique situations and myriad of personalities they experience during each service encounter. These interactions can often be stressful, requiring both mental and physical efforts as the FLEs attempt to provide high quality service (Zeithaml et al., 2013). In fact, FLEs are subject to large amounts of emotional labor, whereby they must adjust their outward feelings, personality, and even body language to be consistent with their work role (Whiting et al., 2011). Emotional labor can take a large toll on FLEs, leading to emotional exhaustion and burnout (Whiting et al., 2011; Ashill et al., 2009; Singh, 2000).

To reduce service performance gaps, organizations should focus internally, on their FLEs. Properly screening and vetting potential employees for the right service competencies and a natural service inclination increases the probability that they will provide high quality service. Once on the job, continuous training will ensure the employees are able to provide consistent and reliable service.

3.3.1.1 Service Competencies

“Service competencies are the skills and knowledge necessary to do the job” (Zeithaml et al., 2013, p.326). Employees must possess the right mix of knowledge, skills, and abilities to provide high quality service. Service competencies are intelligence or physical requirements desired or required by the organization, and they are often demonstrated through a particular rite of passage. For instance, Army boot camp is a rite of passage whereby each soldier’s intelligence, physical ability, and technical soldiering skills are assessed prior to entry into the organization.

Service judgments—daily opportunities for service organization’s to delight or disappoint customers—are based primarily on the specialized skills, techniques, and experiences of the employee (Whiting et al., 2011), therefore improvement in service quality depends on the mindset and behavior of the employee (Luk et al., 2013). While some employees come equipped the right mix of knowledge, skills, and abilities, others need coaching and training to develop the right technical and behavioral skills. But training for service excellence is not simply a menu of procedural steps for the employee to follow. Instead, the goal is to train employees to *think* and *act* in ways that are *aligned to the values of the organization* in order to fulfill the organization’s brand promises. When done properly, competent employees become an extension of the organization’s brand.

3.3.1.2 Service Inclination

Beyond technical competencies, recruiting the right service employees requires the organization to understand which personality traits, values, and goals are necessary and desired to provide high quality service. In other words, does the potential employee possess a natural interest in doing service related work (i.e., a service inclination) (Zeithaml et al., 2013)? An employee's personality is of particular importance in this regard. "Service disposition[s] [are] measureable and predict service effectiveness" (Schneider & Bowen, 1995, p.121). In fact, several studies (most of which use the "Big Five"[43] personality traits to test their hypotheses) have shown that certain personality traits consistently predict beneficial work behaviors (Auh et al., 2011; Sawyerr et al., 2009; Salgado, 1997; Barrick & Mount, 1991) and remain stable over time (Hopwood et al., 2013; Cobb-Clark & Schurer, 2011; Conley, 1985).

Of particular importance to public service organizations, like the US Army, are *situational personality traits* (Ashill et al., 2009). Situational personality traits are a mix of the individual's personality traits and the service environment. Understanding how an individual's personality traits combine with the unique service environment of public service organizations helps the Army recruit the right employees. Who works productively in certain situations? Who has the ability to self-micromanage, or balance the intellectual and social skills required to provide high quality service? Ashill et al. (2009) suggests that when service organizations are able to recruit employees with the right situational personality traits, those employees will be less subject to exhaustion and burnout because they view each service interaction as a challenge to be overcome, rather than an insurmountable obstacle. It is this sort of problem-solver personality that public service organizations like the Army want in their employees.

Realistic job previews are required to assess whether or not SF candidates possess the right service competencies and service inclination (to include situational personality traits) to become successful green berets. Further, internal marketing is necessary to ensure soldiers remain motivated and confident enough to provide high quality service, as well as generally satisfied with the organization for retention purposes.

3.3.2 The Role of Realistic Job Previews

One way to test if a potential employee has the right service competencies and service inclination, and is able to display them in the complex service environment, is through realistic job preview (RJPs). Several studies have shown that organizations that provide RJPs to their employees achieve

[43]The "Big Five" personality traits are openness, conscientiousness, extraversion, agreeableness, and neuroticism. This conceptualization of the dimensions of personality is very popular among social science researchers.

higher task enrichment, better task performance, and reduced employee turnover (Phillips, 1998; McEvoy & Cascio, 1985). Getting a realistic feel for the job allows employees to clearly understand what they are getting into and helps ensure proper person-job and person-organization fit, thus setting them up for performance success. Once they are set up for success, internal marketing is used to further develop service competencies and service inclinations as well as motivate employees to provide high quality service.

3.3.3 Internal Marketing

Internal marketing (IM) is a strategy organizations use to train, motivate, and reward employees in order to attract and retain the very best service-oriented employees. As proposed by Berry et al. (1976), IM is described as an organization's efforts to understand and satisfy employees' needs in order to achieve better service. IM can be applied to many industries, but is especially suited to services organizations because of the role FLEs play in the creation and performance of services (Gounaris, 2008). The range of activities under the IM umbrella is numerous and varied, but they all have in common that they are aimed at *improving service quality by reducing employee performance variability*.

Internal marketing essentially links the overarching strategy of the organization to the organization's employees. As Ahmed and Rafiq (2003) note, "Internal marketing works by bringing the individual into the collective" (p.1182). In other words, by linking the organization's overarching strategy to the competencies to be performed by responsible employees, the organization increases its collective identity, thereby increasing internal integration among departments, and, ultimately, improving employee performance and satisfaction.

Internal marketing begins by recruiting and training the right people for the organization (Zeithaml et al., 2013; Auh et al., 2011; Fojt, 1996). Once the right employees are on board and trained, IM is used to motivate and reward them to prevent emotional exhaustion and burnout. For service organizations, IM is used to strengthen service competencies and service inclination so that employees feel confident in their position and prepared to handle any customer or service issue that comes their way.

3.4 Conceptual Framework

Due to the nature of the service it provides, Army SF is particularly vulnerable to service performance gaps. Army SF's services are highly interactive and are performed in multiple locations simultaneously. Highly interactive services require a large degree of tailoring to suit unique situations, and this tailoring introduces service variability (or reduces service consistency). Likewise, when services are performed in multiple locations, service expectations, the level of supervisory control, and/or the service environment are likely to be different. These differences (or idiosyncrasies) increase the chance for service variability, potentially widening the service performance gap.

In Army SF, desired service competencies and service inclination are aligned to the unique missions SF performs. As mentioned, unlike the conventional Army, SF units operate in very small, geographically separated teams. SF soldiers must be able to act independently, yet in line with the larger SF and DoD mission. They must possess the right mix of service competencies (i.e., cognitive ability, physical ability, and soldiering skills such as marksmanship, navigational ability, etc.) and service inclination (i.e., desire to serve your country, ability to lead, interpersonal skills to interact with local populations, etc.) to perform effectively.

Service performance is measured in two stages, with binary success/failure outcomes at both stages. The first stage, SFAS, serves as a realistic job preview that allows the "interviewers" (Army SF leadership and cadre) to assess potential SF candidates. In this stage, training is minimal and the candidates are assessed mostly on their *natural* service competencies and *natural* service inclination. How well honed are the candidate's soldiering skills? Does he possess a "no quit" attitude and a proclivity to learn/be taught? These are the performance measures examined at SFAS that are used to predict success in the second stage, SFQC.

In SFQC the realistic job preview continues and elements of internal marketing are implemented. The candidates' natural service competencies are sharpened and solidified through several months of intense training. Skills development is the main focus of SFQC, however the candidate's service inclination is also polished with SF history and indoctrination courses. He is put through a multitude of tests over a period of approximately two years. He must pass each one in order to advance. The sustained pressure of the long and arduous qualification process tests the candidate's service inclination—how bad does he want to succeed? How much is he willing to endure—both mentally and physically—to become an SF soldier? This section details the service competencies and service inclinations that are necessary to become a green beret.

3.4.1 Army SF Context: Service Competencies

3.4.1.1 Cognitive Ability

SF soldiers must be intelligent, possessing the ability to understand both the micro and macro environments simultaneously. The US Army uses measures of general intelligence, or “g,” to assess a soldier’s cognitive ability. Many studies suggest that general cognitive ability is the most comprehensive predictor of success in the workplace (Alexander, 2007; Schmidt & Hunter, 2004; O’Reilly & Chatman, 1994; Ree et al., 1994). “G” is “common to all types of cognitive processing, such as verbal, spatial, numerical, reasoning…and appears to be based on underlying neural processes” (O’Reilly & Chatman, 1994, p.604).

Having a high cognitive ability allows a person to focus on and comprehend both the task at hand and the larger perspective concurrently. This is a skill preferred by nearly all employers, including public service organizations like the US Army. In SFAS and SFQC, having a high cognitive ability is likely to help a candidate understand and navigate obstacles (both literal and figurative) during training, and will allow him to keep a sense of perspective so that he can grasp the overall point of each training event. Therefore, for the first service competency, cognitive ability, I hypothesize:

> *H1a/b: Cognitive Ability (COGNIT) has a positive effect on the likelihood of SFAS/SFQC success.*

3.4.1.2 Navigational Ability

Soldiering skills are a critical service competency for Active Duty SF. Specifically, SF soldiers must possess the ability to navigate covertly in every type of terrain, from mountainous jungles to flat, barren deserts. Navigation is a teachable technical skill, assuming the soldier has the appropriate amount of intelligence to understand the concepts and perform the mathematical calculations.

To measure natural skills and abilities, Army SF subjects soldiers to a series of navigational tests during SFAS and SFQC. To pass these tests, soldiers need to be able to read and understand a complex tactical situation, determine the best course of action, plan and plot their route, and reach their objective within a given timeframe. Land navigation tests the candidate's ability to understand fairly complex skills like reading map contours and planning the most expeditious route to an objective given terrain and tactical restraints. He must analyze and measure the pros and cons of several different routes, then decide on one he will use. Further, the candidate must remain flexible and adapt to interruptions and unexpected changes in his plans. Therefore, for the service competency of navigational ability, I hypothesize:

H2a/b: Navigational Performance (NAVIG) has a positive effect on the likelihood of SFAS/SFQC success.

3.4.1.3 Physical Ability

Given the physically taxing nature of SF missions, SF candidates must demonstrate that they have the strength and endurance to operate independently and carry their own logistical support items. They need to have enough stamina to keep going when missions drag on for days at a time, and they must be capable of operating on very little, if any, sleep. This sort of ability to endure is a unique service competency that is required in public service organizations like Army SF. Therefore, I hypothesize:

H3a/b: Physical Strength (STRENG) has a positive effect on the likelihood of SFAS/SFQC success.

H4a/b: Short-Term Endurance (ENDURST) has a positive effect on the likelihood of SFAS/SFQC success.

H5a/b: Long-Term Endurance (ENDURLT) has a positive effect on the likelihood of SFAS/SFQC success.

3.4.1.4 Ranger Qualification

Some candidates who enter SFAS have already been through a program that tests their soldiering skills, albeit in a somewhat different manner, known as Ranger School.[44] Indeed, a proxy measure of specific skills mastery (i.e., soldiering service competencies) in the US Army is being a qualified Army Ranger. Ranger qualification involves learning small unit leadership and patrol tactics in a highly stressful environment. Rangers are airborne qualified[45] and have the opportunity to attend highly sought-after military training schools, such as Jumpmaster training, Sniper school, Pathfinder training,

[44] See Appendix F for study-specific information regarding Ranger qualification.

[45] Airborne qualified soldiers are able to use the parachute as a means of combat deployment (i.e., "jump" into combat zones). Arguably the most famous airborne combat deployment was D-Day, or the invasion of Normandy by 82d and 101st Airborne Division soldiers in 1944.

Military Freefall, Scuba school, and others. After completing Ranger School, the Ranger Tab is awarded for prominent wear on all uniforms. The Ranger Tab is "a mark of distinction in the military and civilian community and proof positive of proven leadership under the toughest conditions possible" (US Army). In other words, being Ranger qualified is a measure of the candidates' existing service competencies. Therefore, I hypothesize:

H6a/b: Being Ranger qualified (RGRDUM) has a positive effect on the likelihood of SFAS/SFQC success.

3.4.2 Army SF Context: Service Inclination

Finally, as many studies note, personality factors play a large role in determining service quality. Army SF seeks soldiers who have good interpersonal skills and are able to work closely in teams. Anecdotally, SFAS and SFQC leadership and cadre believe personality characteristics are very important to a candidate's success or failure, which is why I went to great lengths to preserve these variables despite the pattern of missing cases (this process is described in more detail in Section 3.5.1.2 and Appendix H).

Personality characteristics are the traits possessed by each candidate, such as adaptability, efficiency, teamwork, interpersonal skills, integrity, leadership ability, perseverance, etc. Admittedly, many of these measures are not validated in previous research, however they are intended to measure qualities that are highly valued in the US military. In fact, the Army's core values are Loyalty, Duty, Respect, Selfless Service, Honor, Integrity, and Personal Courage, which create the acronym, LDRSHIP, or leadership. A candidate who possesses these personality characteristics is likely to have the right mind (i.e., proper service inclination) to successfully complete training, and is likely to be seen as an asset rather than a liability in the eyes of his peers and cadre. To examine service inclination, I hypothesize:

H7a/b: Peer-evaluated Personality Traits (PEEREVAL) have a positive effect on the likelihood of SFAS/SFQC success.

3.4.3 Inter-Construct Hypotheses

Beyond the main effects of the constructs and variables on SFAS and SFQC selection, I am also interested in the relative magnitude of prediction *among* the constructs. In other words, which constructs are most predictive of success? What is the relative order of "predictiveness" among the constructs?

This information is particularly useful to SFAS and SFQC leadership and cadre, as they convene a board after each training session to choose which candidates will pass to the next phase (e.g., SFQC for SFAS, and donning the green beret for SFQC). In other words, just because a candidate completes SFAS and/or SFQC does *not* mean he will be selected to move to the next phase.

Clearly, the easiest decisions are made for candidates who performed very well (definitely select) and for candidates who did not perform very well (definitely *do not* select). The most difficult decisions are made for candidates that hover around average status – those that do not perform very well or very poorly. SFAS and SFQC leadership and cadre discuss these candidates thoroughly at the board, going back and forth about the positive and negative aspects of each candidate's performance until they reach a conclusion to select or not select him. Essentially, SFAS and SFQC leadership and cadre are currently making their decision based on experience, "guesstimating" which measurements and constructs are most predictive of success.

Knowing which constructs are most predictive, and therefore should be given the most weight in determining whether or not to select the "middling" candidates, is extremely valuable to Army SF. Furthermore, understanding the relative magnitude of predictive ability for each construct may offer the Army insight into their past selection patterns. They may feel as though they have been placing a higher value on, say, navigational ability, but the relative magnitudes may show that, in fact, peer evaluated personality traits are, historically, the most predictive construct.

Based on the literature review, I believe that peer-evaluated personality traits will be the most predictive. These soft skills have been shown to predict quality performance time and again (Kluemper, et al., 2013; Lievens & Sackett, 2011; Bradley, 1997; Judge, et al., 1995; Borman, 1982; Goffman, 1975). However, knowing that personality traits are highly correlated with general cognitive ability, and that cognitive ability is also highly predictive of workplace success, I predict that general cognitive abilities (including both the service competencies of cognitive ability and navigational ability, as navigational ability also requires moderately high cognitive abilities) are more predictive than physical abilities. Therefore, I hypothesize:

H8a/b: Personality traits (PEEREVAL) predict SFAS/SFQC success at a higher likelihood than cognitive ability or navigational ability (COGNIT or NAVIG).

H9a/b: Cognitive ability and navigational ability (COGNIT and NAVIG) predict SFAS/SFQC success at a higher likelihood than physical strength, short-term endurance, or long-term endurance (STRENG, ENDURST or ENDURLT).

Visually, the hypotheses are:

Figure 3.2 – Inter-Construct Hypotheses

3.4.4 Other Variables

In addition to the main substantive constructs, I include sets of dummy variables to control for time (year dummies, DYRX), career field (military occupational specialty dummies, DMOSX), whether the candidate is enlisted or an officer (DENLIST), and the candidate's age (AGE and the quadratic term of age, AGE^2). I make no hypotheses for these variables, although the military occupational specialty dummies may prove helpful to understanding the career fields from which the majority of successful candidates matriculate.

Similarly, I cannot predict how the Soldier's age prior to entry into SFAS/SFQC affects his chance of success: older soldiers are likely to have a wealth of experience and wisdom to draw from that will help guide them through training, however, younger soldiers are likely to possess more energy and enthusiasm for the grueling training process, as it appeals to the "machismo" of youthful men. I test both the linear and quadratic effect of age to determine if there is a difference in the fit of the model. The conceptual model for this study is presented in Figure 3.3. Next, I turn to the operationalization of each service competency and service inclination (the oval-shaped constructs).

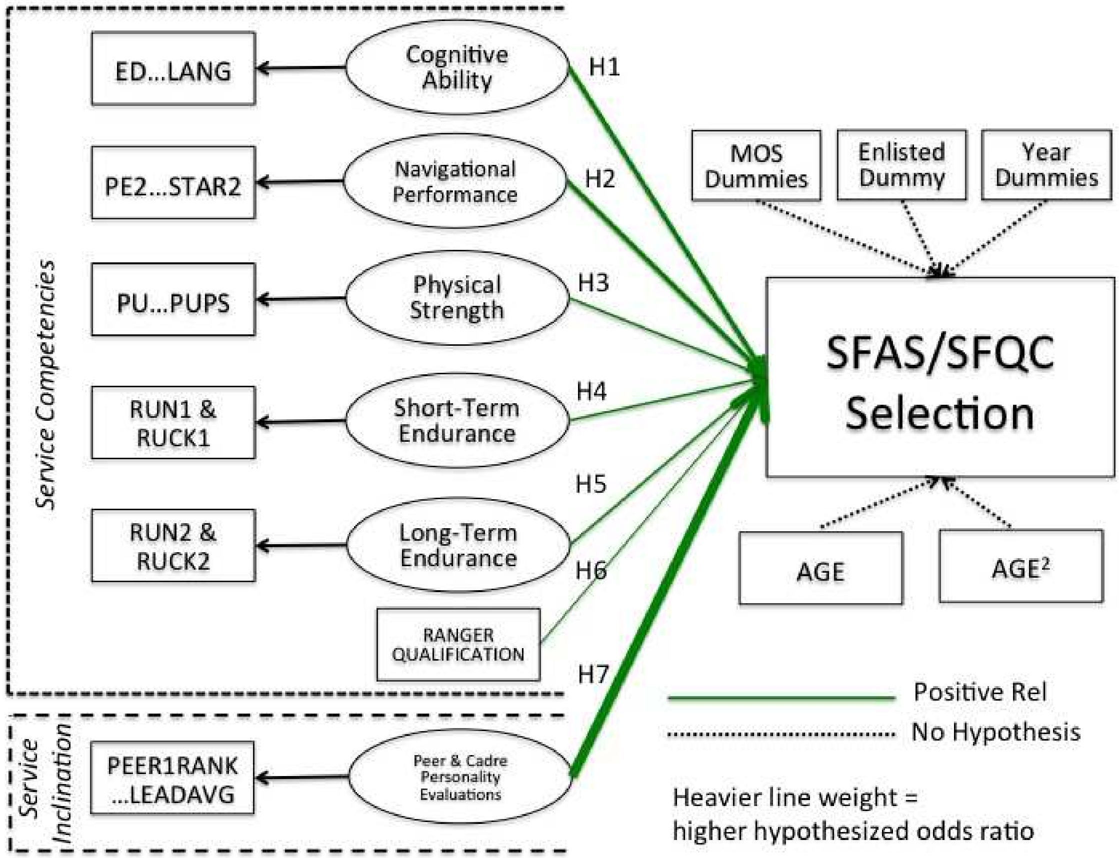

Figure 3.3 – Conceptual Model

3.5 Data

The data for this study consists of measurements that were developed informally by SFAS and SFQC staff. While having many years of experience at successfully producing SF soldiers, they are not academics or statisticians. As a result, the measurements collected were developed ad hoc, without the domain sampling model in mind. Therefore, as a first step, I ascertain the specific measures/constructs that can be derived from the data using Principal Components Analysis (PCA). The PCA is performed on the larger data set (from SFAS) in order to achieve the most accurate results possible. Once the components are extracted via PCA, they are used in the second step, logistic regression analyses, for both the SFAS and SFQC data sets. Descriptive statistics of the components are provided for each of the analyses (see Table 3.8). I begin with a description of the SFAS data, and then move to a description of the SFQC data.

3.5.1 Data Description - SFAS

The SFAS data consists of 23,070 individual cases from 2006 to 2013. Each case contains the candidate's event scores during SFAS and whether or not he was selected to move to the next stage of training, SFQC. In total, 61 objective (e.g., educational history, physical fitness test scores, etc.) and subjective (e.g., peer and cadre assessments and rankings) measures were collected during SFAS. Additionally, three basic descriptive variables (Ranger qualification status, military occupational specialty (MOS), and whether the candidate is enlisted or an officer) and one demographic variable (age) were collected prior to SFAS.[46]

From 2006 to 2013, the average candidate was 25.5 years old.[47] Eighty-eight percent were enlisted and 11% were Ranger qualified. Most of the candidates came from the Infantry career field (DMOS11, 29%) or were immediately placed into SF upon enlistment (DMOS18, 25%). The average candidate had 13.44 years of formal education, the equivalent of high school plus 1.5 years of college.

3.5.1.1 Multivariate Outliers and Influential Cases

The data were examined for the presence of outliers and influential cases. Although outliers did exist, they were not extreme (i.e., out of the range of possibility), nor influential. Analyses were performed both before and after outlier deletion to examine the robustness of the results. The difference in results was inconsequential; therefore all cases were used in the following analyses. Appendix G provides details of the tests for outliers and influential cases, including graphic depictions of outliers and Cook's D estimates.

3.5.1.2 Missing Data

Due to changes in the types of measures the Army collected over the years, gaps in the data exist. Some variables had too few cases to provide reliable results, and thus were excluded from the analyses. Additionally, many of the missing variables are missing not at random (MNAR). These data were uncollectable because of the candidates' voluntary or involuntary withdrawal from SFAS. In other

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[46]Race was not examined, as the archival data did not include this information. Anecdotally, the race of the candidates mirrors that of the actual SF population. The vast majority is white, with minorities representing approximately 10% of officer candidates and 14% of enlisted candidates. Of the minority candidates, approximately 1/3 are black and 1/3 are Hispanic. The other 1/3 consists of primarily Asians, Pacific Islanders, and Native Americans (Harrell et al., 1999).

[47]The SF career field is only open to male candidates, thus 100% of the sample is male.

words, once a candidate withdraws from SFAS training, any uncollected measurements are rendered incalculable.

Appendix H provides a visual representation of the pattern of missing variables by year and provides additional information concerning which variables were kept and which were discarded. In total, twelve variables with too few cases were removed, leaving 49 variables for the PCA.[48] Table 3.2 provides a brief description and basic statistics for each variable collected during SFAS.

[48]Only the variables collected during SFAS (variables 12-60) were used in the PCA. Descriptive and demographic variables were added in the logistic regression.

Description and Basic Statistics for Each SFAS Variable							
No.	**Name (Abbreviation)**	**Abbreviation**	**Description**	**Mean**	**SD**	**Min**	**Max**
1	Ranger Status	RGRDUM	Dummy variable = 1 if the candidate is Ranger[49] qualified, 0 else	.11	.31	0	1
2	Age	AGE	Candidate's age	25.52	4.30	17	50
3	Enlisted Status	DENLIST	Dummy variable = 1 if the candidate is an enlisted Soldier, 0 if the candidate is an officer	.88	.32	0	1
4	Military Occupational Specialty: -- Infantry	DMOS11	Dummy variables for each of 7 possible military occupational specialties	.29	.45	0	1
5	-- Artillery	DMOS13		.06	.23	0	1
6	-- 18X Special Operations	DMOS18		.25	.43	0	1
7	-- Armor	DMOS19		.04	.21	0	1
8	-- Medical	DMOS68		.04	.20	0	1
9	-- Quartermaster	DMOS92		.04	.19	0	1
10	-- All Other MOS	DMOS99		.28	.45	0	1
11	Year Dummies	DYRX	Dummy variables that take into account changes that occur across the years	--	--	0	1
12	Education	ED	Candidate's education level, measured in years	13.44	1.78	10	27
13	General Technical Score	GT	Candidate's score on this section of the ASVAB[50]. Measures Arithmetic Reasoning, Word Knowledge and Paragraph Comprehension	116.73	9.09	89	154
14	Wonderlic Score	WL	Measures the candidate's general cognitive ability (0–100 points)	55.80	28.28	1	100
15	General Ability Measure for Adults	GAMA	Measures the candidate's non-verbal IQ	111.14	13.75	10	150
16	Defense Language Aptitude Battery	DLAB	Measure's the candidate's aptitude for learning a foreign language	88.57	20.70	10	196
17	Test of Adult Basic Education – Reading Portion	READ	Measure's the candidate's basic education level in reading, math, and language. Highest score attainable is 12.9.	12.35	1.36	1.1	12.9
18	Math Portion	MATH		12.05	1.55	1.1	12.9
19	Language Portion	LANG		11.89	1.85	1.4	12.9
20	Push Ups	PU	Candidate's push up score measured on a scale of 0-100	87.74	10.66	16	100

[49] Being Ranger qualified means that the soldier has successfully completed the two-month long Ranger school, making them qualified to conduct joint special operations direct action missions.

[50] ASVAB is the Armed Services Vocational Aptitude Battery, an aptitude test given to all incoming military members.

			(2 minute assessment)				
21	Pull-Ups	PUPS	Count of the number of pull-ups performed (2 minute assessment)	10.17	4.04	1	50
22	Sit Ups	SU	Candidate's sit up score measured on a scale of 0–100 (2 minute assessment)	89.71	10.13	17	100
23	2-Mile Run	RUN	Candidate's run score measured on a scale of 0-100 (2 miles)	91.15	10.84	9	100
24	Obstacle Course	OCOURSE	Candidate's obstacle course assessment score (0-100 points)[51]	17.75	33.71	0	100
25	4-Mile Run	RUN1	Candidate's time (in minutes)	33.75	8.45	22	129.12
26	6-Mile Run	RUN2	Candidate's time (in minutes)	51.23	7.85	36	172.83
27	6-Mile Ruck	RUCK1	Candidate's time (in minutes)	90.20	22.07	36.5	234.82
28	10-Mile Ruck	RUCK2	Candidate's time (in minutes)	138.11	29.05	60	249.52
29	Practical Exercise Land Navigation: -- 1st Phase	PE1	Candidate's score on land navigation exercises. Exercises continually get more difficult as the candidate proceeds from Phase 1 to Phase 4 (higher is better)	3.12	1.21	0	4
30	-- 2nd Phase	PE2		3.28	1.17	0	6
31	-- 3rd Phase	PE3		3.05	1.42	0	8
32	-- 4th Phase	PE4		4.43	2.83	0	8
33	Standard Land Navigation: -- 1st Phase	STAR1	Candidate's score on land navigation exercises. Exercises continually get more difficult as the candidate proceeds from Phase 1 to Phase 2 (higher is better)	2.26	1.34	0	14
34	-- 2nd Phase	STAR2		2.46	1.32	0	11
35	Overall Class Rank by Peers: -- 1st Round	PEER1RANK	"Rack and Stack" ordering/ranking of all members of the class (higher is worse)	103.32	70.02	1	380
36	-- 2nd Round	PEER2RANK		89.74	59.04	1	350
37	Peer Rating Average: -- 1st Round	PEER1OVER	Average rating of the candidate by three peers measured on a scale of 1-5 (higher is better)	3.56	.88	1	5
38	-- 2nd Round	PEER2OVER		3.85	.52	1	5
39	Peers WOULD NOT want candidate on team: -- 1st Round	PEER1PINK	Count data representing peer evaluations of who they would LEAST like to work with on an SF team (higher is worse)	.66	1.70	0	19
40	-- 2nd Round	PEER2PINK		.53	1.62	0	17
41	Peers WOULD want candidate on team:	PEER1BLUE	Count data representing peer evaluations of who they would MOST like to work with on an SF team (higher is	.54	1.34	0	15

[51] A score of zero on the obstacle course occurs when the candidate fails to complete the course. Failing the obstacle course does not necessarily cause immediate involuntary removal from SFAS.

	-- 1st Round		better)				
42	-- 2nd Round	PEER2BLUE		.43	1.15	0	13
43	Behavior Tracking: -- Extreme Negative Behavior	EXTNEG	Count data that captures cadre observations of the candidate outside of graded events	.37	.88	0	11
44	-- Moderately Negative Behavior	MODNEG		1.02	2.19	0	53
45	-- Minimally Negative Behavior	MINNEG		.24	.71	0	9
46	-- Positive Behavior	POS		.04	.26	0	6
47	Personal Characteristic Rating Average: -- Adaptability	ADAPTAVG	Average rating of the candidate on each available personality trait from 4 different peers and cadre on a scale of 1-5 (higher is better) Note: Rating availability varies by year, see Appendix H.	3.66	.59	1	5
48	-- Personal Responsibility	PERSRESAVG		3.33	.47	1	5
49	-- Team Player	TEAMWOAVG		3.35	.9	.33	5
50	-- Perseverance	PERSEVAVG		3.48	.48	1	4.92
51	-- Capability	CAPABAVG		3.62	.5	1.13	5
52	-- Courage	COURAVG		3.73	.37	1.36	5
53	-- Integrity	INTEGAVG		3.73	.38	1	5
54	-- Professionalism	PROFAVG		3.55	.44	1	5
55	-- Character	CHARAVG		4.03	.43	1.09	4.97
56	-- Effectiveness	EFFAVG		3.92	.61	1	5
57	-- Influence	INFLUAVG		3.75	.49	1.08	4.94
58	-- Judgment	JUDGAVG		3.75	.48	1.09	4.85
59	-- Interpersonal Ability	INTERPERAVG		3.76	.57	1	5
60	-- Leadership	LEADAVG		3.65	.61	1	5

Table 3.2 – Description and Basic Statistics for Each Variable – SFAS Dataset

3.5.2 Data Description – SFQC

To examine which variables are most predictive of SFQC success, I gleaned data from Army spreadsheets used to track whether or not a candidate successfully completed SFQC. I had hoped to find data that provided more detailed measures of each candidate's performance as he progressed through SFQC (i.e., measurements that show how well or poorly the candidate performed during each phase of SFQC), however the Army did not collect these data.[52]

The data I was able to collect were a binary measure of whether or not the candidate passed SFQC and was selected for Active Duty SF. I regress these data on SFAS components (from the PCA, see Section 3.6.2) to determine if the predictors of SFQC success are the same as the predictors of SFAS success. The ultimate goal of Army SF leadership and cadre is to produce successful green berets, therefore knowing which variables predict SFQC success *and whether or not they are properly screening for those variables during SFAS* is of most enormous practical importance.

3.5.2.1 Merging Data

To get to the proper data set to analyze, I had to merge the SFAS and SFQC data sets by SSN. It is important to emphasize that the two data sets were not equally matched. SFAS data contained 23,070 cases from 2006 to 2013; however only 9,371 of those candidates (40.61%) were actually selected to attend SFQC. Therefore only 9,371 cases from the SFAS data were eligible to be matched to the SFQC data.

Because the process of attending SFQC takes between 1.5 and 3 years to complete, no candidates who went through SFAS in 2013 had completed SFQC yet, and many of those who attended SFAS in 2012 were also not finished. Further, the SFQC data for the 2007 SFAS class was stripped of its SSNs, therefore I was not able to match or analyze cases from candidates who passed SFAS in 2007.

The SFQC data contains only those candidates who had successfully completed both SFAS and SFQC from 2006 to 2012 (less the missing cases from 2007). Table 3.3 shows the breakdown of the number of successful and unsuccessful candidates by year group. Although the successful/unsuccessful rates for 2006 and 2012 differ greatly from the rates of other years, their totals very nearly match the

[52] Naturally, this data search highlighted areas of deficient data collection in SF training. Many of the SF leaders involved in this study were surprised to find that more detailed measures were not being kept. They intend to improve measurement collection in future training classes.

number of candidates sent to SFQC during those years, and are therefore deemed accurate.[53] SFQC leadership and cadre did not have a reason for the lower success rates during those years.

Successful and Unsuccessful SFQC Candidates by SFAS Year Group		
SFAS Year	**Number (%) Successful**	**Number (%) Unsuccessful**
2006	161 (9.59%)	1518 (90.41%)
2007	Missing SSNs	
2008	382 (31.23%)	841 (68.77%)
2009	403 (33.20%)	811 (66.80%)
2010	778 (48.02%)	842 (51.98%)
2011	731 (52.40%)	664 (47.60%)
2012	228 (17.18%)	1099 (82.82%)

Table 3.3 – Number (%) of Successful and Unsuccessful SFQC Candidates by SFAS Year Group

After the files were matched, there were a total of 8,458 cases.[54] Of those cases, 2,683 candidates had successfully completed both SFAS and SFQC, for a SFQC pass rate of 31.72%.[55] From 2006 to 2012, the average SFQC candidate was 25.4 years old. Eighty-three percent were enlisted and 18% were Ranger qualified. The majority of candidates were placed in SF upon enlistment (DMOS18, 34%), followed closely by candidates from the Infantry career field (DMOS11, 32%). I used the component scores determined in the forthcoming PCA (Section 3.6.2) to examine both SFAS and SFQC success. Table 3.8 provides the basic descriptive statistics for each of the variables used in the analyses.

3.5.2.2 Multivariate Outliers and Influential Cases

The newly merged data were examined for the presence of outliers and influential cases. Outliers did exist, and some were influential. Analyses were performed both before and after outlier deletion to examine the robustness of the results. I removed 1,056 outlying cases to compare the results, for a revised total N of 7,402. Table 3.23 provides the results of the analyses both with and without outliers. Since there were no major differences in the fit of the models, I chose to keep all cases in the logistic regression.

[53] The numbers do not match exactly because, inevitably, a few candidates selected from SFAS fail to show up to SFQC. Although the exact reasons why these candidates choose to "no show" to SFQC is not formally collected, anecdotal evidence suggests they decide to stay in their current career field after they finish SFAS. The number of candidates who fail to show up is very small, typically less than 1% of the number of candidates sent.

[54] While 8,458 cases were completely matched, not all cases contain complete information (i.e., not all cases have values for each construct). Therefore, the N for the logistic regression is 7,899.

[55] 2,683/8,458 = 31.72%

3.6 Measurement Development

To develop constructs out of the existing data, I first grouped the variables into broad constructs based on the insight and judgment of experts (SFAS and SFQC leadership and cadre). This exercise was performed to informally evaluate the underlying constructs being measured by variables 12-60 in Table 3.2. It allowed me to examine whether or not the measurements collected during SFAS *actually measure* the constructs leadership and cadre *believe* they are measuring. These estimations were validated via Principal Components Analysis (PCA) using Stata version 12.1. The PCA accurately captures the underlying correlation structure within the data and confirmed many of the constructs we (myself and the leadership/cadre) expected to find.

3.6.1 Informal Construct Identification

Non-demographic variables (variables 12 through 60 in Table 3.2) were grouped together based strictly on information garnered from SFAS and SFQC experts' best guesses of the constructs measured by the variables. For example, I expected all measurements of the candidates' cognitive ability to group together, and I expected that all measurements of the candidates' personality characteristics to be closely related. I expected seven components to describe the structure of the myriad of measures of each candidate, as shown in Table 3.4. I discuss the details of the measurement variables for each of the constructs in the paragraphs that follow.

Informal Construct Identification			
Comp. No.	**Description**	**Variable No.**	**Variable Names**
1	Cognitive Ability	12 – 19	ED, GT, WL, GAMA, DLAB, READ, MATH, LANG
2	Physical Strength	20 – 23	PU, SU, RUN, PUPS
3	Physical Endurance	25 – 28	RUN1, RUN2, RUCK1, RUCK2
4	Event Performance	24 and 29 – 34	OCOURSE, PE1, PE2, PE3, PE4, STAR1, STAR2
5	Peer Rankings	35 – 42	PEER1RANK, PEER1OVER, PEER1PINK, PEER1BLUE, PEER2RANK, PEER2OVER, PEER2PINK, PEER2BLUE
6	Behavioral Assessment	43 – 46	EXTNEG, MODNEG, MINNEG, POS
7	Personality Characteristic Assessments	47 – 60	ADAPTAVG, PERSRESAVG, TEAMWOAVG, PERSEVAVG, CAPABAVG, COURAVG, INTEGAVG, PROFAVG, CHARAVG, EFFAVG, INFLUAVG, JUDGAVG, INTERPERAVG, LEADAVG

Table 3.4 – Informal Construct Identification

3.6.1.1 Cognitive Ability

The Cognitive Ability construct was expected to include eight variables (variables 12-19 in Table 3.2) that measure different facets of a candidate's mental aptitude. Most of the measures of cognitive ability are gathered via standardized tests, with the exception of ED, which is simply a count of the number of years of formal schooling attained by the candidate.

The three most basic tests are the GT, TABE, and the Wonderlic exam. The General Technical (GT) score is taken from the Armed Services Vocational Aptitude Battery (ASVAB), which is a required test for all new military entrants. This score measures the candidate's arithmetic reasoning, word knowledge, and paragraph comprehension. The Test of Adult Basic Education (TABE) assesses the candidate's skills and knowledge in reading, math, and language comprehension. Similarly, the Wonderlic exam measures the candidate's level of educational functioning. The General Ability Measure for Adults (GAMA) is a bit different, as it measures the candidate's *non-verbal* intelligence by asking him to match illustrations, complete sequences, comprehend analogies, and construct figures. Finally, the Defense Language Aptitude Battery (DLAB) measures the candidate's ability to learn a foreign language. A good score on this test is essential for SF duty, as all green berets are required to attend language training and become proficient in a foreign language.

3.6.1.2 Physical Strength and Physical Endurance

Physical abilities were expected to align under one of two constructs: Physical Strength and Physical Endurance. Physical Strength includes variables that assess mostly upper-body or short term tests of strength, such as push-ups, sit-ups, a two-mile run, and pull-ups (variables 20-23). Push-up, sit-up, and pull-up scores are based on the maximum number of properly performed movements in a two-minute time period. While pull-up scores are based on a total count, push-up and sit-up scores are transformed to an Army-wide 0-100 scale that is used for the semi-annual Army Physical Fitness Test. Scores vary by age group, and are scaled such that points accumulate faster (slower) at lower numbers of push-ups (sit-ups), then slower (faster) as the number of completed push-ups (sit-ups) increases. For instance, a 25 year old male (the average age in this sample) earns 25 points for 9 push-ups, 50 points for 31 push-ups, and 100 points for 71 push-ups. He earns 25 points for 24 sit-ups, 50 points for 43 sit-ups, and 100 points for 80 sit-ups.

The two-mile run is also part of the semi-annual Army Physical Fitness Test and is also based on a scale of 0-100. To earn 25 points, a 25-year old candidate must run two miles in 19:42 minutes (9:51 minutes per mile pace), for 50 points, he must do it in 17:30 minutes (8:45 minutes per mile pace), and for 100 points, he must run two miles in 13:00 minutes (6:30 minutes per mile pace).

Physical Endurance includes variables that assess mostly lower-body and longer-tem tests of strength, such as four- and six-mile runs and six- and ten-mile rucks (variables 25-28). A ruck is a fast-paced walk over rough terrain wearing a 65-pound backpack (known as a rucksack). Rucks may also entail wearing body armor (to include the combat helmet) and carrying food, water, and a weapon. Total carrying weight is estimated to be over 100 pounds. The runs are performed on dirt paths through the surrounding pine forests. There are hills along the course, but overall, the course is fairly flat. All endurance events are measured by the candidate’s total time for each event (i.e., there is no point scaling for these events), and it is, of course, better to be faster.

3.6.1.3 Event Performance

The Event Performance construct was expected to include various tests of soldiering skills, to include the obstacle course and navigational tests (variables 24 and 29-34). These events require a skillful mix of cognitive ability to assess the best or most efficient way to complete the task (i.e., good judgment and excellent map reading skills) and the physical ability to endure the event.

The obstacle course (nicknamed “Nasty Nick”) consists of a series of mostly wooden, metal, and rope structures that requires proper judgment, physical ability, and finesse to surmount. Typical obstacles include: (1) a very high wooden structure of beams, where the candidate must climb up one side, then back down the other, (2) a series of rounded wood balance beams that increase in height as the candidate progresses, (3) rope swings across open water, (4) rope climbs, (5) passing over thin rope bridges, etc. Candidates must run from one obstacle to the next, with obstacles spaced every 50 to 100 yards. The course is performed under time pressure: the faster the candidate gets through the course, the better his score, which is based on a scale of 0-100. Candidates must successfully complete each obstacle before moving to the next one.

The navigational events (PE1-PE4 and STAR1-STAR2) are performed in phases. The purpose of this set up is to allow the candidate time to increase his mastery of the required navigational skills over the course of SFAS. Candidates receive short refresher sessions on the basics of land navigation during the early phases, encompassing such topics as how to read contour lines on a map to assess elevation, learning to plot coordinates, and learning to use the compass and pace count to orient themselves. During later phases, candidates must plan a route to get to their “attack point” on their own, and must use their cognitive and physical abilities to get there on time. As the phases progress, navigation gets more difficult (i.e., more difficult terrain, longer distance, navigating during the night, etc.). Candidates may earn up to 4 points in each navigational event. Points are based on their planning and performance.

3.6.1.4 Peer Rankings

The fifth construct, Peer Rankings, essentially measures performance and likeability (variables 35-42). Team members are asked to rank each other within the team (#1 is best) and provide an overall rating of each candidate on a Likert scale of 1 to 5 (with 5 being the highest score). Further, each team member may hand out three “pink” and three “blue” ratings. Giving a peer a “pink” rating means that the rater would NOT like to work on a team with the rated candidate in a real-world situation. Giving a peer a “blue” rating means that the rater WOULD like to work on a team with the rated candidate in a real-world situation. “Pink” and “blue” scores are count data based on the number of each rating received.

Obviously, receiving one or more “pink” ratings speaks to the candidate’s *lack* of likability and/or operational effectiveness, whereas “blue” ratings speak to the candidate’s likability and/or operational effectiveness. I expected these variables to group together, and that ranking (PEERXRANK) and pink (PEERXPINK) would load negatively, since a higher score is considered worse for these variables.

3.6.1.5 Behavioral Assessment

For the sixth construct, Behavioral Assessment, I expected the four variables that assess the candidates outward behavior (as a degree of negative or positive behavior) would group together (variables 43-46). Negative or positive behavior is assessed by SFAS cadre and is a way to track a candidate’s attitude that might otherwise goes unmeasured. The measurement is subjective (based on cadre opinion) and is simply a count of the number of negative or positive behaviors displayed by the candidate. For instance, a candidate could score well on his 6-mile ruck, however if his attitude was consistently and outwardly poor during the event, the behavioral assessment would capture this negative aspect of the candidate’s performance. When things go wrong, is the candidate likely to react negatively or positively? Is the candidate able to modify his behavior to suit the situation? Displaying consistent, positive behavior allows the cadre to see that the candidate’s behavioral reactions are consistent and predictable, i.e., that he is not a “loose cannon.”

3.6.1.6 Personality Characteristic Assessments

Finally, I expected the seventh construct, Personality Characteristic Assessments, to capture the general personality of a candidate. At two periods during SFAS, the candidates’ personalities are evaluated by their teammates (peers) and by the cadre.[56] Candidates are given scores based on a Likert scale of 1 to 5 for each of the assessed personality characteristics. After the first evaluation, the candidate is given feedback so he can adjust, if necessary. How adaptable is the candidate? Does he display courage and integrity? Does he step up and take a leadership role when warranted? A candidate who possesses positive personality characteristics is likely to have the right mind to successfully complete training, and is likely to be seen as an asset rather than a liability in the eyes of the training cadre. The

[56]Importantly, the peer evaluations and the cadre evaluations were found to be nearly identical for each candidate. This speaks to the reliability of these assessments.

Army considers these personality characteristics to be indicative of future success in SF, and I expected they would group together into one construct.

It is important to re-emphasize that the type of personality characteristics assessed varied over the data collection period. In short, the pattern of “missingness” requires that I perform four separate Principal Components Analyses (PCAs) in order to examine how and where these personality characteristic variables load onto the components.

3.6.2 Principal Components Analysis (PCA)

Following the informal grouping of the variables, a PCA was performed and the results were compared. PCA is a data reduction technique that aims to group like variables based on underlying correlations within the data. PCA reveals the internal structure of the data in a way that captures as much variance as possible. In reducing the data, I am essentially transforming hard, individual measures into latent constructs (components). I examined both the unrotated and rotated (orthogonal and oblique) solutions to better gauge the stability of the constructs. All solutions were evaluated using the Kaiser-Guttman (eigenvalue > 1) Criterion, the scree test, and Horn’s Parallel Analysis to determine how many components to retain.

3.6.2.1 Kaiser-Guttman Criterion, Scree Test, and Horn’s Parallel Analysis

The Kaiser-Guttman criterion, scree test, and Horn’s Parallel Analysis results are provided in Table 3.5. Figure 3.4 provides a visual representation of the scree test and Horn’s Parallel Analysis. As Zwick and Velicer (1986) point out, each criterion has its advantages and disadvantages. In particular, the Kaiser-Guttman eigenvalue > 1 criterion has been shown to grossly overestimate the number of components to retain, and that that number commonly corresponds to a third to a sixth of the number of variables in the correlation matrix. Zwick and Velicer also note that while the scree test is fairly accurate, it can suffer from rater subjectivity, meaning that different viewers of the graph may find different cut-off “elbows,” and thus different numbers of components to retain. Horn’s Parallel Analysis appears to be the most reliable criterion, although when it errs, it tends to overestimate by one or two components (Glorfeld, 1995).

Number of Components to Retain by Year Group & Criterion			
Year Group	**Kaiser-Guttman**	**Scree Test**	**Horn's Parallel Analysis**
2006-2013	**11**	**7**	**7**
2012-2013	11	4	6
2010-2011	11	6	6
2006-2009	12	5	7

Table 3.5 – Number of Components to Retain by Year Group and Criterion

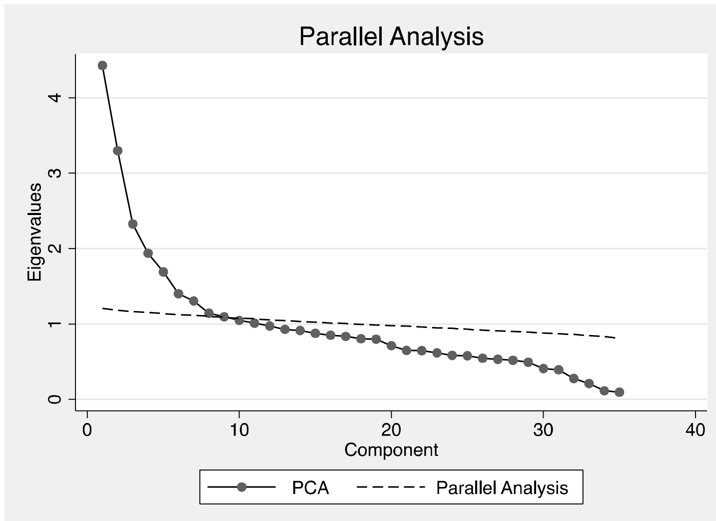

Figure 3.4 – Scree Test and Horn's Parallel Analysis for Years 2006-2013, Oblique (Promax) Rotation

These results suggest I should retain six or seven components. It is important to note that due to changes in the variables measured by SFAS leadership and cadre over the years, not all variables were collected—and therefore available for analysis—each year. To account for variable differences, four different PCAs were performed: (1) using variables common to all years (2006-2013), (2) using variables common to years 2012-2013, (3) using variables common to years 2010-2011, and (4) using variables common to years 2006-2009.

3.6.2.2 Factor Loadings

The results of the PCA, shown in Table 3.6,[57] were similar to the informal construct estimation shown in Table 3.4. Given the fact that the data were not gathered following the domain sampling model,

[57]Table 3.6 shows the oblique rotation because it had the highest loadings for each component, however the unrotated and orthogonally rotated versions provided very similar results in terms of the pattern of variables loading onto factors, which speaks to the stability of the underlying structure. The unrotated and orthogonal versions are available in Appendix I. All versions show loadings > .40. Further, Principal Axis Factoring (PAF) was also used to examine the underlying structure of the data. The results were similar to those of the PCA, however the PCA was more readable (i.e., more variables aligned in a way that improved face validity) and was therefore chosen for inclusion. See Appendix J for the PAF results.

these results are not as clean as they would be had I had access to data measured by fully developed and tested scales. I expected that some variables would not load on any factor, and that not all factors would be interpretable.[58] Despite these difficulties, I obtained results that were quite usable.

These results shown in Table 3.6 are based on all available, common variables in all years of the data set (2006-2013). In other words, it includes variables 12 to 46 of Table 3.2, but not variables 47 to 60 (the personality characteristic variables), since they are not common across all year groups. In each of the separate analyses (2012-2013, 2010-2011, and 2006-2009), variables 47-60 (the personality characteristic variables) aligned themselves with variables 35-42 (the peer ranking variables), and are therefore considered part of the first factor.

Rotated factor loadings (pattern matrix) and unique variances

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7	Uniqueness
ED		0.4718						0.6649
GT		0.7552						0.4257
WL		0.7379						0.4549
GAMA		0.4427						0.6958
DLAB		0.7763						0.4007
READ		0.4461						0.7813
MATH		0.6378						0.5721
LANG		0.6162						0.5940
PU					0.7010			0.4832
SU					0.5670			0.6649
RUN					0.4101			0.6068
OCOURSE							-0.7394	0.4244
PUPS					0.7624			0.4199
RUN1				-0.8844				0.1441
RUN2				0.7956				0.2916
RUCK1							0.4843	0.5067
RUCK2				0.8624				0.1658
PE1								0.6777
PE2			0.4121				0.4492	0.6427
PE3			0.5660					0.6736
PE4			0.6076					0.5753
STAR1			0.7167					0.4827
STAR2			0.7200					0.5170
PEER1RANK	0.7836							0.3818
PEER1OVER	-0.8074							0.3680
PEER1PINK	0.5855							0.5489
PEER1BLUE	-0.5523					0.4253		0.4706
PEER2RANK	0.7895							0.3692
PEER2OVER	-0.8056							0.3267
PEER2PINK	0.5693							0.4861
PEER2BLUE	-0.5606							0.5456
EXTNEG								0.7580
MODNEG						0.4154		0.7561
MINNEG								0.8630
POS								0.8512

(blanks represent abs(loading)<.4)

Table 3.6 – PCA Results

[58] Each retained component must be composed of at least two substantial variable loadings (Zwick and Velicer, 1986), although a minimum of three is preferable. Components six and seven in Table 3.6 contain at least two substantial loadings, but their groupings are not logical. Because these variables do not combine to make a comprehensible component, I chose to not interpret the sixth or seventh component.

I could only logically interpret five of the components in Table 3.6.[59] However, as described below, I chose to split the fourth factor into two separate constructs (short-term endurance and long-term endurance), therefore I retained a total of six constructs.

3.6.2.3 Summary of Retained Components

The first component consists of peer rankings. Importantly, the overall rating and the number of "blue" assessments loaded in an opposite pattern to the numerical ranking and number of "pink" assessments, as the two sets of measurements are negatively related (i.e., higher overall rating and higher number of "blue" assessments indicates a better candidate, whereas higher numerical ranking and higher number of "pink" assessments indicates a worse candidate). When the PCA was performed on each cohort separately (in order to include the differing measures of personality characteristics, variables 47 to 60), I found that in each cohort these variables aligned with the peer rankings. Intuitively this makes sense: if your peers rate you high (low) on various measures of your personality, they are likely to rank you high (low) overall. Therefore, rather than finding two separate constructs (peer rankings and personality characteristics), I found one construct that combined all 22 variables, which I simply call peer evaluations (PEEREVAL).[60]

It is important to emphasize that of the 22 variables comprising PEEREVAL, 8 are consistent across all years (2006-2013), while the remaining 14 differ by year group. The 8 consistent variables are the peer rankings and the differing variables are the personality characteristics. For instance, in 2012, the candidates were rated on each of 12 personality characteristics, whereas in 2011 the candidates were only rated on 4 personality characteristics. To provide an equitable comparison, a score was calculated for each candidate by averaging the variables captured in the candidate's year and standardizing the construct.

[59] After obtaining the results from the seven components PCA, I performed analyses for five and six components (see Appendix I). The results were very similar, with minor changes in the loadings of RUN (which fails to load at >|.40|) and RUCK1 (which loads with the navigational variables, PE3, PE4, STAR1, and STAR2). I chose to display the seven components PCA as it is the most logically interpretable with regard to RUN and RUCK1 and more closely aligns to the results found in Table 3.5.

[60] I examined the two constructs separately and found they correlated rather highly, between .6 and .7, which provides further evidence for combining all the variables into one construct.

The second component clearly measures the candidate's cognitive ability (COGNIT). All measures of the candidate's education level and general mental aptitude load directly on this component, as was expected by the informal grouping of the variables.

The third component is comprised of five measures of navigational ability, a critical service competency for SF success. I expected to find an overall event performance component that also included the obstacle course event, however the obstacle course did not load on this component or any of the other interpretable constructs. Therefore, I refer to this component as navigational ability (NAVIG) rather than event performance.

The fourth component consists of measures of physical endurance, which I expected to find. I was surprised to find, however, the negative loadings of the shorter endurance events, RUN1 (4 mile run) and RUCK1 (6 mile ruck).[61] After consulting with the leadership and cadre, we could find no reason why the shorter endurance events would be negatively correlated with the longer endurance events. In other words, this component failed to achieve face validity. However, all endurance events were deemed substantively important (i.e., these events cause many candidates to quit or be eliminated from SFAS), therefore I chose to keep all the variables. To do this, I separated the variables into two constructs: short-term endurance (ENDURST) and long-term endurance (ENDURLT).

The fifth component from Table 3.6 is composed of the push-up assessment, sit-up assessment, a 2-mile run, and the pull-ups assessment. These items clearly measure the candidate's physical strength (STRENG), as predicted.

Components six and seven did not translate well into meaningful components and did not add any substantive value; therefore they were dropped from further analyses. Interestingly, the behavioral variables (EXTNEG, MODNEG, MINNEG, and POS) did not load clearly on any component. After consulting with the leadership and cadre, they were deemed minimally informational and dropped from subsequent analyses.

[61] RUCK1 did not load >|.40|, therefore it is not shown in Table 3.6. However, it is a substantively important event to SFAS success, and is therefore included in the component.

3.6.2.4 Scale Reliabilities

In total, six separate components were identified. To create the constructs, I first standardized each candidate's scores within each measurement. Next, I averaged the standardized scores into the appropriate construct, making sure to account for negatively angled variables by multiplying their standardized scores by -1 before averaging. The constructs were then standardized to a mean of 0 and a standard deviation of 1.

Finally, scale reliabilities were calculated for each construct. The components, their associated variables, and scale reliabilities are given in Table 3.7. Scale reliabilities were acceptable, particularly for exploratory research using historical data and with measures that were not developed with the domain sampling model in mind (Nunnally, 1978).

PCA Components and Scale Reliabilities

Comp. No.	Description	Name	Description	Variable No.	Variable Names	Alpha
1	Peer Evaluations	PEEREVAL	Measure of the candidate's likability and degree of positive personality characteristics	35-42 & 47-60	PEER1RANK, PEER1OVER, PEER1PINK, PEER1BLUE, PEER2RANK, PEER2OVER, PEER2PINK, PEER2BLUE, ADAPTAVG, PERSRESAVG, TEAMWOAVG, PERSEVAVG, CAPABAVG, COURAVG, INTEGAVG, PROFAVG, CHARAVG, EFFAVG, INFLUAVG, JUDGAVG, INTERPERAVG & LEADAVG	<u>2012-2013</u> **.9067**[62] <u>2010-2011</u> **.8746** <u>2006-2009</u> **.8143**
2	Cognitive Ability	COGNIT	Measure of the candidate's intelligence/cognitive ability	12 – 19	ED, GT, WL, GAMA, DLAB, READ, MATH, LANG	**.8141**
3	Navigational Ability	NAVIG	Measure of the candidate's soldiering skills, combining both mental and physical prowess	29 – 34	PE2, PE3, PE4, STAR1, STAR2	**.7991**
4	Short-Term Endurance	ENDURST	Measure of the candidate's short-term physical endurance	24 & 26	RUN1 & RUCK1	**.5205**
5	Long-Term Endurance	ENDURLT	Measure of the candidate's long-term physical endurance	25 & 27	RUN2 & RUCK2	**.7216**
6	Physical Strength	STRENG	Measure of the candidate's bursts of physical strength	20 – 23	PU, SU, RUN, PUPS	**.6192**

Table 3.7 – PCA Components and Scale Reliabilities

[62] As described, the personality characteristic variables (ADAPTAVG – LEADAVG) changed over the three cohorts, therefore Cronbach's Alpha was determined for each cohort to examine their overall reliability. The scores were acceptable for each cohort.

3.6.2.5 SFAS and SFQC Data Description and Basic Statistics

With the components and scales determined, Table 3.8 provides data descriptions and basic statistics for both the SFAS and SFQC data sets.

SFAS and SFQC Data Description and Basic Statistics								
#	**Name**	**Abbrev.**	**Description**	**N**	**Mean**	**SD**	**Min**	**Max**
1	Cognitive Ability	COGNIT	Composite score of the candidate's cognitive ability	23064	0	1	-5.23	4.53
				8458	0	1	-4.85	3.39
2	Navigational Ability	NAVIG	Composite score of the candidate's navigational ability	16879	0	1	-3.56	2.53
				8200	0	1	-4.95	2.57
3	Physical Strength	STRENG	Composite score of the candidate's physical strength	21554	0	1	-6.96	7.24
				8273	0	1	-5.02	5.32
4	Short-Term Endurance	ENDURST	Composite score of the candidate's short-term endurance	21483	0	1	-9.76	4.61
				8277	0	1	-6.98	4.38
5	Long-Term Endurance	ENDURLT	Composite score of the candidate's long-term endurance	20525	0	1	-6.81	5.01
				8223	0	1	-4.29	4.87
6	Ranger Status	RGRDUM	Dummy variable = 1 if the candidate is Ranger qualified, 0 else	23070	.11	.31	0	1
				8458	.18	.38	0	1
7	Peer Evaluations	PEEREVAL	Composite score of the ratings given to the candidate, as assessed by his peers and cadre	23070	0	1	-6.53	5.86
				8458	0	1	-5.35	3.90
8	Age	AGE	Candidate's age	23033	25.52	4.30	17	50
				8455	25.37	3.93	18	50
9	Enlisted Status	DENLIST	Dummy variable = 1 if the candidate is an enlisted Soldier, 0 if the candidate is an officer	23070	.88	.32	0	1
				8458	.83	.38	0	1
10	Military Occupational Specialty (MOS) -- Infantry	DMOS11	Dummy variables for each of 7 possible military occupational specialties (career fields)	22983	.29	.45	0	1
				8390	.32	.47	0	1
11	-- Artillery	DMOS13		22983	.06	.23	0	1
				8390	.05	.21	0	1
12	-- 18X Special Operations	DMOS18		22983	.25	.43	0	1
				8390	.34	.47	0	1
13	-- Armor	DMOS19		22983	.04	.21	0	1
				8390	.03	.18	0	1
14	-- Medical	DMOS68		22983	.04	.20	0	1
				8390	.03	.17	0	1
15	-- Quartermaster	DMOS92		22983	.04	.19	0	1
				8390	.02	.15	0	1
16	-- All Other	DMOS99		22983	.28	.45	0	1
				8390	.20	.40	0	1

17	Year Dummies	DYRX	Dummy variables that take into account changes that occur across the years		--	--	0	1
Note: SFAS basic statistics are listed first for each component, followed by SFQC basic statistics.								

Table 3.8 – SFAS and SFQC Data Description and Basic Statistics

3.6.2.6 Construct Correlations - SFAS and SFQC

The correlations among the variables and constructs used in the logistic regression (for both SFAS and SFQC) are given in Table 3.9. All correlations were in the expected direction and only two correlations were greater than .40, which suggests that multicollinearity is not a problem.[63] With the measures developed, I move next to describing the statistical methods employed in the analyses.

[63] Although there are several dummy variables (STATDUM, RGRDUM, DMOSX, and DYRX), I tested for multicollinearity and found all variance inflation factors (VIF) < 10. In fact, the average was 2.73, with the highest values for DMOS18 (8.30) and DMOS11 (8.18).

Construct Correlations										
	STATDUM	**RGRDUM**	**AGE**	**DMOS11**	**DMOS13**	**DMOS18**	**DMOS19**	**DMOS68**	**DMOS92**	**DMOS99**
STATDUM	--	-.01	.01	.02	.00	.01	.01	-.01	.01	.04
RGRDUM	0.16	--	.16	.40	.01	-.32	-.01	-.05	-.05	-.04
AGE	-0.01	0.14	--	.15	.03	-.30	.03	.06	.04	.11
DMOS11	0.06	0.36	0.12	--	-.16	-.50	-.13	-.12	-.10	-.35
DMOS13	-0.03	0.00	0.02	-0.15	--	-.16	-.04	-.04	-.03	-.11
DMOS18	0.16	-0.24	-0.28	*-0.42*	-0.15	--	-.14	-.13	-.11	-.36
DMOS19	-0.03	-0.02	0.03	-0.14	-0.05	-0.13	--	-.03	-.03	-.10
DMOS68	-0.05	-0.06	0.03	-0.13	-0.05	-0.12	-0.04	--	-.03	-.09
DMOS92	-0.08	-0.05	0.04	-0.12	-0.04	-0.11	-0.04	-0.03	--	-.07
DMOS99	-0.15	-0.08	0.11	-0.38	-0.14	-0.37	-0.12	-0.11	-0.10	--
DENLIST	-0.08	*-0.57*	-0.19	-0.19	-0.07	0.25	-0.04	0.08	0.03	-0.05
COGNIT	0.26	0.19	0.04	-0.03	-0.02	0.22	-0.04	-0.01	-0.15	-0.11
STRENG	0.19	0.20	0.01	0.05	0.00	0.00	-0.01	-0.01	-0.04	-0.03
ENDURST	0.12	0.04	-0.06	-0.01	-0.02	0.12	-0.01	-0.04	-0.04	-0.07
ENDURLT	0.17	0.07	-0.08	0.01	-0.01	0.10	-0.01	-0.04	-0.04	-0.07
NAVIG	0.39	0.21	-0.01	0.08	-0.03	0.13	-0.02	-0.03	-0.10	-0.15
PEEREVAL	0.38	0.32	0.14	0.16	-0.01	-0.04	-0.02	-0.06	-0.06	-0.06

	DENLIST	**COGNIT**	**STRENG**	**ENDURST**	**ENDURLT**	**NAVIG**	**PEEREVAL**
STATDUM	.05	-.01	.00	.04	.01	.05	.00
RGRDUM	.04	-.01	.00	.04	.01	.05	.00
AGE	-.60	.17	.21	-.01	.06	.17	.34
DMOS11	-.23	-.04	.07	-.04	-.01	.06	.16
DMOS13	-.08	-.03	-.00	-.02	.00	-.04	.01
DMOS18	.31	.17	-.07	.16	.07	.10	-.11
DMOS19	-.05	-.03	-.00	-.01	.01	-.02	-.01
DMOS68	.08	-.02	-.00	-.06	-.04	-.05	-.02
DMOS92	.02	-.11	-.03	-.03	-.03	-.07	-.05
DMOS99	-.08	-.07	.01	-.08	-.05	-.11	-.03
DENLIST	--	-.36	-.22	.03	-.04	-.15	-.31
COGNIT	-0.35	--	.11	.03	.01	.24	.13
STRENG	-0.20	0.17	--	.10	.07	.21	.17
ENDURST	-0.03	0.09	0.14	--	.16	.07	.02
ENDURLT	-0.06	0.09	0.18	-0.13	--	-.11	.06
NAVIG	-0.17	0.35	0.31	0.18	0.11	--	.16
PEEREVAL	-0.27	0.17	0.19	0.12	0.12	0.23	--

Table 3.9 – Construct Correlations[64]

[64] SFAS correlations are below the diagonal and SFQC correlations are above the diagonal.

