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Exploring Predictive Factors of Air Force Servicewomen's Retention

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EXPLORING PREDICTIVE FACTORS OF AIR FORCE SERVICEWOMEN'S RETENTION

by

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ABSTRACT

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Military women's retention is an ongoing organizational challenge. In the U.S. Air Force, the target service for this study, women currently account for 20% of all personnel, but across all services they are retained at a rate five to ten percent lower than males. A related issue is dual-military marriages, and 11% of all active-duty Airmen, regardless of gender, are married to another service member. Almost 54% of married female Airmen are in a dual-military marriage, compared to 13% of married male Airmen. Unlike non-dual-military marriages, retention of dual-military servicemembers significantly decreases after ten years in service.

This study seeks to identify the most important predictors of retention, measured by a single question about intent to remain, along with a set of responses about steps taken to depart. Because of its ability to apply an ensemble algorithm to classification problems when creating a predictive model, Random Forest regression was used for analyses. Findings indicated that the affective dimension of organizational commitment and spousal views about remaining were the most consistently predictive variables. Other meaningful predictors were family views, job satisfaction, perceived job alternatives, and perceived organizational support. Ordinary Least Squares (OLS) regression was also used to determine if gender or dual-military status served to

moderate any of the predictors. Results indicated that gender did moderate two relationships—family views and military pay, whereas dual-military status did not play a moderating role.

These findings suggest that efforts to improve retention would best be directed toward improving organizational commitment of servicemembers and views of their spouses. Next most important would be enhancing family views and perceived organizational support. The views expressed in this report are those of the author and do not reflect the official policy or position of the United States Air Force, Department of Defense, or the U.S. Government.

DEDICATION

To my family,

To Mom and Poppy: You have both shown me the importance of family, hard work, humbleness, and grace. Thank you for everything.

To my siblings: It truly takes a village and boy did I luck out! Thank you for all the encouragement and support you provided the past few years. I will forever be grateful of this time we were able to spend with family.

To Jason: You've been my rock and sounding board throughout this process, and with just the right balance of "man that stinks" and "well, suck it up." Thank you, Jarhead.

To my children: You fill my soul and give me hope for the future. I love you more than you'll ever know, and am so lucky to be your mother.

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As I leave Helen Bader School of Social Welfare I am confident my course work and independent research have made me a better scholar and clinician. I am grateful for the opportunity the U.S. Air Force provided me and am looking forward to using these skills in my future endeavors.

CHAPTER 1: INTRODUCTION

Military women's retention is an ongoing organizational challenge. In the U.S. Air Force, the target service for this study, women currently account for 20.1% of all personnel (Defense Manpower Data Center, 2020). However, across all services, annual retention rates of non-civilian female personnel are from five to ten percent lower than those of males (Military Leadership Diversity Council, 2010). A recent Defense Advisory Committee on Women in the Services (DACOWITS) report on gender and military retention indicated that military women are retained at lower rates than men throughout all points of their military careers (DACOWITS, 2017), but especially during the midpoint of their careers (5-8 years) (Defense Manpower Data Center, 2019). Retention rates for female officers hover around 50 percent near the seven-year-mark, and 30 percent at 12 years of service (MLDC, 2010). In contrast, male officers' retention remains at about 50 percent until year 12 and does not fall to 30 percent until after 21 years of service (MLDC, 2010). As will be discussed, these gender diversity imbalances have important implications for the Air Force's operational and organizational success.

Some research suggests balancing family and work responsibilities is exceedingly difficult, and that work-family conflicts may predict non-retention (Keller, et al., 2018). Other research highlights the absence of women in senior leadership, creating voids in mentorship opportunities (Curry-Hall et al., 2019; Nikandrou, et al., 2008; Allen & Eby, 2004; Franchetti, 2012). Women have also noted not feeling fully enmeshed in their work environment due to it being an 'old boys' network (Keller, et al., 2018). Women in these environments may also experience implicit and explicit bias (Hewlett, et al., 2008), as well as discriminatory behaviors

during the selection processes (Chesler, et al., 2010). All of these factors can in turn lead to women exiting positions prematurely.

As the nature of warfare constantly changes, diversity among its ranks can be a mechanism for the Air Force to maintain dominance. Ensuring that the make-up of the military reflects the diversity of the American population helps the Air Force draw talent from all available pools to sustain air, space and cyberspace superiority. By expanding gender, ethnicity, racial diversity, experiences, and abilities, the military broadens its skillsets and ways of thinking. Leadership that can leverage diversity will find itself meeting mission goals (Sposato, et al.,2015; Verma, 2015).

Within the Air Force, diversity is viewed as an institutional competency. For example, it has been defined as "a composite of...personal life experiences, geographic and socioeconomic backgrounds, cultural knowledge, educational backgrounds, work experience, language abilities, physical abilities, philosophical and spiritual perspectives, age, race, ethnicity, and gender." (Air Force Instruction 36-7001, p. 3). In 2012, the Air Force stated that diversity within its ranks "is a leadership issue" and that diversity "enhances mission readiness and is a national security imperative" (Air Force Talking Points, 2012, p. 2).

Despite efforts within the past two decades to increase diversity in military leadership ranks, most senior leaders are still white males. As the Airmen who are led by these individuals become increasingly diverse in gender, age, religion, family size, and other demographics, policies and programs designed by senior leadership may not be as effective as they were intended. For example, monetary bonuses had often been the focal point for programs and policies designed to retain service members. However, a 2002 study revealed only 4% of

servicewomen consider money a significant factor when choosing to separate from active duty (Streeter, 2014).

In addition, turnover among either women or men is costly to organizations. Scholars typically group direct costs of turnover into three categories: separation costs (exit interviews, and administrative fees associated with turnover), replacement costs (job vacancies postings and interviews), and training costs (introductory training, as well as on-the-job training) (Blankertz & Robinson, 1997). Together, these costs can reach nearly 200% of the departing employee's annual salary (Allen, et al., 2010). Also at risk from turnover are social capital, subject matter expertise, productivity, and morale (Dess & Shaw, 2001; Cole, 2015).

With decreases in personnel, funding, and resources, the military continues to feel the pinch to do 'more with less,' and high retention of quality employees can be critical for that (Losey, 2018). As will be discussed, the Air Force has implemented several policies and programs designed to maintain and improve retention, including efforts focused on women.

Turnover and Retention

A considerable body of organizational literature has examined job turnover, which is the term typically used for the departure of an employee from an organization. As will be discussed, for practical reasons a majority of research examines intent to turnover rather than actual turnover. In addition to examining intent to turnover, this study will also examine the obverse of that, which is intent to remain or reenlist (ITR). The central goal of this exploratory research will explore the variables most predictive of ITR as well as intent to turnover. The variables to be explored include gender, pay grade, marital status, dual-military status, number and ages of children, autonomy, stress, HPWPs, job satisfaction, spillover, family values, spousal values,

perceived organizational support, organizational commitment, job embeddedness, and perceived job alternatives. While other variables have been found to influence turnover, those examined here are available in the study's primary data source, the 2017 version of the Status of Forces Survey of Active Duty Members (SOFS-A).

Predictive Factors

Gender. As noted, evidence exists that turnover is higher among female versus male servicemembers. During focus group interviews with servicewomen, participants noted concerns surrounding career issues, work environment, and personal life matters that heightened turnover intentions (Curry Hall, et al., 2019). Examples of gender retention imbalances outside of the military include a study by Kaminski and Geisler (2012), who found that female math professors in 14 U.S. universities left their positions significantly earlier--after 4.45 years compared to 7.33 years for their male counterparts. This pattern is inconsistent, however, as Leip and Stinchcomb (2013), in a study of jail staff, found that static variables such as gender and race were less influential than dynamic variables, such as job satisfaction, in predicting turnover intentions.

Pay Grade. Pay grades are used within the military to determine wages and benefits based on the corresponding military rank of the service member. Within the Air Force, pay grades are divided into two groups: enlisted (E) and officer (O). Enlisted Airmen fall within the pay grades of E1-E9, and commissioned officers fall within the pay grades of O1-O11. An individual's pay grade is based on their rank and time-in-service. With female servicemembers leaving the military around the midpoint of their careers (E5-E6 and O3-O4), at higher rates than their male counterparts, this is a variable of interest (DACOWITS, 2017).

Marital Status. Marital status has not been found to play a significant role in job retention directly (Silva, et al., 2019). However, both marital status and spousal support may

indirectly influence retention behaviors (Sinclair, 2004; Office of People Analytics (OPA), 2017). This indirect influence occurs through support or non-support of the military lifestyle (OPA, 2017).

Dual Service Spouse. Research has suggested that married couples in a work-linked relationship experience more work-family integration, and as a result may experience more spillover between the two roles (Halbesleben et al., 2010). For example, individuals in a dual-military marriage (i.e., both the spouses in the military) have reported more work-family balance stressors (Keller, et al., 2018). Also, after 7.5 years of military service, retention rates of one or both members of the dual-military couple are significantly lower than non-dual-military members (Long, 2008). However, other research has suggested that married servicemembers with a supportive spouse are more likely to remain in the military (Office of People Analytics, 2017).

Number and Age of Children. An employee's number of children has been found to be negatively associated with retention rates (Lee, 2004). This relationship has also been found to be stronger among single mothers, mothers with low incomes, and mothers with young children under the age of six in the U.S. (Holzer & LaLonde, 2000; Fuller, et al., 2002), and in Britain and Japan (Waldfogel, et al., 1999).

Autonomy. Job autonomy involves the degree to which employees are allowed to regulate their own work pace and processes in completing their job responsibilities. Greater work autonomy has been linked to improved work performance and higher perceived well-being (Vansteenkiste, Ryan, & Deci, 2008). Among social workers, job autonomy, in addition to social support, was also found to have a negative direct effect on turnover intention, but no direct effect on burnout (Kim & Stoner, 2008).

Perceived Stress. Data from the 2017 Status of Forces Survey of Active Duty Members (SOFS-A) reported 45% of servicemembers rated their current stress level in their work as 'more than usual,' and 37% of servicemembers rated their personal life stress levels as 'more than usual' (OPA, 2017). Elevated workplace stress has been linked to physical and mental health deterioration, job dissatisfaction, increased work-family conflict, and turnover intent (Lazarus, 1999). More specific to the military, one study examined the relationship between the workplace stress of 465 Navy nurses and their intent to leave the service. It revealed a statistically significant positive correlation between the two variables for all interviewed nurses regardless of population served (i.e., wounded warriors), nursing specialty, or number of deployments served (Morrison, et al., 2013).

High-Performance Work Practices (HPWP). HPWPs have been defined as "practices that have been shown to improve an organization capacity to effectively attract, select, hire, develop, and retain high-performing personnel" (Garman, et al., 2011, p. 214). Researchers have found support for HPWP utilization and increases in job satisfaction, organizational commitment, and employee psychological empowerment (Messersmith, et al., 2011).

Spillover occurs when demands in one life domain are incompatible with demands in another, resulting in conflict that can impact both work and family life (Greenhaus, 1988). Spillover and difficulties balancing work and family demands are the reason most women report for separating from the military (DACOWITS, 2017, DACOWITS, 2016, Keller, et al., 2018, Curry-Hall, 2019). Examples of such difficulties that were noted by servicewomen in military focus groups were finding extended day care hours, uprooting families every few years for new postings, and missing career advancement opportunities due to parental responsibilities (DACOWITS, 2017, DACOWITS, 2016, Keller, et al., 2018, Curry-Hall, et al., 2019).

Family Views of military service can also influence service members' decisions to remain or separate from the military (Office of People Analytics, 2017). One study found that Air Force officers intent to remain in service was positively associated with families' satisfaction with the military lifestyle (Heilman, et al., 2009).

Spousal Views In addition to family views influencing service member retention behaviors, spousal views have also been found to influence retention behaviors. For example, Huffman and colleagues (2014) administered surveys to military spouses, then tracked the servicemembers' retention status for two years following the completion of the spouses' survey. Results showed that with each 1-point increase in spousal support to stay in the military, (i.e., increased from *Favors staying* to *Strongly favors staying*), the service members' odds of staying in the military were 1.95 greater (Casper, et al., 2014).

Job Satisfaction is highly correlated with turnover and intentions to leave (Wang, et al., 2012; Griffeth, et al., 2000; Lu, et al., 2019; McGilton et al., 2013; Wadsworth, et al., 2018; Oakman & Wells, 2016; Zhang et al., 2016; Hewlett, et al., 2008; Hill et al., 2010; Zangaro, & Kelley, 2010). As one example, it was found to be the strongest predictor of retention among Airmen who were eligible for retirement (Smith, et al., 2010). In another study that addressed civilian nurses, job satisfaction was found to be strongly related to reported turnover intentions (Lu, et al., 2019).

Perceived organizational support (POS) is also frequently examined in turnover literature (Gershon, et al.,2004; Scott, et al., 2003; Brunetto, et al., 2013; Bobbio, et al., 2015; Ahmed, Ahmed, 2013; Dupre & Day, 2007; Connell, 2012). Research conducted with Air Force engineering officers found POS to be the strongest exogenous variable, stronger than organizational commitment and job satisfaction, in predicting turnover intention (Connell, 2012).

Organizational commitment has been regularly measured in studies of influencers of turnover intentions (Smith, et al., 2010; Meyer, et al., 2013; Fragoso, et al., 2019; Takeucuhi & Takeuchi, 2013; James, et al., 1990; Langkamer, & Ervin, 2008). A study using survey data to measure Army Captains' career intentions found that organizational commitment can be influenced by unit climate and morale, and impact intent to leave the military (Langkamer, & Ervin, 2008).

Job embeddedness encompasses a variety of on-the-job and off-the-job factors that reflect employees' sense of being integral to and solidly rooted within an organization, and lends support for linking these factors with employee retention behaviors (Mitchell, et al., 2001). It has been found to moderate the relationships between organizational commitment and turnover intent, through feeling connected within one's neighborhood and support network (Smith, et al., 2010), between leader-member exchange and turnover intent, through forming work connections (Wheeler, et al., 2010), and between job satisfaction and job stress, and turnover intent, through both on-the-job as well as off-the-job factors such as co-worker and family support (Fasbender, et al., 2019).

Perceived job alternatives refers to employees' evaluation of the likelihood of finding alternative employment that is reasonably comparable to or better than the current position (Hom, et al., 1995). It has been found to influence the relationship between job satisfaction and job turnover, through keeping dissatisfied employees at their workplace if there were a lack of alternative jobs (Griffeth et al., 2000; Bubello, 1993). Other research has noted it moderates the relationship between continuance commitment and turnover intent, through having greater investment in the job and perceiving they would struggle if they were to switch (Griffin & Hepburn, 2005).

Variation in variables such as embeddedness and organizational commitment may be associated with many factors, one example is perception of fair treatment. When individuals feel they are being treated equitably regardless of gender, military rank, race, religion, or background, they tend to feel more enmeshed in and committed to their service branch. As noted by then Air Force Secretary Deborah Lee James in 2015

> "To perform we need top talent. Today we claim the title 'World's Greatest Air Force,' but to remain so, we must learn to be comprehensively inclusive, throughout our ranks, and throughout our specialties. If we get this right, we will glean significant benefit from the many perspectives of the population we serve" (James, March 9, 2015).

It should be noted that organizational research has examined a number of other predictors of turnover and retention that cannot be addressed here because they are not measured by the SOFS-A. Four of the most important examples are trust in coworkers, trust in supervisors, burnout, and organizational culture. These are discussed further in the Limitations section in Chapter 5.

Why servicewomen retention is a social work issue

Servicewomen retention is important as it helps workplace diversity. Workplace diversity is important for several reasons. It fosters different perspectives that can lead to increased innovation, safer and better decision making, faster problem-solving, increased job embeddedness, increased job satisfaction, psychological empowerment, organizational commitment, and reduced turnover behaviors (Messersmith, et al., 2011). Reduced turnover, in turn, can lead to lower expenses (Allen, et al., 2010) and retention of social capital—defined as strong personal relationships that exist between coworkers. These are developed when coworkers trust and communicate with each other within their own work areas as well as across different

departments, are comfortable tapping into each others' knowledge and skillsets, and feel responsible for the outcome of their organization as a whole (Pérez-Luño, et al., 2011; Dess, et al., 2001).

Why this is a military issue

As the military battlefield changes and takes place on asymmetric operational environments, the need for a diverse military workforce increases. For example, the Department of Defense (DoD) Diversity and Inclusion Strategic Plan states:

> "We gain a strategic advantage by leveraging the diversity of all members and creating an inclusive environment in which each member is valued and encouraged to provide ideas critical to innovation, optimization, and organizational mission success" (DoD Diversity and Inclusion Strategic Plan, 2012, p. 3).

In other words, continuously pursuing diversity within the military will help to achieve better outcomes, allow for a competitive advantage in wartime or garrison, and promote readiness and ability to complete missions.

According to Segal (1986), Air Force servicemembers are part of a "greedy institution." These types of organization are "characterized by the fact that they exercise pressures on component individuals to weaken their ties, or not to form any ties, with other institutions or persons that might make claims that conflict with their own demands" (Coser, 1974, p. 298). As servicemembers, individuals may experience multiple geographical relocations, deployments, and separations from family members (MacDermid, & Southwell, 2011; Drummet, et al., 2003; Segal, 1986). Also, during deployments they are at risk of physical injury, combat-related disorders, and even death.

Segal (1995) also described the military as a masculine institution. From the beginning of organized warfare, attributes such as physical strength were of paramount importance. Armies prized males for their ability to throw a spear or swing a sword. At the individual level, this could mean the difference between life and death, and at the national level it could mean the difference between prevailing or being conquered. The growth of technological warfare has diminished the need for physical prowess, but women still find themselves working in a culture that prizes "aggressiveness" and "toughness" defined in outdated ways (Morris, 1996).

For women servicemembers to participate fully, one of two things must occur. Either the military must change enough to take full advantage of the strengths and abilities women can offer, or women must be viewed as being able to meet the needs and demands of modern military service (Segal, 1995). Evidence suggests that if the second of these situations does not occur, yet the military is in dire need of more personnel, the first circumstance will arise. For example, when the military transitioned to the All-Volunteer Force (AVF) and relaxed previous family restriction policies, the attrition rate for female servicemembers, following their initial contract length, decreased from 48 percent in 1960 to 26 percent in 1973 (Holm, 1992; King, & DiNitto, 2019).

Findings from non-military organizations

Factors such as dangerous deployments, multiple and sometimes sudden geographic relocations, and separation from family members, means that research on other organizations may not apply to military settings. But complex organizations have certain similarities, and predictors of job turnover in civilian organizations—including organizational commitment, job satisfaction, and aspects of the work environment such as stress, embeddedness, leadership, and fulfillment of work—may operate in similar ways in the military (Griffeth, et al., 2000).

For example, midcareer women working in science, technology, engineering, and mathematics (STEM) often experience turnover at similar rates as women in the military, and Hewlett and colleagues(2008) found several factors in demanding STEM careers that affected turnover rates. These included feeling a part of an 'old boys' network,' being within a hostile macho culture, experiencing high work pressure with long work hours and frequent travel, having an inadequate number of mentors and sponsors, and having rewards/promotions go to employees who are more able to drop personal responsibilities to address work emergencies. All of these factors have also been noted within the servicewomen turnover literature (Keller, et al., 2018; Curry-Hall, et al., 2019; DACOWITS, 2017, DACOWITS, 2018).

Women in the criminal justice field also work in a male-dominated, high-stress environment. One study found female police sergeants expressed higher levels of emotional exhaustion than their male counterparts, and emotional exhaustion, as a component of burnout, is consistently associated with turnover rates (McCarty, 2013). In another study of female police officers, gender-work identity conflict was prevalent for women and predicted lower job satisfaction, lower work motivation, reduced extra-role behaviors, lower perceived performance, more burn-out symptoms, and higher turnover intentions (Veldman, et al., 2017).

Valuable comparisons may also be found in nursing. For example, job satisfaction (Lu, et al., 2019) and work-family balance (Zhang et al., 2016) were found to be mediators of organizational and professional commitment. Moreover, the work environment, job stress, pay scales, staffing ratio, leadership structure, ethnic background, and utilizing up-to-date practices were all found to influence nurses' turnover behavior (Weale, et al., 2016).

Human service professionals also may be a useful point of comparison. A meta-analysis of turnover intention predictors identified organizational commitment and job satisfaction as the

strongest predictors of turnover, among nurses (Kim & Kao, 2014). Stress and burnout had medium to high influence, while employees' perception of fairness and policy had a strong effect on turnover intent. Another meta-analysis of 25 articles that examined retention of child welfare employees postulated that personal factors and work-family balance were not as strong predictors of turnover as organizational factors, such as burnout, job dissatisfaction, lack of social support, and low organizational commitment (Mor Barak, et al., 2001).

Women in military careers

Historically, women in the military have experienced systematically different treatment than their male counterparts. For example, prior to amendments to the 1967 Women's Armed Services Integration Act, servicewomen were likelier than servicemen to receive lower pay for the same work, to be discharged after having a child, becoming a stepparent, and/or adopting a child, to be denied promotion opportunities, to be barred from participating in combat operations, and to be barred from entering into certain job specialties (Holms, 1992). Perhaps for these reasons, women in the Canadian military were found to have lower levels of organizational commitment and higher levels of burnout and psychosomatic symptoms as compared to males (Leiter, et al., 1994). These authors argued that servicewomen tend to have inadequate support networks (i.e., mentors and female leadership), and their higher levels of stress and burnout may be less a product of occupation frustrations than of these inadequate supports (Leiter, et al., 1994). Similarly, Keller and colleagues (2018) explored biases faced by servicewomen, and found that while some explicit (overtly sexist) biases may have decreased, implicit biases still persist, such as potential negative ramifications for progress in women's military careers should they become pregnant.

Servicewomen are also far more likely to experience maltreatment based on their gender than servicemen. For example, while both men and women may be victims of harassment, and both may experience a military sexual trauma (MST), women are 20 times more likely to experience a MST than their brothers-in-arms (Suris & Lind, 2008). Similarly, researchers at the RAND Corporation estimated that approximately 12.4 percent of active-component female Airmen, compared to 3.2 percent of male Airmen, had experienced sexual harassment within the past year (Morral, et al., 2015). With regard to other health-related indicators, male service members are more likely to report problems related to alcohol use after a deployment, whereas servicewomen are more likely to report depressive symptoms (Maguen, et al., 2012). In addition, research conducted on Gulf War veterans indicated that women reported more interpersonal stressors (family and personal life stressors) that may negatively impact one's mental health (Vogt, et al., 2005).

Evidence also suggests that family-related factors are more important and complex for female servicemembers. For example, data from Gulf War female veterans suggests that achieving work-family balance may be more difficult for female servicemembers, who typically devote more time to domestic duties than males (Southwell & MacDermid, 2016). Also, the rate of divorce among servicewomen exceeds that of women in the civilian population (U.S. Bureau of Labor Statistics, 2013) and also that of male servicemembers (Edlestein, et al., 2017; Karney & Crown, 2007). In turn, divorce makes female servicemembers more likely to be single parents (Southwell & MacDermid Wadsworth, 2016).

Research also suggests women may forecast spillover between work and family prior to entering into active duty military service. For example, research conducted with first year U.S.

Naval Academy students showed gendered differences in career intentions, such as higher levels of anticipating delayed childbearing among women cadets (Smith, & Rosenstein, 2017).

Dual Military Careers

Across all four service branches—Army, Navy, Marine Corps and Air Force—over 86,000 servicemembers (12.9%) were in dual-military marriages in 2018 (Defense Manpower Data Center, 2018). In the Air Force, 19.6% of married personnel were in a dual marriage as of that year, including, strikingly, a majority (53%) of female Airmen (DMDC, 2018).

While information on civilian-sector dual-career households is comparatively easy to locate, it is rarer for dual military couples, and available findings come largely from studies using focus groups (DACOWITS, 2015; DACOWITS, 2017, DACOWITS, 2018, Keller et al., 2018). Also, despite the high percentage of female Airmen who are in a dual-military marriage, little is known about how that affects turnover behavior. Available findings mostly address secondary effects such as spillover (e.g., from being part of a greedy institution) that may not have been experienced at all or as strongly if only one partner was a servicemember (Huffman & Olson, 2017).

Summary

The issue of retention among servicewomen is important for a military that seeks to maintain and expand diversity in in ranks as a means of meeting 21st century challenges. Doing so is both a social work and military issue, and addressing it will require adapting research findings from nonmilitary settings.

Existing work on military retention is potentially fruitful, but gaps in this work limit the ability to craft and implement effective policies to attract and retain female Airmen. In particular,

research has often failed to examine military retention from a multilevel perspective (micro and macro levels). Correcting this may help explain how certain factors influence turnover intent or retention. So may research that addresses other gaps, such as the paucity of studies that examine dual-military couples. As over half of female Airmen (53%) are in a dual-military marriage, it is important to understand whether dual-military marriages are protective or risk factors for turnover.

CHAPTER 2: LITERATURE REVIEW

Scope/Overview of the Problem

Turnover Defined. In the proposed study, turnover will be defined as the departure of an employee from an organization. Price and Mueller (1986) divide turnover into two types: voluntary and involuntary. Voluntary turnover is the termination of employment by choice of the employee (see also Hom & Griffeth, 1995). Involuntary turnover is removal of an employee by the employer, or by other forces, such as accidental or combat disability or death. Voluntary turnover typically occurs more frequently than involuntary turnover, and both tend to be disruptive to productivity and the achievement of outcomes (Hausknecht, et al., 2009). In particular, the loss of skilled employees can cost the organization well more than the departing employee's annual salary due to the cost of recruitment, selection, and training of successors (Allen, et al., 2010). The recruitment and training of new employees can also retard or undermine workforce diversity and, ultimately, mission success (Hom, Robertson, & Ellis, 2008).

Studying turnover after its occurrence can be problematic, given that individuals who have departed the organization may be difficult to contact (Firth, et al., 2004), and those who can be contacted may differ in important ways from those who cannot. But employees' self-reported intent to leave has been argued to be a viable proxy for actual turnover (Van Breukelen, et al., 2004; Mor Barak, et al., 2001).

Military Retention Defined. When an enlisted servicemember's estimated expiration of term of service (ETS) approaches zero, the member has four options: reenlist, extend the service contract, transition to the officer ranks, or separate from the military. Service members in ETS Zone A have between 17 months and 6 years in service when reaching this juncture; Zone B

service members have 6-10 years of service; and service members in Zone C have 10-14 years of service. Reenlistment can occur only if the member is eligible, and to be eligible the member must be without legal/health problems and must meet occupational Service specific requirements (i.e., recommendations and evaluations, examinations, promotion selection boards, high-year tenure [HYT], height/weight requirements). Members not meeting these requirements are ineligible for reenlistment (Military Leadership Diversity Council, 2011).

Air Force servicemembers in officer ranks receive an Active Duty Service Commitment (ADSC) upon commissioning into the Air Force. Unlike enlisted servicemembers who enter and separate according to their enlistment contract, military officers serve indefinite active duty tours by appointment of the President. Officers who desire to separate from the Air Force must request discharge of their duties from the Secretary of the Air Force. Dependent on the needs of the military, this request may be denied (AFI 36-2107, 2018). Rates of service members denied voluntary separation were unable to be found.

Turnover Rates.

In the Air Force, annual retention rates of servicewomen are five to ten percent lower than for their male counterparts (Military Leadership Council, 2010). It is not known from these turnover rates if, how soon, or where former servicewomen find alternative employment. Also unknown from available data is whether the turnover was voluntary or a forced separation.

As noted earlier, women working in STEM careers are an example of those who separate earlier and at higher rates than males (Frehill, 2010). Findings from one study that examined occupation exit rates indicated that 50% of women working in STEM careers left their STEM job for a job outside of the STEM career field, compared to 20% of women working in non-STEM careers such as law and nursing (Glass, et al., 2013). Also, women exiting STEM career

fields were especially numerous among those early in their careers, and women who were married to another STEM employee were 70% less likely to leave the field (Glass, et al., 2013). Nationwide and across career fields, women on average stay with their employers for 4.0 years, compared to 4.3 years for men (Bureau of Labor Statistics, 2018).