3.7 Methodology

Logistic regression was used to determine which variables predict SFAS and SFQC success. The dependent variable (STATDUM) indicates SFAS/SFQC success (STATDUM=1) or failure (STATDUM=0) and was regressed on a total of 23 variables.[65] Logistic regression is appropriate for this analysis given the binary nature of the outcome variable (Tabachnick & Fidell, 2007; Kutner et al., 2004). The independent variables are shown in Table 3.8. Ten variables provide basic military descriptors of the candidate (e.g., Ranger qualification, age, age squared, military occupational specialty, and whether he was enlisted or not), six components were distilled from the PCA, and seven[66] dummies account for unobserved changes over the years used in this study. Stata version 12.1 was again used for the logistic regression analyses:

$$P(Y=1)=\frac{e^{z}}{1+e^{z}}$$

Where

$$\begin{aligned} z = b_0 &+ b_1 COGNIT + b_2 NAVIG + b_3 STRENG + b_4 ENDURST + b_5 ENDURLT + b_6 RGRDUM + b_7 PEEREVAL \\ &+ b_8 AGE + b_9 AGE^2 + b_{10} DENLIST + b_{11} DMOS11 + b_{12} DMOS13 + b_{13} DMOS18 \\ &+ b_{14} DMOS19 + b_{15} DMOS68 + b_{16} DMOS92 + b_{17} DYR7 + b_{18} DYR8 + b_{19} DYR9 \\ &+ b_{20} DYR10 + b_{21} DYR11 + b_{22} DYR12 + b_{23} DYR13 \end{aligned}$$

b_0 = the intercept or constant term, or the value of Y (STATDUM) when b_1-b_{23} equal 0

b_1 = the change in the likelihood of SFAS/SFQC success with a one standard deviation increase in cognitive ability (COGNIT), holding all other variables constant

b_2 = the change in the likelihood of SFAS/SFQC success with a one standard deviation increase in navigational ability (NAVIG), holding all other variables constant

b_3 = the change in the likelihood of SFAS/SFQC success with a one standard deviation increase in physical strength (STRENG), holding all other variables constant

b_4 = the change in the likelihood of SFAS/SFQC success with a one standard deviation increase in short-term endurance (ENDURST), holding all other variables constant

[65] 21 variables for SFQC, as the dummy variables for 2007 (DYR7) and 2013 (DYR13) are not applicable.

[66] Five for SFQC.

b_5 = the change in the likelihood of SFAS/SFQC success with a one standard deviation increase in long-term endurance (ENDURLT), holding all other variables constant

b_6 = the change in the likelihood of SFAS/SFQC success if the candidate is Ranger qualified (RGRDUM=1), holding all other variables constant

b_7 = the change in the likelihood of SFAS/SFQC success with a one standard deviation increase in peer evaluations (PEEREVAL), holding all other variables constant

b_8 = the change in the likelihood of SFAS/SFQC success with a one standard deviation increase in age (AGE), holding all over variables constant

b_9 = the change in the rate of SFAS/SFQC success with a one standard deviation increase in age squared (AGE^2), holding all over variables constant

b_{10} = the change in the likelihood of SFAS/SFQC success if the candidate is an enlisted Soldier (DENLIST=1), holding all other variables constant

$b_{11\ldots16}$ = the change in the likelihood of SFAS/SFQC success dependent on the candidate's military occupational specialty (DMOSX), holding all other variables constant

$b_{17\ldots23}$ = dummy variable capturing unseen temporal effects (e.g., changes in the economy, etc.), DYRX denotes the likelihood of SFAS/SFQC success dependent on the year the candidate went through SFAS, holding all other variables constant[67]

3.8 SFAS Results

3.8.1 SFAS Descriptive Statistics

Table 3.10 and Figures 3.5 to 3.11 provide the frequency of the dummy variables used in the SFAS regression, as well as the distribution of the standardized constructs. The DV, STATDUM, has a nearly 50/50 split among successful and unsuccessful candidates. Approximately 11% of the sample is Ranger qualified (RGRDUM), and 88% are enlisted soldiers (DENLIST).

		STATDUM	DYR13	DYR12	DYR11	DYR10	DYR9	DYR8	DYR7	DYR6
Frequency	0	52.1	90.78	88.18	88.38	88.1	86.9	86.2	85.96	85.49
	1	47.9	9.22	11.82	11.62	11.9	13.1	13.8	14.04	14.51
N when Variable=1		11051	2126	2727	2680	2745	3023	3184	3238	3347
Total N		23070	23070	23070	23070	23070	23070	23070	23070	23070
		RGRDUM	DMOS11	DMOS13	DMOS18	DMOS19	DMOS68	DMOS92	DMOS99	DENLIST
Frequency	0	88.97	70.81	94.35	75.36	95.58	95.91	96.29	71.7	11.99
	1	11.03	29.19	5.65	24.64	4.42	4.09	3.71	28.3	88.01
N when Variable=1		2545	6708	1299	5662	1015	941	853	6505	20304
Total N		23070	22983	22983	22983	22983	22983	22983	22983	23071

Table 3.10 – Frequency Distributions of Dummy Variables (SFAS Data)

[67]Given the fact that no SSN data were available for the candidates who went through SFAS in 2007, DYR7 (*b*17) is not included in the SFQC logistic regression. Further, candidates who entered SFAS in 2013 are not yet through SFQC training, therefore DYR13 (*b*23) is also excluded from the SFQC analysis.

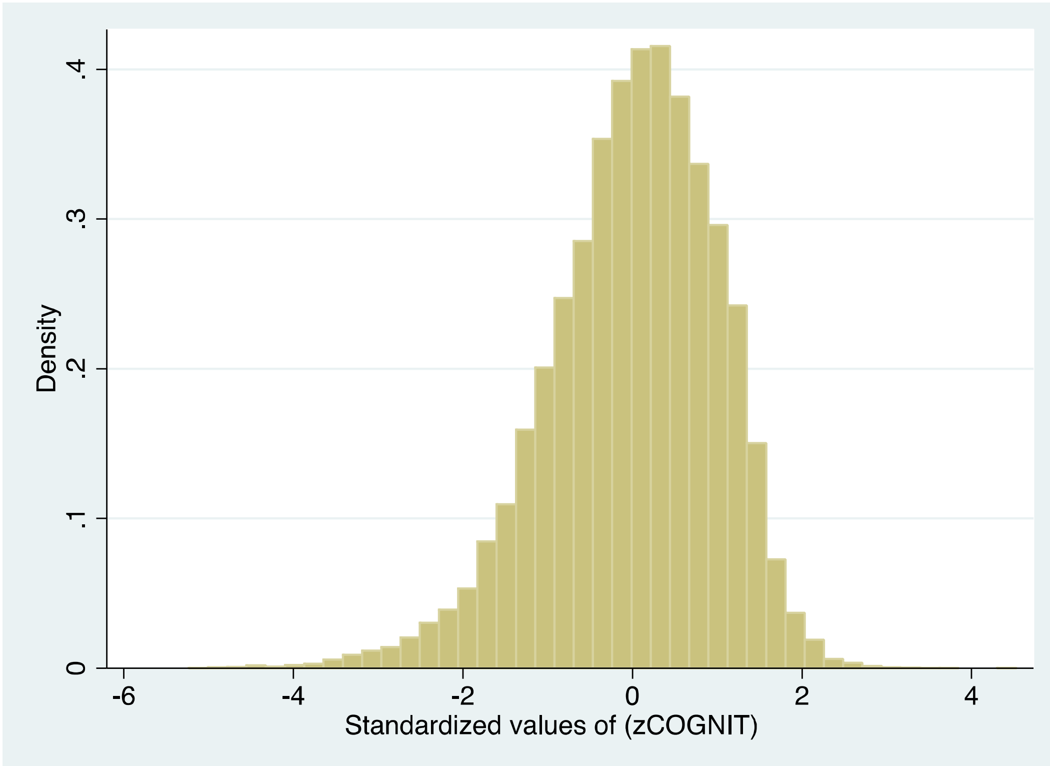

Figure 3.5 – Cognitive Ability Distribution (SFAS Data)

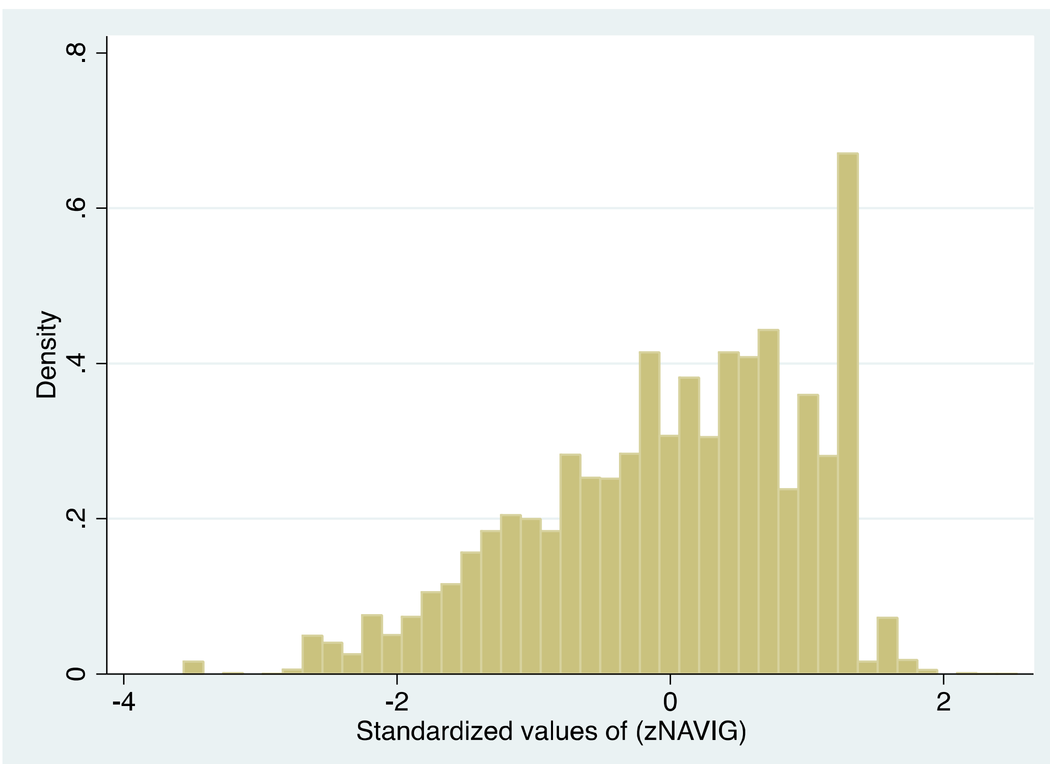

Figure 3.6 – Navigational Ability Distribution (SFAS Data)

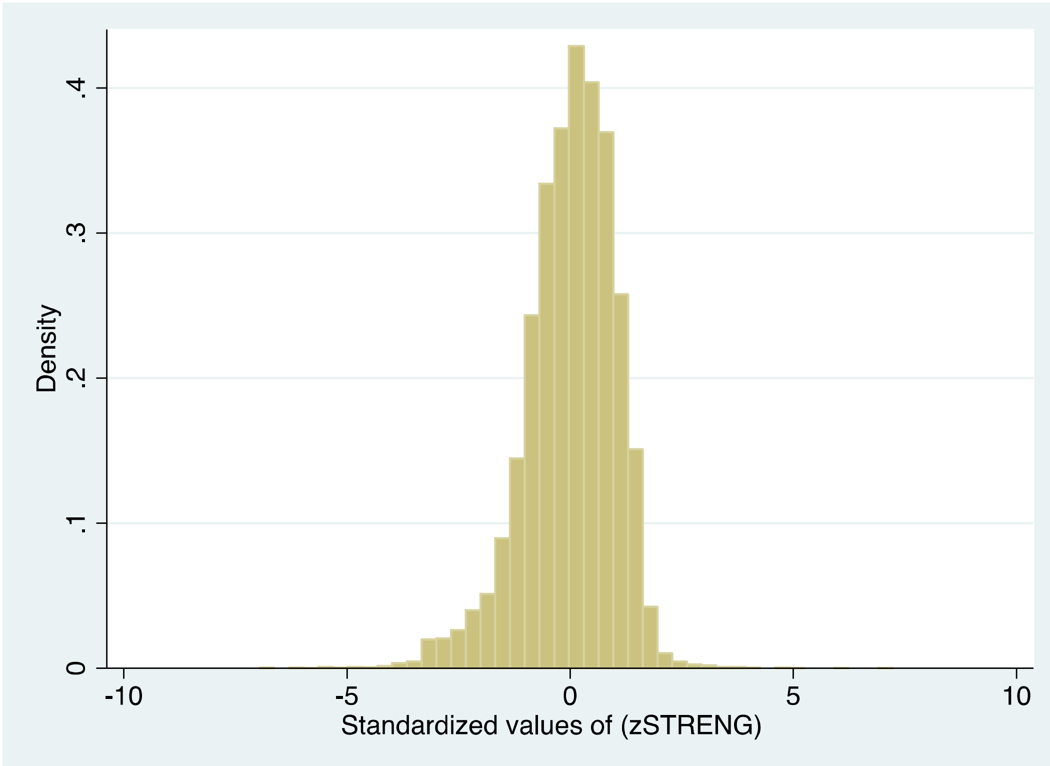

Figure 3.7 – Physical Strength Distribution (SFAS Data)

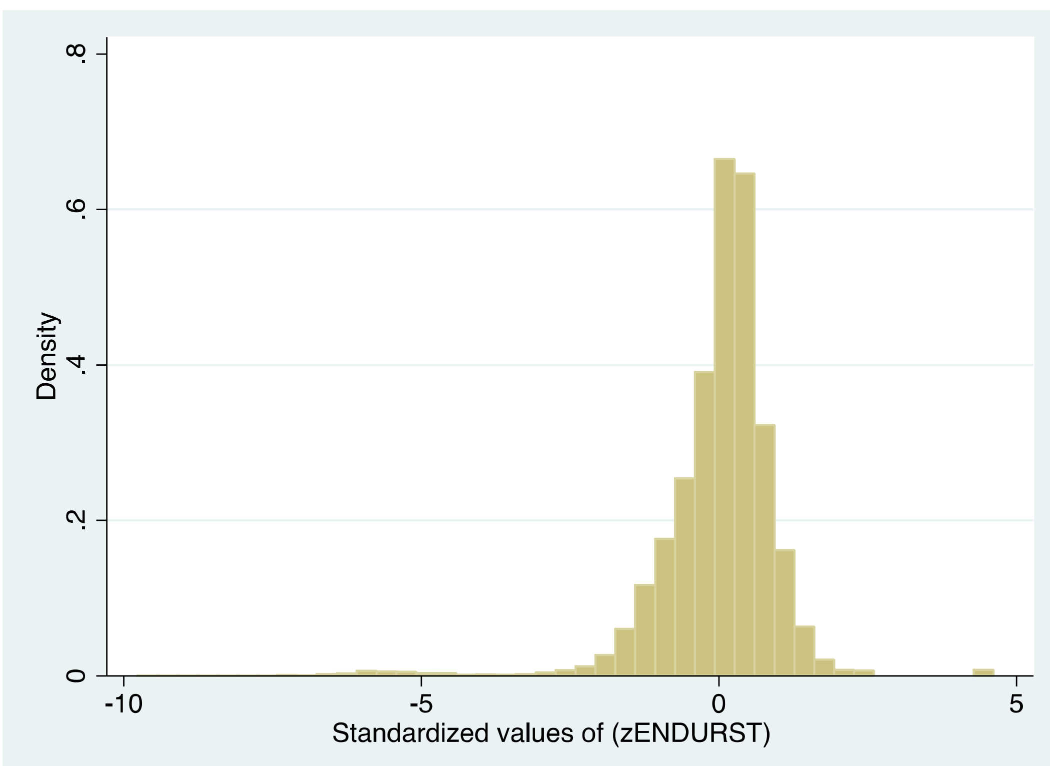

Figure 3.8 – Short-Term Endurance Distribution (SFAS Data)

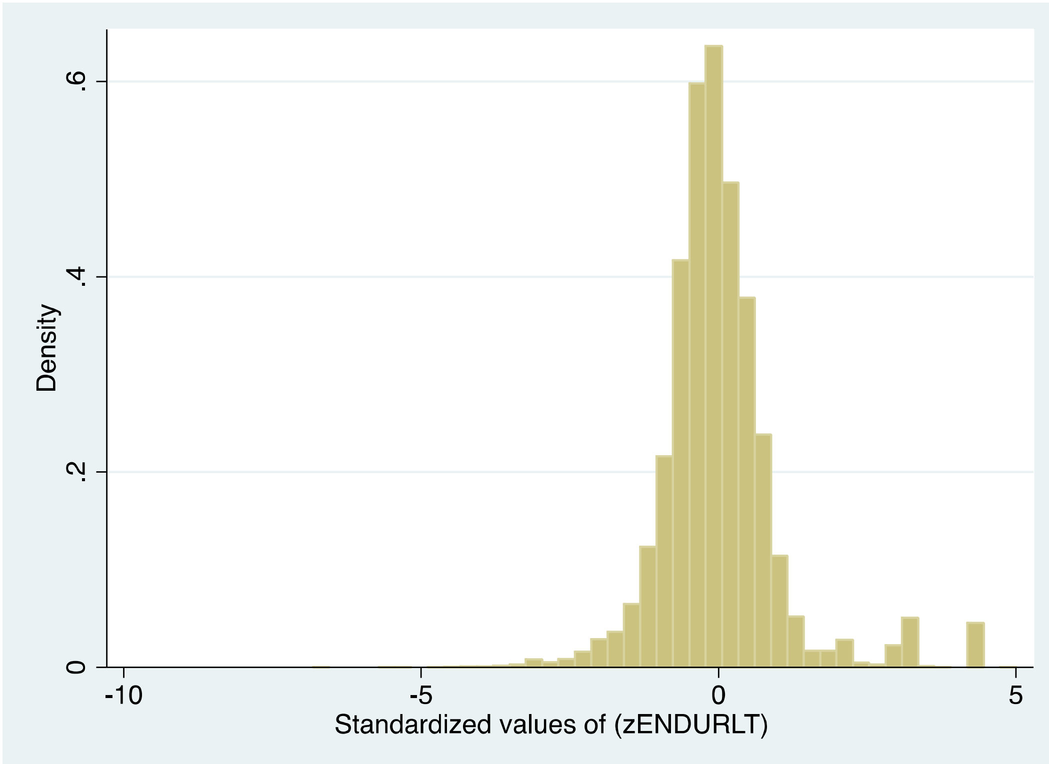

Figure 3.9 – Long-Term Endurance Distribution (SFAS Data)

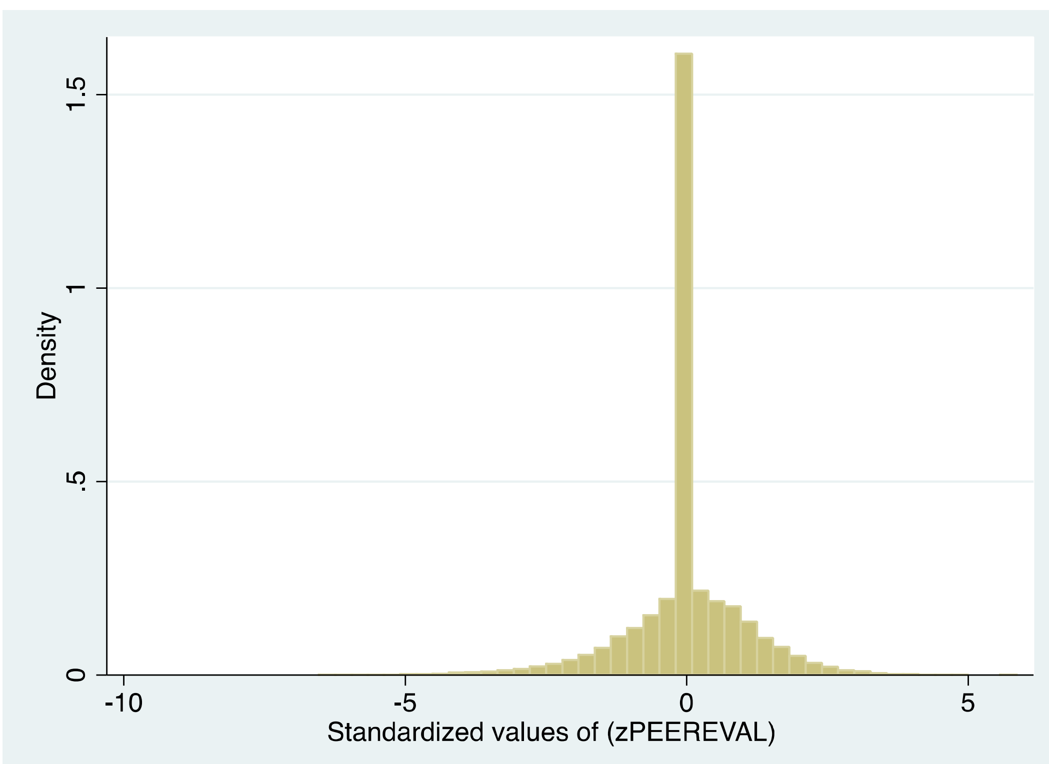

Figure 3.10 – Peer Evaluations Distribution (SFAS Data)

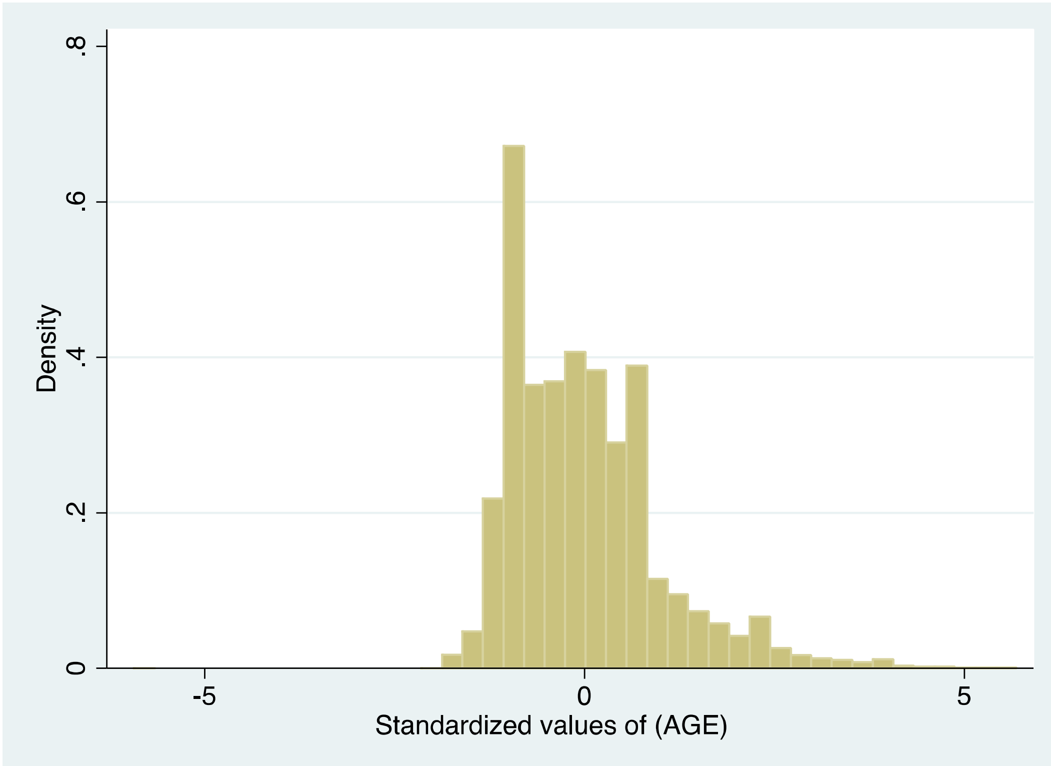

Figure 3.11 – Age Distribution (SFAS Data)

3.8.2 SFAS Logistic Regression

The SFAS logistic regression results are presented in Table 3.11.[68] First, I discuss the substantive results, then I examine inter-construct hypotheses, (i.e., the relative predictive ability of the constructs). Finally, I examine the covariate results, for which no hypotheses were made.

[68]The results presented here are given in regression coefficient form. Odds ratio format are provided in Appendix K. Odds ratios are used to compare the relative odds of the outcome (DV, or Selection in this case) given a one-unit increase in the independent variable. When the odds ratio of an independent variable is equal to 1, the variable does not effect the outcome (DV, or Selection). When the odds ratio of an independent variable is >1, the variable is associated with higher odds of the outcome (DV, or Selection). When the odds ratio of an independent variable is <1, the variable is associated with lower odds of the outcome (DV, or Selection). The odds ratio is simply the exponential function of the regression coefficient, e.g., e^{b1}.

SFAS Logistic Regression Results							
DV=STATDUM	**Coefficient**	**SE**	**z**	**p-value**		**95% CI**	
Cognitive Ability	0.346	0.025	13.610	0.000	***	0.296	0.396
Navigational Ability	0.953	0.030	31.950	0.000	***	0.895	1.012
Physical Strength	0.192	0.024	8.020	0.000	***	0.145	0.239
Short-Term Endurance	0.147	0.028	5.260	0.000	***	0.093	0.202
Long-Term Endurance	0.301	0.030	9.940	0.000	***	0.242	0.361
Ranger Qualification Dummy	0.422	0.084	5.010	0.000	***	0.257	0.587
Peer Evaluations	0.770	0.023	32.890	0.000	***	0.724	0.816
Age	0.062	0.027	2.300	0.021	*	0.009	0.115
Age^2	-0.058	0.014	-4.320	0.000	***	-0.085	-0.032
Enlisted Dummy Variable	1.066	0.082	13.070	0.000	***	0.906	1.226
DMOS11 – Infantry	0.246	0.055	4.520	0.000	***	0.140	0.353
DMOS13 – Field Artillery	0.169	0.092	1.820	0.068		-0.013	0.350
DMOS18 – SF 18X	0.644	0.060	10.690	0.000	***	0.526	0.762
DMOS19 – Armor	0.108	0.102	1.060	0.288		-0.092	0.309
DMOS68 – Medical	0.103	0.107	0.960	0.336		-0.107	0.313
DMOS92 - Quartermaster	0.162	0.117	1.390	0.165		-0.067	0.392
DYR7 – Dummy Year 2007	0.574	0.086	6.690	0.000	***	0.406	0.743
DYR8 – Dummy Year 2008	-0.194	0.082	-2.370	0.018	*	-0.355	-0.033
DYR9 – Dummy Year 2009	-0.113	0.085	-1.330	0.185		-0.281	0.054
DYR10 – Dummy Year 2010	0.025	0.095	0.260	0.795		-0.162	0.212
DYR11 – Dummy Year 2011	-0.609	0.091	-6.680	0.000	***	-0.788	-0.430
DYR12 – Dummy Year 2012	-0.931	0.087	-10.690	0.000	***	-1.101	-0.760
DYR13 – Dummy Year 2013	-0.850	0.093	-9.150	0.000	***	-1.032	-0.668
Constant	-0.250	0.099	-2.520	0.012		-0.445	-0.056
# Observations	16038	**Log Likelihood**		-7573.137		**Pseudo R^2**	0.2725

* p<.05 ** p<.01 *** p<.001
Omitted military occupational specialty (MOS) is DMOS99
Omitted dummy year (DYR) is 2006 (DYR6)

Table 3.11 – SFAS Logistic Regression Results (Regression Coefficient)

3.8.2.1 Substantive Results

Regarding the substantive hypotheses, the results show that cognitive ability (COGNIT) is positively related to SFAS success, thus supporting H1a. Specifically, the coefficient b_1=.346 (p<.001) denotes that having cognitive ability that is one standard deviation higher than the mean results in an approximately 41% greater chance of SFAS success, holding all other variables constant.

H2a predicts that navigational performance (NAVIG), a service competency skill, is positively related to SFAS success. The coefficient b_2=.953 (p<.001) shows that navigational ability is indeed highly predictive of SFAS success (160% greater chance of success with a one standard deviation increase, holding all other variables constant).

H3a, H4a, and H5a examine the role of physical strength, short-term endurance, and long-term endurance in SFAS success. Each measure is positively predictive of success. Candidates who are one standard deviation stronger (STRENG) than their peers enjoy a 21% increased chance of success (b_3=.192, p<.001), holding all other variables constant. Similarly, a one standard deviation increase in short- and long-term endurance (ENDURST and ENDURLT, respectively) increases SFAS success by 16% (b_4=.147, p<.001) and 35% (b_5=.301, p<.001), respectively. Therefore H3a, H4a, and H5a are supported.

Further, it is clear that candidates who are Ranger qualified (RGRDUM=1) have a 53% greater chance of successfully completing SFAS than their unqualified peers (b_6=.422, p<.001), lending support for H6a. H7a examines how peer rankings and personality trait assessments (PEEREVAL) affect a candidate's success. The coefficient b_7=.770 (p<.001) suggests that these assessments are highly and positively predictive of SFAS success. In fact, positive peer assessments result in a 116% greater chance of being selected for the next phase of training, SFQC.

3.8.2.2 Inter-Construct Results

Finally, H8a and H9a predicted that certain constructs would predict SFAS success at a higher likelihood than others. Specifically, in H8a, I predicted that peer evaluations (PEEREVAL) would predict success at a higher likelihood than cognitive or navigational ability (COGNIT or NAVIG). In H9a, I predicted that cognitive and navigational ability (COGNIT and NAVIG) would predict success at a higher likelihood than any of the physical assessments (STRENG, ENDURST, or ENDURLT).

The results show that H8a partially holds, as peer evaluations (PEEREVAL=.770, p<.001) predict success at a higher likelihood than cognitive ability (COGNIT=.346, p<.001). However, peer evaluations do not predict success at a higher likelihood than navigational ability (NAVIG=.953, p<.001). H9a is supported, as cognitive ability and navigational ability both predict SFAS success at a higher likelihood than physical strength (STRENG=.192, p<.001), short-term endurance (ENDURST=.147, p<.001), and long-term endurance (ENDURLT=.301, p<.001). Relative likelihood of success amongst the components is shown in Figure 3.12.

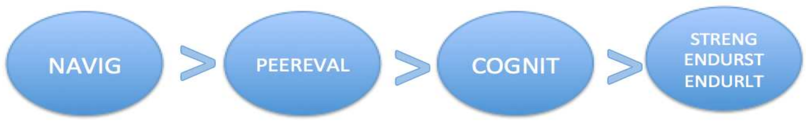

Figure 3.12 – Inter-Construct Results

Although certain variables are more predictive, paired tests show that the regression coefficients are not all significantly different from each other.[69] I find that cognitive ability is not significantly different from long-term endurance. This may be due to the fact that long-term endurance requires a certain mental toughness that may be related to cognitive ability. I also find that physical strength is not significantly different from short-term endurance. These results make sense, as short-term endurance and physical strength exercises both require intense, short-lived bursts of physical power. Table 3.12 provides a summary of the paired test results.

Pairwise Comparison of Regression Coefficients - SFAS				
Variable 1	**Variable 2**	**chi^2 (1 df)**	**p-val**	**Sig**
Navigational Ability	Peer Evaluations	23.91	.0000	***
Navigational Ability	Cognitive Ability	216.29	.0000	***
Navigational Ability	Physical Strength	396.76	.0000	***
Navigational Ability	Short-Term Endurance	357.11	.0000	***
Navigational Ability	Long-Term Endurance	225.14	.0000	***
Peer Evaluations	Cognitive Ability	156.70	.0000	***
Peer Evaluations	Physical Strength	293.81	.0000	***
Peer Evaluations	Short-Term Endurance	275.17	.0000	***
Peer Evaluations	Long-Term Endurance	147.91	.0000	***
Cognitive Ability	Physical Strength	19.70	.0000	***
Cognitive Ability	Short-Term Endurance	27.80	.0000	***
Cognitive Ability	Long-Term Endurance	1.28	.2570	ns
Physical Strength	Short-Term Endurance	1.31	.2531	ns
Physical Strength	Long-Term Endurance	6.84	.0089	**
Short-Term Endurance	Long-Term Endurance	17.09	.0000	***
* p<.05 ** p<.01 *** p<.001				

Table 3.12 – Pairwise Comparison of Regression Coefficients - SFAS

The summary results of the hypotheses are given in Table 3.13.

[69] I performed pairwise comparisons of the regression coefficients rather than paired t-tests of the means. This approach has the advantage of testing the pairwise differences while controlling for confounding variables.

Summary of Hypothesized Results - SFAS		
H#	**Hypotheses**	**Supported?**
H1a	Cognitive ability has a positive effect on the likelihood of SFAS success.	Yes
H2a	Navigational ability has a positive effect on the likelihood of SFAS success.	Yes
H3a	Physical strength has a positive effect on the likelihood of SFAS success.	Yes
H4a	Short-term endurance has a positive effect on the likelihood of SFAS success.	Yes
H5a	Long-term endurance has a positive effect on the likelihood of SFAS success.	Yes
H6a	Being Ranger qualified has a positive effect on the likelihood of SFAS success.	Yes
H7a	Peer-evaluated personality traits have a positive effect on the likelihood of SFAS success.	Yes
H8a	Peer-evaluated personality traits predict SFAS success at a higher likelihood than cognitive ability or navigational ability.	Partially
H9a	Cognitive ability and navigational ability predict SFAS success at a higher likelihood than physical strength, short-term endurance, or long-term endurance.	Yes

Table 3.13 – Summary of Hypothesized Results - SFAS

3.8.2.3 Covariate Results

Candidates chosen for SF during recruitment (DMOS18) and those coming from the Infantry (DMOS11) enjoy a 90% (b_{13}=.644, p<.001) and 28% (b_{11}=.246, p<.001) greater chance for success (respectively) than their counterparts from other career fields.[70] Interestingly, the quadratic term for age (AGE^2) was significant and negative (b_9=-.058, p<.001). This suggests an inverted-U structure for age, such that candidates who are near the mean age of the sample (25.5 years) enjoy a higher probability of success than those on the tails (i.e., those who are furthest from the mean in either direction).

Being an enlisted candidate (DENLIST) is shown to provide a much greater chance of success (b_{10}=1.066, p<.001), however these results are likely to be misleading given the much higher ratio of enlisted candidates to officer candidates. In fact, simple statistics show that 64%[71] of officers who attempt SFAS are successful, whereas 46%[72] of enlisted are successful. Therefore, the odds ratio associated with DENLIST is likely to be skewed by the much higher ratio of enlisted candidates (88% of candidates).

[70]"Other" in this case means career fields other than those listed in the analyses. These career fields were captured in a variable labeled DMOS99, which was excluded from analysis as the reference group.

[71]1,782 successful officers / 2,766 officer candidates = .64.

[72]9,269 successful enlisted / 20,304 enlisted candidates = .46.

Although I made no hypotheses regarding the effect of time, I find significant differences in 2007, 2008, 2011, 2012, and 2013 compared to the reference year, 2006. Post-hoc discussions with SFAS leadership and cadre revealed no reason why these years should be significantly different.

3.9 SFQC Results

3.9.1 SFQC Descriptive Statistics

I begin the SFQC analysis by first examining the frequency distributions of the dummy variables and histograms of the substantive variables, as shown in 3.14 and Figures 3.13 through 3.19. Clearly the majority of SFQC candidates are enlisted, non-Rangers, from the Special Forces (DMOS18) and Infantry (DMOS11) career fields.

		STATDUM	DYR13	DYR12	DYR11	DYR10	DYR9	DYR8	DYR7	DYR6
Frequency	0	68.28	--	84.31	83.51	80.85	85.65	85.54	--	80.15
	1	31.72	--	15.69	16.49	19.15	14.35	14.46	--	19.85
N when Variable=1		2683	--	1327	1395	1620	1214	1223	--	1679
Total N		8458	--	8458	8458	8458	8458	8458	--	8458
		RGRDUM	DMOS11	DMOS13	DMOS18	DMOS19	DMOS68	DMOS92	DMOS99	DENLIST
Frequency	0	82.15	67.57	95.18	66.00	96.52	97.13	97.79	79.81	17.14
	1	17.85	32.43	4.82	34.00	3.48	2.87	2.21	20.19	82.86
N when Variable=1		1510	2721	404	2853	292	241	185	1694	7008
Total N		8458	8390	8390	8390	8390	8390	8390	8390	8458

Table 3.14 – Frequency Distributions of Dummy Variables (SFQC Data)

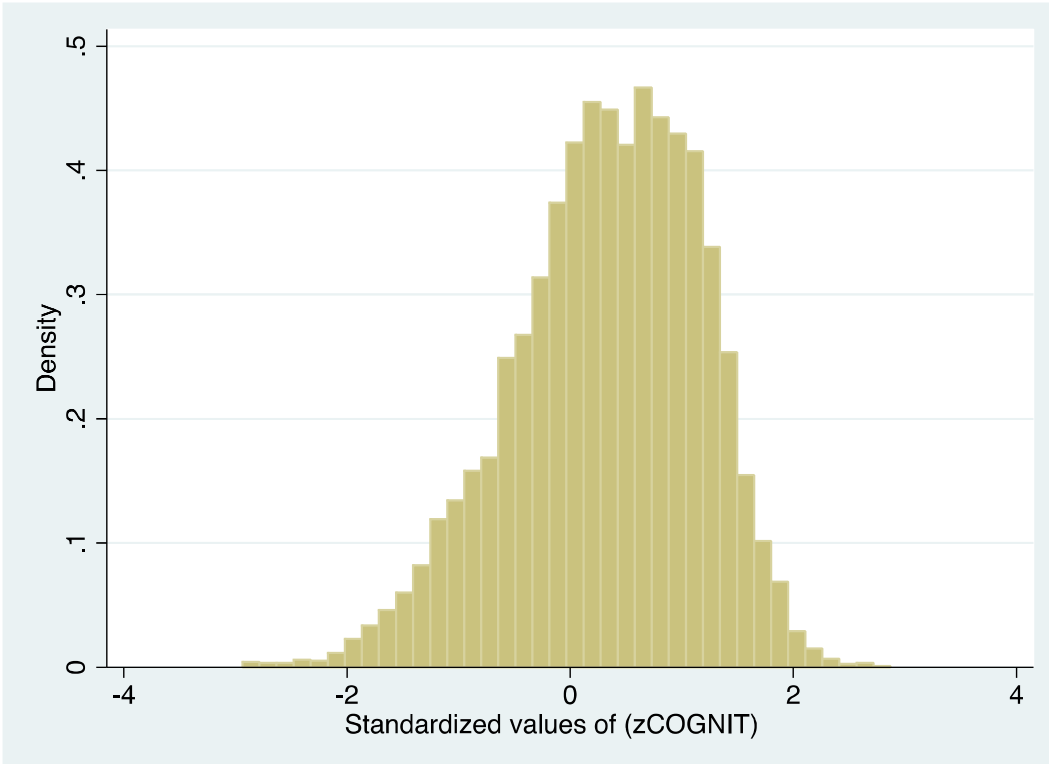

Figure 3.13 – Cognitive Ability Distribution (SFQC Data)

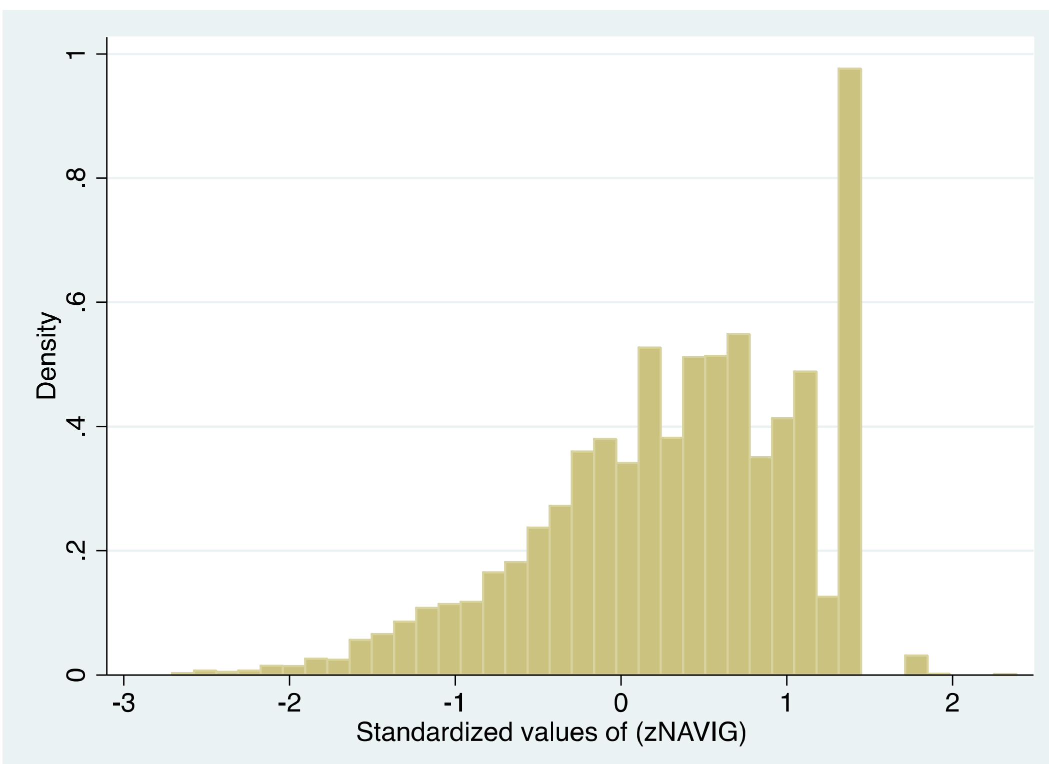

Figure 3.14 – Navigational Ability Distribution (SFQC Data)

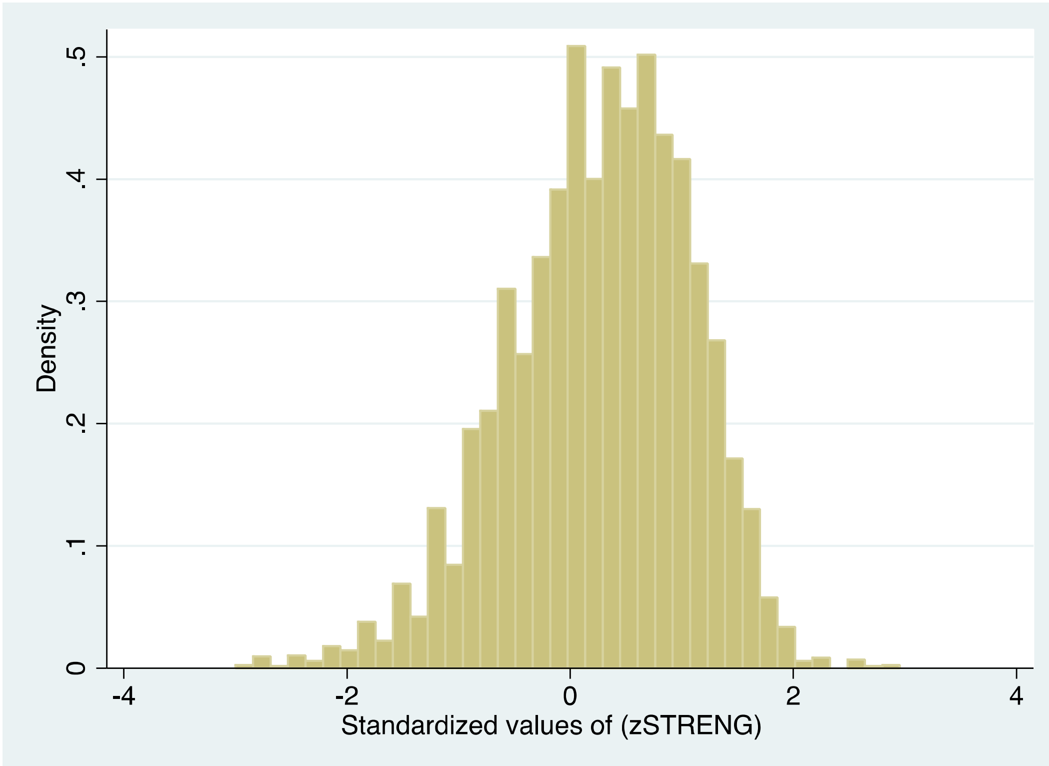

Figure 3.15 – Physical Strength Distribution (SFQC Data)

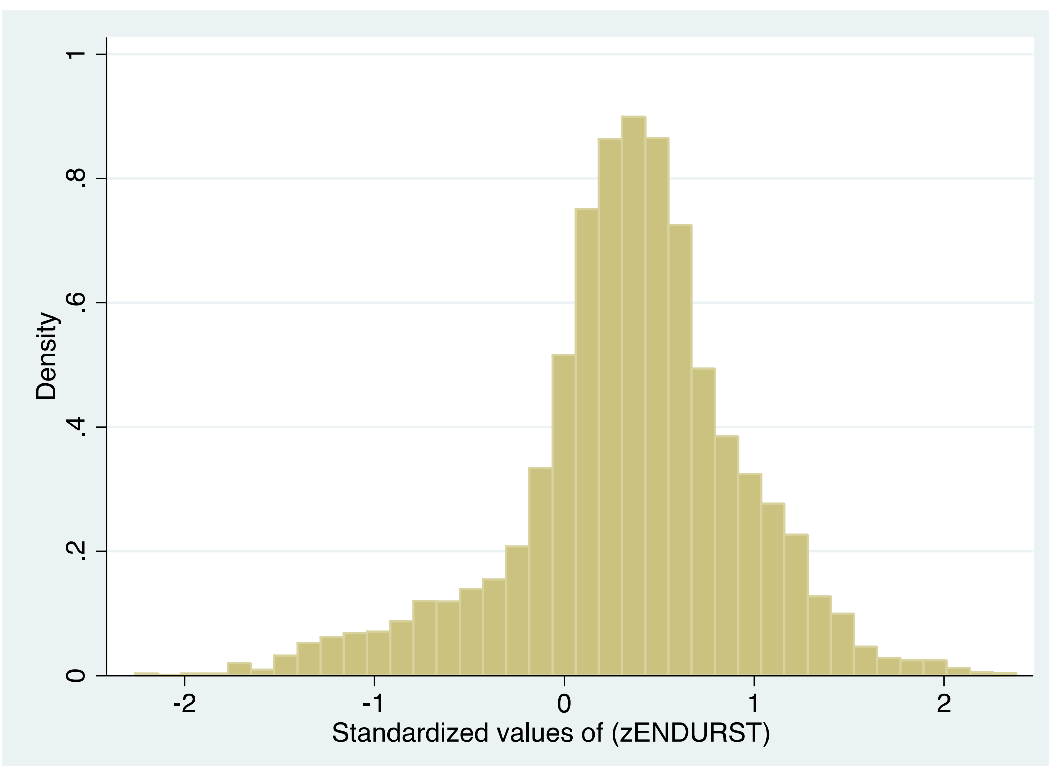

Figure 3.16 – Short-Term Endurance Distribution (SFQC Data)

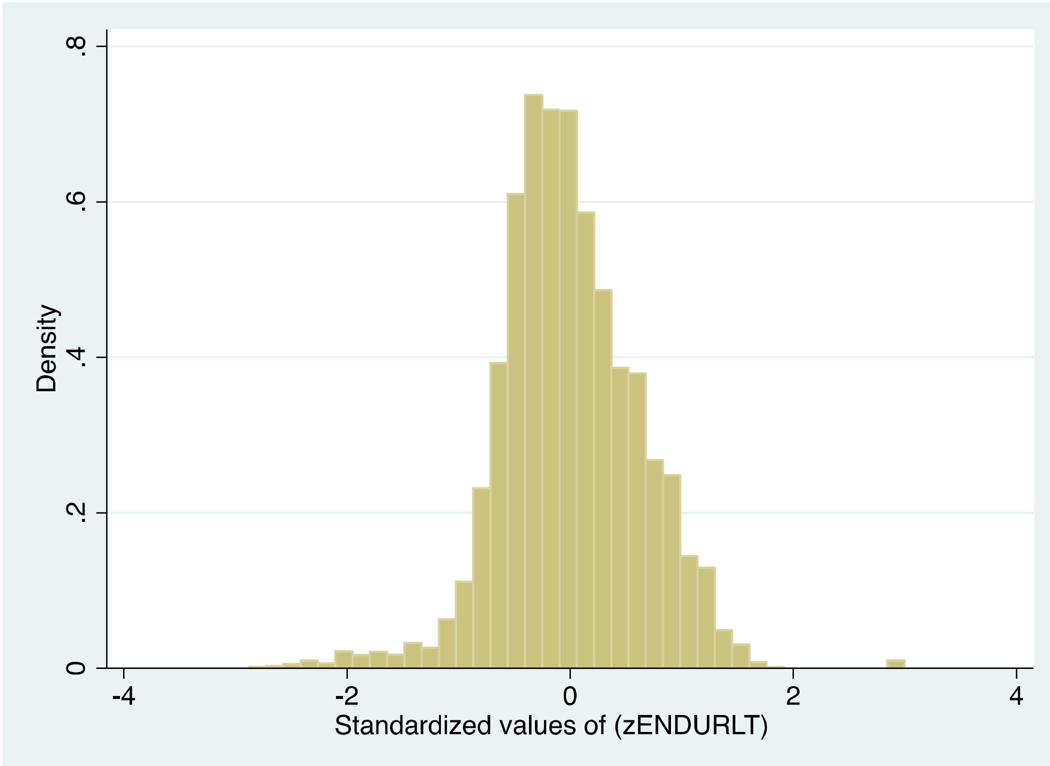

Figure 3.17 – Long-Term Endurance Distribution (SFQC Data)

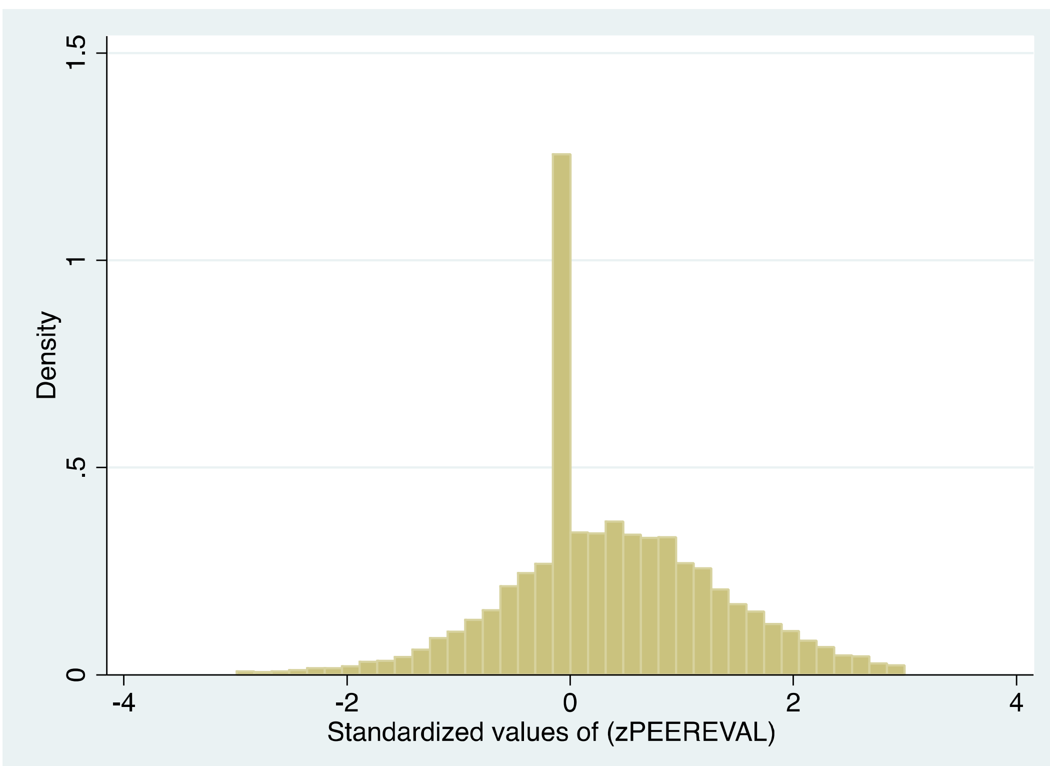

Figure 3.18 – Peer Evaluations Distribution (SFQC Data)

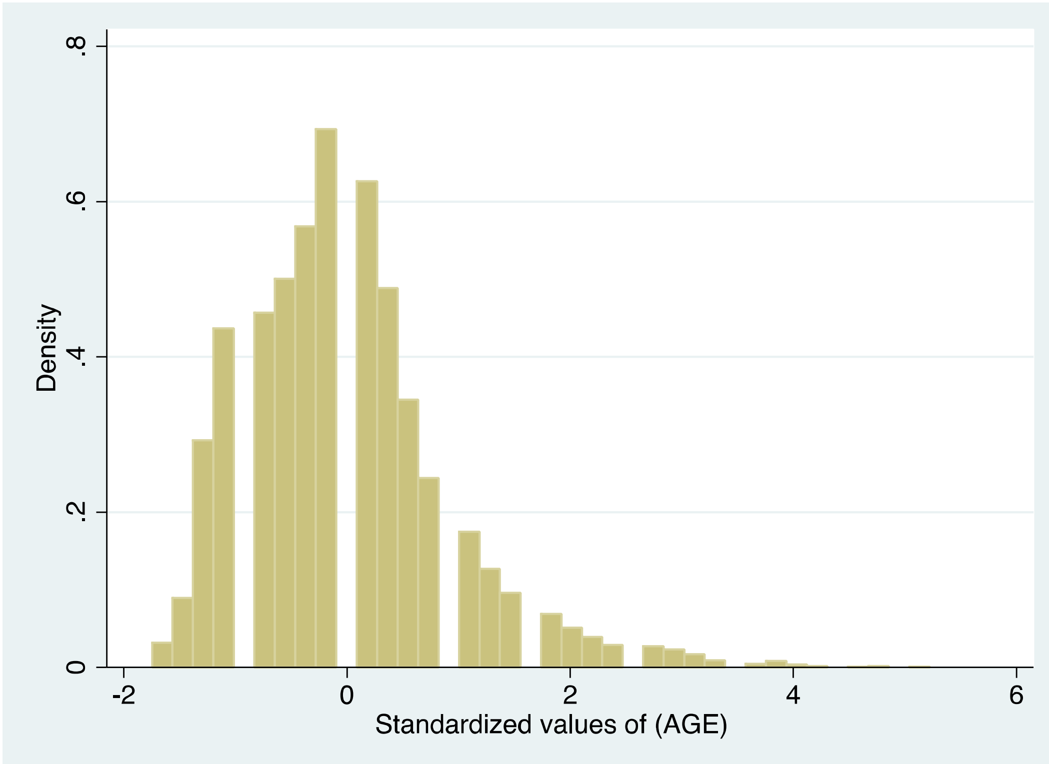

Figure 3.19 – Age Distribution (SFQC Data)

3.9.2 SFQC Logistic Regression

Comparing the results of the SFQC logistic regression analysis to the SFAS logistic regression analysis, I find some differences. A few variables that were predictive of SFAS success were no not predictive of SFQC success. Specifically, short-term endurance (ENDURST), long-term endurance (ENDURLT), age (AGE), age squared (AGE^2), being enlisted (DENLIST), and being from the infantry military occupational specialty (DMOS11) *were* predictive of SFAS success and *were not* predictive of SFQC success. Further, the medical military occupational specialty (DMOS68) was significant (and negative) for the SFQC analyses, whereas it did not achieve significance in the SFAS analyses. The results of the SFQC logistic regression are given in Table 3.15.

SFQC Logistic Regression Results							
DV=STATDUM	Coefficient	SE	z	p-value		95% CI	
Cognitive Ability	0.078	0.032	2.450	0.014	*	0.016	0.140
Navigational Ability	0.234	0.037	6.290	0.000	***	0.161	0.307
Physical Strength	0.204	0.031	6.570	0.000	***	0.143	0.264
Short-Term Endurance	-0.007	0.030	-0.230	0.816		-0.065	0.051
Long-Term Endurance	0.002	0.029	0.050	0.956		-0.055	0.058
Ranger Qualification Dummy	0.345	0.092	3.760	0.000	***	0.165	0.524
Peer Evaluations	0.232	0.028	8.160	0.000	***	0.176	0.288
Age	-0.040	0.039	-1.030	0.305		-0.116	0.036
Age^2	-0.032	0.020	-1.570	0.117		-0.072	0.008
Enlisted Dummy Variable	-0.048	0.097	-0.500	0.618		-0.239	0.142
DMOS11 – Infantry	0.049	0.080	0.610	0.543		-0.108	0.206
DMOS13 – Field Artillery	0.157	0.136	1.160	0.248		-0.109	0.422
DMOS18 – SF 18X	0.637	0.084	7.600	0.000	***	0.473	0.801
DMOS19 – Armor	0.002	0.160	0.010	0.990		-0.312	0.316
DMOS68 – Medical	-0.444	0.182	-2.440	0.015	*	-0.800	-0.088
DMOS92 - Quartermaster	-0.266	0.213	-1.250	0.212		-0.683	0.152
DYR8 – Dummy Year 2008	1.527	0.124	12.310	0.000	***	1.284	1.770
DYR9 – Dummy Year 2009	1.278	0.121	10.590	0.000	***	1.042	1.515
DYR10 – Dummy Year 2010	1.834	0.122	15.080	0.000	***	1.595	2.072
DYR11 – Dummy Year 2011	2.015	0.126	15.940	0.000	***	1.767	2.262
DYR12 – Dummy Year 2012	0.142	0.133	1.070	0.285		-0.118	0.403
Constant	-2.296	0.145	-15.840	0.000		-2.580	-2.012
# Observations	7899	Log Likelihood	-4256.793			Pseudo R^2	0.1459

* p<.05 ** p<.01 *** p<.001
Omitted military occupational specialty (MOS) is DMOS99
Omitted dummy year (DYR) is 2006 (DYR6)

Table 3.15 – SFQC Logistic Regression Results

3.9.2.1 Substantive Results

Focusing on the SFQC results in Table 3.15, I find that cognitive ability is positively predictive of SFQC success (COGNIT = .078, p<.05), in support of H1b. A one standard deviation in cognitive ability increases the likelihood of SFQC success by 8%. In support of H2b, a one standard deviation increase in navigational ability increases the likelihood of SFQC success by 26% (NAVIG = .234, p<.001). Physical strength increases SFQC success by 23% (STRENG = .204, p<.001) for each standard deviation increase, thus supporting H3b. Short-term endurance is not predictive of SFQC success (ENDURST = -.007, ns), nor is long-term endurance (ENDURLT = .002, ns), in contrast to H4b and H5b. Being Ranger qualified increases the likelihood of SFQC success by 41% (RGRDUM = .345, p<.001), supporting H6b. Finally, a one standard deviation increase in peer evaluations increases a candidate's likelihood of SFQC success by 26% (PEEREVAL = .232, p<.001), therefore H7b is supported.

3.9.2.2 Inter-Construct Results

For H8b, I find the same results of H8a—navigational ability (NAVIG=.234, p<.001) is slightly more predictive of SFQC success than peer evaluations (PEEREVAL=.232, p<.001), however peer evaluations are more predictive than cognitive ability (COGNIT=.078, p<.05). Thus, I find partial support for H8b. H9b is also only partially supported, because while navigational ability is more predictive of SFQC success than physical strength (STRENG=.204, p<.001), short-term endurance (ENDURST=-.007, ns), or long-term endurance (ENDURLT=.002, ns); cognitive ability is not more predictive than physical strength.

Paired tests again show that some of the regression coefficients are not significantly different from one another. The results of the paired tests for SFQC are shown in Table 3.16.

Pairwise Comparison of Regression Coefficients - SFQC				
Variable 1	**Variable 2**	**chi^2 (1 df)**	**p-val**	**Sig**
Navigational Ability	Peer Evaluations	0.00	.9680	ns
Navigational Ability	Cognitive Ability	8.88	.0029	**
Navigational Ability	Physical Strength	.38	.5402	ns
Navigational Ability	Short-Term Endurance	25.18	.0000	***
Navigational Ability	Long-Term Endurance	22.46	.0000	***
Peer Evaluations	Cognitive Ability	13.24	.0003	***
Peer Evaluations	Physical Strength	.43	.5114	ns
Peer Evaluations	Short-Term Endurance	31.55	.0000	***
Peer Evaluations	Long-Term Endurance	30.01	.0000	***
Cognitive Ability	Physical Strength	8.06	.0045	**
Cognitive Ability	Short-Term Endurance	3.83	.0503	ns
Cognitive Ability	Long-Term Endurance	3.11	.0776	ns
Physical Strength	Short-Term Endurance	21.84	.0000	***
Physical Strength	Long-Term Endurance	19.75	.0000	***
Short-Term Endurance	Long-Term Endurance	.07	.7880	ns
* p<.05 ** p<.01 *** p<.001				

Table 3.16 – Pairwise Comparison of Regression Coefficients - SFQC

Navigational ability is not significantly different from peer evaluations or physical strength. Peer evaluations are not significantly different from physical strength, which suggests candidates may be taking both navigational ability and physical strength into account when forming their perceptions of their peers. Cognitive ability is not significantly different from either short- or long-term endurance. This, again, may be evidence of “mind over matter,” in that a strong cognitive ability may relate to being able to push oneself physically. Finally, short-term endurance is not significantly different from long-term endurance. These results mirror the PCA, as the short- and long-term endurance variables aligned under the same factor, but were of opposite signs.

The summary results of the hypotheses are given in Table 3.17.

Summary of Hypothesized Results - SFQC		
H#	**Hypotheses**	**Supported?**
H1b	Cognitive ability has a positive effect on the likelihood of SFQC success.	Yes
H2b	Navigational ability has a positive effect on the likelihood of SFQC success.	Yes
H3b	Physical strength has a positive effect on the likelihood of SFQC success.	Yes
H4b	Short-term endurance has a positive effect on the likelihood of SFQC success.	No
H5b	Long-term endurance has a positive effect on the likelihood of SFQC success.	No
H6b	Being Ranger qualified has a positive effect on the likelihood of SFQC success.	Yes
H7b	Peer-evaluated personality traits have a positive effect on the likelihood of SFQC success.	Yes
H8b	Peer evaluated personality traits predict SFQC success at a higher likelihood than cognitive ability or navigational ability.	Partially
H9b	Cognitive ability and navigational ability predict SFQC success at a higher likelihood than physical strength, short-term endurance, or long-term endurance.	Partially

Table 3.17 – Summary of Hypothesized Results - SFQC

3.9.2.3 Covariate Results

Like SFAS, the quadratic term for age (AGE^2) is negative, which suggests that candidates whose age is closest to the mean value (25.4 years old for SFQC candidates) enjoy the highest likelihood of SFQC success, whereas those whose age is furthest from the mean in either direction have lower likelihoods of success. However, unlike SFAS, the quadratic term is not significantly different from zero (AGE^2 = -.032, ns). Finally, candidates who were selected “off the streets” to join SF have an 89% greater likelihood of success than those from other career fields (DMOS18 = .637, p<.001), and candidates from the medical career field enter SFQC with a 36% lower likelihood of SFQC success than those from other career fields (DMOS68 = -.444, p<.05).

3.10 Robustness

To examine the robustness of the results, I performed six different analyses for both the SFAS and SFQC data sets: (1) excluding outlying cases, (2) cohort examinations (based on the alignment of the personality characteristic variables), (3) excluding navigational ability,[73] (4) classification tables, (5) moderator analyses, and (6) cross-validation. The details and results of each analysis are described below, beginning with the SFAS data set.

3.10.1 SFAS Robustness Checks

Table 3.18 displays the results of the first four robustness examinations. I compared the models by examining the percentage of variables that displayed the same significance pattern and sign as the original model (Model 1a for the SFAS data). The results for each comparison are provided in Table 3.19.

[73] Given that the navigational events occur during the middle and end of SFAS and that about 20% of the starting candidates have already been eliminated from SFAS by then, fewer cases contain the NAVIG variable. In other words, candidates who have already been eliminated will have measures on the other variables, but not on NAVIG. I am essentially missing NAVIG data on candidates whose dependent variable (STATDUM) is zero, which could bias my results. To examine the robustness of the results, I run the regression without the NAVIG variable and compare the results.