Models of Turnover

Research and conceptual writing on employee turnover dates to the 1920s (Bills, 1925). Below is a chronological summary and description of the most frequently referenced turnover process models.

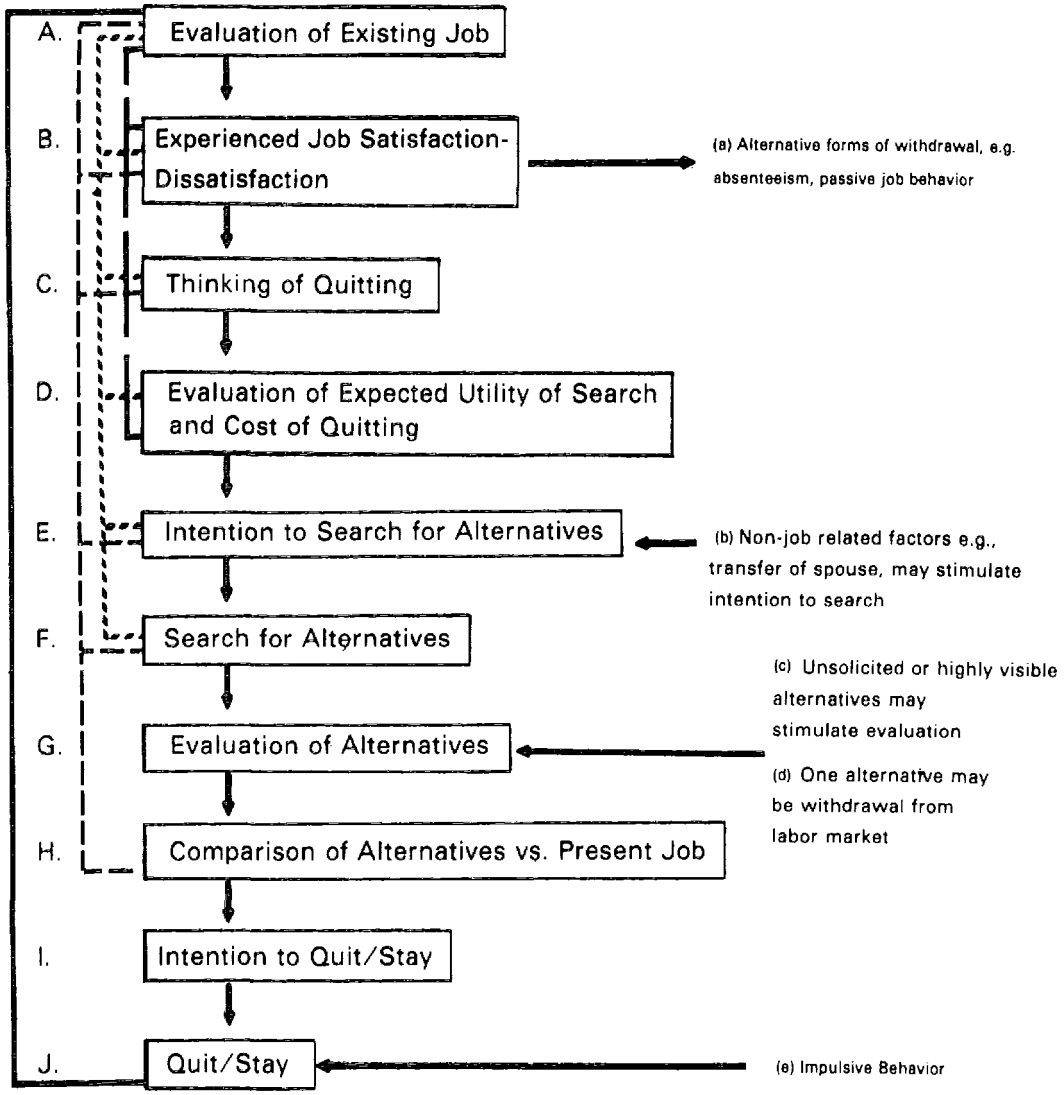
March and Simon, 1958

These authors posited that voluntary turnover arose from individual decision making based on (1) perceived ease of movement (presently referred to as perceived job alternatives) and (2) perceived desirability of staying or leaving (most commonly measured as job satisfaction). These perceptions were in turn believed to be affected by personal characteristics such as age, gender, abilities, and length at organization.

Mobley's Model of Employment Turnover, 1977

Subsequent work by Mobley and others also retained a focus on perceived job alternatives and job satisfaction, and some authors have characterized it as the most influential writing on turnover (Hom, et al., 2017). Mobley suggests that job dissatisfaction progresses into turnover by means of a linear sequence (Figure 1).

Figure 1: Mobley's Model of Employment Turnover



Since the appearance of this model, other researchers have continued to build on it. For example, turnover determinants such as community drivers (i.e., family responsibilities) and occupational drivers (i.e., potential career progression) were integrated into the model by Price and Mueller (1981). They argued that such drivers impact work-life balance and personal well-being and may ultimately affect retention intentions.

Also within Mobley's framework, work and non-work factors are considered antecedents to turnover behavior. Specifically, when organizations' policies and practices are not perceived

as supportive with regard to non-work roles, employees are more likely to report intentions to leave (Mobley, 1982). As first-line supervisors have the most direct access to the employee, they serve as the gatekeepers of work-family initiatives (i.e., providing office space and allotted time for nursing mothers to express milk) (Kossek & Distelberg, 2009). As evidence of supervisors' importance, employees who report family-supportive supervisors are likely to report more positive attitudes towards their organization (Thomas & Ganster, 1995), lower levels of work-family conflict (O'Driscoll, et al., 2003), and lower levels of psychological distress (Frone, Russell, & Cooper, 1997).

The Price-Mueller and Mobley models spurred research such as that of Hom, Griffeth, and Sellaro (1984), who suggested that intent to quit occurs before intentions to search for an alternative job. This implies two paths to turnover. On one path, the employee begins to think about termination and to evaluate the benefits associated with quitting in order to compare those against potential alternative job placements. On the other path, the individual would terminate work immediately. This turnover framework was supported by results from a survey of over 200 U.S nurses (Hom & Griffeth, 1991), and it dominated turnover research until the mid-1990s.

The Unfolding Model, 1994

In 1994, Lee and Mitchell (1994) proposed the dramatically different "Unfolding Model." This approach challenged three commonly held turnover beliefs: (1) that job dissatisfaction is the strongest predictor of turnover; (2) that dissatisfied employees look for and leave for perceived better jobs, and (3) that employees contemplating turnover use their current organization to compare alternatives based on rational expectations of benefits a different organization would provide.

Instead, the Unfolding Model called attention to new predictors, such as a "shock" or sudden, impactful event that induces thoughts about separation. These can in turn create paths to turnover, of which Lee and Mitchell described five. In the first, employees quit their job due to a predetermined "script"- a behavioral response that occurs automatically because it has occurred before. As a military example, an Airman might separate upon receiving orders to an overseas post if a friend stationed there speaks negatively of it and the Airman assumes she, too, will not enjoy the assignment. In the second path, a negative job shock such as being asked by a supervisor to cover up a mistake, challenges employees values and makes them rethink their attachment to the organization. In the third path, a shock causes employees to compare their current job to potential alternatives. For example, if the Airman is a pilot, FedEx might reach out to her with a hefty sign-on bonus, causing her to reexamine the compatibility between her current position and her goals. In the final path, which is split into two--4a and 4b--the employee does not receive a single shock but faces mounting inducements to quit arising from various smaller factors. In this circumstance, some employees may quit even without an alternate job (Path 4a), or will continue to work until they have searched and evaluated other potential jobs (Path 4b).

One study based on the Unfolding Model collected data from former employees of a public accounting firm and created qualitative methods to measure the existence of paths predicted by the model (Lee, et al., 1999). Results indicated that a large majority of those who left voluntarily (212 out of 229) followed one of the five paths. Findings also suggested that the speed of exit depends on the path, as employees on a shock-driven path left much quicker than employees who were are dissatisfied with their job. This may not apply to the Air Force, since majority of service members do not have the option of immediately terminating their service

contract upon receiving a shock. However, it could increase the likelihood of exit when the next opportunity arises.

Job Embeddedness, 2001

After a period of sustained research, in the early 2000's the Unfolding Model was refined with a new construct--job embeddedness (Mitchell, et al., 2001). This is claimed to predict turnover more strongly than previous models centering on factors such as job satisfaction, organizational commitment, job search, and job alternatives (Mitchell, et al., 2001; Holtom, et al., 2006; Lee, et al., 2004). Job embeddedness theory encompasses a variety of factors that influence an employee's decision to remain within an organization. Job embeddedness is argued to be a critical moderating construct between on-the-job factors, such as co-worker relationships, and off-the-job factors, such as commute times, and employee retention (Holtom, et al., 2006).

The two areas of focus within job embeddedness are off-the-job embeddedness, termed *community embeddedness (CE)*, and on-the-job embeddedness, termed *organizational embeddedness (OE)*. OE factors include the fit between the employee's skill set and the job's demands, as well as the employee's relationship with co-workers. CE factors include the distance to and from work and family commitments (i.e., a child's traveling soccer league schedule) (Mitchell, et al., 2001).

Job embeddedness is posited to involve three components: fit, links, and sacrifice. The *fit* component describes an employee's perceived comfort and compatibility with both the organization and community. For example, do the Airman's values mesh with the organization's culture? Does the Airman feel comfortable in her current neighborhood? The *links* component comprises formal and informal connections the Airman has within and outside the service. If the Airman has many friends and social groups within her immediate community as well as within

her unit, she likely will have a stronger bond to the organization. Finally, the *sacrifice* component pertains to the perceived or real costs associated with terminating employment. For example, an Airman would lose her pension if she decides to separate from the military early. If employees feel they fit well within their job and also have both formal and informal networks with colleagues and members of their community, they may feel embedded in their job. These who do are more likely to stay within their organizations so they don't sacrifice community and organizational bonds (Lee, et al., 2004). Research suggests that all three components; fit, links, and sacrifice, are negatively related to turnover (Mitchell et al., 2001).

Eight Motivational Forces and Voluntary Turnover, 2004

In further developing the Unfolding Model, Maertz and Griffeth (2004) identified eight "forces" that help shape an individual's desire to separate or remain. They contend that this framework fills previous gaps regarding employees' psychological reasoning for quitting and can also serve as a mediating mechanism that ties predictor variables to turnover. The identified forces are:

- Affective forces – how satisfied an individual is with the job
- Alternative forces – self-efficacy thoughts regarding other job opportunities
- Behavioral forces – perceived mental and financial costs of leaving one's job
- Calculative forces – rational perceived future benefits associated with remaining
- Constituent forces – relationship with co-workers and supervisors
- Contractual forces – perceived obligation to remain with the organization due to a psychological contract, perceived expectations based on informal arrangements, and common ground between two parties (Rousseau, 2001)
- Moral/ethical forces – personal values and beliefs regarding turnover

- Normative forces – perceived expectations of friends and family regarding turnover.

Research on these forces and their relationship to work-family conflict suggests that competing priorities indirectly affect withdrawal cognitions through both job dissatisfaction and job avoidance, with job dissatisfaction being a catalyst for avoidance (e.g., showing up late, or missing work). This is an example of an affective force (Hom & Kinicki, 2001). These authors also found that an imbalance between work and family can minimize personal goals that exist outside the organization (calculative force). Work-family conflict effects can also be mediated through normative forces. For example, if work responsibilities conflict with family responsibilities, family members may encourage the employee to quit (Lee & Mauer, 1999).

High-Performance Work Systems (HPWS), 2000

HPWS has been defined as "a group of separate but interconnected human resource (HR) practices defined to enhance employees' 'skills and effort'" (Takeuchi, Lepak, Wang, & Takeuchi, 2007, p. 1069). These systems involve human resource (HR) practices, such as appraisal processes, training in organization-specific skills, compensation, and comprehensive approaches to recruitment and selection (Messersmith, et al., 2011). As research on organizational variables has expanded, human resource management scholars have been able to link HPWS to psychological variables that affect turnover behaviors. These include increased job satisfaction (Macky & Boxall, 2007; Takeuchi, et al., 2009), organizational commitment (Macky & Boxall, 2007; Takeuchi et al., 2009), trust in leadership (Gould-Williams, 2003; Liggans, et al., 2019), and psychological empowerment (Guthrie, 2001).

Until recently, however, scholars were unaware of the underlying mechanism by which HPWS was associated with organizational performance outcomes. Using survey data from 1,372

Welsh government employees, Messersmith et al. (2011) employed a multisource model to examine the relationship between HR practices with organizational performance, as well as the indirect paths to employee attitudes and behaviors. Results suggest that organizational citizenship behavior, defined as an employee's voluntary commitment within their organization that is not a part of their daily duties, partially mediated the relationship between HPWS and organizational performance. Put another way, HPWS may increase citizenship-related behaviors, which then enhance work performance. The authors also found support for HPWS utilization and increases in job satisfaction, organizational commitment, and employee psychological empowerment.

These results may seem rather common sense--that investing in employees through HPWS would make them more likely to engage in behaviors that help meet the organization's goals. Proponents of the model argue that when leaders employ HPWS practices, employees feel more confident in their abilities and are more likely to step outside of their rigid job descriptions to help co-workers. These exchanges can potentially alter the organizational culture—defined as underlying values and beliefs that shape the psychological and social environment (Frost, 1985). When appropriately implemented, HPWS practices can also enhance organizational outcomes, such as increased productivity, job satisfaction, and affective commitment, and they can also reduce intent to leave (Huselid, 1995; Ang, et al., 2013).

Making Sense of Turnover Predictors

Researchers have explored turnover behaviors through different methods. Some studies have explored how organizational factors relate to turnover, while others have explored how variables work to moderate this relationship. For this study I will group all my variables together as predictive variables and explore them simultaneously. These predictive variables include,

gender, pay grade, marital status, dual service spouse, number and age of children, autonomy, stress, HPWP, spillover, job satisfaction, spillover, family views, spousal views, perceived organizational support, organizational commitment, job embeddedness, and perceived job alternatives.

While at times these factors may operate independently, writers such as Carlson (2017) proposed that they are often interconnected. Interactions that are hard to untangle may be present, and while I will attempt to place variables under single headers, (i.e., marital status or stress), it will be acknowledged that predictors are most likely correlated with each other and may interact with each other in complex ways.

Predictive Variables

Gender. As noted earlier, within the Air Force female officers are more likely than male officers to separate from the military between two and 10 years of service (Izawa, 2017). Within the Navy, enlisted female Sailors have been found to separate an average of two years earlier than their male counterparts (6 years of service for females and 8 years of service for males), with female officers separating nearly three years earlier than male officers (11 years of service compared to 14 years) (Levells & Poe, 2017). Female Army officers are more likely than male officers to separate after their initial service contract of four years (Miller, 2017), and Coast Guard reports indicate that enlisted female retention rates are consistently lower than enlisted male rates from five years of service onwards (Mayer, 2017). Finally, within the Marine Corps, female officers' continuation rates are four percentage points lower than male officers at nine years of service (Izawa, 2017). Unfortunately, there is no clear-cut explanation why these retention differences exist. However, focus group interviews suggest that the ability to achieve

work-family balance may be critical to women's turnover behavior (DACOWITS, 2017; DACOWITS, 2018; Keller, et al, 2018).

Pay Grade. Pay grades are used within the military to determine wages and benefits based on the corresponding military rank of the service member. Within the Air Force, pay grades are divided into two groups: enlisted (E) and officer (O). Enlisted Airmen fall within the pay grades of E1-E9, and commissioned officers fall within the pay grades of O1-O11. An individual's pay grade is based on their rank and time in service.

Since the SOFS-A dataset that will be examined does not have a time-in-service variable, pay grade will be used as a proxy for how long a service member has been in the military. Military women are retained at lower rates than men throughout all points of their military careers (DACOWITS, 2017), but especially during the midpoint (5-8 years), which tends to align with the pay grades of E4-E6, and O3-O4 (Defense Manpower Data Center, 2019). Retention rates for female officers hover around 50 percent near the seven-year-mark, and 30 percent at 12 years of service (MLDC, 2010). In contrast, male officers' retention remains at about 50 percent until year 12 and does not fall to 30 percent until after 21 years of service (MLDC, 2010).

Marital Status. Results from the 2012 Survey of Active Duty Spouse (n=12,274), as well as administrative data on active duty members, revealed that 93% of active duty members having a spouse who strongly favored the service member remaining in the military did indeed remain for at least two years following completion of the survey (Office of People Analytics, 2017). Using data retrieved from the 1996 Survey on U.S. Army Officer's careers, Huffman and colleagues (2014) examined the effect of non-work factors (i.e., spousal support), on turnover intent. Mediation analyses revealed that spousal support was negatively related to turnover intent (beta coefficient = -.55). This research also found that work-family conflict (WFC) and job

satisfaction were significantly related to job turnover (beta coefficient = .42 and -.67, respectively) (Huffman, et al., 2014). As can be seen from the signs of the beta coefficients, lower WFC and higher job satisfaction levels were associated with lower intent to leave.

Spouse in Service. Dual-military couples are military service members who are married to each other (Huffman & Payne, 2006). In 2018, about one in five (19.6%) of all Airmen were in a dual military marriage, but more than half (53 %) of female Airmen were in a dual military marriage. In addition, 14,967 active duty dual-military Airmen had children (DMDC, 2018; DACOWITS, 2018). This has led some military researchers to contend that gender equality in the military has surpassed gender equality in families. For example, Kelty, Kleykamp, and Segal (2010) argue that the military has offered women most opportunities that males are offered. In both the military and larger society, however, the authors note that women continue to be expected to take the lead in childrearing. This situation increases the challenge for active duty servicewomen in balancing work and family demands.

In focus groups taking place in 2017, female participants noted that dual-military marriages were hard on families, given that one of the service member's careers typically had to be prioritized over the others.

> [Dual-military couple discuss] whose career is more important because you just don't see military marriages where both of them are [senior leaders]. That just doesn't happen very often. At some point, one career is just on a different path. I just think that's the reality of the military. (DACOWITS, p. 14)

Another problem was the fact that the couple may be assigned to different duty stations, as military assignments are based on the needs of the Air Force (DACOWITS, 2017). As one female officer in the focus group noted:

> Getting to the 20-year mark is…really important…I was pregnant, and my husband was going to [a different location than I was]. If I could have gotten out at that point, I would have. The detailer was not working with us. Instead, I came here and have been [living in a different geographic location than my spouse] with an infant. (DACOWITS, p. 17)

One study on marriage satisfaction among dual-military couples (n=1,320) found that females were less satisfied than males with their marriages (Schumm, Resnick, Bollman, & Jurich, 1998). However, these conclusions were drawn using results from a single item in the survey. More recent qualitative research on dual-military Air Force couples (n=20) explored the relationship between number of deployments, years of military service, rank, and stress levels with martial satisfaction. Results showed that as wives' rank increased, their comfort level with their marriage decreased (Lacks, et al., 2015). These authors also noted that as a husband's rank and time in service increased, his stress levels did as well, but the authors did not note if this affected their wives' marital satisfaction.

Individual factors such as marital status may not directly predict turnover intent. However, these results suggest that they may still be associated with turnover behavior through mediating variables such as job satisfaction, work-family balance, and organizational commitment.

Number and Age of Children. Using data from women with young children in the United States, Britain and Japan to examine employment rates and turnover behaviors,

Waldfogel and her colleagues (1998) found that young children is strongly negative associated with women's workplace retention. While this study may be somewhat dated, having occurred when family leave policies were less generous than now, some of the findings and suggestions are echoed in more current literature. For example, the authors mention the importance of family leave policies that guarantee women their job upon return from maternity leave. These work-family balance policies are still being shown to influence job satisfaction, organizational commitment, and assist in female retention (Gunderson, 2002; DACOWITS, 2017), and they will be discussed further in the HPWS section. Waldfogel at al. also speculate that the less-developed child care system in Britain is the most influential reason for British women having the lowest rates of female retention among the three surveyed countries. This echoes findings from military focus groups, in which women voiced concerns over lack of child care options, especially for those with duty hours outside of the traditional 9-5 workday (DACOWITS, 2017; Curry-Hall, et al., 2019).

The number of children a woman is responsible for has also been found to be negatively associated with female job retention (Erdamar & Demirel, 2009). This may occur due to additional children bringing about additional financial stressors (i.e., day care, or after school programs) (Schochet & Malik, 2017). While the number of children may not directly influence turnover intent, it has been connected to decreased job satisfaction and organizational commitment, both of which have been shown to influence turnover behavior (Erdamar & Demirel, 2009; Aryee, et al., 2005).

Autonomy. Self-determination theory (SDT; Deci & Ryan, 1985a; Ryan & Deci, 2000) defines autonomy as regulation by the individual. Job autonomy involves employers' allowing employees to regulate their own work pace and processes required to complete job requirements

(Dwyer & Ganster, 1991). Higher levels of autonomy have been linked to improved performance as well as higher well-being (Vansteenkiste, et al., 2008). Also, job autonomy has been identified as an important correlate of higher job satisfaction, lower work-family conflict, and lower negative work-family spillover (Demerouti, et al., 2012; Keene & Reynolds, 2005). Research with physicians that examined how workplace violence affected job satisfaction and turnover intent found that autonomy and opportunities for job control served as buffers for the relationship between job satisfaction and turnover intent (Heponiemi, et al., 2014). The relationship may occur as autonomy affects coping strategies by allowing employees opportunities to take breaks as needed to address emotional needs, and allows some flexibility in deciding when to address potentially stressful situations (Spector, 2002). Research with Millennial-age nurses (those born between 1981 and 1996) found a positive correlation between providing autonomy at work and job retention (Moortezagholli, 2020). Subjects reported that having autonomy in their jobs allowed for creativity and problem-solving. Even within and environment of strict work guidelines, they indicated that autonomy was important for work functions they were directly overseeing and in which they were subject-matter experts. Though with a very different employee group—truck drivers having an average of 17 years of experience—autonomy as a component of job satisfaction (i.e., task identity and skill variety) was found to be the strongest predictors of job retention (Prockl, et al., 2017).

In James MacGregor Burns's book on leadership, the author claims that, "leadership is an aspect of power . . . over other persons" (1978, p. 18). As such, the relationship between a leader and her/his subordinates occurs when "persons with certain motives and purposes mobilize… resources so as to arouse, engage, and satisfy the motives of followers" (p. 18). If authority is defined as being in a position of superiority over someone, and autonomy is an individual's

ability to govern oneself, how does military authority align with personal autonomy? As the military has a culture that is characterized by adherence to a chain of command, uniformity, dependence on leadership, and a recognition that a military member is different than a "civilian", autonomy within one's military position may be different than within a civilian position (Woody, et al., 2005) and the range of what may be considered "autonomy" may be much more restricted, especially for those in junior ranks.

Stress within Civilian Organizations

One study that sought to understand why child welfare employees desire to leave utilized measures designed to capture emotional and physical behaviors leading up to separation (i.e., job withdrawal, work withdrawal, alternative employment search, and termination), as opposed to just measuring intent to leave (Hopkins, et al., 2010). While a variety of individual, organizational, and attitudinal factors influenced emotional and physical behaviors related to separation differently, factors related to organizational climate explained significantly more variance in types of organizational withdrawal than individual or attitudinal factors.

The study also found that among individual factors, with respect to job withdrawal, stress was the strongest predictor. In the regression model for work withdrawal (defined as negative behaviors such as tardiness that employees engage in while still employed), stress was again the strongest contributor. Also, the overall model for job search and job-seeking behavior suggested that stress was once again the most important contributor, while high morale and career commitment were related to lower levels of job search. Binary logistic regression revealed that stress increased the odds of an employee exiting by two and a half times.

Stress within the Military

Pace of Work. In a 2016 study called the Blue Star Family Military Lifestyle Survey, more than seven in ten respondents reported that increased operations tempo (OPTEMPO), the measure of the pace of military operations in regards to equipment usage (such as flying hours or tank hours), resulted in unhealthy stress levels. Service members and spouses also noted unhealthy stress levels resulted from time away from family, the impact of deployment on children, and family stability across all military branches.

Overall, however, studies on the relationship between OPTEMPO and military turnover behavior have resulted in inconsistent findings (Huffman, et al., 2005). Some of the findings have suggested a higher OPTEMPO is related to greater intent to leave (Giacalone, 2000; Sullivan, 1998), while others indicate that a higher OPTEMPO increased job satisfaction and likelihood to remain in the military (Castro, et al., 1999; Reed & Segal, 2000).

Using post-2001 data, which would reflect a much higher OPTEMPO compared to pre-2001 data, Olsen and Heilmann analyzed secondary data from 2,171 Airmen (Olsen & Heilman, 2009). The four variables measured were OPTEMPO, career intentions, job satisfaction, and organizational commitment. Two individual characteristics: gender and rank were also examined, and OPTEMPO was measured through deployments, temporary duty (TDY) assignments, training exercises and work hours. Using job satisfaction and organizational commitment as moderators, results revealed no significant relationship between OPTEMPO and turnover intentions (Olsen, et al., 2009). Results also suggested rank and gender did not moderate the relationship between OPTEMPO and turnover intent. Still, given inconsistent findings across studies, OPTEMPO, as measured through work stress will be included among variables addressed here.

Female-Specific Stress. A study by the RAND Corporation used qualitative interviews with female Air Force officers to better understand why they leave the Air Force at higher rates than males (Keller et al., 2018). Fifty-four focus groups were conducted across 12 locations with a total of 295 participants. The female officers' ranks were between O-1 and O-5 and included a variety of career fields. Gender composition of work experiences was brought up in 94 percent of the focus groups, including the lack of female role models in senior leadership positions, especially those who are married with children. In addition, participants cited sexual harassment and assault, sexism, and challenges interacting with an "old boys' network." As an example, one focus group participant noted that,

> As the only female in the squadron, you have to be tougher than the guys, and it sucks. And you pick up the pick axe and swing away and you cannot show weakness, especially as an officer. (p. 30)

A majority of participants also noted that long hours and/or shift work can lead to burnout and work-life balance difficulties. All of the noted work environment conditions are elements of the perceived organizational culture and may influence an individual's turnover behaviors (Westbrook, Ellett, & Asberg, 2012).

High Performance Work Practices (HPWPs). HPWPs encompass practices (i.e., working remotely), policies (i.e., maternity and paternity leave), motivation (high pay), rewards (i.e., promotions) and supports to employees (i.e., on-site day care center), along with opportunities available to help employees' contribute to reaching organizational goals (Hartnell, et al., 2019). This study will focus on policies and supports made available to help minimize work-family conflict, such as the expansion of child and youth programs, and the military parental leave program. While these policies and supports were designed to minimize negative

spillover, some employees have reported feeling that they indirectly penalize them, while inviting stigma and bias against mothers (Fuller & Hirsh, 2019). The following paragraphs will discuss pros and cons of policies designed to minimize work-family balance.

Policies centered on promoting Work-Family Balance (WFB) can be used to determine WFB's relationship to organizational commitment and turnover. While there may be formal WFB policies in work centers, employees may also have informal perceptions of support within their work center. For example, even though employers offer benefits such as working from home, does the company leadership indirectly penalize those who take advantage of these policies (i.e., by questioning their judgment or work performance)? Some research has suggested that work centers that are more accommodating to working mothers and have more WFB policies in place may actually negatively affect these women indirectly, leading to discrimination and bias against mothers (Fuller & Hirsh, 2019). For example, analyses using Canadian workplace-employee data suggests that women with bachelor's degrees or higher experience stronger wage penalties when they work from home (versus the workplace) when compared to less educated women who work at the work center (Fuller, et al., 2019).

Based on results from both qualitative and experimental studies, a picture sometimes emerges of employers holding biased assumptions about a working mother's commitment to the job, her capability to perform the job, and the value she brings to the organization (Bornstein, 2013; Ridgeway & Correll, 2004). These implicit bias concerns were also voiced among DACOWITS focus group participants (DACOWITS 2003, DACOWITS 2004, DACOWITS 20017) and within military retention surveys (DiSilverio, 2003). For example, in interviews regarding the 2016 updated maternity leave policy, one focus group participant noted:

> I have a friend who has a baby who works in flight line–centric support operations. When she got pregnant, her leadership wanted to remove her from that position, so she had to fight very hard to stay in her position. It worked, but she struggled with choosing to take her 12 weeks of maternity leave because logistics is a fast-moving field, and she knew that the guys would pass her if she stayed out that long. (DACOWITS, 2017, p. 37)

Other research has suggested the opposite effect of work-family policies. By utilizing opportunities such as in-place day care programs, flexible work hours/placements, and other family-friendly perks, employees reported being better equipped to balance work and family issues, and ultimately to have stronger work performance (Gunderson, 2002). Other results suggest that family-friendly working accommodations are positively associated with enhanced job satisfaction and higher levels of work retention for both men and women (Morganson, Litano, & O'Neil, 2014; Fang, et al., 2019). Unfortunately, many of the policies addressed in these civilian studies are not found in the military. Therefore, it is difficult to know if these programs would also affect retention rates for military members.

The preceding section covered variables related to turnover intent. The next section will cover organizational factors that serve as mediators and moderators of turnover intent. As previously mentioned, there is overlap in some areas, as not every variable fits neatly into one category.

Job satisfaction. Job satisfaction has been defined as how much individuals enjoy or dislike all aspects of their job (Spector, 1997). This typically involves more than just getting paid well, and evidence suggests that employees seek enriching, rewarding and enjoyable work as much or more than well-paid work (Tao, et al., 2015).

A meta-analysis of predictors of turnover, utilizing 67 samples and over 24,000 subjects, identified job satisfaction and organizational commitment as the most frequently predictive attitudinal variables (Griffeth, et al., 2000). In addition, available research indicates there is a statistically significant relationship between overall job satisfaction and outcomes such as job effectiveness, burnout, and turnover intentions (Lu, et al., 2019; McGilton et al., 2013). High job satisfaction is also associated with job retention, whereas low job satisfaction is associated with burnout and turnover intention. Still, while job satisfaction is considered an important predictor of job turnover, economic factors such as high unemployment rates may outweigh the effect of job satisfaction and keep employees in jobs they may not be satisfied with (Wadsworth, et al., 2018).

Different career fields have different organizational characteristics linked to job satisfaction. For example, job satisfaction among nurses is correlated with organizational and professional commitment, job stress, pay scales, staffing ratio, leadership structure, ethnic background, and use of up-to-date practices (Lu, et al., 2019; Weale, et al., 2016). More traditional mediators of job satisfaction for nurses include work-family balance (Zhang et al., 2016), organizational commitment (Santos, et al., 2016), structural empowerment- organizational policies and processes that enable employees to work in an autonomous manner, and achieve professional attainment (Wong & Laschinger, 2013) and job demands (Olsen et al., 2017). However, researchers have also highlighted the role of psychological (i.e., individual self-esteem) and environmental (i.e., structural make-up of the work center) components found to mediate job satisfaction (Lu, et al., 2019; Weale, et al., 2016). This holistic lens may offer a more accurate view of the work-life interface and how it affects job satisfaction and job retention.

Research examining job satisfaction and retention among military nurses found that perceived teamwork, promotion opportunities, leadership experience, pay, and favorable work environments (i.e., job variety opportunities, nurse-physician relationships) were the strongest influencers of job satisfaction (Zangaro & Kelley, 2010). In a multilevel-model that examined the effects of equal opportunity (EO) climate on job satisfaction in the military, results suggested that psychological EO climate and individual perceptions of the work context, as opposed to the organizational climate, were positively associated with job satisfaction, and negatively associated with job stress. These factors were also indirectly related to job satisfaction via job stress (Walsh, et al., 2010).

Research conducted on women in STEM fields offers additional insight on correlates of job satisfaction. For example, findings suggest that it is associated with: (1) a belief that women are suited for work in this area (Hill et al., 2010); (2) a work environment free of implicit and explicit bias (Hewlett, et al., 2008); (3) perceived non-discriminatory behaviors against women in selection processes, together with work environment factors such as staffing, co-worker relationships, career development opportunities, and management (Chesler, et al., 2010); and (4) an environment that is conducive to healthy work-family balance (Dubey, Singh, 2019). As will be discussed below, the SOFS-A has five questions related to job satisfaction.

Spillover. As one of the first scholars to argue that work and family issues bleed into each other, Rosabeth Kanter argues:

> Occupations contain an emotional climate as well that can be transferred to family life. A person's work and relative placement in an organization can arouse a set of feelings that are brought home and affect the tenor and dynamics of family life. (1977, p. 47)

Spillover is different from work-family conflict, which is considered "a form of inter-role conflict in which the demands of work and family roles are incompatible in some respect so that participation in either the work or family role is more difficult because of participation in the other role" (Greenhaus & Beutell, 1985, p. 77). Spillover can be both positive, which refers to the extent in which experiences in one aspect improve the quality of life in another aspect, and negative, in which pressures from home and work are incompatible resulting in difficulties fulfilling expectation and poor performance (Frone, 2003; Bellavia & Frone, 2005). Spillover between family and work roles has been linked to many individual, health, and work-related outcomes (i.e., mental and physical well-being, life satisfaction, organizational commitment, and job satisfaction; Baral & Bhargava, 2010; Duxbury & Higgins, 2001; Karatepe & Bekteshi, 2008). Additionally, the spillover construct frequently appears in literature on servicewomen's retention (Major, et al., 2012; Khan & Fazili, 2016; Bowen, et al., 2013; Fang, et al., 2019).

Conceptually, positive spillover stems from adequate amounts of resources (e.g. time, energy) to enable employees to fully engage and complete both work and family role expectations (Lee, et al., 2014). Also, if individuals feel socially supported at work, through either work-life benefits (e.g. flexibility to take a child to a medical appointment) and/or leadership support, they may have stronger psychological health and better ability to manage stressors (Bakker & Demorouti, 2007). Recent research conducted with Chinese construction employees supports the argument that family-related factors impact turnover behaviors (Li, et al., 2019). This was shown when turnover intentions were found to be partially mediated by work-family conflict.

Some of the variables that affect individuals' family stressors include parental responsibilities, partner support, partner workload, and the number of dependents (Khan &

Fazili, 2016). Variables that affect individuals' work stressors include hours, shift, investment in the job place, treatment of the employee, pleasure derived from the job, and flexibility within schedule to address needs as they arrive. Individuals who are able to balance work-family conflicts report lower stress and healthier levels of physical and mental health (Duxbury & Higgins, 2001). Those who have a harder time balancing work and family may report lower organizational commitment and job satisfaction (Bhargava & Baral, 2009).

Difficulties balancing work and family, along with negative spillover, were cited as the main factors for turnover intentions within the majority of RAND and DACOWITS-led focus groups (Keller et al., 2018; Hall et al., 2019; DACOWITS, 2017; DACOWITS, 2018, Hosek, et al., 2001; DACOWITS, 2003; DACOWITS, 2004). A type of stressor noted with particular frequency was childcare. As military members rotate every few years, they may know a limited number of people with whom they feel comfortable leaving their children. This makes them increasingly dependent on the military installation's Child Development Centers (CDCs), but CDCs often have limited hours of operation. During a 2018 RAND focus group, one participant noted:

> I am a shift worker. Childcare is so hard for a shift worker. The CDC offers 12 hours of child care, so if you work 12-hour shifts, you're really working 13 hours minimum per shift when you take into account changing clothes and finishing paperwork--and if you are a single mom or have a husband who is also a shift worker or a civilian, your only real option is to get child care on the outside. (Keller, et al., 2019, p. 33)

In the 2019 Blue Star Families Military Family Lifestyle Survey, over half of active duty respondents highlighted the lack of availability and affordability of childcare as negatively affecting their careers (Blue Star Families, 2019). Military parents with children with special

needs also reported difficulties reengaging in specialty care, in a timely manner, after relocations. More than one-third (36%) reported their communities do not have all the resources their special-needs family requires.

DiSilverio (2003) examined reasons for female turnover in the Air Force. She surveyed 560 separated active duty female Airmen who had transitioned into the Air Force Reserves, seeking to determine why they left active duty service. Among respondents, 41% reported they left the service to spend more time with family, 41% did it for geographical stability (i.e., did not want to uproot their family every three years), 27% desired to stay at home with their children, and 27% were dissatisfied with their leadership. In addition, 64% reported they would have stayed in the Air Force if there had been greater flexibility for going from active-duty service to the reserves and vice-versa. Another 58% said they would have remained if non-punitive sabbatical-type leaves had been available.

Also in the 2019 Blue Star Families Military Family Lifestyle Survey, service member spouses noted the lingering expectations that military spouses should support their service member's career over their own familial, professional, and personal priorities. Along these lines, Shiffer (2015) notes that the all-volunteer force (AVF) wasn't designed for the modern service member, who is better educated, has a spouse with a degree, has children, and is living in an increasingly diverse society. Nor was the AVF designed to flourish in the current operational tempo of long, low-level conflicts. As evidenced by the above findings, spillover between work and family can heavily influence retention decisions. As such, two additional items from the SOFS-A will be used for analyses related to spillover—one item related to family views on military service and one item related to spousal views of military service.

Family Views. As mentioned in the previous paragraph, family views of military service have been linked to retention behaviors. Situations in which servicemembers are apart from their families have been found to influence family views on military service. As with many civilian jobs (i.e., flight attendants, truck drivers) separation from family members is a common occurrence within military families (Behnke, et al., 2010). Military jobs separate servicemembers from their families for reasons such as deployments, remote assignments, training and school opportunities. These separations vary in duration and frequency, as well as in how much time family members had to prepare for the separation. Data from the 2017 SOFS-A reported servicemembers worked an average of 91 days of overtime, and spent 47 nights away from their permanent duty station within the past 12 months (OPA, 2017).

Using the Unfolding model of turnover (Lee & Mitchell, 1994), which argues that work-induced family separations can be considered a "shock," researchers examined the relationship between work-induced family separation and turnover intentions (Behnke, et al., 2004). The peacetime data used in the study revealed that family separation was significantly related to turnover intent, although job satisfaction was found to be a strong mediator between family separation and turnover intent. Non-peacetime longitudinal data from 2,700 military families also revealed that couples, on average, become significantly less fulfilled with their marriages, across the duration of the deployment, and non-deployed spouses reported decreased parental satisfaction (Meadows, et al., 2017).

Spousal Views. In addition to family influence on ITR via marital and parental satisfaction, the availability of job opportunities for military spouses has also been found to be related to ITR. Remote stateside locations, as well as military locations abroad limit the range of spousal job options. A recent DoD survey reported a quarter of military spouses are unemployed,

which is approximately six times the 2017 national average unemployment rate, and two and a half times the rate in the U.S.'s most impoverished neighborhoods (OPA, 2017). Spousal unemployment can lead to financial strain, decreased spousal support of the military, and decreased job satisfaction and organizational commitment by the servicemember (Harrell, et al., 2005). Research with 5505 U.S. Army officers' spouses explored the extent to which spousal career support would influence service member retention. The research found that spousal career support significantly decreased the odds of turnover, with lower work interfering with family (WIF), which refers to an incompatibility between work and family demands, and higher job satisfaction mediating the relationship (Casper, et al., 2014).

In other research that examined service members' attitudes toward their organization's family-supportive organization perceptions (FSOP; Allen, 2001), findings suggest FSOP is positively associated with organizational commitment and is mediated through work-to-family experiences as well as spousal attitudes (Holliday Wayne, et al., 2013). Results also found FSOP to be negatively associated with service members' work-to-family conflict, which in turn resulted with a more positive attitude towards the service member's work schedule and organizational commitment by the military spouse. Finally, a reciprocal relationship was found between spousal positive commitment and service members' affective commitment. These relationships were similar regardless of military members' gender or spouse gender.

Perceived Organizational Support (POS). POS is described as belief on the part of employees that their workplace values their work and cares for their wellbeing (Rhoades & Eisenberger, 2002). In a longitudinal study that examined the roles of POS and leader-member exchange (LMX) between the role-stress and turnover intent exchange of child welfare employees, findings indicated significant indirect effects of POS and LMX on the role stress and

turnover intent exchange at both the six-month as well as the year mark (Ahraemi, & Mor Barak, 2015). The findings suggest social exchanges, LMX and POS are important when examining turnover.

In research conducted with nurses, POS and teamwork, measured through the Satisfaction with Teamwork measures (Rubin, et al., 1994), were found to be predictors of turnover intentions among subjects in both the U.S. and Australia (Brunetto, et al., 2013). In another study, nurse managers' perceived servant leadership style, in which an individual's leader puts the employees needs first, shares power, and enables growth, and POS were found to be negatively correlated with burnout and intent to leave (Bobbio, et al., 2015). And in research conducted with 320 hospital staff members, Ahmed and Ahmed (2013) found that POS was directly positively associated with affective and normative commitment and indirectly negatively associated with turnover intent.

Within the military population, POS, work-life balance and job clarity have been found to significantly predict individual health symptoms, with POS mediating the relationship between HR practices and turnover intent (Dupre & Day, 2007). Similarly, research conducted with data derived from Air Force civil engineers suggests POS was the strongest mediator between demographic differences (marital status and age) and turnover intent (Connell, 2012).

These findings complement 2018 DACOWITS results regarding unit climate, unit culture and inappropriate behavior. Within the focus groups for this study, participants cited leadership, community, respect, communication, trust, motivation, teamwork, and favoritism as factors that enhance or undermine unit climate and perceived organizational support (DACOWITS, 2018). Additionally, falling under the POS umbrella is the idea that employee leadership cares about

employees and seeks to help them maintain work-family balance (Rhoades & Eisenberger, 2002).

Organizational Commitment. Organizational commitment (OC) pertains to an employee's psychological attachment to and positive attitudes toward the organization (Mowday, et al., 1979). OC is formed when there is a secure, psychological bond between the employee and the organization, and since as far back as the 1970s it has been shown to be negatively related to turnover (Porter, et al., 1976).

According to social exchange theory, when relationships between the employee and organization are formed, the employee exchanges her work for the organization's payment. Similarly, the employee will trade her commitment for the organization's support and growth opportunities. When expectations within these exchanges are met, a mutually beneficial relationship between the employee and the organization is formed (Rhoades & Eisenberger, 2002).

Meyer and Allen (1991) argue that OC is a psychological state, comprised of three components: a desire, *affective commitment*, an obligation, *normative commitment*, and a need, *continuance commitment* that keep employees with an organization. This three-component model (TCM) of commitment posits that individuals' psychological state depicts their relationship with their organization and also influences their decision to remain or leave their organization (Allen, 2003).

Civilian Literature on TCM. Individuals can experience different degrees of AC, NC, and CC at the same time, and recent research has stressed the importance of examining how all three forms of commitment interact to influence behavior and turnover (Meyer, et al., 2013; Gellatly, et al., 2014). These combination of the three forms of commitment can then be used to

form distinct *commitment profiles*. In the early 2000's, organizational commitment researchers began to examine profiles of employees to identify those more likely to remain with the organization. In 2006, Gellatly and colleagues focused on profiles with differing commitment types in a variety of Canadian-based organizations. They discovered that AC/NC-dominate profiles had the highest intentions to stay (Gellatly, et al., 2009). This led to a conclusion that how a situation is experienced and how that ultimately affects behavior is dependent on the context created within that profile. For example, using data collected from Canadian hospital employees, Gellatly et al. (2006) discovered that when NC is combined with strong CC, overall organization commitment may rise for employees out of thoughts that they are obligated to remain. A related study found that when strong NC is partnered with strong AC and low CC, employees display high levels of organizational support behaviors (Gellatly, et al., 2006). However, when strong NC is partnered with high CC and low AC, employees display low levels of organizational support behaviors. Research with U.S. nurses has indicated that the AC/NC-dominant group was the lowest in levels of work-related stress that carried over outside of the job, along with lower turnover intentions (Gellatly, et al., 2014; Kam, et al., 2016).

These findings are relevant outside of the nursing field. As with healthcare organizations, the military nurtures commitment through the use of continuance commitment-encouraging behaviors (i.e., benefits, salaries, and bonuses). But findings also suggest that these behaviors alone may not result in greater employee commitment, and strengthening of NC and CC is also important to help retain employees (Kam, et al., 2016).

Military Literature on TCM

A study using data more than 6,500 Canadian military personnel (analyzed with Latent Profile Analysis) revealed that subjects with profiles characterized by high AC and NC reported

the highest levels of overall well-being, stay intentions, and organizational satisfaction (Meyer, et al., 2013). Individuals within these profiles were more likely to report high POS, satisfaction with leaders, and satisfaction with the job. Conversely, military members with profiles of high CC-dominance reported the lowest levels of organizational satisfaction, scored highest on anxiety and depression levels, and were the most active with job searches.

In another study that used a variable-centered approach, researchers analyzed human resources (HR) practices designed to maximize employee integration and employee commitment to determine their relationship with AC, NC and CC. Results suggested that the perceived presence of the HR practices was positively related to AC, NC, and CC (Fragoso, et al., 2019). This complements findings and conclusions of others such as Takeuchi and Takeuchi (2013), which suggested that when employees feel their organization is considerate of their needs and goals they will have a stronger, more committed relationship with the organization.

Researchers using longitudinal data from U.S. Army officers found a majority of individuals did not change their organizational commitment profile memberships across a four-year timeframe (Xu & Payne, 2016). Within their study of Army officers, fewer than one-third (29%) of the officers transitioned between commitment profiles over the four years. Using survival analysis, the researchers found the "stability" of the commitment profile differed by profile, with the weakest (medium AC-low CC) and strongest (high AC-high CC) showing the least stability, suggesting that stability of commitment is a matter of degree, and not an all-or-nothing phenomenon, and also that success in boosting certain profiles may be transitory.

Some researchers have argued that spousal commitment towards an employee's organization can influence employee organizational commitment (Schefer, et al., 2013; Shaffer & Harrison, 1998; Gade, et al., 2003). This argument supports Crossover Theory, which suggests

that strain may spill over from work to home and may indirectly influence the wellbeing of an individual's partner (Bakker, et al., 2009). For example, a 2003 study that measured organizational commitment among Army soldiers and their spouses found organizational commitment of both the military member and military spouse were similar (Gade et al., 2003). Within the two populations (spouses and servicemembers), the AC and CC dimensions were correlated, with sound internal consistency coefficients for AC and CC scales across both servicemembers and spouses. In another study that examined data obtained from 186 military couples to determine spousal influence on organizational commitment and reenlistment, Bull Schaefer et al. (2013) reported significant direct-path relationships between servicemember and spouse AC, CC, and intent to reenlist measures. Results also revealed that perceived spousal positive emotions towards retention assisted in a significant partial mediation between the service member's and spouse AC. These results suggest that servicemembers' organizational commitment is indirectly impacted by crossover, and positive spousal emotions regarding the military and retention strengthen the organizational commitment of both the service member and spouse. As will be discussed below, items in the SOFS-A that will be available for analyses in this study address only elements of AC and CC, and they consist of six items.

Job Embeddedness. This construct encompasses a variety of on-the-job and off-the-job factors that reflect employees' sense of being integral to and solidly rooted within an organization (Mitchell, et al., 2001). It has been found to influence decisions to remain within an organization, and it may also be a critical mediator between retention and certain on-the-job and off-the-job factors (Holtom, et al., 2006). Examples of the former include the fit between an employee's skill set and the job's demands, as well as employees' relationship with their co-workers. Off-the-job factors include the distance to and from work, along with potentially

conflicting family commitments. Three components of job embeddedness are fit, links, and sacrifice (Mitchell, et al., 2001).

The *fit* component describes an employee's perceived comfort and compatibility with both the organization and the community. For example, do an Airman's values mesh with the organizations culture? Does the Airman feel comfortable in the neighborhood where she currently resides? The second component of embeddedness, *links*, represents the formal and informal connections the Airman has to the community and organization. If the Airman has many friends and social groups within her immediate community as well as within her unit, she likely will have a stronger bond to the organization. The final component, *sacrifice*, pertains to the perceived or real costs associated with terminating employment. For example, an Airman would lose her pension if she decided to separate from the military before her 20-year mark (Mitchell, et al., 2001).

One relevant study examined job embeddedness in a sample of Airmen who had an average of 18.2 years of service and were choosing between retirement, reenlistment, or separation (Smith, Holtom, & Mitchell, 2010). Using the TCM model, results revealed that CC and organizational job embeddedness predicted reenlistment among sample members whose choices were between reenlistment or separation. For those eligible to retire, AC, CC and job embeddedness predicted retirement or reenlistment behaviors. Findings also indicated that Airmen in both groups who were more embedded within their communities were more likely to voluntarily leave the military. As will be discussed below, the SOFS-A contains a single item related to job embeddedness.

Perceived Alternatives. This refers to employees' evaluation of the likelihood of finding alternative employment that is reasonably comparable to or better than the current position

(Hom, et al., 1995). In making this evaluation, employees consider how easy it would be to move to another job outside of their current organization. Also involved are their perceptions of how marketable they are, and how many jobs are available. Mobley (1977) theorized that an abundance of alternative jobs can lead to dissatisfaction with an employee's current organization. If so, perceived job alternatives can have both a direct and indirect effect on retention via job satisfaction (Griffeth & Hom, 1988).

In a meta-analysis of turnover antecedents that resulted in actual turnover, Griffeth, Hom, and Gaertner (2000) found a relatively low correlation (R=.11) between perceived alternative opportunities and turnover. These findings almost mirror the results of 1995 meta-analysis of turnover antecedents (p=.13; Hom & Griffeth, 1995). In recent research on more than 1,500 pharmacists that examined the relationship between perceived job alternatives and turnover, Rojanasarot and colleagues (2017) utilized a Perceived Alternatives Job Scale that manifested four constructs: professional opportunities, environmental conditions, compensation, and coworkers. Results suggested that the higher the environmental stress and professional commitment, the easier pharmacists perceived it to get another job in a lower stress environment. Also, stronger organizational commitment was inversely related to perceived better job alternatives. This finding supports the idea that strengthening the bond between employee and organization may help to retain employees. As will be discussed below, the SOFS-A contains one item related to perceived alternatives.

The previous paragraphs have detailed variables related to turnover intent within civilian and military populations. The identification of these factors leads to the question of whether interventions that incorporate them in efforts to retain female employees have been tested. The following section offers an overview of research in this area.

Retaining female employees

Turnover among female employees occurs at high rates within many career fields (Rasheed, et al., 2018; Yong Kim, et al., 2017), and the U.S. Air Force and other organizations have implemented many efforts (work groups, focus groups, and surveys) to evaluate and address the problem. Among themes common to many of them is the need to create "inclusive" work environments in which women feel less like outsiders, more enmeshed in operations, and more comfortable engaging in policies designed to minimize work-family conflict (Brimhall & Mor Barak, 2018). This enmeshment may lead to increased job satisfaction and ultimately to job retention (Major, et al., 2012).

Civilian Interventions. One inclusive-work-environments approach emphasizes creating flexibility to balance work and family demands (Gunderson, 2002). Such efforts include expanded leave benefits, dependent care benefits, alternative work arrangements, and mental health and wellness programs, and these accommodations have been found to be associated with enhanced job satisfaction and higher levels of work retention for both men and women (Morganson, et al., 2014; Fang, et al., 2019).

Also shown to increase retention is improved maternity leave benefits. In 2007, for example, Google increased its maternity leave from 12 weeks to five months of full-paid leave. Female employees had previously left Google at twice the rate of males following the birth of a child, but afterward they were retained at the same rates as males (Rhodes, 2018). Other companies such as Accenture sought to embrace diversity and create a culture of belonging, with the goal of increasing its proportion of female employees to at least 50% by 2025 (Rhodes, 2018). In 2020, Accenture reported continuing work toward this goal, but as of that year 49 percent of its new hires were women (Accenture, 2020). Expanded mentoring has also been

employed, and in a study of college engineering students, results indicated that female (but not male) mentors helped female students feel welcomed, enmeshed, and motivated to remain within the engineering career field. After two years, female engineering student retention rates exceeded those from previous years when mentors were not available, and the benefits of mentoring lasted well past the intervention duration, two years of college, in which female STEM students traditionally have the greatest attrition rates (Dennehy & Dasgupta, 2017).

Military Interventions. Aware that AVF servicemembers are living within a more diverse and inclusive environment, the military has recognized the need to expand efforts to retain employees having skill training and degrees that can easily transfer into civilian employment. Detailed below are examples of programs and policies that have attempted to reduce turnover intent, often by means of lowering work-family conflict.

Career Intermission Pilot Program (CIPP). In 2009, Congress authorized all U.S. military branches to implement a Career Intermission Program (CIP). The CIP provides a one-time sabbatical from the military that can last from one to three years. It is designed to "manage short-term conflicts between service responsibilities and life priorities" (Air Force Personnel Center, 2017). During the sabbatical, military members receive two-thirteenths of their base pay as a stipend. They also continue to receive full medical/dental benefits for themselves and their dependents. For every one month of sabbatical leave, the Airman owes the Air Force two months of service upon return. The program is open to Active Duty Airmen, Active Guard and Active Reserve Airmen. While enrolled in this program, the military member must maintain military readiness (Pub L. 110-417).

The first 61 CIPP participants in the Air Force began in 2015-16. Fifty-seven percent were female and 54 percent were enlisted personnel. Education (47%) and family needs (37%)

were the most cited reasons for participating. Because the most recent data on the effect of program is from only two years following its start, its impact on retention cannot yet be determined (U.S. Government Accountability Office, 2017).

Repeal of Don't Ask, Don't Tell (DADT). The Don't Ask, Don't Tell Repeal Act of 2010 lifted prohibitions on gay, lesbian, and bisexual military members identifying themselves as such (P.L. 111-321, 2010). Results from the DoD's 2015 Health Related Behaviors Survey suggests that at that time almost 4% of men and 16% of women in the military self-identifed as gay, lesbian, or bi-sexual (Meadows, et al., 2015). According to a separate report from the same year, this translates to about 44,000 male and more than 32,000 female servicemembers (2015 Demographics: Profile of the Military Community). National figures from a 2017 Gallup survey indicate that 4.5% of the U.S. adult population identified as LGBT (3.9% of men and 5.1% of women) (Newport, 2018). This suggests that the number of gay, lesbian, or bisexual military members is equal to or greater than in the general population, which highlights the importance for retention of creating an LGBTQ-friendly unit and organization culture within the military, especially among women.

In the Obama administration, transgender troops who were already serving in the military were allowed to serve openly without risking discharge. This was halted by the Trump administration in July 2017, then restored by President Biden in January 2021. Although there is no official way to track the number of transgender servicemembers, it is believed around 9,000 identify as transgender and approximately 1,000 have been diagnosed with gender dysphoria (Sonne & Marimow, 2019).

Opening All Military Occupations to Women. In December 2015, then Defense Secretary Ash Carter announced that all occupations in the U.S. military would be open to men

and women (Department of Defense, 2015). In the Air Force, the integration of females into previously male-only career fields was designed to "draw from a larger pool of skilled and qualified individuals," and "maximize our military effectiveness" (James, 2015).