Variable	Results	Robustness Checks				
	Model 1a	Model 2a	Model 3a	Model 4a	Model 5a	Model 6a
			Cohorts			
	2006-2013	2006-2013 Outlier Deletion	2012-2013	2010-2011	2006-2009	2006-2013 without NAVIG
Cognitive Ability	0.346 ***	0.346 ***	0.306 ***	0.125 *	0.441 ***	0.508 ***
Navigational Ability	0.953 ***	0.953 ***	1.380 ***	1.137 ***	0.776 ***	-- --
Physical Strength	0.192 ***	0.187 ***	0.145 *	0.230 ***	0.191 ***	0.338 ***
Short-Term Endurance	0.147 ***	0.134 **	0.287 *	0.106 **	0.023	0.161 ***
Long-Term Endurance	0.301 ***	0.380 ***	0.673 ***	0.120 *	0.429 ***	0.127 ***
Ranger Qualification Dummy	0.422 ***	0.437 ***	0.252	0.326	0.440 ***	0.692 ***
Peer Evaluations	0.770 ***	0.782 ***	0.861 ***	0.495 ***	0.979 ***	0.799 ***
Age	0.062 *	0.067 *	0.124 *	0.103	0.012	0.045 *
Age^2	-0.058 ***	-0.079 ***	-0.101 **	-0.088 ***	-0.012	-0.077 ***
Enlisted Dummy Variable	1.066 ***	1.103 ***	1.559 ***	0.110	1.333 ***	0.737 ***
DMOS11 – Infantry	0.246 ***	0.262 ***	0.363 **	0.287 *	0.191 **	0.447 ***
DMOS13 – Field Artillery	0.169	0.188 *	-0.070	-0.119	0.340 **	0.209 **
DMOS18 – SF 18X	0.644 ***	0.646 ***	0.589 ***	0.845 ***	0.511 ***	1.130 ***
DMOS19 – Armor	0.108	0.143	0.115	-0.379	0.300 *	0.193 *
DMOS68 – Medical	0.103	0.074	0.080	0.121	0.200	-0.010
DMOS92 - Quartermaster	0.162	0.133	-0.086	0.433	0.100	0.016
DYR7 – Dummy Year 2007	0.574 ***	0.615 ***	-- --	-- --	0.424 ***	0.127 *
DYR8 – Dummy Year 2008	-0.194 *	-0.155	-- --	-- --	-0.245 *	-0.368 ***
DYR9 – Dummy Year 2009	-0.113	-0.085	-- --	-- --	-0.116	-0.830 ***
DYR10 – Dummy Year 2010	0.025	0.206 *	-- --	-- --	-- --	-0.203 **
DYR11 – Dummy Year 2011	-0.609 ***	-0.548 ***	-- --	-0.754 ***	-- --	-0.396 ***
DYR12 – Dummy Year 2012	-0.931 ***	-0.862 ***	-- --	-- --	-- --	-0.464 ***

DYR13 – Dummy Year 2013	-0.850 ***	-0.764 ***	0.079	-- --	-- --	-0.507 ***
Constant	-0.250	-0.308	-1.717	0.568	-0.546	-0.675
# Obs	16038	14750	3766	4050	8222	20024
Log Likelihood	-7573.137	-7110.748	-1652.137	-1782.314	-4006.441	-10971.2
df	23	23	17	17	19	22
Pseudo R2	0.2725	0.2517	0.3234	0.2172	0.2775	0.2075
% SEL-SEL	79.25	78.85	81.58	81.61	77.97	73.06
% NSEL-NSEL	71.43	69.75	72.99	62.44	74.01	70.37
% Correct Classification	77.01	76.35	78.94	78.74	76.58	71.81

Table 3.18 – Results of the First Four Robustness Examinations – SFAS

Robustness Comparisons - SFAS			
Model	**# Variables Being Compared**	**% Same Significance Pattern as Model 1a**	**% Maintained Same Sign as Model 1a**
Model 2a: Outlier Exclusion	23	87%	100%
Model 3a: Cohort 2012-2013	17	88%	82%
Model 4a: Cohort 2010-2011	17	82%	88%
Model 5a: Cohort 2006-2009	19	74%	100%
Model 6a: NAVIG Exclusion	22	82%	91%

Table 3.19 – Robustness Comparisons – SFAS

3.10.1.1 Excluding Outlying Cases

For the first examination, I excluded the outlying cases in the SFAS data set and re-ran the regression. The results show a similar significance pattern for the regression that omits outlying cases (Model 2a) and the one that does not (Model 1a). In fact, 20 of the 23 variables (87% of the variables) in Model 2a maintain the same significance pattern and 100% of the variables maintained the same sign as Model 1a.[74] Given that the log-likelihood and pseudo R^2 values are quite similar, I chose to retain all cases.

3.10.1.2 Cohort Examinations

For the second examination, I analyzed each of the year groups separately to account for the varying types of personality traits that were gathered across the years (see Appendix H). Specifically, Model 3a examines the 2012-2013 cohort, Model 4a examines the 2010-2011 cohort, and Model 5a examines the 2006-2009 cohort. The results are similar to Model 1a with respect to variable significance and sign. Log-likelihood ratio tests show the models are all significantly different from Model 1a ($\chi^2_{(6)}$=17.37, p<.01 for Model 3a; $\chi^2_{(6)}$=17.33, p<.01 for Model 4a; and $\chi^2_{(4)}$=16.36, p<.01 for Model 5a). Further, the pseudo R^2 values vary quite a bit by year cohort. However, finding similar substantive results with the relatively small number of complete cases in each cohort speaks to the stability and robustness of Model 1a.

[74]Significance did not change for any of the substantive components.

3.10.1.3 NAVIG Exclusion

For the third robustness examination, I excluded the navigational ability (NAVIG) variable to account for the fact that approximately 20% of SFAS candidates drop out prior to performing the navigational events, and therefore do not have a score for this variable. In total, 18 of the 22 variables (82% of the variables) in Model 6a maintain the same significance pattern, and 20 of the 22 variables (91% of the variables) maintained the same sign as Model 1a. The log-likelihood ratio ($\chi^2_{(1)}$=16.26, $p<.001$) shows the model is significantly different from Model 1a, and the lower pseudo R^2 value suggests that quite a bit of variance is lost when navigational ability is excluded from the model. Clearly, navigational ability is an important predictor of SFAS success, and the overall similarity in the substantive variables demonstrates the robustness of Model 1a.

3.10.1.4 SFAS Classification Tables

The fourth robustness examination takes into account the accuracy of the model in predicting candidate selection and non-selection. Overall, Model 1a model correctly predicted the candidate's outcome 77% of the time, as shown in the bottom of Table 3.18. The "% SEL-SEL" row shows the percentage of times the model predicts candidate selection (i.e., SFAS success, or STATDUM=1) and the candidate was actually selected. The model accurately predicts selection approximately 79% of the time. The "% NSEL-NSEL" row shows the percentage of times the model predicts the candidate *will not* be selected (i.e., SFAS failure, or STATDUM=0) and the candidate was actually *not* selected. The model accurately predicts non-selection approximately 70% of the time.

Beyond the classification tables, I also developed a scorecard for SFAS leadership and cadre to assess whether or not a candidate should be selected based on their raw training scores. I tested this scorecard on the existing database of candidate and it successfully predicted selection or non-selection 70% of the time.[75] Again, these results speak to the stability of the model.

3.10.1.5 SFAS Moderator Analyses

The fifth robustness examination looks for the presence of moderators in the model. Specifically, I examine the potential for the substantive factors to vary over time using cohort dummies, and then

[75]See the discussion section for more information on this process.

examine how the selection prediction of each substantive factor varies by the candidate's Ranger status (whether the candidate is Ranger qualified or not). I chose Ranger status as a potential moderator because soldiers who are Ranger qualified have been in the Army for a longer period of time than those who are not Ranger qualified (see Appendix F) and, therefore, theoretically, should have better-honed soldier skills. I hope to determine whether tenure and more advanced soldier skills affect the relationships between the substantive factors and SFAS success.

3.10.1.5.1 Time as a Moderator

To examine the potential time-varying effects of the substantive variables, I created dummy variables for each cohort. Candidates who went through SFAS from 2006 to 2009 were coded as Cohort 1, candidates who went through SFAS from 2010 to 2011 were coded as Cohort 2, and candidates who went through SFAS from 2012 to 2013 were coded as Cohort 3. Next, interaction terms were created whereby each cohort dummy was crossed with each of the six substantive variables (COGNIT, NAVIG, STRENG, ENDURST, ENDURLT, AND PEEREVAL). Cohort 1 (2006-2009) was used as the reference group for the results shown in Table 3.20.[76]

[76]Table 3.20 provides summary results of the substantive variables with significant moderation. Full results (in both regression coefficient and odds ratio form) can be found in Appendix L.

Variable	Results	Moderator Analyses		
	Model 1a	Model 7a		
	Initial Results	Variable Result Cohort 1^	Variable Result Cohort 2	Variable Result Cohort 3
Cognitive Ability	0.346 ***	0.402 ***	0.256 *	0.239 **
Navigational Ability	0.953 ***	0.764 ***	1.182 ***	1.345 ***
Physical Strength	0.192 ***	0.182 ***	0.287	0.111
Short-Term Endurance	0.147 ***	0.019	0.111	0.273 *
Long-Term Endurance	0.301 ***	0.428 ***	0.121 ***	0.655
Peer Evaluations	0.770 ***	0.957 ***	0.546 ***	0.826 *
COHORT2	--	--	-.795 ***	---
COHORT3	--	--	---	-.943 ***
# Obs	16038	16308		
Log Likelihood	-7573.137	-7485.3377		
df	23	35		
Pseudo R2	0.2725	0.2809		
% SEL-SEL	79.25	79.78		
% NSEL-NSEL	71.43	72.44		
% Correct Classification	77.01	77.67		
^ = Cohort 1 is the reference group. Substantive results in this column represent the results for Cohort 1.				
* p<.05 ** p<.01 *** p<.001				

Table 3.20 – Time as a Moderator Results - SFAS

Model 7a shows the results of adding cohort dummies and interactions as a proxy for capturing the time-varying nature of the effects of the substantive variables. First, the model is significant ($\chi^2_{(35)}$=5847.97, p<.001) and captures slightly more variance in the dependent variable than the original model (pseudo R^2=28.09), which is expected given that Model 7a adds 12 new variables to the equation. Of particular importance is the way the main effects change when interaction terms are included. Short-term endurance (ENDURST) for Cohort 1 is no longer significant when the cohort dummies and their interaction terms are added. Interestingly, when the cohort variables are added, the main effect of peer evaluations (PEEREVAL) became more predictive of SFAS success than cognitive or navigational ability (COGNIT or NAVIG) for Cohorts 1 and 2, as initially hypothesized in H8a and Figure 3.2.

Second, the two cohort dummies (COHORT2 and COHORT3) show that the likelihood of success is lower for those candidates who entered SFAS from 2010 to 2013 (COHORT2 = -.795, $p<.001$ and COHORT3 = -.943, $p<.001$). This suggests that being selected has become more difficult, when compared with the reference group (COHORT1, 2006 to 2009).

Third, 8 out of 12 moderator variables are significant. Looking at the trends among the substantive variables, the predictive ability of cognitive ability has decreased over time (COGNIT1 = .402, $p<.001$; COGNIT2 = .256, $p<.05$; COGNIT3 = .239, $p<.01$). This suggests a general trend against selecting candidates based on cognitive ability. Navigational ability, on the other hand, increased in predictive ability over time (NAVIG1 = .764, $p<.001$; NAVIG2 = 1.182, $p<.001$; NAVIG3 = 1.345, $p<.001$). This suggests that navigational ability has become more important to SFAS success over time. Physical strength does not change significantly from Cohort 1, however short-term endurance only becomes significantly predictive of SFAS success in Cohort 3 (ENDURST3 = .273, $p<.05$). Long-term endurance trends downward from Cohort 1 to Cohort 2 (ENDURLT1 = .428, $p<.001$; and ENDURLT2 = .121, $p<.001$), with no significant change in Cohort 3. It appears that long-term endurance has become less predictive of SFAS success over time. Finally, the importance of peer evaluations to SFAS success changes significantly from year to year. Peer evaluations are quite important to SFAS success in Cohort 1 (PEEREVAL1 = .957, $p<.001$), then become less predictive in Cohort 2 (PEEREVAL2 = .546, $p<.001$), and then become more predictive in Cohort 3 (PEEREVAL3 = .826, $p<.05$).

These results suggest that the factors that SFAS leadership and cadre have deemed important for selection have changed significantly over the years. Although I can only make conjectures as to why these changes have taken place, I believe they are the result of SFAS leadership and cadre attempting to find the right combination of factors to improve success rates in the SFQC phase. In other words, they used different selection criteria in order to test (albeit anecdotally) which factors were most predictive of SFQC success, as that is the main goal of SFAS—to pre-screen candidates prior to SFQC. Part of the value of this research is to help SF leadership and cadre become more efficient at and consistent with selecting SFAS candidates for SFQC. Understanding how their selection criteria have changed over the years—and whether or not those changes were intentional—is key to improving selection criterion consistency. Figures 3.20 through 3.24 display the interaction plots for each significant variable-by-cohort combination.[77]

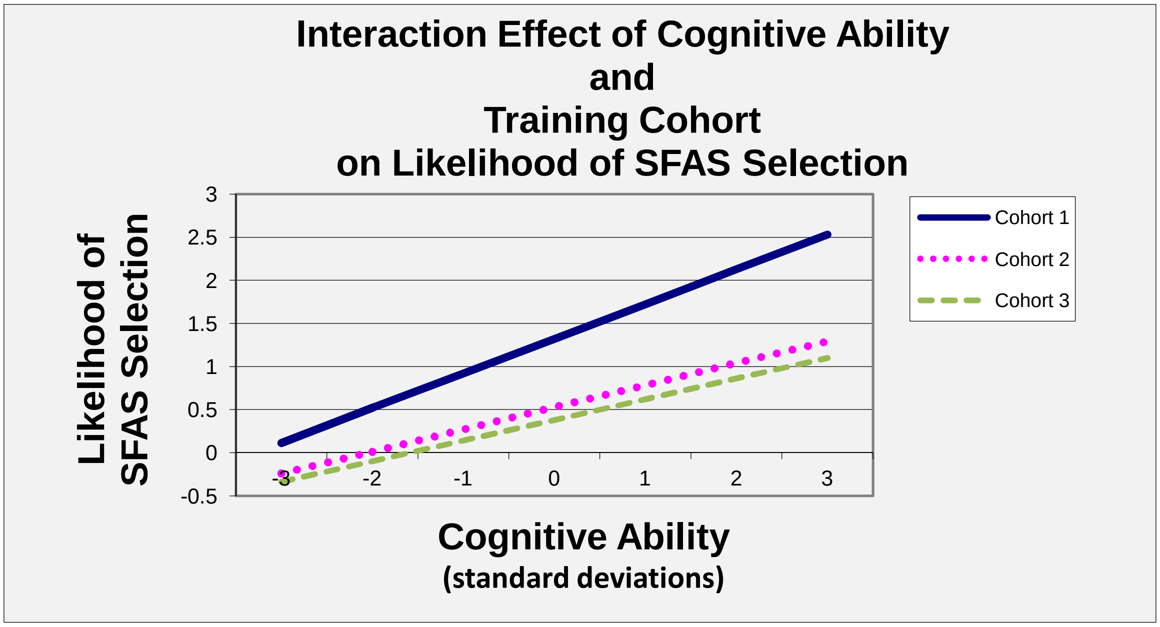

Figure 3.20 – Interaction Effect of Cognitive Ability & Training Cohort - SFAS

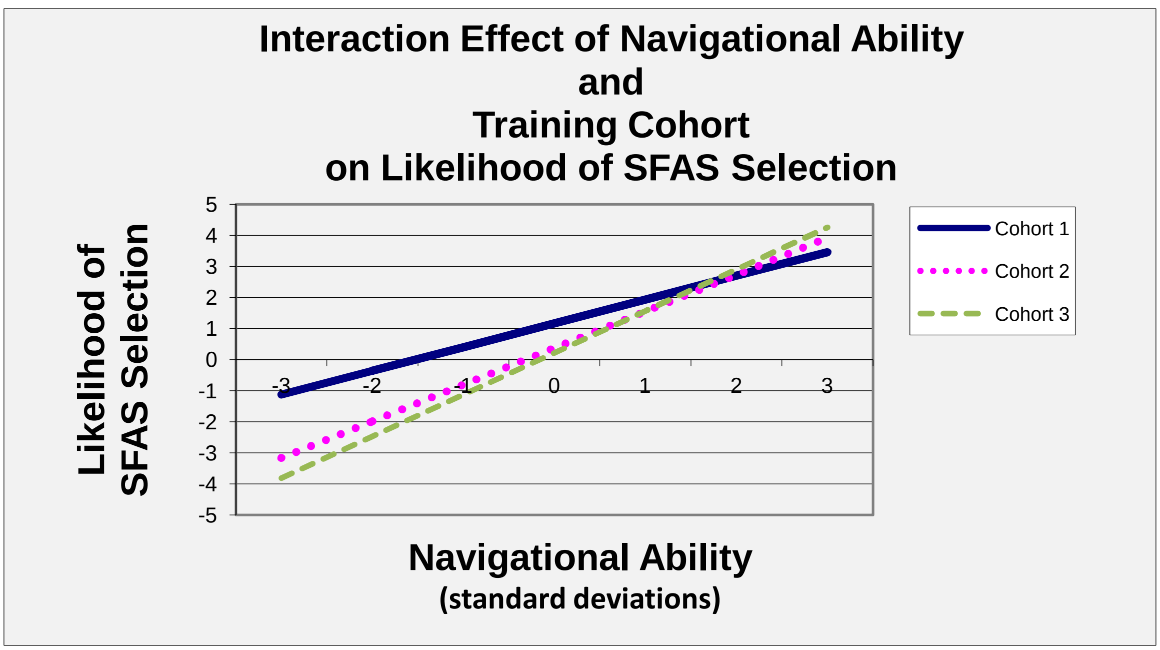

Figure 3.21 – Interaction Effect of Navigational Ability & Training Cohort - SFAS

[77] The interaction plot for physical strength (STRENG) is not included, as neither the Cohort 2 nor Cohort 3 interactions are significantly different from Cohort 1.

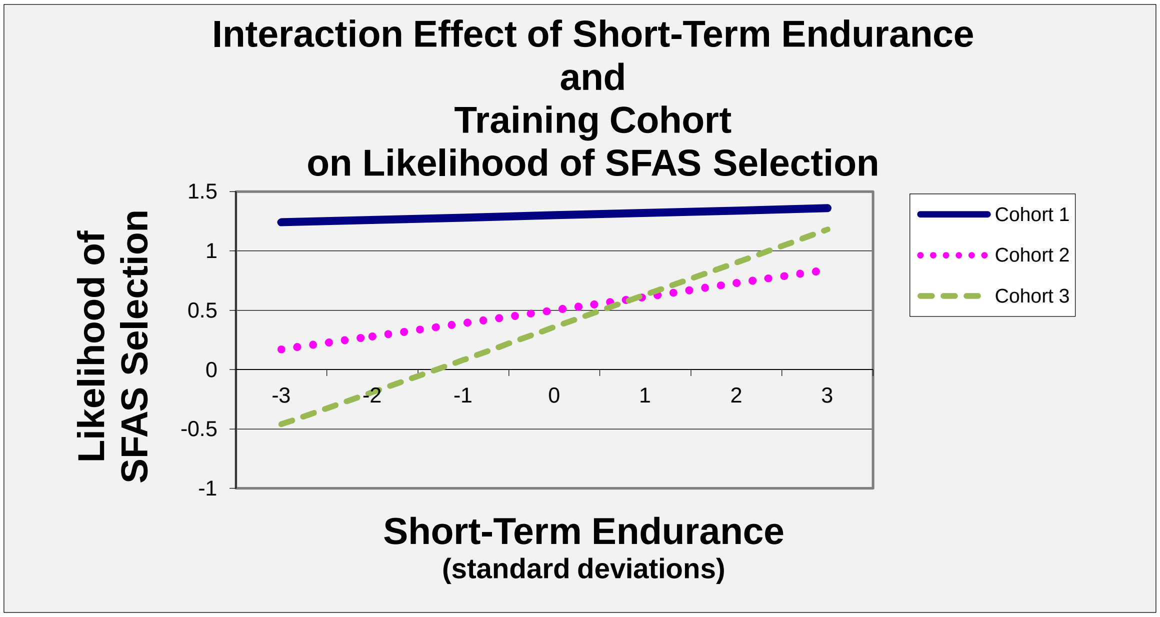

Figure 3.22 – Interaction Effect of Short-Term Endurance & Training Cohort - SFAS

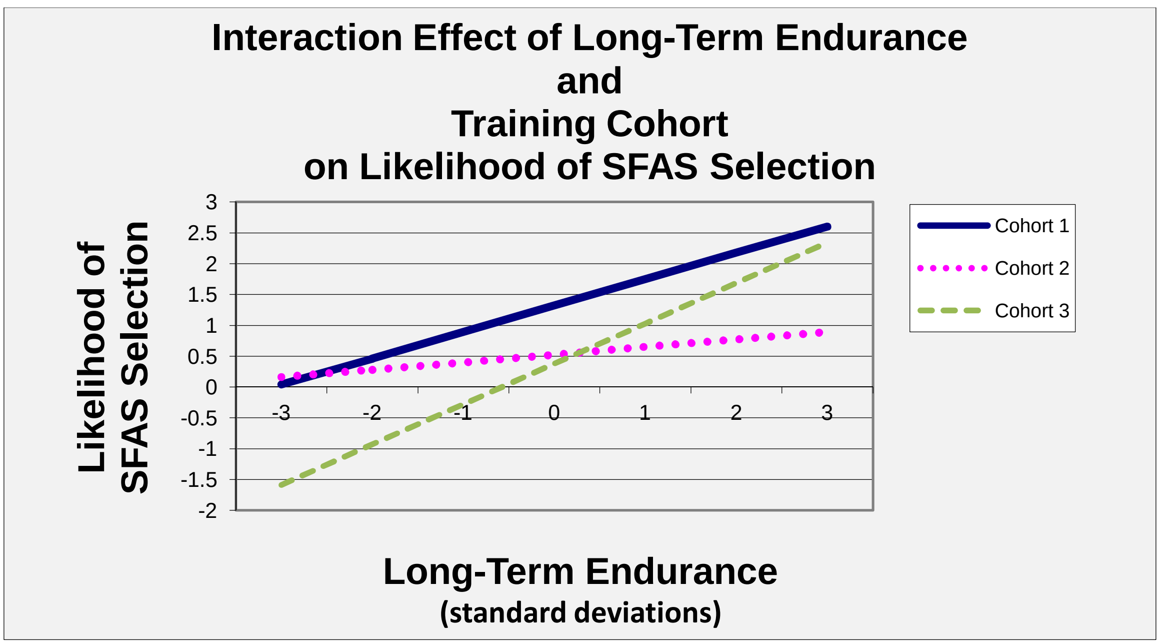

Figure 3.23 – Interaction Effect of Long-Term Endurance & Training Cohort - SFAS

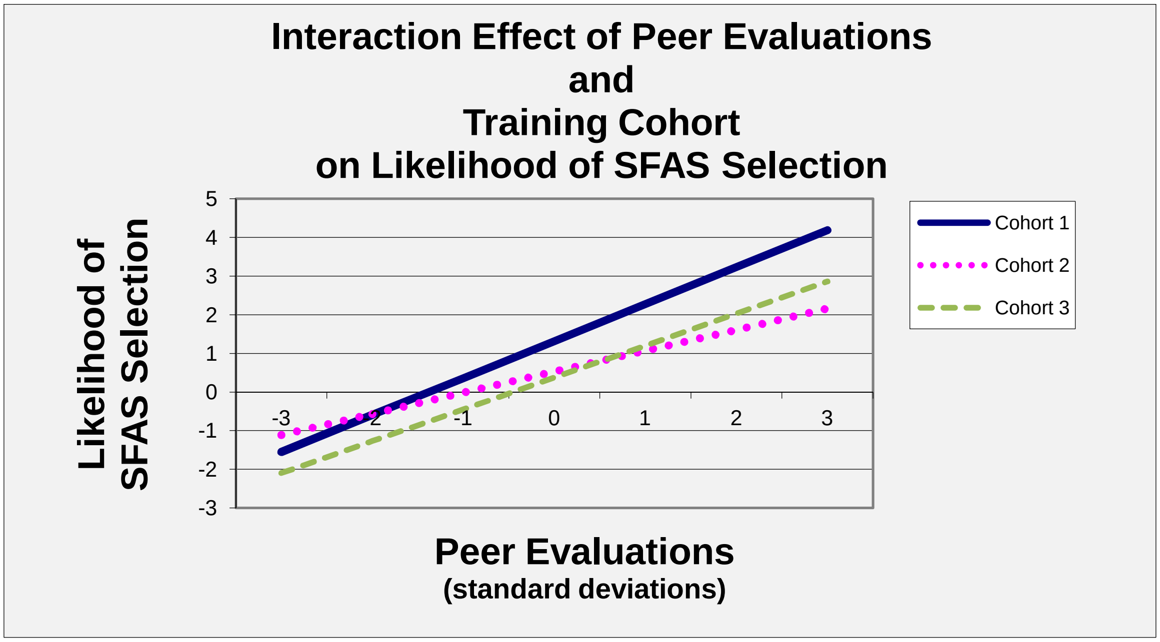

Figure 3.24 – Interaction Effect of Peer Evaluations & Training Cohort - SFAS

3.10.1.5.2 Ranger Status as a Moderator

Model 8a in Table 3.21 shows the results of Ranger status (i.e., whether or not the SFAS candidate is Ranger qualified) as a moderator. First, the model is significant ($\chi^2_{(29)}$=5705.81, p<.001) and captures slightly more variance in the dependent variable than the original model (pseudo R^2=27.41), which is expected as Model 8a adds 6 new variables to the equation. There were no changes in significance, and few changes in magnitude among the main effects when the interaction terms were added.

Variable	Results	Moderator Analyses	
	Model 1	Model 8	
	Initial Results	Variable Result Ranger=0#	Variable Result Ranger=1
Cognitive Ability	0.346 ***	0.349 ***	0.315
Navigational Ability	0.953 ***	0.941 ***	1.158 *
Physical Strength	0.192 ***	0.200 ***	0.107
Short-Term Endurance	0.147 ***	0.166 ***	-0.070 *
Long-Term Endurance	0.301 ***	0.299 ***	0.317
Peer Evaluations	0.770 ***	0.733 ***	1.124 ***
Ranger Qualification Dummy	.422 ***	--	.317 **
# Obs	16038	16038	
Log Likelihood	-7573.137	-7556.42	
df	23	29	
Pseudo R2	0.2725	0.2741	
% SEL-SEL	79.25	79.29	
% NSEL-NSEL	71.43	71.20	
% Correct Classification	77.01	76.95	

Ranger = 0 is the reference group. Substantive results in this column represent the results when the candidate is not Ranger qualified.

* p<.05 ** p<.01 *** p<.001

Table 3.21 – Ranger Status as a Moderator Results - SFAS

Three of the six moderator variables are significant. In particular, being a Ranger improves a candidate's chance of SFAS success when it comes to navigational ability (NAVIG1 = 1.158, p<.05; NAVIG0 = .941, p<.001) and peer evaluations (PEEREVAL1 = 1.124, p<.001; PEEREVAL0 = .733, p<.001). These results make sense, as those who are Ranger qualified have already experienced a myriad of navigational training and tend to have more time in service, which may make them more competent (at least in the eyes of their peers), thus boosting their peer evaluation scores. Interestingly, Ranger status negatively moderates the relationship between SFAS selection and short-term endurance. In other words, short-term endurance (ENDURST) is less predictive of SFAS success for candidates who are Ranger qualified (ENDURST1 = -.070, p<.05) as compared to their non-Ranger qualified counterparts

(ENDURST0 = .166, p<.001). I find no reason why this relationship might exist. Figures 3.25 through 3.27 show the interaction plots for each significant variable-by-Ranger status combination.

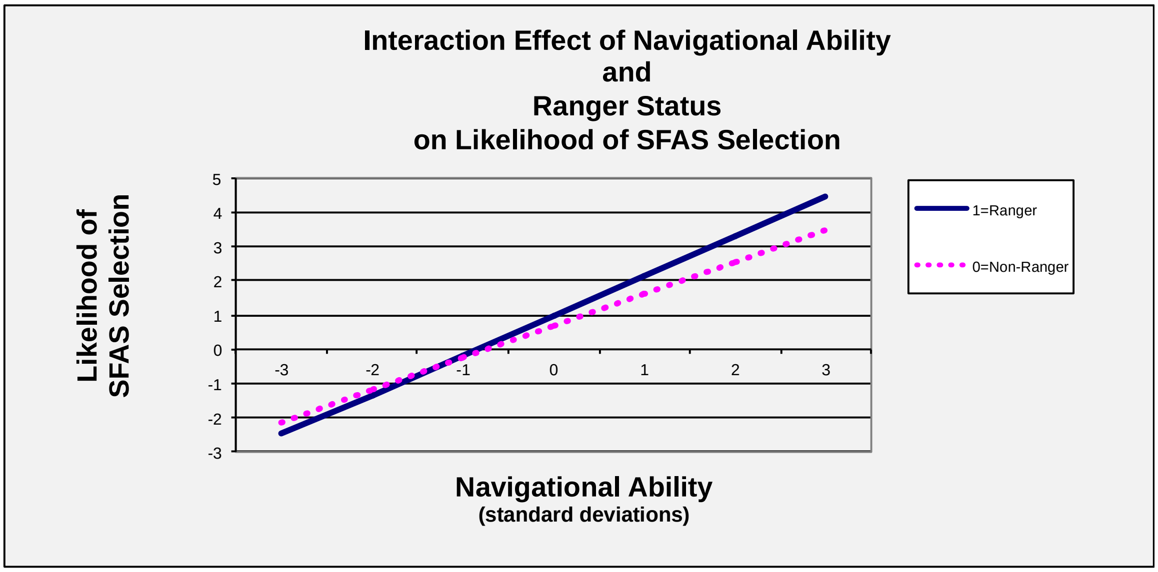

Figure 3.25 – Interaction Effect of Navigational Ability & Ranger Status - SFAS

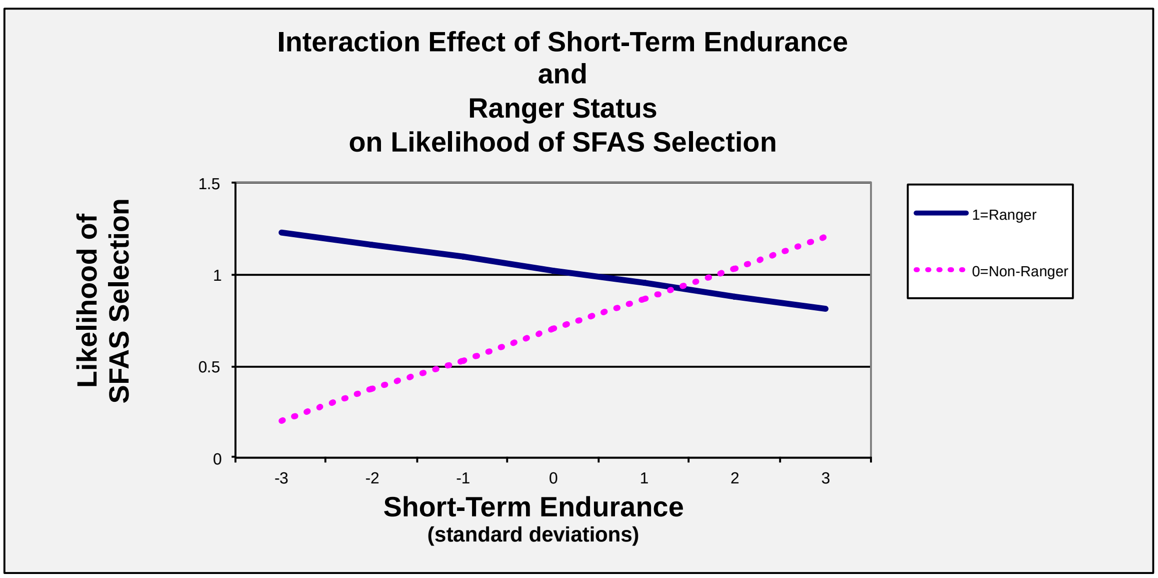

Figure 3.26 – Interaction Effect of Short-Term Endurance & Ranger Status - SFAS

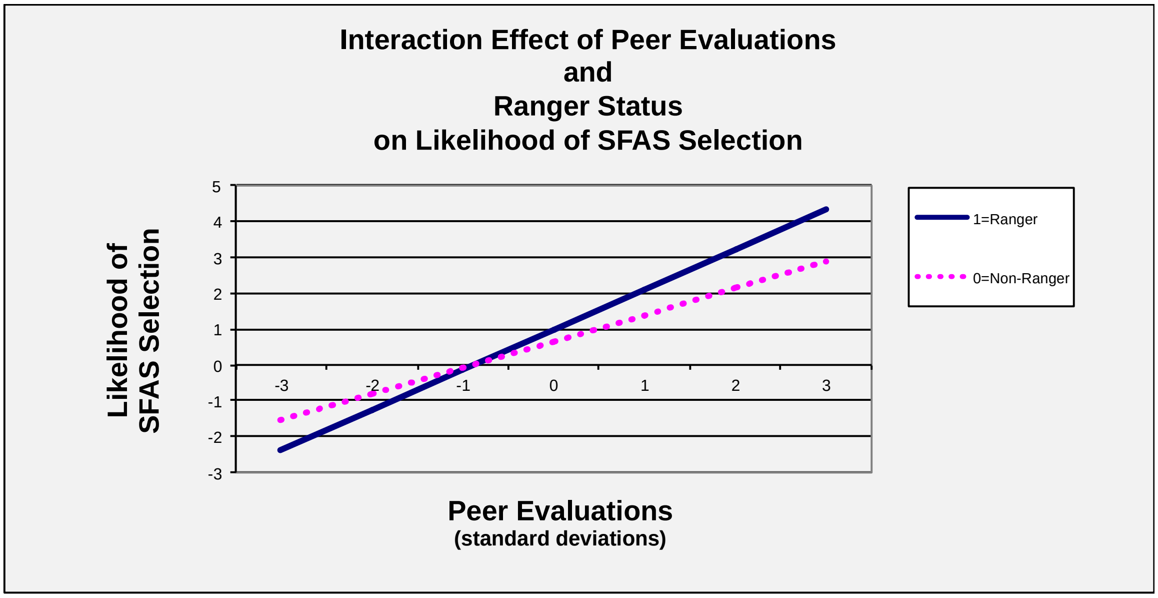

Figure 3.27 – Interaction Effect of Peer Evaluations & Ranger Status - SFAS

3.10.1.5.3 Time and Ranger Status as Moderators

In Model 9a both types of moderators were examined together, in one model. This model was significant ($\chi^2_{(41)}$=5881.58, p<.001) and captures more variance in the dependent variable than any of the other models (pseudo R^2=28.25), which is expected given that Model 9a has more variables than any other model. The results are basically an amalgamation of Models 7a and 8a, so they are not repeated here. They can be found in Appendix L.

3.10.1.6 SFAS Cross-Validation

To test if the SFAS results are generalizable to an independent data set, random sub-sampling cross-validation procedures were performed whereby the data were randomly split 75/25 into a training set and a validation set. The process was repeated 50 times and coefficients were recorded for each set (training and validation). The coefficients for each of the iterations were averaged to examine the generalizability of the model. For the model to be cross-validated, the resultant coefficients should be consistent across the training and validation sets. Additionally, the pseudo R^2 values should be similar. Lack of similarity suggests the model fits the validation set too well, or is over-fitting (Tabachnick & Fidell, 2007; Kutner et al., 2004).

The SFAS cross-validation results are shown in Table 3.22. Each overall model is significant (i.e., the overall chi-square value is significant) and all of the coefficient magnitudes for the training and validation sets mirrored those of the original regression (Model 1a). This, again, speaks to the stability of the SFAS model.

The pattern of significance, however, was slightly different between the training/validation sets and the original model. For 16 of the variables (70%), the pattern was the same. It is worth mentioning that the pattern of significance only differed for covariates—there were no differences in the substantive variables. In fact, a high level of significance was achieved for all substantive variables. This suggests that covariates, such as the career field from which the Soldier was drawn, his age, and the year he entered training, are not as stable as the substantive variables for predicting SFAS success. This point is very important, as it indicates that SFAS is working as a pre-screening mechanism for SFQC. It highlights the fact that variables which can be gathered from the soldier's personnel file *before* coming to SFAS are *not as stable* for predicting success as the variables collecting *during* SFAS.

Finally, all the pseudo-R^2 values are within +/- 2% of the original model. As a happy bonus, the percentage of correct classifications remained over 75% for both the training and validation sets, and the mean absolute deviation for both the training and validation sets was zero. This suggests the error in the model is quite low. In summary, the cross-validation suggests Model 1a is stable and the results are generalizable to an independent data set.

SFAS Cross-Validation Results					
Variable	Results	Cross-Validation		Sign in same direction?	Pattern of significance the same?
		Training Set	Validation Set		
	2006-2013	2006-2013	2006-2013		
Cognitive Ability	0.346 ***	0.342 ***	0.366 ***	YES	YES
Navigational Ability	0.953 ***	0.956 ***	0.952 ***	YES	YES
Physical Strength	0.192 ***	0.192 ***	0.191 **	YES	YES
Short-Term Endurance	0.147 ***	0.147 ***	0.154 *	YES	YES
Long-Term Endurance	0.301 ***	0.300 ***	0.313 ***	YES	YES
Ranger Qualification Dummy	0.422 ***	0.429 ***	0.387 *	YES	YES
Peer Evaluations	0.770 ***	0.770 ***	0.784 ***	YES	YES
Age	0.062 *	0.063 ***	0.057	YES	NO
Age2	-0.058 ***	-0.059 ***	-0.056	YES	NO
Enlisted Dummy Variable	1.066 ***	1.067 ***	1.073 ***	YES	YES
DMOS11 - Infantry	0.246 ***	0.244 ***	0.256 *	YES	YES
DMOS13 - Field Artiller	0.169	0.167 ***	0.174	YES	NO
DMOS18 - SF 18X	0.644 ***	0.642 ***	0.656 ***	YES	YES
DMOS19 - Armor	0.108	0.111 *	0.096	YES	NO
DMOS68 - Medical	0.103	0.106	0.093	YES	YES
DMOS92 - Quartermaster	0.162	0.158 **	0.187	YES	NO
DYR7 - Dummy Year 2007	0.574 ***	0.576 ***	0.576 **	YES	YES
DYR8 - Dummy Year 2008	-0.194 *	-0.190 ***	-0.213	YES	NO
DYR9 - Dummy Year 2009	-0.113	-0.109 *	-0.129	YES	NO
DYR10 - Dummy Year 2010	0.025	0.029	0.019	YES	YES
DYR11 - Dummy Year 2011	-0.609 ***	-0.610 ***	-0.598 **	YES	YES
DYR12 - Dummy Year 2012	-0.931 ***	-0.931 ***	-0.935 ***	YES	YES
DYR13 - Dummy Year 2013	-0.850 ***	-0.855 ***	-0.830 ***	YES	YES
Constant	-0.250	-0.251 --	0.747 --	--	--
# Obs	16038	13247	2791	100% same sign direction	70% same pattern of significance
Model Significant?	YES	YES	YES		
df	23	23	23		
Psuedo R2	0.2725	0.2717	0.2766		
% Change from Original R2	--	0.29%	1.48%		

* p<.05 ** p<.01 *** p<.001

Training and Validation Set values based on average across 50 repetitions

Table 3.22 – Cross-Validation Results - SFAS

3.10.2 SFQC Robustness Checks

Moving to the SFQC data set, the same six robustness examinations were performed. Table 3.23 displays the results of the first four examinations, and again I compare the models by examining the percentage of variables that displayed the same significance pattern and sign as the original model (Model 1b for the SFQC data). The results for each comparison are provided in Table 3.24.

Variable	Results: Model 1b		Robustness Checks: Model 2b		Model 3b		Model 4b		Model 5b		Model 6b	
	2006-2012		2006-2012 Outlier Deletion		Cohorts: 2012		2010-2011		2006-2009^		2006-2012 without NAVIG	
Cognitive Ability	1.081	*	1.064		0.786	*	1.162	**	1.055		1.108	**
Navigational Ability	1.264	***	1.247	***	1.672	**	1.345	***	1.209	***	--	
Physical Strength	1.226	***	1.225	***	1.480	***	1.343	***	1.150	**	1.219	***
Short-Term Endurance	0.993		1.032		0.736		1.113	**	0.855		0.998	
Long-Term Endurance	1.002		0.924	*	1.618	**	1.099	*	0.839	**	1.024	
Ranger Qualification Dummy	1.411	***	1.339	**	1.283		1.859	***	1.287		1.519	***
Peer Evaluations	1.261	***	1.260	***	1.125		1.321	***	1.133	*	1.275	***
Age	0.961		0.972		0.947		0.878	*	1.097		0.963	
Age^2	0.968		0.953	*	1.053		0.963		0.951		0.963	
Enlisted Dummy Variable	0.953		0.902		1.769		1.087		0.722	*	0.948	
DMOS11 – Infantry	1.050		1.011		1.348		1.249		0.847		1.107	
DMOS13 – Field Artillery	1.170		1.091		1.899		1.302		0.899		1.166	
DMOS18 – SF 18X	1.891	***	1.930	***	4.601	***	1.225		2.497	***	1.976	***
DMOS19 – Armor	1.002		0.986		0.764		0.886		1.218		1.042	
DMOS68 – Medical	0.641	*	0.632	*	0.853		0.946		0.267	**	0.634	*
DMOS92 – Quartermaster	0.767		0.768		0.833		1.023		0.502		0.844	
DYR8 – Dummy Year 2008	4.605	***	4.786	***	Omitted		Omitted		4.065	***	4.339	***
DYR9 – Dummy Year 2009	3.591	***	3.529	***	Omitted		Omitted		3.497	***	3.684	***
DYR10 – Dummy Year 2010	6.258	***	5.679	***	Omitted		0.829	*	Omitted		7.614	***
DYR11 – Dummy Year 2011	7.497	***	7.208	***	Omitted		Omitted		Omitted		0.732	***
DYR12 – Dummy Year 2012	1.153		1.146		Omitted		Omitted		Omitted		1.476	**
Constant	0.101		0.109	--	0.034		0.693		0.139		0.088	

# Obs	7899	7341	1319	2964	3616	8152
Log Likelihood	-4256.793	-3907.555	-541.803	-1869.077	-1735.028	-4413.139
df	21	21	16	17	18	20
Pseudo R^2	0.1459	0.1416	0.1078	0.0902	0.1253	0.1403
% SEL-SEL	60.56	60.01	68.75	65.18	63.16	60.17
% NSEL-NSEL	75.41	75.85	83.35	64.26	78.40	75.10
% Correct Classification	72.12	72.77	83.17	64.71	77.60	71.93
^ No 2007 cases						
* p<.05 ** p<.01 *** p<.001						

Table 3.23 – Results of the First Four Robustness Examinations – SFQC

Robustness Comparisons - SFQC			
Model	**# Variables Being Compared**	**% Same Significance Pattern as Model 1b**	**% Maintained Same Sign as Model 1b**
Model 2b: Outlier Exclusion	21	86%	86%
Model 3b: Cohort 2012	16	75%	75%
Model 4b: Cohort 2010-2011	17	71%	71%
Model 5b: Cohort 2006-2009^	18	78%	78%
Model 6b: NAVIG Exclusion	20	95%	100%
^ No 2007 cases			

Table 3.24 – Robustness Comparisons – SFQC

3.10.2.1 Excluding Outlying Cases

For the first robustness examination of the SFQC data, outlying cases were excluded and the regression was re-run. I find similar significance and sign patterns, with 86% of the variables being significant and having in the same sign in both Models 1b and 2b. Given that the log-likelihood and pseudo R^2 values are quite similar, I chose to retain all cases.

3.10.2.2 Cohort Examinations

For the second robustness examination of the SFQC results, cohorts were again created and analyzed separately to account for the varying types of personality traits that were gathered in each cohort (see Appendix H). The cohort analyses (Models 3b, 4b, and 5b) provide similar results to Model 1b with respect to variable significance and sign (approximately 75% of the variables maintain significance and sign across models), however the magnitudes of the coefficients vary by cohort, as do the pseudo R^2 values. Log-likelihood ratio tests show the models are all significantly different from Model 1b ($\chi^2_{(5)}$=16.44, p<.01 for Model 3b; $\chi^2_{(4)}$=15.56, p<.01 for Model 4b; and $\chi^2_{(3)}$=15.66, p<.01 for Model 5b). However, as in the SFAS data, finding generally similar substantive results with a relatively small number of complete cases in each cohort speaks to the stability and robustness of Model 1b.

3.10.2.3 NAVIG Exclusion

In the third robustness examination, navigational ability (NAVIG) was excluded to account for the fact that approximately 20% of the candidates drop out prior to performing the navigational events. In total, 19 of the 20 variables (95% of the variables) in Model 6b maintain the same significance pattern, and 100% of the variables maintained the same sign as Model 1b. There were fairly small changes in magnitude among the variables and the pseudo R^2 value was slightly worse when navigational ability was excluded. Again, these results speak to the stability and robustness of the original model (Model 1b).

3.10.2.4 SFQC Classification Tables

Using the same criteria as was used in the SFAS classification table analysis, I find that Model 1b accurately predicts selection approximately 61% of the time and non-selection approximately 75% of the time. These results remained fairly consistent across robustness examinations.

3.10.2.5 SFQC Moderator Analyses

Next, I examined the SFQC model for time and Ranger status moderators, again aiming to determine whether time and tenure/more advanced soldiering skills affect the relationship between the substantive factors and SFQC success.

3.10.2.5.1 Time as a Moderator

The formulation of cohorts was the same as for the SFAS moderation analysis, and the results are shown in Table 3.25. First, Model 7b is significant ($\chi^2_{(33)}$=1549.12, p<.001) and captures slightly more variance in the dependent variable than the original model (Pseudo R^2=15.54), which is expected given that the model adds 12 new variables. The only change in the main effects that occurred when the interaction terms were added was that long-term endurance (ENDURLT=-.183, p<.05) became significant.

Variable	Results		Moderator Analyses					
	Model 1b		Model 7b					
	Initial Results		Variable Result Cohort 1^		Variable Result Cohort 2		Variable Result Cohort 3	
Cognitive Ability	.078	*	.152	**	.121	ns	-.31	***
Navigational Ability	.234	***	.234	***	.356	ns	.560	ns
Physical Strength	.204	***	.161	**	.409	**	.237	ns
Short-Term Endurance	-.007	ns	-.140	ns	.081	*	-.028	ns
Long-Term Endurance	.002	ns	-.183	*	.084	**	.737	***
Peer Evaluations	.232	***	.115	*	.314	**	-.008	ns
# Obs	7899		7899					
Log Likelihood	-4256.793		-4209.192					
df	21		33					
Pseudo R2	.1459		.1554					
^ = Cohort 1 is the reference group. Substantive results in this column represent the results for Cohort 1.								
* p<.05 ** p<.01 *** p<.001								

Table 3.25 – Time as a Moderator Results – SFQC

Second, the two cohort dummies (COHORT2 and COHORT3) show that the likelihood of being selected at SFQC (i.e., chosen to wear the green beret) is higher for those candidates who entered SFAS from 2010 to 2011 (COHORT2 = 1.679, p<.001) and lower for those candidate who entered SFAS in 2013 (COHORT3 = -.043, ns) when compared to candidates who entered from 2006 to 2009 (the reference group), although the results for Cohort 3 were not significant. This suggests that being selected to don the green beret was easiest in 2010 and 2011, and appears to be getting more difficult.

Finally, examining the interactions between the cohort dummies and the substantive variables shows that 6 out of 12 moderator variables are significant. Looking at the trends among the substantive variables, the predictive ability of cognitive ability has decreased over time, although the results for Cohort 2 are not significant (COGNIT1 = .152, p<.01; COGNIT2 = .121, ns; and COGNIT3 = -.31, p<.001). This suggests a general trend against selecting candidates based on cognitive ability, even to the point where the coefficient becomes negative and significant. Navigational ability, on the other hand, stayed very stable over time, with no significant changes in Cohort 2 or Cohort 3 (NAVIG1 = .234, p<.001; NAVIG2 = .356, ns; and NAVIG3 = .560, ns). Physical strength became more predictive in Cohort 2, but was not at all significant for Cohort 3 (STRENG1 = .161, p<.01; STRENG2 = .409, p<.01; and STRENG3 = .237, ns). Short-term endurance is not significant for Cohort 1 (ENDURST1 = -.140, ns), then becomes significant for Cohort 2 (ENDURST2 = .081, p<.05), before again becoming not significant for Cohort 3 (ENDURST3 = -.028, ns). This suggests this variable may not be a stable predictor of SFQC success. Long-term endurance trends upward from Cohort 1 to Cohort 3 (ENDURLT1 = -.183, p<.05; and ENDURLT2 = .084, p<.01; and ENDURLT3 = .737, p<.001), suggesting long-term endurance has become more important to SFQC success over time. Finally, the importance of peer evaluations to SFQC success trends upward from Cohort 1 (PEEREVAL1 = .115, p<.05) to Cohort 2 (PEEREVAL2 = .314, p<.01) before becoming non-significant in Cohort 3 (PEEREVAL3 = -.008, ns).

As in the SFAS analysis, these results suggest that the factors deemed important for SFQC success have changed significantly over the years. These results will be used to inform the decisions of SF leadership and cadre as they seek to create more efficient and consistent methods of selecting new green berets. Figures 3.28 through 3.32 display the interaction plots for each significant variable-by-cohort combination.[78]

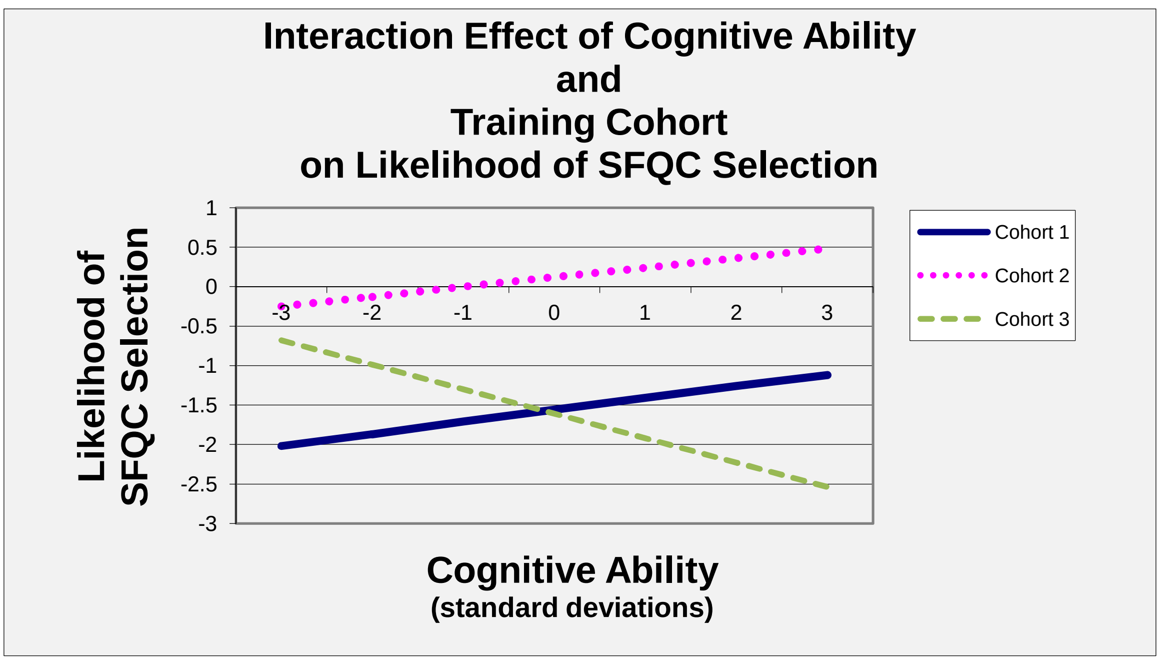

Figure 3.28 – Interaction Effect of Cognitive Ability & Training Cohort – SFQC

[78]The interaction plot for navigational ability (NAVIG) is not included, as neither the Cohort 2 nor Cohort 3 interactions are significantly different from Cohort 1.

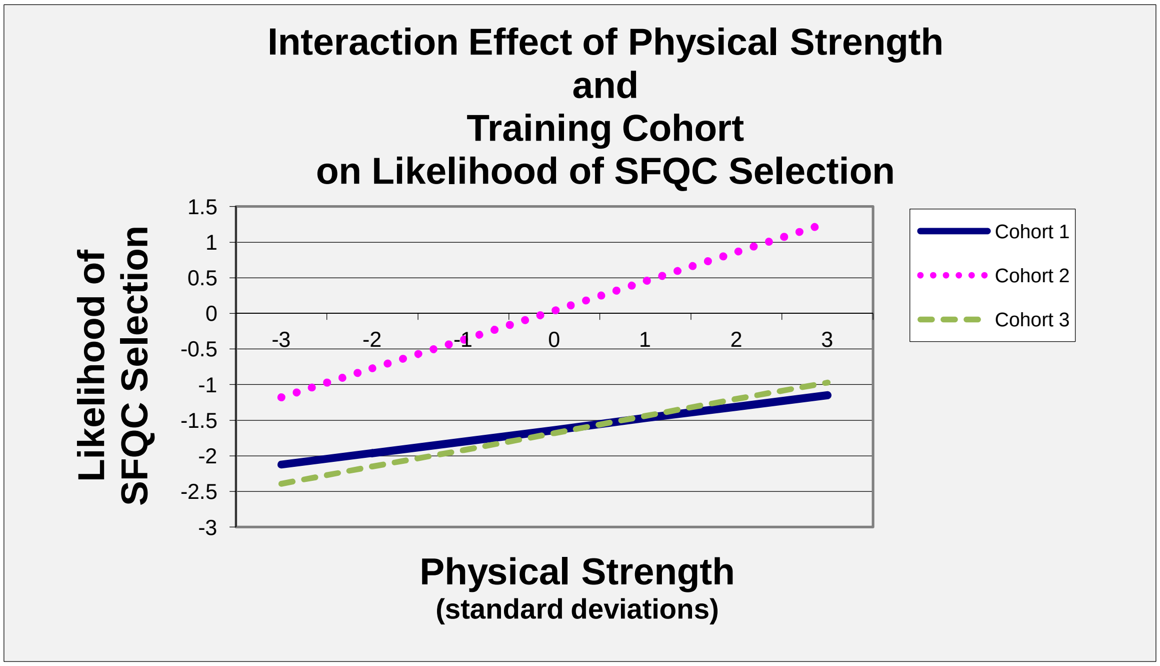

Figure 3.29 – Interaction Effect of Physical Strength & Training Cohort – SFQC

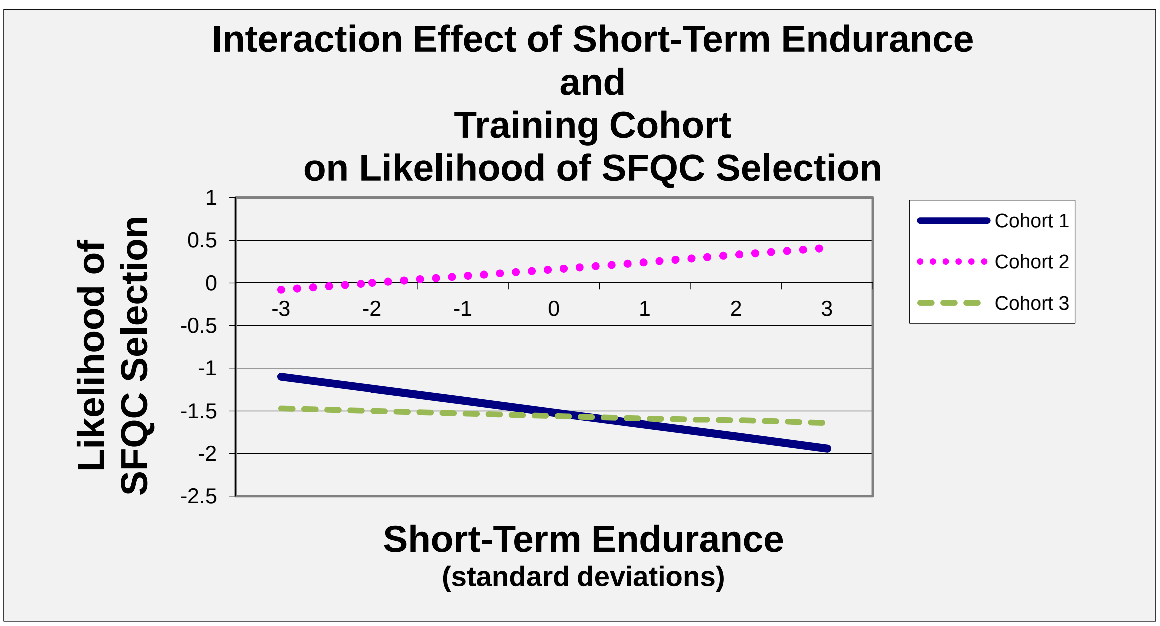

Figure 3.30 – Interaction Effect of Short-Term Endurance & Training Cohort – SFQC

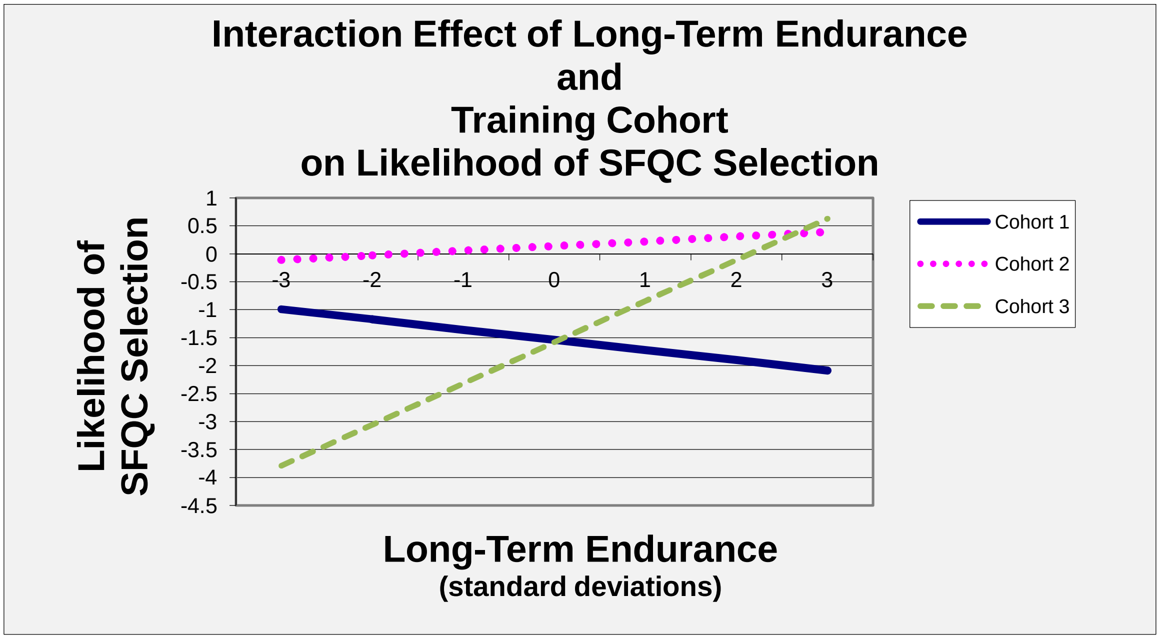

Figure 3.31 – Interaction Effect of Long-Term Endurance & Training Cohort – SFQC

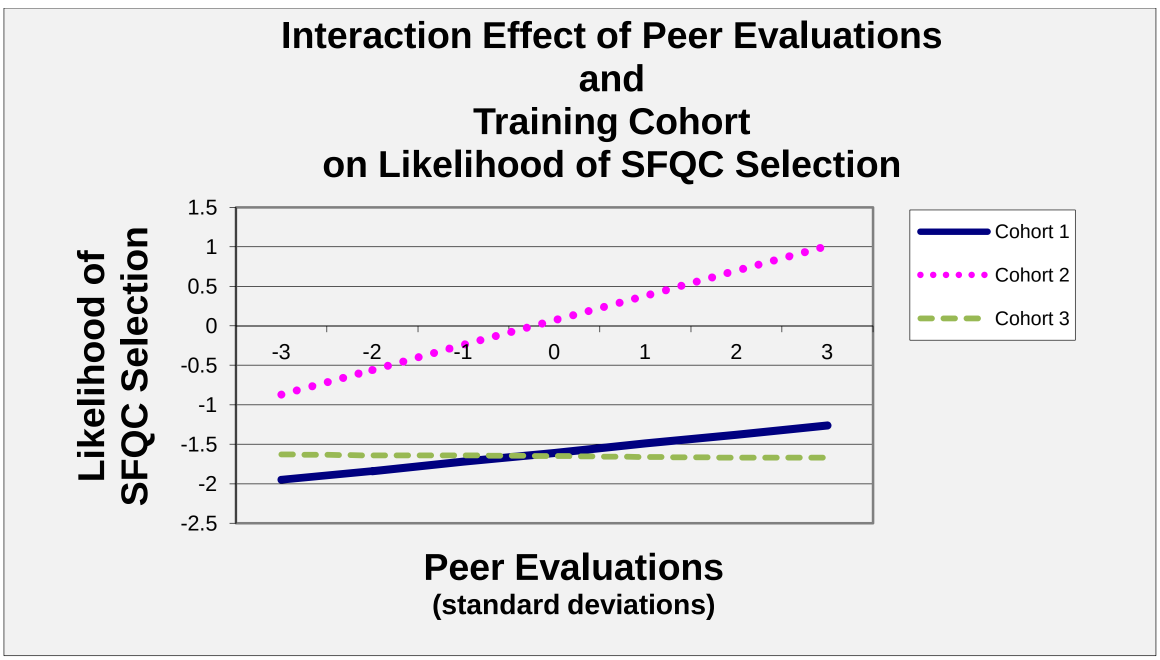

Figure 3.32 – Interaction Effect of Peer Evaluations & Training Cohort – SFQC

3.10.2.5.2 Ranger Status as a Moderator

Model 8b in Table 3.26 shows the results of Ranger status (i.e., whether or not the SFAS candidate is Ranger qualified) as a moderator. First, the model is significant ($\chi^2_{(27)}$=1477.81, p<.001) and captures slightly more variance in the dependent variable than the original model (pseudo R^2=14.83), which is expected as Model 8a adds 6 new variables to the equation. There were no changes in significance, and few changes in magnitude among the main effects when the interaction terms were added.

Variable	Results	Moderator Analyses	
	Model 1	Model 8	
	Initial Results	Ranger Status Moderator#	Variable Result Ranger=1
Cognitive Ability	.078 *	.099 *	.067 ns
Navigational Ability	.234 ***	.273 ***	.398 ns
Physical Strength	.204 ***	.262 ***	.175 ns
Short-Term Endurance	-.007 ns	.027 ns	-.144 *
Long-Term Endurance	.002 ns	.020 ns	-.085 ns
Peer Evaluations	.232 ***	.288 ***	.042 ***
Ranger Qualification Dummy	.345 ***	--	.612 ***
# Obs	7899	7899	
Log Likelihood	-4256.79	-4244.85	
df	21	27	
Pseudo R2	.1459	.1483	
% SEL-SEL	60.56	61.11	
% NSEL-NSEL	75.41	75.64	
% Correct Classification	72.12	72.40	
# = Ranger = 0 is the reference group. Substantive results in this column represent the results when the candidate is not Ranger qualified.			
* p<.05 ** p<.01 *** p<.001			

Table 3.26 – Ranger Status as a Moderator Results - SFAS

Two of the six moderator variables are significant. In particular, being a Ranger reduces a candidate's chance of SFAS success when it comes to short-term endurance (ENDURST1 = -.144, p<.05; ENDURST0 = .027, ns) and peer evaluations (PEEREVAL1 = .042, p<.001; PEEREVAL0 = .288, p<.001). I find no reason why these instances of negative moderation occur. Figures 3.33 and 3.34 show the interaction plots for the two significant variable-by-Ranger status combinations.

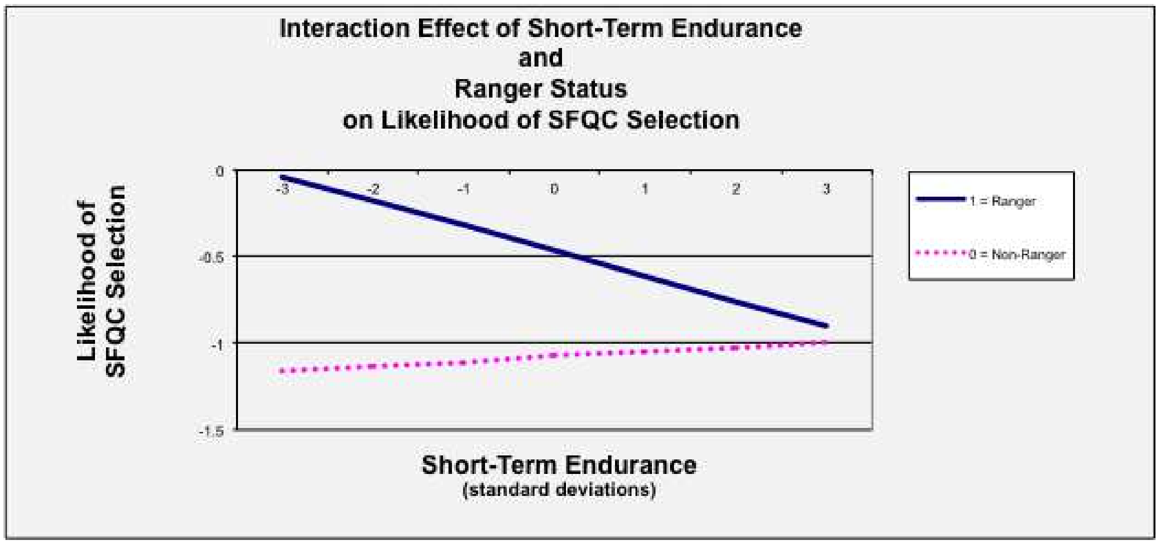

Figure 3.33 – Interaction Effect of Short-Term Endurance & Ranger Status - SFQC

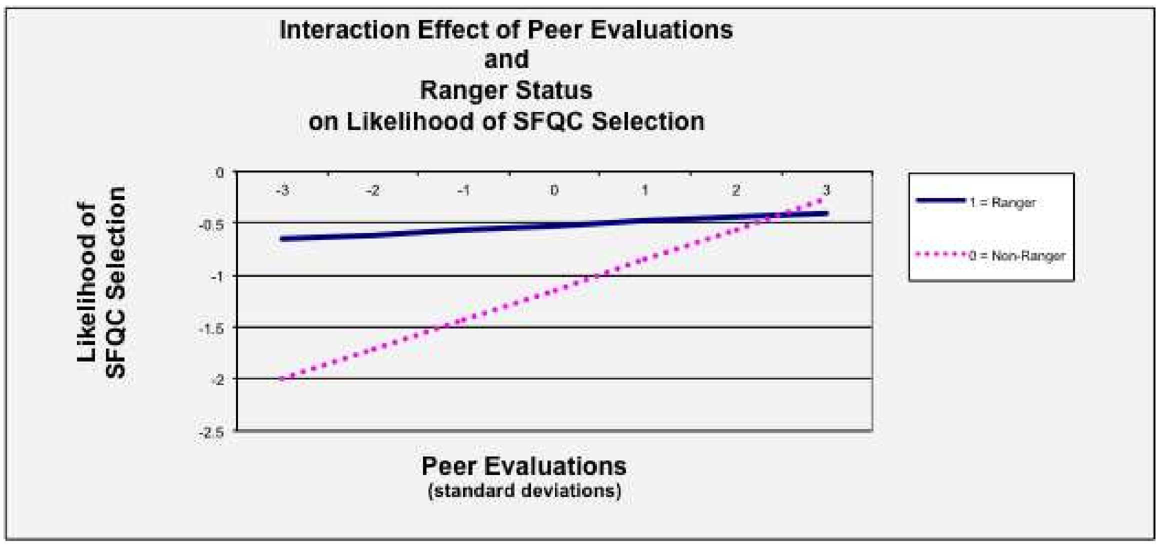

Figure 3.34 – Interaction Effect of Peer Evaluations & Ranger Status – SFQC

3.10.2.5.3 Time and Ranger Status as Moderators

Model 9b examined both types of moderators together, in one model. This model was significant ($\chi^2_{(39)}$=1567.27, p<.001) and captures more variance in the dependent variable than any of the other SFQC models (Pseudo R^2=15.72), which is expected given that Model 9a has more variables than any other model. The results are basically an amalgamation of Models 7b and 8b, so they are not repeated here. They can be found in Appendix L.

3.10.2.6 SFQC Cross-Validation

The SFQC model was also subjected to a random 75/25 split cross-validation, and the results were quite good, which suggests the SFQC model is stable and generalizable to an independent data set. The SFQC results are shown in Table 3.27. Each overall model is significant (i.e., the overall chi-square value is significant) and all of the magnitudes of the coefficients for the training and validation sets were similar to those of the original regression.

For 18 of the 21 variables (86%) the pattern of significance was the same and the coefficient sign was in the same direction for both the training and validation sets. It is important to note that the same three variables (ENDURST, ENDURLT, and DMOS19) had differing patterns of both significance and sign. Further, none of these variables achieved significance in the overall model, nor in the training and validation sets. This suggests these three variables are less stable predictors than the other variables in the SFQC model.

Finally, the pseudo R^2 value for the training set was within the +/- 2% range, however the pseudo R^2 value for the validation set was not. As a happy bonus, the percentage of correct classifications remained around 70% for both the training and validation sets, and the mean absolute deviation for both the training and validation sets was zero. This suggests the error in the model is quite low. In summary, the cross validation suggests the model is stable and the results are generalizable to an independent data set.

SFQC Cross-Validation Results									
Variable	Results		Cross-Validation				Sign in same direction?	Pattern of significance the same?
			Training Set		Validation Set			
	2006-2012^		2006-2012^		2006-2012^			
Cognitive Ability	0.078	*	0.092	***	0.092		YES	YES
Navigational Ability	0.234	***	0.295	***	0.302	***	YES	YES
Physical Strength	0.204	***	0.246	***	0.232	**	YES	YES
Short-Term Endurance	-0.007		-0.010		0.006		NO	NO
Long-Term Endurance	0.002		0.003		-0.002		NO	NO
Ranger Qualification Dummy	0.345	***	0.345	***	0.341	*	YES	YES
Peer Evaluations	0.232	***	0.232	***	0.246	**	YES	YES
Age	-0.040		-0.042		-0.033		YES	YES
Age2	-0.032		-0.033	*	-0.035		YES	YES
Enlisted Dummy Variable	-0.048		-0.050		-0.050		YES	YES
DMOS11 - Infantry	0.049		0.059		0.020		YES	YES
DMOS13 - Field Artiller	0.157		0.154		0.175		YES	YES
DMOS18 - SF 18X	0.637	***	0.634	***	0.656	***	YES	YES
DMOS19 - Armor	0.002		0.011		-0.042		NO	NO
DMOS68 - Medical	-0.444	*	-0.434	***	-0.490		YES	YES
DMOS92 - Quartermaster	-0.266		-0.258	*	-0.307		YES	YES
DYR8 - Dummy Year 2008	1.527	***	1.543	***	1.499	***	YES	YES
DYR9 - Dummy Year 2009	1.278	***	1.287	***	1.267	***	YES	YES
DYR10 - Dummy Year 2010	1.834	***	1.841	***	1.841	***	YES	YES
DYR11 - Dummy Year 2011	2.015	***	2.036	***	1.974	***	YES	YES
DYR12 - Dummy Year 2012	0.142		0.157	*	0.103		YES	YES
Constant	-2.296	--	-2.594	--	-2.565	--	--	--
# Obs	7899		6052		1847		86% same sign direction	86% same pattern of significance
Model Significant?	YES		YES		YES			
df	21		21		21			
Pseudo R2	0.1459		0.1470		0.1509			
% Change from Original R2	--		0.75%		3.40%			

^ No 2007 cases.

* p<.05 ** p<.01 *** p<.001

Training and Validation set values based on average across 50 repetitions

Table 3.27 – Cross-Validation Results - SFQC

3.11 Discussion

The goal of this study was to examine how service competencies (cognitive ability, navigational ability, physical strength, short- and long-term endurance, and Ranger qualification) and service inclination (peer-evaluated personality characteristics) affect performance in a public service organization, Army SF. This study is the first to formally identify which variables are most predictive of SF training success. Interestingly, the Army has been capturing demographic and performance measurements since 1992, yet despite having literally hundreds of thousands of cases to examine, the data remained unexamined until now.[79] The results were briefed to the Army leaders in charge of the design and administration of SFAS and SFQC, and, despite being very close to the process every day, they were a bit surprised by some of the findings.

3.11.1 Summary of Results

The results of the PCA closely matched the informal assessment of what SF leaders believed to be the main components within the data, which provides face validity to the results. Regarding the logistic regressions, the SF leaders were surprised to find how predictive *subjective* measurements (i.e., personality characteristics and peer rankings) were to SFAS and SFQC success. These measures were generally more predictive than the cognitive and physical abilities touted by many SF recruitment websites. These results were well received, given the leadership and cadre's desire to create both effective ODA team members and green berets that are able to operate independently. A summary listing of the key results along with implications for Army SF are provided in Table 3.28.

[79] Over the years, the Army continually modified their performance measurements. Data from 2006 forward were the most similar, therefore only those data were used in this study.

Summary of Key Results & Implications					
Factor	**SFAS Results**		**SFQC Results**		**Implications**
Cognitive Ability	.346	***	.078	*	Cognitive ability helps sort the "wheat from the chaff" in SFAS, however this service competency is less helpful in SFQC where the majority of candidates are likely to be of similar cognitive ability.
Navigational Ability	.953	***	.234	***	Navigational ability is highly predictive of both SFAS and SFQC success. This soldiering skill is a critical service competency for successful SF performance and could serve as a gated event, whereby candidates who are unsuccessful are immediately eliminated from training.
Physical Strength	.192	***	.204	***	Physical strength is also a critical service competency for successful training performance, as it is predictive of both SFAS and SFQC success. The measures of physical strength could easily be performed before the soldier enters SFAS. Failure to meet the physical strength requirements could be used as a means to deterring unqualified candidates.
Short-Term Endurance	.147	***	-.007	ns	Short- and long-term endurance help sort the "wheat from the chaff" in SFAS, however this service competency is less helpful in SFQC where the majority of candidates are likely to be of similar endurance ability.
Long-Term Endurance	.301	***	.002	ns	
Ranger Status	.422	***	.345	***	Ranger status is highly predictive of SFAS and SFQC success. This proxy measure of service competency and tenure suggests Army SF should focus their recruiting efforts on Ranger-qualified candidates who already have the soldiering skills and experience necessary to successfully complete training.
Peer Evaluations	.770	***	.232	***	Peer evaluations (of personality characteristics and peer rankings) are highly predictive of SFAS and SFQC success. To pre-screen potential candidates for service inclination, SF training applications could require the candidate to submit recommendation letters from his peer(s) and supervisor(s) that vouch for the candidate's positive personality characteristics.
Age^2	-.058	***	-.032	ns	Army SF should seek candidates who have the right combination of youthful strength and experienced wisdom.
Infantry Career Field	.246	***	.049	ns	The career field from which the candidate matriculates is an important predictor of training success. Those from the Infantry fare well in SFAS, but do not stand out from the crowd in SFQC. On the other hand, candidates who were recruited from outside the Army perform very well in both SFAS and SFQC. The 18X program could continue to work well if the Army is able to recruit the same caliber of candidates.
SF Career Field	.644	***	.637	***	
* p<.05 ** p<.01 *** p<.001					

Table 3.28 – Summary of Key Results & Implications

3.11.2 Academic Implications

These results provide the first comprehensive examination of the service competency and service inclination requirements for public service organizations. They may prove helpful to other public service organizations whose missions are similar in risk and profile to those of Army SF.

First, the high predictive ability of cognitive ability as a service competency adds to the existing studies that have found that “g” is an effective predictor of workplace performance. “G” appears to be a useful predictor in the public service domain. The results show that cognitive ability is highly predictive to SFAS success, but its predictive ability wanes for SFQC. This is likely due to the fact that the profiles of candidates entering SFQC are much more similar than the profiles of candidates who enter SFAS. Essentially, after SFAS selection, the field of candidates is more competitively matched, leaving less variation for the SFQC analyses.

Second, navigational ability, which is a service competency that requires both soldiering skills and cognitive ability, is also an important and effective predictor of SF training success. Because it is highly predictive of both SFAS and SFQC success, navigational ability may serve as a natural gated event, whereby candidates who fail the navigational events are involuntary withdrawn from training.

Third, with regard to physical abilities, it was interesting to find that the service competencies of strength, short-term endurance, and long-term endurance were approximately equally predictive of SFAS success. This suggests that soldiers need to come to SFAS physically prepared for exercises and events that require both short bursts of strength and long bouts of endurance. For SFQC, physical strength is a predictor of success, whereas the two endurance variables are not. Logically, having short- and long-term endurance is necessary to make it through many of the phases of SFQC. The difference in significance may be attributable to the possibility that while short- and long-term endurance are required to stand out in the SFAS crowd, all candidates selected for SFQC are likely to possess similar endurance abilities (again, less variation in the candidates’ abilities), and therefore these variables are not predictive of SFQC success. In short, for SFQC, short- and long-term endurance are necessary to keep pace, but they will not help a candidate stand out amongst his peers.

Fourth, being a Ranger, a proxy measure of soldiering skills, predicts both SFAS and SFQC success. Ranger qualification demonstrates a soldier’s ability to succeed in similar Army training environments and increases his likelihood of success. Naturally, SF recruiters should focus on recruiting Ranger qualified soldiers.

Fifth, peer evaluations, a measure of service inclination, are highly predictive of both SFAS and SFQC success. This finding is very important, as Army SF missions require the highest level of teamwork and personality plays an enormous role in interpersonal likability and team bonding. Because Army SF operates in such small teams, it is extremely important that the team members like and trust each other. The fact that these subjective measures play such a large role in predicting training success suggests that Army SF should continue to screen candidates' personalities at SFAS and SFQC; but they might also be able to eliminate candidates with poor service inclination *prior to SFAS* by requiring SF hopeful to provide peer(s) and supervisor(s) recommendations and personality assessments in their SF application package. These letters should be sealed and submitted to the SF evaluation board by the author so they may write freely.

Sixth, the fact that the quadratic form of age formed a concave (inverted-U) function confirmed that successfully completing SFAS and SFQC requires a nice combination of youthful strength and experienced wisdom. Indeed, average-aged candidates fare best, while their older and younger counterparts are less successful. Army SF recruiters should focus their recruitment on candidates who have the right mix of youthful strength and experienced wisdom.

Finally, the career field from which the candidate matriculates affects training success. Specifically, being an Infantryman predicts SFAS success but not SFQC success,[80] while being part of the 18X program (i.e., an SF direct recruit) is highly predictive of both SFAS and SFQC success. Army leaders were happy to find that their direct recruiting program, the 18X program, was producing successful candidates. The 18X program was implemented to attract possible candidates from outside the existing Army structure. After 2001, it was necessary to recruit more candidates in order to fulfill mission requirements; therefore Army SF reinstated this program[81] to garner a combination of in-service and non-service recruits. The significance and predictive ability of DMOS18 (the military operational specialty code assigned to 18X candidates) attests to the success of this program.

[80] I find no reason why being an Infantryman is not predictive SFQC success, as Infantrymen typically have more training and experience with soldiering skills.

[81] The 18X program was previously used in the early 1990s.

3.11.3 Practical Implications

The results demonstrate which service competencies are most important to SF training success, as well as highlight the fact that a solid service inclination is an important predictor for success in public service organizations. The best predictors of SFAS success (the ones that increases a candidate's likelihood by greater than 50%) are the candidate's navigational ability, his personality assessments from his peers/his cadre, being recruited into the 18X program, and being Ranger qualified. Interestingly, two of these assessments (the 18X program and being Ranger qualified) are available prior to SFAS, so Army SF leadership should pay special attention to these variables when screening applicants for SFAS entry. The only variable that increases a candidate's likelihood for SFQC success by greater than 50% is being in the 18X program. Other highly predictive variables include being Ranger qualified and having higher-than-average navigational ability and positive peer evaluations.

These results provide a strong case that SFAS is indeed a useful tool to weed out candidates who might otherwise appear well qualified on paper. In other words, SFAS provides the right atmosphere to test candidates and measure how they react under pressure, in a stressful environment. Only candidates who can handle the heat are allowed to pass to SFQC. Because SFQC is much more time consuming and expensive than SFAS, SFAS is serving as an inexpensive yet effective way of narrowing the field and improving the quality of candidates admitted to the SFQC pipeline.

Although the SFQC results did not align perfectly with the SFAS results, they were similar in many ways. Both showed navigational ability, physical strength, Ranger qualification, and peer evaluations to be important predictors of SFAS and SFQC success. It is important to note that these results showcase *historical selection trends* in Army SF. The next step for Army SF leadership and cadre is to examine these results and determine if their historical selection trends are aligned with their selection goals. In other words, are they satisfied that navigational ability and peer evaluations are the best substantive predictors? Or would they prefer to have other factors be most predictive? By taking a closer look at how these constructs are measured and weighted in the selection process, SF leadership and cadre can better align their selection goals with selection decisions.

One tool that will help SF leadership and cadre make better selection decisions is the selection scorecard developed using the results of the logistic regression. The scorecard is a simple excel spreadsheet82 that uses the candidate's raw scores and regression coefficients to predict whether or not the candidate will succeed in SFQC. Figure 3.35 provides a screenshot of the scorecard.

ED	GT	WL	GAMA	DLAB	READ	MATH	LANG
16		88	102	95			
COGNIT	0.787	0.346	0.272302				

Candidate ID	1022	
Result:	0.845	PASS

PU	SU	PUPS	RUN
99	95	11	93
STRENG	0.716	0.192	0.137472

RUN1	RUCK1		
31	89		
ENDURST	0.184	0.147	0.027048

RUN2	RUCK2		
49			
ENDURLT	0.053	0.301	0.015953

PE1	PE2	PE3	PE4	STAR1	STAR2
4	4	4	4	4	
NAVIG	0.835	0.953	0.795755		

PEER1RANK	PEER1OVER	PEER1PINK	PEER2BLUE	PEER2RANK	PEER2OVER	PEER2PINK	PEER2BLUE	ADAPTAVG	PERSRESAV(	TEAMWOAVG
42	4.1	0	0					4.33		1.67
PERSEVAVG	CAPABAVG	COURAVG	INTEGAVG	PROFAVG	CHARAVG	EFFAVG	INFLUAVG	JUDGAVG	INTERPERAV	LEADAVG
						3.5				4.33
PEEREVAL	0.271	0.77	0.20867							

RGRDUM	1	0.422	0.422
zAGE	0.808	0.062	0.050096
zAGE2	0.652864	-0.058	-0.03787
DMOS11	1	0.246	0.246
DMOS13	0	0.169	0
DMOS18	0	0.644	0
DMOS19	0	0.108	0
DMOS68	0	0.103	0
DMOS92	0	0.162	0
DENLIST	0	1.066	0
DYR7	0	0.574	0
DYR8	1	-0.194	-0.194
DYR9	0	-0.113	0
DYR10	0	0.025	0
DYR11	0	-0.609	0
DYR12	0	-0.931	0
DYR13	0	-0.85	0
Constant	----	-0.25	-0.25

Figure 3.35 – Scorecard Screenshot

The user simply inputs the raw scores into the green boxes and the background equations display the candidate's likelihood of success.[83] This particular scorecard was used for accuracy testing,

[82]The equations in the spreadsheet were input by the author and the users are currently improving the user interface.

therefore it includes all the possible variables. Empty boxes indicate variables for which the candidate was not assessed. The spreadsheet only standardizes and calculates results for variables with raw scores—it ignores blank boxes. When the resulting score is greater than .5 (i.e., higher than 50% probability of success), the candidate is given a "pass" recommendation. This tool may prove especially helpful for making decisions about candidates who hover around the averages—the "middling" candidates.

3.12 Conclusion and Limitations

No hiring system is perfect. The inherent need for service organizations to assess human nature introduces idiosyncrasies that can blur otherwise clear measurements. By distilling the many measurements collected by Army SF into a few definitive constructs, one can more clearly examine the true attributes of each candidate and how their service competencies and service inclination predict training success. The results of the logistic regression show that both relatively objective service competencies and relatively subjective service inclinations are important to predicting success in public service organizations, where the effectiveness and image of the organization rests almost completely in the actions (or inactions) of the employees. The ability to predict which candidates have the greatest potential for success may help public service organizations save millions of dollars and thousands of hours in training costs while improving the overall quality of service. Knowing which factors are key to success in public service organization improves hiring decisions.

Just as no hiring system is perfect, neither is any study without limitations. A drawback of this study is that the model is only tested on one elite, public service organization. Future studies should examine how the key factors found in this study differ by public service organization. Second, PCA, by its nature, involves a bit of subjectivity on behalf of the researcher. While the first five components lined up rather clearly, other researchers may have different opinions regarding the interpretation of the other components. Third, as mentioned, the data was MNAR and there were several missing cases. Complete data is preferred, of course, however the MNAR nature of this data is reflective of the actual processes in SFAS (i.e., voluntary and involuntary withdrawals from training). Finally, the low pseudo R^2 value

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[83]This tool uses historical means to standardize and compare the candidate's scores. It requires the user to periodically update the mean scores on each variable and component, as these scores may change over time.

associated with the SFQC analysis suggests there are constructs that are predictive of SFQC success that are not currently being measured by Army SF leadership and cadre. A follow-up study that examines other potential predictors may prove insightful.

REFERENCES

Ahmed, P. K., & Rafiq, M. (2003). Internal Marketing Issues and Challenges. *European Journal of Marketing, 37* (9), 1177-1186.

Alexander, S. G. (2007). *Predicting Long Term Job Performance Using a Cognitive Ability Test.* University of North Texas. Ann Arbor: ProQuest Information and Learning Company.

Allemand, M., Steiger, A. E., & Hill, P. L. (2013). Stability of Personality Traits in Adulthood. *The Journal of Gerontopsychology and Geriatric Psychiatry, 26* (1), 5-13.

Almlund, M., Duckworth, A. L., Heckman, J. J., & Kautz, T. D. (2011). Personality Psychology and Economics. *National Bureau of Economic Research Working Paper Series* (pp. 1-252). Cambridge: National Bureau of Economic Research.

American Special Ops. (n.d.). *American Special Ops: United States Military and Law Enforcement Special Operations*. Retrieved August 29, 2013, from Special Forces Selection and Training: http://www.americanspecialops.com/special-forces/selection/

Apasu, Y. (1987). The Importance of Value Structures in the Perception of Rewards by Industrial Salespersons. *Academy of Marketing Science*, 1-10.

Ashill, N. J., Rod, M., Thirkell, P., & Carruthers, J. (2009). Job Resourcefulness, Symptoms of Burnout and Service Recovery Performance: An Examination of Call Centre Frontline Employees. *Journal of Services Marketing, 23* (5), 338-350.

Auh, S., Menguc, B., Fisher, M., & Haddad, A. (2011). The Contingency Effect of Service Employee Personalities on Service Climate: Getting Employee Perceptions Aligned Can Reduce Personality Effects. *Journal of Services Research, 14* (4), 426-442.

Barrick, M. R., & Mount, M. K. (1991). The Big Five Personality Dimensions and Job Performance: A Meta-Analysis. *Personnel Psychology, 44* (1), 1-26.

Berntson, E., Sverke, M., & Marklund, S. (2006). Predicting Perceived Employability: Human Capital or Labour Market Opportunities? *Economic and Industrial Democracy, 27* (2), 233-244.

Berry, L. L., Hensel, J. S., & Burke, M. C. (1976). Improving Retailer Capability for Effective Consumerism Response. *Journal of Retailing, 52* (3), 3-14.

Bienstock, C. C., DeMoranville, C. W., & Smith, R. K. (2003). Organizational Citizenship Behavior and Service Quality. *Journal of Services Marketing, 17* (4), 357-378.

Borman, W. C. (1982). Validity of Behavioral Assessment for Predicting Military Recruiter Performance. *Journal of Applied Psychology, 67* (1), 3-9.

Bradley, J. P. (1997). *Predicting Basic Military Officer Training Performance With Three Types of Personality Measures: Self-Reports, Interviewer Ratings and Reference Ratings.* University of Western Ontario, Department of Psychology. London: National Library of Canada.

Cobb-Clark, D. A., & Schurer, S. (2011). The Stability of Big-Five Personality Traits. *Economic Letters, 115*, 11-15.

Conley, J. J. (1985). Longitudinal Stability of Personality Traits: A Multitrait-Multimethod-Multioccasion Analysis. *Journal of Personality and Social Psychology, 49* (5), 1266-1282.

Dagger, T. S., Danaher, P. J., Sweeney, J. C., & McColl-Kennedy, J. R. (2013). Selective Halo Effects Arising from Improving the Interpersonal Skills of Frontline Employees. *Journal of Service Research, 16* (4), 488-502.

Department of Defense (DoD). (n.d.). *About the Department of Defense (DOD)*. Retrieved August 29, 2013, from US Department of Defense: http://www.defense.gov/about/

Department of Defense. (2010). *Joint Publication 1-02: Department of Defense Dictionary of Military and Associated Terms.* Washington, DC: Department of Defense.

FEMA. (2013, August 26). *US Fire Administration*. Retrieved August 29, 2013, from National Fire Department Census Quick Facts: http://apps.usfa.fema.gov/census/summary.cfm

Fojt, M. (1996). Service Excellence: Lessons from the Banking Industry. *Journal of Services Marketing, 10* (5), 54-57.

Glorfeld, L. W. (1995). An Improvement on Horn's Parallel Analysis Methodology for Selecting the Correct Number of Factors to Retain. *Educational and Psychological Measurement, 55* (337), 377-393.

Goffman, J. M. (1975). Predicting Academic Success For Military Paramedical Personnel. *Journal of Medical Education, 50*, 797-804.

Gounaris, S. (2008). The Notion of Internal Market Orientation and Employee Job Satisfaction: Some Preliminary Evidence. *Journal of Services Marketing, 22* (1), 68-90.

Harrell, M. C., Nataraj Kirby, S., Sloan, J. S., Graf II, C. M., McKelvey, C. J., & Sollinger, J. M. (1999). *Barriers to Minority Participation in Special Operations.* National Defense Research Institute. Santa Monica, CA: RAND Corporation.

Hartline, M. D., & Ferrell, O. C. (1996). The Management of Customer-Contact Service Employees: An Empirical Investigation. *Journal of Marketing, 60* (4), 52-70.

Hartmann, E., Sunde, T., Kristensen, W., & Martinussen, M. (2003). Psychological Measures As Predictors of Military Training Performance. *Journal of Personality Assessment, 80* (1), 87-98.

Haworth, C. M., Wright, M. J., Luciano, M., Martin, N. G., de Geus, E. J., van Beijsterveldt, C. E., et al. (2010). The heritability of general cognitive ability increases linearly from childhood to young adulthood. *Molecular Psychiatry, 15* (11), 1112-1120.

Henderson, N. D. (2010). Predicting Long-Term Firefighter Performance from Cognitive and Physical Ability Measures. *Personnel Psychology, 63*, 999-1039.

Hopwood, C. J., Morey, L. C., Donnellan, M. B., Samuel, D. B., Grilo, C. M., McGlashan, T. H., et al. (2013). Ten-Year Rank-Order Stability of Personality Traits and Disorders in a Clinical Sample. *Journal of Personality, 81* (3), 335-344.

Judge, T. A., Cable, D. M., Boudreau, J. W., & Bretz, R. D. (1995). An Empirical Investigation of the Predictors of Executive Career Success. *Personnel Psychology, 48*, 485-519.

Kalns, J., Baskin, J., Reinert, A., Darren, M., Santos, A., Daugherty, S., et al. (2011). Predicting Success in the Tactical Air Combat Party Training Pipeline. *Military Medicine, 176* (4), 431-437.

Karter, M. J., & Stein, G. P. (2013). *US Fire Department Profile 2012.* National Fire Protection Association, Fire Analysis and Research Division. Quincy: National Fire Protection Association.

King, C., & Grace, D. (2010). Building and Measuring Employee-Based Brand Equity. *European Journal of Marketing, 44* (7/8), 938-971.

Kluemper, D. H., DeGroot, T., & Choi, S. (2013). Emotion Management Ability: Predicting Task Performance, Citizenship, and Deviance. *Journal of Management, 39* (4), 878-905.

Kruger, L. G. (2013). *United States Fire Administration: An Overview.* Washington, DC: Congressional Research Service.

Kutner, M. H., Nachtsheim, C. J., & Neter, J. (2004). *Applied Linear Regression Models.* New York, NY: McGraw-Hill Irwin.

Lievens, F., & Sackett, P. R. (2011). The Validity of Interpersonal Skills Assessment Via Situational Judgment Tests for Predicting Academic Success and Job Performance. *Journal of Applied Psychology, 97* (2), 460-468.

Luk, S. T., Lu, K., & Liu, B. (2013). SERV*OR in China: Testing the Effect of Service Orientation on Service Skills Performance. *Journal of Services Marketing, 27* (1), 25-39.

McEvoy, G. M., & Cascio, W. F. (1985). Strategies for Reducing Employee Turnover: A Meta-Analysis. *Journal of Applied Psychology, 70* (2), 342-353.

McHenry, J. J., Hough, L. M., Toquam, J. L., Hanson, M., & Ashworth, S. (1990). Project A Validity Results: The Relationship Between Predictor and Criterion Domains. *Personnel Psychology, 43*, 335-354.

Nunnally , J. C. (1978). *Psychometric Theory.* New York: McGraw-Hill.

Office of Justice Programs. (n.d.). *Bureau of Justice Statistics*. Retrieved August 29, 2013, from http://www.bjs.gov/index.cfm?ty=tp&tid=71

Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer. (2012). *Fiscal Year 2013 Budget Request.* Washington, DC: Department of Defense.

Office of the United States Trade Representative. (n.d.). *Services & Investment*. Retrieved October 30, 2013, from Services: http://www.ustr.gov/trade-topics/services-investment/services

O'Reilly III, C. A., & Chatman, J. A. (1994). Working Smarter and Harder: A Longitudinal Study of Managerial Success. *Administrative Science Quarterly, 39* (4), 603-627.

Phillips, J. M. (1998). Effects of Realistic Job Previews on Multiple Organizational Outcomes: A Meta-Analysis. *The Academy of Management Journal, 41* (6), 673-690.

Rafiq, M., & Ahmed, P. K. (2000). Advances in the Internal Marketing Concept: Definition, Synthesis and Extension. *Journal of Services Marketing, 14* (6), 449-462.

Ree, M. J., Earles, J. A., & Teachout, M. S. (1994). Predicting Job Performance: Not Much More Than g. *Journal of Applied Psychology, 79* (4), 518-524.

Rodriguez, J. (2009). Predicting the Military Career Success of United States Air Force Academy Cadets. *Armed Forces & Society, 36* (1), 65-85.

Rosenthal, R. (1978). Combining Results of Independent Studies. *Psychological Bulletin*, 185-193.

Salgado, J. F. (1997). The Five Factor Model of Personality and Job Performance in the European Community. *Journal of Applied Psychology, 82* (1), 30-43.

Sawyerr, O. O., Srinivas, S., & Wang, S. (2009). Call Center Employee Personality Factors and Service Performance. *Journal of Services Marketing, 23* (5), 301-317.

Schmidt, F. L., & Hunter, J. (2004). General Mental Ability in the World of Work: Occupational Attainment and Job Performance. *Journal of Personality and Social Psychology, 86* (1), 162-173.

Singh, J. (2000). Performance Productivity and Quality of Frontline Employees in Service Organizations. *Journal of Marketing, 64* (2), 15-34.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics.* Boston, MA: Pearson Education, Inc.

The World Bank. (n.d.). *The World Bank: Working for a World Free of Poverty*. Retrieved August 29, 2013, from United States Data: http://data.worldbank.org/indicator/MS.MIL.XPND.GD.ZS

Ueno, A. (2010). What are the Fundamental Features Supporting Service Quality? *Journal of Services Marketing, 24* (1), 74-86.

US Army. (n.d.). *75th Ranger Regiment*. Retrieved September 10, 2013, from GoArmy.com: http://www.goarmy.com/ranger/training.html

US Government Spending. (n.d.). *Estimated FY 2013 Spending for Governments in the United States*. Retrieved August 29, 2013, from Government Spending: the Details: http://www.usgovernmentspending.com/current_spending

Wayne, S. J., Liden, R. C., Kraimer, M. L., & Graf, I. K. (1999). The Role of Human Capital, Motivation and Supervisor Sponsorship in Predicting Career Success. *Journal of Organizational Behavior, 20* (5), 577-595.

Whiting, A., Donthu, N., & Baker, A. M. (2011). Investigating the Immediate and Long-Term Effects of Job Stressors on Frontline Service Employees. *International Journal of Research in Marketing, 28*, 319-331.

Zeithaml, V. A., & Bitner, M. (1996). *Services Marketing.* New York, NY: McGraw-Hill College.

Zeithaml, V. A., Bitner, M. J., & Gremler, D. D. (2013). *Services Marketing: Integrating Customer Focus Across the Firm.* New York, NY: McGraw-Hill.

Zeithaml, V. A., Parasuraman, A., & Berry, L. L. (1990). *Delivering Quality Service: Balancing Customer Perceptions and Expectations.* New York, NY: The Free Press.

Zwick, W. R., & Velicer, W. F. (1986). Comparison of Five Rules for Determining the Number of Components to Retain. *Psychological Bulletin, 99* (3), 432-442.

CHAPTER IV – STUDY 3:
KEEPING THE BEST:
UNDERSTANDING RETENTION IN ARMY SPECIAL FORCES

4.1 Introduction

In the second study, I examined which service competencies and service inclinations are important for employee accession in public service organizations. Theoretically, all service organizations only hire those best suited to the job and the organization (i.e., those employees with the right service competencies and service inclination). Assuming the theoretical case is true, service organizations hope to keep their employees for as long as possible to avoid service disruptions and the expenses associated with vetting and hiring new employees. In actual hiring experiences, however, the organization does not always find the best job candidate, and even those who seem to be a very good fit at the outset can prove to be less than stellar performers. In other words, not all employees should be kept.

Dalton et al. (1981) highlights the difference between functional and dysfunctional turnover. In functional turnover, "[t]he individual wants to leave the organization, but the organization is unconcerned. The organization has a negative evaluation of the individual" (p.716). If the organization views the employee negatively, it is in the best interest of the organization for the employee to voluntarily leave. Dysfunctional turnover, on the other hand, occurs when "[t]he individual wants to leave the organization but the organization prefers to retain the individual" (p.716). One can assume that dysfunctional turnover occurs because well-performing employees are unsatisfied with certain aspects of their work life, or are receiving better employment opportunities elsewhere. As service experts Zeithaml et al. (2013) note,

> Employee turnover, especially when the best service employees are the ones leaving, can be very detrimental to…employee morale and overall service quality. And, just as they do with customers, some firms spend a lot of time attracting employees but then tend to take them for granted (or even worse), causing these good employees to search for job alternatives. (p. 334)

Understanding *who* is leaving the organization is a critical precursor to knowing whether the turnover experienced by the organization is functional or dysfunctional. Further, understanding *why* dysfunctional turnover is occurring can help the organization properly incentivize well-performing employees to remain in the organization.

Examining accession decisions without simultaneously looking at retention is like constantly adding water to a pool without ever closing the drain. Retention is accession's other half, and now that I know the service competencies and service inclinations associated with successful completion of Army Special Forces (SF) training, I must examine how those factors affect a soldier's likelihood to remain in the organization.

For public service organizations like the US Army, a good retention plan is absolutely critical to mission effectiveness, as losing too many soldiers at once can degrade a unit's ability to operate. As mentioned, the US Army cannot simply hire in new soldiers when the ones in their ranks retire or separate from service. Soldiers must be grown from the ground up, starting at the lowest level and systematically moving up through the ranks as they gain time in the organization and experience in their career field. This aspect of public service organizations is radically different from more typical service organizations (e.g., hospitality services, telecommunication services, etc.), which are able to hire new employees at all levels of the organization anytime the need arises.

Soldiers who make it all the way through the selection process have proven themselves to be the best of the best, therefore it behooves the Army to retain them for as long as possible.[84] To avoid the need to recruit and select large numbers of new candidates, Army SF leadership must understand *who* among their ranks is leaving and *why* they are choosing to leave. In a sense, the Army is competing to be the "preferred employer" of these soldiers, providing training, career advancement opportunities, internal support, and attractive incentives so that the soldier prefers to stay in the Army rather than seek outside employment.

If their retention practices are effective, Army SF leaders can afford to be *even more selective in their recruitment and accession processes*—less positions to fill means less pressure to recruit and select large numbers of candidates. Further, if retention practices are effective, Army SF can afford to be *more*

[84] Ideally, Army SF would like to retain soldiers past the five-year commitment they incurred for signing up for SF duty. This allows Army SF to receive a better return on its two-year and approximately $250K (per soldier) training investment.

selective with their incentive programs. Army SF leadership can choose who gets certain incentives based more on merit and less on “chance” year group membership.[85]

This study uses survival analysis to determine *who* is leaving Army SF as a first step to understanding how to better align incentives. The remainder of this paper proceeds as follows: section 4.2 reviews the relevant literature, section 4.3 presents the conceptual framework, section 4.4 details the data and methods used, section 4.5 provides the results, section 4.6 discusses implications, and section 4.7 concludes the paper.

4.2 Literature Review

To examine the literature, I begin by offering a brief explanation of the ways soldiers can depart the Army. The intent is to help the reader understand the two methods of “failure” I will examine via survival analysis. I also provide a brief summary of the current retention issues facing Army SF. Next, I provide an overview of the ways retention differs among military and civilian employees. Although these factors will not be examined in the conceptual models, I feel they are important to rounding out the reader’s understanding of retention in the Army. Finally, I provide an overview of literature pertaining to the factors that will be examined in the conceptual models.

4.2.1 Overview of Army Departure Methods

Each new Active Duty recruit (whether officer or enlisted), signs a contract that commits him to a certain number of years in the Army.[86] For officers, the number of years of commitment depends on their commissioning source. Those who matriculate through the United States Military Academy, or West Point, owe five years of Active Duty service. Officers coming from Reserve Officer Training Corps, or ROTC, programs owe four years of service if they received a scholarship, or three years if they did not receive a scholarship. Officers matriculating from Officer Candidate School incur a commitment of three years (United States Army, 2009).

[85] The majority of incentive programs are aimed at soldiers of certain ranks or from certain year groups. Based on historical averages, the Army knows how many soldiers of each rank and each year group they need to maintain mission effectiveness, and they incentivize based on those needs. Merit is rarely a deciding factor. Essentially, if the soldier is in good standing and in the needed year group, he is offered an incentive.

[86] Even after his Active Duty service obligation is fulfilled, he is retained in the inactive Reserves for several years afterward. The typical Reserve obligation is six to seven years after completion of Active Duty. There are no drills or regular service commitments associated with inactive Reserve duty. Rather, these soldiers are maintained on a readiness roster and can be recalled to Active Duty in times of crisis or national emergency.

On the enlisted side, Active Duty service obligation varies by enlistment agreement. New soldiers sign up for between two to six years of Active Duty service for their first enlistment term, depending on the career field they will enter and any enlistment bonuses they chose to take. Naturally, a larger bonus obligates the soldier to more years of service.

After their first term of enlistment is over, soldiers can choose to remain in the Army or separate from service. Officers who remain do not need to sign an additional service obligation agreement, although they are likely to incur additional service obligation if they attend professional or academic training or if they move to a different post. Enlisted soldiers do need to sign a reenlistment agreement whereby they will incur another time-specific Active Duty service obligation. Again, the length of the second enlistment depends on the career field the soldier is in and whether or not he accepted a reenlistment bonus.

Those soldiers who choose to leave military service *after* they have fulfilled their service obligation but *prior* to retirement eligibility are said to have "ETSd," a term which stands for "expiration term of service." For instance, if a soldier's service contract ends on December 31, 2013, that is his ETS date, or the date he is eligible to exit the military. Soldiers who ETS are not eligible for any military retirement benefits, however they are likely eligible for benefits associated with the Department of Veterans Affairs, commonly known as the VA. According to the VA,

> For the purposes of VA health benefits and services, a person who served in the active military service and who was discharged or released under conditions other than dishonorable is a Veteran. (United States Department of Veterans Affairs, 2012)

This definition includes National Guard and Reserve soldiers who were called to Active Duty service and completed the full period for which they were called.

On the other hand, if a soldier completes 20 or more years of Active Duty service, he is eligible for military retirement benefits, which include an "immediate, lifetime, inflation-protected" pension based on the amount of…basic pay[87] and health care benefits through the VA (Enns et al., 1984, p.101). Army National Guard and Army Reserve soldiers are also eligible for retirement benefits, but their criteria for

[87]For those who entered military service after August 1986, the pension is based on the soldier's "high 36," or average of his highest 36 months of pay. The pension starts at 50% of a soldier's "high 36" for 20 years of service and increases by 2.5% for each additional year of service. Therefore, soldiers who serve 30 years are eligible for a pension of 75% of their "high 36." Pensions are adjusted annually based on cost of living/inflation.

retirement is based on an annual points system (i.e., the number of years in which the soldier performs enough duty to earn the required retirement points) and their pension and benefits begin at age 60. The military's retirement pension is said to be one of the most coveted, as a soldier who enlists at 17 years old is eligible for retirement at age 37. Most military retirees begin new careers, allowing them enough time to fully retire from their second career and essentially receive two retirement pensions for the rest of their lives (Enns et al., 1984). The military's retirement program has come under scrutiny several times in the past three decades, with legislation put forward several times to reduce the benefits paid to military retirees and/or adjust the retirement program for new military recruits. In total, the military retirement program cost $52B in 2012 (House of Representatives Committee on the Budget, 2013), which was approximately 10% of the military's budget that year (Office of the Under Secretary of Defense (Comptroller), 2012). Despite their cost, the enticing benefits of military retirement are a strong recruitment and retention tool for the all-volunteer force, and strong lobbying on behalf of veterans' groups has thwarted most attempts to restructure the retirement program.

There are several ways for soldiers to leave military service. Table 4.1 provides 17 of the most pertinent departure categories, however for this study, I am only interested in those soldiers whom ETS or retire.[88]

[88]Because I separate the data into two categories, I essentially remove any random censoring, or reasons for departure other than ETS and retirement.

Departure Categories	
Number	**Reason**
1	Retirement – full length of service (20 years)
2	Expiration of term of service (ETS)
3	School failure
4	Attend a civilian school
5	Conscientious objector
6	Court martial / Dropped from roles in lieu of court martial
7	Death (in combat, not in combat)
8	Defective enlistment agreement
9	Disability (from combat, not from combat, permanent, temporary)
10	Deserter
11	Military prisoner
12	Misconduct
13	Parenthood
14	Medical or physical failure
15	Homosexual activity[89]
16	Hardship
17	Other

Table 4.1 – Departure Categories

In Army SF, retention is especially important, given the large investment of time, money, and specialized training. SF soldiers must be retained in order to fill all the upper level positions required by the career field. Army SF has a myriad of programs designed to retain soldiers, however the most commonly known and frequently used are retention bonuses. Army SF soldiers are offered lump sum payments in exchange for a commitment to serve for a specific number of years. The bonus amount and commitment period typically vary by year group (i.e., how many years the soldier has been in the Army). For instance, given the dearth of experience in the force (due to high turnover rates), Army SF is currently offering highly experienced members with 18.5 or more years of service a $150K bonus for 6.5 additional years of service.

At the present moment, Army SF can afford large bonuses for highly skilled soldiers, however future budget constraints may limit the amount and quantity of bonuses available. Furthermore, not all soldiers are motivated by money. The mission of Army SF involves deployments, training, and simple day-to-day operations that cause frequent separations from family and friends and limit the ability of

[89] The Don't Ask, Don't Tell Repeal Act became law in 2010. Since the official appeal date of 20 September 2011, homosexual soldiers are allowed to serve openly. Therefore admission of consensual homosexual activity is no longer a reason for separation. The Uniform Code of Military Justice (UCMJ) prohibits and criminalizes certain sexual activities regardless of sexual orientation: forcible sodomy, sexual misconduct, conduct unbecoming an officer and gentleman, fraternization, and adultery (UCMJ, 2014).

soldiers to pursue other life goals, such as furthering their formal education. While the Army does have other means to incentivize soldiers to stay (time away from the force for educational programs, etc.), they are not as prevalent or as frequently employed as bonuses. Again, given the time and money invested into each SF soldier, understanding the determinants of retention is critical for the Army to realize decent returns on their investments.

4.2.2 Differences in Military and Civilian Retention

The literature on military retention factors is surprisingly sparse considering the high cost of turnover in the military relative to other service organizations. Certainly there are the typical costs associated with recruiting and training more soldiers, but there are also costs associated with the fact that the military cannot simply hire in employees in mid- and high-level positions (i.e., costs of knowledge and experience gaps), and costs associated with decreased mission effectiveness when turnover is high. These are costs that affect the United States in many different ways—in its perception as the most capable military in the world, in its ability to engage in strong diplomatic exchanges and back up political promises, and in its capability to provide strong homeland defense. As in the accession study, the price for poor retention can be catastrophic—up to and including loss of life.

With such high stakes, it is important to examine how different factors affect military retention. I am most interested in examining attributes of the soldiers who ETS, because the Army is getting the least return on investment from these soldiers. However, I will also look for differences among those who ETS and those who retire. Understanding *whom* Army SF is losing before retirement and *whom* they are keeping until retirement may help SF leadership make better decisions regarding when and to whom to offer retention incentives.

In the following sections, I discuss differences between military and civilian retention with regard to employee withdrawal behaviors, job dissatisfaction, perceived employment alternatives, institutional motivators, the role of community, monetary and quality of life incentives, personality factors, workplace shocks, and organizational flexibility and adaptability. Despite the fact that I do not have data to examine these factors, I feel they are important for the reader's understanding of how the work environment and decisions faced by military employees differ from work environment and decisions faced by civilian employees.

4.2.2.1 Military Withdrawal Behaviors

One area where the military differs radically from civilian organizations is in withdrawal behaviors. The Army enlisted force (which comprises approximately 78% of the total force[90], according to the 2012 Demographic Profile of the Military Community, (2012)) must make very explicit reenlistment decisions each time their enlistment contract ends (Hom et al., 1992). Choosing to reenlist makes the soldier irreversibly committed to several more years in the military, while choosing to ETS gives the military notification of who is leaving and when they are leaving, allowing the organization time to offer retention incentives if the soldier has highly sought after knowledge and skills.

4.2.2.2 The Role of Job Dissatisfaction & Perceived Alternatives

Interestingly, Hom et al. (1992) found that job dissatisfaction has less effect on a military member's decision to quit than on their civilian counterparts. Military members also base their decisions to quit less on perceived alternatives (i.e., outside employment) than their civilian counterparts, as soldier skills are less likely to be portable outside the military environment than civilian skills (especially for those soldiers who are in very military-specific occupations, such as Infantry or Artillery), and because geographical constraints limit the amount of job searching a soldier is able to perform while still in the service. Further, Steel and Landon (2010) showed that military personnel consider their internal opportunities (i.e., promotions, training, career broadening) and external opportunities (i.e., outside employment offers) separately when considering reenlistment. Their analyses show the results to be additive—both sets of opportunities matter when making reenlistment decisions. These findings clearly show that the Army can somewhat control reenlistment decisions by providing more internal opportunities to their employees. However, when military members begin the search process for another job, they are more likely to follow through and leave the service than their civilian counterparts are to leave their jobs (Steel & Ovalle, 1984).

4.2.2.3 Institutional Motivators

Hom et al. (1992) found that institutional motivators (i.e., military service as a calling, patriotism, and a sense of duty and honor) were more important for military members than for their civilian

[90]The remaining 22% are officers.

counterparts, and Manigart and Prensky (1982) showed that military calling had the largest impact on making the military a career for members of the volunteer Belgian armed forces. Woodruff et al. (2006) showed that soldiers are motivated by both occupational and institutional factors, and soldiers with the highest propensity for serving in the military are motivated by both economic (e.g., pay and benefits, to include GI Bill educational benefits) and institutional factors. The notion of being part of something larger than oneself has been a consistent theme in military recruitment and retention efforts for ages. In the US, "Uncle Sam" posters like the one in Figure 4.1 appeal to the notion of duty. This poster reads

If you believe this country needs an Army,
you can't help but believe that it needs soldiers.
Who will these soldiers be?
Don't look over your shoulder. After all, with your
education, ambition and dreams, you have a personal stake
in the future of this country.
And a personal duty to serve it.
That's right, though military service is no longer
an obligation, it is no less a duty.
And in spite of all the bonuses, benefits, travel
and excitement of being a soldier, fulfilling your duty is
the most fulfilling part of all.
Think about it.

Figure 4.1 – "Uncle Sam" Poster Appealing to Sense of Duty

4.2.2.4 Military Community

Several studies have been performed that examine the role of the military community on soldier well being and retention. Soldier and family support programs provide a sense of community in the Army, as families are frequently uprooted and moved throughout the world, and soldiers frequently leave their spouses and children for extended periods of time. Studies show that military programs that provide support for *both soldiers and their families* can increase retention rates (Heilmann et al., 2009; Burrell et al., 2003; Kirby & Naftel, 2000).

4.2.2.5 Monetary & Quality of Life Incentives

A study of military dental officers showed that, for younger officers, monetary bonuses are a major driver of retention; while for older officers, quality of practice, quality of life, and less frequent moves are considered more important (Chaffin et al., 2008). These results call for broader retention initiatives, providing different incentives for different service members. Currently, the Army uses mainly monetary incentives to retain soldiers, however their efforts to improve quality of life (e.g., better military housing, more stable deployment schedules, etc.) have also improved dramatically since 2001.

4.2.2.6 Personality Factors

In an interesting study that examined how the personality factors of hardiness and grit affect a cadet's performance and retention at the United States Military Academy (West Point), Maddi et al. (2012) found that both hardiness and grit predicted first year retention, but only hardiness predicted performance. They define grit as "sustained interest and persistent effort in the passionate pursuit of long-term goals" (p.20) and hardiness as a sort of inherent knowing what to do in certain circumstances: "a pattern of attitudes and skills that provides the existential form of courage and motivation needed for learning from stressful circumstances, in order to determine what will be the most effective performance" (p.21). Having the right personality characteristics to handle the stressors of the military environment is clearly critical to soldier success and retention.

4.2.2.7 Workplace Shocks & Deployments

Although not specifically tested on a military population, Holtom et al. (2008) discuss how workplace shocks can affect an employee's decision to leave. Specifically, they note differences in retention based on whether the shock was expected or unexpected, positive or negative in nature, and internal or external to the organization. In the military sense, shocks can come in many forms. For instance, the attacks on September 11th, 2001 were clearly unexpected, negative in nature, and came from sources external to the military. This shock had the dual effect of causing some to leave the military earlier than they might have during peacetime,[91] while causing others to remain in the service longer than they had planned, or to even join the military for the first time. On the other hand, actions such as budget cuts and reductions in force are internal, negative shocks that were expected by some and unexpected by others. These sort of shocks can have a negative effect on retention, as soldiers may feel their service is unappreciated by lawmakers or the service as a whole.

Deployments tend to have similarly ambiguous effects on retention. In a retention study of Reservist who have deployed, Kirby and Naftel (2000) found that the effects of being mobilized for deployment increased unit cohesion and sense of pride, which tended to increase retention. However, as the authors carefully note, these results are likely to be heavily dependent on the “circumstances, length, and frequency of mobilization” (p.259). In short, deployments serve as a way for military members to put all their training to use in a “real world” environment, but too many deployments can cause stress that results in turnover.

4.2.2.8 Organizational Flexibility & Adaptability

A final difference between military and civilian organizations lies in their ability to be flexible and adaptive to individual employee wants and needs. Indeed, the Army is somewhat hampered by laws regulating the size and budget of the service, and by their own decades-old incentive policies. The military, like all bureaucratic organizations, is guilty of using strategies that worked in the past, without taking into account changes that have occurred in recent years. In their insightful article on supportive management and job quality on turnover intentions and health of military personnel, Dupré and Day (2007) note that

[91] “Stop Loss” procedures were enacted shortly after the September 11th attacks to prevent the loss of personnel from certain critical career fields. The Department of Defense estimates this particular Stop Loss affected 145,000 service members who were eligible to depart the service via ETS or retirement (Armed Forces Press Service, 2012).

> Although the military may not always have the flexibility to change organizational standards and job specifications if they want to remain competitive and functional, they do have a significant amount of control over how they manage personnel and how they structure specific aspects of jobs or military occupations. (p.188)

It is no secret that change happens fairly slowly in the military, but change is possible. Maintaining a talented, all-volunteer force calls for changes in the way soldiers are incentivized for retention.

4.2.3 Factors Affecting Retention

The retention literature is one of the largest in the Industrial/Organizational Psychology and Organizational Behavior fields. These fields are teeming with studies that attempt to pinpoint the main factors associated with retention (conversely, turnover). Steers and Mowday (1981) called retention one of the most durable topics of academic inquiry, as there are over 1,000 turnover studies in the 20th century alone. Retention has been examined from many different angles—from realistic job previews prior to employment (Caldwell & O'Reilly, 1985); to individual differences in personality and motivation (Holtom et al., 2008), age, tenure, education, and marital status (Cotton & Tuttle, 1986); to workplace factors such as culture, work-life balance, and employee voice (Spencer, 1986); and to job-related factors, such as satisfaction and role clarity (Cotton & Tuttle, 1986), over/underemployment (Maynard et al., 2006), and job enrichment (McEvoy & Cascio, 1985).

Clearly, retention is an important topic for many reasons. First, the cost associated with recruiting, selecting, and training new employees often exceeds 100% of the annual salary of the position being filled (Allen et al., 2010). It is much less expensive to keep the employees you have (assuming they are performing well) than to recruit new employees. Further, some costs of turnover, such as employee knowledge and experience, are difficult to quantify and nearly impossible to immediately replace.

Second, "Emerging evidence suggests that as much as 30 to 40% of market value is attributable to intangible factors (e.g., …attracting and retaining talent)" (Holtom et al., 2008, p.232). This is particularly important in the services industry, where employees play a vital role in creating and upholding brand image. Being able to attract and retain talented employees boosts a company's value.

Finally, with regard to talent, evidence suggests that talented employees are more likely to leave their jobs than less talented employees (Maltarich et al., 2010; Holtom et al., 2008). Talented employees are less affected by high unemployment rates, making them vulnerable to loss at any time, not just in times of economic prosperity (Allen et al., 2010). How can service organizations buck these trends and retain a productive, talented workforce? The first step is to understand *who* is leaving and *why* they are leaving.

Relevant retention factors vary by industry. My interest focuses on retention in service industries, and, more specifically, in public service organizations. I build on the accession information garnered from Study 2 (Chapter 3) and use the same service competencies and service inclination factors to understand which employees are most vulnerable to loss in public service organizations. Understanding *who* leaves will help public service organizations like the Army adjust their incentive programs to retain their most talented employees. Finally, I use the results from Study 1 (Chapter 2) to recommend how the Army can use relationship marketing techniques to incentivize well-performing soldiers to stay.

4.3 Conceptual Framework

In this section, I discuss the conceptual frameworks for two types of departure from the military: ETS and retirement. I believe the factors that predict ETS and the factors that predict retirement will be different, therefore I create two conceptual frameworks and two sets of hypotheses.

4.3.1 Conceptual Framework – ETS

There is an adage in the military that "the good ones get out." This means that people who are talented will eventually pursue different employment for various reasons: (1) because they can (i.e., they have knowledge and abilities that are useful outside the military), (2) because they desire to make more money, (3) because they are frustrated with the bureaucratic military system, (4) because they are tired of frequent deployments and constantly uprooting their families, or (5) because the military was not challenging enough for them (i.e., they sought constant adventure and soon realized the real adventure comes with long periods of training and preparation). "The good ones get out" is an anecdotal statement, thus far not rooted in empirical evidence. I test that notion in this study, by examining *whom* ETSs from SF service. Do the top performers during SF qualification training ETS, or do the less stellar candidates leave the service? If the adage is true, I also want to know *when* "the good ones get out" so the Army can take measures to prevent their departure.

Understanding that talented employees tend to be the most vulnerable to leaving, I believe the SFAS performance indicators that are most relevant to employment outside the military will predict ETS. That is, candidates who score highest on cognitive ability, navigational ability, and peer evaluations are most likely to ETS. Although navigational ability is a skill that is specific to military service, it shows a measure of cognitive strength and cool-headedness that is also appreciated in outside employment, therefore I include it with cognitive ability and peer evaluations. Further, Ranger qualification sets a soldier apart as having better skills than non-Ranger qualified soldiers. Therefore, I use Ranger qualification as a proxy measure of leadership talents and general hardiness that is prized by outside employers. Specifically, I hypothesize:

H1a – Cognitive ability (COGNIT) is positively related to the likelihood of ETS.

H1b – Navigational ability (NAVIG) is positively related to the likelihood of ETS.

H1c – Peer evaluations (PEEREVAL) are positively related to the likelihood of ETS.

H1d – Ranger qualification (RGRDUM) is positively related to the likelihood of ETS.

Although physical abilities are a talent appreciated in military service, I believe they are unrelated to success in outside employment. In other words, in the majority of career fields outside the military, physical abilities are not necessarily relevant factors for employment or job success. Therefore, I hypothesize:

H2a – Physical strength (STRENG) is unrelated to the likelihood of ETS.

H2b – Short-term endurance (ENDURST) is unrelated to the likelihood of ETS.

H2c – Long-term endurance (ENDURLT) is unrelated to the likelihood of ETS.

Research has clearly shown that older employees tend to be more vested in their jobs, and are therefore less likely to leave prior to retirement (Steel & Ovalle, 1984). Therefore, I hypothesize:

H3 – Age (AGE) is negatively related to the likelihood of ETS.

Finally, I expect to find differences in length of service among the military occupational specialties (MOS). I expect that those soldiers who came to SF via the 18X program will be more likely to ETS than their counterparts from other MOS. Soldiers from other MOS already have experience with the Army's culture and lifestyle and fully understand what they are committing to do. In a sense, they have already received a realistic job preview, whereas their 18X counterparts who enter the Army and SF simultaneously have not had the benefit of fully understanding Army life prior to joining SF. Further, anecdotally, Army SF leaders believe that 18X soldiers come into the Army with higher education and skills more suited to the civilian work environment.[92] They believe many 18X soldiers join SF for a quick adventure, never intending to stay in the Army for their career. I will test this notion via the hypotheses:

H4a – Being an 18X soldier (DMOS18) is positively related to the likelihood of ETS.

H4b – All other MOSs are negatively related to the likelihood of ETS.

Visually, the conceptual framework for ETS is shown in Figure 4.2.

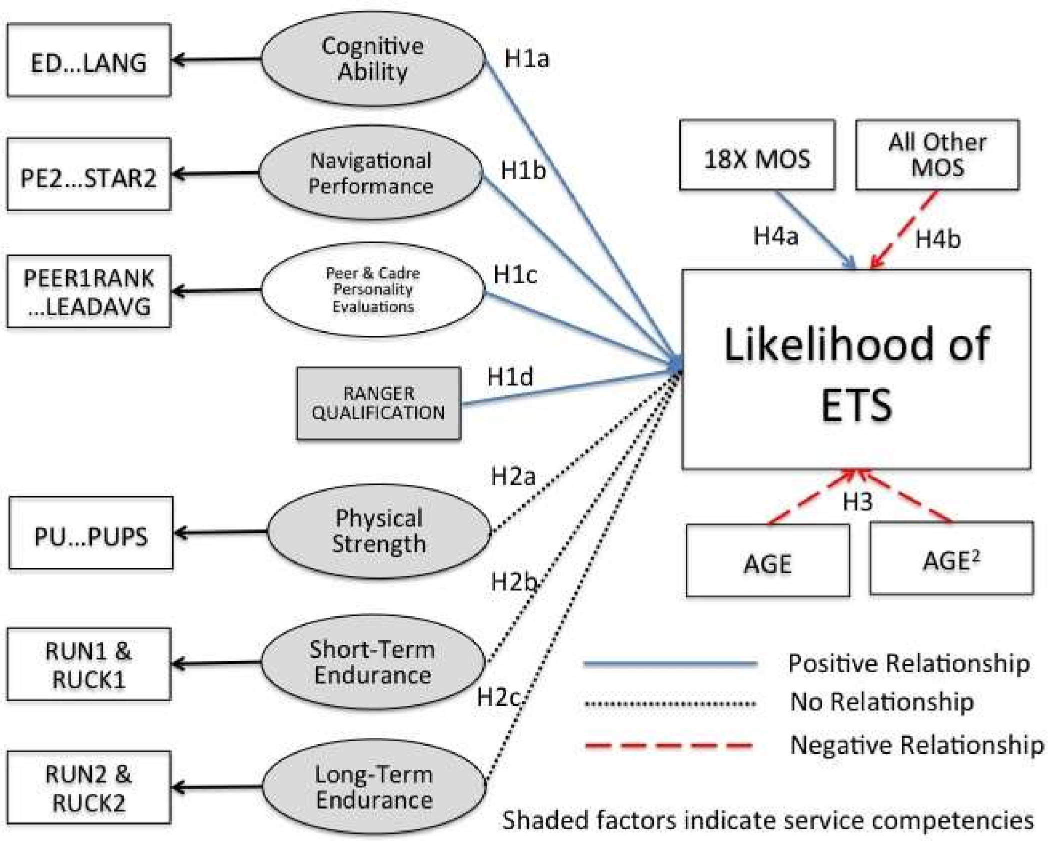

Figure 4.2 – Conceptual Framework - ETS

<u>4.3.2 Conceptual Framework – Retirement</u>

If "the good ones get out," does that mean only the "bad" ones are left? No, not at all. In fact, all members of the Army have gone through a series of vetting processes (e.g., recruiter screening, medical screening, boot camp, career training classes, SFAS and SFQC, etc.) whereby wholly unqualified

[92] The data show that soldiers who enter via the 18X program are, on average, .30 standard deviations above the mean score for cognitive ability.

members are removed prior to service. Therefore, I am not necessarily discriminating between “good” and “bad,” rather I am discriminating between “good” and “better” performance on criteria captured during SF training. It is important to understand that I unfortunately *am not* capturing all aspects of a soldier’s life that can affect retention. Clearly, his motivation for being in the Army, his patriotism, and his commitment to the service are major factors that are not analyzed here. Further, I have no data family situations (i.e., marriage, divorce, children, etc.) and deployments (i.e., total number of deployments, deployment length, deployment frequency, level of combat, etc.), both of which are important to the full retention picture.[93] Still, it is important to understand how performance indicators do or do not predict a soldier’s length of stay in Army SF.

Analyzing retirement requires several years worth of data, in order to know if and when the event of interest (i.e., retirement) happens. With SFAS data from 1991 and loss data through 2013, I was able to capture 22 years of data. Unfortunately, the SFAS performance data before 2006 is much less robust than the data from 2006 to 2013. The only consistent measures I am able to examine are those associated with cognitive ability, physical strength, Ranger qualification, age, and soldier MOS.

Again, with the literature pointing to the notion that talented employees are the most vulnerable to leaving, I believe those who retire will have more cognitive ability and will be more likely to be Ranger qualified than their counterparts who stay beyond retirement eligibility. Thus, I hypothesize:

H5a – Cognitive ability (COGNIT) is positively related to the likelihood of retirement.

H5b – Ranger qualification (RGRDUM) is positively related to the likelihood of retirement.

I believe physical abilities are an important factor for military retirement. Specifically, SF soldiers who fail to meet physical standards are involuntarily removed prior to retirement. Soldiers who desire to remain past retirement eligibility must maintain their physical strength, passing the Army’s physical fitness test twice a year. In other words, those who can no longer “keep up” are more likely to retire than those who are still able to meet the standards. Therefore, I hypothesize:

H6 – Physical strength (STRENG) is negatively related to the likelihood of retirement.

Again, research shows that older employees tend to stay until retirement. Therefore, I hypothesize:

[93] This data was requested from the Army, however it was not made available for this research.

H7 – Age (AGE) is positively related to the likelihood of retirement.

Finally, as in the ETS framework, I expect to find differences in length of service among the military occupational specialties. I expect that those soldiers who came to SF from a different MOS will be more likely to stay beyond retire eligibility than their 18X counterparts. Therefore, I hypothesize:

H8a – Being an 18X soldier (DMOS18) is positively related to the likelihood of retirement.

H8b – All other MOSs are negatively related to the likelihood of retirement.

Visually, the conceptual framework for retirement is shown in Figure 4.3.

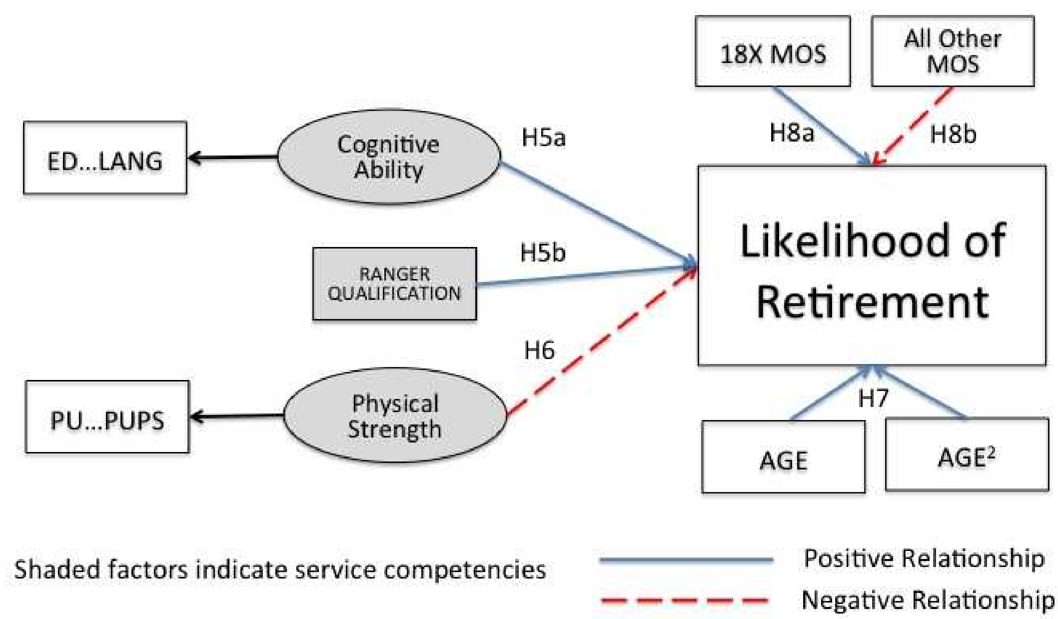

Figure 4.3 – Conceptual Framework - Retirement

4.3.3 Summary of Hypotheses

A summary of the hypotheses is presented in Table 4.2. Next, I discuss the data and the methods used to examine if and when a soldier ETSd or retired.