Since the Air Force has a smaller number of positions that involve direct combat, the only job previously not open to females was in the special operations field. After this barrier was removed females, at least seven women have attempted to complete the training, and one has successfully completed it (Losey, 2019). In the Army in 2018, a female Soldier became the first to complete the Army's Special Forces Assessment and Selection, and that same year almost 800 women were serving in previously closed Army combat jobs, including 18 females who graduated from the Army's Ranger training (Meyers, 2018). In the Marine Corps in 2018, 113 enlisted females and 29 female officers were serving in positions previously off-limits to female Marines (Snow, 2018). Because these policies are relatively new, have affected few women, and the expanded roles have few parallels in civilian organizations, it is unclear what effects these policies may have on retention.

Talent Marketplace. In 2018, using an algorithm based on a Nobel-Prize winning National Medical Residency Matching Program (Roth, 2003), the Air Force implemented "Talent Marketplace" (TM) to assist in the military's assignment-matching process. TM considers the servicemember's assignment preferences as well as the prospective new commanders' ranking of officers being considered, resulting in a preliminary match. The goal is to assist the Air Force Personnel Center (AFPC) with finalizing assignments while also increasing transparency. While TM is currently only available for commissioned officers, the Air Force is working to expand this program to enlisted servicemembers, including dual-military members, with the hope of improving their input regarding relocation as well as positively

influencing retention. Some examples of machine-based job matching in civilian organizations have been reported, but some observers have argued that effective algorithms are still years away and adequate data is still lacking (Lazarus, 2018; Keller & Meaney, 2017).

Expansion of Child and Youth Programs. Research has demonstrated the impact reliable daycare has on working parents. Using data from the National Child Care Survey, researchers have shown the availability of care directly impacts the stability of employed mothers (Hofferth & Collins, 2000). Research has also found child care subsidies, that help offset child care fees, and also help to maintain a regular childcare provider, as opposed to a short-term provider, have helped to maintain job stability and retention (Green, 2017).

Understanding that children greatly affect military readiness and retention, during fiscal year (FY) 2019 the Air Force increased Child and Youth funding from $36.9 million to $100.2 million. This is designed to (1) expand child care for those needing it outside of normal duty hours, (2) fund youth resiliency camps, (3) and help cover child care costs for families that must use child care services off of military installations. Funding was also designated for creating more than 100 additional civilian child care positions across Air Force installations, along with strengthening bonds with youth partnerships such as the Boys and Girls Clubs (Kelly, 2019). Again, this initiative is too recent to enable outcomes to be evaluated.

Recharge for Resiliency. Research has shown organizational change is inevitable. These changes can have both positive and negative outcomes, such as stress, anxiety, or frustration (Brown, Abuatiq, 2020). Frequent change within an organization can lead to fatigue or resistance. Helping to build resilience among employees can help to minimize these negative outcomes, and increase employee well-being, within organizations that are always changing. For

example, a two-day resiliency training with a staff of 379 healthcare workers found significant improvement in resilience and stress (Kemper & Rao, 2017).

Maintaining resiliency among Airmen will help keep servicemembers mentally and physically healthy and may also be a positive retention influence (Meadows, et al., 2019). The Recharge for Resiliency Program provides opportunities for servicemembers to decompress and adjust upon redeployment (Meadows, et al., 2019). During FY19, this program was expanded to improve squadron strength, and it has provided leadership with funding and time allocations to plan for squadron activities focused on improving readiness, cohesion, and resilience. The Air Force plans to implement this program across the total force over the next several years. Although this program has slowly been rolling out Air Force wide, to date there has not been any published outcome data.

Leave Extensions

Deferred Deployment and Fitness Assessments of Post-Partum Women. In 2015, DACOWITS recommended that the Secretary of Defense require each military service to evaluate female post-partum deployment policies to determine operational impacts (DACOWITS, 2015). Following analysis, both the Air Force and the Navy determined that increasing the length of post-partum deployment deferment would not jeopardize military readiness. Therefore, both the Air Force and Navy increased their deployment deferments, as well as physical fitness assessments, from six months to 12 months (Air Force Instruction 36-3003; SECNAVINST 1000.10B). After operational analysis, both the Army and the Marine Corps decided to keep their post-partum deployment deferments to six months (DACOWITS, 2016). In April 2020, the Marine Corps extended the physical fitness assessment to nine months, and the deployment deferment to 12 months following the birth of a child (Marine Corps Order

5000.12F). To date the Army maintains a six-month post-partum deployment and physical fitness assessment deferment. Should servicemembers feel they are ready to deploy sooner, they can waive their deployment deferments.

Not only are there benefits for child and mother, extended maternity leave also provides benefits for organizations. For example, when Google increased the length of its paid maternity leave, turnover of young mothers decreased by 50 percent (Wojcicki, 2014). Findings from a study of young mothers in California and New Jersey, before and after each state began a paid maternity leave program, are instructive. They indicated a 20 percent decrease in the number of mothers who left their jobs in the first year following a birth, and a more than 50 percent decrease after five years following birth, compared to when there was no paid maternity leave (Miller, 2020).

Military Parental Leave Program. In June 2018, the Air Force again updated its maternity convalescent leave policy and renamed it the Military Parental Leave Program (MPLP). It now includes maternity convalescent leave, primary caregiver leave and secondary caregiver leave, and it is designed for birth mothers, fathers, same-sex parents, adoptive and surrogate parents. Service members who qualify for Maternity Convalescent Leave are those who are the birthparent, and they may take up to 42 days of non-chargeable leave, unless additional leave is recommended by a medical provider. Maternity convalescent leave may be used in conjunction with Primary Caregiver Leave or Secondary Caregiver Leave. Primary caregiver leave is for service members who identify as the "primary caregiver" following the birth or adoption of one or more children. Members can take up to 42 days of non-chargeable leave, for a maximum of 84 days of non-chargeable leave, when combined with maternity convalescent leave. Secondary caregiver leave is for service members who identify as the

"secondary caregiver" following the birth or adoption of a child(ren). Members identifying as the secondary caregiver are granted up to 21 days of non-chargeable leave, not to exceed 63 days of non-chargeable leave when combined with maternity convalescent leave (AFI 36-3003, 2018).

The Air Force is not the only organization that is hoping parental leave policies result in sustainable lower attrition rates. BuzzFeed, an online website that features breaking news, also recently changed its parental leave policies. In 2017, BuzzFeed implemented 18 weeks of full paid leave for primary caregivers, and six weeks for secondary caregivers. Three years since implementation, BuzzFeed has maintained a 95% retention rate among its employees that have utilized the policy (Nedlund, 2020).

Extending the Timeline to Decide to Remain in the Military Following a Birth. Prior to the AVF, pregnant servicemembers were not allowed to remain in the military. Now, pregnant enlisted Airmen can choose to remain or voluntarily separate, with separation requests being considered by military leadership (AFI 36-3208, 2018).

Until 2017, pregnant Airmen who chose to separate from the military due to pregnancy had to do so prior to giving birth. In April of that year the policy was changed to grant mothers up to 12 months post-partum to decide if they would like to remain or separate from the Air Force (Air Force Personnel Center, 2017). The hope is that this additional time will result in fewer separations.

The civilian and military initiatives described above are designed to change organizational culture and climate to embrace diversity and inclusion within organizations and military ranks. The key question now is whether they will help reduce work-family conflict and address other factors associated with the retention of female employees.

Significance of this study

As the literature review section has highlighted, antecedents to turnover intentions may differ between individuals within the same organization. Because turnover is costly to finances, morale, and productivity (Allen, et al., 2010), as well as to diversity if it occurs disproportionately among female servicemembers (Hom, Robertson, & Ellis, 2008), it is important to know what antecedents, if altered, might reduce turnover, and through what pathways. The goal of the proposed study is to determine which factors are most predictive of intentions to remain as well as intentions to separate. Understanding those factors can help to better assess if current policies designed to retain servicewomen are working or have the potential to work. As a way to provide a clearer picture of the problem and its correlates, the study will examine both individual and organizational factors that can be addressed to retain servicewomen. Among other benefits, this may help to fill literature gaps on overall retention, retention of females, and retention of members of dual-military couples. Finally, evidence suggests that fostering workplace diversity (i.e., by mitigating turnover among women) allows for increased innovation, safer decision making, faster problem solving, increased job satisfaction, and organizational commitment (Messersmith, et al., 2011). Results from this study may therefore help guide policy and practice not just in the military but also the civilian sector.

Statement of the Research Problem.

In order to gain a better understanding of servicewomen's retention, further exploration of variables related to turnover is needed. Most fruitful would be an examination of trends in job-search behaviors as well as predictors of intent to remain. Additional research to determine if gender and dual-military status serves as moderators in these behaviors is also needed.

Research questions and Hypotheses

The research questions and hypotheses for this study are outlined below:

RQ 1: What factors predict reporting intentions to remain (ITR1) in the Air Force?

H1: Factors that increase the likelihood of reporting intent to remain include spousal views, and organizational commitment.

RQ 2: Among Air Force personnel, what factors are related to efforts to separate from the military (ITR2)?

H2: Factors related to efforts to leave include dual-military service, number and ages of dependents, stress, and perceived job alternatives.

RQ 3. Does gender moderate intent to remain (ITR1) and/or efforts to leave (ITR2)?

H3: Yes, gender will serve as a moderator in ITR1 and ITR2.

RQ 4. Does dual military status moderate intent to remain (ITR1) and/or efforts to leave (ITR2)?

H4: Yes, dual military status will serve as a moderator in ITR1 and ITR2.

Chapter 3: Methodology

This chapter describes the data source, sample, measures, and statistical analyses used to conduct this study.

Data Source

Status of Forces Survey of Active Duty Servicemembers (SOFS-A)

This study used data from the Status of Forces Survey of Active Duty Servicemembers (SOFS-A). Eligible respondents were service members who work full time for the military and were not classified as a Reserve or National Guard service members. The SOFS-A is conducted by DoD and is administered at least annually. It addresses key issues of servicemembers' lives, such as family life, finances, mental and physical health, effects of deployments and Permanent Change of Station (PCS) moves, and retention attitudes and behaviors. In a typical year, roughly 124,000 service members are asked to complete the survey. The sample includes all military branches and ranks and uses disproportional stratified sampling procedures to ensure an adequate number of responses from smaller reporting categories (e.g., Marine Corps officers).

The SOFS-A continues a line of research on Active Duty members that started in 2002. Regular administration of the survey began in 2003, and three surveys per year occurred between 2003 and 2009. Since June 2010, the survey has been administered once or twice per year. The majority of SOFS-A items use 5-point Likert-type responses measuring level of agreement with a statement. While some questions were added, revised, or deleted, many items in the 2017 SOFS-A were included in previous versions. However, items in the publicly available SOFS-A datasets vary from year to year. For example, the 2017 public access version included gender and dual-military status, whereas those items were omitted from the 2016 version.

Analytic Sample

In 2017, the total SOFS-A sample size was 123,508, and 15% of surveyed Active Duty members completed the survey. The OPA which administered the survey, notes that the low response rate may have been due to the lack of reminders as well as the frequency of DoD surveys administered that year (OPA, 2017). Responses were received from 24,098 Airmen, both female and male. Of these, respondents from the Air Force, which will be the focus of these analyses, totaled 4,324, roughly 19% of surveyed Airmen. Males made up 3,441 of this group, and females 883.

Both enlisted and commissioned officers participated in this survey. Enlisted service members (E1-E9) made up a majority of the respondents --66.5 percent--with Staff Sergeants and Technical Sergeants (E5-E6) accounting for the largest portion of responses at 28.8 percent. Only commissioned officers within the O1-O6 ranks were included in the survey, and among these, officers with the ranks of Captain and Major (O3-O4) made up 18.5 percent of all respondents. The survey also included four categories of marital status: single with child(ren), single without children, married with child(ren), and married without children; age of child(ren), and whether respondents with spouses were from dual-military couples. Results showed 431 respondents in the dual-military group.

Measures

The operationalization of dependent variables is explained below.

Dependent variables

Turnover Intent

Turnover is sometimes measured as actual job leaving, but more commonly as turnover intent. And, while turnover intent is a strong proxy for turnover it is not the same as actual turnover. As discussed previously, intent is easier to measure, as the employee is still with the organization (Firth, et al., 2004), and it has also been argued to be a strong indicator for actual turnover (Van Breukelen, et al., 2004).

Some researchers have suggested that military turnover processes may not always mirror those in civilian organizations (Hom, et al., 1979; Steele, 1996) and may produce results that do not generalize outside military settings (Steele, 2002). Others (Griffeth, et al., 2000) have argued that reported intent to turnover is more highly correlated with actual turnover among military samples than in civilian samples, due to contractual factors. Steele (2002) and Griffeth and colleagues (2000) agree that a contract will affect individual's turnover decisions. Therefore, use of a military sample in which all individuals are serving under a contract may produce results that have greater predictive power for the intent to turnover measure as a proxy for actual turnover. For this study, the dependent variables to be examined will be Intent to Remain (ITR1) and Intent to Remain, measured through exit activity count (ITR2).

Intent to Remain (ITR1*)*. Respondents were asked to answer this question: "Suppose that you have to decide whether to stay on active duty. Assuming you could stay, how likely is it that you would choose to do so?" Response options were coded as 1 (very unlikely), 2 (likely), 3

(neither likely nor unlikely), 4 (likely), and 5 (very likely). The higher the ITR1 value is indicative of a greater intent to stay.

Intent to Remain, measured through efforts to leave count (ITR2). Respondents were also asked "During the past 6 months, have you done any of the following to explore the possibility of leaving the military?" Table 1 lists the 12 actions that followed this question, which were answered "Yes" or "No." The number of "Yes" responses were totaled for each respondent. The higher ITR2 values indicates having made more preparations to leave. The Kuder-Richardson 20 index (KR-20; Cortina, 1993) was calculated as an index of internal consistency of this list of actions. KR-20 values can range from 0.0 to 1.0, with higher values indicating the instrument has greater internal consistency. Within social science research 0.7 is typically an acceptable value for tests with less than 50 items, and 0.8 is an acceptable value for tests with more than 50 items (Salkind, 2010). Results for this item showed an acceptable value of .81. In males, the KR-20 index was .81, and in females, it was .78.

Table 1. Items related to Efforts to Leave Count

"During the past 6 months, have you done any of the following to explore the possibility of leaving the military?"

1. Thought seriously about leaving the military	Yes or No
2. Wondered what life might be like as a civilian	Yes or No
3. Discussed leaving and/or civilian opportunities with family members or friends	Yes or No
4. Talked about leaving with your immediate supervisor	Yes or No
5. Gathered information on education programs or colleges	Yes or No
6. Gathered information on civilian job options (e.g., visited employment websites, attended a job fair, read newspaper ads)	Yes or No
7. Attended a program that helps people prepare for civilian employment	Yes or No
8. Prepared a resume	Yes or No
9. Applied for a job	Yes or No
10. Interviewed for a job	Yes or No
11. Attended pre-separation briefing or Transition GPS Program	Yes or No
12. Gathered information about comparable civilian pay and benefits	Yes or No

Independent Variables

Gender. In the survey, respondents were given the dichotomous option of male (1) or female (2).

Pay Grade. Pay grades are used within the military to determine wages and benefits based on the corresponding military rank of the service member. Self-reported service ranks were used to form the following pay grade categories: (1) Junior enlisted airmen with paygrades E1-E4; (2) Non-commissioned officers (junior NCOs) with paygrades E5-E6; (3) Non-commissioned officers (senior NCOs) with paygrades E7-E9; (4) Commissioned officers)

including second and first lieutenants with paygrades of O1-O2; (5) mid-career commissioned officers including captains and majors with paygrades of O3-O4; (6) Senior commissioned officers including Lieutenant Colonels and Colonels with paygrades of O5-O6.

Marital Status. This categorical variable was coded into four categories: (1) single with child[ren], (2) single without child[ren]; (3) married with child[ren]; or (4) married without child[ren].

Dual Service Spouse. This dichotomous variable, coded (1) not dual-military or (2) dual-military, indicated whether the participant had a spouse who was also an active duty service member.

Dependents by number and age. This variable asked respondents to indicate if they had any dependents. If so, they were also asked to indicate the number of children they had in each of the following age groups: less than 5 years old, between 6-13 years of age, between 14 and 18 years of age, between 19 and 22 years of age, and 23 years of age or older, yielding a total of five separate variables.

Autonomy. Perceived job autonomy was assessed via a single item, "To what extent does your unit leader allow innovation, creativity, or openness to new ideas in your unit?" This variable was coded as a continuous variable: (1) not at all, (2) small extent, (3) moderate extent, (4) large extent and (5) very large extent.

Stress. The SOFS-A asked two questions related to stress: "Overall, how would you rate the current level of stress in your work life?" and "Overall, how would you rate the current level of stress in your personal life?" For both questions, responses were coded as (1) much less than usual, (2) less than usual, (3) neither more or less, (4) more than usual, and (5) much more than usual. Stress was calculated as a sum of the two items that measured overall stress levels.

Cronbach's alpha for these items was .54 in the total sample, and it was .57 for male participants and .41 for female participants. In the 2016 sample, Cronbach's alpha was .52 for the full sample. This alpha score is far below an 'acceptable' value of .7, indicating personal stress and work stress levels do not hang well together as a group.

High Performance Work Practices (HPWPs). The presence of HPWPs was assessed with a single item, "How much do you agree or disagree with this statement: 'If I stay in the Air Force, I will be promoted as high as my ability and effort warrant." Responses were coded as (1) strongly disagree, (2) disagree, (3) neither disagree nor agree, (4) agree, or (5) strongly agree.

Job satisfaction. Job satisfaction was calculated as a sum of 10 items that assessed satisfaction with various aspects of the current employment. The decision to use a summed score rather than an average score is due to the comprehensibility of the interpretation of the item. Sample items included: "Taking all things into consideration, how satisfied are you, in general, with each of the following aspects of being in the military: total compensation, the type of work you do in your military job, etc." Additional items included: "How satisfied are you with the following aspects of your career: your level of responsibility on the job, your level of authority on the job, etc." Responses were coded as (1) very dissatisfied, (2) dissatisfied, (3) neither dissatisfied nor satisfied, (4) satisfied or (5) very satisfied. Higher scores indicate more satisfaction with the duties. Internal consistency, as assessed with Cronbach's alpha, was .86. In male participants, internal consistency was .85, and in female participants, internal consistency was .87.

Spillover. Spillover between work and family was assessed from a single item: "To what extent is family burden a reason for your leaving the service?" Responses were coded as (1) not at all, (2) small extent, (3) moderate extent, (4) large extent, or (5) very large extent.

Family views. Service members were asked about their family's thoughts on military retention via the single item: "Does your family think you should stay on or leave active duty"? Responses were coded (1) strongly favors leaving, (2) somewhat favors leaving, (3) has no opinions one way or the other, (4) somewhat favors staying, or (5) strongly favors staying.

Spousal views. Service members were asked about their spouse's thoughts on military retention via the item: "Does your spouse or significant other think you should stay on or leave active duty? Responses were coded 1 (strongly favors leaving), 2 (somewhat favors leaving), 3 (has no opinions one way or the other), 4 (somewhat favors staying), or 5 (strongly favors staying).

Perceived organizational support (POS). To measure POS, I used responses from a set of questions measuring service members' "level of awareness" of organizational-level support systems. These included a military crisis line, veterans crisis line, national suicide prevention lifeline, military OneSource, military & family life counseling, and the BeThere peer support line. Military OneSource is a DoD program that provides all military members and their families with 24/7 support on issues such as therapy, moving, taxes, and military benefits (Military OneSource, 2020). BeThere support line is also a 24/7 communication service that is staffed by military veterans as well as spouses of prior service members, and provides resources and problem-solving strategies for mental health, family and social support, as well as employment concerns (BeThere, 2021). This variable was computed as a total score across the six items. Again, the decision to use a summed score rather than an average score is due to the

comprehensibility of the interpretation of the item. Each item was coded as (1) I know a lot about this service, (2) I have heard about this service, but I only superficially understand it, (3) I have heard of this service, but I do not really know what it is, or (4) I have never heard of this service. Internal consistency, as measured with Cronbach's alpha, was .84 for the full sample of Air Force participants, .85 for male participants, and .79 for female participants.

Organizational commitment. Participants were asked to report their level of agreement for eight items of organizational commitment. Responses were coded as (1) strongly disagree, (2) disagree, (3) neither disagree nor agree, (4) agree or (5) strongly agree, for three different groupings of items used to measure organizational commitment. One group, designed to assess an affective dimension of organizational commitment, was computed from 4 different items. Cronbach's alpha for this group was .70 in the full sample (.69 for males; .71 for females), so for the purpose of initial analyses the group will be treated as a scale. The second measure, intended as a normative dimension of organizational commitment, was based on a single item. A third group, designed to assess a continuance dimension, was computed from 3 items. Appendix B lists all items used within each organizational commitment dimension. Cronbach's alpha for the set was .82 (.82 for males and .80 for females), so it will again be treated as a scale in initial analyses. In the 2016 sample, the estimate of Cronbach's alpha for the affective scale and continuance scales was .70 and .82, respectively. There were no normative dimensions within the 2016 dataset.

Job Embeddedness. A job embeddedness measure was obtained from the question, "Suppose you have to decide whether to stay on active duty, would military values, lifestyle and traditions be the most important factor in your decision?" Responses were coded as a dichotomous variable, (1) yes or (2) no.

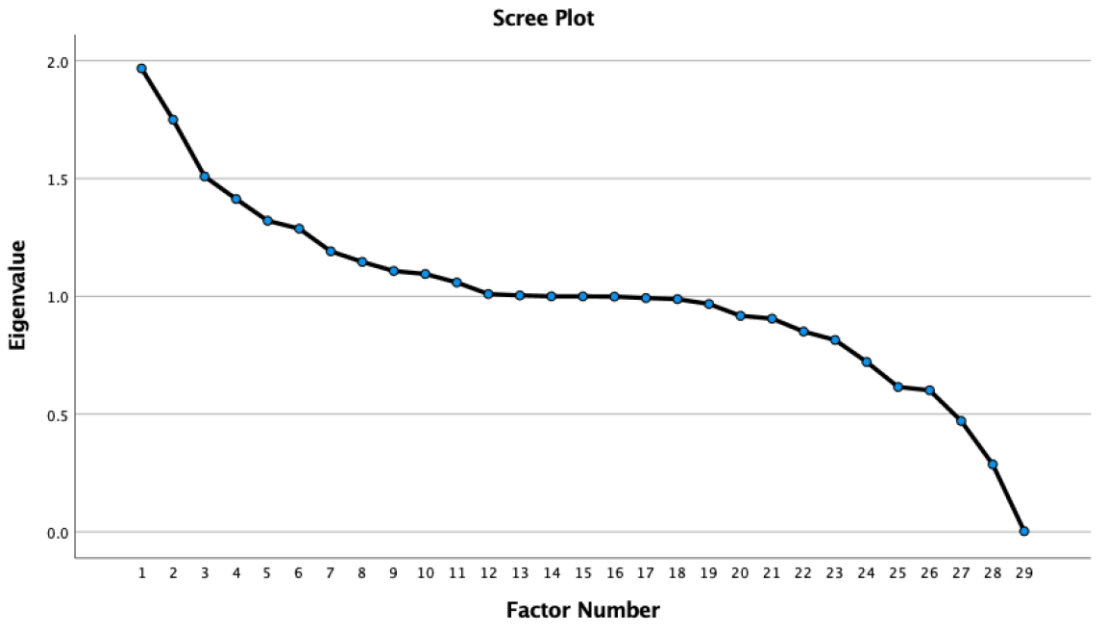
Perceived Job alternatives. This variable was based on the item: "One of the problems with leaving the military would be the lack of available alternatives." Responses were coded as (1) strongly agree, (2) agree, (3) neither agree nor disagree, (4) disagree or (5) strongly disagree.

Active Duty Factor (ADF). There was an item on the SOFS-A that asked the following question, "Suppose that you have to decide whether to stay on active duty. Which of the following would be the most important factor in this decision? Select one item from the list below." Participants then selected a single item from a list of 29 options. Examples of options included "Quality of the work environment based on unit morale, camaraderie, and professionalism" and "Quality of leadership." Participants were offered three opportunities to indicate most important factors, ranging from most important to the third most important. This set of indicators is unique to military members and covers topics such as military benefits, special pay, and military tradition. As it was thought these items may be able to capture some military specific predictors of retention behavior these items were included into this study. Frequencies of original responses to each item are presented in Appendix A.

These three items were recoded into a single item that was dichotomized as (1) item was indicated as important or (0) item not indicated as important, for each participant. Because many of the items seemed to be related to an underlying construct, an empirical approach to factor identification was attempted. Specifically, this was an exploratory factor analysis, based on a tetrachoric correlation matrix appropriate for dichotomous data (Lorenzo-Seva & Ferrando, 2012). However, a clean factor solution did not emerge. As one indicator of this, the scree plot is presented in Figure 2. As can be seen in the scree plot, there is no clear elbow to guide factor

extraction. Even so, attempts were made to extract between 1 and 6 factors, and no clean solutions emerged. Factor loadings were low, with less than 3 items per factor.

Figure 2. Scree Plot of Factor Analysis



Therefore, a theoretical approach was utilized to identify groupings of items from the full set. These groupings were as follows: job environment (4 items), job quality (2 items), military benefits (6 items), military pay (3 items) family/spousal stability and support (7 items), leisure and mission travel (2 items), career benefits (2 items), pride and tradition (2 items) and 'other' (1 item). Responses on each of these groupings were dichotomized, such that indicating any one item as importance on any of the three original questions yielded a score of 1, and not indicating importance on any of the three original questions yielded a score of 0. Frequencies of individuals with scores of 1 on each grouping are displayed in Appendix 1.

Data Analysis

Preliminary Analyses. Descriptive analyses were performed before conducting any inferential tests. These included calculation of prevalence rates, as well as computation of means and medians. Table 2 offers preliminary descriptive results for variables used in model testing among both the 2017 and 2016 datasets. Where data are available, this table also includes comparisons across these samples.

Missing Data. Many variables in the dataset that were of potential interest had substantial amounts of missing data, some upwards of 50%. As a result, these variables were not included in the random forest models, but they were analyzed in separate post-hoc analyses using Ordinary Least Squares (OLS) procedures. This significantly reduced sample size is considered "Missing Not at Random" (MNAR), as there is a reason why the variable responses are not completed (Ibrahim & Molenberghs, 2009). One example is a series of questions on the number of dependents a military member has. Unmarried as well as married, childless Airmen did not respond to these questions as they were not applicable to them. Another series related to transitioning out of the military, which were not completed by Airmen not considering separation.

Due to the large number of missing cases, the resulting sample likely includes certain biases and cannot be considered to be reflective of the entire Air Force population. As such, Listwise Deletion was used for missing data. As both multiple imputation (MI) and maximum likelihood (ML) procedures assume data are at least missing at random, these procedures would be inappropriate to run, due to the fact that they could have muddy the water when examining military retention (Honaker, et al., 2011).

Random Forest (RF) Analysis. Different analytic approaches were evaluated prior to deciding to use RF to explore military retention. For example, OLS regression analyses are

frequently seen in military retention research (Orrick, 2008; Sinclair, 2004; Lindell, 2018), and logistic regression models offer advantages in interpolation ability (using the data to help predict data within the dataset). For example, OLS was used to examine how factors such as promotions, physical fitness levels, and performance evaluation averages impact Marine Corps career longevity and retention (Crider, 2015). These limitations would be particularly problematic for answering my research question, as I am interested in determining factors most predictive of military retention in order to create a retention model for upcoming years.