Summary of Hypotheses		
	H#	**Description**
ETS	H1a	Cognitive ability is positively related to the likelihood of ETS.
	H1b	Navigational ability is positively related to the likelihood of ETS.
	H1c	Peer evaluations are positively related to the likelihood of ETS.
	H1d	Ranger qualification is positively related to the likelihood of ETS.
	H2a	Physical strength is unrelated to the likelihood of ETS.
	H2b	Short-term endurance is unrelated to the likelihood of ETS.
	H2c	Long-term endurance is unrelated to the likelihood of ETS.
	H3	Age is negatively related to the likelihood of ETS.
	H4a	Being an 18X soldier is positively related to the likelihood of ETS.
	H4b	All other MOS are negatively related to the likelihood of ETS.
Retirement	H5a	Cognitive ability is positively related to the likelihood of retirement.
	H5b	Ranger qualification is positively related to the likelihood of retirement.
	H6	Physical strength is negatively related to the likelihood of retirement.
	H7	Age is positively related to the likelihood of retirement.
	H8a	Being an 18X soldier is positively related to the likelihood of retirement.
	H8b	All other MOS are negatively related to the likelihood of retirement.

Table 4.2 – Summary of Hypotheses

4.4 Data & Methodology

4.4.1 Data

For this study, I used several fields from the SFAS data (in Study 2). In particular, I included the six components found in the principal components analysis (PCA) (i.e., cognitive ability, navigational ability, physical strength, short-term endurance, long-term endurance, and peer evaluations) and examine how each affects the two forms of departure (i.e., ETS and retirement). Further, I examine the effects of age and career field on the two forms of departure, while using year dummies to control for differences over time.

Study 2 was comprised of 23,070 cases of individuals who went through SF training from 2006 to 2013, however in this study, I include data from 1991 to 2013, for a total of 53,408 SF training cases. Data prior to 2006 contains fewer fields than the more recent data,[94] however having older data is necessary for my analysis, as it allows me to capture both when a soldier went through SFAS (in the 1990s) and when he retired (typically from 2000 to 2013) or separated from service prior to retirement (ETSd).

I matched the SFAS data (1991 to 2013) to a data set that showed which soldiers left service in fiscal years 2004 to 2013. The loss data pertains to enlisted soldiers only, thus my analyses are specific to the enlisted force. In most cases, I have the actual date the soldier left service, thus allowing me to calculate their total time in *SF service*. Those without a specific date had at least the month and year of departure, and I assume a mid-month departure (the 15th of the month) for those cases in order to calculate their total time in SF service. In total, I matched 23,340 cases by social security number. I assume all unmatched cases (i.e., those without a loss date) are censored, which indicates the soldier is still in service.

It is very important to note that I am only able to decipher the total amount of time the soldier spent in *SF service* with my data. In other words, I know when a soldier entered SF training (i.e., SFAS, the beginning of his SF service commitment) and when he left the Army (i.e., the end of SF duty). *I do not know his total time in Army service.* This point is particularly critical for those soldiers who enter SF

[94] As a reminder, the majority of older cases contain variables that measure cognitive ability, physical strength, Ranger status, age, and military occupational specialty.

from other career fields (i.e., other than 18X soldiers), as they may have as much as 15 years of Active Duty service under their belts prior to entering SF. *The origin of time for this study is the first day the soldier attends SFAS.*

To illustrate this point, Figure 4.4 shows the simplicity of determining ETS and retirement eligibility when the soldier's *total years of Army service is* known. Clearly, anything more than the soldier's service obligation and less than 20 years is considered an ETS departure.

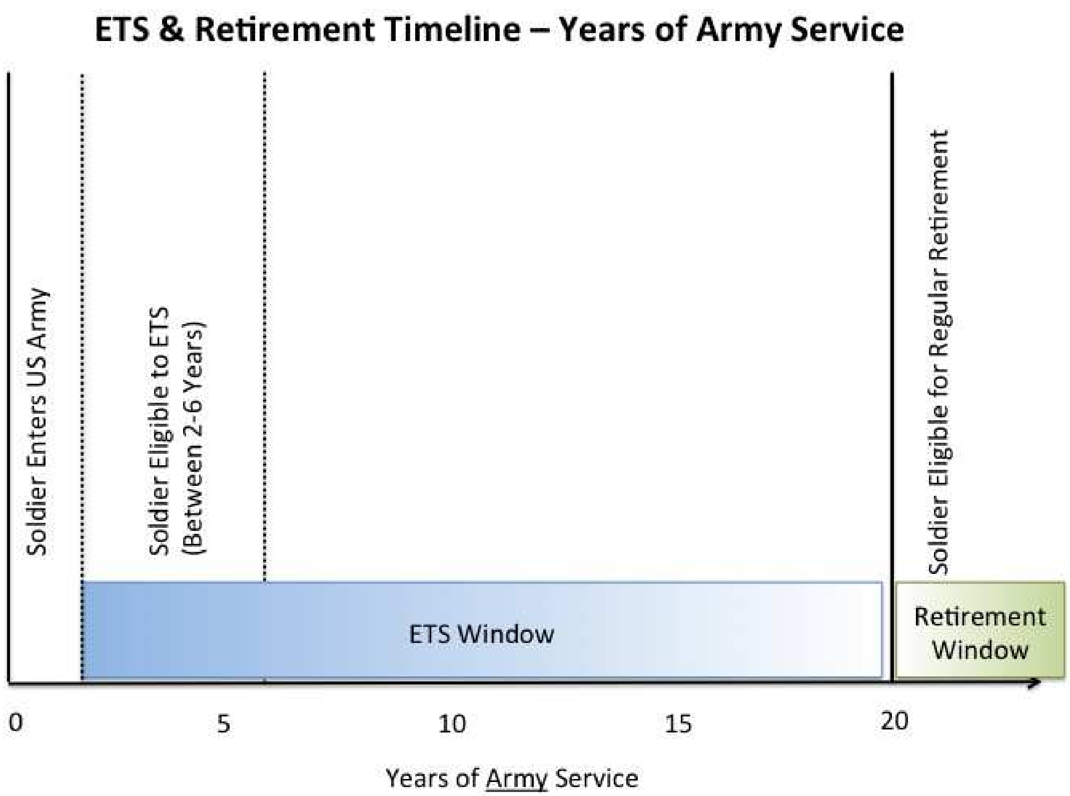

Figure 4.4 – ETS & Retirement Timeline – Years of Army Service

Figure 4.5 shows the complexity involved in analyzing my data, which contains *total years of SF service*. SF soldiers are able to ETS anytime after their 5 year service obligation is complete but before *20 total years in Army* service, *not SF service*. So, for example, if a soldier enters SF training with 10 years of Army service in Infantry, he is eligible to ETS when his 5-year service commitment is complete, which equates to his 15th year of total Army service. He is able to ETS anytime from his 15th year to 19 years and 364 days.

Using the same line of reasoning, SF soldiers are able to retire after completing *20 total years of Army service*, *not SF service*. Therefore, if a soldier comes into SF training with 10 years of Army service in Infantry, he is eligible to retire after 10 years of SF service, which equates to 20 total years of Army service. I highlight this point to make the reader aware that I am analyzing total time in SF service vice total time in Army service. It is especially critical for the retirement analysis, as it will appear that some soldiers have retired after just 5 year of service, when in actuality, the soldier had 15 years of prior Army service under his belt before coming to SF. Thus, with his 15 prior years plus his 5-year service commitment completed, he is eligible for Army retirement. There are very few cases like this in my data, but they do exist.

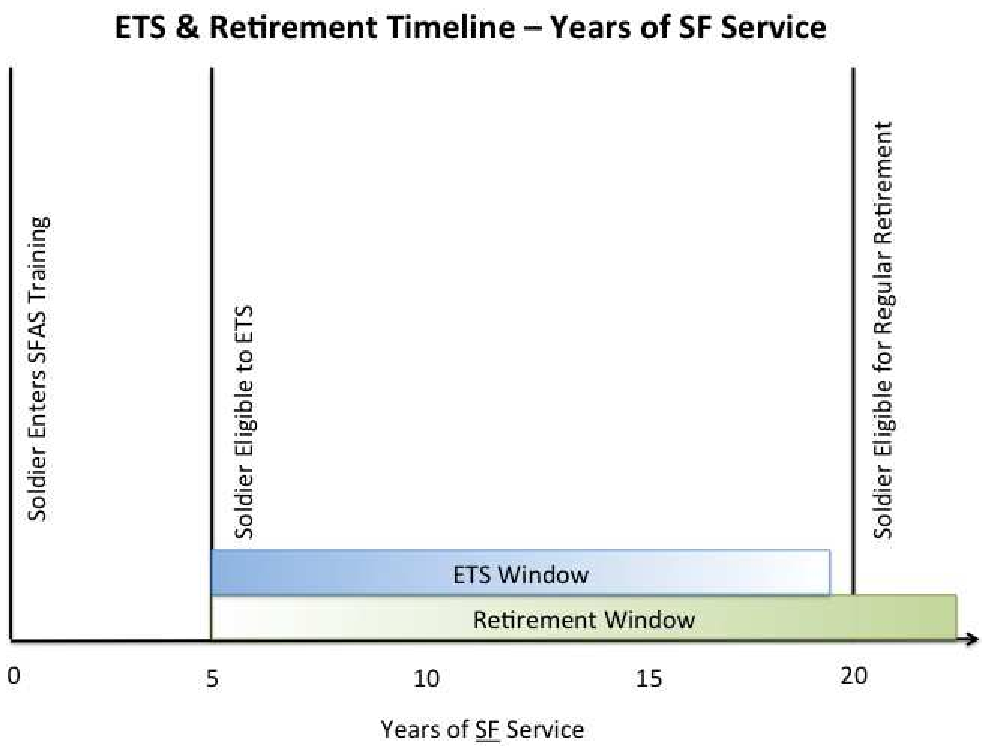

Figure 4.5 – ETS & Retirement Timeline – Years of Army Service

Table 4.3 provides the percentage of soldiers who went through SFAS from 1991 to 2013 *and* who ETSd or retired by fiscal year 2013 (the last year for which I have data on SF losses). Clearly, the percentage of soldiers who exited service prior to retirement (i.e., those in the ETS columns) has increased dramatically over the years, particularly after the events of September 11th, 2001. Further, many soldiers are coming to SF duty with several years of experience in the Army, as they are eligible to retire (and some do retire) within 8 to 10 years of entering SFAS. This effectively means Army SF is only getting 6.5 to 8.5 years of active SF service, assuming the soldiers make it through SFAS and SFQC in the shortest time span, 1.5 years.

Soldiers who Departed by SFAS Year and Departure Category*				
SFAS Year	**ETS**		**Retirement**	
	Number	**% of Total Departures**	**Number**	**% of Total Departures**
1991	4	2.63%	133	87.50%
1992	8	5.37%	126	84.56%
1993	1	2.38%	36	85.71%
1994	3	5.56%	39	72.22%
1995	5	14.29%	18	51.43%
1996	19	15.97%	75	63.03%
1997	22	14.29%	64	41.56%
1998	32	21.62%	51	34.46%
1999	39	30.71%	36	28.35%
2000	26	27.96%	17	18.28%
2001	38	32.20%	18	15.25%
2002	75	50.34%	14	9.40%
2003	143	71.86%	4	2.01%
2004	141	62.39%	4	1.77%
2005	195	76.17%	2	0.78%
2006	193	83.91%	--	--
2007	No Data			
2008	41	80.39	--	--
2009	3	18.75%	--	--
2010	No Observations			
2011				
2012				
2013				
* Based on the latest SF loss data available, fiscal year 2013.				

Table 4.3 – Soldiers who Departed Service by SFAS Year & Departure Category

<u>4.4.2 Methodology</u>

I used survival analysis to examine if and when a soldier left Army SF service. "Survival analysis is a collection of statistical methods used to address questions that have to do with whether and when an event of interest takes place" (Guo, 2010, p.3). In particular, survival analysis takes into account both time to event occurrence and censored data. In short, "[c]ensoring refers to data incompletion" (Guo, 2010). In left-hand censoring, the origin, or starting point of a certain time spell, is unknown. In right-hand censoring, the end point is unknown (i.e., the event of interest, such as ETS or retirement, had not yet occurred at the time the data was collected). Finally, random censoring occurs when the researcher is able to see both the start and end points of a given case, but the observation is terminated for reasons *other than* occurrence of the event of interest.

Singer and Willett (2003) recommend using the "whether" and "when" test to determine whether or not survival analysis is an appropriate data analysis method. Specifically, the researcher aims to determine whether an event occurred and when it occurred. In my case, I am attempting to determine whether SF soldiers departed the service and, if they did, when they left. In this frame, censored data refers to all the soldiers who passed SFAS and SFQC (i.e., are in Army SF) and have not yet departed the service.

Specifically, I used the Cox proportional hazards model to perform examine my models. This popular method is non-parametric (distribution free) and uses partial likelihood methods which do not requires the specification of a baseline hazard function, as the estimates are based on the ranking (or ordering) of event times[95] rather than numerical values (Guo, 2010). Cox regression is termed "proportional hazards" because it assumes a constant ratio of a hazard rate between any two individuals.[96] In this study, departure takes two forms, therefore I perform two sets of Cox regressions to examine differences in whether a soldier ETSs or retires.

4.4.2.1 Event of Interest: ETS

For the first analysis, the event of interest is whether or not the soldier ETSd, or departed service prior to retirement. Soldiers included in this analysis have either ETSd (i.e., had the event of interest) or are still in the service. This analysis does not include those soldiers who have retired or are eligible to retire. Since I do not have each soldier's total Army service time to determine retirement eligibility, I use a proxy measure to determine eligibility. I have total time in Army service for one group of SFAS candidates—those who went through training in 2013.[97] In those 1,846 observations, the average time in Army service prior to entering SF training is 3.13 years. I extrapolate this average to all cases, allowing

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[95] I use Efron's method for dealing with tied event times.

[96] The proportionality assumption was tested via the log(-log(survival)) versus log of survival time graph for each predictor. The proportionality assumption is justified for this data.

[97] Army SF recently began capturing total time in service data for all candidates entering SF training.

me to assume that after 16.87 years in SF service, the soldier is eligible for retirement. Therefore the data for my ETS analysis includes only soldiers with less than 16.86 years in SF service.

4.4.2.2 Event of Interest: Retirement

In the second analysis, the event of interest is whether or not the soldier retired. Soldiers included in this analysis have either retired (i.e., had the event of interest) or are still in the service and are eligible for retirement. Again, I use the average time in Army service and assume those soldiers with 16.87 or more years of service are eligible for retirement.

4.4.2.3 Robustness Methods

To examine the robustness of the results, I also perform survival analysis using the piecewise exponential model.[98] The piecewise exponential model is a parametric model that takes into account the fact that long study periods often do not accurately capture changes as they occur. For instance, this study uses a one-year period, meaning that I examine when soldiers depart service using a yearly time variable. In other parametric models, a soldier who departs after serving 5 years and 1 day is treated the same as a soldier who served 5 years and 364 days. Both are assumed to have left in their 6th year of service. Clearly, a difference of nearly one year can have an impact on regression results. The piecewise exponential model takes this inaccuracy into account by allowing fractional time measurements, such that the first soldier would have served 5.003 years in the Army, while the second served 5.997 years. Clearly, the piecewise exponential model provides a more accurate time measurement.

4.5 Results

4.5.1 Descriptive Statistics

Table 4.4 provides the basic descriptive statistics for the substantive variables (i.e., those variables collected during the candidate's tenure at SFAS). Stata version 12.1 was used for all analyses:

[98]Parametric models (i.e., exponential, Gompertz-Makeham, log-logistic, Weibull, log-normal, and generalized gamma distributions) were examined and the AICs were fairly similar, therefore I chose to examine the piecewise exponential model.

Descriptive Statistics of Discrete Variables										
	ETS					**Retirement**				
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
Cognitive Ability	20751	0.01	0.98	-6.20	3.89	4395	0.02	0.97	-3.55	6.87
Navigational Ability	15699	0.00	1.00	-3.86	3.98	45	-0.59	0.94	-2.34	0.89
Physical Strength	16473	0.02	0.98	-4.09	5.47	2402	0.06	1.27	-2.53	5.47
Short-Term Endurance	15759	0.00	1.00	-4.39	6.20	44	0.20	0.81	-1.41	1.56
Long-Term Endurance	15607	0.00	1.00	-3.35	6.44	43	0.22	0.54	-0.81	1.24
Ranger Qual Dummy	20445	0.20	0.40	0	1	4382	0.26	0.44	0	1
Peer Evaluations	12475	0.00	0.98	-9.63	7.71	18	1.02	1.81	-0.70	5.52
Age	20424	25.48	3.98	18	50	4360	25.89	3.52	18	42
Age^2	20424	665.11	218.38	324	2500	4360	682.75	190.82	324	1764
Enlisted Dummy Var	20753	0.83	0.38	0	1	4395	0.80	0.40	0	1
DMOS11 – Infantry	20753	0.39	0.49	0	1	4395	0.45	0.50	0	1
DMOS13 – Field Artillery	20753	0.05	0.22	0	1	4395	0.06	0.23	0	1
DMOS18 – SF 18X	20753	0.22	0.41	0	1	4395	0.07	0.25	0	1
DMOS19 – Armor	20753	0.04	0.19	0	1	4395	0.03	0.16	0	1
DMOS31 – Mil Police	20753	0.03	0.17	0	1	4395	0.06	0.24	0	1
DMOS91 – Mechanical Maintenance	20753	0.03	0.18	0	1	4395	0.04	0.20	0	1

Table 4.4 – Descriptive Statistics of Discrete Variable

Given that survival analysis necessarily includes censored cases, I cannot rely on typical descriptive statistics to tell the whole story of the data. Instead, I use Kaplan-Meier tables to estimate the survival function. Kaplan-Meier tables consider both censored and uncensored data "by considering survival to any point in time as a series of steps defined by the observed survival and censored times" (Guo, 2010, p.43). The full Kaplan-Meier tables are provided in Appendix M, while the estimate survival and hazard plots are shown below. I examined the basic descriptive statistics in three different groups: (1) those soldiers whom ETSd, (2) those soldiers who retired, and (3) a conglomerate of soldiers whom ETSd and retired. Examining the data in these groups helps point out differences in survival rates and hazard rates among the departure categories.

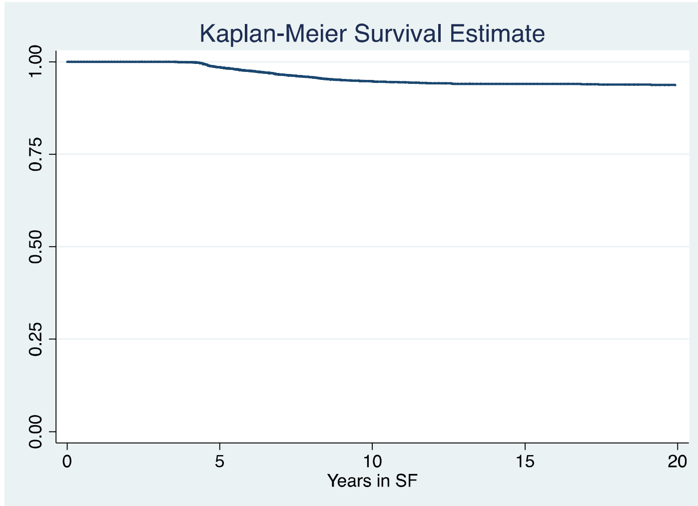
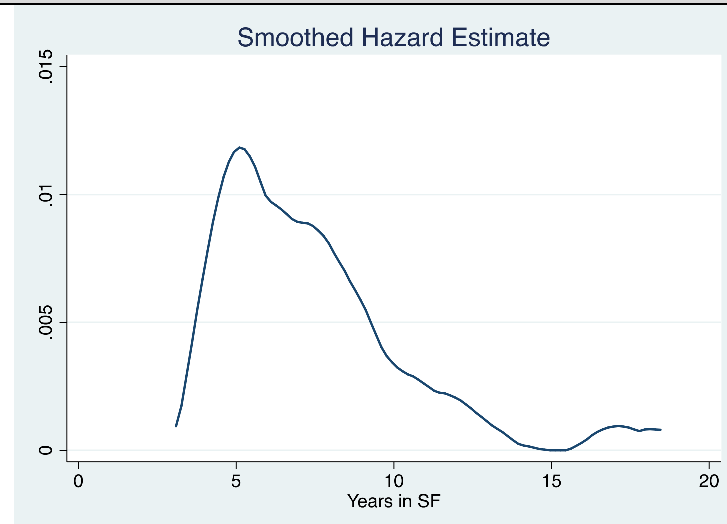
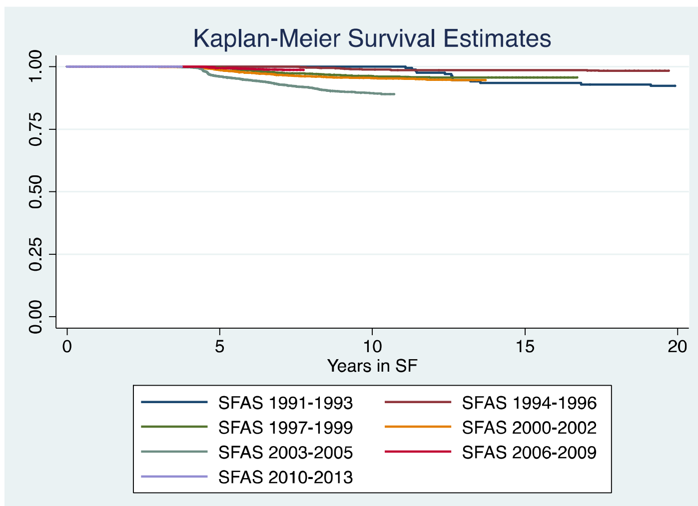
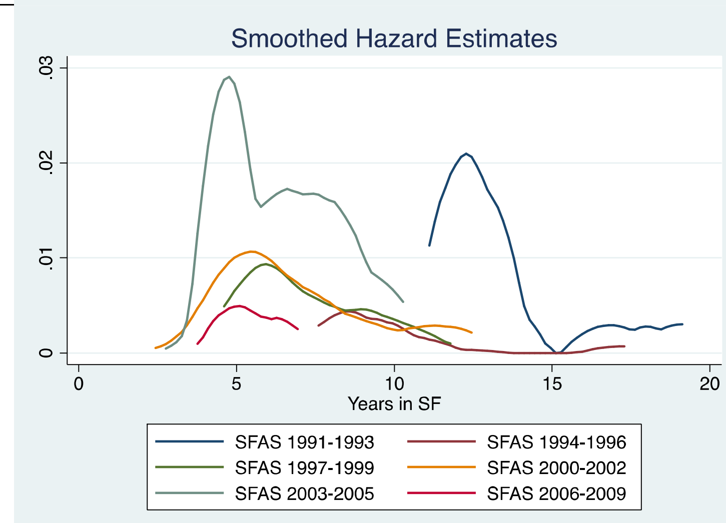
4.5.1.1 ETS

Table 4.5 shows the survival and hazard plots for soldiers who ETSd. The table shows (1) the overall survival and hazard functions, (2) survival and hazard functions by year the soldier went through

SFAS, and (3) survival and hazard functions based on whether the soldier went through SFAS before or after September 11th, 2001 (i.e., SFAS year groups 1991-2001 v. SFAS year groups 2002-2013).

Overall, it appears the greatest risk of ETS occurs around a soldier's fifth year in the military. This makes sense, as the average required term of enlistment for an SF soldier is 60 months, or 5 years. At approximately 13 years of service, the risk of the soldier leaving service prior to retirement becomes, and remains, very low. The hazard of ETS occurs much earlier in the soldier's career for more recent SF soldiers. Soldiers who went through SFAS from 1997 to 2009 are much more likely to leave after approximately 5 years in SF service than soldiers who went through SFAS from 1991 to 1996, whose likelihood of leaving occurs between 10 and 13 years of SF service. Interestingly, the increase in the hazard rate for soldiers who went through SFAS from 1991 to 1996 coincides with the time when the Global War on Terrorism was expanding operations rapidly, which may have caused the increasing ETS rate. The pre- and post-September 11th charts show a similar trend. Clearly, these charts show the effects of deployments on retention. The post-September 11th years have been ones of frequent deployments for Army SF; and this has had a profound effect on retention.

Digging a little deeper into *who* is leaving, I find that those SF soldiers who were initially recruited into the 18X program (i.e., those soldiers who were not previously part of the US Army but were instead recruited directly "off the streets" into the SF career field) are much more likely to leave service prior to retirement than their counterparts from other career fields. This may be because soldiers who enter SF with previous Army experience have a better understanding of what Army life is like and, presumably, they like the lifestyle. Otherwise they would not sign themselves up for an additional five years of service in order to transfer to SF.

Survival & Hazard Plots - ETS		
Grouping Var	**Survival Plot**	**Hazard Plot**
Overall		
SFAS Year		

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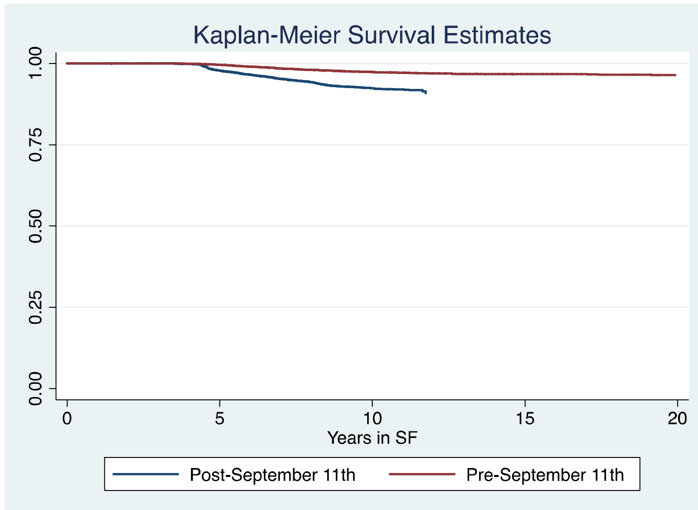
<td>
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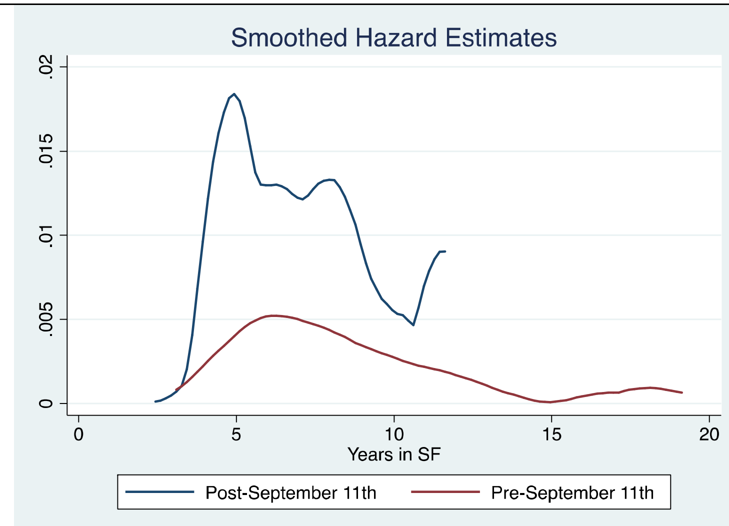
<td>
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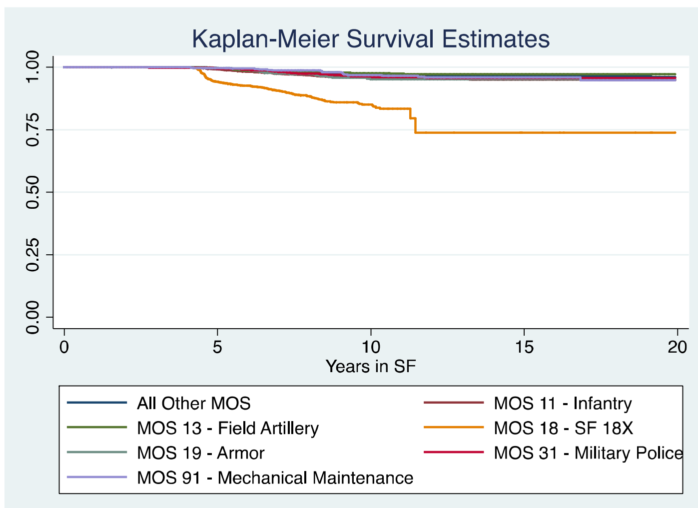
<td>MOS</td>
<td>
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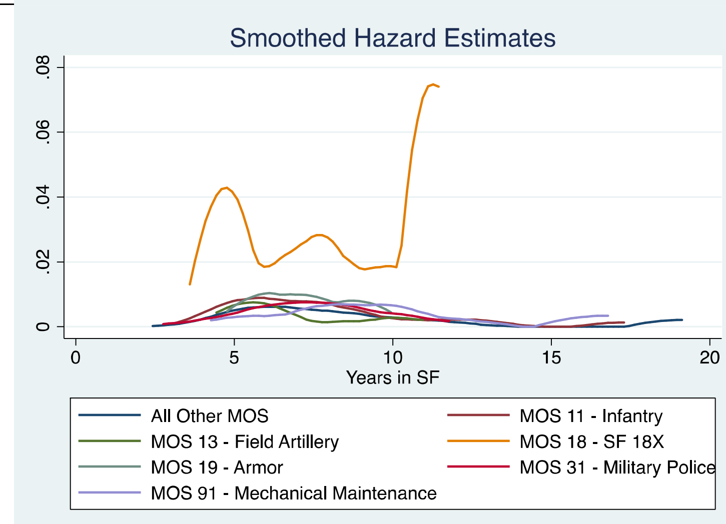
<td>
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</table>

Table 4.5 – Survival & Hazard Plots - ETS

4.5.1.2 Retirement

Table 4.6 shows the survival and hazard plots for soldiers who retired from service. In this table I also examine (1) the overall survival and hazard functions, (2) survival and hazard functions by year the soldier went through SFAS, and (3) survival and hazard functions based on whether the soldier went through SFAS before or after September 11th, 2001 (i.e., SFAS year groups 1991-2001 v. SFAS year groups 2002-2013).

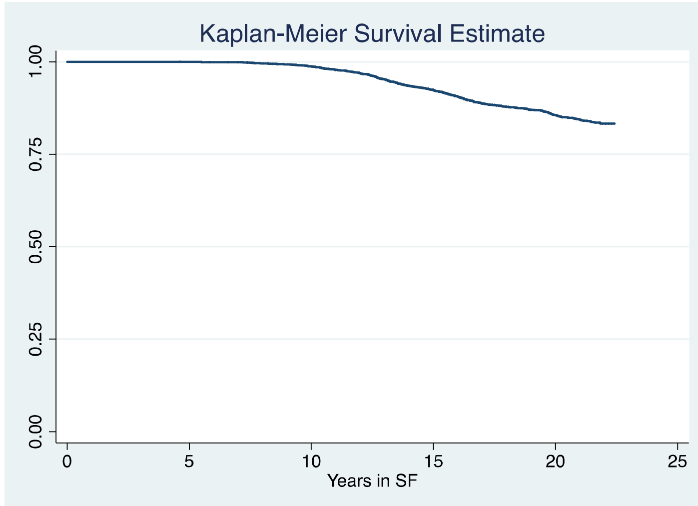
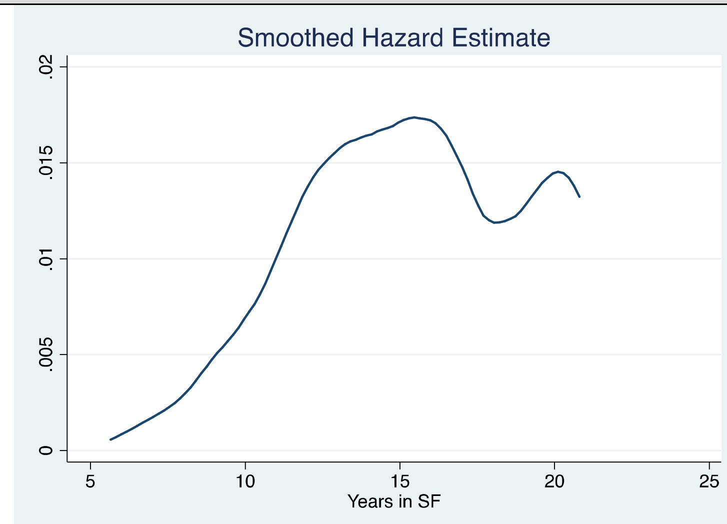
Overall, there are two peaks in the retirement hazard rate—a large peak at 15 years of SF service and a smaller peak at 20 years of SF service. Twenty years in service is the statutory length of service for retirement, however as discussed, many soldiers come to SF service with several years of previous service. Hence the larger peak at 15 years. The SFAS year groups and pre- and post-September 11th graphs show that more recent SFAS grads retire much earlier into their SF career than their less recent counterparts.

Finally, the last graphs show that recruiting from different military occupational specialties results in different retirement hazard rates. Clearly, being in the military police specialty prior to SF or being recruited via the 18X program[99] results in the highest likelihood of retirement. The peak in 18X retirements at 15 years of SF service requires explanation. How can soldiers who entered SF duty directly be eligible to retire after just 15 years, when they had no previous military experience? Twenty years in service is the statutory length of service for retirement, however when the military is forced to draw down due to changes in Congressionally authorized manning strengths, one way to reduce numbers is to offer early retirement. Early retirement offers the same benefits as full retirement, albeit with a different monthly stipend that is adjusted for fewer years of service. In 1993, the Army established the Temporary Early Retirement Authority (known as TERA) to give soldiers the option to retire after 15 years of service (Tice, 2012). This program lasted until 1996 and was meant to reduce the size of the Army

[99] This graph depicts the retirement hazard for those candidates recruited into the 18X program in the 1990s. Those recruited in fiscal year 2002 (i.e., the most recent use of the 18X program) are not yet eligible for retirement.

following the end of the Cold War. Clearly, the 18X hazard rate is showing the results of the 1993 TERA.[100]

[100] In 2012, the Defense Authorization Act reinstated TERA with some eligibility changes from the 1993 version. This programs lasts through December 31, 2018 and seeks voluntary departure from service prior to enacting involuntary departure measures.

<table>
<tr><th colspan="3">Survival & Hazard Plots - Retirement</th></tr>
<tr><th>Grouping Var</th><th>Survival Plot</th><th>Hazard Plot</th></tr>
<tr><td>Overall</td><td>
</td><td>
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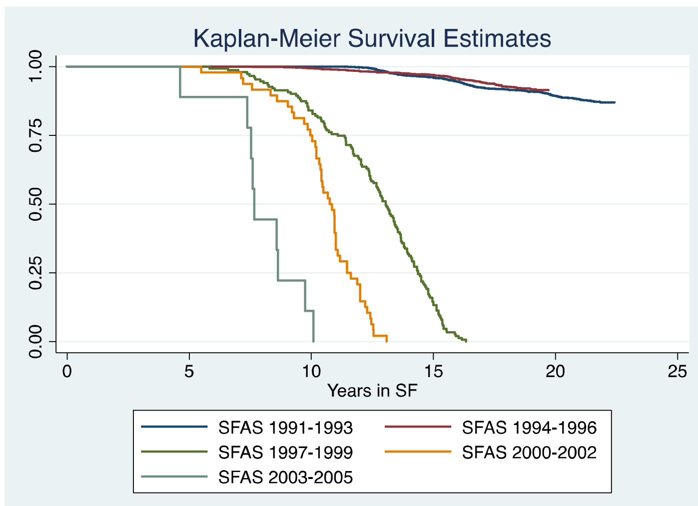
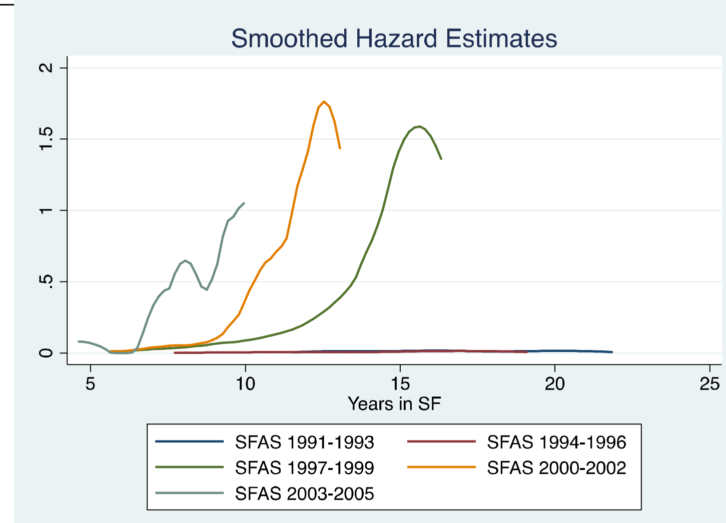
<tr><td>SFAS Year</td><td>
</td><td>
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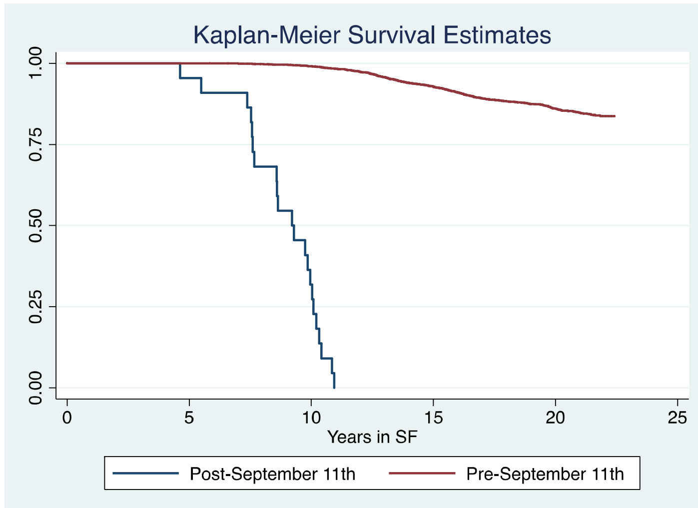
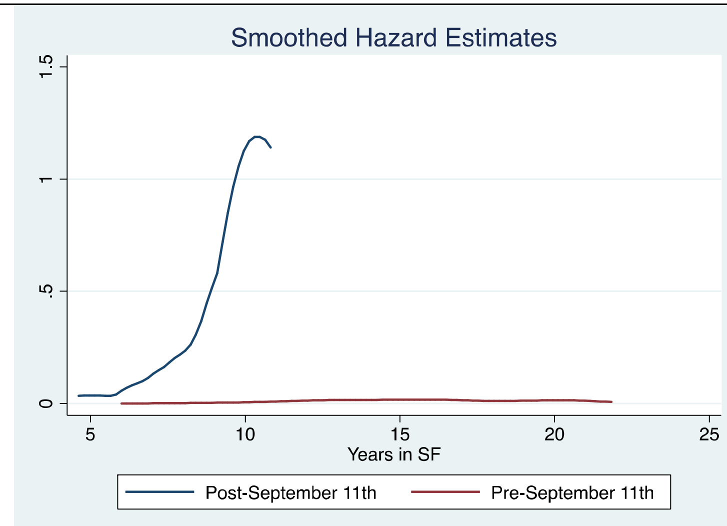
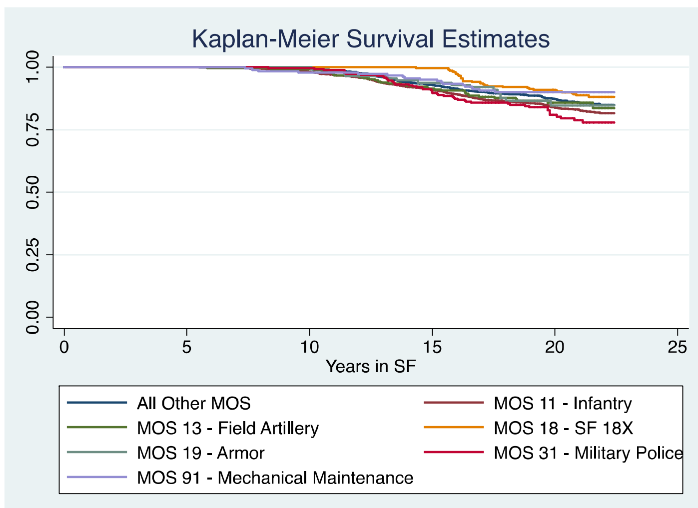
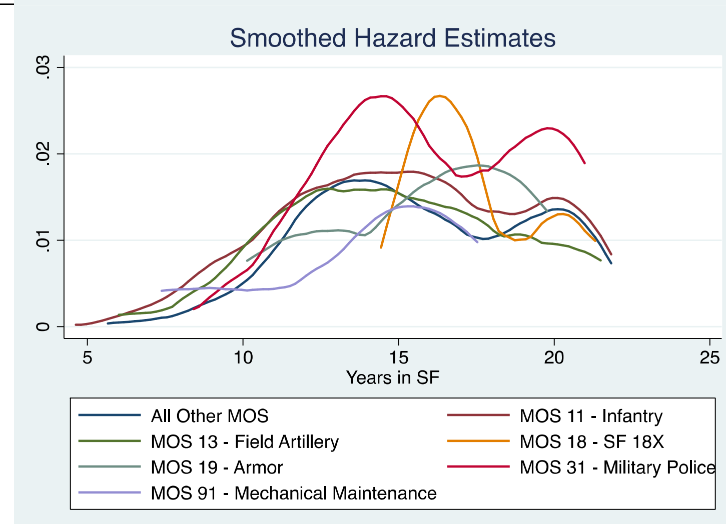
Pre- & Post-September 11th		
MOS		

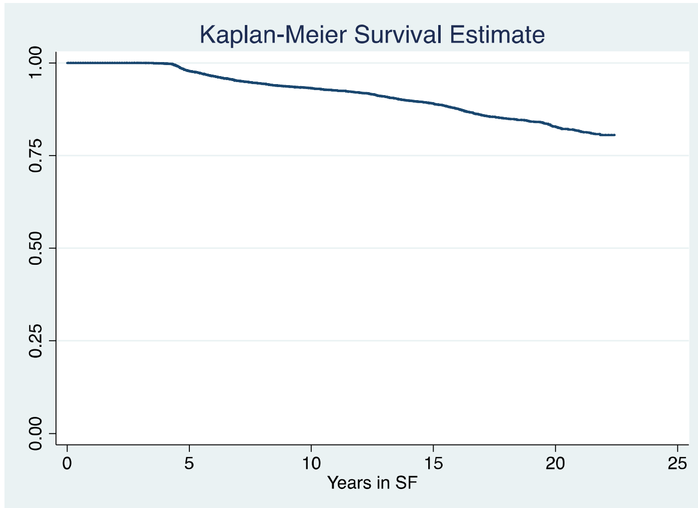
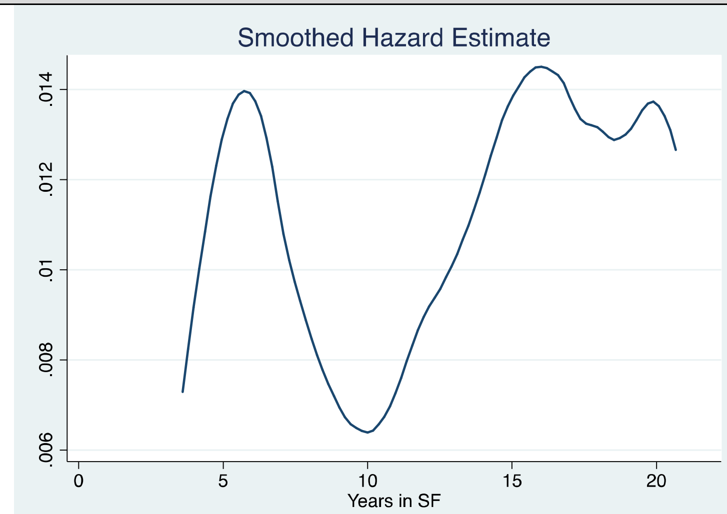
Table 4.6 – Survival & Hazard Plots - Retirement

4.5.1.3 ETS and Retirement

Finally, Table 4.7 shows the survival and hazard plots for both ETS and retirement. In this table I examine the same three groupings as the previous tables, plus I add two graphs that depict the survival and hazard rates based on whether the soldier ETSd or retired.

The overall hazard plot shows a conglomeration of the previous two tables—there is a peak at 5 years, which suggests a high hazard for ETS and two peaks at 15 and 20 years, which suggest a high hazard for retirement. In the SFAS training year charts, the findings suggest that soldiers who went through SFAS training more recently are likely to ETS at around the 5 year mark, while those who went through SFAS training in the early 1990s are more likely to retire around the 15 or 20 year marks. These trends are mirrored in the pre- and post-September 11th training years.

In the fourth row of graphs, I again find that those candidates who enlist under the 18X program are at a much higher risk of ETS after 5 years of service, and were more likely to retire with the 15 year TERA than the more typical 20-year retirement. This suggests the soldiers recruited under the 18X program may view their service obligation differently than those who enter SF through a different Army MOS. Finally, in the last set of graphs, there is a pattern that matches the 15-year TERA and 20 year retirement. However, there is something very interesting with the ETS hazard rate. The hazard rate increases at 5 years and stays fairly level through 10 years of service. There is an increase in the hazard rate at 12 years followed by a large decline through approximately year 16 of service. This suggests that those "on the fence" about getting out of the Army do so by their 12th year of service. Interestingly, the hazard rate jumps again at approximately year 17. One would think that after serving for so many years, the soldier is highly likely to stay until retirement, since he is only approximately 3 or 4 years away from a full pension and benefits package. Why these soldiers with so much experience and time invested into their careers choose to separate rather than retire is an interesting question well worth investigating. The answers may help the Army solve its current problem of retaining soldiers with more experience and knowledge, those in the higher enlisted ranks.

<table>
<tr><th colspan="3">Survival & Hazard Plots – ETS & Retirement</th></tr>
<tr><th>Grouping Var</th><th>Survival Plot</th><th>Hazard Plot</th></tr>
<tr><td>Overall</td><td>
</td><td>
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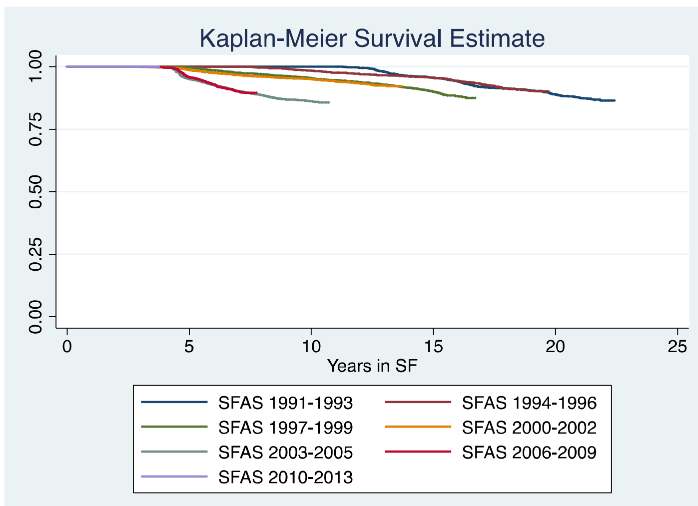
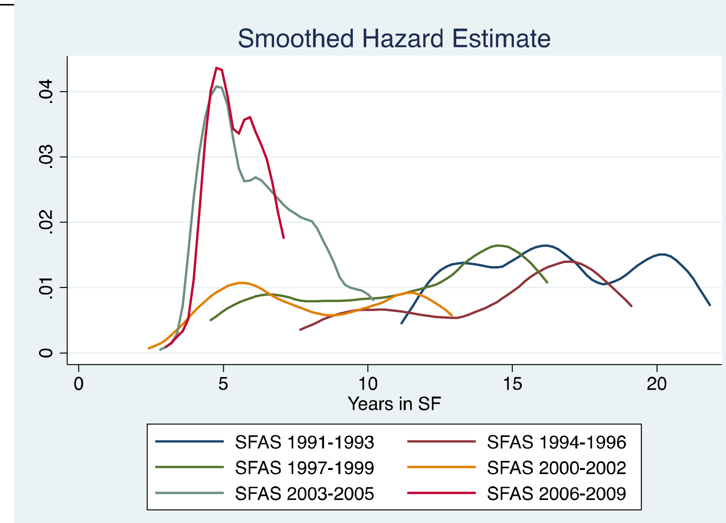
<tr><td>SFAS Year</td><td>
</td><td>
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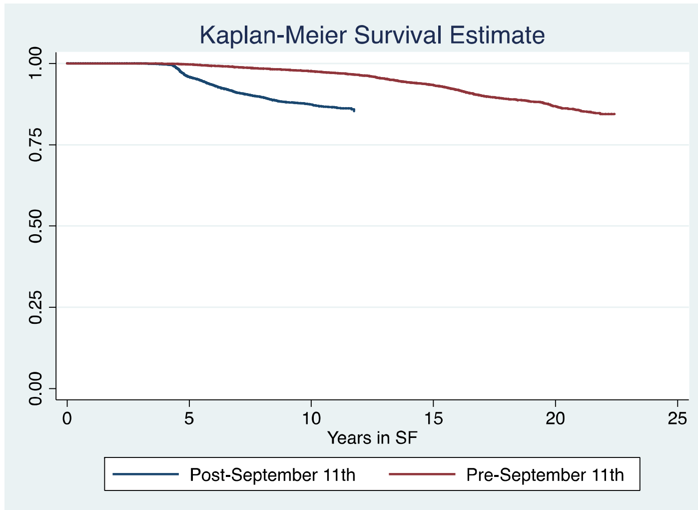
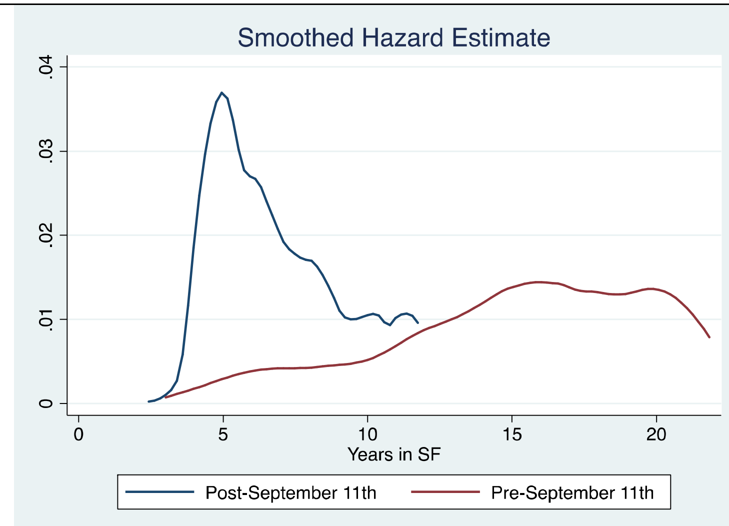
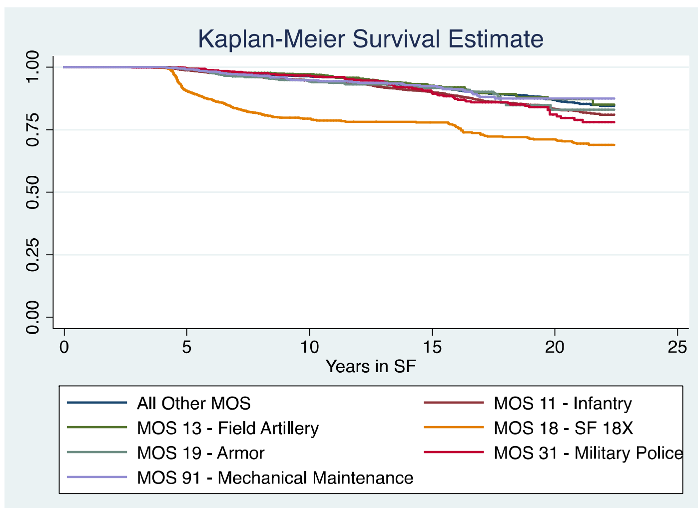
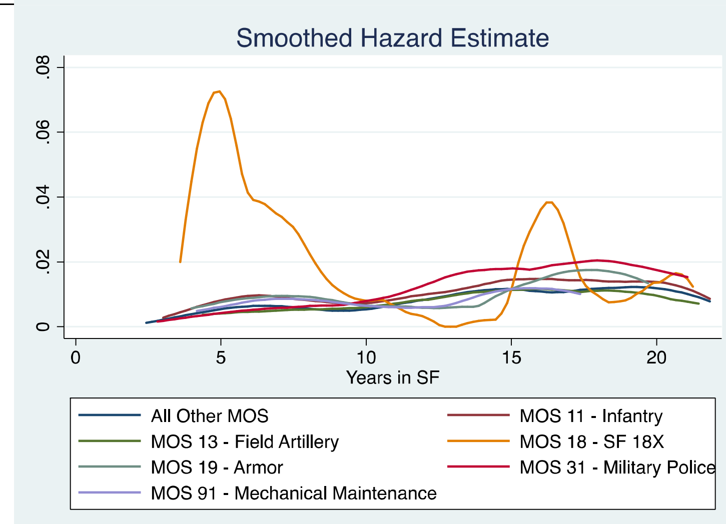
Pre- & Post-September 11th





MOS





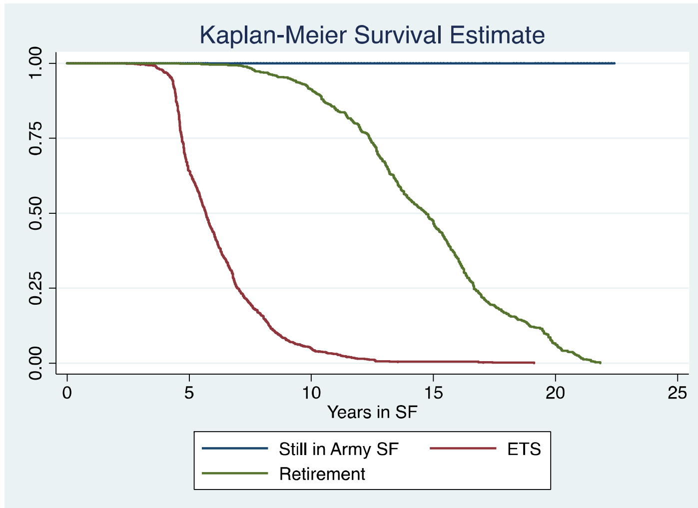
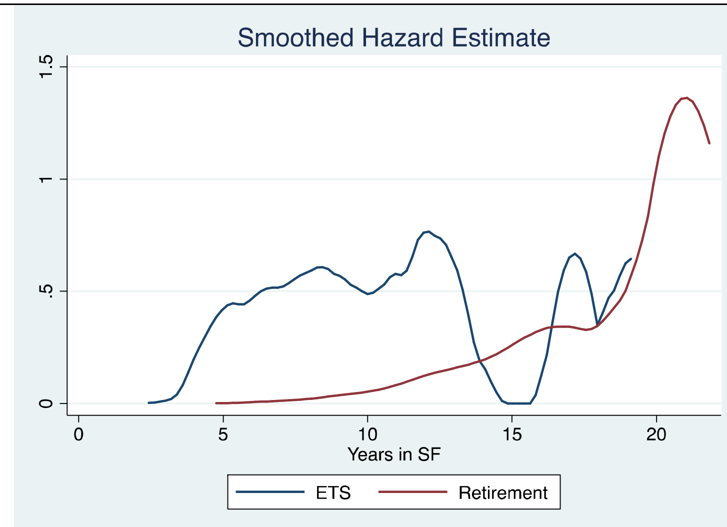
ETS v. Retirement		

Table 4.7 – Survival & Hazard Plots – ETS & Retirement

4.5.1.4 90th Percentile of the Survivor Function

Examining the time it takes for 10% of SF soldiers to ETS or retire (i.e., the 90th percentile of the survivor function) for each of the grouping variables, I find results that naturally mirror the survival and hazard plots. Specifically, Table 4.8 shows that SF soldiers who went through SFAS in the earlier years (1991-1993 and 1997-1999) stay in the Army approximately 20 years and 15 years, respectively. This result is reiterated in the pre- and post-September 11th groups, which shows that 10% of SF soldiers leave service around 17 years. Clearly, the majority of pre-September 11th SF soldiers chose to retire vice ETS. On the other hand, post-September 11th soldiers tend to ETS rather than retire. Ten percent of soldiers who went through SFAS in 2003-2009 were out of the Army in approximately 7 to 8 years.

Examining survival based on military occupational specialty, I find that soldiers recruited directly into SF (i.e., 18X soldiers) leave service much earlier than their counterparts from other MOS. Ten percent of 18X soldiers leave service in approximately 5 years, whereas the other MOSs tend to depart with between 15 to 17 years of service. Clearly, this shows that 18X soldiers are much more likely to ETS than other soldiers.

Finally, for soldiers who ETS, 10% leave within 4.5 years of service, whereas soldiers who retire tend to do so within 10 years after SFAS.[101] All groups were statistically different at $p<.001$ using the Breslow (Generalized Wilcoxon) test.

[101] Again, soldiers may be eligible to retire only 10 years after SFAS because they have already served many years in a different career field prior to becoming an SF candidate/SF soldier.

90th Percentile of the Survivor Function			
Grouping Variable	**Group**	**ETS & Retirement**	
		% Distribution	**90th Percentile**
SFAS Year	1991-1993	10.64%	19.50***
	1994-1996	8.03%	--
	1997-1999	10.27%	15.00***
	2000-2002	12.05%	--
	2003-2005	16.65%	7.18***
	2006-2009	18.03%	7.04***
	2010-2013	24.32%	--
Pre- & Post-September 11th	Pre	36.50%	17.05***
	Post	63.50%	7.66***
MOS	All Other MOS	24.97%	16.83 ***
	MOS 11 - Infantry	39.31%	15.00***
	MOS 13 – Field Artillery	5.05%	16.91***
	MOS 18 – SF 18X	20.83%	5.12***
	MOS 19 – Armor	3.39%	17.50***
	MOS 31 – Military Police	3.18%	15.00***
	MOS 91 – Mechanical Maintenance	3.27%	16.62***
ETS v. Retirement	ETS	4.36%	4.43***
	Retirement	2.81%	10.20***
*** p<.001 Breslow (Generalized Wilcoxon) Test			

Table 4.8 – 90th Percentile of the Survival Function

4.5.2 Cox Regression

I performed two Cox regressions to examine which variables were significant predictors of ETS and which were significant predictors of retirement. Further, I examined the regressions with and without the dummy years, as many of the dummies are omitted or have extremely large hazard ratios. I found the results change very little when the dummy years are omitted, therefore they are not shown here.

4.5.2.1 Cox Regression – ETS

Soldiers are not eligible for ETS until they have served their first SF term of 60 months, or 5 years. Since my most recent loss data is from 2013, I exclude those soldiers who went through SFAS in 2009 or later, as they are not yet eligible for ETS. The results of the Cox regression are shown in Table 4.9.

Cox Regression Coefficient Results - ETS						
Variable	**Coefficient**		**SE**	**z-value**	**95% CI**	
Cognitive Ability	0.19	*	0.09	2.1	0.01	0.38
Navigational Ability	0.34	***	0.09	3.69	0.16	0.53
Physical Strength	-0.08	ns	0.07	-1.07	-0.22	0.06
Short-Term Endurance	-0.01	ns	0.08	-0.17	-0.18	0.15
Long-Term Endurance	0.14	ns	0.13	1.11	-0.11	0.39
Ranger Qualification Dummy	-1.15	**	0.33	-3.46	-1.81	-0.50
Peer Evaluations	0.07	ns	0.06	1.14	-0.05	0.20
Age	0.62	*	0.27	2.34	0.10	1.14
Age^2	-0.01	**	0.01	-2.65	-0.03	0.00
DMOS11 – Infantry	0.58	*	0.26	2.26	0.08	1.09
DMOS13 – Field Artillery	-0.72	ns	0.74	-0.97	-2.18	0.73
DMOS18 – SF 18X	1.17	***	0.25	4.63	0.68	1.67
DMOS19 – Armor	-0.35	ns	0.74	-0.48	-1.81	1.10
DMOS31 – Military Police	-0.05	ns	0.62	-0.08	-1.26	1.17
DMOS91- Mechanical Maintenance	-34.51	ns	--	0.00	--	3.94
# Obs	10440		**# Failures**		212	
LR Chi2(15)	181.67		**Log-Likelihood**		-1590.189	
Prob > Chi2	0.000		***p<.05 **p<.01 ***p<.001**			

Table 4.9 – Cox Regression Coefficient Results – ETS

Cognitive ability is a significant predictor of separating from service prior to retirement (COGNIT=.19, p<.05). In fact, for each standard deviation increase in cognitive ability, a soldier is 21% more likely to ETS. This result confirms the adage “the good ones get out” and supports H1a.

Navigational ability also predicts separating, with a 41% increase in the likelihood of separating for each standard deviation increase in navigational ability (NAVIG=.34, p<.001). Thus, hypothesis H1b is supported.

I predicted that peer evaluations would be positively related to the likelihood of ETS, however I found no significant relationship between peer evaluations and ETS. Thus H1c is not supported.

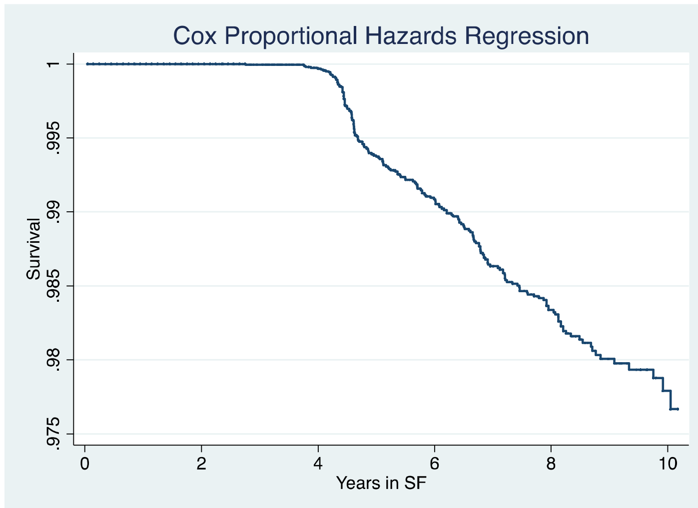
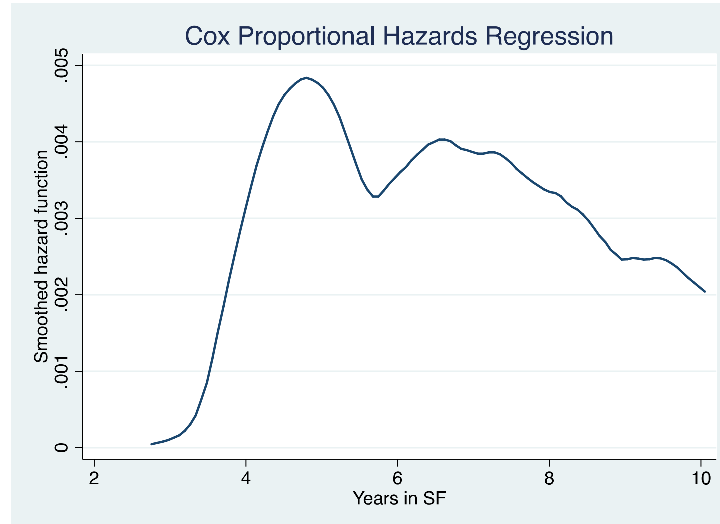
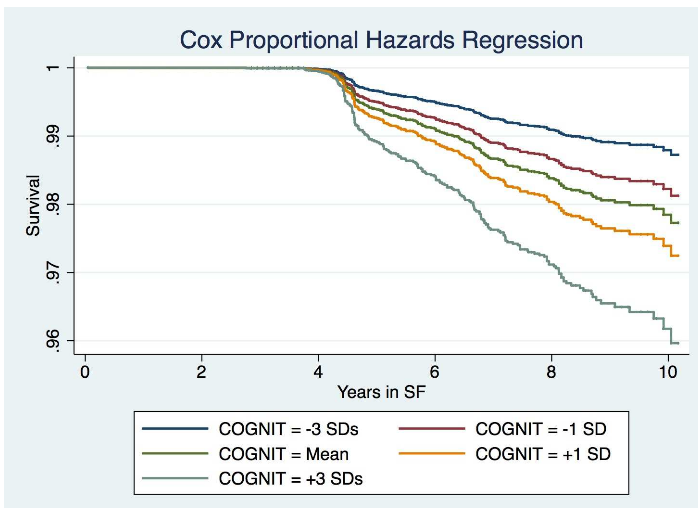
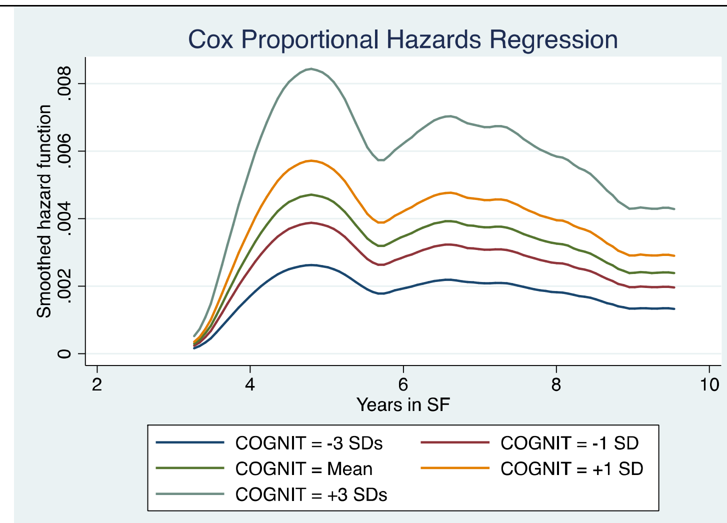
Counter to H1d, SF soldiers who are Ranger qualified are *less* likely to separate from service (RGRDUM=-1.15, p<.01). Soldiers who are Ranger qualified are 68% less likely to ETS than their non-Ranger counterparts. This may be due to the notion that Ranger-qualified soldiers tend to have more experience with the Army lifestyle and Army operating environment than their non-Ranger counterparts.

Their experience may make them more comfortable in their jobs and within the organization, and thus more likely to remain in Army SF.

As predicted in H2a through H2c, none of the physical factors (physical strength, short-term endurance, and long-term endurance) were significantly predictive of ETS. In H3, I hypothesized that age is negatively related to the likelihood of ETS, such that older soldiers would be less likely to leave service prior to retirement. I found that the quadratic function of age is negative, which suggests that those soldiers who are closer to the mean age during SFAS (mean=25.5 years old, sd=3.95 years) are more likely to ETS, although the coefficient is very small (AGE^2=-.01, p<.01). Thus, H3 is supported.

In H4a I predicted that being an 18X soldier is positively related to the likelihood of ETS, while being from any of the other career fields would be negatively related to ETS. I found that being recruited directly into the 18X program results in a 223% greater likelihood of separating from service prior to retirement (DMOS18=1.17, p<.001). Breaking down the difference in cognitive and navigational abilities between SF candidates recruited via the 18X program and those candidates recruited from other Army military occupational specialties shows that 18X candidates tend to score higher on the cognitive and navigational ability tests, which may give them better opportunities outside the military than their counterparts. Clearly, 18X soldiers are much more likely to separate from service, to the detriment of the SF career field (i.e., dysfunctional turnover). Thus, H4a is supported.

Finally, H4b predicted that all other MOS would be negatively related to the likelihood of ETS. This hypothesis was not supported, as the only other predictive MOS was Infantry, which was positively related to the likelihood of ETS. The model predicted survival and hazard plots for the significant predictors of ETS departure are shown in Table 4.10.

<table>
<tr><th colspan="3">Model Predicted Survival & Hazard Plots – ETS</th></tr>
<tr><th>Grouping Var</th><th>Survival Plot</th><th>Hazard Plot</th></tr>
<tr><td>Overall</td><td>
</td><td>
</td></tr>
<tr><td>Cognitive Ability</td><td>
</td><td>
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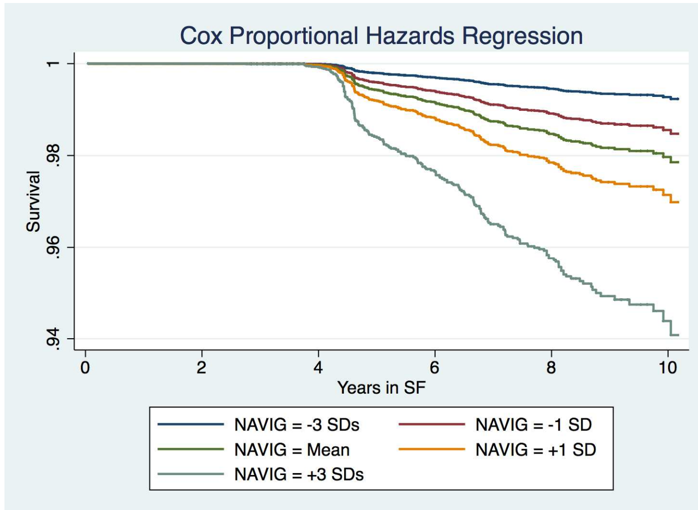
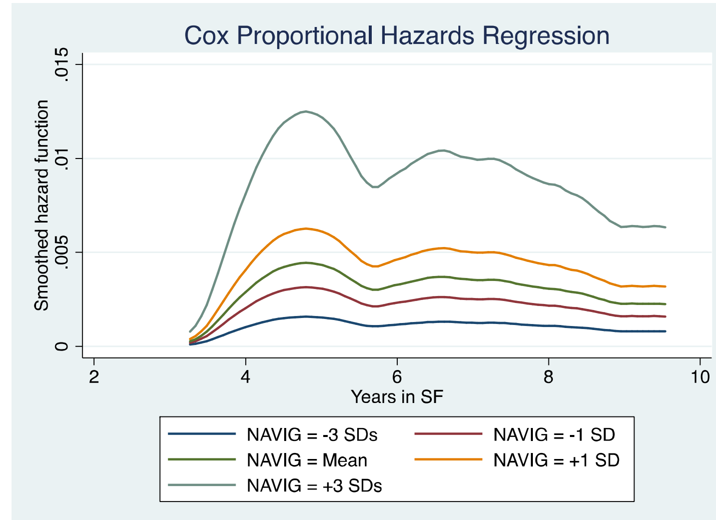
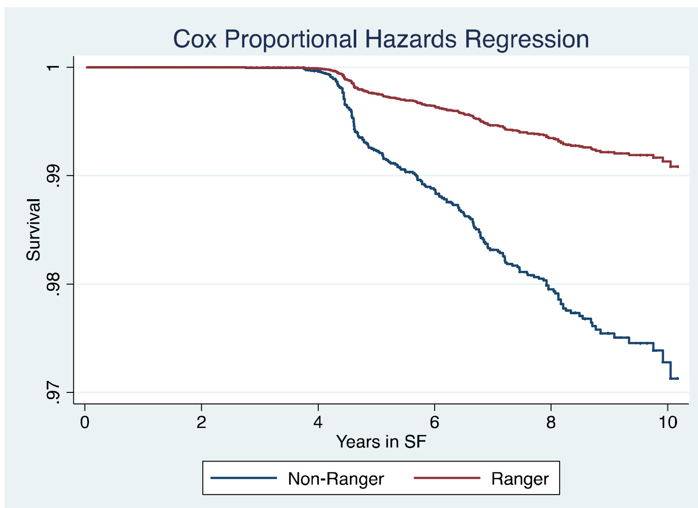
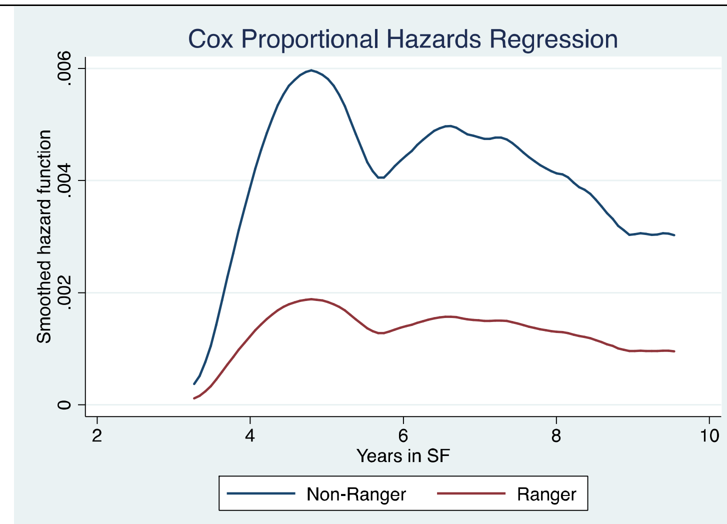
Navigational Ability



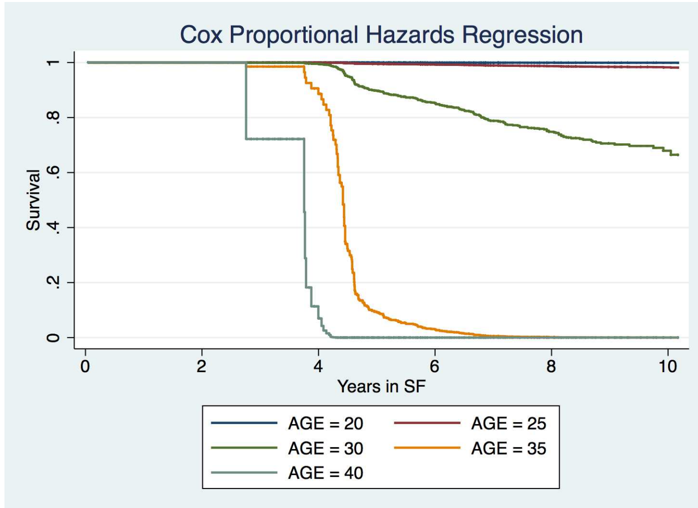


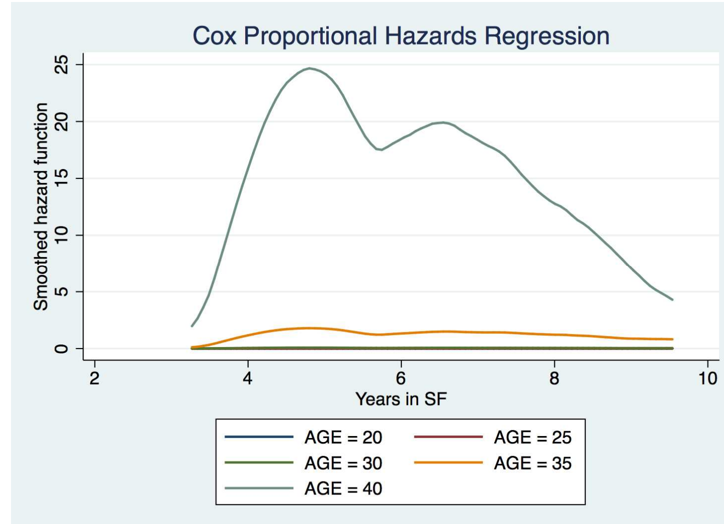
Ranger Status



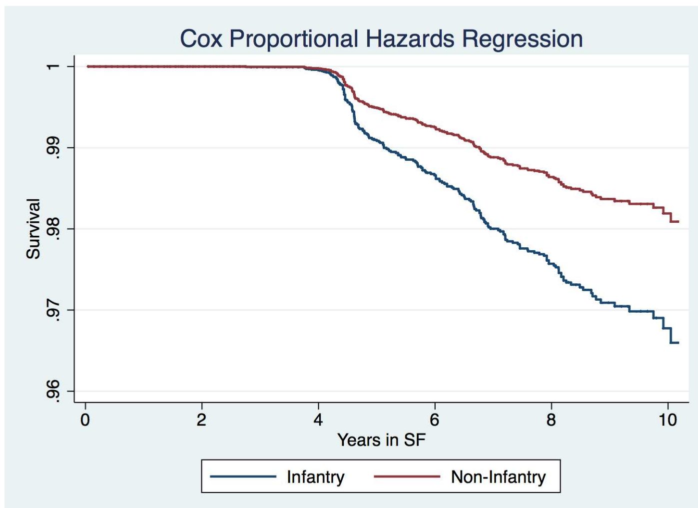


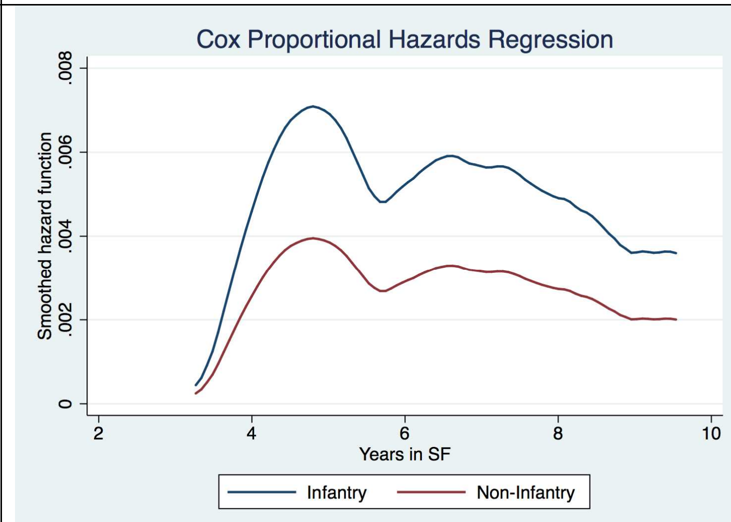
Age





Infantry





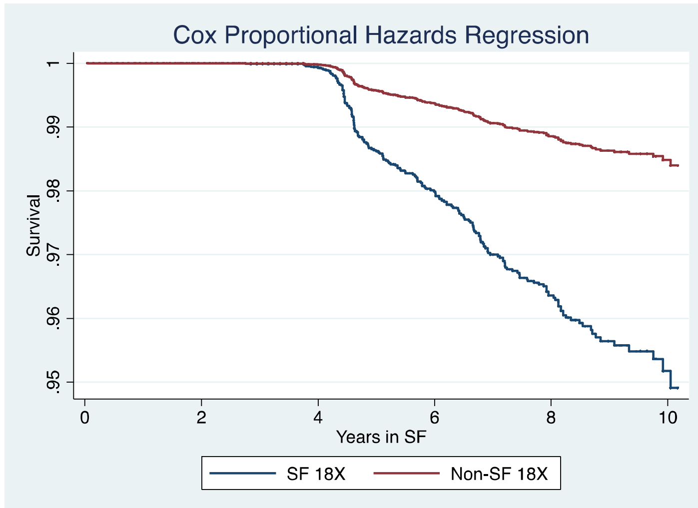
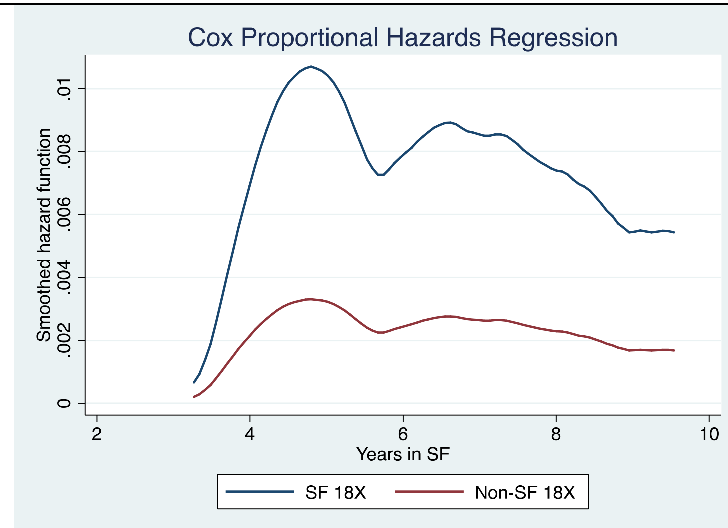
<table>
<tr>
<td>SF 18X</td>
<td>
</td>
<td>
</td>
</tr>
</table>

Table 4.10 – Model Predicted Survival & Hazard Plots – ETS

4.5.2.2 Cox Regression - Retirement

Soldiers are eligible for retirement after 20 years of service, whether that service was performed entirely in the SF career field or split among different career fields. Again, the variables that were tracked at SFAS changed over the years, with more recent years have the most consistent variable measurements. Before 2006, the only variables that were consistently tracked were those related to cognitive ability, physical strength, Ranger status, age, and MOS. Therefore I only use those variables in the retirement Cox regression, as shown in Table 4.11.

Cox Regression Coefficient Results - Retirement						
_t	**Coefficient**		**SE**	**z-value**	**95% CI**	
Cognitive Ability	-0.72	***	0.06	-11.87	-0.83	-0.60
Physical Strength	-0.31	***	0.05	-6.61	-0.40	-0.22
Ranger Qualification Dummy	0.05	ns	0.13	0.37	-0.21	0.31
Age	1.21	***	0.22	5.44	0.77	1.65
Age^2	-0.02	***	0.00	-4.86	-0.03	-0.01
DMOS11 – Infantry	0.21	ns	0.13	1.61	-0.05	0.47
DMOS13 – Field Artillery	-0.12	ns	0.241	-0.510	-0.595	0.349
DMOS18 – SF 18X	-0.55	ns	0.319	-1.710	-1.170	0.080
DMOS19 – Armor	0.02	ns	0.348	0.060	-0.663	0.702
DMOS31 – Military Police	0.42	*	0.206	2.020	0.013	0.821
DMOS91 – Mechanical Maintenance	0.05	ns	0.332	0.150	-0.602	0.701
# Obs	2381		**# Failures**		346	
LR Chi2(11)	298.81		**Log-Likelihood**		-2490.164	
Prob > Chi2	0.000		***p<.05 **p<.01 ***p<.001**			

Table 4.11 – Cox Regression Coefficient Results – Retirement

Cognitive ability is negatively related to retirement (COGNIT=-.72, p<.001). For each standard deviation increase in cognitive ability, a soldier is 51% less likely to retire, counter to H5a.

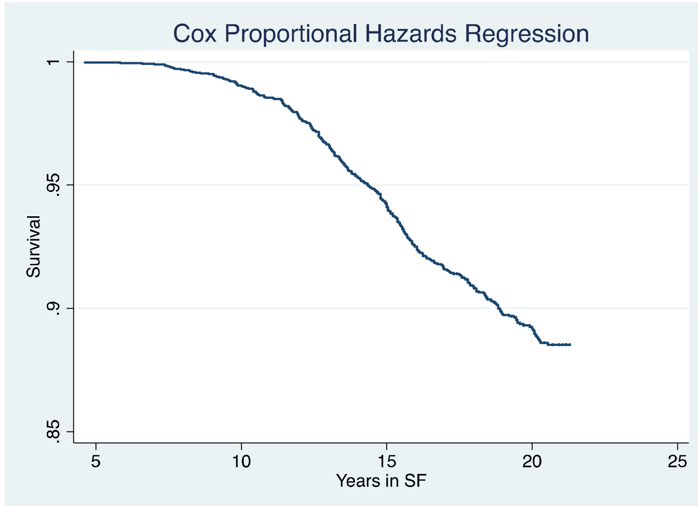
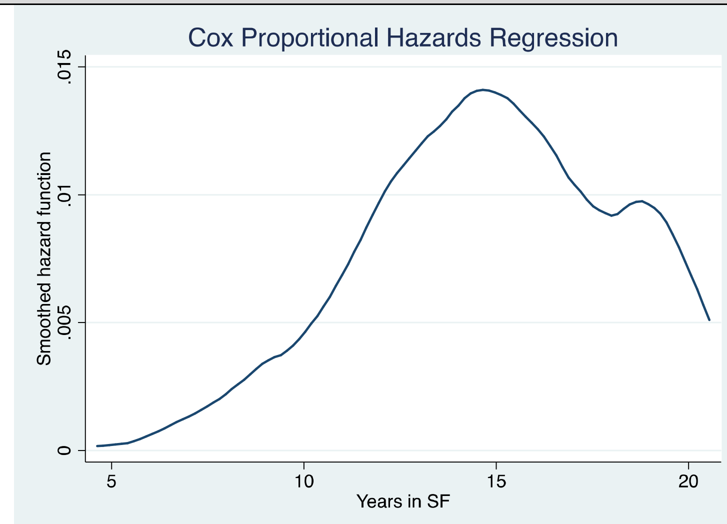
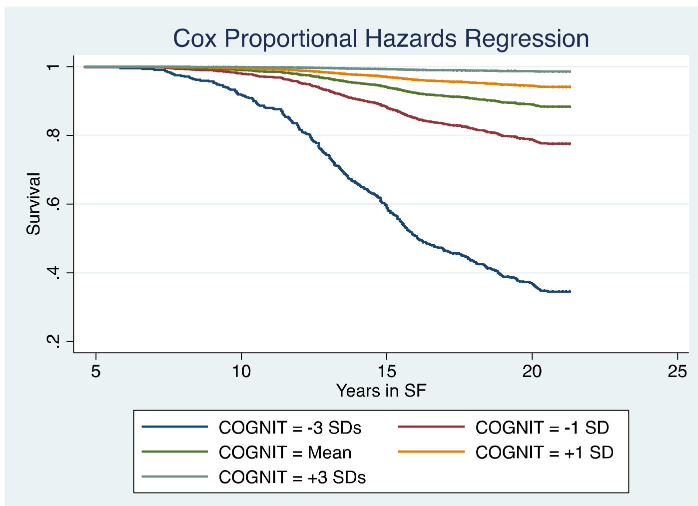
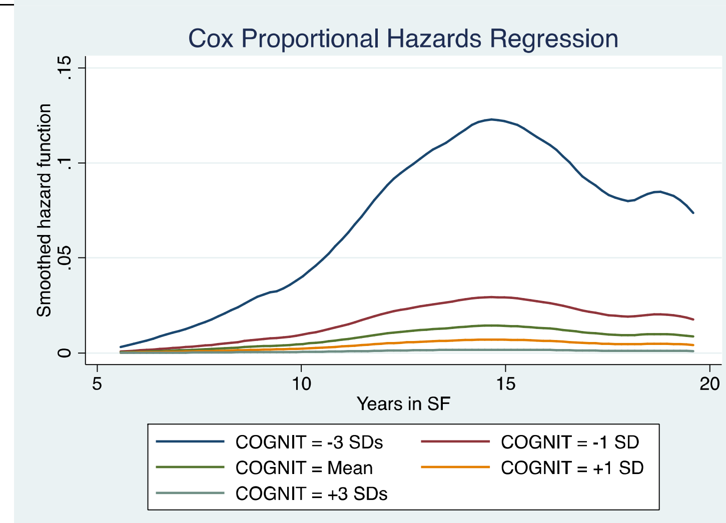
Ranger qualification was not related to risk of retiring (RGRDUM=.05, ns), which does not support H5b. Post-ante, this result is interesting, as Ranger qualification was negatively related to ETS (counter to my hypothesis). This essentially means that Ranger qualification is predictive for SF training success, but not in whethe r the soldier chooses to retire from service.

In support of H6, physical strength is negatively related to retirement (STRENG=-.31, p<.001), with a 27% decrease in the likelihood of retiring for each standard deviation increase in physical strength.

Like the ETS results, the quadratic function of age is negative, which suggests that those soldiers who are closer to the mean age during SFAS are more likely to retire, although, again, the coefficient is very small (AGE^2=-.02, p<.001). These results are counter to my hypothesis in H7, which predicted that more senior candidates would have more time in service and thus be more likely to retire. The quadratic term for age predicts both ETS and retirement, which essentially makes the factor unable to distinguish between the two types of departure.

Finally, being from the 18X military occupational specialties was not predictive of retirement. Thus H8a was not supported. Instead, being from the military police career field (DMOS31=.42, p<.05) generated a 52% increase in the likelihood of retirement. These results are a bit surprising, as I expected other career fields to be negatively related to the likelihood of retirement. In particular, Infantrymen typically have the most esprit du corps, and therefore one would expect them to be more likely to remain in the Army even after retirement eligibility. Thus H8b is not supported.

The model-predicted survival and hazard plots for the significant predictors of retirement are shown in Table 4.12.

<table>
<tr><th colspan="3">Model Predicted Survival & Hazard Plots – Retirement</th></tr>
<tr><th>Grouping Var</th><th>Survival Plot</th><th>Hazard Plot</th></tr>
<tr><td>Overall</td><td>
</td><td>
</td></tr>
<tr><td>Cognitive Ability</td><td>
</td><td>
</td></tr>
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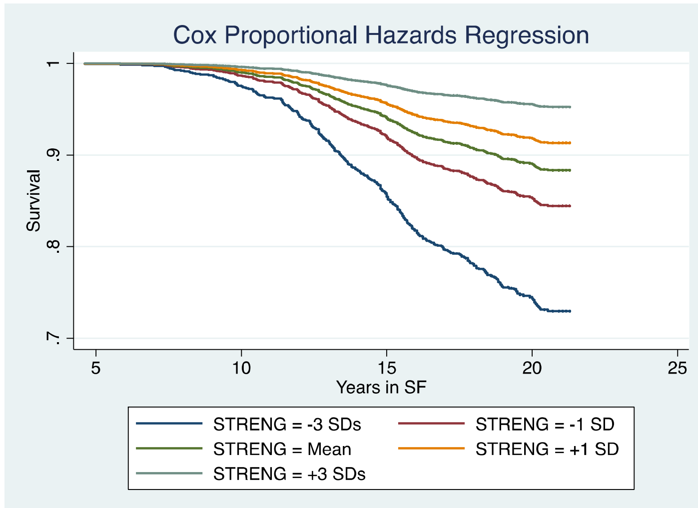
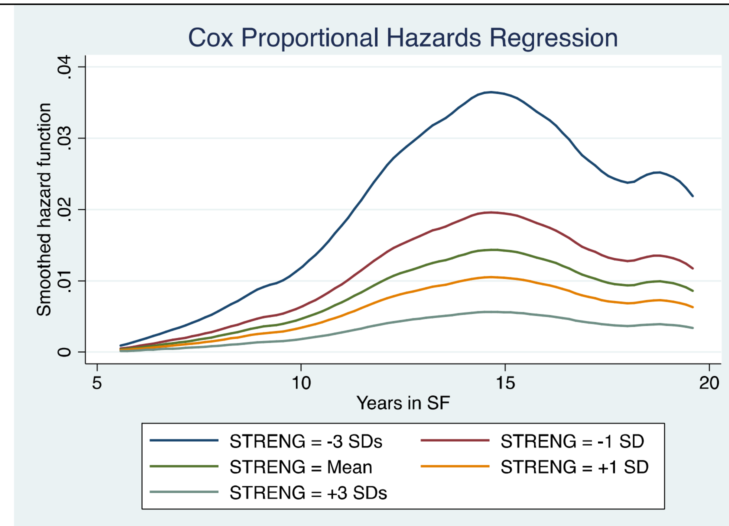
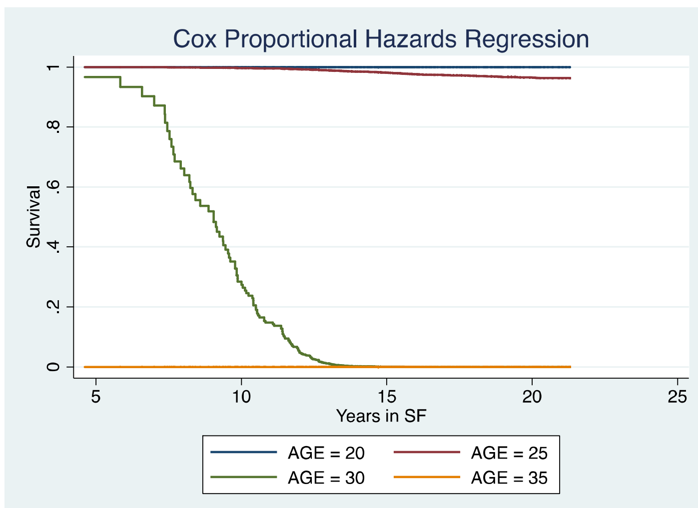
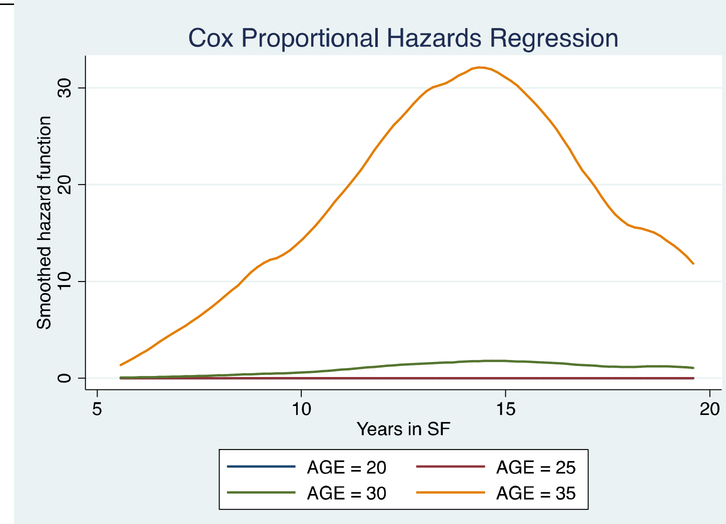
Physical Strength





Age





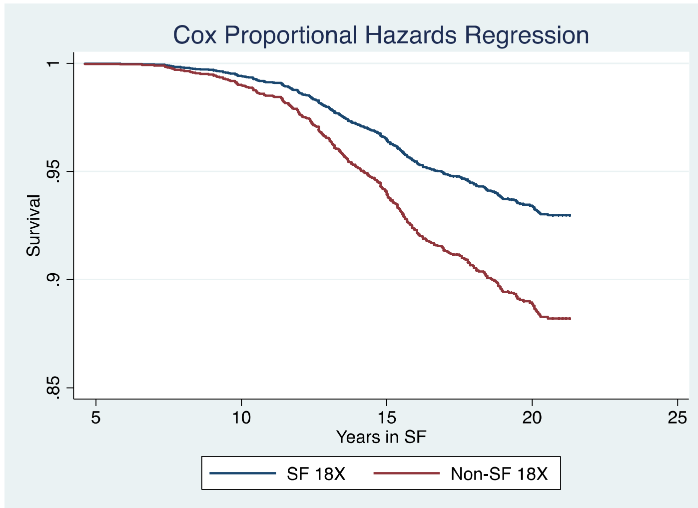
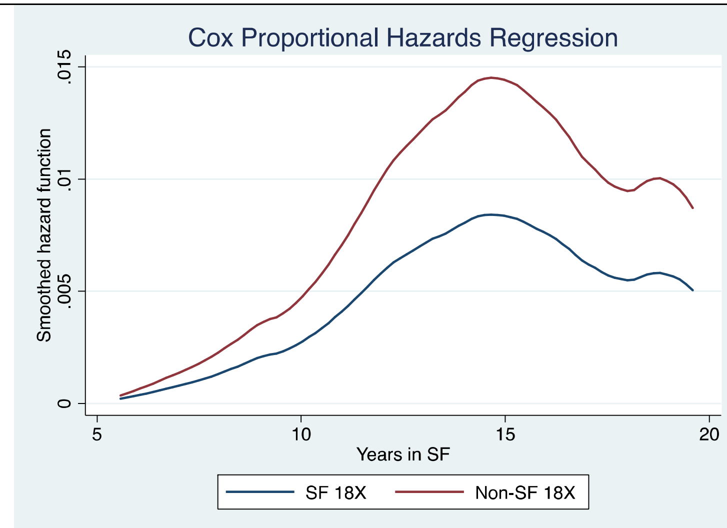
SF 18X		

Table 4.12 – Model Predicted Survival and Hazard Models – Retirement

4.5.3 Summary of Results

Table 4.13 provides a brief summary of the hypothesized results. In total, 8 of my 16 hypotheses (50%) were supported.

Summary of Hypothesized Results			
	H#	**Description**	**Supported?**
ETS	H1a	Cognitive ability is positively related to the likelihood of ETS.	Yes
	H1b	Navigational ability is positively related to the likelihood of ETS.	Yes
	H1c	Peer evaluations are positively related to the likelihood of ETS.	No
	H1d	Ranger qualification is positively related to the likelihood of ETS.	No
	H2a	Physical strength is unrelated to the likelihood of ETS.	Yes
	H2b	Short-term endurance is unrelated to the likelihood of ETS.	Yes
	H2c	Long-term endurance is unrelated to the likelihood of ETS.	Yes
	H3	Age is negatively related to the likelihood of ETS.	Yes
	H4a	Being an 18X soldier is positively related to the likelihood of ETS.	Yes
	H4b	All other MOS are negatively related to the likelihood of ETS.	No
Retirement	H5a	Cognitive ability is positively related to the likelihood of retirement.	No
	H5b	Ranger qualification is positively to the likelihood of retirement.	No
	H6	Physical strength is negatively to the likelihood of retirement.	Yes
	H7	Age is positively related to the likelihood of retirement.	No
	H8a	Being an 18X soldier is positively related to the likelihood of retirement.	No
	H8b	All other MOS are negatively related to the likelihood of retirement.	No

Table 4.13 – Summary of Hypothesized Results

4.5.4 Piecewise Exponential Model

For robustness purposes, I used a piecewise exponential model to analyze the data and compared the results to those from the Cox regressions. The results of the piecewise exponential model for soldiers who ETS is shown in Table 4.14. Out of the 15 substantive variables in the Cox regression, 13 (87%) maintained the same sign and 10 (67%) maintained significance. Further, the magnitudes of the coefficients remained fairly stable across regressions.

Piecewise Exponential Coefficient Results - ETS						
_t	**Coefficient**		**SE**	**z-value**	**95% CI**	
Cognitive Ability	0.15	***	0.04	4.02	0.08	0.22
Navigational Ability	0.25	***	0.03	7.92	0.19	0.31
Physical Strength	-0.20	***	0.03	-6.65	-0.25	-0.14
Short-Term Endurance	0.27	***	0.03	8.68	0.21	0.33
Long-Term Endurance	0.24	***	0.03	7.31	0.18	0.30
Ranger Qualification Dummy	-0.97	***	0.13	-7.66	-1.22	-0.72
Peer Evaluations	0.07	*	0.03	2.55	0.02	0.12
Age	0.26	*	0.10	2.53	0.06	0.47
Age^2	-0.01	***	0.00	-3.81	-0.01	0.00
DMOS11 – Infantry	0.64	***	0.10	6.32	0.44	0.83
DMOS13 – Field Artillery	-0.90	**	0.30	-2.98	-1.49	-0.31
DMOS18 – SF 18X	0.82	***	0.10	8.3	0.63	1.02
DMOS19 – Armor	-0.06	ns	0.25	-0.24	-0.55	0.43
DMOS31 – Military Police	0.16	ns	0.24	0.68	-0.31	0.63
DMOS91- Mechanical Maintenance	-14.80	ns	419.81	-0.04	-837.61	808.02
Time Period 1	-0.51	ns	1.00	-0.51	-2.48	1.45
Time Period 2	-0.39	ns	1.00	-0.39	-2.36	1.57
Time Period 3	-0.24	ns	1.00	-0.24	-2.21	1.72
Time Period 4	-0.02	ns	1.00	-0.02	-1.98	1.95
Time Period 5	0.18	ns	1.00	0.18	-1.78	2.15
Time Period 6	-0.11	ns	1.00	-0.11	-2.08	1.85
Time Period 7	-0.31	ns	1.01	-0.31	-2.28	1.66
Time Period 8	-0.79	ns	1.01	-0.78	-2.77	1.20
Time Period 9	-0.99	ns	1.02	-0.97	-3.00	1.01
Time Period 10	-1.68	ns	1.10	-1.53	-3.82	0.47
Time Period 11-20	Omitted					
Constant	-5.40	--	1.60	-3.38	-8.52	-2.27
# Obs	49094		**# Failures**		1334	
LR Chi2(25)	1400.50		**Log-Likelihood**		-5483.730	
Prob > Chi2	0.000		***p<.05 **p<.01 ***p<.001**			

Table 4.14 – Piecewise Exponential Coefficient Results – ETS

The results of the piecewise exponential model for soldiers who retired is shown in Table 4.15. Out of the 11 substantive variables in the Cox regression, 9 (82%) maintained the same sign and 8 (73%) maintained significance. Further, the magnitudes of the coefficients remained fairly stable across regressions. These results show the findings are robust.

Piecewise Exponential Coefficient Results - Retirement						
_t	**Coefficient**		**SE**	**z-value**	**95% CI**	
Cognitive Ability	-0.63	***	0.02	-40.17	-0.66	-0.60
Physical Strength	-0.26	***	0.01	-21.57	-0.29	-0.24
Ranger Qualification Dummy	-0.05	ns	0.04	-1.39	-0.12	0.02
Age	1.18	***	0.06	19.63	1.06	1.29
Age^2	-0.02	***	0.00	-18.17	-0.02	-0.02
DMOS11 – Infantry	0.17	***	0.03	4.97	0.10	0.24
DMOS13 – Field Artillery	-0.14	*	0.06	-2.26	-0.27	-0.02
DMOS18 – SF 18X	-0.33	***	0.08	-4.34	-0.48	-0.18
DMOS19 – Armor	0.05	ns	0.09	0.5	-0.13	0.22
DMOS31 – Military Police	0.44	***	0.05	8.33	0.34	0.55
DMOS91 – Mechanical Maintenance	-0.08	ns	0.09	-0.84	-0.26	0.10
Constant	-19.37	--	0.81	-23.81	-20.96	-17.77
# Obs	46065		**# Failures**		5071	
LR Chi2(11)	3182.10		**Log-Likelihood**		-14896.330	
Prob > Chi2	0.000		***p<.05 **p<.01 ***p<.001**			

Note: When time period dummies are included in the model, it does not converge, hence they are removed.

Table 4.15 – Piecewise Exponential Coefficient Results – Retirement

4.6 Discussion

The goal of this study was to examine how service competencies (cognitive ability, navigational ability, physical strength, short- and long-term endurance, and Ranger qualification) and service inclination (peer-evaluated personality characteristics) affect retention in public service organizations like Army SF. This study is the first to formally identify which variables are most predictive of SF ETS and SF retirement.

Understanding *who* is leaving the organization is a critical precursor to knowing whether the turnover experienced by the organization is functional or dysfunctional. Further, understanding *why* dysfunctional turnover is occurring can help the organization properly incentivize well-performing employees to remain in the organization. I hope the results can be used to properly incentivize the talented soldiers Army SF prefers to keep in service.

4.6.1 Summary of Results

The results suggest there are some key differences between soldiers who leave the service prior to retirement and those who stay until retirement. A summary listing of the key results along with implications for Army SF are provided in Table 4.16.

Summary of Key Results & Implications			
Factor	**ETS Results**	**Retirement Results**	**Implications**
Cognitive Ability^	.19 *	-.72 ***	Soldiers with higher cognitive ability are more likely to ETS and less likely to retire. Unfortunately for Army SF, I found evidence that “the good ones get out” prior to retirement eligibility, at least with regard to cognitive ability. This is likely due to the fact that those who *can* do something else *will* do something else. Clearly, Army SF needs to find new ways to challenge their most cognitively gifted soldiers. Perhaps offering more opportunities for civilian education, larger leadership roles, or the ability to participate in strategic planning sessions would provide incentive for these soldiers to stay until retirement.
Navigational Ability	.34 ***	--	Navigational ability is predictive of ETS. This result essentially mirrors what I found for cognitive ability, as navigational ability requires many of the same cognitive attributes. Again, Army SF should seek to incentivize more gifted soldiers by providing them with intellectual and leadership challenges.
Physical Strength	-.08 ns	-.31 ***	Physical strength is not predictive of ETS, however I found that soldiers who displayed less physical strength during SFAS are more likely to retire. These results are intuitive, as those soldiers with less ability to “keep up” physically are more likely to retire than stay past their retirement eligibility.
Short-Term Endurance	-.01 ns	--	Short- and long-term endurance are not predictive of ETS. Unfortunately, no data are available to determine their relation to retirement.
Long-Term Endurance	.14 ns	--	
Ranger Status^	-1.15 **	.05 ns	Ranger status is negatively related to ETS, which means non-Rangers are more likely to depart service prior to retirement. However, I found no significant relationship between Ranger qualification and retirement. The Army should incentivize these highly trained tactical experts to remain at least until retirement, preferably even after they have reached retirement eligibility.
Peer Evaluations	.07 ns	--	Peer evaluations (of personality characteristics and peer rankings) are not predictive of ETS. Unfortunately, no data are available to determine their relation to retirement.
Age^2	-.01 **	-.02 ***	The age results are a bit ambiguous, as those around the mean age during SFAS are both more likely to ETS and more likely to retire. These results suggest that age is not a good differentiator of a soldier’s departure method. Instead, Army SF should refer to the model predicted survival and hazard plots, which clearly indicate that older SFAS candidates, particularly those over 35 years old, are more likely to depart service earlier than their younger counterparts. Army SF should consider whether or not spending the time and money on these candidates is worthwhile, given the short return on their investment.

Infantry Career Field^	.58	*	.21	ns	Career field are differentially predictive of ETS and retirement. In particular, Army SF is losing more Infantry and 18X soldiers to ETS. Arguably, these soldiers are among the most qualified for SF service. Army SF should find new ways to incentivize these soldiers to stay at least until retirement.
Field Artillery Career Field	-.72	ns	-.12	ns	
SF Career Field	1.17	***	-.55	ns	
Armor Career Field	-.35	ns	.02	ns	
Military Police Career Field	-.05	ns	.42	*	
Mechanical Maintenance Career Field	-34.51	ns	.05	ns	

* p<.05 ** p<.01 *** p<.001

^ The ETS hazard rate for these variables is quite small. Although I find significant effects, the resulting probability of ETS is not very high. This means that, for these variables, the chance of the soldier ETSing is quite low, conditional on the fact that he has not already ETSd.

Table 4.16 – Summary of Key Results & Implications

4.6.2 Academic Implications

This study provides the first comprehensive examination of how the individual service competencies and service inclinations of a soldier are related to their decision to ETS or retire from public service. In short, Army SF is clearly experiencing some dysfunctional turnover. Having data-supported confirmation of the problem is an important first step to creating a solution.

4.6.3 Practical Implications

My results show that certain service competencies that are highly sought after in both military and civilian environments must be better “appreciated” by the Army if they hope to retain their best and brightest soldiers. Clearly, Army SF is losing some of its most talented soldiers long before retirement. As a next step, Army SF should perform a survey to determine *why* these soldiers are leaving. A better understanding of their reasons for departure will help the Army tailor incentives to suit these soldiers needs and desires. Further, Army SF would be wise to examine each soldier’s motivation for joining SF. Motivational data may also be predictive of retention and can also be used to tailor incentives.

Along the lines of collecting more data, there are other variables that are likely to be important for a soldier’s retention that were not examined in this study. In particular, the following factors may prove valuable: (1) the soldier’s life cycle stage (i.e., whether or not he is married or divorced, or does or does not have children), (2) his deployment history (e.g., number and length of deployments, and whether or not he participated in heavy combat), (3) his eligibility for a retention bonus, (4) where he has been stationed over the course of his career, (5) time in Army service prior to attending SF training, and (6) any additional training classes he has completed. This information is collected by several different Army organizations, however I was not permitted access to the data for this study.

4.7 Conclusion and Limitations

Understanding whether, when, and how (i.e., via ETS or retirement) a soldier departs military service is key to developing a better retention program and more appropriate incentives. Virtually no organization desires to maintain *all* of its employees, however every organization should want their employees to *want to stay*. This allows the organization the ability to selectively retain their most talented workers—it puts the organization in the decision-making role rather than the individual. When the organization makes the “stay or go” decision, they are in control of the process and can better predict what their structure and capabilities will look like in the future. Unfortunately for Army SF, the current system puts practically all the decisions in the hands of the soldier, with very little control from the organization as a whole.

The results show that Army SF loses many of its most talented soldiers after their first term of enlistment—approximately five years after they start training. Given that training lasts approximately two years, Army SF is only seeing a three-year return on their $250K investment. More information is needed to understand *why* these talented soldiers are leaving and the type of incentives that might make them stay in the Army. Clearly, if the Army can get these soldiers to stay past their 10 to 12 year mark, they are much more likely to stay until retirement. To rein back the need to push so many soldiers through the SFAS and SFQC training processes in order to maintain mission capability, Army SF should find ways to close the “drain pipe” and keep the soldiers they have already selected and spent so much time and money training.

This study has some limitations that could be corrected with additional data. For instance, data pertaining to each soldier’s deployment experience (heavy combat v. not heavy combat), length, and frequency may help the Army better understand how deployments affect the decision to ETS or retire. Further, personal information pertaining to the soldier’s marital and parental status might also play a role in their departure decision. Motives for joining Army SF could also prove insightful. In short, to get the full picture on ETS and retirement, more data is needed. Finally, the retirement analyses were limited by the fact that SFAS data was not comprehensively collected before 2006. This limited my analyses to those few variables that were available.

REFERENCES

Allen, D. G., Bryant, P. C., & Vardaman, J. M. (2010, May). Retaining Talent: Replacing Misconceptions with Evidence-Based Stategies. *Academy of Management Perspectives*, 48-64.

Armed Forces Press Service. (2012, March 22). *Officials Extend Deadline to Apply for "Stop Loss" Pay*. Retrieved March 26, 2014, from U.S. Department of Defense: http://www.defense.gov/news/newsarticle.aspx?id=67650

Burrell, L., Briley Durand, D., & Fortado, J. (2003). Military Community Integration and Its Effect on Well-Being and Retention. *Armed Forces & Society, 30* (7), 7-24.

Caldwell, D. F., & O'Reilly III, C. A. (1985). The Impact of Information on Job Choices and Turnover. *Academy of Management Journal, 28* (4), 934-943.

Chaffin, L. G., Hamilton, C. H., & Czerw, M. J. (2008). Army Dental Officer Retention. *Military Medicine, 173* (10), 1014-1018.

Coates, H. R., Silvernail, T. S., Fulton, L. V., & Ivanitskaya, L. (2011). The Effectiveness of the Recent Army Captain Retention Program. *Armed Forces & Society, 37* (1), 5-18.

Cotton, J. L., & Tuttle, J. M. (1986). Employee Turnover: A Meta-Analysis and Review with Implications for Research. *Academy of Management Review, 11* (1), 55-70.

Dalton, D. R., Krackhardt, D. M., & Porter, L. W. (1981). Functional Turnover: An Empirical Assessment. *Journal of Applied Psychology, 66* (6), 716-721.

Dupre, K. E., & Day, A. L. (2007). The Effects of Supportive Management and Job Quality on the Turnover Intentions and Health of Military Personnel. *Human Resource Management, 46* (2), 185-201.

Enns, J. H., Nelson, G. R., & Warner, J. T. (1984). Retention and Retirement: The Case of the U.S. Military. *Policy Sciences, 17*, 101-121.

Ferguson, R., & Brohaugh, B. (2009). The Talent Wars. *Journal of Consumer Marketing, 26* (5), 358-362.

Guo, S. (2010). *Survival Analysis.* New York: Oxford University Press, Inc.

Heilmann, S. G., Bell, J. E., & McDonald, G. K. (2009). Work-Home Conflict: A Study of the Effects of Role Conflict on Military Officer Turnover Intention. *Journal of Leadership & Organizational Studies, 16* (1), 85-96.

Holtom, B. C., Mitchell, T. R., Lee, T. W., & Eberly, M. B. (2008). Turnover and Retention Research. *The Academy of Management Annals, 2* (1), 231-274.

Hom, P. W., Caranikas-Walker, F., Prussia, G. F., & Griffeth, R. W. (1992). A Meta-Analytical Structural Equation Analysis of a Model of Employee Turnover. *Journal of Applied Psychology, 77* (6), 890-909.

House of Representatives Committee on the Budget. (2013, December 10). *The Need to Reform Military Compensation*. Retrieved March 5, 2014, from House Budget Committee Publications: http://budget.house.gov/news/documentsingle.aspx?DocumentID=364048

Kirby, S. N., & Naftel, S. (2000). The Impact of Deployments on the Retention of Military Reservists. *Armed Forces & Society, 26* (2), 259-284.

Maddi, S. R., Matthews, M. D., Kelly, D. R., Villarreal, B., & White, M. (2012). The Role of Hardiness and Grit in Predicting Performance and Retention of USMA Cadets. *Military Psychology, 24*, 19-28.

Maltarich, M. A., Nyberg, A. J., & Reilly, G. (2010). A Conceptual and Empirical Analysis of the Cognitive Ability-Voluntary Turnover Relationship. *Journal of Applied Psychology, 95* (6), 1058-1070.

Manigart, P., & Prensky, D. (1982). Recruitment and Retention of Volunteers: Problems in the Belgian Armed Forces. *Armed Forces & Society, 9* (1), 98-114.

Maynard, D. C., Joseph, T. A., & Maynard, A. M. (2006). Underemployment, Job Attitudes, and Turnover Intentions. *Journal of Organizational Behaviour, 27*, 509-536.

McEvoy, G. M., & Cascio, W. F. (1985). Strategies for Reducing Employee Turnover: A Meta-Analysis. *Journal of Applied Psychology, 70* (2), 342-353.

Office of the Deputy Under Secretary of Defense (Military Community and Family Policy). (2012, November). *2011 Demographics.* Retrieved March 12, 2014, from Profile of the Military Community: http://www.militaryonesource.mil/12038/MOS/Reports/2011_Demographics_Report.pdf

Office of the Deputy Under Secretary of Defense (Military Community and Family Policy). (2012). *2012 Demographics.* Retrieved March 12, 2014, from Profile of the Military Community: http://www.militaryonesource.mil/12038/MOS/Reports/2012_Demographics_Report.pdf

Office of the Under Secretary of Defense (Comptroller). (2012, February). *United States Department of Defense Fiscal Year 2013 Budget Request.* Retrieved March 2, 2014, from Office of the Deputy Chief Management Officer: http://dcmo.defense.gov/publications/documents/FY2013_Budget_Request_Overview_Book.pdf

Singer, J. D., & Willett, J. B. (2003). *Applied Longitudinal Data Analysis: Modeling Change and Event Occurrence.* New York: Oxford University Press, Inc.

Spencer, D. G. (1986). Employee Voice and Employee Retention. *Academy of Management Journal, 29* (3), 488-502.

Steel, R. P., & Landon, T. E. (2010). Internal Employment Opportunity and External Employment Opportunity: Independent or Interactive Retention Effects? *Military Psychology, 22*, 282-300.

Steel, R. P., & Ovalle, N. K. (1984). A Review and Meta-Analysis of Research on the Relationship Between Behavioral Intentions and Employee Turnover. *Journal of Applied Psychology, 69* (4), 673-686.

Steers, R. M., & Mowday, R. T. (1981). Employee Turnover and Postdecision Accommodation Processes. In L. L. Cummings, & B. M. Staw, *Research in Organizational Behavior* (Vol. 3, pp. 235-281). Greenwich, CT: JAI Press.

Tice, J. (2012, February 19). *Earlier drawdowns give idea of what's to come*. Retrieved March 10, 2014, from Army Times: http://www.armytimes.com/article/20120219/NEWS/202190319/Earlier-drawdowns-give-idea-what-s-come

United States Army. (2009, August 10). *Officer Active Duty Service Obligations.* Retrieved March 10, 2014, from Army Regulation 350-100: http://www.apd.army.mil/jw2/xmldemo/r350_100/main.asp

United States Congress. (n.d.). *Uniform Code of Military Justice.* Retrieved March 5, 2014, from Uniform Code of Military Justice: http://www.au.af.mil/au/awc/awcgate/ucmj.htm

United States Department of Veterans Affairs. (2012, September 26). *Veteran Eligibility*. Retrieved March 12, 2014, from Health Benefits: http://www.va.gov/healthbenefits/apply/veterans.asp

Woodruff, T., Kelty, R., & Segal, D. R. (2006). Propensity to Serve and Motivation to Enlist among American Combat Soldiers. *Armed Forces & Society, 32*, 353-366.

Zeithaml, V. A., Bitner, M., & Gremler, D. D. (2013). *Services Marketing: Integrating Customer Focus Across the Firm.* New York: The McGraw Hill Companies, Inc.

CHAPTER V – CONCLUSION:
LESSONS LEARNED AND PRACTICAL IMPLICATIONS

5.1 Study Goals Revisited

The purpose of these essays was to comprehensively examine accession and retention in a public service organization in order to understand how these important processes differ from the accession and retention processes of non-public service organizations, which are more frequently studied. Further, the results have been used to inform SF leadership's decisions regarding recruitment and retention of elite soldiers.

The first step toward improving accession and retention policies and practices is to understand the implications of the current policies and practices. The current policies and practices of Army SF generate mixed results. On the one hand, the implementation of the SFAS program has prevented wholly unqualified candidates from entering SFQC. SFAS has clearly saved millions of dollars in training costs and manpower that would have been wasted on unqualified candidates. On the other hand, SF's recent trend in retention is clearly favoring ETS over retirement. The majority of soldiers are leaving after their first term of enlistment—after serving a total of five years in SF, or about 3 years after completing SF training.

What can we learn from these three studies? How should Army SF change to produce *and keep* their best soldiers? Are there ways to change while staying within current budget restrictions? In this final section, I combine the lessons learned from each of the studies, and use those lessons to recommend new strategies to improve Army SF accession and retention.

5.2 Lessons Learned & Practical Implications

5.2.1 Cognitive Ability

Cognitive ability consistently played a role in all three studies. It was important for SFAS and SFQC success, and it was a positively associated with leaving Army SF prior to retirement (known as expired term of service, or ETS). Those with higher cognitive ability are at a higher risk of ETS, particularly after their first term of enlistment (i.e., after five years of total SF service). Perhaps the good news is that those who are less cognitively gifted are also more likely to retire than to stay past retirement eligibility (for those who stay until at least retirement eligibility, i.e., those who have not ETSd). This suggests that the Army tends to select more cognitively gifted soldiers for the higher leadership positions—the kinds of positions that require commitment to stay past retirement eligibility. While this is good news, one still has to consider the fact that Army SF is losing its most cognitively gifted soldiers quite early, while keeping less gifted soldiers until retirement. This suggests that their retention practices do not properly incentivize their smartest soldiers. This sort of "brain drain" among young soldiers essentially opens the door for less cognitively skilled soldiers to advance to higher ranks and leadership roles.

How can Army SF properly incentivize their smarter soldiers? I believe these soldiers desire more challenging tasks, more chances to use and display their talents. The Army can use occupational RM programs that allow gifted soldiers to develop personally and professionally.

- For example, while the Army offers tuition assistance and other programs for soldiers to earn degrees from civilian institutions, most soldiers are not allotted enough free time to take advantage of these programs. Setting up a schedule that allows those soldiers to pursue their educational goals may incentivize them to stay in Army SF.
- Participation in military-centric programs, such as Harvard's National Security Fellows Program and George Washington University's School of Medicine and Health Sciences programs (particularly for 18D soldiers—SF medics), challenges these soldiers while also allowing them to develop professionally.
- Finally, allowing cognitively gifted soldiers to sit in and learn from regularly scheduled, higher-level strategy sessions may open their minds to roles they could hold in the future, and helps

them understand how their job fits within the larger strategy. Understanding the importance of their role may prompt them to stay in service.

5.2.2 Navigational Ability

Navigational ability serves a dual role as a measure of cognitive ability and a measure of soldiering skills, however there are clearly elements of navigational ability that are distinct from cognitive ability, as the results show. What is it about this capability that is different from cognitive ability? Is it possible to measure this unique capability prior to SFAS? If so, how?

Soldiers with excellent navigational skills are likely to have a strong spatial orientation—an ability to create a mental map that corresponds to the terrain they are traversing. They are able to harness their cognitive, spatial, and physical talents simultaneously in order to solve difficult navigational challenges. Further, they are flexible, adapting quickly to changes in their plans or unexpected obstacles. Clearly, my measurement of navigational ability is serving as a proxy for a multitude of talents—talents highly desired by Army SF.

Army SF should test for this ability prior to SFAS. Perhaps subjecting potential SFAS candidates to a series of simulated tasks that measure their ability to consolidate large quantities of information while multitasking would prove useful. For instance, in the Air Force, potential pilot candidates are assessed (via a flight simulator) on their ability to maintain hand-eye coordination and fly their planned route while also being bombarded with information they must remember and recite. The Air Force is essentially testing the candidate's ability to simultaneously control and maximally use their physical, navigational, and cognitive resources. This sort of test has the added bonus of assessing performance under stress, which is clearly a critical part of Army SF service. Perhaps Army SF could design a similar test to screen potential candidates for navigational prowess prior to SFAS.

The results show that navigational ability is an important predictor of SFAS and SFQC success, as well as a significant predictor of ETS. Like cognitive ability, those with the best navigational skills are likely to leave service after their first term of commitment expires. Unfortunately, no data were available to examine navigational ability's affect on the likelihood of retirement.

Soldiers with excellent navigational ability would clearly prefer opportunities to showcase and expand their talents. Again, occupational RM may prove useful for retaining these soldiers.

- Allowing them to design and lead courses aimed at improving the soldiering skills of younger or newer SF soldiers (and even conventional Army soldiers) would provide a platform where their skills could be put to good use, and where they would feel the importance of their job. Such an opportunity has the bonus benefit of marketing SF to conventional Army soldiers in a positive light, thus encouraging more recruits.
- Allowing these soldiers to participate in exchange programs with soldiers from allied nations permits them to learn new ways to hone their craft, all within the adventurous atmosphere that most SF soldiers crave. Soldiers should receive credit toward their professional development when they participate in such training or exchange programs.
- Finally, challenging these soldiers with navigational exercises that grow in complexity and difficulty make pique their interest and encourage them to stay in the Army. For instance, exercises that take place in different terrains (e.g., woodland, desert, mountain, etc.) may be a low-level challenge, whereas exercises that take place in a foreign country where the soldier is able to read and understand the local language may be a moderate-level challenge, and, finally, exercises that take place in a foreign country where the soldier cannot read and understand the local language may be a high-level challenge.

5.2.3 Physical Strength

Physical strength is a good news story for Army SF. Clearly, this is an organization that prides itself on physical fitness, and the results reflect that pride. Physical strength is predictive of SFAS and SFQC success, and the most physically fit soldiers are the ones who are most likely to stay past retirement eligibility. A wonderful and recent addition to the SF physical training regimen is the Tactical Human Optimization, Rapid Rehabilitation and Reconditioning (THOR3) Program. Established in 2009 in recognition of the fact that in SF, "Humans are more important than hardware," THOR3 takes a holistic approach to physical training, building SF soldiers' physical and mental strength capabilities to boost their combat performance, prevent injury, and help them remain healthy, viable assets to the force (Kelly et al., 2013, p.1). This sort of focus on the soldier's physical and mental health signals that Army SF cares about their most important assets (i.e., an organizational RM signal) and helps soldiers remain connected to the goals and overall mission of the organization (i.e., ideological RM). THOR3 facilities are quite popular, and are a good example of a program that benefits both the soldier and Army SF in terms of inspiring soldier commitment and retention.

5.2.4 Ranger Qualification

Soldiers with Ranger qualification are clearly important assets to the SF community. These soldiers have previously demonstrated their soldiering capabilities, and tend to do quite well through SFAS and SFQC. They are also less likely to ETS soon after completing SF training than their non-Ranger counterparts, which is likely due to the fact that Ranger qualified soldiers typically have several years of Army experience prior to joining SF. They are likely to be more committed to the goals and values of the organization, as demonstrated by their willingness to commit to several more years of service in order to join SF. Further, Ranger qualification did not significantly predict retirement, thus I find no difference in the likelihood of retiring versus staying past retirement eligibility for Ranger qualified soldiers.

To incentivize these soldiers, the Army should highlight their importance by performing ideological RM activities.

- Consistently showing how the performance of these soldiers directly affects mission and goal achievement may help solidify their bond to the organization and link the identity of the soldier with that of the organization and its successes. This sort of unit pride can go a long way in boosting morale and retention.
- Emphasizing the strong brotherhood that exists among SF soldiers may further commit these soldiers to *each other*, which, by proxy, commits them to the organization. Those who have been part of such an organization thoroughly understand the strong bond that exists between soldiers of the same unit—the way individual soldiers will rally in battle (or in any situation) for each other *as much or even more* than their rally for the cause of the organization. These strong feelings are unique to public service organizations that face high risks on a daily basis. Crises bring soldiers closer, creating a love for each other that typically does not exist in other organizations (i.e., non-public service organizations). The Army should capitalize on this emotion as a way of retaining talented, Ranger qualified soldiers.

5.2.5 Peer Evaluations

Peer evaluations of candidate personality characteristics were clearly important for SFAS and SFQC success; however they were not predictive of ETS and no data were available to test how peer evaluations affect the likelihood of retirement. Positive personality characteristics are essential in SF operations, where soldiers work in very small teams for extended periods of time. It appears that the peer evaluations performed during SFAS are sufficient for weeding out those with negative personality characteristics.

5.2.6 Special Forces 18X Designation

Finally, candidates who enter SF through the 18X program have greater success through SFAS and SFQC, however they are more likely to ETS after their first term of enlistment than their non-18X counterparts. No significant difference existed between those who retire and those who remain past retirement eligibility. The much greater likelihood of 18X soldiers to ETS suggests that these soldiers are either (1) unsatisfied with the Army lifestyle, or (2) only intended to join SF for a quick adventure (i.e., they never intended to stay in the Army as a career). Either way, the Army is clearly losing valuable assets shortly after their training is complete.

To incentivize these soldiers, Army SF should emphasize social, occupational, and ideological RM activities.

- Again, emphasizing the tight brotherhood that exists in the SF community may provide these soldiers a higher level of social support than they are likely to find in civilian employment, thus creating permanent bonds that tie them to the organization.
- Army SF should also provide these adventure-seeking soldiers with plenty of opportunities to hone their crafts in both the training and real-world environments. Jumpmaster and freefall training, scuba school, survival school, weapons training, and exercises to familiarize these soldiers with operations in several different environments (e.g., desert, jungle, mountainous terrain, etc.) are occupational RM tools that may pique their interest and increase their commitment to the organization.
- The Army should take particular care to determine how 18X soldiers *and their families* are adjusting to Army life. Reaching out to these soldiers through the host of soldier and family

readiness programs that currently exist in the Army[102] may improve their socialization process and make them feel more comfortable in the Army environment.

- Finally, the Army *must* find a way to reduce the backlog that exists in their SFQC training program. When these adventure-seeking soldiers are forced to wait for months at a time to attend the next phase of their training, they become disillusioned with the organization, committing to leave at the soonest possible time.[103] This sort of break in ideological congruency (i.e., when the SF program does not meet the candidates' expectations) must be avoided for retention efforts to be successful.

5.3 Final Thoughts

In total, Army SF's track record proves that, as an organization, it is very adept and successful at finding and training the nation's best soldiers. As is the case for any organization, performing a deep dive into SF's policies and practices revealed some areas of that could be improved. My hope is that Army SF leaders will use the information garnered from these three studies to their benefit—to further improve their organization so they can continue to produce the high quality soldiers we rely on to defend our nation.

[102] For example, the Better Opportunities for Single Soldiers (BOSS) program designs events and projects to meet the needs and desires of single soldiers, particularly younger soldiers. Family Readiness Groups (FRG) seek to support and assist soldiers and their family members by providing a network of communication for building relationships (particularly among spouses) and disseminating information to ensure all family members feel they are a welcomed and supported part of the Army family.

[103] This waiting period typically involves the performance of menial tasks because the training organization must visually see each soldier report to work each day, even when there is no work for them to do. Clearly, reporting to formation several times a day for no reason other than accountability can quickly disillusion many candidates.

REFERENCE

Kelly, T. K., Masi, R., Walker, B., Knapp, S., & Leuschner, K. J. (2013). *An Assessment of the Army's Tactical Human Optimization, Rapid Rehabilitation and Reconditioning Program.* Santa Monica: RAND Corporation.