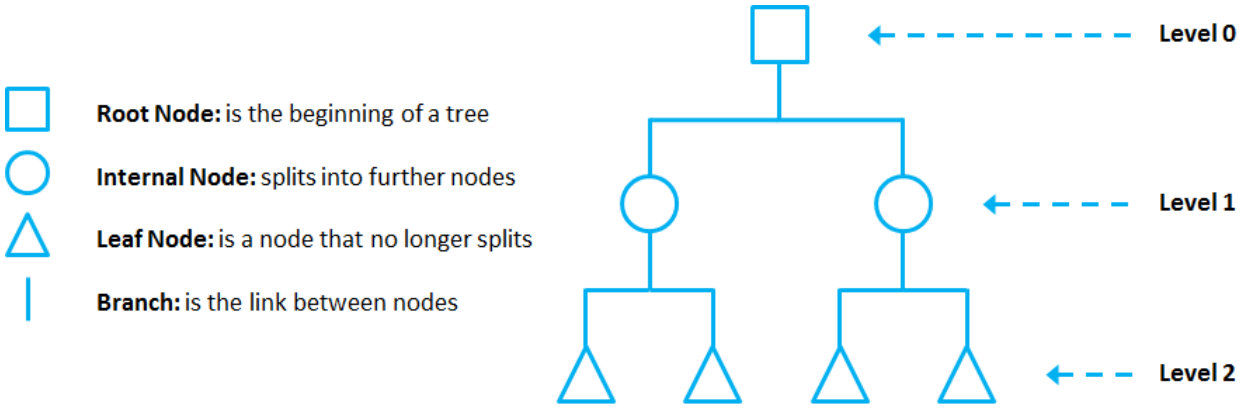
Survival analysis techniques, which enable outlier data to be included within the calculations, have also been used among military retention researchers. After comparison and identification of significant variables, parametric survival analysis has been found to be appropriate for creating models to predict military retention (Lindell, 2018). However, survival analysis examines time-dependent relationships in which the date of occurrence of at least a portion of target events (e.g., separation from the military) is known. The SOFS-A dataset provides information only on intent to remain, not actual turnover.

Considerable retention research has used structural equation modeling (SEM) to determine the role played by different variables in accounting for turnover (Zhang, et al., 2015; Langkamer, et al., 2008; Liggans, et al., 2019; Fragoso, et al., 2019; Brunetto, et al., 2013; Clairborne, et al., 2015; Fox & Quinn, 2015; Garner & Hunter, 2013; Hattke, et al., 2018)). But despite this uptick in its deployment, SEM is not always appropriate. This is because endogeneity remains prevalent in SEM models that utilize survey data (Antonakis, et al., 2010), and its presence complicates efforts to determine which attitudes trigger other behaviors (Hattke, et al., 2018).

An alternative approach is the use of data-driven tree-based algorithms. These algorithms generate predictive models that are stable, highly accurate, and easy to interpret (Chang & Chen, 2005). The simplest type of tree-based algorithms involves data-mining by means of decision trees. One approach, called Classification and Regression Tree (CART) analysis (Breiman, et al., 1984), has been widely applied (Chang & Chen, 2005; He, et al., 2018; Beaulac & Rosenthal, 2019: El-Rayes, et al., 2020). Decision trees use algorithms that divide data sets into small groups, based on certain variables. Classification trees are used for modeling categorical outcomes and regression trees are used for modeling continuous.

Every decision tree consists of three things; nodes, branches and leaves. Nodes characterize an attribute (e.g., number of children), every branch characterizes a decision (e.g., include if respondent has more than two children), and each leaf characterizes an outcome (e.g., ITR). A visual representation of a decision tree is shown in Figure 3.

Figure 3. Visual representation of a decision tree (Lopez Yse, 2019)



CART is a nonparametric technique that does not assume a particular form of relationship, and it always produces binary splits, in which at each level the data is split into two groups, allowing similar cases (homogeneity groups) as well as dissimilar cases (heterogeneity groups) to be formed (Breiman, et al., 1984). Using the Gini Impurity measure allows

researchers to understand the level of split. Splits in which all cases are in one category and zero cases are in the other, are considered to have the highest degree of purity. Conversely, even splits are considered perfect impurity (Rokach & Maimom, 2007). A score of 1 signifies maximum inequality, and a score of 0 indicates perfect equality.

While solving regression problems, the CART algorithm seeks out splits that minimize the Least Square Deviation, so that the sum of the squared residuals is also minimized (Beaulac & Rosenthal, 2019). By repeating this process, and creating a sequence of decision trees, a single "optimal tree" can be produced. The optimal tree is identified after testing the performance of each tree, using new data the decision trees had not seen prior, or through cross-validation, in which the data set is divided into a number of folds, and testing is completed at each fold (Zornoza, 2019). As tree procedures are considered exploratory, it is necessary to cross-validate the results onto other data sets (Painsky & Rosset, 2017).

The CART approach is especially useful when concerns exist regarding multicollinearity between the independent variables, as well as non-linear relationships (Yoo, et al., 2018). It has also been shown to have a decreased root mean square error compared to other methods such as multiple linear regression (Ji, et al., 2013). However, the CART approach is prone to overfitting, therefore despite doing well with the training data set, it is not as strong with making predictions on untested samples (Zornoza, 2019). An ensemble of many individual decision trees, such as a random forest, has been found to have stronger predictive abilities (Yoo, et al., 2018).

The random forest analysis builds off the simplicity of a single decision tree, while having the power of an ensemble model. This is done in three steps. The first step is to split the dataset into testing and training samples. While there is no ideal ratio for splitting a data set, the 80/20 or 70/30 splits are frequently seen within published literature (Alqahtani & Whyte, 2016).

For this study, the training dataset consists of 80% of the full sample, as well as all variables of interest.

The second step of the random forest procedure uses bootstrapped sampling procedures for each tree (Breiman, 2001; He, et al., 2018). The sampling with replacement allows each data point to be picked at random, as well as the possibility of being picked more than once. This step helps to minimize the overfitting problem encountered when using single decision trees (Chang & Chen, 2005). While building a random forest, it is important to ensure that each individual tree is uncorrelated. This happens as certain features (e.g., affective commitment or POS) are randomly selected for evaluation. Thus, at each node, a random subsample of variables is split, which further protects from over-fitting by minimizing features with high predictive capabilities within the training data set. The third step is to repeat the first two steps hundreds of times, creating a 1000 plus various trees within the ensemble random forest (Tat, 2017). Again, as tree procedures are considered exploratory, it is necessary to cross-validate the results onto other data sets (Painsky & Rosset, 2017).

SOFS-A Random Forest Models. In order to answer my first and second research questions--concerning which variables predict Airmen's ITR, and which variables are linked to job-search behavior and efforts to leave--random forest models were run with the 2016 and 2017 datasets. Random Forest analyses were conducted in R Studio (R Core Team, 2014). I used a total of seven models to examine the questions, using different combinations of subsamples as described in Table 5, across the 2017 and 2016 datasets. Models 1-6 were created using the following independent variables from the 2017 SOFS-A dataset: gender, pay grade, marital status, dual service spouse, number of dependents, stress, job satisfaction, family views, spousal views, perceived organizational support, organizational commitment, and perceived job

alternatives. Model 1 included all Airmen and ITR1, Model 2 included Female Airmen and ITR1, Model 3 included Male Airmen and ITR1, Model 4 included all Airmen and ITR2, Model 5 included Female Airmen and ITR2, and Model 6 included Male Airmen and ITR2.

The 2016 SOFS-A dataset was used for Model 7, solely to evaluate robustness and to cross-validate the 2017 models. As the gender variable was not made available to the public within this dataset, Model 7 utilized the full Air Force sample as well as ITR1, intent to remain, which was also the only ITR-related item made available to the public. Model 7 included the following independent variables: job satisfaction, stress, organizational commitment, and perceived job alternatives. For all of these models there was an 80/20 split within the datasets for the train-and-test components of the random forest models. Table 2 shows variables available within each model.

Table 2. Models tested with observed results.

Model Features	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Dataset	2017	2017	2017	2017	2017	2017	2016
Sample	Full	Female only	Male only	Full	Female only	Male only	Full
Dependent Variables							
Intent to Remain (direct question)	Included	Included	Included	-	-	-	Included
Intent to Remain	-	-	-	Included	Included	Included	-
Independent Variables							
Gender	Included	Included	Included	Included	Included	Included	
Pay Grade	Included	Included	Included	Included	Included	Included	
Family/Marital Status	Included	Included	Included	Included	Included	Included	
Dual Service Spouse	Included	Included	Included	Included	Included	Included	
Dependents	Included	Included	Included	Included	Included	Included	
Stress	Included	Included	Included	Included	Included	Included	Included
Job Satisfaction	Included	Included	Included	Included	Included	Included	Included
Family Views	Included	Included	Included	Included	Included	Included	Included
Spousal Views	Included	Included	Included	Included	Included	Included	
POS	Included	Included	Included	Included	Included	Included	
Organizational Commitment (3 dimensions)	Included	Included	Included	Included	Included	Included	Included
Perceived Job Alternatives	Included	Included	Included	Included	Included	Included	Included
Active Duty Factors (9 in total)	Included	Included	Included	Included	Included	Included	

I used three methods of interpreting random forest results. First, r-squared values were examined as indicators of the proportion of variance in the outcome variable that is explained by variance in the independent variables. P-values were calculated using a permutation test, in which tests build sampling distributions by resampling the observed data (Cummings, et al., 2004). The null hypothesis is that the randomly assigned data will not differ significantly from the original dataset, indicating that there is no true relationship between observed scores on any independent variables and the dependent variable (i.e., *r*-square = 0).

Second, out-of-bag (OOB) prediction error, also referred to as mean-square error (MSE), is an indicator of accuracy, or conversely, error, in models that are generated. This value is calculated in the validation process (Bhatia, 2019). The phrase "out-of-bag" refers to the iterative procedure of the models. In each permutation, random numbers of cases are used to develop a prediction of the observed outcome. Those not included in each permutation are considered not in the test, or out of the bag. The proportion of occurrences when these observed outcomes do not equal what is predicted for them, across all cases, is an estimate of error. These values are closer to zero when there is less error.

Third, variable importance scores, which are based on the decrease of Gini impurity, a measurement of the likelihood of an incorrect classification when a variable is chosen to split on a node, indicate the relative importance of each variable to the prediction of the outcome, within each model. For each of the seven models the relative importance of each variable was reported.

OLS Regression.

Random forest models are nonparametric (McAlexander & Mentch, 2020), so there are no distributional assumptions for variables in these models. Further, there is no formal testing of significance of parameters. Therefore, as a supplement to the random forest analyses, ordinary

least squares (OLS) regression was also used to analyze data with all predictors of each dependent variable (Mun & Geng, 2019).

The OLS analyses were conducted to address Research Question 3: 'Does gender moderate ITR and job search behavior?' and Research Question 4: 'Does dual-military status moderate ITR and job search behavior?' Prior to running the analysis, SPSS v. 25 was used to screen variables for univariate normality. Results indicated that all variables in the model were normally distributed, based on the criterion of absolute values less than 2 for both skewness and kurtosis (Tabachnick & Fidell, 2013). Due to the large sample sizes and the fact that scales were constructed from specified scales (i.e., maximum values were truncated by response formats for most variables), there were no outliers to remove.

Cross Validation.

The 2016 SOFS-A dataset was used to evaluate robustness and to cross-validate the 2017 dataset. As the 2016 dataset had several variables that were not made available to the public, only one model, which consisted of the whole Air Force sample, was used to evaluate ITR1, intent to remain.

CHAPTER 4: RESULTS

This chapter presents results of descriptive and inferential data analyses, including results of random forest (RF) models that examined factors most relevant to servicemember retention and turnover. In the latter I will address each hypothesis separately, and at the end of this chapter I will provide a summary of the main results. Overall, the research questions sought to shed light on factors most important in servicemember retention and turnover. The study was also designed to determine if gendered differences exist between these factors, and to understand if dual-military status is associated with ITR.

As can be seen in Table 3, descriptive statistics are reported for all variables within the 2017 dataset (i.e., they were all used in models tested in this dataset). As not all variables were available in the 2016 dataset, only those with descriptive statistics in the 2016 dataset column were used to test models with these data. Where data are available, Table 2 also includes comparisons across these samples.

Table 3.

Descriptive statistics of variables used in model testing – 2017 and 2016 datasets.

	2017 dataset (n = 4324)			2016 dataset (n = 5485)			Comparisons between samples (t or χ^2)
Variable	n (%)	M	SD	n (%)	M	SD	
Gender							-
Female	883 (20.4)	-	-	-	-	-	
Male	3441 (79.6)	-	-	-	-	-	
Pay Grade							-
E1-E4	1135 (26.2)	-	-	-	-	-	
E5-E6	1244 (28.8)	-	-	-	-	-	
E7-E9	499 (11.5)	-	-	-	-	-	
O1-O2	261 (6.0)	-	-	-	-	-	
O3-O4	798 (18.5)	-	-	-	-	-	
O5-O6	383 (8.9)	-	-	-	-	-	
Family Status							-
Single with child(ren)	382 (8.8)	-	-	-	-	-	
Single without child(ren)	1413 (32.7)	-	-	-	-	-	
Married with child(ren)	1645 (38.0)	-	-	-	-	-	
Married without child(ren)	884 (20.4)	-	-	-	-	-	
							-
Dual Service Spouse							
Not a dual spouse	3893 (90.0)	-	-	-	-	-	
Dual Spouse	431 (10.0)	-	-	-	-	-	
Dependents							
Less than 5 years old	-	0.48	0.76	-	-	-	-
6 through 13 years of age	-	0.53	0.87	-	-	-	-
14 through 18 years of age	-	0.21	0.52	-	-	-	-
19 through 22 years of age	-	0.08	0.32	-	-	-	-
23 years of age or older	-	0.04	0.22	-	-	-	-
Stress	-	6.57	1.51		6.61	1.54	1.29
Job Satisfaction	-	28.16	9.09		21.89	4.25	N/A[a]

Family Views	-	3.45	1.20		3.42	1.20	1.23
Spousal Views	-	3.44	1.31		-	-	-
Perceived Organizational Support	-	14.26	2.37	-	-	-	-
Organizational Commitment							
Affective	-	13.48	3.02		13.52	3.02	0.52
Normative	-	1.35	0.30		2.34	1.15	55.15***
Continuance	-	7.26	2.58		7.19	2.92	1.24
Perceived Job Alternatives	-	2.41	1.17		2.48	1.17	2.94**
Active Duty Factor							
Job Environment	669 (15.1)	-	-	-	-	-	
Job Quality	455 (10.3)	-	-	-	-	-	
Military Benefits	898 (20.3)	-	-	-	-	-	
Military Pay	672 (15.2)	-	-	-	-	-	
Family/Spousal	858 (19.4)	-	-	-	-	-	
Stability/Support	326 (7.4)	-	-	-	-	-	
Leisure and Mission Travel	309 (7.0)	-	-	-	-	-	
Career Benefits	210 (4.7)	-	-	-	-	-	
Pride and Tradition	88 (2.0)	-	-	-	-	-	
Other							
Intention to remain (ITR1)		3.62	1.31		3.61	1.30	3.78
Intention to remain (ITR2)		6.08	3.15		-	-	-

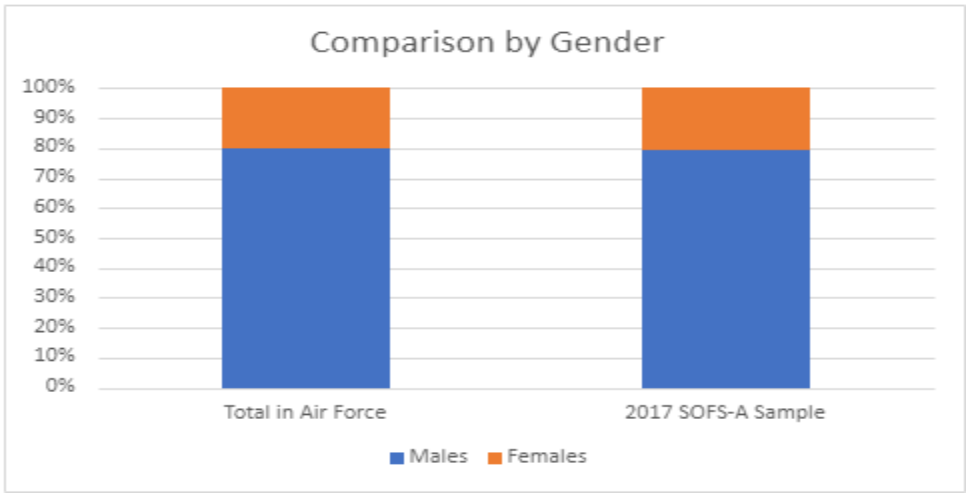
[a]There is no comparison between samples for Job Satisfaction because the 2016 measure was different from the 2017 version.
*$p < .05$, **$p < .01$, ***$p < .001$
[b]Higher scores in ITR1 indicate higher intentions to stay, and higher scores in ITR2 indicate having made more preparations to leave

Descriptive Analyses

Breakdown of SOFS-A Respondents

In an effort to ensure an adequate number of responses from smaller reporting categories, the SOFS-A dataset consists of a disproportional stratified sample (as noted in the previous chapter). Figures 4 and 5 below show the gender of servicemembers and respondents. In 2017, the Air Force consisted of 318,580 Airmen, which included roughly 63,000 (20%) females, and 255,000 (80%) males (OPA, 2017). Airmen who completed the 2017 SOFS-A survey totaled 4,324, of which 883 (20.4%) were females and 3,441 (79.6%) were males. Despite the SOFS-A being a disproportional stratified sample, gender break downs across all Air Force personnel as well as within the SOFS-A sample were fairly similar. A Chi-square test was performed to determine any statistically significant differences between the Air Force population and the SOFS-A respondents, and $p<.001$ was obtained, indicating statistical significance. It is important to note that the Chi-square test is sensitive to sample size. Therefore, the large *n* that is derived from the Air Force population can make minor relationships appear to be statistically significant.

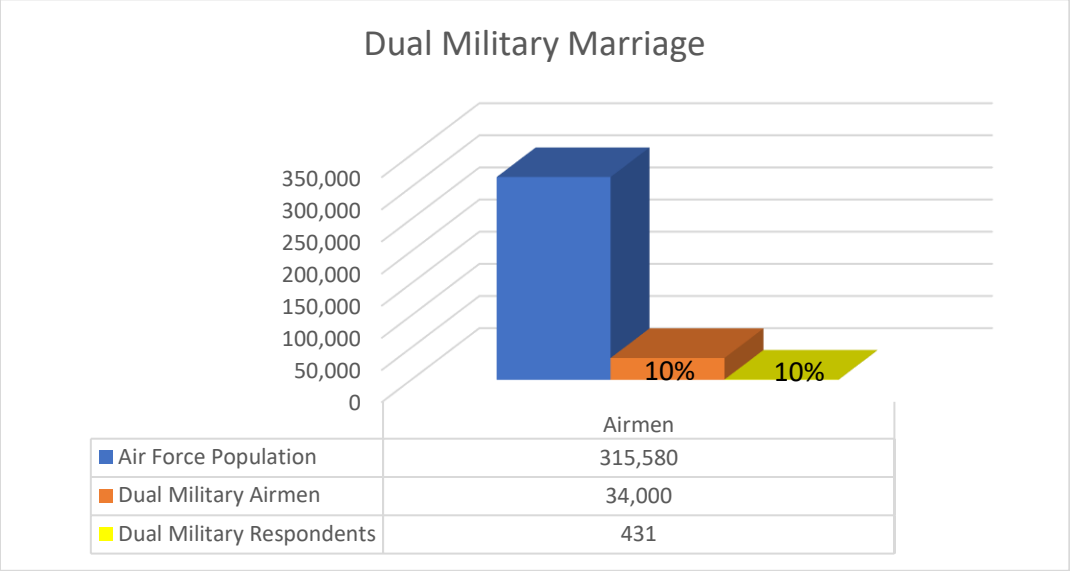
Figure 4: Comparison by Gender



Dual Military Marriage

In 2017, the Air Force consisted of roughly 34,000 (10%) Airmen in a dual-military marriage (OPA, 2017), and 431 (10%) of SOFS-A respondents were in a dual-military marriage (Figure 6). Dual military marriage rates in the sample thus mirrored those in the Air Force as a whole. A Chi-square test was performed to determine any statistically significant differences between the Air Force population and the SOFS-A respondents, and $p<.05$ was obtained, indicating statistical significance.

Figure 5: Dual Military Marriages in the Air Force and within the SOFS-A respondents

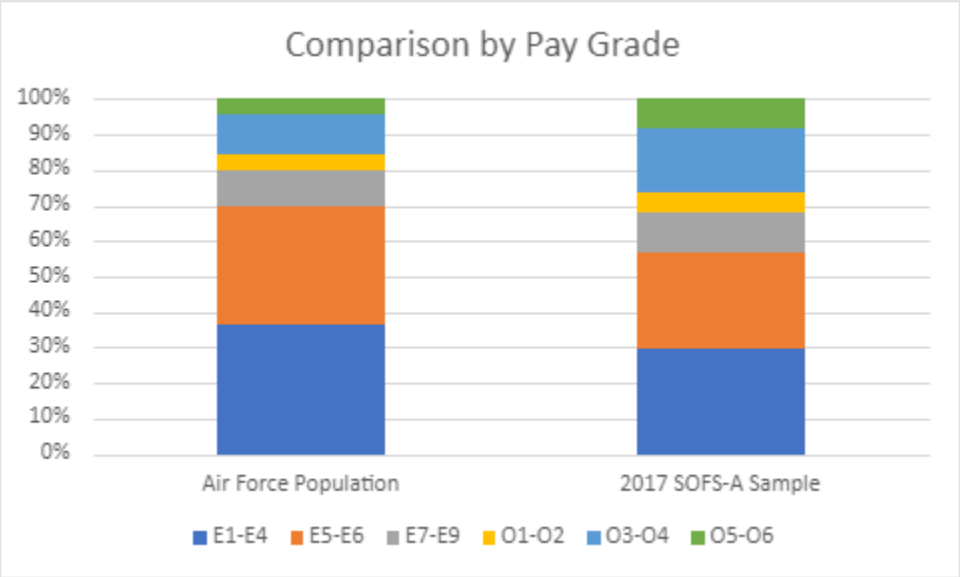


Pay Grade

Figure 7 shows the distribution of Air Force service members across pay grades, including 113,115 (39%) Airmen within groups E1 through E4, 101,600 (31.8%) in E5-E6, 32,300 (10%) in E7-E9. Among officers were 13,970 (4.5% of total) in the O1-O2 paygrades, 34,290 (10.8%) in O3-O4, and 13,060 (4%) in O5-O6 (OPA, 2017). Among SOFS-A enlisted respondents, roughly 1135 (26%) Airmen were in E1-E4, 1244 (29%) in E5-E6, and 500 (11.5%)

in E7-E9. Among officers, 261 (6%) were in the O1-O2 paygrade groups, 800 (18.5%) in O3-O4, and 380 (9%) in O5-O6. A Chi-square test was performed to determine if the distribution of cases across pay grade categories varied significantly between the Air Force population, and SOFS-A respondents, and $p<.001$ was obtained, indicating statistical significance.

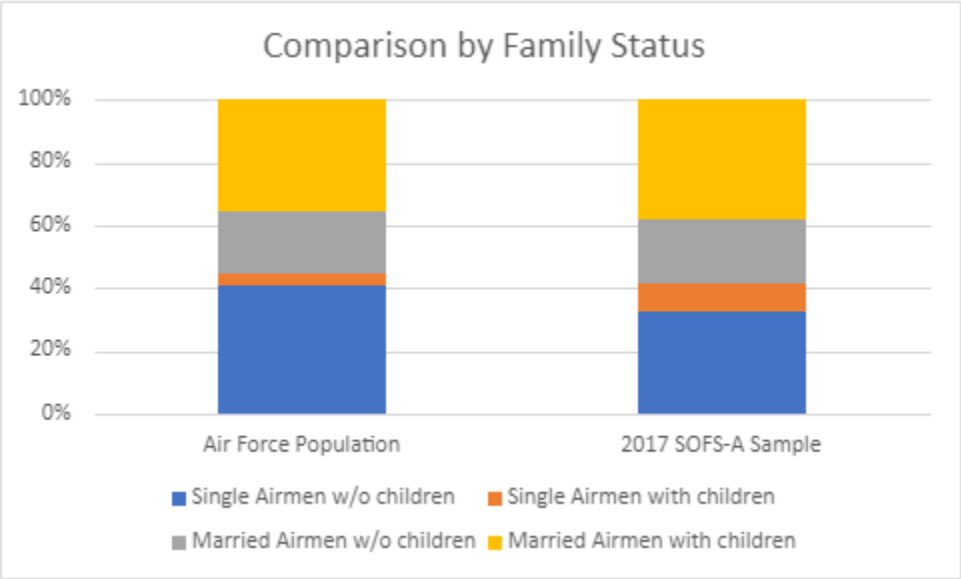
Figure 6: Comparison by Pay Grades



Family Status

In 2017, the Air Force consisted of roughly 130,000 (40%) single Airmen without children, 12,000 (3.8%) single Airmen with children, 113,000 (35.5%) married Airmen with children, and 64,000 (20%) married Airmen without children (Figure 9; OPA, 2017). The SOFS-A respondents include roughly 1410 (32.7%) single Airmen without children, 380 (8.8%) single Airmen with children, 1645 (38%) married Airmen with children, and 885 (20.5%) married Airmen without children (Figure 10). A Chi-square test was performed to determine if the distribution of cases across family status categories varied significantly between the Air Force population, and SOFS-A respondents, and $p<.05$ was obtained, indicating statistical significance.

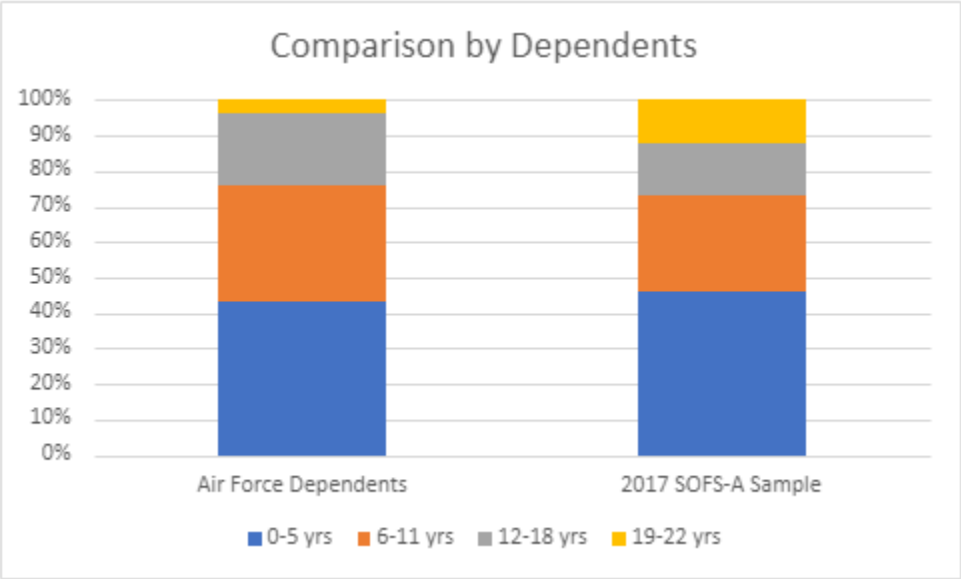
Figure 7: Comparison by Family Status



Number of Dependents

In 2017, there were over 107,000 (43%) Air Force children that were between the ages of zero to five, nearly 82,000 (33%) children between six to eleven years old, over 51,000 (20%) children between the ages of 12 to 18, and over 8,800 (3.5%) children between 19 and 22 (Figure 11; OPA, 2017). Information regarding number of dependents aged 23 and older was unable to be located. Within the 2017 SOFS-A dataset, roughly 1,235 (41%) Air Force children that were between the ages of zero to five, nearly 735 (24%) children between six to eleven years old, 384 (13%) children between the ages of 12 to 18, over 330 (11%) children between 19 and 22, and 330 (11%) dependents aged 23 and older (Figure 12). A Chi-square test was performed to determine if the distribution of cases across number of dependents categories varied significantly between the Air Force population, and SOFS-A respondents, and $p<.05$ was obtained, indicating statistical significance.