APPENDIX A – FULL MODEL EXCLUDING OUTLYING OBSERVATIONS

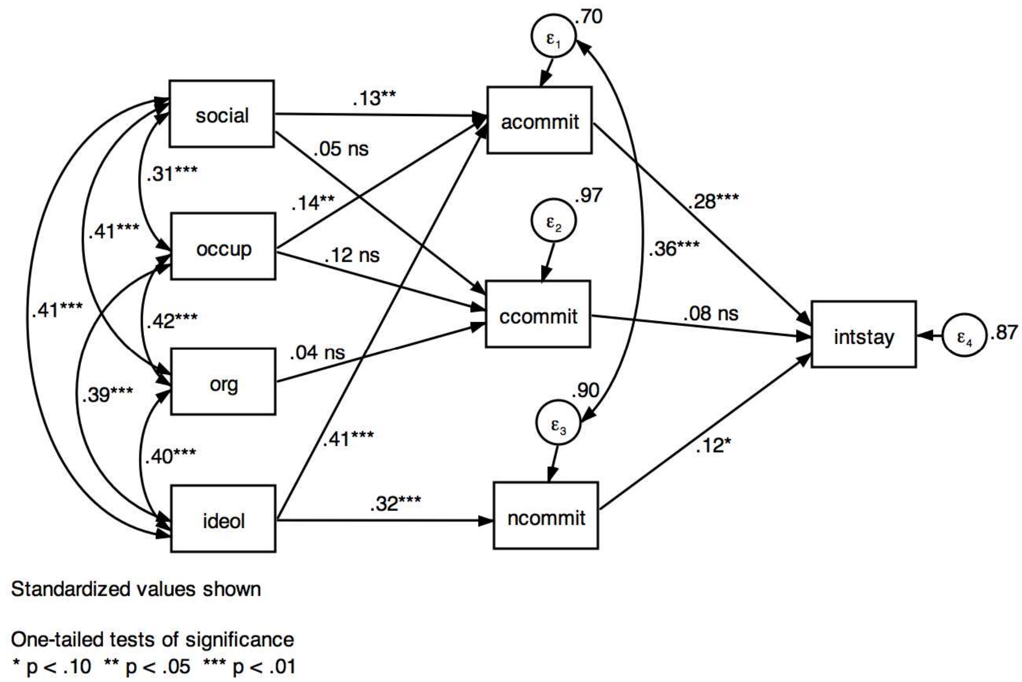


Figure A1 – Full Model Excluding Outlying Observations

<u>Fit</u>:
$\chi^2(11) = 16.86$ p=.1122
RMSEA = .046
RMSR = .048
CFI = .980

APPENDIX B – MODERATOR ANALYSES BY CORRELATION

Respondents' Age

Construct Correlations	k	N	Mr	SDr	Mρ	$SE_{M\rho}$	95% Conf Interval L	95% Conf Interval U	SDρ	95% Cred Interval L	95% Cred Interval U	% Due to Artifacts
SOCIAL-OCCUP												
<= 36 Years Old	24	6,085	0.33	0.22	**0.40**	0.05	***0.31***	***0.49***	0.22	-0.04	0.83	9.1%
>= 37 Years Old	61	24,788	0.17	0.23	**0.21**	0.03	***0.15***	***0.27***	0.23	-0.25	0.67	5.6%
SOCIAL-ORG												
<= 36 Years Old	54	15,745	0.43	0.19	**0.49**	0.03	***0.43***	***0.54***	0.19	0.10	0.87	8.1%
>= 37 Years Old	69	25,777	0.18	0.35	**0.21**	0.04	***0.13***	***0.30***	0.35	-0.48	0.90	2.5%
SOCIAL-IDEOL												
<= 36 Years Old	12	3,489	0.32	0.29	**0.38**	0.08	0.22	0.54	0.29	-0.18	0.94	5.3%
>= 37 Years Old	38	15,780	0.23	0.22	**0.28**	0.04	0.21	0.35	0.22	-0.15	0.72	5.7%
SOCIAL-ACOMMIT												
<= 36 Years Old	33	16,733	0.26	0.22	**0.32**	0.04	0.24	0.39	0.22	-0.12	0.75	4.5%
>= 37 Years Old	41	11,947	0.31	0.18	**0.37**	0.03	0.31	0.42	0.18	0.01	0.72	11.7%
SOCIAL-CCOMMIT												
<= 36 Years Old	4	2,824	-0.02	0.12	**-0.01**	0.06	-0.12	0.11	0.12	-0.24	0.23	17.9%
>= 37 Years Old	7	1,354	0.04	0.13	**0.05**	0.05	-0.05	0.15	0.13	-0.21	0.32	42.0%
SOCIAL-NCOMMIT												
<= 36 Years Old	5	2,312	0.28	0.16	**0.34**	0.07	0.20	0.48	0.16	0.02	0.66	9.8%
>= 37 Years Old	14	6,824	0.23	0.20	**0.28**	0.05	0.17	0.38	0.20	-0.11	0.67	6.8%
SOCIAL-INTSTAY												
<= 36 Years Old	39	14,515	0.23	0.16	**0.27**	0.03	0.22	0.32	0.16	-0.04	0.58	13.0%
>= 37 Years Old	85	27,553	0.15	0.19	**0.18**	0.02	0.14	0.22	0.19	-0.19	0.55	10.7%
OCCUP-ORG												
<= 36 Years Old	71	2,605	0.30	0.26	**0.36**	0.03	0.30	0.42	0.26	-0.15	0.87	5.1%
>= 37 Years Old	73	46,020	0.36	0.33	**0.43**	0.04	0.35	0.50	0.33	-0.22	1.07	1.8%
OCCUP-IDEOL												
<= 36 Years Old	15	3,604	0.29	0.24	**0.35**	0.06	0.23	0.47	0.24	-0.11	0.81	9.7%
>= 37 Years Old	17	7,367	0.15	0.28	**0.20**	0.07	0.07	0.33	0.28	-0.34	0.74	3.9%
OCCUP-ACOMMIT												
<= 36 Years Old	46	22,473	0.19	0.22	**0.24**	0.03	***0.17***	***0.30***	0.22	-0.20	0.67	5.2%
>= 37 Years Old	20	8,372	0.35	0.15	**0.44**	0.03	***0.37***	***0.50***	0.15	0.14	0.74	5.2%
OCCUP-CCOMMIT												

<= 36 Years Old	3	828	0.04	0.10	**0.06**	0.06	-0.05	0.17	0.10	-0.13	0.25	78.1%
>= 37 Years Old	5	1,000	0.10	0.19	**0.13**	0.08	-0.04	0.29	0.19	-0.24	0.49	20.3%
OCCUP-NCOMMIT												
<= 36 Years Old	9	2,078	0.28	0.29	**0.34**	0.10	***0.15***	***0.53***	0.29	-0.22	0.91	6.1%
>= 37 Years Old	9	4,067	-0.13	0.38	**-0.16**	0.13	***-0.41***	***0.09***	0.38	-0.90	0.59	1.9%
OCCUP-INTSTAY												
<= 36 Years Old	44	15,594	0.14	0.21	**0.17**	0.03	0.10	0.23	0.21	-0.24	0.57	8.1%
>= 37 Years Old	64	3,519	0.15	0.16	**0.17**	0.02	0.13	0.21	0.16	-0.15	0.50	6.5%
ORG-IDEOL												
<= 36 Years Old	19	4,790	0.46	0.32	**0.55**	0.07	***0.40***	***0.69***	0.32	-0.08	1.18	3.1%
>= 37 Years Old	36	13,159	0.15	0.20	**0.17**	0.03	***0.11***	***0.24***	0.20	-0.21	0.56	9.9%
ORG-ACOMMIT												
<= 36 Years Old	104	49,742	0.26	0.26	**0.31**	0.03	0.26	0.36	0.26	-0.21	0.83	2.8%
>= 37 Years Old	61	43,985	0.31	0.20	**0.37**	0.03	0.32	0.42	0.20	-0.03	0.77	3.4%
ORG-CCOMMIT												
<= 36 Years Old	25	5,240	0.15	0.29	**0.18**	0.06	0.07	0.29	0.29	-0.38	0.74	7.1%
>= 37 Years Old	17	3,617	0.02	0.25	**0.03**	0.06	-0.09	0.14	0.25	-0.46	0.51	10.6%
ORG-NCOMMIT												
<= 36 Years Old	18	3,579	0.26	0.19	**0.31**	0.04	0.22	0.39	0.19	-0.06	0.67	15.2%
>= 37 Years Old	21	8,554	0.14	0.25	**0.16**	0.05	0.06	0.27	0.25	-0.32	0.65	5.4%
ORG-INTSTAY												
<= 36 Years Old	115	37,517	0.24	0.18	**0.27**	0.02	***0.24***	***0.31***	0.18	-0.09	0.64	9.9%
>= 37 Years Old	92	60,793	0.15	0.17	**0.18**	0.02	***0.15***	***0.22***	0.17	-0.16	0.52	5.7%
IDEOL-ACOMMIT												
<= 36 Years Old	20	5,152	0.52	0.26	**0.66**	0.06	0.55	0.77	0.26	0.16	1.17	5.0%
>= 37 Years Old	16	7,556	0.60	0.19	**0.71**	0.05	0.62	0.81	0.19	0.34	1.09	3.9%
IDEOL-CCOMMIT												
<= 36 Years Old	4	1,162	0.25	0.13	**0.31**	0.07	0.18	0.44	0.13	0.05	0.57	26.5%
>= 37 Years Old	7	1,549	0.06	0.18	**0.09**	0.07	-0.04	0.22	0.18	-0.26	0.43	20.8%
IDEOL-NCOMMIT												
<= 36 Years Old	5	1,610	0.36	0.37	**0.49**	0.16	0.16	0.81	0.37	-0.24	1.21	2.4%
>= 37 Years Old	9	3,771	0.27	0.21	**0.34**	0.07	0.20	0.48	0.21	-0.07	0.75	6.0%
IDEOL-INTSTAY												
<= 36 Years Old	23	8,483	0.21	0.29	**0.25**	0.06	0.13	0.37	0.29	-0.31	0.81	3.6%
>= 37 Years Old	31	10,155	0.12	0.24	**0.13**	0.04	0.05	0.22	0.24	-0.34	0.61	5.8%
ACOMMIT-CCOMMIT												
<= 36 Years Old	51	20,900	0.17	0.27	**0.22**	0.04	0.14	0.29	0.27	-0.31	0.74	4.5%
>= 37 Years Old	22	12,859	0.21	0.29	**0.27**	0.06	0.15	0.39	0.29	-0.30	0.85	2.6%
ACOMMIT-NCOMMIT												
<= 36 Years Old	23	9,066	0.47	0.23	**0.58**	0.05	0.49	0.67	0.23	0.14	1.02	4.0%

>= 37 Years Old	16	5,096	0.52	0.16	**0.62**	0.04	0.54	0.70	0.16	0.30	0.94	8.3%
ACOMMIT-INTSTAY												
<= 36 Years Old	113	51,790	0.31	0.30	**0.36**	0.03	***0.31***	***0.42***	0.30	-0.22	0.95	2.2%
>= 37 Years Old	69	47,815	0.20	0.28	**0.23**	0.03	***0.16***	***0.29***	0.28	-0.32	0.77	1.6%
CCOMMIT-NCOMMIT												
<= 36 Years Old	31	11,720	0.15	0.25	**0.19**	0.04	0.10	0.28	0.25	-0.29	0.67	5.6%
>= 37 Years Old	13	3,586	0.13	0.16	**0.17**	0.04	0.08	0.26	0.16	-0.14	0.48	20.6%
CCOMMIT-INTSTAY												
<= 36 Years Old	44	19,804	0.17	0.27	**0.21**	0.04	***0.13***	***0.28***	0.27	-0.32	0.73	3.8%
>= 37 Years Old	32	13,077	-0.02	0.18	**-0.02**	0.03	***-0.08***	***0.04***	0.18	-0.36	0.33	10.0%
NCOMMIT-INTSTAY												
<= 36 Years Old	32	11,375	0.26	0.26	**0.31**	0.05	0.21	0.40	0.26	-0.21	0.82	4.5%
>= 37 Years Old	29	8,676	0.25	0.30	**0.29**	0.06	0.19	0.40	0.30	-0.29	0.87	4.0%

k = number of effect sizes included in each analysis, N = sample size, Mr = mean uncorrected correlation, SDr = standard deviation of uncorrected correlation, Mρ = mean corrected correlation (corrected for unreliability in each variable), $SE_{M\rho}$ = standard error of Mρ, 95% Conf Interval = confidence interval for Mρ, SDρ = standard deviation of estimated ρ's, 95% Cred Interval = credibility interval of Mρ.

Bold, italicized numbers indicate moderator presence.

Table B1 – Moderator Analysis – Age

Gender of the Respondents												
							95% Conf Interval			95% Cred Interval		
Construct Correlations	k	N	Mr	SDr	Mρ	$SE_{M\rho}$	L	U	SDρ	L	U	% Due to Artifacts
SOCIAL-OCCUP												
Female	32	15,406	0.20	0.23	**0.25**	0.04	0.17	0.33	0.23	-0.20	0.71	4.7%
Male	57	16,103	0.22	0.28	**0.26**	0.04	0.19	0.34	0.28	-0.28	0.81	5.3%
SOCIAL-ORG												
Female	79	29,187	0.25	0.35	**0.29**	0.04	0.21	0.37	0.35	-0.41	0.98	2.2%
Male	51	18,981	0.38	0.26	**0.44**	0.04	0.37	0.51	0.26	-0.07	0.95	4.0%
SOCIAL-IDEOL												
Female	26	12,311	0.21	0.23	**0.26**	0.05	0.17	0.35	0.23	-0.20	0.72	4.8%
Male	25	6,076	0.31	0.26	**0.38**	0.05	0.28	0.49	0.26	-0.13	0.90	6.4%
SOCIAL-ACOMMIT												
Female	28	11,556	0.40	0.15	**0.48**	0.03	***0.42***	***0.53***	0.15	0.17	0.78	9.0%
Male	50	19,900	0.23	0.21	**0.28**	0.03	***0.22***	***0.34***	0.21	-0.14	0.70	6.7%
SOCIAL-CCOMMIT												
Female	8	1,712	0.04	0.12	**0.05**	0.04	-0.04	0.13	0.12	-0.19	0.28	48.7%
Male	4	6,650	0.32	0.29	**0.35**	0.14	0.07	0.64	0.29	-0.21	0.92	1.1%
SOCIAL-NCOMMIT												
Female	8	5,498	0.22	0.19	**0.26**	0.07	0.13	0.39	0.19	-0.12	0.64	5.9%
Male	11	3,638	0.29	0.18	**0.34**	0.05	0.24	0.45	0.18	0.00	0.69	10.5%
SOCIAL-INTSTAY												
Female	61	22,626	0.18	0.18	**0.21**	0.02	0.17	0.26	0.18	-0.14	0.56	9.9%
Male	65	25,918	0.20	0.16	**0.23**	0.02	0.19	0.27	0.16	-0.08	0.54	12.3%
OCCUP-ORG												
Female	90	29,374	0.30	0.31	**0.36**	0.03	0.30	0.43	0.31	-0.25	0.98	3.4%
Male	67	34,867	0.30	0.25	**0.36**	0.03	0.30	0.42	0.25	-0.12	0.84	3.4%
OCCUP-IDEOL												
Female	21	8,192	0.14	0.25	**0.18**	0.05	***0.08***	***0.29***	0.25	-0.31	0.67	6.0%

Male	15	3,415	0.40	0.26	**0.50**	0.07	***0.37***	***0.63***	0.26	0.00	1.00	6.0%
OCCUP-ACOMMIT												
Female	35	11,982	0.32	0.21	**0.39**	0.04	0.32	0.46	0.21	-0.03	0.81	7.5%
Male	37	22,024	0.23	0.26	**0.28**	0.04	0.20	0.37	0.26	-0.22	0.79	2.9%
OCCUP-CCOMMIT												
Female	13	11,172	0.27	0.25	**0.33**	0.07	***0.19***	***0.47***	0.25	-0.16	0.82	2.6%
Male	2	503	0.01	0.08	**0.01**	0.06	***-0.10***	***0.12***	0.08	-0.14	0.17	109.1%
OCCUP-NCOMMIT												
Female	12	4,678	-0.10	0.39	**-0.11**	0.11	***-0.33***	***0.11***	0.39	-0.87	0.65	2.3%
Male	6	1,467	0.35	0.25	**0.41**	0.10	***0.21***	***0.61***	0.25	-0.07	0.90	6.1%
OCCUP-INTSTAY												
Female	53	16,528	0.20	0.17	**0.24**	0.02	0.19	0.29	0.17	-0.10	0.58	13.5%
Male	54	24,974	0.15	0.22	**0.18**	0.03	0.12	0.24	0.22	-0.25	0.61	5.4%
ORG-IDEOL												
Female	31	11,636	0.19	0.29	**0.23**	0.05	0.13	0.33	0.29	-0.33	0.79	4.1%
Male	30	7,267	0.34	0.30	**0.41**	0.05	0.30	0.52	0.30	-0.17	0.99	4.6%
ORG-ACOMMIT												
Female	102	32,398	0.38	0.26	**0.46**	0.03	***0.41***	***0.51***	0.26	-0.05	0.96	4.2%
Male	82	64,629	0.25	0.25	**0.30**	0.03	***0.24***	***0.35***	0.25	-0.19	0.78	2.1%
ORG-CCOMMIT												
Female	40	8,484	0.10	0.29	**0.12**	0.05	0.03	0.21	0.29	-0.44	0.68	7.3%
Male	7	8,453	0.29	0.24	**0.33**	0.09	0.15	0.51	0.24	-0.15	0.81	2.1%
ORG-NCOMMIT												
Female	33	0,451	0.14	0.21	**0.17**	0.04	0.10	0.24	0.21	-0.23	0.58	9.5%
Male	7	2,073	0.35	0.29	**0.40**	0.11	0.18	0.62	0.29	-0.18	0.98	3.4%
ORG-INTSTAY												
Female	130	48,005	0.18	0.21	**0.21**	0.02	0.17	0.24	0.21	-0.20	0.61	7.2%
Male	78	50,823	0.23	0.14	**0.27**	0.02	0.24	0.30	0.14	-0.01	0.54	8.7%
IDEOL-ACOMMIT												
Female	20	9,171	0.51	0.29	**0.61**	0.07	0.48	0.74	0.29	0.04	1.18	1.9%
Male	23	6,067	0.51	0.29	**0.64**	0.06	0.52	0.76	0.29	0.07	1.21	3.6%
IDEOL-CCOMMIT												
Female	9	2,189	0.11	0.20	**0.14**	0.07	0.02	0.27	0.20	-0.24	0.53	15.3%

Male	2	522	0.28	0.05	**0.34**	0.04	0.27	0.42	0.05	0.24	0.45	188.6%
IDEOL-NCOMMIT												
Female	8	3,414	0.19	0.14	**0.25**	0.05	***0.15***	***0.34***	0.14	-0.02	0.52	16.5%
Male	6	1,967	0.48	0.29	**0.62**	0.12	***0.39***	***0.86***	0.29	0.05	1.20	2.8%
IDEOL-INTSTAY												
Female	30	10,049	0.14	0.25	**0.16**	0.05	0.07	0.25	0.25	-0.33	0.66	5.6%
Male	30	8,952	0.18	0.30	**0.21**	0.05	0.10	0.31	0.30	-0.38	0.79	3.6%
ACOMMIT-CCOMMIT												
Female	25	6,534	0.11	0.24	**0.13**	0.05	0.04	0.23	0.24	-0.33	0.60	8.8%
Male	42	18,137	0.10	0.26	**0.13**	0.04	0.05	0.21	0.26	-0.38	0.64	4.6%
ACOMMIT-NCOMMIT												
Female	15	4,428	0.51	0.18	**0.62**	0.05	0.53	0.71	0.18	0.26	0.98	7.3%
Male	22	8,782	0.49	0.22	**0.60**	0.05	0.51	0.69	0.22	0.17	1.03	4.0%
ACOMMIT-INTSTAY												
Female	87	27,140	0.28	0.36	**0.33**	0.04	0.25	0.40	0.36	-0.38	1.04	2.2%
Male	93	49,290	0.33	0.27	**0.40**	0.03	0.34	0.45	0.27	-0.14	0.93	2.2%
CCOMMIT-NCOMMIT												
Female	13	3,152	0.17	0.17	**0.23**	0.05	0.13	0.32	0.17	-0.11	0.56	19.8%
Male	29	11,202	0.12	0.25	**0.16**	0.05	0.07	0.25	0.25	-0.32	0.65	5.6%
CCOMMIT-INTSTAY												
Female	33	8,479	0.10	0.24	**0.12**	0.04	0.04	0.21	0.24	-0.35	0.60	8.4%
Male	37	22,159	0.18	0.23	**0.22**	0.04	0.14	0.29	0.23	-0.24	0.67	3.8%
NCOMMIT-INTSTAY												
Female	32	8,539	0.24	0.29	**0.28**	0.05	0.18	0.38	0.29	-0.29	0.85	5.1%
Male	27	10,560	0.25	0.28	**0.30**	0.05	0.20	0.41	0.28	-0.24	0.85	3.4%

k = number of effect sizes included in each analysis, N = sample size, Mr = mean uncorrected correlation, SDr = standard deviation of uncorrected correlation, Mρ = mean corrected correlation (corrected for unreliability in each variable), $SE_{M\rho}$ = standard error of Mρ, 95% Conf Interval = confidence interval for Mρ, SDρ = standard deviation of estimated ρ's, 95% Cred Interval = credibility interval of Mρ.

Bold, italicized numbers indicate moderator presence.

Table B2 – Moderator Analysis – Gender

Construct Correlations	k	N	Mr	SDr	Mρ	$SE_{M\rho}$	95% Conf Interval L	95% Conf Interval U	SDρ	95% Cred Interval L	95% Cred Interval U	% Due to Artifacts
SOCIAL-OCCUP												
In/Col <=62	8	2,088	0.51	0.14	**0.60**	0.05	***0.50***	***0.70***	0.14	0.32	0.88	12.9%
In/Col 63-80	43	15,749	0.21	0.20	**0.24**	0.03	***0.18***	***0.30***	0.20	-0.14	0.63	8.6%
In/Col >=81	56	40,638	0.25	0.33	**0.31**	0.04	***0.22***	***0.40***	0.33	-0.34	0.96	1.4%
SOCIAL-ORG												
In/Col <=62	22	5,861	0.45	0.15	**0.51**	0.03	0.44	0.57	0.15	0.21	0.80	12.4%
In/Col 63-80	12	3,361	0.45	0.19	**0.48**	0.06	0.38	0.60	0.19	0.10	0.86	8.5%
In/Col >=81	135	73,572	0.34	0.37	**0.40**	0.03	0.34	0.46	0.37	-0.33	1.13	1.4%
SOCIAL-IDEOL												
In/Col <=62	7	2,165	0.33	0.19	**0.40**	0.07	***0.25***	***0.54***	0.19	0.02	0.78	9.2%
In/Col 63-80	12	5,430	0.07	0.15	**0.08**	0.04	***-0.002***	***0.17***	0.15	-0.21	0.38	12.6%
In/Col >=81	45	22,721	0.40	0.26	**0.49**	0.04	***0.42***	***0.57***	0.26	-0.01	1.00	3.2%
SOCIAL-ACOMMIT												
In/Col <=62	19	11,933	0.27	0.18	**0.33**	0.04	0.25	0.41	0.18	-0.03	0.69	5.4%
In/Col 63-80	10	4,229	0.39	0.15	**0.47**	0.05	0.38	0.57	0.15	0.18	0.77	10.0%
In/Col >=81	64	27,049	0.37	0.22	**0.43**	0.03	0.38	0.49	0.22	-0.01	0.87	5.0%
SOCIAL-CCOMMIT												
In/Col <=62						Only 1 Correlation						--
In/Col 63-80	3	656	0.11	0.10	**0.13**	0.06	0.02	0.24	0.10	-0.07	0.32	60.2%
In/Col >=81	15	10,680	0.29	0.27	**0.32**	0.07	0.19	0.46	0.27	-0.21	0.85	2.7%
SOCIAL-NCOMMIT												
In/Col <=62	4	1,954	0.32	0.13	**0.39**	0.07	0.25	0.52	0.13	0.12	0.65	11.9%
In/Col 63-80						No Correlations						--
In/Col >=81	16	7,630	0.24	0.20	**0.29**	0.05	0.19	0.39	0.20	-0.10	0.67	7.0%
SOCIAL-INTSTAY												
In/Col <=62	21	6,028	0.18	0.22	**0.21**	0.05	0.12	0.31	0.22	-0.23	0.65	8.7%
In/Col 63-80	36	14,437	0.20	0.11	**0.23**	0.02	0.19	0.27	0.11	0.01	0.45	24.2%
In/Col >=81	92	38,510	0.13	0.19	**0.15**	0.02	0.11	0.19	0.19	-0.23	0.53	7.6%

OCCUP-ORG												
In/Col <=62	31	8,585	0.36	0.27	**0.42**	0.05	0.32	0.51	0.27	-0.12	0.95	4.2%
In/Col 63-80	26	10,636	0.42	0.30	**0.52**	0.06	0.40	0.64	0.30	-0.07	1.11	2.3%
In/Col >=81	151	99,825	0.33	0.34	**0.40**	0.03	0.34	0.45	0.34	-0.26	1.06	1.4%
OCCUP-IDEOL												
In/Col <=62	7	2,166	0.46	0.26	**0.53**	0.10	0.34	0.73	0.26	0.02	1.05	3.6%
In/Col 63-80	3	1,933	0.12	0.19	**0.14**	0.11	-0.07	0.36	0.19	-0.23	0.52	5.7%
In/Col >=81	47	26,288	0.31	0.35	**0.38**	0.05	0.28	0.48	0.35	-0.30	1.06	1.6%
OCCUP-ACOMMIT												
In/Col <=62	19	11,793	0.20	0.19	**0.25**	0.04	***0.16***	***0.34***	0.19	-0.12	0.62	5.3%
In/Col 63-80	7	3,502	0.41	0.18	**0.51**	0.07	***0.37***	***0.64***	0.18	0.15	0.87	5.5%
In/Col >=81	63	42,273	0.29	0.29	**0.36**	0.04	0.29	0.43	0.29	-0.21	0.92	1.9%
OCCUP-CCOMMIT												
In/Col <=62	7	9,930	0.29	0.25	**0.35**	0.09	0.17	0.54	0.25	-0.13	0.84	1.3%
In/Col 63-80	3	656	0.11	0.23	**0.13**	0.13	-0.13	0.39	0.23	-0.32	0.58	9.0%
In/Col >=81	11	3,147	0.05	0.22	**0.06**	0.07	-0.07	0.19	0.22	-0.37	0.50	10.2%
OCCUP-NCOMMIT												
In/Col <=62	5	1,116	0.42	0.24	**0.50**	0.11	***0.30***	***0.71***	0.24	0.04	0.97	6.6%
In/Col 63-80						No Correlations						--
In/Col >=81	16	6,185	0.04	0.44	**0.05**	0.11	***-0.16***	***0.27***	0.44	-0.81	0.92	1.6%
OCCUP-INTSTAY												
In/Col <=62	10	4,307	0.19	0.21	**0.24**	0.07	0.11	0.37	0.21	-0.17	0.65	6.0%
In/Col 63-80	39	14,616	0.20	0.18	**0.23**	0.03	0.17	0.28	0.18	-0.13	0.58	9.6%
In/Col >=81	76	36,261	0.14	0.23	**0.16**	0.03	0.11	0.21	0.23	-0.29	0.61	4.8%
ORG-IDEOL												
In/Col <=62	12	2,742	0.40	0.33	**0.45**	0.10	0.260	0.63	0.33	-0.20	1.09	3.7%
In/Col 63-80	5	2,421	0.22	0.14	**0.25**	0.06	***0.13***	***0.37***	0.14	-0.02	0.52	11.2%
In/Col >=81	67	44,703	0.40	0.36	**0.48**	0.04	***0.39***	***0.56***	0.36	-0.23	1.18	1.2%
ORG-ACOMMIT												
In/Col <=62	35	29,291	0.22	0.27	**0.26**	0.05	***0.17***	***0.35***	0.27	-0.28	0.79	1.6%
In/Col 63-80	26	9,099	0.45	0.24	**0.53**	0.05	***0.44***	***0.62***	0.24	0.06	0.99	4.1%
In/Col >=81	158	96,013	0.29	0.29	**0.34**	0.02	***0.29***	***0.38***	0.29	-0.24	0.91	1.9%

ORG-CCOMMIT												
In/Col <=62					Only 1 Correlation							--
In/Col 63-80	22	4,942	0.06	0.24	**0.07**	0.05	-0.03	0.17	0.24	-0.40	0.54	10.0%
In/Col >=81	34	16,931	0.23	0.29	**0.26**	0.05	0.17	0.36	0.29	-0.30	0.83	3.1%
ORG-NCOMMIT												
In/Col <=62	5	973	0.30	0.26	**0.35**	0.11	0.13	0.58	0.26	-0.15	0.86	7.4%
In/Col 63-80	12	2,677	0.18	0.08	**0.21**	0.02	0.16	0.260	0.08	0.04	0.38	75.7%
In/Col >=81	29	12,224	0.21	0.24	**0.25**	0.05	0.16	0.34	0.24	-0.23	0.73	5.1%
ORG-INTSTAY												
In/Col <=62	32	9,429	0.27	0.21	**0.30**	0.04	***0.23***	***0.38***	0.21	-0.10	0.71	8.3%
In/Col 63-80	44	15,266	0.21	0.17	**0.24**	0.03	0.19	0.29	0.17	-0.10	0.57	10.5%
In/Col >=81	198	126,648	0.15	0.23	**0.17**	0.02	***0.14***	***0.20***	0.23	-0.29	0.62	3.2%
IDEOL-ACOMMIT												
In/Col <=62	17	6,819	0.38	0.43	**0.46**	0.11	0.26	0.67	0.43	-0.39	1.31	1.0%
In/Col 63-80	2	300	0.50	0.33	**0.52**	0.23	0.07	0.98	0.33	-0.12	1.16	3.7%
In/Col >=81	42	23,338	0.48	0.22	**0.58**	0.03	0.52	0.65	0.22	0.16	1.01	3.0%
IDEOL-CCOMMIT												
In/Col <=62	5	1,944	0.22	0.14	**0.26**	0.06	0.14	0.39	0.14	-0.02	0.54	15.9%
In/Col 63-80					No Correlations							--
In/Col >=81	16	4,123	0.19	0.29	**0.22**	0.07	0.08	0.36	0.29	-0.35	0.79	5.5%
IDEOL-NCOMMIT												
In/Col <=62	2	788	0.60	0.17	**0.82**	0.12	***0.59***	***1.06***	0.17	0.49	1.16	4.2%
In/Col 63-80	3	822	0.12	0.15	**0.16**	0.09	***-0.01***	***0.33***	0.15	-0.13	0.45	24.0%
In/Col >=81	10	4,174	0.27	0.20	**0.34**	0.06	***0.22***	***0.47***	0.20	-0.05	0.74	6.9%
IDEOL-INTSTAY												
In/Col <=62	15	5,656	0.23	0.30	**0.27**	0.08	0.12	0.42	0.30	-0.31	0.85	3.3%
In/Col 63-80	12	5,319	0.10	0.22	**0.11**	0.06	-0.01	0.24	0.22	-0.31	0.54	5.5%
In/Col >=81	54	23,272	0.12	0.27	**0.14**	0.04	0.06	0.21	0.27	-0.40	0.67	3.3%
ACOMMIT-CCOMMIT												
In/Col <=62	11	7,924	0.28	0.20	**0.36**	0.06	***0.24***	***0.48***	0.20	-0.03	0.75	4.0%
In/Col 63-80	25	7,619	0.02	0.23	**0.02**	0.05	***-0.07***	***0.11***	0.23	-0.42	0.47	9.0%
In/Col >=81	46	24,344	0.21	0.26	**0.27**	0.04	***0.19***	***0.34***	0.26	-0.24	0.78	3.5%

ACOMMIT-NCOMMIT												
In/Col <=62	4	1,870	0.66	0.16	**0.85**	0.08	***0.70***	***1.01***	0.16	0.54	1.16	3.8%
In/Col 63-80	13	3,885	0.33	0.08	**0.38**	0.02	***0.34***	***0.43***	0.08	0.22	0.54	48.5%
In/Col >=81	25	8,739	0.52	0.18	**0.63**	0.04	***0.56***	***0.70***	0.18	0.27	0.99	5.9%
ACOMMIT-INTSTAY												
In/Col <=62	37	20,039	0.46	0.26	**0.55**	0.04	***0.47***	***0.64***	0.26	0.05	1.06	2.1%
In/Col 63-80	26	7,868	0.41	0.20	**0.49**	0.04	0.42	0.57	0.20	0.10	0.88	7.1%
In/Col >=81	156	116,451	0.33	0.28	**0.38**	0.02	***0.34***	***0.42***	0.28	-0.18	0.93	1.5%
CCOMMIT-NCOMMIT												
In/Col <=62	3	1,644	0.47	0.03	**0.65**	0.02	***0.62***	***0.69***	0.03	0.59	0.71	164.2%
In/Col 63-80	23	6,997	0.03	0.14	**0.03**	0.03	***-0.02***	***0.09***	0.14	-0.24	0.31	22.2%
In/Col >=81	19	6,937	0.17	0.18	**0.22**	0.04	***0.14***	***0.30***	0.18	-0.13	0.56	12.7%
CCOMMIT-INTSTAY												
In/Col <=62	14	11,363	0.29	0.26	**0.35**	0.07	***0.22***	***0.49***	0.26	-0.16	0.86	2.0%
In/Col 63-80	21	6,015	0.14	0.21	**0.16**	0.05	0.08	0.25	0.21	-0.24	0.57	9.8%
In/Col >=81	52	29,549	0.12	0.25	**0.13**	0.03	***0.07***	***0.20***	0.25	-0.36	0.62	3.5%
NCOMMIT-INTSTAY												
In/Col <=62	6	3,120	0.33	0.42	**0.43**	0.17	0.09	0.76	0.42	-0.40	1.25	0.9%
In/Col 63-80	16	4,524	0.25	0.20	**0.28**	0.05	0.18	0.38	0.20	-0.11	0.67	9.7%
In/Col >=81	44	15,103	0.25	0.23	**0.28**	0.03	0.22	0.35	0.23	-0.17	0.74	6.3%

k = number of effect sizes included in each analysis, N = sample size, Mr = mean uncorrected correlation, SDr = standard deviation of uncorrected correlation, Mρ = mean corrected correlation (corrected for unreliability in each variable), $SE_{M\rho}$ = standard error of Mρ, 95% Conf Interval = confidence interval for Mρ, SDρ = standard deviation of estimated ρ's, 95% Cred Interval = credibility interval of Mρ.

Bold, italicized numbers indicate moderator presence.

Table B3 – Moderator Analysis – Individualism v. Collectivism

Summary of Significant Moderators – Individualism v. Collectivism							
Construct 1	**Construct 2**	**Strongest Association→Weakest Association**					
			Mρ		***Mρ***		***Mρ***
Social RM	Occupational RM	Low Indiv	.60	High Indiv	.31	Moderate Indiv	.24
Social RM	Ideological RM	High Indiv	.49	Low Indiv	.40	Moderate Indiv	.08 ns
Occupational RM	Affective Commitment	Moderate Indiv	.51	Low Indiv	.25	--	--
Occupational RM	Normative Commitment	Low Indiv	.50	High Indiv	.05 ns	--	--
Organizational RM	Ideological RM	High Indiv	.48	Moderate Indiv	.25	--	--
Organizational RM	Affective Commitment	Moderate Indiv	.54	High Indiv	.34	Low Indiv	.26
Organizational RM	Intent to Stay	Low Indiv	.30	High Indiv	.17	--	--
Ideological RM	Normative Commitment	Low Indiv	.82	High Indiv	.34	Moderate Indiv	.16
Affective Commitment	Continuance Commitment	Low Indiv	.36	High Indiv	.27	Moderate Indiv	.02 ns
Affective Commitment	Normative Commitment	Low Indiv	.85	High Indiv	.63	Moderate Indiv	.38
Affective Commitment	Intent to Stay	Low Indiv	.55	High Indiv	.38	--	--
Continuance Commitment	Normative Commitment	Low Indiv	.65	High Indiv	.22	Moderate Indiv	.03 ns
Continuance Commitment	Intent to Stay	Low Indiv	.35	High Indiv	.13	--	--

Table B4 – Moderator Analysis – Summary of Significant Moderators for Individualism v. Collectivism

Hofstede’s Cultural Dimension: Power Distance												
							95% Conf Interval			95% Cred Interval		
Construct Correlations	**k**	**N**	**Mr**	**SDr**	**Mρ**	**$SE_{M\rho}$**	**L**	**U**	**SDρ**	**L**	**U**	**% Due to Artifacts**
SOCIAL-OCCUP												
Power <= 39	55	28,572	0.18	0.19	**0.22**	0.03	***0.17***	***0.27***	0.19	-0.15	0.59	6.7%
Power 40-49	44	27,815	0.29	0.37	**0.36**	0.06	***0.25***	***0.47***	0.37	-0.37	1.09	1.2%
Power >=50	8	2,088	0.51	0.14	**0.60**	0.05	***0.50***	***0.70***	0.14	0.32	0.88	12.9%
SOCIAL-ORG												
Power <= 39	23	6,251	0.37	0.22	**0.42**	0.05	0.33	0.51	0.22	-0.01	0.84	7.8%
Power 40-49	126	71,099	0.34	0.38	**0.40**	0.03	0.34	0.47	0.38	-0.33	1.14	1.3%
Power >=50	20	5,444	0.44	0.15	**0.49**	0.03	0.43	0.56	0.15	0.20	0.78	13.4%
SOCIAL-IDEOL												
Power <= 39	14	6,404	0.14	0.25	**0.17**	0.07	***0.04***	***0.30***	0.25	-0.32	0.66	4.4%
Power 40-49	43	21,747	0.40	0.26	**0.49**	0.04	***0.41***	***0.56***	0.26	-0.02	0.99	3.1%
Power >=50	7	2,165	0.33	0.19	**0.40**	0.07	0.25	0.54	0.19	0.02	0.78	9.2%
SOCIAL-ACOMMIT												
Power <= 39	18	11,372	0.43	0.14	**0.50**	0.03	***0.43***	***0.57***	0.14	0.22	0.78	8.1%
Power 40-49	59	20,481	0.34	0.24	**0.41**	0.03	0.35	0.47	0.24	-0.06	0.88	5.2%
Power >=50	16	11,358	0.26	0.18	**0.32**	0.04	***0.23***	***0.40***	0.18	-0.03	0.67	5.4%
SOCIAL-CCOMMIT												
Power <= 39	2	450	0.06	0.04	**0.06**	0.03	***0.01***	***0.12***	0.04	-0.02	0.15	334.0%
Power 40-49	16	10,886	0.29	0.27	**0.32**	0.07	***0.19***	***0.45***	0.27	-0.20	0.84	2.8%
Power >=50					Only 1 Correlation							--
SOCIAL-NCOMMIT												
Power <= 39					No Correlations							--
Power 40-49	16	7,630	0.24	0.20	**0.29**	0.05	0.19	0.39	0.20	-0.10	0.67	7.0%
Power >=50	4	1,954	0.32	0.13	**0.39**	0.07	0.25	0.52	0.13	0.12	0.65	11.9%
SOCIAL-INTSTAY												
Power <= 39	41	17,142	0.15	0.19	**0.18**	0.03	0.12	0.23	0.19	-0.20	0.55	7.9%
Power 40-49	87	35,805	0.15	0.17	**0.17**	0.02	0.13	0.21	0.17	-0.17	0.51	9.7%
Power >=50	21	6,028	0.18	0.22	**0.21**	0.05	0.12	0.31	0.22	-0.23	0.65	8.7%
OCCUP-ORG												

Power <= 39	42	14,780	0.37	0.30	**0.46**	0.05	0.37	0.55	0.30	-0.13	1.05	3.6%
Power 40-49	135	95,681	0.34	0.34	**0.40**	0.03	0.34	0.46	0.34	-0.26	1.07	1.3%
Power >=50	31	8,585	0.36	0.27	**0.42**	0.05	0.32	0.51	0.27	-0.12	0.95	4.2%
OCCUP-IDEOL												
Power <= 39	5	2,907	0.21	0.25	**0.29**	0.11	0.07	0.51	0.25	-0.21	0.78	3.7%
Power 40-49	45	25,314	0.31	0.35	**0.37**	0.05	0.27	0.48	0.35	-0.32	1.07	1.6%
Power >=50	7	2,166	0.46	0.26	**0.53**	0.10	0.34	0.73	0.26	0.02	1.05	3.6%
OCCUP-ACOMMIT												
Power <= 39	19	16,299	0.22	0.25	**0.28**	0.06	0.17	0.39	0.25	-0.21	0.77	2.2%
Power 40-49	51	29,476	0.34	0.29	**0.42**	0.04	0.34	0.50	0.29	-0.15	0.99	2.0%
Power >=50	19	11,793	0.20	0.19	**0.25**	0.04	0.16	0.34	0.19	-0.12	0.62	5.3%
OCCUP-CCOMMIT												
Power <= 39	3	792	0.01	0.05	**0.01**	0.03	***-0.04***	***0.06***	0.05	-0.08	0.10	200.4%
Power 40-49	11	3,011	0.08	0.25	**0.09**	0.08	-0.06	0.24	0.25	-0.40	0.58	8.2%
Power >=50	7	9,930	0.29	0.25	**0.35**	0.09	***0.17***	***0.54***	0.25	-0.13	0.84	1.3%
OCCUP-NCOMMIT												
Power <= 39					Only 1 Correlation							--
Power 40-49	15	5,843	0.01	0.43	**0.02**	0.11	***-0.20***	***0.24***	0.43	-0.82	0.86	1.7%
Power >=50	5	1,116	0.42	0.24	**0.50**	0.11	***0.30***	***0.71***	0.24	0.04	0.97	6.6%
OCCUP-INTSTAY												
Power <= 39	46	17,757	0.15	0.25	**0.17**	0.04	0.10	0.24	0.25	-0.32	0.66	4.9%
Power 40-49	69	33,120	0.16	0.20	**0.19**	0.02	0.14	0.23	0.20	-0.20	0.57	6.3%
Power >=50	10	4,307	0.19	0.21	**0.24**	0.07	0.11	0.37	0.21	-0.17	0.65	6.0%
ORG-IDEOL												
Power <= 39	7	3,395	0.19	0.16	**0.21**	0.06	***0.10***	***0.33***	0.16	-0.09	0.52	9.9%
Power 40-49	65	43,729	0.41	0.36	**0.48**	0.04	***0.40***	***0.57***	0.36	-0.22	1.18	1.2%
Power >=50	12	2,742	0.40	0.33	**0.45**	0.10	0.26	0.63	0.33	-0.20	1.09	3.7%
ORG-ACOMMIT												
Power <= 39	22	8,665	0.42	0.18	**0.50**	0.04	***0.43***	***0.58***	0.18	0.15	0.86	7.7%
Power 40-49	151	94,149	0.29	0.30	**0.34**	0.02	***0.29***	***0.39***	0.30	-0.24	0.93	1.7%
Power >=50	46	31,589	0.22	0.27	**0.26**	0.04	***0.18***	***0.34***	0.27	-0.26	0.78	2.0%
ORG-CCOMMIT												
Power <= 39					No Correlations							--
Power 40-49	36	17,343	0.24	0.29	**0.27**	0.05	***0.17***	***0.36***	0.29	-0.30	0.83	3.2%
Power >=50	21	4,791	0.03	0.20	**0.04**	0.04	***-0.05***	***0.12***	0.20	-0.36	0.44	14.0%
ORG-NCOMMIT												

Power <= 39						No Correlations						--
Power 40-49	31	12,636	0.21	0.24	**0.25**	0.04	0.17	0.34	0.24	-0.22	0.72	5.6%
Power >=50	15	3,238	0.22	0.17	**0.25**	0.04	0.16	0.34	0.17	-0.09	0.59	16.7%
ORG-INTSTAY												
Power <= 39	39	18,848	0.06	0.33	**0.07**	0.05	***-0.03***	***0.17***	0.33	-0.57	0.71	2.1%
Power 40-49	188	20,051	0.17	0.20	**0.19**	0.01	***0.16***	***0.22***	0.20	-0.21	0.59	4.2%
Power >=50	47	12,444	0.27	0.19	**0.30**	0.03	***0.25***	***0.36***	0.19	-0.07	0.67	10.9%
IDEOL-ACOMMIT												
Power <= 39	3	493	0.54	0.30	**0.64**	0.17	0.31	0.98	0.30	0.06	1.23	3.7%
Power 40-49	41	23,145	0.48	0.22	**0.58**	0.03	0.51	0.65	0.22	0.16	1.00	3.0%
Power >=50	17	6,819	0.38	0.43	**0.46**	0.11	0.26	0.67	0.43	-0.39	1.31	1.0%
IDEOL-CCOMMIT												
Power <= 39						No Correlations						--
Power 40-49	16	4,123	0.19	0.29	**0.22**	0.07	0.08	0.36	0.29	-0.35	0.79	5.5%
Power >=50	5	1,944	0.22	0.14	**0.26**	0.06	0.14	0.39	0.14	-0.02	0.54	15.9%
IDEOL-NCOMMIT												
Power <= 39						No Correlations						--
Power 40-49	10	4,174	0.27	0.20	**0.34**	0.06	0.22	0.47	0.20	-0.05	0.74	6.9%
Power >=50	5	1,610	0.36	0.37	**0.49**	0.16	0.16	0.81	0.37	-0.24	1.21	2.4%
IDEOL-INTSTAY												
Power <= 39	13	7,200	-0.02	0.31	**-0.03**	0.09	***-0.19***	***0.14***	0.31	-0.63	0.58	2.2%
Power 40-49	50	20,569	0.15	0.22	**0.18**	0.03	0.12	0.24	0.22	-0.26	0.61	5.3%
Power >=50	18	6,478	0.24	0.28	**0.29**	0.07	***0.16***	***0.42***	0.28	-0.26	0.83	3.9%
ACOMMIT-CCOMMIT												
Power <= 39	2	622	0.07	0.24	**0.08**	0.17	-0.25	0.41	0.24	-0.39	0.55	7.6%
Power 40-49	42	23,360	0.21	0.27	**0.27**	0.04	0.19	0.35	0.27	-0.25	0.79	3.2%
Power >=50	34	14,921	0.15	0.27	**0.20**	0.05	0.11	0.29	0.27	-0.33	0.73	4.1%
ACOMMIT-NCOMMIT												
Power <= 39	5	1,295	0.25	0.14	**0.30**	0.06	***0.18***	***0.43***	0.14	0.02	0.58	24.6%
Power 40-49	25	8,739	0.52	0.18	**0.63**	0.04	***0.56***	***0.70***	0.18	0.27	0.99	5.9%
Power >=50	16	5,444	0.43	0.26	**0.53**	0.06	0.41	0.66	0.26	0.03	1.03	4.0%
ACOMMIT-INTSTAY												
Power <= 39	19	6,661	0.48	0.08	**0.57**	0.02	***0.54***	***0.61***	0.08	0.42	0.72	40.1%
Power 40-49	149	114,295	0.33	0.29	**0.38**	0.02	***0.33***	***0.42***	0.29	-0.18	0.94	1.5%
Power >=50	51	23,402	0.44	0.26	**0.52**	0.04	***0.45***	***0.59***	0.26	0.01	1.04	2.6%
CCOMMIT-NCOMMIT												

Power <= 39					No Correlations							--
Power 40-49	19	6,937	0.17	0.18	**0.22**	0.04	0.14	0.30	0.18	-0.13	0.56	12.7%
Power >=50	26	8,641	0.11	0.27	**0.15**	0.05	0.05	0.26	0.27	-0.38	0.69	5.2%
CCOMMIT-INTSTAY												
Power <= 39	4	1,093	0.21	0.28	**0.26**	0.14	-0.01	0.54	0.28	-0.29	0.82	5.6%
Power 40-49	51	29,303	0.12	0.25	**0.13**	0.03	0.06	0.20	0.25	-0.35	0.61	3.5%
Power >=50	32	16,531	0.24	0.26	**0.29**	0.05	0.20	0.38	0.26	-0.21	0.80	3.4%
NCOMMIT-INTSTAY												
Power <= 39	3	967	0.51	0.13	**0.56**	0.08	***0.42***	***0.71***	0.13	0.31	0.82	11.4%
Power 40-49	44	15,103	0.25	0.23	**0.28**	0.03	***0.22***	***0.35***	0.23	-0.17	0.74	6.3%
Power >=50	19	6,677	0.25	0.32	**0.31**	0.07	0.16	0.45	0.32	-0.33	0.94	2.9%

k = number of effect sizes included in each analysis, N = sample size, Mr = mean uncorrected correlation, SDr = standard deviation of uncorrected correlation, Mρ = mean corrected correlation (corrected for unreliability in each variable), $SE_{M\rho}$ = standard error of Mρ, 95% Conf Interval = confidence interval for Mρ, SDρ = standard deviation of estimated ρ's, 95% Cred Interval = credibility interval of Mρ.

Bold, italicized numbers indicate moderator presence.

Table B5 – Moderator Analysis – Power Distance

Summary of Significant Moderators – Power Distance							
Construct 1	**Construct 2**	**Strongest Association→Weakest Association**					
			Mρ		***Mρ***		***Mρ***
Social RM	Occupational RM	High Power Dist	.60	Moderate Power Dist	.36	Low Power Dist	.22
Social RM	Ideological RM	Moderate Power Dist	.49	Low Power Dist	.17	--	--
Social RM	Affective Commitment	Low Power Dist	.50	High Power Dist	.32	--	--
Social RM	Continuance Commitment	Moderate Power Dist	.32	Low Power Dist	.06	--	--
Occupational RM	Continuance Commitment	High Power Dist	.35	Low Power Dist	.01 ns	--	--
Occupational RM	Normative Commitment	High Power Dist	.50	Moderate Power Dist	.02 ns	--	--
Organizational RM	Ideological RM	Moderate Power Dist	.48	Low Power Dist	.21	--	--
Organizational RM	Affective Commitment	Low Power Dist	.50	Moderate Power Dist	.34	High Power Dist	.26
Organizational RM	Continuance Commitment	Moderate Power Dist	.27	High Power Dist	.04 ns	--	--
Organizational RM	Intent to Stay	High Power Dist	.30	Moderate Power Dist	.19	Low Power Dist	.07 ns
Ideological RM	Intent to Stay	High Power Dist	.29	Low Power Dist	.03 ns	--	--
Affective Commitment	Normative Commitment	Moderate Power Dist	.63	Low Power Dist	.30	--	--
Affective Commitment	Intent to Stay	Low Power Dist	.57	High Power Dist	.52	Moderate Power Dist	.38
Normative Commitment	Intent to Stay	Low Power Dist	.56	Moderate Power Dist	.28	--	--

Table B6 – Moderator Analysis – Summary of Significant Moderators for Power Distance

Hofstede's Cultural Dimension: Long- v. Short-Term Orientation												
							95% Conf Interval			95% Cred Interval		
Construct Correlations	k	N	Mr	SDr	Mρ	$SE_{M\rho}$	L	U	SDρ	L	U	% Due to Artifacts
SOCIAL-OCCUP												
LTO <=29	55	0,654	0.24	0.33	**0.30**	0.04	0.21	0.39	0.33	-0.35	0.95	1.4%
LTO >=30	50	17,207	0.24	0.21	**0.29**	0.03	0.23	0.35	0.21	-0.12	0.71	7.7%
SOCIAL-ORG												
LTO <=29	133	73,722	0.35	0.37	**0.41**	0.03	0.35	0.47	0.37	-0.32	1.14	1.3%
LTO >=30	25	6,384	0.33	0.18	**0.37**	0.04	0.31	0.45	0.18	0.02	0.73	12.8%
SOCIAL-IDEOL												
LTO <=29	53	4,831	0.37	0.27	**0.45**	0.04	0.38	0.53	0.27	-0.07	0.98	3.3%
LTO >=30	11	5,485	0.17	0.28	**0.22**	0.09	0.06	0.39	0.28	-0.33	0.78	2.9%
SOCIAL-ACOMMIT												
LTO <=29	71	30,036	0.37	0.22	**0.44**	0.03	0.39	0.49	0.22	0.00	0.87	5.1%
LTO >=30	16	1,151	0.26	0.16	**0.32**	0.04	0.24	0.40	0.16	0.01	0.63	7.1%
SOCIAL-CCOMMIT												
LTO <=29	15	0,680	0.29	0.27	**0.32**	0.07	***0.19***	***0.46***	0.27	-0.21	0.85	2.7%
LTO >=30	2	450	0.06	0.04	**0.06**	0.03	***0.01***	***0.12***	0.04	-0.02	0.15	334.0%
SOCIAL-NCOMMIT												
LTO <=29	16	7,630	0.24	0.20	**0.29**	0.05	0.19	0.39	0.20	-0.10	0.67	7.0%
LTO >=30	3	1,040	0.41	0.10	**0.49**	0.06	0.37	0.61	0.10	0.29	0.69	24.7%
SOCIAL-INTSTAY												
LTO <=29	102	0,990	0.16	0.18	**0.18**	0.02	0.14	0.21	0.18	-0.17	0.53	9.3%
LTO >=30	39	15,068	0.14	0.20	**0.17**	0.03	0.10	0.23	0.20	-0.23	0.57	7.5%
OCCUP-ORG												
LTO <=29	166	107,320	0.34	0.34	**0.41**	0.03	0.36	0.46	0.34	-0.25	1.07	1.4%
LTO >=30	26	7,841	0.27	0.28	**0.32**	0.06	0.22	0.43	0.28	-0.23	0.88	4.6%
OCCUP-IDEOL												

LTO <=29	46	25,625	0.31	0.35	**0.38**	0.05	0.28	0.48	0.35	-0.31	1.06	1.6%
LTO >=30	11	4,762	0.30	0.29	**0.38**	0.09	0.21	0.56	0.29	-0.19	0.95	2.9%
OCCUP-ACOMMIT												
LTO <=29	62	43,029	0.31	0.27	**0.38**	0.03	0.31	0.44	0.27	-0.15	0.91	2.0%
LTO >=30	23	13,436	0.18	0.24	**0.23**	0.05	0.13	0.32	0.24	-0.24	0.70	3.7%
OCCUP-CCOMMIT												
LTO <=29	11	3,147	0.08	0.19	**0.10**	0.06	-0.01	0.21	0.19	-0.26	0.47	15.0%
LTO >=30	9	10,380	0.27	0.26	**0.34**	0.09	0.17	0.51	0.26	-0.16	0.84	1.5%
OCCUP-NCOMMIT												
LTO <=29	16	6,185	0.04	0.44	**0.05**	0.11	***-0.16***	***0.27***	0.44	-0.81	0.92	1.6%
LTO >=30	2	646	0.52	0.06	**0.61**	0.04	***0.54***	***0.69***	0.06	0.50	0.72	66.9%
OCCUP-INTSTAY												
LTO <=29	82	37,864	0.17	0.19	**0.20**	0.02	0.16	0.24	0.19	-0.18	0.58	6.8%
LTO >=30	40	16,467	0.12	0.26	**0.14**	0.04	0.06	0.22	0.26	-0.37	0.64	4.4%
ORG-IDEOL												
LTO <=29	45	22,942	0.37	0.35	**0.45**	0.05	0.35	0.55	0.35	-0.23	1.13	1.5%
LTO >=30	15	4,959	0.32	0.27	**0.36**	0.07	0.22	0.50	0.27	-0.17	0.89	3.9%
ORG-ACOMMIT												
LTO <=29	160	99,797	0.30	0.29	**0.35**	0.02	0.30	0.40	0.29	-0.22	0.92	1.8%
LTO >=30	48	31,861	0.22	0.26	**0.25**	0.04	0.18	0.33	0.26	-0.26	0.77	2.2%
ORG-CCOMMIT												
LTO <=29	34	16,931	0.23	0.29	**0.26**	0.05	***0.17***	***0.36***	0.29	-0.30	0.83	3.1%
LTO >=30	20	4,530	0.03	0.21	**0.03**	0.05	***-0.06***	***0.13***	0.21	-0.38	0.45	13.3%
ORG-NCOMMIT												
LTO <=29	29	12,224	0.21	0.24	**0.25**	0.05	0.16	0.34	0.24	-0.23	0.73	5.1%
LTO >=30	11	2,588	0.20	0.10	**0.23**	0.03	0.17	0.29	0.10	0.03	0.42	48.2%
ORG-INTSTAY												
LTO <=29	209	28,485	0.17	0.20	**0.20**	0.01	***0.17***	***0.22***	0.20	-0.20	0.59	4.5%
LTO >=30	53	20,105	0.07	0.34	**0.08**	0.05	***-0.01***	***0.17***	0.34	-0.58	0.73	2.5%
IDEOL-ACOMMIT												
LTO <=29	44	23,741	0.48	0.22	**0.58**	0.03	0.52	0.65	0.22	0.15	1.01	3.0%
LTO >=30	15	6194.00	0.36	**0.45**	0.44	0.116	0.21	0.67	0.45	-0.44	1.32	1.0%

IDEOL-CCOMMIT												
LTO <=29	16	4,123	0.19	0.29	**0.22**	0.07	0.08	0.36	0.29	-0.35	0.79	5.5%
LTO >=30	3	1,422	0.20	0.15	**0.23**	0.09	0.06	0.41	0.15	-0.07	0.53	11.1%
IDEOL-NCOMMIT												
LTO <=29	10	4,174	0.27	0.20	**0.34**	0.06	0.22	0.47	0.20	-0.05	0.74	6.9%
LTO >=30	5	1,610	0.36	0.37	**0.49**	0.16	0.16	0.81	0.37	-0.24	1.21	2.4%
IDEOL-INTSTAY												
LTO <=29	54	21,832	0.17	0.22	**0.19**	0.03	0.13	0.25	0.22	-0.25	0.63	5.2%
LTO >=30	25	11,893	0.06	0.33	**0.08**	0.07	-0.05	0.21	0.33	-0.57	0.72	2.3%
ACOMMIT-CCOMMIT												
LTO <=29	44	23,982	0.21	0.27	**0.27**	0.04	0.19	0.35	0.27	-0.26	0.79	3.2%
LTO >=30	34	12,066	0.11	0.27	**0.14**	0.05	0.05	0.23	0.27	-0.40	0.68	5.1%
ACOMMIT-NCOMMIT												
LTO <=29	26	9,050	0.52	0.18	**0.63**	0.04	0.56	0.70	0.18	0.27	0.98	6.1%
LTO >=30	14	4,194	0.38	0.23	**0.45**	0.06	0.33	0.57	0.23	0.00	0.90	5.9%
ACOMMIT-INTSTAY												
LTO <=29	154	16,742	0.33	0.28	**0.38**	0.02	0.34	0.43	0.28	-0.18	0.94	1.5%
LTO >=30	52	18,882	0.40	0.27	**0.49**	0.04	0.41	0.56	0.27	-0.03	1.01	3.3%
CCOMMIT-NCOMMIT												
LTO <=29	19	6,937	0.17	0.18	**0.22**	0.04	0.14	0.30	0.18	-0.13	0.56	12.7%
LTO >=30	24	7,391	0.05	0.19	**0.06**	0.04	-0.01	0.14	0.19	-0.30	0.43	12.3%
CCOMMIT-INTSTAY												
LTO <=29	53	29,925	0.12	0.25	**0.13**	0.03	0.07	0.20	0.25	-0.36	0.62	3.5%
LTO >=30	26	9,402	0.18	0.31	**0.22**	0.06	0.10	0.34	0.31	-0.40	0.83	3.2%
NCOMMIT-INTSTAY												
LTO <=29	47	16,070	0.26	0.24	**0.30**	0.03	0.23	0.37	0.24	-0.16	0.76	5.8%
LTO >=30	15	4,177	0.15	0.31	**0.16**	0.08	0.01	0.32	0.31	-0.44	0.77	4.0%

k = number of effect sizes included in each analysis, N = sample size, Mr = mean uncorrected correlation, SDr = standard deviation of uncorrected correlation, Mρ = mean corrected correlation (corrected for unreliability in each variable), $SE_{M\rho}$ = standard error of Mρ, 95% Conf Interval = confidence interval for Mρ, SDρ = standard deviation of estimated ρ's, 95% Cred Interval = credibility interval of Mρ.

Bold, italicized numbers indicate moderator presence.