Figure 8: Comparison of Dependent Children



Further Exploration of Descriptive Statistics

Mean Scores and Standard Deviations

Prior to running statistical analysis, all continuous variables were screened for univariate normality. Results indicated that all variables in the model were normally distributed, based on the criterion of absolute values less than 2 for both skewness and kurtosis (Tabachnick & Fidell, 2013). Table 4 lists the predictor variables used within the RF models, as well as the range of the potential item response, plus means and standard deviations. While at first glance, the standard deviation scores may appear to suggest the data is greatly spread out, the range of the potential item responses, listed on Table 4, indicates that the variables are normally distributed.

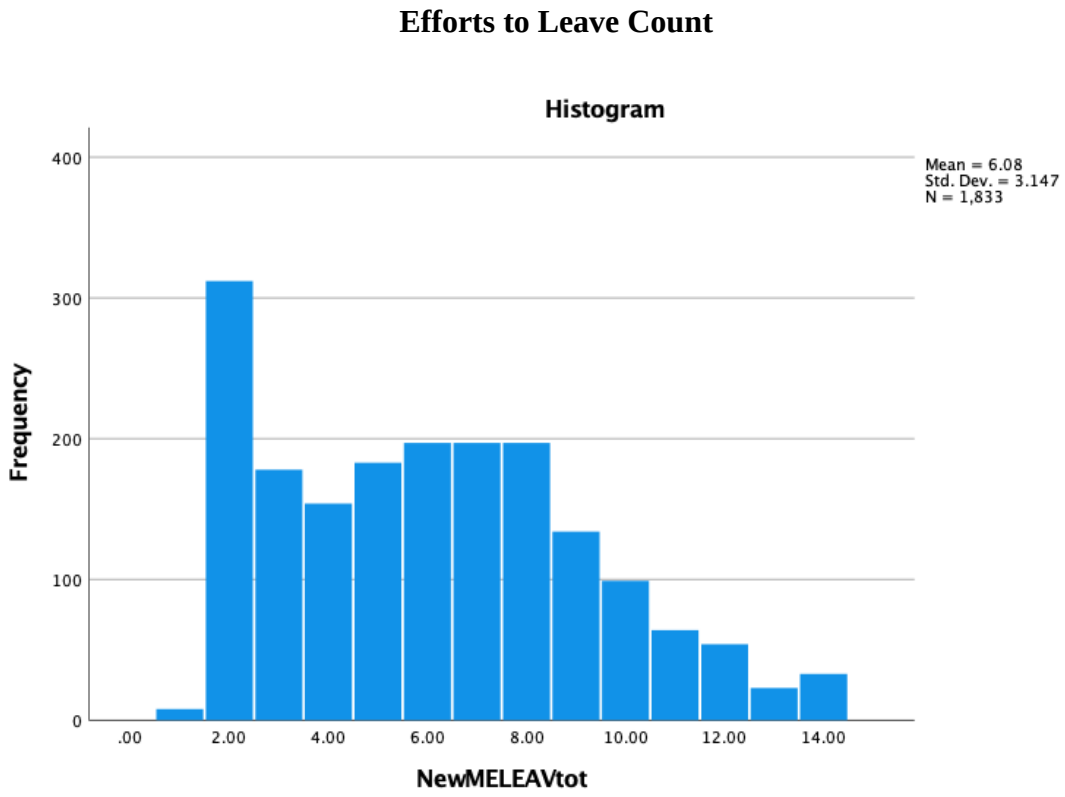
Table 4: Range, Mean, and Standard Deviation of SOFS-A Variables

Variable	Range	Mean	Standard Deviation
Dependents			
Less than 5 years old	1-8	0.48	0.76
6 through 13 years old	1-8	0.53	0.87
14 through 18 years old	1-8	0.21	0.52
19 through 22 years old	1-8	0.04	0.22
23 years of age and older	1-8	0.04	0.32
Stress	2-10	6.57	1.51
Job Satisfaction	Total score of 10 items that ranged from 1-5	28.16	9.09
Family Views	1-5	3.45	1.20
Spousal Views	1-5	3.44	1.31
Perceived Organizational Support	6-30	14.26	2.37
Affective Dimension of Org. Commitment	4-20	13.48	3.02
Normative Dimension of Org. Commitment	1-5	1.35	0.30
Continuance Dimension of Org. Commitment	5-15	7.26	2.58
Perceived Job Alternatives	1-5	3.70	0.96
Intent to Remain	1-5	3.62	1.31
Efforts to Leave	0-12	6.08	3.15

To further explore this, Figure 9 presents a visual representation of the dependent variable, ITR2, Efforts to Leave Count, which consists of 14 items in which respondents could report yes or no to each item. This item was scored so that higher scores (meaning more "yes" responses) indicate having made more preparations to leave. One could assume that respondents could either report lots of steps to leave, or report few to none. If that was done, there is a chance that it would result in a Poisson distribution. However, this was not the case, and the derived skew value of .43 and kurtosis of -.58 were within acceptable ranges. As displayed in Figure 9, results are mostly normally distributed, although an elevated number of respondents reported

they engaged in fewer efforts to leave behaviors, meaning more individuals have intentions to remain in the Air Force.

Figure 9: Efforts to Leave Count



This pattern of sufficiently normal distribution continues with the remaining variables listed in Table 4, meaning the number of responses less than the mean score is approximately equal to the number of responses greater than the mean score. Those variables with higher standard deviation scores, such as Job Satisfaction, suggest SOFS-A respondents had greater variability in their responses, thus making the distribution more spread out. On the other hand,

variables consisting of one item, such as spousal views, had a lower standard deviation score, thus making a tighter distribution (Hill, 1973).

Hypothesis Testing

Hypothesis testing for the four research questions used either the 2017 or 2016 SOFS-A datasets. Testing was carried out on both the 2017 and 2016 SOFS-A datasets. Seven models were created to address my four research questions. Models 1-3 used the dependent variable, "Suppose that you have to decide whether to stay on active duty. Assuming you could stay, how likely is it that you would choose to do so?" (ITR1). Models 4-6, which were tested only on the 2017 dataset, used the dependent variable, "What factors are related to job-search behaviors and/or intent to quit" (ITR2). Finally, Model 7 addressed ITR1, but in the 2016 dataset. It was tested solely to cross-validate results from analyses of the 2017 dataset, and to evaluate their robustness. For all of these models there was an 80/20 split within the datasets for the train and test components of the random forest models. Summaries of variables in each model, along with model results, are depicted in Table 3.

Question 1: What factors predict reporting intentions to remain in the Air Force?

To address RQ 1, I calculated the bivariate correlations between the predictors and intent to remain and then conducted four random forest models to explore the predictors among ITR. Finally, OLS was performed.

Bivariate Analysis

Among the main study variables, spousal views was positively correlated with intent to remain, ITR1 ($r = .654$, $p<.001$). All three dimensions of organizational commitment were also found to be positively correlated to ITR1. The affective dimension was ($r = .639$, $p<.01$), the normative dimension ($r=.316$, $p<.01$), and the continuance dimension was ($r =.233$, $p<.01$). In addition to my hypothesized correlations of ITR1, perceived job alternatives ($r =.541$, $p<.01$), family views ($r =.479$, $p<.01$), HPWP ($r =.284$, $p<.01$), and autonomy ($r =.202$, $p<.01$) were found to have the strongest positive correlation to intent to remain, ITR1. These results can be found in Table 5.

Table 5: Bivariate Correlations with intent to remain, ITR1

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. ITR1	1															
2. Gender	.000	1														
3. Pay Grade	.071**	-.017	1													
4. Marital Status	.111**	-.126**	.308**	1												
5. Dual-spouse	.023	.245**	.010	.245**	1											
6. Kids 5 & under	.093**	-.086**	.181**	.426**	.027	1										
7. Kids 6-13	.109**	-.068**	.283**	.342**	-.010	.539**	1									
8. Kids 14-18	.055**	-.049**	.265**	.253**	-.036*	.193**	.567**	1								
9. Kids 19-22	.035	-.036	.248**	.158**	-.020	.050*	.297**	.572**	1							
10. Kids 23 & up	.063**	.023	.175**	.134**	-.003	.147**	.242**	.268**	.497**	1						
11. Autonomy	.202**	-.018	.124**	.039	-.007	.003	.033	.042	.061*	.028	1					
12. Stress	-.164**	.027	.034*	.066**	.026	.081**	.085**	.024	.004	.032	-.146**	1				
13. HPWP	.284**	-.018	-.040	-.047*	-.011	-.084**	-.105**	-.062*	-.021	-.027	.312**	-.204**	1			
14. Spillover	-.179**	.027	.137**	.170**	.064	.188**	.139**	.030	-.014	.073	.c	.205**	.c	1		
15. Family Views	.479**	.036	-.071**	-.006	.020	-.045**	-.051**	-.093**	-.047*	-.034	.120**	-.140**	.242**	-.269**	1	
16. Spousal Views	.654**	-.010	-.047**	.086**	.067**	.028	.057**	.006	-.004	.025	.180**	-.162**	.264**	-.244**	.675**	1
17. Job Sat.	.257**	-.025	.124**	.052**	-.039**	-.009	-.027	.004	.027	-.005	.504**	-.185**	.570**	-.153**	.163**	.188**
18. POS	-.086**	-.027	.061**	-.034	-.012	-.028	-.057**	-.043*	-.046*	-.050*	-.140**	.006	-.066**	.004	-.054**	-.072**
19. Affective	.639**	-.021	.160**	.108**	-.008	.068**	.095**	.101**	.090**	.096**	.265**	-.157**	.287**	-.147**	.360**	.458**
20. Normative	.316**	.053**	.025	.025	.007	.040*	.003	-.019	-.017	.053**	.078**	-.029	.169**	-.085	.216**	.229**
21. Continuance	.233**	.009	-.281**	-.068**	-.010	-.006	-.038*	-.056**	-.077**	-.036	-.068**	.005	.103**	-.073	.201**	.216**
22. Job Embedded	-.157**	-.008	-.073**	-.012	-.013	.025	.042	-.014	-.061*	-.019	.c	.056*	.c	.028	-.081**	-.108**
23. Job Alternatives	.541**	.007	.119**	.072**	-.008	.012	.033	.070**	.077**	.058**	.344**	-.288**	.390**	-.163**	.321**	.419**
24. ADF: Job Environment	-.104*	.024	.088**	-.053**	-.013	-.045**	-.042*	-.025	-.020	-.005	.c	0.01	.c	.003	-.051**	-.082**
25. ADF: Job Quality	-.041**	-.012	.101**	-0.02	-.016	-.031	-.001	.031	.027	.036	.c	-.014	.c	-.024	-.033*	-0.03
26. ADF: Mil Benefit	.109**	-.041**	-.059**	.011	-.005	.015	.046**	-.004	.006	.016	.c	-.003	.c	-.156**	.104**	.142**
27. ADF: Military Pay	.007	-.014	-.017	-.030*	.001	-.029	.017	-.019	.008	.012	.c	.012	.c	.028	-.018	-.013
28. ADF: Family Support	.020	-.013	.106**	.103**	.017	.070**	.084**	.079**	.038*	.015	.c	.031*	.c	.298**	-.007	.004
29. ADF: Travel	-.059**	.013	-.007	-.035*	.018	-.036*	-.032	-.001	-.001	.006	.c	.009	.c	.102*	-.043**	-.049**
30. ADF: Career Benefits	-.068**	.030*	.025	-.019	.000	-.024	-.011	-.016	-.015	-.001	.c	-.025	.c	-.073	-.003	.005
31. ADF: Pride/Tradition	.044**	-.048**	.046**	.008	-.043**	-.028	.008	.001	.008	.054**	.c	-.023	.c	-.076	.042**	.064**
32: ADF: Other	-.068**	-.020	-.017	-.037*	-.021	-.027	-.027	-.022	-.010	.015	.c	-.005	.c	-.128**	-.028	-.030

Note: All Correlations used pairwise deletion. Thus, sample size varies for each correlation. **<.010 *<.050
.c = sample size too small to calculate

Table 5: (continued)

Measure	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1. ITR1																
2. Gender																
3. Pay Grade																
4. Marital Status																
5. Dual-spouse																
6. Kids 5 & under																
7. Kids 6-13																
8. Kids 14-18																
9. Kids 19-22																
10. Kids 23 & up																
11. Autonomy																
12. Stress																
13. HPWP																
14. Spillover																
15. Family Views																
16. Spousal Views																
17. Job Sat.	1															
18. POS	.029	1														
19. Affective	.308**	-.096**	1													
20. Normative	.129**	-.068**	.530**	1												
21. Continuance	.001	-.014	.209**	.289**	1											
22. Job Embedded	-.165**	.065**	-.205**	-.103**	.014	1										
23. Job Alternatives	.388**	-.095**	.615**	.277**	.072**	-.159**	1									
24. ADF: Job Environment	-.305**	-.031	-.081**	-.033*	-.084**	.070**	-.055**	1								
25. ADF: Job Quality	-.220**	-.018	-.012	-.011	-.081**	.014	-.007	.252**	1							
26. ADF: Mil Benefit	-.335**	-.097**	.047**	.028	.096**	.031	.046**	.029	.016	1						
27. ADF: Military Pay	-.307**	-.048**	-.053**	-.036*	.001	.098**	-.017	.147**	.118**	.307**	1					
28. ADF: Family Support	-.316**	-.049**	.026	-.008	.006	.103**	.028	.245**	.137**	.240**	.134**	1				
29. ADF: Travel	-.199**	-.017	-.063**	-.042**	-.029	.040	-.033*	.086**	.098**	.088**	.144**	.131**	1			
30. ADF: Career Benefits	-.186**	-.039*	.036*	-.001	-.028	.006	.045**	.132**	.100**	.111**	.097**	.050**	.103**	1		
31. ADF: Pride/Tradition	-.127**	-.064**	.124**	.086**	-.023	-.107**	.074**	.054**	.096**	.144**	.024	.065**	-.006	.039**	1	
32: ADF: Other	-.127**	.028	-.071**	-.033*	-.010	.039	-.069**	.044**	.010	.021	.003	.004	.034*	.006	.037*	1

Note: All Correlations used pairwise deletion. Thus, sample size varies for each correlation. **<.010 *<.050

.c = sample size too small to calculate

In order to explore the first research question, I used the random forest (RF) algorithm (Breiman, 2001a) in R Studio (R Core Team, 2014). The RF algorithm was chosen over the classical classification tree analysis because RF prevents overfitting, which is problematic in classical classification tree analysis (Breiman, 2001b). Model precision was optimized by testing predictive accuracy, and variable importance was evaluated by the Gini index (Gini, 1909). The Gini index calculates the amount of probability of a specific variable that is classified incorrectly when selected randomly (Tyagi, 2020). In all analyses, Bootstrap aggregating was used for the training algorithm, the training data used to learn from until the model achieves a desired level of accuracy (Breiman, 1996).

A total of three models were tested on the 2017 dataset to identify factors that predict respondents' intent to remain (DV = ITR1). All three models included gender, pay grade, marital status, dual service spouse, number of dependents, perceived organizational support, family views, job satisfaction, stress, spousal views, organizational commitment, spillover, perceived job alternatives, and the nine ADF variables.

Three main phases were involved in building the random forest. The first required creating a bootstrapped data set for each tree. To "train" each individual tree, a random sample of the entire dataset was used. The second step was to train the forest of trees, using the random data sets, by randomly selecting certain features to evaluate at each node. By evaluating only a subset of all the initially entered variables, the RF approach avoids including variables that have high predictive power (measured by Gini impurity) in every tree, while creating many un-correlated trees. Building each tree with random data, and random features allows for greater tree diversity and a better-performing final model. The last step of the RF process was to repeat the first two steps 500 times so that a full forest was created.

The *r*-squared values for the three 2017 random forest models that predict intent to remain range from .58 to .61 and all are significant, as well as the one 2016 random forest model, at .51 (Table 6).

Table 6: *r*-squared values for each ITR1 model

Dependent Variable	Population	Model Number	R-squared	p-values
ITR1 – Likelihood of Remaining	All surveyed Airmen	1	.61	$p < .001$
ITR1 – Likelihood of Remaining	Female Airmen	2	.58	$p < .001$
ITR1 – Likelihood of Remaining	Male Airmen	3	.61	$p < .001$
ITR1 – Likelihood of Remaining	All surveyed Airmen from 2016 dataset	7	.51	$p < .001$

P-values were also calculated using a permutation test, in which observed dependent variables are randomly assigned to other cases (Cummings, et al., 2004). An alpha level of .05 was used to differentiate significant from non-significant results. As detailed in Table 7, results from the 2017 SOFS-A dataset for ITR1 show that the p-values were significantly different from zero in 10 of the 11 variables. These included family views, job satisfaction, all three dimensions of organizational commitment (affective, normative and continuance), perceived job alternatives, spillover, job embeddedness, HPWP, and autonomy, where in all cases the p-values of <.001 meant that the likelihood of the r-squared values being due to chance was less than one out of 1,000 (Zhu, 2016).

Table 7: *P*-values associated with ITR1

Variable	*p*-value
Stress	.560
Job Satisfaction	.034
Family Views	<.001
Spousal Views	<.001
Perceived Organizational Support	.043
Organizational Commitment – affective	<.001
Organizational Commitment – normative	.009
Organizational Commitment – continuance	<.001
Perceived Job Alternatives	<.001
ADF: Job Environment	.09
ADF: Job Quality	.137
ADF: Military Benefits	.006
ADF: Military Pay	.007
ADF: Family/Spousal Stability/Support	.750
ADF: Leisure and Mission Travel	.311
ADF: Career Benefits	.332
ADF: Pride and Tradition	.032
ADF: Other	.383

Table 7 also shows results for the nine ADF variables. In this group, four variables (Job Environment, Military Benefits, Military Pay, and Pride and Tradition) correlated at non-chance levels with ITR1, while the remainder did not.

The Out-of-bag (OOB) prediction error was also used to interpret RF results. Also referred to as mean-square error (MSE), this is an indicator of accuracy, or conversely, error, in the tested models. It is calculated in the validation process, and the phrase 'out-of-bag' refers to the iterative aspect of the modeling process. In each permutation, a random number of cases is used to develop a prediction of the observed outcome. Those not included in each permutation are considered not in the test, or "out of the bag." The proportion of occurrences when these observed outcomes do not equal what is predicted for them, across all cases, is an estimate of error. Values are closer to zero when there is less error.

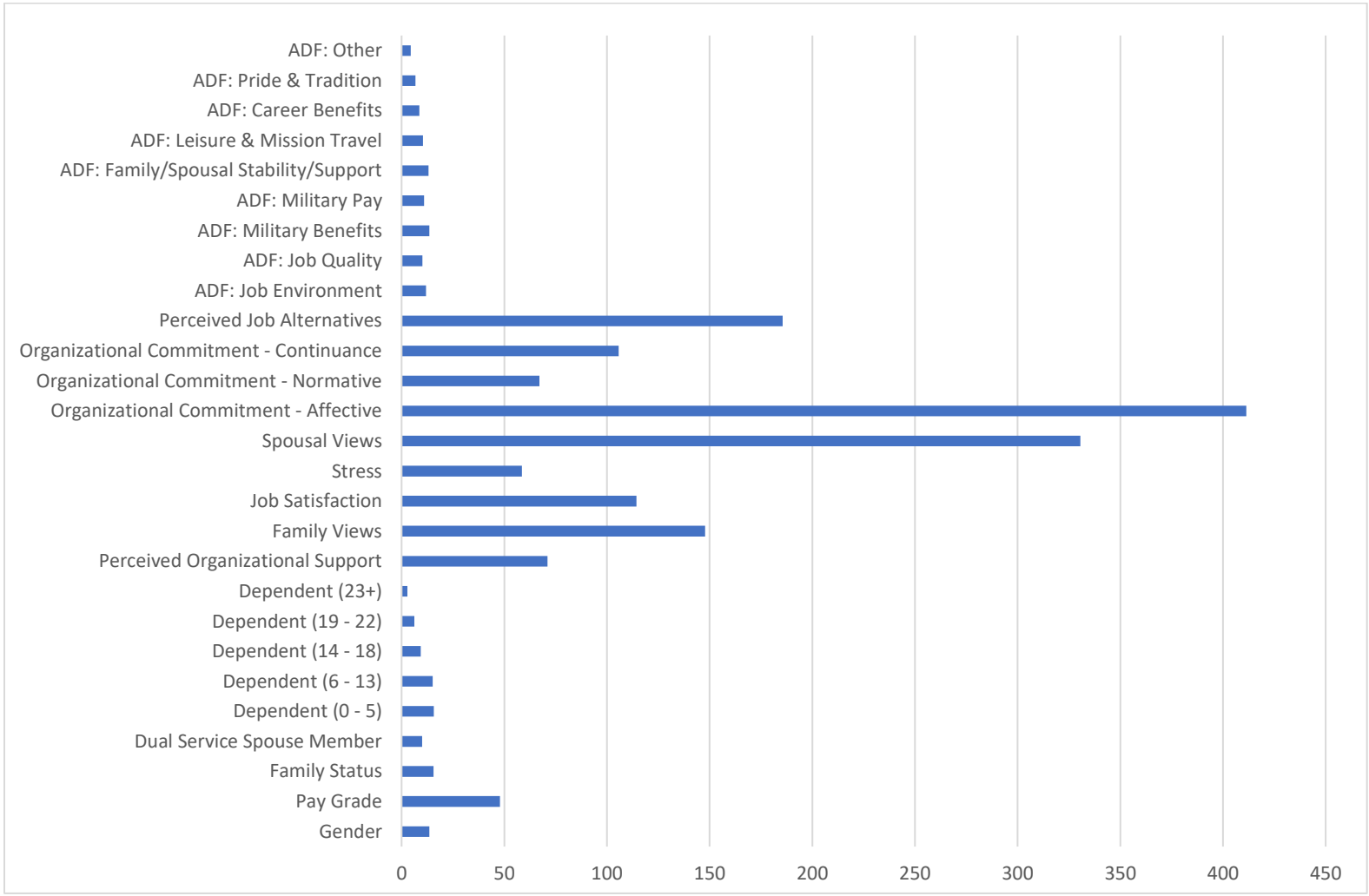
While there is no established criteria for MSE, the lower the MSE value suggests it is a better predictive model compared to other models with higher MSE values (Rowe, 2018). Models 1-3, as well as 7, which predict the intent to remain, had uniformly low MSE values, along with relatively high r-squared values, which can be seen in Table 6. MSE values for ITR1 can be found in Table 8.

Table 8: MSE values for each RF model

Dependent Variable	Population	Model Number	MSE
ITR1 – Intent to Remain	All surveyed Airmen	1	.70
ITR1 – Intent to Remain	Female Airmen	2	.72
ITR1 – Intent to Remain	Male Airmen	3	.69
ITR1 – Intent to Remain	All surveyed Airmen from 2016 dataset	7	.83

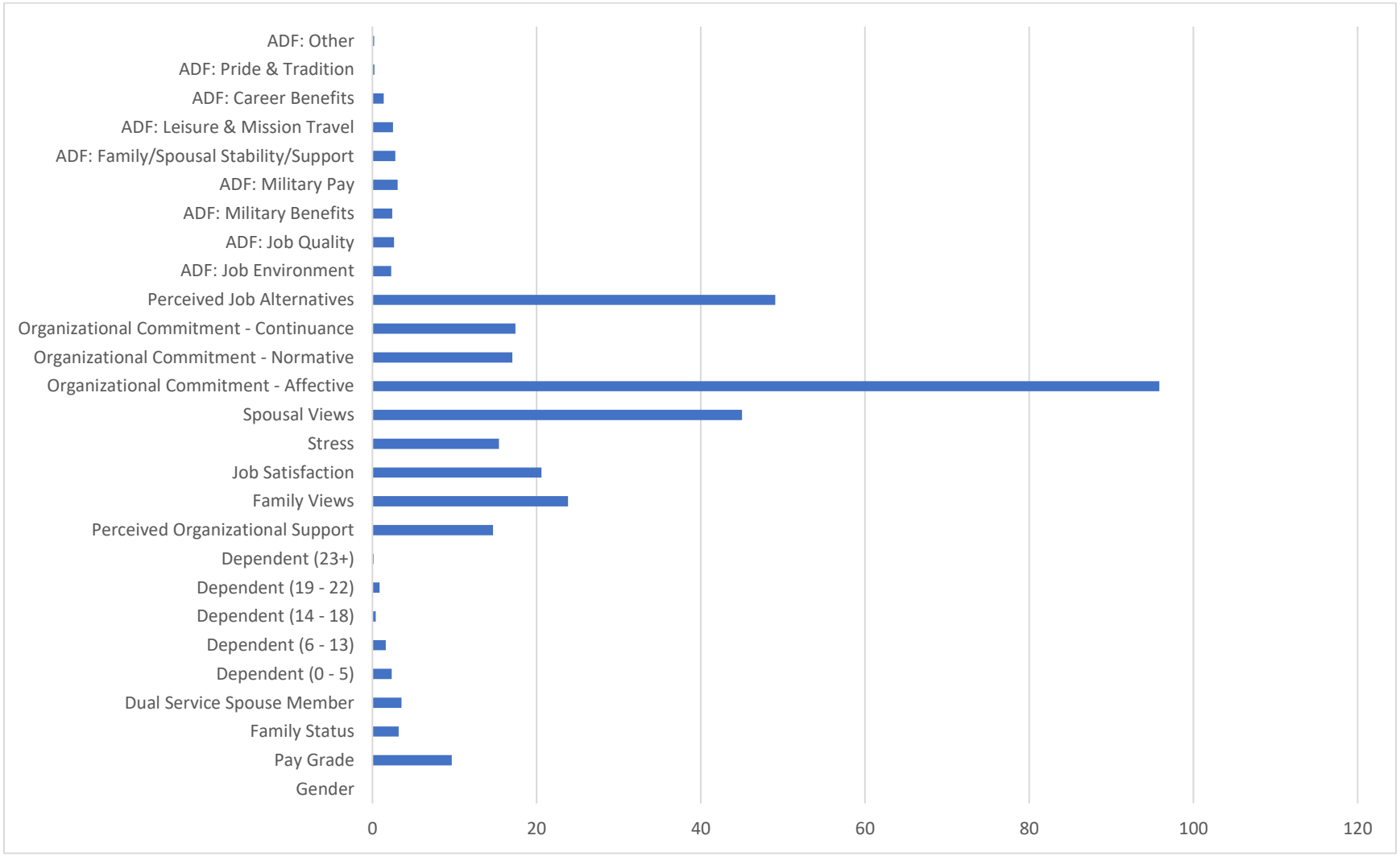
The final method of interpreting RF results involved exploring variable importance scores for each individual model. A variable importance score indicates the relative contribution of each variable to the prediction of ITR, as measured by a Gini-based importance score. The Gini-based importance score is calculated from the reduced sum of squared errors when variables are chosen to split during the RF process (Hoare, 2018). Variables with high importance are likely to account for meaningful variation in retention. Conversely, variables that have low importance are those that can potentially be omitted from a model, making it less complex and faster to fit and predict ITR (Brownlee, 2020). Figures 10a, 10b, and 10c illustrate the relative importance of variables in Models 1 through 3 as predictors/moderators of ITR1. Note that specific values should not be compared across all three models, since there are different Gini-based importance scores. As such, it is important to examine relative importance across all three models rather than specific values.

Figure 10a. Prediction of intention to remain in the Air Force, 2017 dataset (single question DV; Model 1)



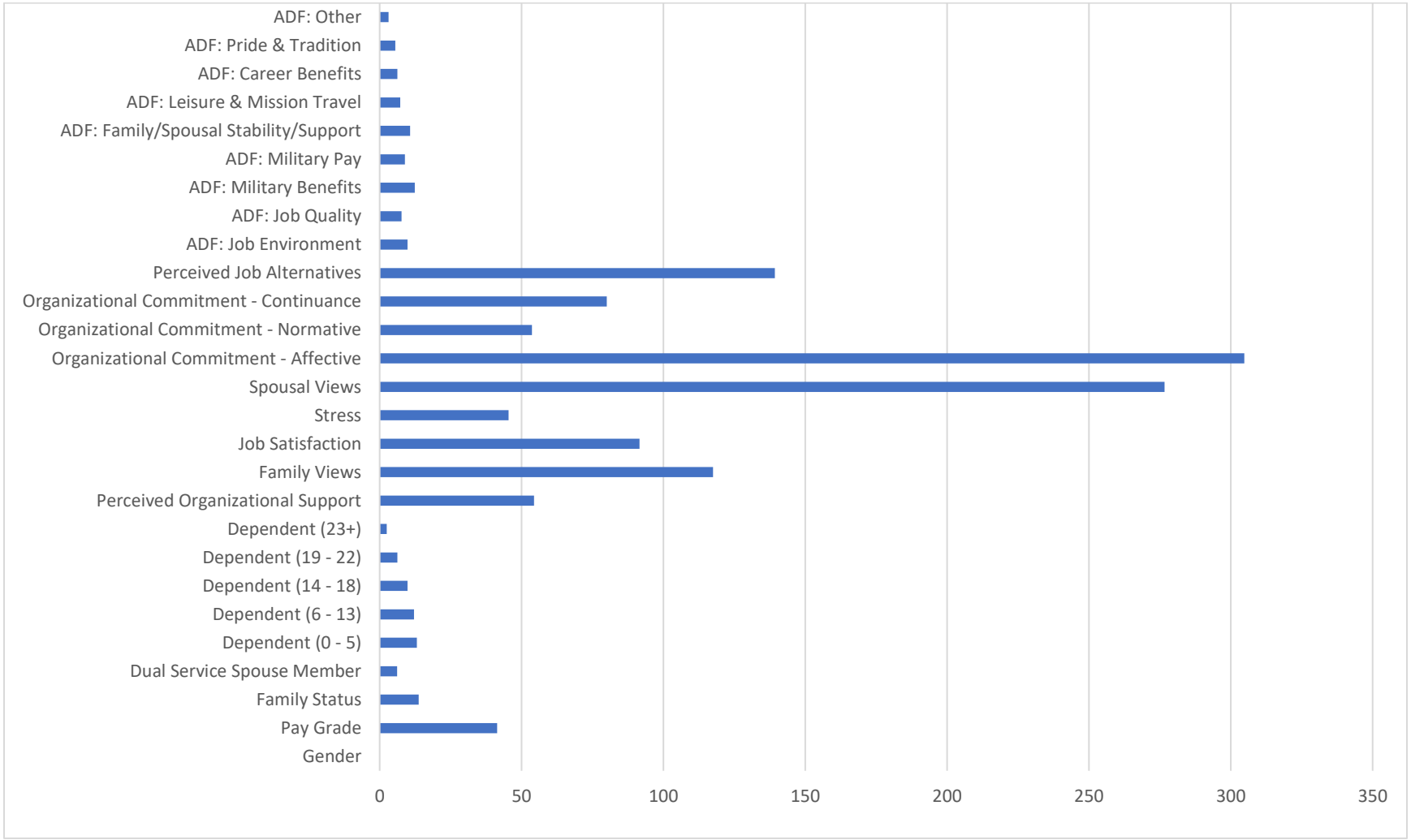
X-axis: Gini Based Importance Score

Figure 10b. Prediction of intention to remain in the Air Force, 2017 dataset, females only (single question DV; Model 2)



X-axis: Gini Based Importance Score

Figure 10c. Prediction of intention to remain in the Air Force, 2017 dataset, males only (single question DV; Model 3)



X-axis: Gini Based Importance Score

A striking result in each figure is that the affective dimension of organizational commitment is consistently the most important variable in predicting retention, using ITR1. This holds true regardless of gender. Also, for both females and males, spousal views and perceive job alternatives were either second or third in importance. After that, family views was the third most important variable to ITR1 among both males and females. Finally, job satisfaction appears to have been more important to ITR1 among males than among females, though in both samples it ranked no higher than fifth in level of importance.

To summarize, the random forest models 1-3 partially support my hypotheses. The affective component of organizational commitment stood out for its importance, followed by spousal views. After that, perceived job alternatives, family views, and job satisfaction rounded out the top five spots among the male and female samples.

Ordinary Least Squares (OLS)

The technique for model testing was again the RF approach (Breiman, 2001). Random forest models are nonparametric (McAlexander & Mentch, 2020), so there are no distributional assumptions for variables in these models. Further, there is no formal testing of significance of parameters. Therefore, as a supplement to the random forest analyses, ordinary least squares (OLS) regression was also used to analyze data with all predictors for each dependent variable (Mun & Geng, 2019).

Prior to running the analysis, variables were screened for univariate normality. Results indicated that all variables in the model were normally distributed, based on the criterion of absolute values less than 2 for both skewness and kurtosis (Tabachnick & Fidell, 2013). Due to the large sample sizes and the fact that scales were constructed from specified scales that had

values that ranged from 1 to 5, and maximum values were truncated by response formats for most variables, outliers were not removed from the dataset.

In examining the results from the 2017 ITR1 dataset OLS analysis, there are a few things to note. The first are the p-values, which were discussed earlier in this paper. The ADF variables, Job Quality, Family/Spousal Stability/Support, Leisure and Mission Travel, Career Benefits, and Other category, as well as the Stress variable all have p-values greater than .05, indicating these variables do not fit the model well and are not statistically significant predictors. Secondly examining the R-squared value will show us how well the available variables work to predict ITR1. Within this dataset, the R-squared value is .62, meaning the available variables explain 62% of the variance in the ITR1 dependent variable. Finally, other items to explore include the estimate, error, and Beta scores. For example, within the Family views variable, as family views moves up by one (i.e., a respondent choses family views as very important (a score of 5) over important (a score of 4) as a reason to remain in the Air Force, the family views variable goes up by .27, and this number can be found in the estimate column. The beta coefficient score shows the degree of change in ITR1 for every one-unit change in the independent variables. To use the Family views example again, as this variable moves up by 1, family support goes up by .25 standard deviations.

What is also noteworthy from the OLS results is that the most predictive variable identified within the RF models – the affective dimension of organizational commitment -- also shows to be the strongest predictor in OLS analysis. This is shown through a probability that measures how well the 2017 SOFS-A dataset and the variables that claim to predict ITR agree. Therefore, within both the RF models as well as the OLS regression analysis, the affective

dimension of organizational commitment, spousal and family views, as well as perceived job alternatives were found to be significant predictors of ITR1.

Table 9. Results from Ordinary Least Squares regression analyses, using ITR1 – 2017 dataset

Variable	Estimate	Error	β	*p*
Gender	-.01	.09	-.04	.893
Pay Grade	-.00	.02	.00	.996
Family Status	-.11	.08	-.04	.193
Dual Military	.02	.11	.01	.823
Dependents 0-5	.09	.07	.04	.157
Dependents 6-13	.05	.07	.02	.476
Dependents 14-18	-.12	.12	-.03	.372
Dependents 19-22	-.71	.27	-.07	.008
Dependents 23 & up	.22	.468	.01	.471
Stress	-.00	.01	-.00	.770
Job Satisfaction	.01	.00	.05	.034
Family Views	.27	.01	.25	<.001
Spousal Views	.37	.02	.38	<.001
POS	.31	.03	.09	.042
Organizational Commitment – Affective	.19	.01	.44	<.001
Organizational Commitment-Normative	-.05	.01	-.05	<.001
Organizational Commitment-Continuance	.04	.01	.09	<.001
Perceived Job Alternatives	.26	.02	.14	<.001
ADF: Job Environment	-.12	.04	-.04	.004
ADF: Job Quality	-.02	.05	-.01	.670
ADF: Military Benefits	.17	.04	.05	<.001
ADF: Military Pay	.12	.04	.03	.003
ADF: Family/Spousal Stability/ Support	.04	.04	.01	.340
ADF: Leisure & Mission Travel	-.08	.05	-.02	.150
ADF: Career Benefits	.19	.01	.44	<.001
ADF: Pride & Tradition	-.05	.41	-.05	<.001
ADF: Other	-.08	.01	-.01	.843
F	262.87			
R^2	.62			<.001

Note. Dependent variable is single item direct assessment of intentions to remain (ITR1). 'ADF' stands for Active Duty Factor.

Question 2: What factors predict efforts to leave the Air Force?

To address RQ 2, I calculated the bivariate correlations between the predictors and efforts to leave. As a reminder, higher scores in ITR2 indicate having made more preparations to leave, and is opposite of ITR1, which measures intent to remain. As such, the signs of the coefficients in the bivariate correlations and OLS analyses were expected to be different between ITR1 and ITR2. Three random forest models were developed to explore the predictors among efforts to leave. Finally, OLS was performed.

Bivariate Analysis

Among respondents, having children between the ages of zero and five was found to be minimally negatively correlated to ITR2 ($r = -.027$, $p < .05$). Having children in any other age groups was found to be positively correlated to ITR2, though again at low levels. Within the category of children aged 6 to 13, ($r = .050$, $p < .01$), military dependents between the ages of 14 to 18 ($r = .095$, $p < .01$), military dependents aged 19-22 ($r = .159$, $p < .01$), and dependents 23 and older ($r = .067$, $p < .01$). Despite the fact that these correlations were statistically significantly different from zero, the size of the coefficients is uniformly small, meaning that little can be inferred about the relationship.

Indeed, other predictors beside those identified in RQ2 tended to have stronger bivariate correlations with ITR2 (Table 6). These includes spousal views ($r = -.442$, $p < .01$), family views ($r = -.379$, $p < .01$), the affective dimension of organizational commitment ($r = -.374$, $p < .01$), perceived job alternatives ($r = -.336$, $p < .01$), and job satisfaction ($r = -.297$, $p < .01$). The negative signs for the coefficients indicate that as spousal view and family views were more positive

toward the military, as affective organizational commitment was higher, and as job satisfaction was higher, fewer efforts to separate were reported.

As shown in Tables 5 and 10, gender was not found to be correlated to ITR1 ($r = .000$, $p<.05$), and minimally correlated with ITR2 ($r = -.053$, $p<.01$). Lastly, dual-military status was found to be minimally positively correlated with ITR1 ($r = .023$, $p<.05$), and negatively correlated with ITR2 ($r = -.032$, $p<.05$).

Table 10: Bivariate correlation with efforts to leave, ITR2

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. ITR2	1															
2. Gender	-.053*[86]	1														
3. Pay Grade	.075**	-.017	1													
4. Marital Status	.011	-.126**	.308**	1												
5. Dual-spouse	-.032	.245**	.010	.245**	1											
6. Kids 5 & under	.027	-.086**	.181**	.426**	.027	1										
7. Kids 6-13	.050*	-.068**	.283**	.342**	-.010	.539**	1									
8. Kids 14-18	.095**	-.049**	.265**	.253**	-.036*	.193**	.567**	1								
9. Kids 19-22	.159**	-.036	.248**	.158**	-.020	.050*	.297**	.572**	1							
10. Kids 23 & up	.067*	.023	.175**	.134**	-.003	.147**	.242**	.268**	.497**	1						
11. Autonomy	.c	-.018	.124**	.039	-.007	0.003	.033	.042	.061*	.028	1					
12. Stress	.168**	.027	.034*	.066**	.026	.081**	.085**	.024	.004	.032	-.146**	1				
13. HPWP	.c	.061**	-.040	-.047*	-.011	-.084**	-.105**	-.062*	-.021	-.027	.312**	-.204**	1			
14. Spillover	.193**	.036	.137**	.170**	.064	.188**	.139**	0.03	-.014	.073	.c	.205**	.c	1		
15. Family Views	-.379**	.026	-.071**	-.006	.020	-.045**	-.051**	-.093**	-.047*	-.034	.120**	-.140**	.242**	-.269**	1	
16. Spousal Views	B19.442*	-.010	-.047**	.086**	.067**	.028	.057**	.006	-.004	.025	.180**	-.162**	.264**	-.244**	.675**	1
17. Job Sat.	.297**	-.025	.124**	.052**	-.039**	-.009	-.027	.004	.027	-.005	.504**	-.185**	.570**	-.153**	.163**	.188**
18. POS	.031	-.027	.061**	-.034	-.012	-.028	-.057**	-.043*	-.046*	-.050*	-.140**	.006	-.066**	.004	-.054**	-.072**
19. Affective	.374**	-.021	.160**	.108**	-.008	.068**	.095**	.101**	.090**	.096**	.265**	-.157**	.287**	-.147**	.360**	.458**
20. Normative	.238**	.053**	.025	.025	.007	.040*	.003	-.019	-.017	.053**	.078**	-.029	.169**	-.085	.216**	.229**
21. Continuance	.178**	.009	-.281**	-.068**	-.010	-.006	-.038*	-.056**	-.077**	-.036	-.068**	.005	.103**	-.073	.201**	.216**
22. Job Embedded	-.099**	-.008	-.073**	-.012	-.013	.025	.042	-.014	-.061*	-.019	.c	.056*	.c	.028	-.081**	-.108**
23. Job Alternatives	.336**	.007	.119**	.072**	-.008	.012	.033	.070**	.077**	.058**	.344**	-.288**	.390**	-.163**	.321**	.419**
24. ADF: Job Environment	-.094**	.024	.088**	-.053**	-.013	-.045**	-.042*	-.025	-.020	-.005	.c	0.01	.c	.003	-.051**	-.082**
25. ADF: Job Quality	-.035	-.012	.101**	-.020	-.016	-.031	-.001	.031	.027	.036	.c	-.014	.c	-.024	-.033*	-.030
26. ADF: Mil Benefit	.129**	-.041**	-.059**	.011	-.005	.015	.046**	-.004	.006	.016	.c	-.003	.c	-.156**	.104**	.142**
27. ADF: Military Pay	-.030	-.014	-.017	-.030*	.001	-.029	.017	-.019	.008	.012	.c	.012	.c	.028	-.018	-.013
28. ADF: Family Support	.004	-.013	.106**	.103**	.017	.070**	.084**	.079**	.038*	.015	.c	.031*	.c	.298**	-.007	.004
29. ADF: Travel	-.028	.013	-.007	-.035*	.018	-.036*	-.032	-.001	-.001	.006	.c	.009	.c	.102*	-.043**	-.049**
30. ADF: Career Benefits	-.002	.030*	.025	-.019	.000	-.024	-.011	-.016	-.015	-.001	.c	-.025	.c	-.073	-.003	.005
31. ADF: Pride/Tradition	.079**	-.048**	.046**	.008	-.043**	-.028	.008	.001	.008	.054**	.c	-.023	.c	-.076	.042**	.064**
32: ADF: Other	-.032	-.020	-.017	-.037*	-.021	-.027	-.027	-.022	-.010	.015	.c	-.005	.c	-.128**	-.028	-.030

Note: All Correlations used pairwise deletion. Thus, sample size varies for each correlation. **<.010 *<.050
.c = sample size too small to calculate

Table 10: (continued)

Measure	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1. ITR2																
2. Gender																
3. Pay Grade																
4. Marital Status																
5. Dual-spouse																
6. Kids 5 & under																
7. Kids 6-13																
8. Kids 14-18																
9. Kids 19-22																
10. Kids 23 & up																
11. Autonomy																
12. Stress																
13. HPWP																
14. Spillover																
15. Family Views																
16. Spousal Views																
17. Job Sat.	1															
18. POS	.029	1														
19. Affective	.308**	-.096**	1													
20. Normative	.129**	-.068**	.530**	1												
21. Continuance	.001	-.014	.209**	.289**	1											
22. Job Embedded	-.165**	.065**	-.205**	-.103**	.014	1										
23. Job Alternatives	.388**	-.095**	.615**	.277**	.072**	-.159**	1									
24. ADF: Job Environment	-.305**	-.031	-.081**	-.033*	-.084**	.070**	-.055**	1								
25. ADF: Job Quality	-.220**	-.018	-.012	-.011	-.081**	.014	-.007	.252**	1							
26. ADF: Mil Benefit	-.335**	-.097**	.047**	.028	.096**	.031	.046**	.029	.016	1						
27. ADF: Military Pay	-.307**	-.048**	-.053**	-.036*	.001	.098**	-.017	.147**	.118**	.307**	1					
28. ADF: Family Support	-.316**	-.049**	.026	-.008	.006	.103**	.028	.245**	.137**	.240**	.134**	1				
29. ADF: Travel	-.199**	-.017	-.063**	-.042**	-.029	.040	-.033*	.086**	.098**	.088**	.144**	.131**	1			
30. ADF: Career Benefits	-.186**	-.039*	.036*	-.001	-.028	.006	.045**	.132**	.100**	.111**	.097**	.050**	.103**	1		
31. ADF: Pride/Tradition	-.127**	-.064**	.124**	.086**	-.023	-.107**	.074**	.054**	.096**	.144**	.024	.065**	-.006	.039**	1	
32: ADF: Other	-.127**	.028	-.071**	-.033*	-.10	.039	-.069**	.044**	0.01	.021	.003	.004	.034*	.006	.037*	1

Note: All Correlations used pairwise deletion. Thus, sample size varies for each correlation. **<.010 *<.050
.c = sample size too small to calculate

Three models, all employing the 2017 dataset, were calculated to examine Research Question 2: "Among Air Force personnel, what factors predict efforts to separate the Air Force?" as measured by ITR2. These were Models 4-6, and they were created using the same predictors as analyzed above for ITR1 (shown in Table 6). Also included were all nine ADF variables. Model 4 was tested on the All Airmen sample, Model 5 on female-only Airmen, and Model 6 on male-only Airmen.

As in Question 1, building the random forest model for this research question consisted of the same phases. These were: (1) creating a bootstrapped data set for each tree; (2) training the forest of trees using random data sets; and (3) randomly selecting certain features to evaluate at each node and doing so 500 times so that a forest was created.

Also as with Question 1, three methods of interpreting results were employed. Results relating to r-squared values can be found in Table 11, which shows them for all models. Models 4, 5, and 6 all addressed the ITR2 variable that measured servicemembers' efforts to leave. All three had smaller *r*-squared values than Models 1, 2, 3, and 7, which addressed the single-item ITR1 measure of intent to remain. This indicates that hypothesized predictors account for more variation in ITR1 than in the ITR2. Given findings previously cited concerning the association between these variable and turnover risk, ITR1 may thus be the more informative measure of that risk in this study.

Table 11: *r*-squared values for each ITR2 model

Dependent Variable	Population	Model Number	R-squared	p-values
ITR2 - Efforts to Leave	All surveyed Airmen	4	.29	$p < .001$
ITR2 - Efforts to Leave	Female Airmen	5	.35	$p < .001$
ITR2 - Efforts to Leave	Male Airmen	6	.28	$p < .001$

Table 12 shows *p*-values calculated using a permutation test calculated by holding ITR2 constant and permuting the response variables. This allows for randomization between the independent and dependent variables, supplying a model for a random sampling distribution of the data. This procedure is repeated, creating many models, which allows RF to determine the frequency of models equal to or better than what was observed from the original data.

As with Models 1-3, an alpha level of .05 was used to differentiate significant from non-significant results. Within the 2017 SOFS-A dataset, family views, job satisfaction, all three dimensions of organizational commitment (affective, normative and continuance), perceived job alternatives, spillover, job embeddedness, HPWP, and autonomy had p-values of <.001).

Results pertaining to ITR2 showed that only four variables had p-values of .05 or less. These were the affective dimension of organizational commitment, job satisfaction, family views, and spousal views, suggesting a non-chance relationship with ITR2.

Table 12: P-values associated with ITR2

Variable	*p*-value
Stress	.480
Job Satisfaction	.047
Family Views	<.001
Spousal Views	<.001
Perceived Organizational Support	.062
Organizational Commitment – affective	<.001
Organizational Commitment – normative	.075
Organizational Commitment – continuance	.113
Perceived Job Alternatives	.095
ADF: Job Environment	.827
ADF: Job Quality	.402
ADF: Military Benefits	.202
ADF: Military Pay	-.184
ADF: Family/Spousal Stability/Support	.707
ADF: Leisure and Mission Travel	.069
ADF: Career Benefits	-.562

ADF: Pride and Tradition	.993
ADF: Other	.843

Notes: Dependent variable is multiple items measuring efforts to leave.
"ADF" stands for Active Duty Factor

Again, the second method of interpreting results was to estimate Out-of-bag (OOB) prediction error by calculating MSE. MSE values for ITR2 can be seen in Table 13. As noted previously, the lower the MSE values for Models 1-3 suggest that ITR1 measures turnover risk better than ITR2, at least with respect to these predictors and moderators.

Table 13: MSE values for each ITR2-Efforts to leave models

Dependent Variable	Population	Model Number	MSE
ITR2 - Efforts to Leave	All surveyed Airmen	4	6.68
ITR2 - Efforts to Leave	Female Airmen	5	5.22
ITR2 - Efforts to Leave	Male Airmen	6	6.96

The third interpretation method was to again examine variable importance scores for each model, in which scores indicate the relative importance of each variable to the prediction of the ITR measure. Figures 11a, 11b, and 11c, show the relative variable importance while using ITR2, efforts to leave, as the dependent variable. As noted, it is important not to compare specific values across all three models as they consist of different samples, total Air Force sample, female Airmen, and male Airmen, as well as Gini based importance scores.

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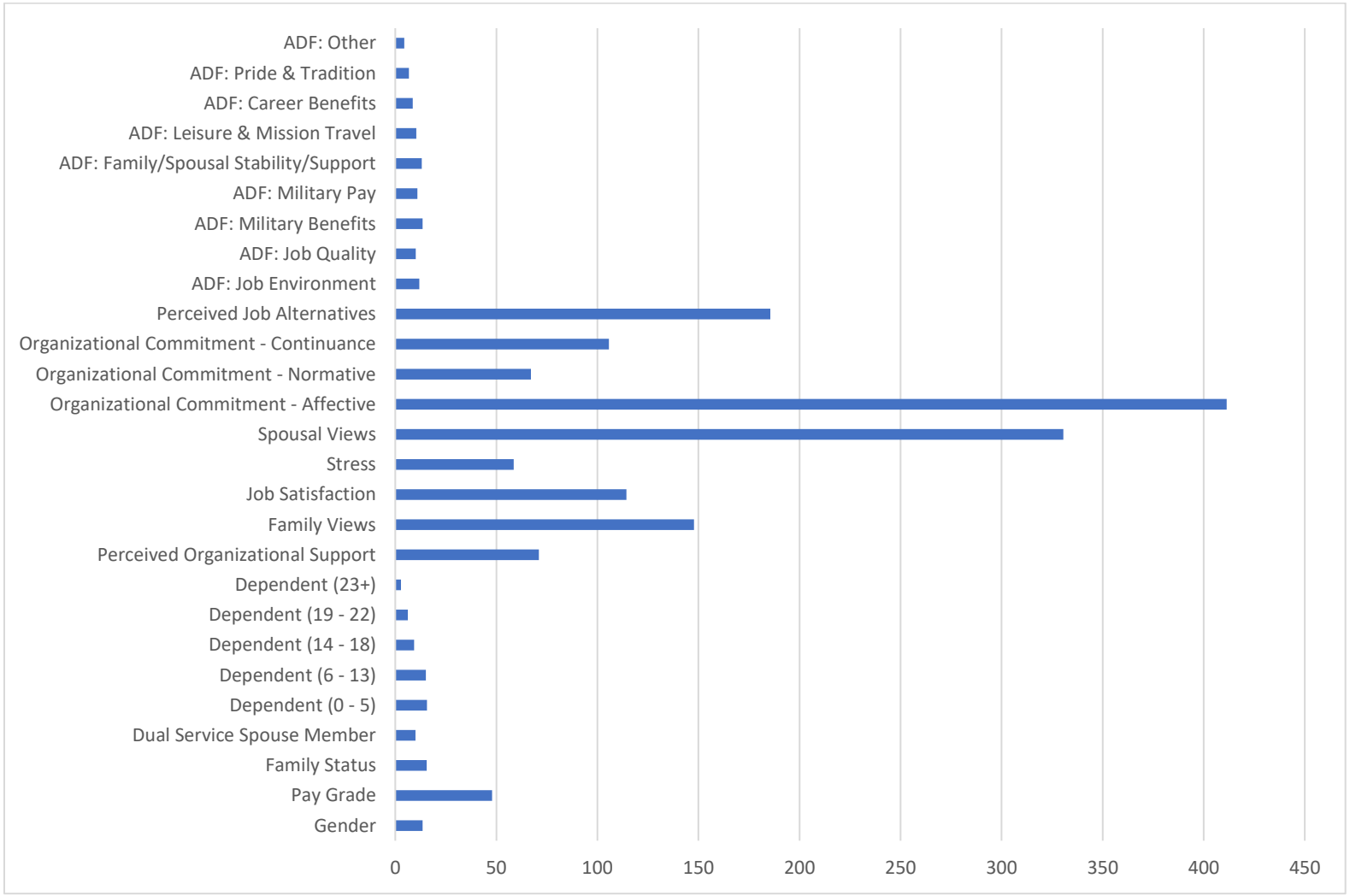
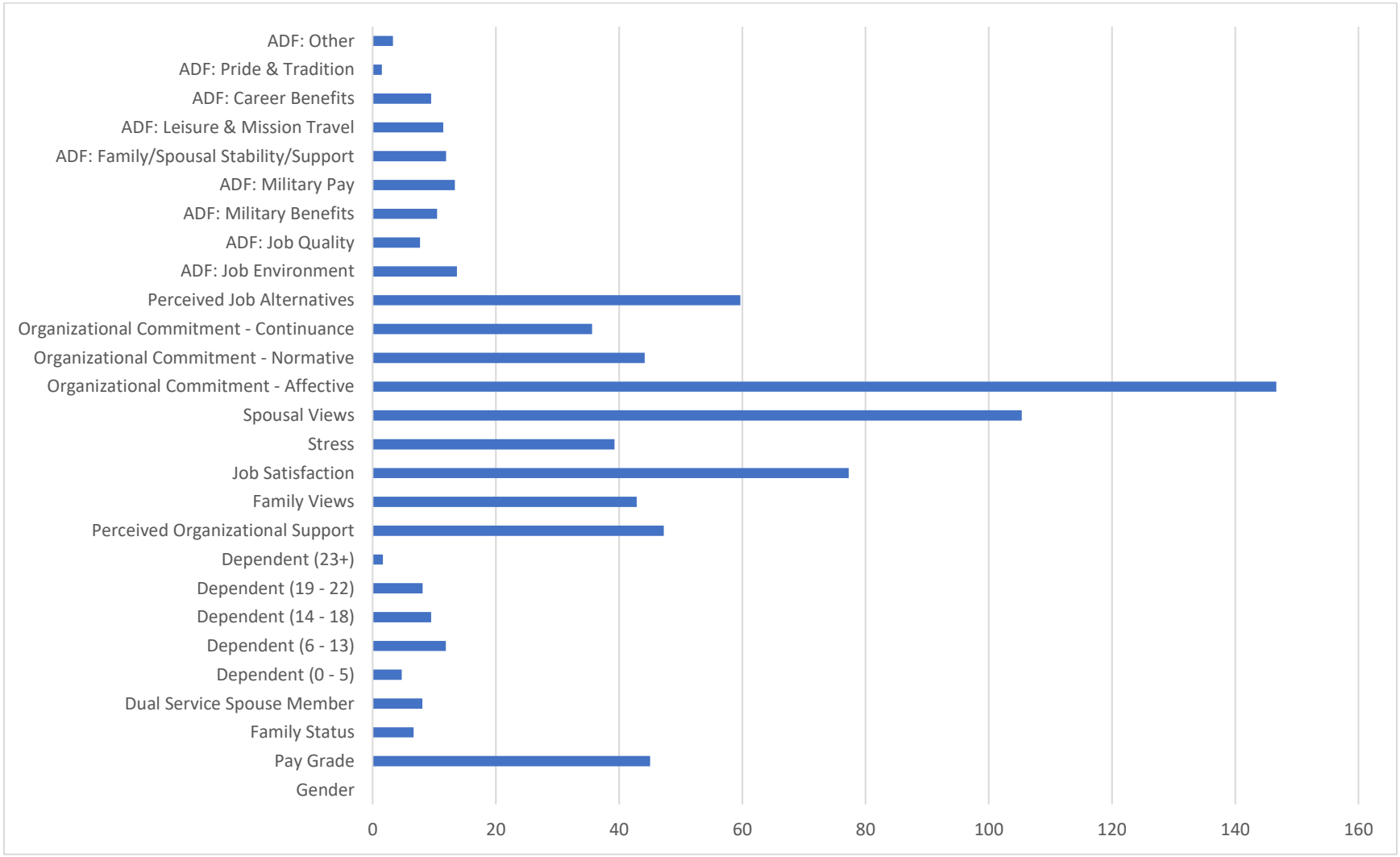
Figure 11a. Prediction of efforts to leave the Air Force, 2017 dataset (sum of efforts to leave; Model 4)