Table B7 – Moderator Analysis – Long- v. Short-Term Orientation

APPENDIX C – UNSTANDARDIZED SEM RESULTS

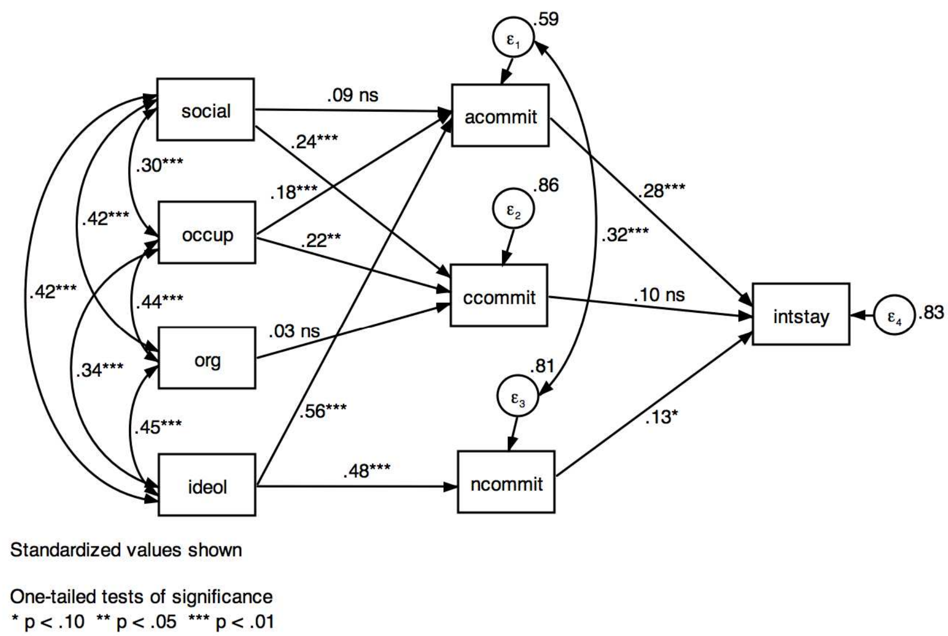


Figure C1 – Unstandardized SEM Model

APPENDIX D – COVARIANCE MATRIX OF SEM MODEL COEFFICIENTS

		ACOMMIT			CCOMMIT			NCOMMIT	INTSTAY		
		SOCIAL	OCCUP	IDEOL	SOCIAL	OCCUP	ORG	IDEOL	ACOMMIT	CCOMMIT	NCOMMIT
ACOMMIT	SOCIAL	.0045									
	OCCUP	-.0009	.0044								
	IDEOL	-.0023	-.0017	.0064							
CCOMMIT	SOCIAL	.0001	-.0001	-8.03-06	.0073						
	OCCUP	-.0000	.0001	-.0000	-.0012	.0092					
	ORG	-3.37-06	9.77-06	.0000	-.0032	-.0045	.0089				
NCOMMIT	IDEOL	-.0000	-8.32-06	.0024	7.42-06	-2.90-06	2.65-06	.0054			
INTSTAY	ACOMMIT	1.84-19	1.58-19	-7.79-19	-1.19-19	-1.06-19	-1.57-19	-9.56-19	.0055		
	CCOMMIT	1.19-19	1.69-19	-7.91-20	3.03-19	2.23-19	1.71-19	5.90-20	-.0008	.0037	
	NCOMMIT	1.14-20	-2.47-19	7.70-19	5.86-20	-7.06-20	1.92-20	1.04-18	-.0031	-.0002	.0054

Table D1 – Covariance Matrix of Coefficients of the SEM Model

APPENDIX E – MODERATOR DESCRIPTIVE STATISTICS & ALTERNATE MODERATOR RESULTS

Descriptive Statistics - Moderator Variables					
Variable	**k**	**Mean**	**SD**	**Min**	**Max**
ACOMMIT-INTSTAY					
z-Transformed Correlation	228	0.35	0.32	-1.69	1.07
Mean Age	182	33.69	8.90	18	61
% Male Respondents	180	53.38	29.86	2	100
Commitment Scale Dummy-Porter et al.	228	0.21	0.41	0	1
Commitment Scale Dummy - Other	228	0.48	0.50	0	1
Individualism v. Collectivism Score	220	78.09	24.01	17	91
Power Distance Score	220	47.04	15.53	22	104
Uncertainty Avoidance Score	219	42.07	13.99	20	83
Masculinity v. Femininity Score	220	59.88	6.41	39	95
Long- v. Short-Term Orientation Score	206	36.00	19.78	16	118
CCOMMIT-INTSTAY					
z-Transformed Correlation	89	0.14	0.27	-0.99	1.07
Mean Age	76	35.01	9.30	18.2	61
% Male Respondents	70	52.74	25.50	8	99
Commitment Scale Dummy-Porter et al.	89	0.00	0.00	0	0
Commitment Scale Dummy - Other	89	0.52	0.50	0	1
Individualism v. Collectivism Score	88	77.02	22.34	18	91
Power Distance Score	88	50.83	15.12	36	90
Uncertainty Avoidance Score	87	50.24	20.76	21	100
Masculinity v. Femininity Score	88	57.33	7.84	14	66
Long- v. Short-Term Orientation Score	79	35.03	15.73	23	118
IDEOL-ACOMMIT					
z-Transformed Correlation	67	0.52	0.31	-0.23	1.48
Mean Age	36	35.00	6.85	22	45
% Male Respondents	43	54.75	22.70	16	87
Commitment Scale Dummy-Porter et al.	67	0.15	0.36	0	1
Commitment Scale Dummy - Other	67	0.51	0.50	0	1
Individualism v. Collectivism Score	62	73.68	27.48	17	91
Power Distance Score	62	49.61	16.34	36	90
Uncertainty Avoidance Score	62	38.82	10.49	20	79
Masculinity v. Femininity Score	62	58.97	6.04	42	66
Long- v. Short-Term Orientation Score	59	40.49	24.00	16	118
IDEOL-NCOMMIT					
z-Transformed Correlation	16	0.35	0.26	0.02	0.86
Mean Age	14	37.12	6.80	24.5	45

% Male Respondents	14	45.48	20.97	16	78
Commitment Scale Dummy-Porter et al.	16	0.00	0.00	0	0
Commitment Scale Dummy - Other	16	0.56	0.51	0	1
Individualism v. Collectivism Score	15	77.53	24.73	20	91
Power Distance Score	15	50.93	16.39	40	80
Uncertainty Avoidance Score	15	42.47	17.72	21	75
Masculinity v. Femininity Score	15	58.73	8.26	43	66
Long- v. Short-Term Orientation Score	15	42.87	30.77	29	118
NCOMMIT-INTSTAY					
z-Transformed Correlation	68	0.24	0.25	-0.99	0.68
Mean Age	61	36.15	11.31	18.2	61
% Male Respondents	59	45.46	25.74	0	98
Commitment Scale Dummy-Porter et al.	68	0.00	0.00	0	0
Commitment Scale Dummy - Other	68	0.46	0.50	0	1
Individualism v. Collectivism Score	66	81.62	17.69	20	91
Power Distance Score	66	47.89	12.84	39	80
Uncertainty Avoidance Score	66	47.26	18.89	21	83
Masculinity v. Femininity Score	66	58.23	6.64	43	66
Long- v. Short-Term Orientation Score	62	33.55	16.10	23	118
OCCUP-ACOMMIT					
z-Transformed Correlation	99	0.34	0.30	-0.41	1.38
Mean Age	66	34.09	6.05	22	49
% Male Respondents	72	51.95	25.11	5	99
Commitment Scale Dummy-Porter et al.	99	0.16	0.37	0	1
Commitment Scale Dummy - Other	99	0.55	0.50	0	1
Individualism v. Collectivism Score	90	75.49	27.02	17	91
Power Distance Score	90	46.11	14.47	35	104
Uncertainty Avoidance Score	90	40.07	12.81	20	79
Masculinity v. Femininity Score	90	58.32	7.50	39	66
Long- v. Short-Term Orientation Score	85	37.88	21.11	23	118
OCCUP-CCOMMIT					
z-Transformed Correlation	24	0.14	0.25	-0.27	0.74
Mean Age	8	37.67	4.04	32	42
% Male Respondents	15	39.78	18.08	14	80
Commitment Scale Dummy-Porter et al.	24	0.00	0.00	0	0
Commitment Scale Dummy - Other	24	0.58	0.50	0	1
Individualism v. Collectivism Score	21	66.29	31.77	20	91
Power Distance Score	21	51.48	16.81	35	77
Uncertainty Avoidance Score	15	36.80	4.07	26	43
Masculinity v. Femininity Score	21	53.38	14.62	14	66
Long- v. Short-Term Orientation Score	20	37.60	10.70	25	61
ORG-CCOMMIT					

z-Transformed Correlation	57	0.10	0.26	-0.33	0.74
Mean Age	42	32.43	5.56	21	40
% Male Respondents	47	37.21	15.13	18.55	74.7
Commitment Scale Dummy-Porter et al.	57	0.00	0.00	0	0
Commitment Scale Dummy - Other	57	0.70	0.46	0	1
Individualism v. Collectivism Score	57	83.40	11.10	30	91
Power Distance Score	57	49.96	13.03	40	90
Uncertainty Avoidance Score	57	53.95	22.25	37	83
Masculinity v. Femininity Score	57	58.88	4.48	42	63
Long- v. Short-Term Orientation Score	54	32.33	4.39	29	38
SOCIAL-ACOMMIT					
z-Transformed Correlation	103	0.34	0.22	-0.18	1.19
Mean Age	74	35.42	6.30	22.9	52.16
% Male Respondents	78	55.27	24.28	2	99
Commitment Scale Dummy-Porter et al.	103	0.19	0.40	0	1
Commitment Scale Dummy - Other	103	0.45	0.50	0	1
Individualism v. Collectivism Score	95	76.33	25.33	17	91
Power Distance Score	95	44.97	14.94	13	104
Uncertainty Avoidance Score	95	40.63	11.63	20	74
Masculinity v. Femininity Score	95	58.99	7.26	39	88
Long- v. Short-Term Orientation Score	87	34.45	19.61	16	118
SOCIAL-CCOMMIT					
z-Transformed Correlation	22	0.09	0.17	-0.15	0.58
Mean Age	11	35.67	6.46	22.9	42
% Male Respondents	12	39.11	22.33	14	92
Commitment Scale Dummy-Porter et al.	22	0.00	0.00	0	0
Commitment Scale Dummy - Other	22	0.36	0.49	0	1
Individualism v. Collectivism Score	19	85.63	13.51	37	91
Power Distance Score	19	41.63	6.30	38	66
Uncertainty Avoidance Score	19	39.68	8.52	37	74
Masculinity v. Femininity Score	19	56.11	15.34	14	63
Long- v. Short-Term Orientation Score	17	30.76	4.98	29	44

Table E1 – Moderator Descriptive Statistics

Alternate Moderator Results								
Structural Relationship	**Moderator Variables**						**Total # of Effect Sizes (k) Available (k after Listwise Deletion)**	**Adj. R^2**
	Indiv v. Collect *(b1)*	**Power Distance** *(b2)*	**Uncertainty Avoidance** *(b3)*	**Masc v. Fem** *(b4)*	**Long- v. Short-Term Orientation** *(b5)*	**Commit Scale**[b] *(b6-b7)*		
SOCIAL-ACOMMIT	--	--	--	--	--	**.11***[d] (1.98) [.45]	103 (87)	.00
SOCIAL-CCOMMIT	Omitted	Omitted	Omitted	--	Omitted	**.25****[d] (2.74) [1.83]	21 (17)	.26
OCCUP-ACOMMIT	--	--	--	--	--	**-.19*** (-1.87) [.43]	99 (85)	--
OCCUP-CCOMMIT	--	Omitted	--	--	Omitted	--	24 (14)	--
ORG-CCOMMIT	Omitted	Omitted	**-.00*** (-1.82) [.54]	Omitted	Omitted	--	57 (54)	.03
IDEOL-ACOMMIT	--	--	--	**.05***** (2.79) [.78]	--	--	67 (59)	.07
IDEOL-NCOMMIT	Omitted	Omitted	**-.01**** (-2.48) [1.87]	Omitted	--	--	16 (15)	.38
ACOMMIT-INTSTAY	**-.01***** (-2.89) [.41]	**-.01***** (-2.63) [.37]	--	--	--	**-.13***[c] (-1.92) [.27]	228 (205)	.08
CCOMMIT-INTSTAY	--	--	--	--	--	--	89 (78)	--
NCOMMIT-INTSTAY	**-.03**** (-2.16) [.59]	Omitted	--	--	**-.03**** (-2.65) [.72]	--	68 (62)	.17

* p<.10 ** p<.05 *** p<.01; (t-value) [Cohen's d]; a – based on % of males in the study, higher value = more males b – Omitted (comparison) scale is Meyer & Allen (1991) c – Significant difference between Meyer & Allen (1991) and Mowday et al. (1979) d – Significant difference between Meyer & Allen (1991) and "Other" scales

Table E2 – Alternate Moderator Results

APPENDIX F – RANGER QUALIFICATION

I use candidates' Ranger status (binary, 1=Ranger qualified, 0=Not Ranger qualified) as a proxy for organization-relevant job skills and job tenure. I examined the total time in service for Ranger qualified candidates versus the total time in service for non-Ranger qualified candidates. Unfortunately, time in service measurements[104] were only captured from late 2012 to 2013, therefore only 3,749 of the 21,070 cases (17.8%) have a time in service variable. Despite the low percentage, the average time in service for a Ranger qualified candidate is 5.70 years (range: 2.04 – 18.00 years), a full 2.5 years longer than non-Ranger qualified candidates at 3.24 years (range: .05 – 23 years). Figures F1 and F2 show the heavy skew of low job tenure among non-Ranger qualified candidates, whereas Ranger qualified candidates clearly have longer job tenure.

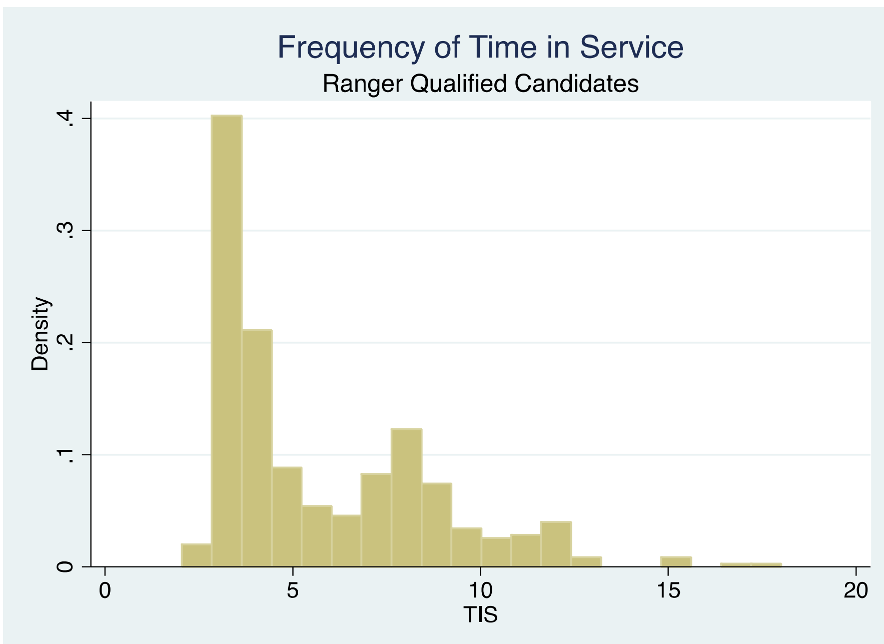


Figure F1 – Job Tenure Among Ranger Qualified Candidates

[104]Time in service was captured in the SFAS data only.

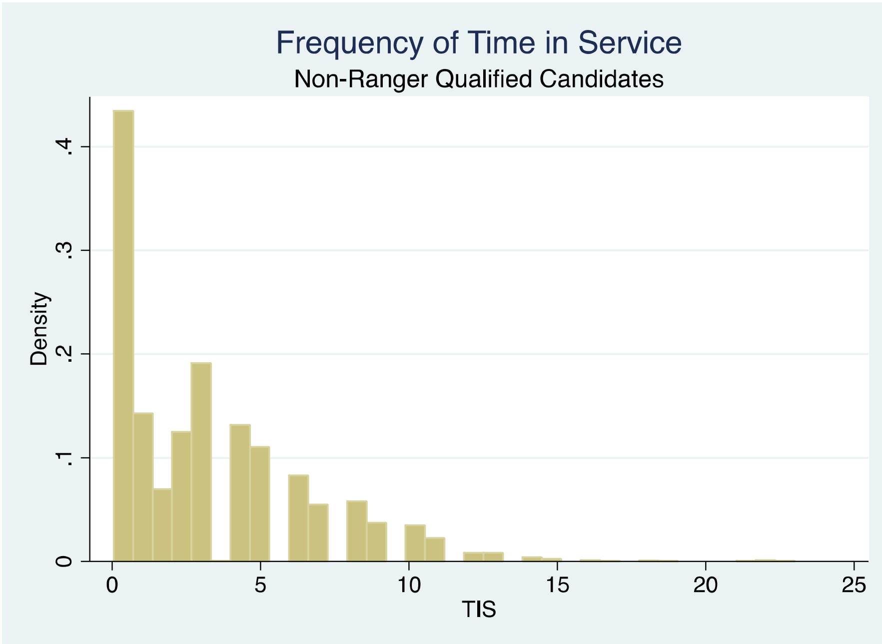


Figure F2 – Job Tenure Among Non-Ranger Qualified Candidates

APPENDIX G – MULITVARIATE OUTLIER & INFLUENCIAL CASES TESTS

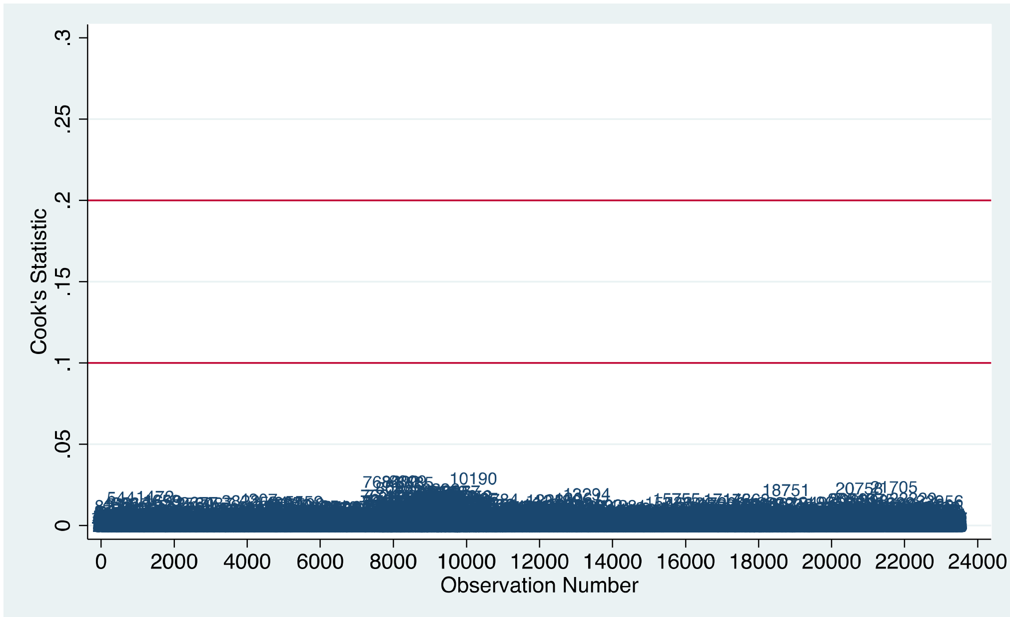


Figure G1 – Cook's Statistic

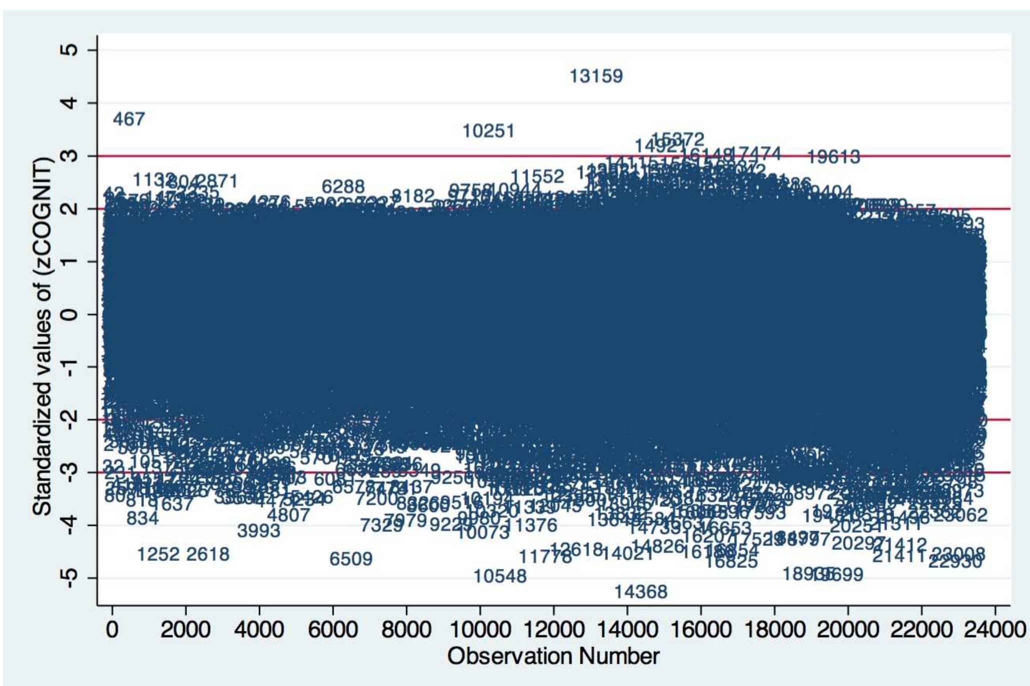


Figure G2 – Cognitive Ability Outliers

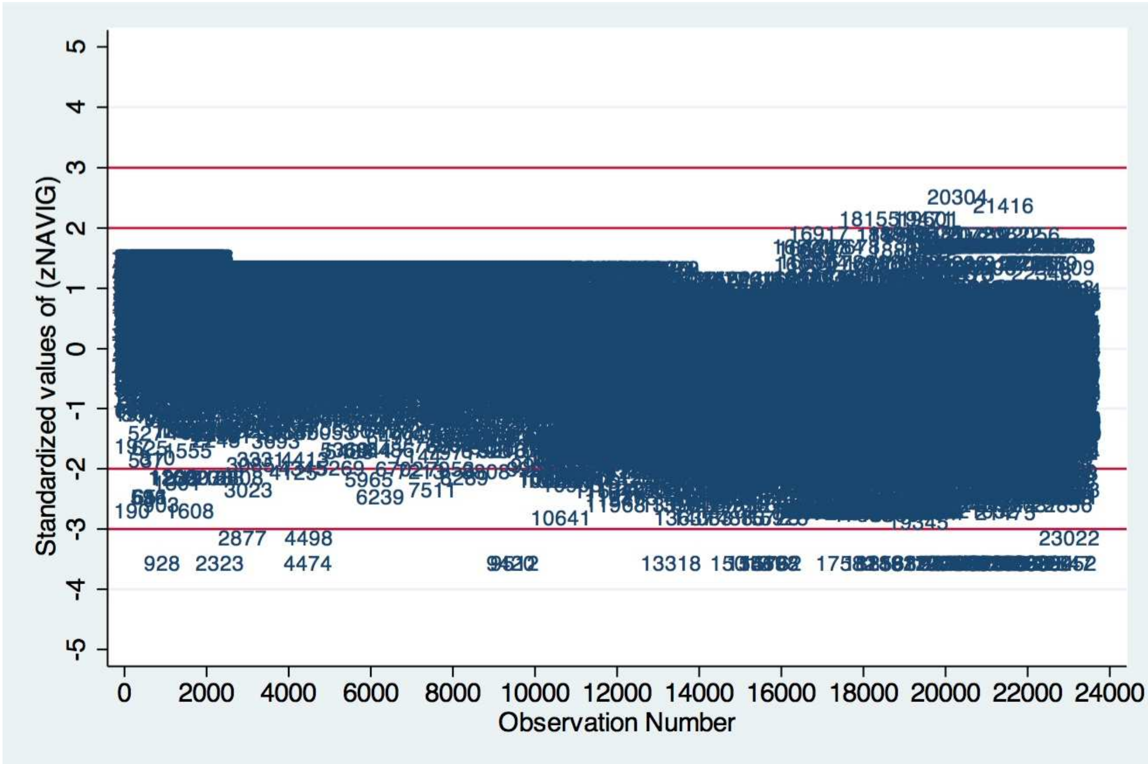


Figure G3 – Navigational Ability Outliers

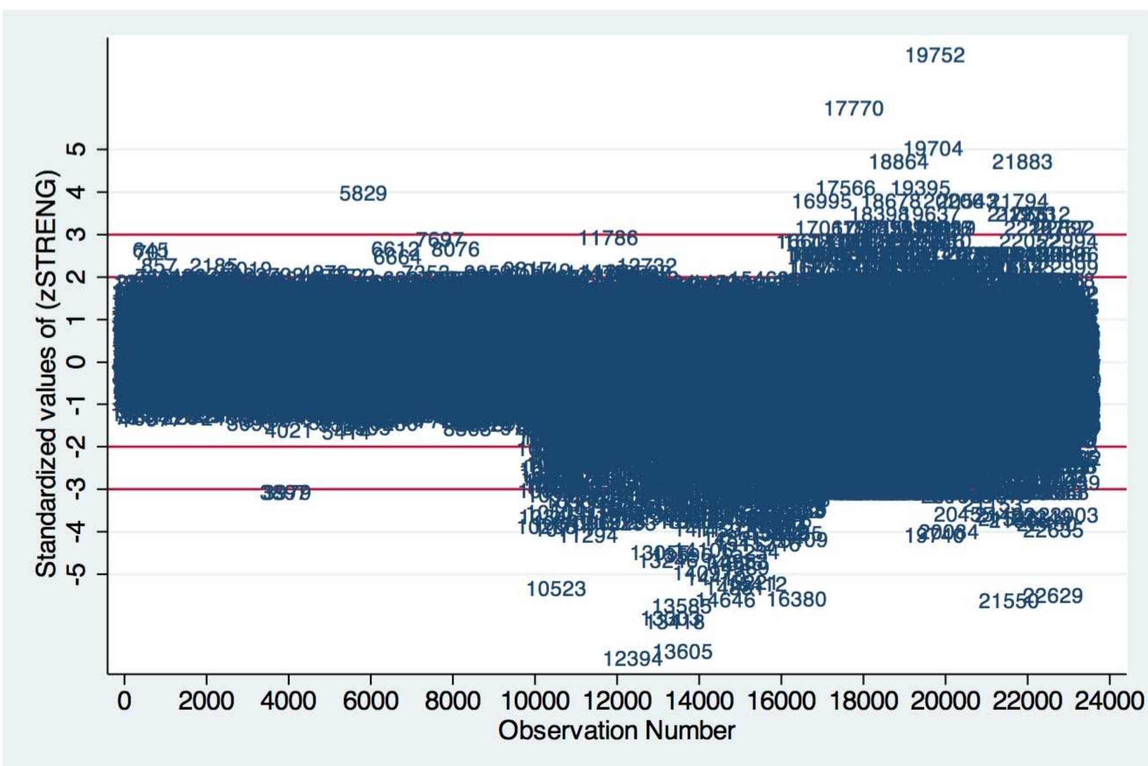


Figure G4 – Physical Strength Outliers

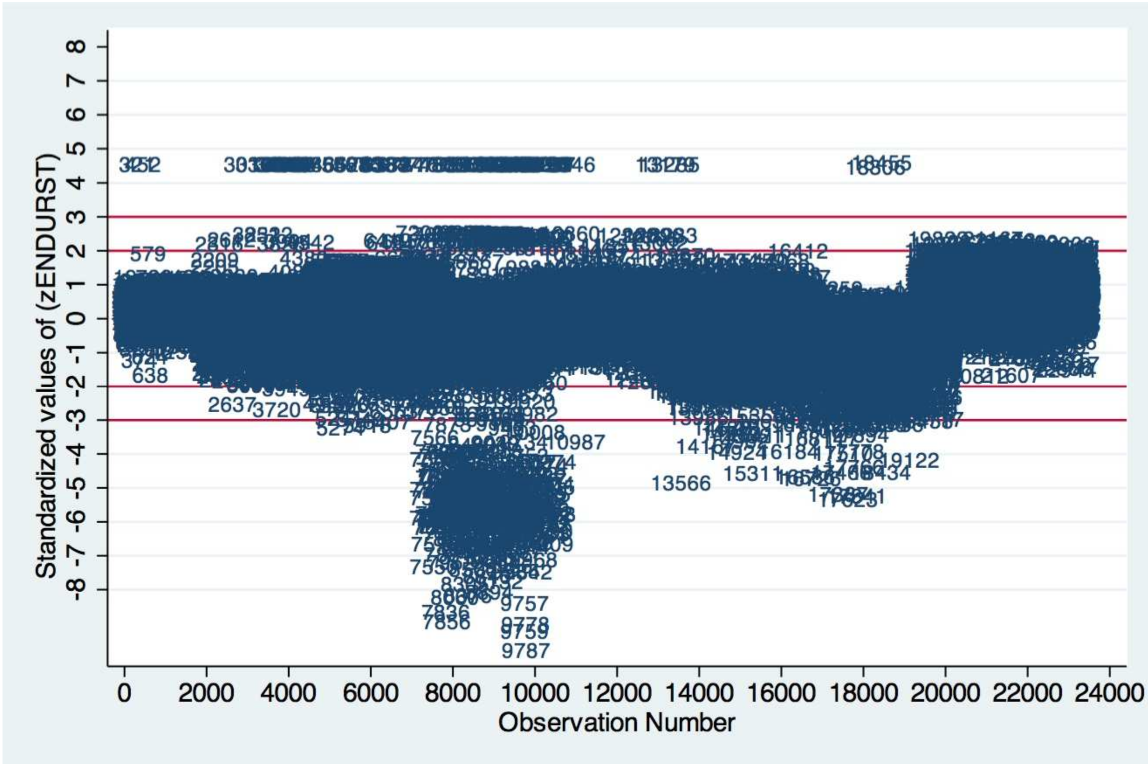


Figure G5 – Short-Term Endurance Outliers

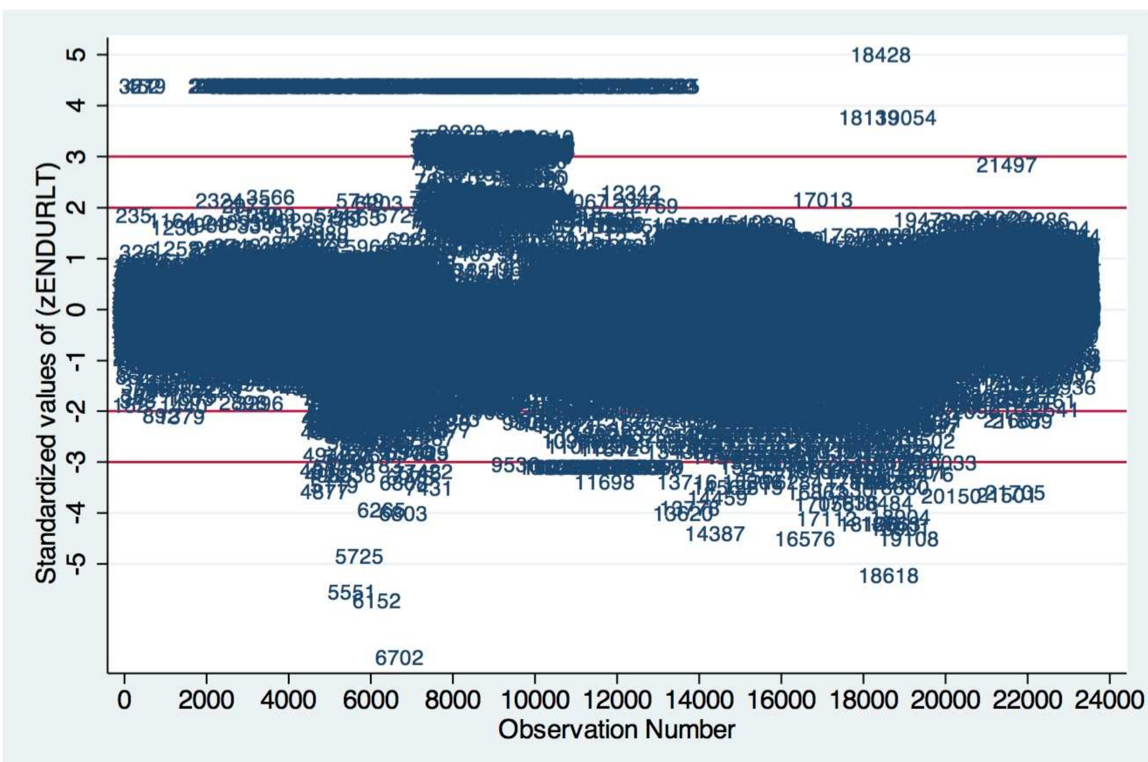


Figure G6 – Long-Term Endurance Outliers

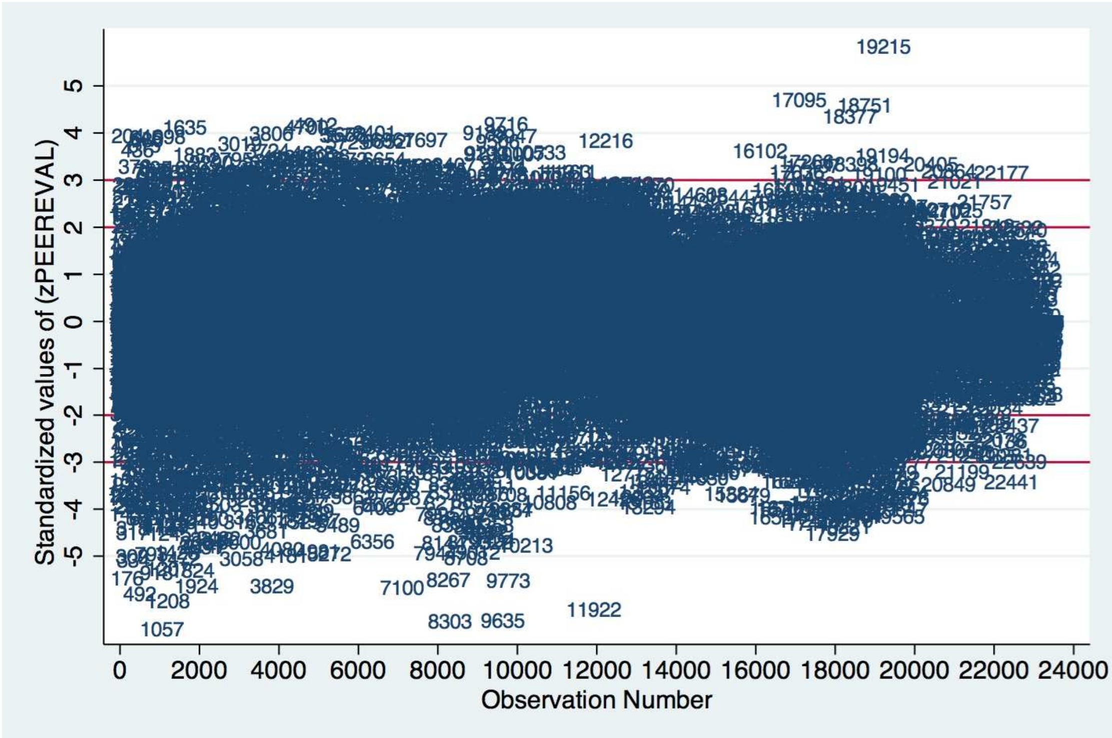


Figure G7 – Peer Evaluation Outliers

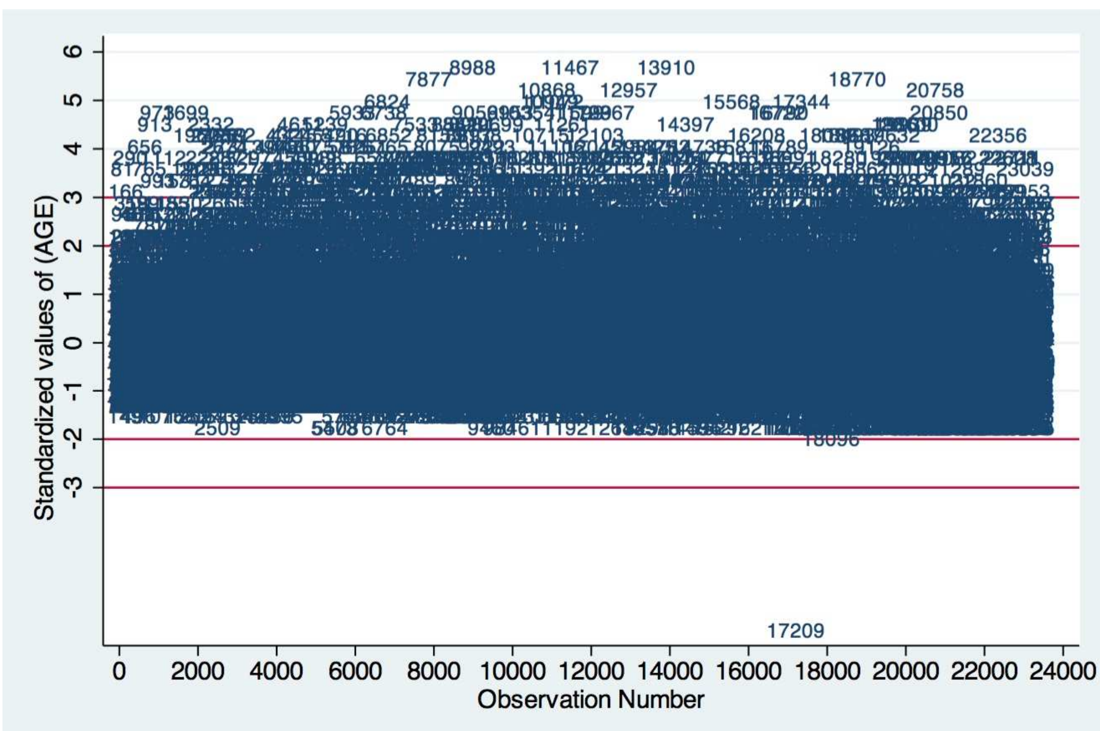


Figure G8 – Age Outliers

APPENDIX H – PATTERN OF MISSING VARIABLES

Pattern of Missing Variables								
	2013	2012	2011	2010	2009	2008	2007	2006
ED								
TIS								
GT								
WL	0							
MAB2								
VIQ								
PIQ								
FSIQ								
GAMA	0							
DLAB								
READ								
MATH								
LANG								
PU							0	
SU							0	
RUN							0	
OCOURSE								
PUPS								
RUN1								
RUN2								
RUCK1								
RUCK2								
RUCK3								
LRM								
PE1								
PE2								
PE3								
PE4								
STAR1								
STAR2								
MAPTEST								
PEER1RANK								
PEER1OVER								0
PEER1PINK								
PEER1BLUE								
PEER2RANK								0
PEER2OVER							0	0
PEER2PINK								
PEER2BLUE								
PEER3RANK								
PEER3OVER								
PEER3PINK								
PEER3BLUE								
EXTNEG								0
MODNEG								0
MINNEG								0

POS						0		0
ADAPTAVG			X					
PERSRESAVG			X	X	X	X	X	X
TEAMWOAVG			X					
PERSEVAVG			X	X	X	X	X	X
CAPABAVG			X	X	X	X	X	X
COURAVG			X	X	X	X	X	X
INTEGAVG			X	X	X	X	X	X
PROFAVG			X	X	X	X	X	X
CHARAVG	X				X	X	X	X
EFFAVG	X							
INFLUAVG	X				X	X	X	X
JUDGAVG	X				X	X	X	X
INTERPERAVG	X	X	X					
LEADAVG	X	X	X					

Table H1 – Pattern of Missing Variables

Shaded (red) boxes indicate variables with missing data or too few cases to achieve reliable results. In total, twelve variables with too few cases were removed: TIS, MAB2, VIQ, PIQ, FSIQ, RUCK3, LRM, MAPTEST, PEER3RANK, PEER3OVER, PEER3PINK, PEER3BLUE.

Boxes with a “0” represents specific variable “missingness” by year, but for which sufficient data exists in the other years to obtain reliable results.[105] Boxes with an “X” also represent variable “missingness” by year, but, despite the large amount of missing data on the variable, are of substantive importance to the study and are therefore retained in the analysis. These variables are cadre- and peer-assessments of *other candidates’* personality characteristics. These subjective measurements are contextually interesting, however, as Table H1 shows, their collection varied over the years as SF leadership and cadre attempted to determine which variables were most important for assessing candidates. These personality characteristic variables are averaged into a larger overall construct, wherein their “missingness” does not affect results.

[105] I standardized and averaged items into constructs. Using this method, small amounts of missing data are tolerable.

APPENDIX I – ADDITIONAL PCA RESULTS

Factor loadings (pattern matrix) and unique variances

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7	Uniqueness
ED								0.6671
GT		0.6783						0.4267
WL		0.6289						0.4552
GAMA		0.4543						0.6956
DLAB		0.6886						0.4006
READ								0.7824
MATH		0.5802						0.5721
LANG		0.5408						0.5948
PU					0.6580			0.4830
SU					0.5559			0.6642
RUN					0.4069			0.6019
OCOURSE						-0.6164		0.4238
PUPS					0.7373			0.4198
RUN1			-0.8760					0.1534
RUN2			0.8064					0.2968
RUCK1				-0.4222				0.5041
RUCK2			0.8283					0.1699
PE1						0.4319		0.6774
PE2						0.5335		0.6423
PE3				0.4072				0.6732
PE4				0.4755				0.5757
STAR1				0.5397				0.4832
STAR2				0.5487				0.5162
PEER1RANK	-0.6947							0.3817
PEER1OVER	0.6666							0.3679
PEER1PINK	-0.5707							0.5504
PEER1BLUE	0.5004						0.4384	0.4714
PEER2RANK	-0.7111							0.3694
PEER2OVER	0.7276							0.3265
PEER2PINK	-0.5572							0.4862
PEER2BLUE	0.4964							0.5476
EXTNEG								0.7596
MODNEG								0.7564
MINNEG								0.8687
POS								0.8537

(blanks represent abs(loading)<.4)

Table I1 – Unrotated PCA Solution – 2006-2013[106]

[106] Analyses do not include personality characteristic variables that vary across years.

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7	Uniqueness
ED		0.4658						0.6671
GT		0.7470						0.4267
WL		0.7289						0.4552
GAMA		0.4696						0.6956
DLAB		0.7687						0.4006
READ		0.4338						0.7824
MATH		0.6428						0.5721
LANG		0.6148						0.5948
PU					0.6955			0.4830
SU					0.5601			0.6642
RUN					0.4100			0.6019
OCOURSE						-0.7364		0.4238
PUPS					0.7562			0.4198
RUN1			-0.8753					0.1534
RUN2			0.7934					0.2968
RUCK1						0.4880		0.5041
RUCK2			0.8574					0.1699
PE1								0.6774
PE2						0.4451		0.6423
PE3				0.5528				0.6732
PE4				0.5988				0.5757
STAR1				0.6886				0.4832
STAR2				0.6862				0.5162
PEER1RANK	-0.7744							0.3817
PEER1OVER	0.7866							0.3679
PEER1PINK	-0.5987							0.5504
PEER1BLUE	0.5483							0.4714
PEER2RANK	-0.7840							0.3694
PEER2OVER	0.8037							0.3265
PEER2PINK	-0.5884							0.4862
PEER2BLUE	0.5569							0.5476
EXTNEG								0.7596
MODNEG							0.4132	0.7564
MINNEG								0.8687
POS								0.8537

Table I2 – Orthogonal (Varimax) PCA Rotation – 2006-2013

Rotated factor loadings (pattern matrix) and unique variances

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Uniqueness
ED		0.4446				0.7794
GT		0.7377				0.4511
WL		0.7378				0.4584
GAMA		0.4577				0.7134
DLAB		0.7617				0.4152
READ		0.4409				0.8008
MATH		0.6534				0.5741
LANG		0.6263				0.6141
PU					0.6923	0.4967
SU					0.5630	0.6717
RUN						0.7185
OCOURSE						0.8218
PUPS					0.7609	0.4239
RUN1				-0.8914		0.1537
RUN2				0.7956		0.2952
RUCK1			-0.5203			0.6745
RUCK2				0.8540		0.1900
PE1						0.8813
PE2						0.9275
PE3			0.5151			0.7214
PE4			0.6262			0.5780
STAR1			0.6879			0.5140
STAR2			0.6761			0.5611
PEER1RANK	0.7569					0.4111
PEER1OVER	-0.8044					0.3721
PEER1PINK	0.6241					0.6100
PEER1BLUE	-0.4969					0.6731
PEER2RANK	0.7678					0.3878
PEER2OVER	-0.8204					0.3368
PEER2PINK	0.6304					0.6111
PEER2BLUE	-0.5194					0.6727
EXTNEG						0.9504
MODNEG						0.9187
MINNEG						0.9307
POS						0.9838

(blanks represent abs(loading)<.4)

Table I3 – Five Retained Components PCA – Oblique (Promax) Rotation

Rotated factor loadings (pattern matrix) and unique variances

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Uniqueness
ED		0.4988					0.7037
GT		0.7634					0.4261
WL		0.7383					0.4567
GAMA		0.4338					0.7060
DLAB		0.7780					0.4022
READ		0.4335					0.8006
MATH		0.6390					0.5728
LANG		0.6058					0.6099
PU					0.7015		0.4850
SU					0.5675		0.6672
RUN					0.4079		0.7015
OCOURSE						-0.7316	0.4404
PUPS					0.7624		0.4200
RUN1				-0.8876			0.1521
RUN2				0.7940			0.2950
RUCK1						0.5044	0.5446
RUCK2				0.8598			0.1746
PE1							0.6925
PE2			0.4156			0.4489	0.6434
PE3			0.5718				0.6748
PE4			0.6141				0.5764
STAR1			0.7028				0.5003
STAR2			0.7052				0.5362
PEER1RANK	0.7756						0.3967
PEER1OVER	-0.8078						0.3690
PEER1PINK	0.6091						0.6086
PEER1BLUE	-0.5159						0.6625
PEER2RANK	0.7869						0.3727
PEER2OVER	-0.8173						0.3361
PEER2PINK	0.6013						0.6005
PEER2BLUE	-0.5322						0.6669
EXTNEG							0.8860
MODNEG							0.9103
MINNEG							0.9174
POS							0.9837

(blanks represent abs(loading)<.4)

Table I4 – Six Retained Components PCA – Oblique (Promax) Rotation

APPENDIX J – PRINCIPAL AXIS FACTORING RESULTS

```
Factor analysis/correlation                        Number of obs    =     2911
Method: principal factors                         Retained factors =       16
Rotation: (unrotated)                              Number of params =      440
```

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	3.95809	1.28160	0.3228	0.3228
Factor2	2.67650	0.59514	0.2183	0.5411
Factor3	2.08136	0.77491	0.1697	0.7108
Factor4	1.30645	0.32612	0.1065	0.8173
Factor5	0.98032	0.22557	0.0799	0.8973
Factor6	0.75476	0.06230	0.0616	0.9588
Factor7	0.69246	0.09771	0.0565	1.0153
Factor8	0.59475	0.16449	0.0485	1.0638
Factor9	0.43026	0.10595	0.0351	1.0989
Factor10	0.32431	0.06331	0.0264	1.1253
Factor11	0.26100	0.02513	0.0213	1.1466
Factor12	0.23587	0.05871	0.0192	1.1659
Factor13	0.17716	0.04960	0.0144	1.1803
Factor14	0.12756	0.05495	0.0104	1.1907
Factor15	0.07261	0.06032	0.0059	1.1966
Factor16	0.01229	0.01650	0.0010	1.1976
Factor17	-0.00422	0.00702	-0.0003	1.1973
Factor18	-0.01124	0.00911	-0.0009	1.1964
Factor19	-0.02035	0.03816	-0.0017	1.1947
Factor20	-0.05852	0.00503	-0.0048	1.1899
Factor21	-0.06354	0.02431	-0.0052	1.1848
Factor22	-0.08785	0.00405	-0.0072	1.1776
Factor23	-0.09190	0.01479	-0.0075	1.1701
Factor24	-0.10669	0.01718	-0.0087	1.1614
Factor25	-0.12387	0.01706	-0.0101	1.1513
Factor26	-0.14093	0.00397	-0.0115	1.1398
Factor27	-0.14490	0.01512	-0.0118	1.1280
Factor28	-0.16002	0.00070	-0.0130	1.1149
Factor29	-0.16072	0.00854	-0.0131	1.1018
Factor30	-0.16926	0.02049	-0.0138	1.0880
Factor31	-0.18975	0.01718	-0.0155	1.0726
Factor32	-0.20693	0.00205	-0.0169	1.0557
Factor33	-0.20898	0.01314	-0.0170	1.0386
Factor34	-0.22211	0.02964	-0.0181	1.0205
Factor35	-0.25175	.	-0.0205	1.0000

LR test: independent vs. saturated: chi2(595) = 3.0e+04 Prob>chi2 = 0.0000

Factor loadings (pattern matrix) and unique variances

Variable	Factor1	Factor2	Factor3	Factor4	Factor5
ED					
GT		0.6460			
WL		0.5879			
GAMA		0.4055			
DLAB		0.6540			
READ					
MATH		0.5178			
LANG		0.4779			
PU					0.4534
SU					
RUN					
OCOURSE					
PUPS					0.5129
RUN1			-0.8443		
RUN2			0.7417		
RUCK1				0.4780	
RUCK2			0.8240		
PE1					
PE2					
PE3					
PE4					
STAR1				-0.4146	
STAR2				-0.4092	
PEER1RANK	-0.7080				
PEER1OVER	0.6854				
PEER1PINK	-0.5297				
PEER1BLUE	0.4591				
PEER2RANK	-0.7323				
PEER2OVER	0.7529				
PEER2PINK	-0.5260				
PEER2BLUE	0.4576				
EXTNEG					
MODNEG					
MINNEG					
POS					

Table J1 – PAF Results – 2006-2013

APPENDIX K – LOGISTIC REGRESSION ODDS RATIO RESULTS

SFAS Logistic Regression Results							
DV=STATDUM	**Coefficient**	**SE**	**z**	**p-value**		**95% CI**	
Cognitive Ability	1.413	0.036	13.610	0.000	***	1.345	1.486
Navigational Ability	2.595	0.077	31.950	0.000	***	2.447	2.751
Physical Strength	1.212	0.029	8.020	0.000	***	1.156	1.270
Short-Term Endurance	1.159	0.032	5.260	0.000	***	1.097	1.224
Long-Term Endurance	1.352	0.041	9.940	0.000	***	1.274	1.434
Ranger Qualification Dummy	1.525	0.128	5.010	0.000	***	1.293	1.798
Peer Evaluations	2.160	0.051	32.890	0.000	***	2.063	2.261
Age	1.064	0.029	2.300	0.021	*	1.009	1.122
Age^2	0.943	0.013	-4.320	0.000	***	0.919	0.969
Enlisted Dummy Variable	2.905	0.237	13.070	0.000	***	2.475	3.408
DMOS11 – Infantry	1.279	0.070	4.520	0.000	***	1.150	1.424
DMOS13 – Field Artillery	1.184	0.109	1.820	0.068		0.988	1.419
DMOS18 – SF 18X	1.904	0.115	10.690	0.000	***	1.692	2.143
DMOS19 – Armor	1.115	0.114	1.060	0.288		0.912	1.362
DMOS68 – Medical	1.109	0.119	0.960	0.336		0.899	1.368
DMOS92 - Quartermaster	1.176	0.138	1.390	0.165		0.935	1.480
DYR7 – Dummy Year 2007	1.776	0.152	6.690	0.000	***	1.501	2.101
DYR8 – Dummy Year 2008	0.824	0.068	-2.370	0.018	*	0.701	0.967
DYR9 – Dummy Year 2009	0.893	0.076	-1.330	0.185		0.755	1.056
DYR10 – Dummy Year 2010	1.025	0.098	0.260	0.795		0.850	1.236
DYR11 – Dummy Year 2011	0.544	0.050	-6.680	0.000	***	0.455	0.650
DYR12 – Dummy Year 2012	0.394	0.034	-10.690	0.000	***	0.332	0.468
DYR13 – Dummy Year 2013	0.427	0.040	-9.150	0.000	***	0.356	0.513
Constant	0.779	0.077	-2.520	0.012		0.641	0.946
# Observations	16038	**Log Likelihood**		-7573.137		**Pseudo R^2**	0.2725
* p<.05 ** p<.01 *** p<.001							

Table K1 – SFAS Logistic Regression Results – Odds Ratio

SFQC Logistic Regression Results							
DV=STATDUM	Coefficient	SE	z	p-value		95% CI	
Cognitive Ability	1.081	0.034	2.450	0.014	*	1.016	1.150
Navigational Ability	1.264	0.047	6.290	0.000	***	1.175	1.359
Physical Strength	1.226	0.038	6.570	0.000	***	1.154	1.303
Short-Term Endurance	0.993	0.029	-0.230	0.816		0.937	1.053
Long-Term Endurance	1.002	0.029	0.050	0.956		0.946	1.060
Ranger Qualification Dummy	1.411	0.129	3.760	0.000	***	1.179	1.689
Peer Evaluations	1.261	0.036	8.160	0.000	***	1.193	1.333
Age	0.961	0.037	-1.030	0.305		0.890	1.037
Age^2	0.968	0.020	-1.570	0.117		0.930	1.008
Enlisted Dummy Variable	0.953	0.093	-0.500	0.618		0.787	1.153
DMOS11 – Infantry	1.050	0.084	0.610	0.543		0.897	1.229
DMOS13 – Field Artillery	1.170	0.159	1.160	0.248		0.897	1.526
DMOS18 – SF 18X	1.891	0.158	7.600	0.000	***	1.604	2.228
DMOS19 – Armor	1.002	0.160	0.010	0.990		0.732	1.372
DMOS68 – Medical	0.641	0.117	-2.440	0.015	*	0.449	0.916
DMOS92 - Quartermaster	0.767	0.163	-1.250	0.212		0.505	1.164
DYR8 – Dummy Year 2008	4.605	0.571	12.310	0.000	***	3.611	5.872
DYR9 – Dummy Year 2009	3.591	0.433	10.590	0.000	***	2.834	4.549
DYR10 – Dummy Year 2010	6.258	0.761	15.080	0.000	***	4.931	7.942
DYR11 – Dummy Year 2011	7.497	0.948	15.940	0.000	***	5.852	9.605
DYR12 – Dummy Year 2012	1.153	0.153	1.070	0.285		0.888	1.496
Constant	0.101	0.015	-15.840	0.000		0.076	0.134
# Observations	7899	**Log Likelihood**		-4256.793		**Pseudo R^2**	0.1459
* p<.05 ** p<.01 *** p<.001							

Table K2 – SFQC Logistic Regression Results – Odds Ratio

APPENDIX L – FULL MODERATION RESULTS

Variable	Results	Moderator Analyses - SFAS					
	Model 1a	Model 7a			Model 8a		Model 9a
	Initial Results	Time (Cohort) Moderator^	Variable Result Cohort 2	Variable Result Cohort 3	Ranger Status Moderator#	Variable Result Ranger=1	Time & Ranger Status
COGNIT	0.346 ***	0.402 ***	0.256 *	0.239 **	0.349 ***	0.315	0.410 ***
NAVIG	0.953 ***	0.764 ***	1.182 ***	1.345 ***	0.941 ***	1.158 *	0.753 ***
STRENG	0.192 ***	0.182 ***	0.287	0.111	0.200 ***	0.107	0.192 ***
ENDURST	0.147 ***	0.019	0.111	0.273 *	0.166 ***	-0.070 *	0.036 ***
ENDURLT	0.301 ***	0.428 ***	0.121 ***	0.655	0.299 ***	0.317	0.429
RGRDUM	0.422 ***	0.376 ***	--	--	--	0.317 **	0.262 **
PEEREVAL	0.770 ***	0.957 ***	0.546 ***	0.826 *	0.733 ***	1.124 ***	0.927 ***
AGE	0.062 *	0.056 *	--	--	0.067 *	--	0.061 *
AGE2	-0.058 ***	-0.055 ***	--	--	-0.060 ***	--	-0.057 ***
DENLIST	1.066 ***	1.079 ***	--	--	1.080 ***	--	1.094
COHORT2	--	-0.795 ***	--	--	--	--	-0.816 ***
COHORT3	--	-0.943 ***	--	--	--	--	-0.961 ***
COGNIT*COHORT2	--	-0.146 *	--	--	--	--	-0.159 **
COGNIT*COHORT3	--	-0.163 **	--	--	--	--	-0.171 **
NAVIG*COHORT2	--	0.417 ***	--	--	--	--	0.398 ***
NAVIG*COHORT3	--	0.581 ***	--	--	--	--	0.570 ***
STRENG*COHORT2	--	0.105	--	--	--	--	0.091
STRENG*COHORT3	--	-0.072	--	--	--	--	-0.073
ENDURST*COHORT2	--	0.092	--	--	--	--	0.088

Variable	Results	Moderator Analyses - SFAS					
	Model 1a	Model 7a			Model 8a		Model 9a
	Initial Results	Time (Cohort) Moderator^	Variable Result Cohort 2	Variable Result Cohort 3	Ranger Status Moderator#	Variable Result Ranger=1	Time & Ranger Status
ENDURST*COHORT3	--	0.254 *	--	--	--	--	0.257 *
ENDURLT*COHORT2	--	-0.307 ***	--	--	--	--	-0.315 ***
ENDURLT*COHORT3	--	0.227	--	--	--	--	0.220
PEEREVAL*COHORT2	--	-0.411 ***	--	--	--	--	-0.424 ***
PEEREVAL*COHORT3	--	-0.131 *	--	--	--	--	-0.143 *
RGRDUM*COGNIT	--	--	--	--	-0.034	--	-0.040
RGRDUM*NAVIG	--	--	--	--	0.217 *	--	0.253 **
RGRDUM*STRENG	--	--	--	--	-0.093	--	-0.089
RGRDUM*ENDURST	--	--	--	--	-0.236 *	--	-0.208 *
RGRDUM*ENDURLT	--	--	--	--	0.018	--	0.018
RGRDUM*PEEREVAL	--	--	--	--	0.391 ***	--	0.389 ***
DMOS11	0.246 ***	0.251 ***	--	--	0.247 ***	--	0.252 ***
DMOS13	0.169	0.153	--	--	0.177	--	0.162
DMOS18	0.644 ***	0.625 ***	--	--	0.636 ***	--	0.618 ***
DMOS19	0.108	0.117	--	--	0.111	--	0.120
DMOS68	0.103	0.139	--	--	0.106	--	0.142
DMOS92	0.162	0.167	--	--	0.160	--	0.164
DYR7	0.574 ***	0.402 ***	--	--	0.560 ***	--	0.393 ***
DYR8	-0.194 *	-0.270 **	--	--	-0.207 *	--	-0.281 **
DYR9	-0.113	-0.125	--	--	-0.135	--	-0.148
DYR10	0.025	0.774 ***	--	--	0.011	--	0.779 ***
DYR11	-0.609 ***	Omitted	--	--	-0.629 ***	--	Omitted

Variable	Results	Moderator Analyses - SFAS					
	Model 1a	Model 7a			Model 8a		Model 9a
	Initial Results	Time (Cohort) Moderator^	Variable Result Cohort 2	Variable Result Cohort 3	Ranger Status Moderator#	Variable Result Ranger=1	Time & Ranger Status
DYR12	-0.931 ***	-0.084	--	--	-0.954 ***	--	-0.090
DYR13	-0.850 ***	Omitted	--	--	-0.867 ***	--	Omitted
_cons	-0.250 --	-0.296 --	--	--	-0.255 --	--	-0.300 --
# Obs	16038	16308			16038		16038
Log Likelihood	-7573.137	-7485.3377			-7556.42		-7468.533
df	23	35			29		41
Pseudo R2	0.2725	0.2809			0.2741		0.2825
% SEL-SEL	79.25	79.78			79.29		79.85
% NSEL-NSEL	71.43	72.44			71.20		72.49
% Correct Classification	77.01	77.67			76.95		77.73

^ = Cohort 1 is the reference group. Substantive results in this column represent the results for Cohort 1.

= Ranger = 0 is the reference group. Substantive results in this column represent the results when the candidate is not Ranger qualified.

* p<.05 ** p<.01 *** p<.001

Table L1 – Full Moderation Results - SFAS

Variable	Results	Moderator Analyses – SFQC					
	Model 1b	Model 7b			Model 8b		Model 9b
	Initial Results	Variable Result Cohort 1^	Variable Result Cohort 2	Variable Result Cohort 3	Variable Result Ranger=0#	Variable Result Ranger=1	Time & Ranger Status
COGNIT	0.078 *	0.152 **	0.121	-0.310 ***	0.099 *	0.067	0.161 **
NAVIG	0.234 ***	0.234 ***	0.356	0.560	0.273 ***	0.398	0.220 **
STRENG	0.204 ***	0.161 **	0.409 **	0.237	0.262 ***	0.175	0.180 **
ENDURST	-0.007	-0.140	0.081 *	-0.028	0.027	-0.144 *	-0.109
ENDURLT	0.002	-0.183 *	0.084 **	0.737 ***	0.020	-0.085	-0.177 *
RGRDUM	0.345 ***	0.377 ***	--	--	--	0.612 ***	0.646 ***
PEEREVAL	0.232 ***	0.115 *	0.314 **	-0.008	0.288 ***	0.042 ***	0.175 **
AGE	-0.040	-0.031	--	--	-0.052	--	-0.043
AGE2	-0.032	-0.036	--	--	-0.029	--	-0.033
DENLIST	-0.048	-0.034	--	--	-0.072	--	-0.052
COHORT2	--	1.679 ***	--	--	--	--	1.725 ***
COHORT3	--	-0.043	--	--	--	--	-0.024
COGNIT*COHORT2	--	-0.031	--	--	--	--	-0.038
COGNIT*COHORT3	--	-0.462 ***	--	--	--	--	-0.469 ***
NAVIG*COHORT2	--	0.122	--	--	--	--	0.122
NAVIG*COHORT3	--	0.326	--	--	--	--	0.331
STRENG*COHORT2	--	0.248 **	--	--	--	--	0.241 **
STRENG*COHORT3	--	0.076	--	--	--	--	0.100
ENDURST*COHORT2	--	0.221 *	--	--	--	--	0.215 *
ENDURST*COHORT3	--	0.112	--	--	--	--	0.094
ENDURLT*COHORT2	--	0.267 **	--	--	--	--	0.273 **
ENDURLT*COHORT3	--	0.920 ***	--	--	--	--	0.967 ***

Variable	Results	Moderator Analyses - SFQC					
	Model 1b	Model 7b			Model 8b		Model 9b
	Initial Results	Variable Result Cohort 1^	Variable Result Cohort 2	Variable Result Cohort 3	Variable Result Ranger=0#	Variable Result Ranger=1	Time & Ranger Status
PEEREVAL*COHORT2	--	0.199 **	--	--	--	--	0.183 **
PEEREVAL*COHORT3	--	-0.123	--	--	--	--	-0.112
RGRDUM*COGNIT	--	--	--	--	-0.032	--	-0.011
RGRDUM*NAVIG	--	--	--	--	0.125	--	0.061
RGRDUM*STRENG	--	--	--	--	-0.087	--	-0.091
RGRDUM*ENDURST	--	--	--	--	-0.171 *	--	-0.124
RGRDUM*ENDURLT	--	--	--	--	-0.105	--	-0.070
RGRDUM*PEEREVAL	--	--	--	--	-0.246 ***	--	-0.239 **
DMOS11	0.049	0.026	--	--	0.050	--	0.062
DMOS13	0.157	0.146	--	--	0.148	--	0.139
DMOS18	0.637 ***	0.643 ***	--	--	0.623 ***	--	0.639 ***
DMOS19	0.002	0.000	--	--	-0.001	--	-0.003
DMOS68	-0.444 *	-0.408 *	--	--	-0.438 *	--	-0.405 *
DMOS92	-0.266	-0.201	--	--	-0.238	--	-0.183
DYR8	1.527 ***	1.378 ***	--	--	1.554 ***	--	1.403 ***
DYR9	1.278 ***	1.255 ***	--	--	1.318 ***	--	1.284 ***
DYR10	1.834 ***	-0.207 *	--	--	1.863 ***	--	-0.214 *
DYR11	2.015 ***	Omitted	--	--	2.052 ***	--	Omitted
DYR12	0.142	Omitted	--	--	0.180	--	Omitted
_cons	-2.296	-2.411	--	--	-2.613	--	-2.449

Table Continued							
Variables	Moderator Analyses - SFQC						
	Model 1b	Model 7b			Model 8b		Model 9b
	Initial Results	Variable Result Cohort 1^	Variable Result Cohort 2	Variable Result Cohort 3	Variable Result Ranger=0#	Variable Result Ranger=1	Time & Ranger Status
# Obs	7899	7899			7899		7899
Log Likelihood	-4256.793	-4209.192			-4244.845		-4200.117
df	21	33			27		39
Pseudo R2	0.1459	0.1554			0.1483		0.1572
% SEL-SEL	60.56	62.30			61.11		62.2
% NSEL-NSEL	75.41	74.92			75.64		75.19
% Correct Classification	72.12	72.39			72.40		72.5
^ = Cohort 1 is the reference group. Substantive results in this column represent the results for Cohort 1.							
# = Ranger = 0 is the reference group. Substantive results in this column represent the results when the candidate is not Ranger qualified.							
* p<.05 ** p<.01 *** p<.001							

Table L2 – Full Moderation Results – SFQC

APPENDIX M – KAPLAN-MEIER TABLES

failure _d: ETSEVENT2 == 1
analysis time _t: SFSERVICEYR

Beg. Time	Total	Fail	Survivor Function	Std. Error	[95% Conf.	Int.]
0	0	0	1.0000	.	.	.
.903242	19556	0	1.0000	.	.	.
1.80648	18295	0	1.0000	.	.	.
2.70973	17069	1	0.9999	0.0001	0.9996	1.0000
3.61297	15487	5	0.9996	0.0002	0.9992	0.9998
4.51621	14118	88	0.9936	0.0007	0.9921	0.9947
5.41945	12700	161	0.9818	0.0011	0.9795	0.9839
6.32269	12034	104	0.9735	0.0014	0.9707	0.9761
7.22593	11072	100	0.9653	0.0016	0.9621	0.9683
8.12918	9712	70	0.9588	0.0018	0.9552	0.9621
9.03242	8447	61	0.9524	0.0019	0.9485	0.9561
9.93566	7256	23	0.9497	0.0020	0.9456	0.9535
10.8389	6588	21	0.9469	0.0021	0.9426	0.9508
11.7421	5759	13	0.9449	0.0022	0.9405	0.9490
12.6454	4838	12	0.9427	0.0022	0.9381	0.9469
13.5486	4137	2	0.9422	0.0023	0.9376	0.9465
14.4519	3565	0	0.9422	0.0023	0.9376	0.9465
15.3551	2797	0	0.9422	0.0023	0.9376	0.9465
16.2584	2290	0	0.9422	0.0023	0.9376	0.9465
17.1616	1767	2	0.9412	0.0024	0.9364	0.9457
18.0648	1147	1	0.9406	0.0025	0.9355	0.9452
18.9681	716	0	0.9406	0.0025	0.9355	0.9452
19.8713	264	1	0.9391	0.0029	0.9333	0.9445
20.7746	155	0	.	.	.	.

Note: survivor function is calculated over full data and evaluated at indicated times; it is not calculated from aggregates shown at left.

Table M1 – Kaplan-Meier Table - ETS

failure _d: RETEVENT == 1
analysis time _t: SFSERVICEYR

Beg. Time	Total	Fail	Survivor Function	Std. Error	[95% Conf.	Int.]
4	0	0	1.0000	.	.	.
4.80879	4395	1	0.9998	0.0002	0.9984	1.0000
5.61757	4394	1	0.9995	0.0003	0.9982	0.9999
6.42636	4393	1	0.9993	0.0004	0.9979	0.9998
7.23514	4389	4	0.9984	0.0006	0.9967	0.9992
8.04393	4377	12	0.9957	0.0010	0.9932	0.9972
8.85272	4368	9	0.9936	0.0012	0.9908	0.9956
9.6615	4353	15	0.9902	0.0015	0.9868	0.9927
10.4703	4320	33	0.9827	0.0020	0.9784	0.9862
11.2791	4294	26	0.9768	0.0023	0.9719	0.9808
12.0879	4253	42	0.9672	0.0027	0.9615	0.9721
12.8966	4194	58	0.9540	0.0032	0.9474	0.9598
13.7054	4129	65	0.9392	0.0036	0.9318	0.9459
14.5142	4089	42	0.9297	0.0039	0.9217	0.9369
15.323	4039	48	0.9188	0.0041	0.9103	0.9265
16.1318	3969	71	0.9026	0.0045	0.8935	0.9110
16.9406	3907	61	0.8887	0.0047	0.8791	0.8977
17.7494	3292	32	0.8810	0.0049	0.8710	0.8902
18.5581	2826	22	0.8748	0.0050	0.8646	0.8843
19.3669	2605	17	0.8693	0.0052	0.8588	0.8791
20.1757	1978	43	0.8524	0.0057	0.8408	0.8632
20.9845	1604	18	0.8440	0.0060	0.8319	0.8553
21.7933	796	12	0.8355	0.0064	0.8225	0.8477
22.6021	88	2	.	.	.	.

Note: survivor function is calculated over full data and evaluated at indicated times; it is not calculated from aggregates shown at left.

Table M2 – Kaplan-Meier Table - Retirement

```
failure _d:  CENSOR == 0
analysis time _t:  SFSERVICEYR
```

Beg. Time	Total	Fail	Survivor Function	Std. Error	[95% Conf. Int.]	
0	0	0	1.0000	.	.	.
1	21446	0	1.0000	.	.	.
2	20024	0	1.0000	.	.	.
3	18555	3	0.9998	0.0001	0.9995	0.9999
4	16799	27	0.9983	0.0003	0.9975	0.9988
5	15351	326	0.9781	0.0012	0.9757	0.9802
6	14180	205	0.9645	0.0015	0.9614	0.9672
7	13745	185	0.9519	0.0017	0.9484	0.9551
8	12122	106	0.9441	0.0019	0.9403	0.9476
9	10778	91	0.9367	0.0020	0.9326	0.9405
10	9614	52	0.9319	0.0021	0.9276	0.9359
11	8855	61	0.9258	0.0022	0.9213	0.9300
12	7762	59	0.9192	0.0024	0.9144	0.9237
13	6728	77	0.9094	0.0026	0.9042	0.9144
14	6070	80	0.8982	0.0029	0.8924	0.9036
15	5194	50	0.8902	0.0030	0.8841	0.8960
16	4517	77	0.8761	0.0034	0.8693	0.8826
17	3905	83	0.8589	0.0038	0.8513	0.8662
18	3191	38	0.8496	0.0041	0.8415	0.8574
19	2669	26	0.8419	0.0043	0.8333	0.8502
20	1987	40	0.8272	0.0048	0.8176	0.8364
21	1602	26	0.8157	0.0053	0.8052	0.8258
22	645	13	0.8055	0.0060	0.7935	0.8169
23	88	0	.	.	.	.

Note: survivor function is calculated over full data and evaluated at indicated times; it is not calculated from aggregates shown at left.

Table M3 – Kaplan-Meier Table – ETS & Retirement