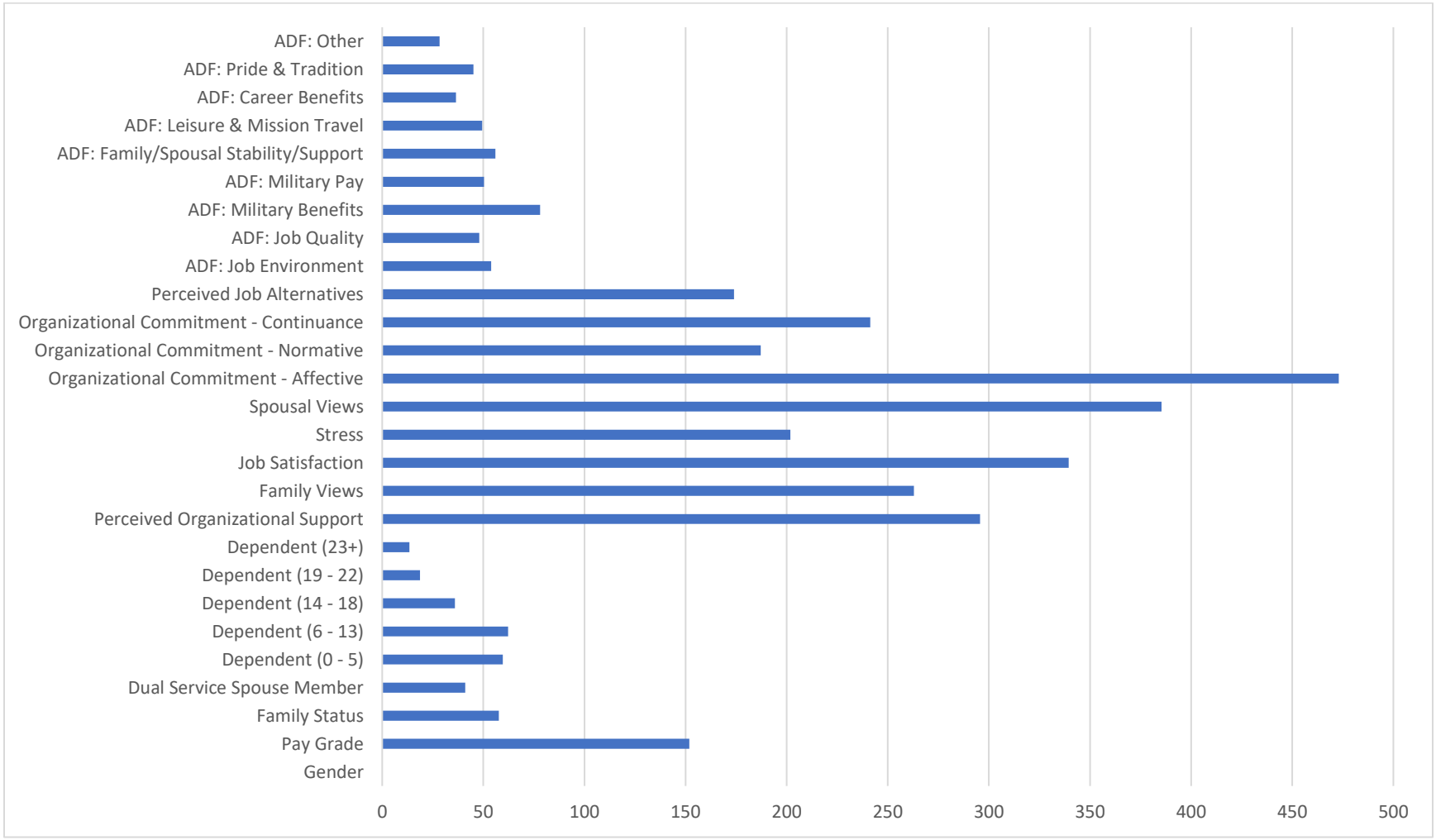
X-axis: Gini Based Importance Score

Figure 11b. Prediction of efforts to leave the Air Force, 2017 dataset, females only (sum of efforts to leave; Model 5)



X-axis: Gini Based Importance Score

Figure 11c. Prediction of efforts to leave the Air Force, 2017 dataset, males only (sum of efforts to leave; Model 6)



X-axis: Gini Based Importance Score

As was the case in ITR1, the affective dimension of organizational commitment is consistently the most important variable in predicting retention, using ITR2. This holds true regardless of gender. In all three samples, spousal views was the second most important predictor, and the job satisfaction variable was third most. Females and males differed in terms of which variables were the fourth and fifth most predictive, in that, for female Airmen, perceived job alternatives and perceived organizational support occupied those two ranks, while for male Airmen the fourth and fifth most important variable were perceived organizational support and family views.

To summarize, RF Models 4-6 partially support the hypotheses. While dual-military service, number of dependents, and stress levels were not found to be predictive of efforts to leave, the perception of job alternatives was found to be predictive of such efforts. In addition to perceived job alternatives, affective commitment, job satisfaction, spousal views, family views, POS, and continuance commitment rounded out the top five most important variables across all three samples.

Ordinary Least Squares (OLS)

A few items will be explored while examining the results from the 2017 ITR2, efforts to leave, dataset OLS analysis. As a reminder, higher scores indicate having made more preparations to leave. Again, p-values will first be discussed. Within the ITR2 dataset, there were more p-values greater than .05 compared to the ITR1 dataset. In the ITR2 dataset, only family views, spousal views, the affective dimension of organizational commitment, and job satisfaction had p-values less than .05, and are statistically significantly predictors. Second, the R-squared value of .27 reports that the variables used explain 27% of the variance in ITR2. Finally, Beta scores will show how much change there is in ITR2 for every one-unit change in an independent

variable. Again using the family views variable, we can see that as survey respondents report a change in family views (i.e., a respondent choses family views as very important (a score of 5) over important (a score of 4) as a reason to remain in the Air Force, the family views variable goes up by .31, and family support goes up by .12 standard deviations.

When comparing ITR2 to ITR1, ITR2 has 13 of the 17 independent variables with p-values greater than .05, whereas ITR1 has five of the 17 independent variables with p-values greater than .05. Also, comparing the R-squared values of the ITR1 model and the ITR2 model, the ITR2 R-squared value explains 32% less variance within the independent variables. This suggests ITR1 model offers a better fit.

Despite ITR2 having a poorer fit model, the most predictive variables related to ITR2 as identified in the RF models, the affective dimension of organizational commitment, spousal and family views, and job satisfaction were also found to be the most predictive variables within the OLS regression analysis, meaning they are most significant predictors of ITR2.

Table 14. Results from Ordinary Least Squares regression analyses, using ITR2 – 2017 dataset

Variable	Estimate	Error	β	*p*
Gender	.53	.23	.07	*.021*
Pay Grade	-.07	.06	-.04	*.206*
Family Status	-.09	.22	-.02	*.654*
Dual Military	.46	.34	.05	*.173*
Dependents 0-5	.07	.20	.01	*.736*
Dependents 6-13	-.05	.20	-.01	*.795*
Dependents 14-18	-.06	.30	-.01	*.833*
Dependents 19-22	-.64	.53	-.04	*.223*
Dependents 23 & up	.32	.79	.01	*.688*
Stress	-.11	.05	-.05	*.061*
Job Satisfaction	.05	.03	.06	*.047*
Family Views	.31	.09	.12	*<.001*
Spousal Views	.53	.08	.22	*<.001*
POS	.24	.07	.03	*.062*
Organizational Commitment –	.13	.04	.12	*<.001*

Affective Organizational Commitment- Normative	.14	.08	.05	*.075*
Organizational Commitment- Continuance	.05	.03	.04	*.113*
Perceived Job Alternatives	.20	.12	.06	*.095*
ADF: Job Environment	-.04	.19	-.01	*.827*
ADF: Job Quality	-.17	.20	-.02	*.402*
ADF: Military Benefits	.26	.21	.04	*.202*
ADF: Military Pay	-.03	.18	-.06	*.184*
ADF: Family/Spousal Stability/Support	-.07	.19	-.01	*.707*
ADF: Leisure & Mission Travel	.40	.22	.05	*.069*
ADF: Career Benefits	-.13	.22	-.01	*.562*
ADF: Pride & Tradition	.00	.25	.00	*.993*
ADF: Other	-.08	.41	-.01	*.843*
F	28.52			*<.001*
R^2	.28			

Note. Dependent variable is sum of efforts to separate (ITR2). 'ADF' stands for Active Duty

Cross Validation Model

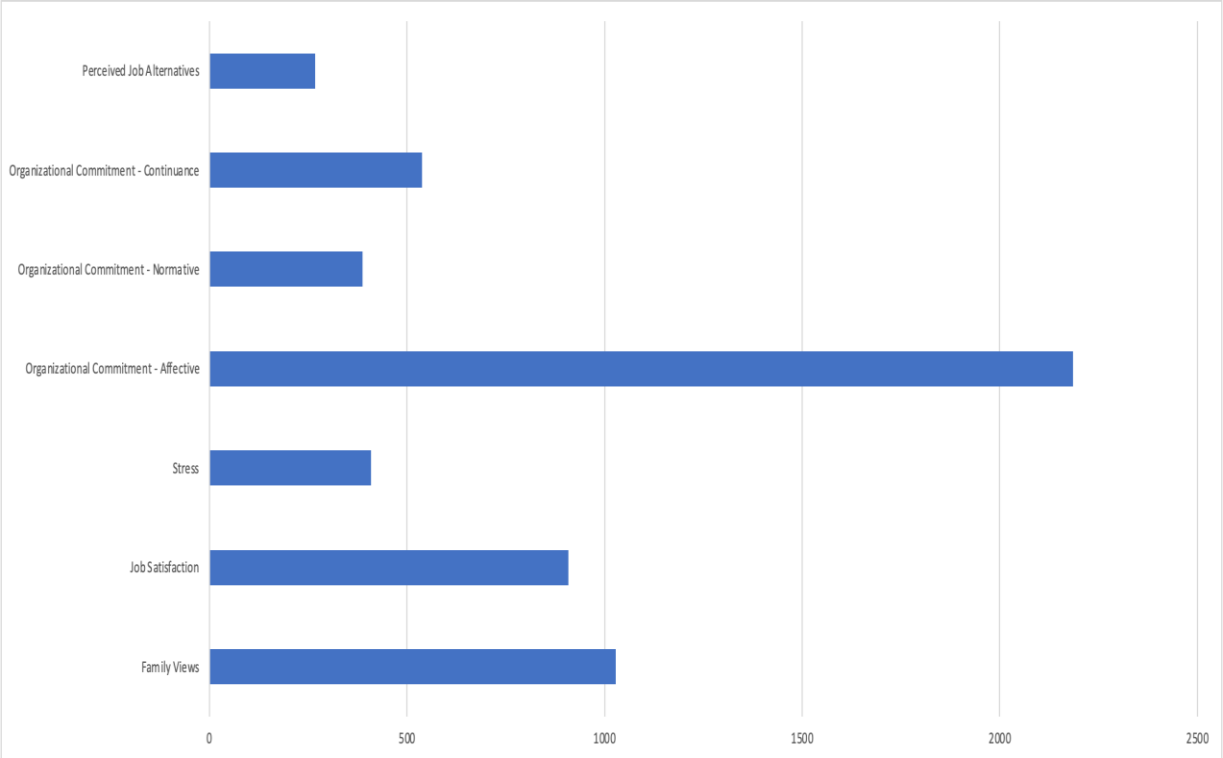
Model 7 addressed the 2016 dataset, and ITR1, intent to remain, is the only dependent variable for which information is available from that dataset. Also, no data from 2016 is available for the gender variable, so results shown are for the entire Air Force sample. Due to other limitations in data availability, Model 7 tested only seven variables whereas Models 1-6 included 18.

Figure 12 shows results from Gini tests on the importance of each of the seven variables in the 2016 dataset that are common to 2017, calculated on ITR1. Results indicate that the

affective dimension of organizational commitment was even more dominant in its importance that in the preceding six models. After that, the most important variables were family views and job satisfaction.

These results offer three important suggestions. The first is that data from 2016 do appear to cross-validate the 2017 models. Second, the affective dimension of organizational commitment appears to account for a very substantial amount of variation in ITR across datasets. Third, the predictive capacity of variables such as job satisfaction appear to differ between ITR1, intent to remain, and ITR2, efforts to separate.

Figure 12. Prediction of intention to remain in the Air Force, 2016 dataset (Model 7)



X-axis: Gini Based Importance Score

Table 15 shows the results from the same OLS regression analyses as described above, except on the 2016 dataset and with ITR1. An alpha level of .05 was used to differentiate significant from non-significant results. Of the seven variables used within the model, five of them had *p*-values of <.001, providing evidence to reject the null hypothesis. However, both stress and perceived job alternatives were found to have higher *p*-values, indicating these two variables are not statistically significantly related to ITR1, intent to remain. Also relevant is the R squared value, which at .52 indicates that the five significantly predictive variables account for a nontrivial amount of variation (more than half) in ITR.

Table 15: Results from Ordinary Least Squares regression analyses – 2016 dataset

Variable	Estimate	Error	β	*p*
Family Views	.30	.01	.27	<.001
Job Satisfaction	.03	.00	.09	<.001
Stress	-.01	.01	-.01	.300
Organizational Commitment – affective	.22	.01	.50	<.001
Organizational Commitment – normative	-.06	.01	-.06	<.001
Organizational Commitment – continuance	.05	.01	.11	<.001
Perceived Job Alternatives	-.03	.02	-.02	.280
F	775.73			<.001
R^2	.52			

Note. Dependent variable is ITR1, intent to remain

Question 3: Does gender moderate ITR?

As my research focused on retention predictors among servicewomen, I tested gender as a moderator using an ordinary squares regression framework. I used both ITR1, intent to remain, and ITR2, efforts to separate, as the dependent variables. While using ITR1, gender did serve as a moderator in two instances--the case of ADF: Military Pay (consisting of three items—see Appendix A) and Family Views. In regards to ADF: Military Pay, post-hoc probing to identify the presence of any moderating effects revealed that this direct effect was not significant for males (b = -.04, p = .55), but it was for females (b = .28, p = .02). Post hoc analysis of Family Views revealed a direct effect that was stronger for males (b = .55, p < .001) than for females (b = .44, p < .001). My hypothesis that gender would moderate ITR was thus partially supported. These results can be seen in Table 16, in which the important numbers are represented by the *p*-value, and gender as the moderator. Within the table it can be seen that gender only serves as a

moderator for the two variables, ADF: Military Pay, and Family Views. As for the rest of the variables, the p-values are quite high, indicating gender is not a significant moderating variable.

Table 16: Results from Ordinary Least Squares regression analyses, using ITR1 – 2017 dataset

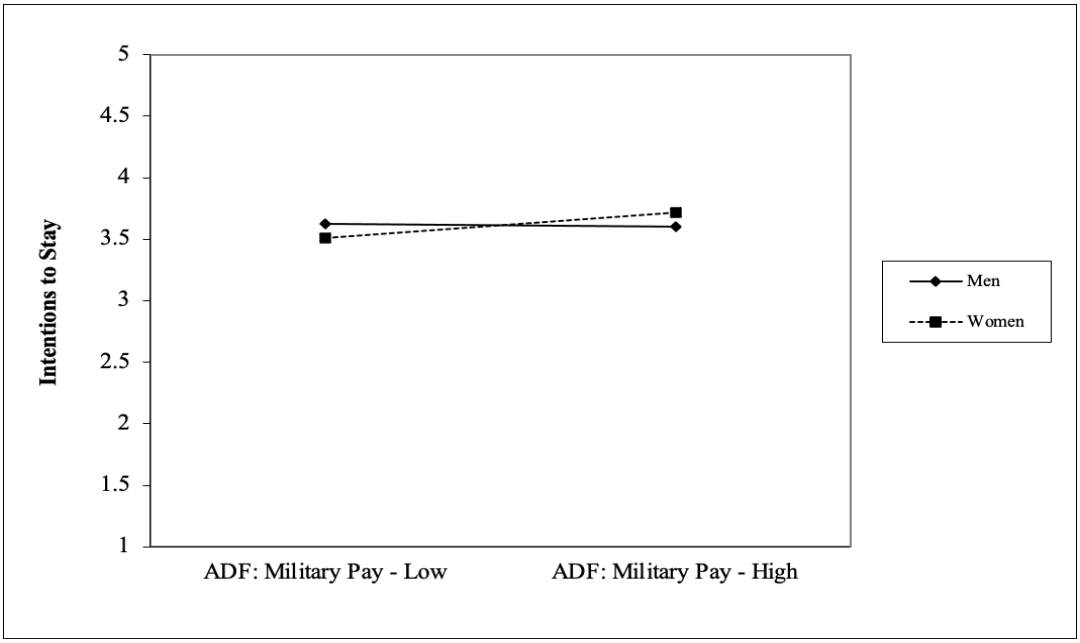
Variable	Estimate	Error	β	*p*	Gender as moderator (*p*)
Gender	-.01	.09	-.04	.893	-
Pay Grade	-.00	.02	.00	.996	.203
Family Status	-.11	.08	-.04	.193	.300
Dual Military	.02	.11	.01	.823	.785
Dependents 0-5	.09	.07	.04	.157	.262
Dependents 6-13	.05	.07	.02	.476	.314
Dependents 14-18	-.12	.12	-.03	.372	.401
Dependents 19-22	-.71	.27	-.07	.008	.168
Dependents 23 & up	.22	.468	.01	.471	.411
Stress	-.00	.01	-.00	.770	.520
Job Satisfaction	.01	.00	.05	.034	.264
Family Views	.27	.01	.25	<.001	.001[c]
Spousal Views	.37	.02	.38	<.001	.430
POS	.31	.03	.09	.042	.320
Organizational	.19	.01	.44	<.001	.610
Commitment – Affective Organizational	-.05	.01	-.05	<.001	.970
Commitment-Normative	.04	.01	.09	<.001	.950
Organizational Commitment-Continuance	.26				
Perceived Job Alternatives	-.12	.02	.14	<.001	.290
ADF: Job Environment	-.02				
ADF: Job Quality	.17	.04	-.04	.004	.520
ADF: Military Benefits	.12	.05	-.01	.670	.290
ADF: Military Pay	.04	.04	.05	<.001	.440
ADF: Family/Spousal Stability/Support	.17	.04	.03	.003	.020[b]
ADF: Leisure & Mission Travel	.12	.04	.01	.340	.360
ADF: Career Benefits	.04				
ADF: Pride & Tradition	-.08	.05	-.02	<.001	.190
ADF: Other	.19	.01	.44	<.001	.610
	-.05	.41	-.05	.843	.970
		.01	-.01	<.001	.968

F	-.08	<.001
R^2	262.87	
	.62	

Note. Dependent variable is single item direct assessment of intentions to remain. 'ADF' stands for Active Duty Factor.
[a]Moderation was tested within an ordinary least squares regression framework, in which the specified independent variable was included with gender and their interaction. The *p*-value represents the significance level of the associated estimate.
[b]Post-hoc probing revealed that this direct effect was not significant for men (b = -.04, *p* = .55), and it was significant for women (b = .28, *p* = .02).
[c]Post-hoc probing revealed that this direct effect was stronger for men (b = .55, *p* < .001) than for women (b = .44, *p* < .001

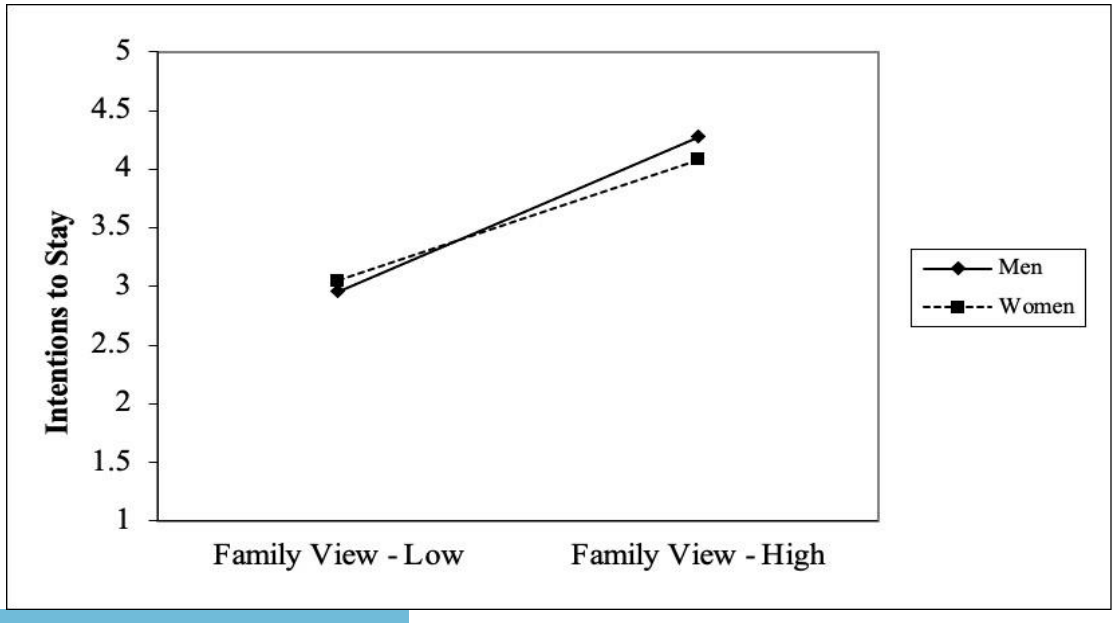
Also informative is Figure 13, which consists of a plot of interactions between ADF: Military Pay and gender in predicting intent to stay. This figure is derived from post-hoc probing of moderating effects from the two-way interactions of ADF: Military Pay and gender. Holmbeck (2002) notes that post-hoc probing should be completed when examining interaction effects, and in this figure the b represents unstandardized regression coefficient (i.e., slope) and the *p*-value represents how well the data supports the null hypothesis. The direct effect was found to be significant for females (b = .28), but not for males (b = -.04). Also, a *p*-value of .02, for female Airmen is smaller than the .05 representing significant results, offering support to reject the null hypothesis. The *p*-value of .55 for males represents non-significant results.

Figure 13: Plot of Interaction between ADF: Military Pay and Gender



Finally, Figure 14 shows a plot of interactions between Family Views and gender in prediction of intent to stay. Post-hoc probing showed that for both male and female Airmen, *p*-values were < .001, suggesting support for rejecting the null hypothesis. Also, the direct path was stronger for male Airmen (b = .55) than for female Airmen (b = .44).

Figure 14: Plot of Interaction between Family Values and Gender



I also tested gender as a moderator using an ordinary squares regression framework and ITR2, efforts to separate, as the dependent variable. While using ITR2, gender was not found to serve as a moderator in any instance.

Table 17: Results from Ordinary Least Squares regression analyses, using ITR2 – 2017 dataset

Variable	Estimate	Error	β	*p*	Gender as moderator (*p*)
Gender	.53	.23	.07	.021	-
Pay Grade	-.07	.06	-.04	.206	.297
Family Status	-.09	.22	-.02	.654	.977
Dual Military	.46	.34	.05	.173	.767
Dependents 0-5	.07	.20	.01	.736	-
Dependents 6-13	-.05	.20	-.01	.795	-
Dependents 14-18	-.06	.30	-.01	.833	-
Dependents 19-22	-.64	.53	-.04	.223	-
Dependents 23 & up	.32	.79	.01	.688	-
Stress	-.11	.05	-.05	.061	.963
Job Satisfaction	.05	.03	.06	.047	.368
Family Views	.31	.09	.12	<.001	.082
Spousal Views	.53	.08	.22	<.001	.117
POS	.24	.07	.03	.062	.837
Organizational Commitment – Affective	.13	.04	.12	<.001	.856
Organizational Commitment-Normative	.14	.08	.05	.075	.688
Organizational Commitment-Continuance	.05	.03	.04	.113	.789
Perceived Job Alternatives	.20	.12	.06	.095	.261
ADF: Job Environment	-.04	.19	-.01	.827	.662
ADF: Job Quality	-.17	.20	-.02	.402	.769
ADF: Military Benefits	.26	.21	.04	.202	.238
ADF: Military Pay	-.03	.18	-.06	.184	.974
ADF: Family/Spousal Stability/ Support	-.07	.19	-.01	.707	.384
ADF: Leisure & Mission Travel	.40	.22	.05	.069	.946
	-.13	.22	-.01	.562	.698

ADF: Career Benefits	.00	.25	.00	.993	.902
ADF: Pride & Tradition	-.08	.41	-.01	.843	.533
ADF: Other	28.52			<.001	
F	.28				
R^2					

Note. Dependent variable is efforts to leave, ITR2. 'ADF' stands for Active Duty Factor.
[a]Moderation was tested within an ordinary least squares regression framework, in which the specified independent variable was included with gender and their interaction. The *p*-value represents the significance level of the associated estimate.

Question 4: Does dual-military status moderate ITR?

The final research question I proposed was whether dual-military status could be considered a protective factor or a risk factor. Toward this end, I tested to see if dual-military status served as a moderator in an OLS framework using ITR1 as well as ITR2 as the dependent variables. Tables 18 and 19 reports findings from this analysis.

Table 18: Results from Ordinary Least Squares regression analyses, using ITR1 – 2017 dataset

Variable	Estimate	Error	β	*p*	Dual-Military as moderator (*p*)
Gender	-.01	.09	-.04	.893	.476
Pay Grade	-.00	.02	.00	.996	.168
Family Status	-.11	.08	-.04	.193	.137
Dual Military	.02	.11	.01	.823	-
Dependents 0-5	.09	.07	.04	.157	.399
Dependents 6-13	.05	.07	.02	.476	.115
Dependents 14-18	-.12	.12	-.03	.372	.516
Dependents 19-22	-.71	.27	-.07	.008	.334
Dependents 23 & up	.22	.468	.01	.471	.542
Stress	-.00	.01	-.00	.770	.854
Job Satisfaction	.01	.00	.05	.034	.852
Family Views	.27	.01	.25	<.001	.851
Spousal Views	.37	.02	.38	<.001	.830
POS	.31	.03	.09	.042	.521
Organizational Commitment – Affective	.19	.01	.44	<.001	.850
Organizational Commitment-Normative	-.05	.01	-.05	<.001	.106

Organizational Commitment-Continuance	.04	.01	.09	<.001	.941
Perceived Job Alternatives	.26	.02	.14	<.001	.386
ADF: Job Environment	-.12	.04	-.04	.004	.566
ADF: Job Quality	-.02	.05	-.01	.670	.961
ADF: Military Benefits	.17	.04	.05	<.001	.960
ADF: Military Pay	.12	.04	.03	.003	.234
ADF: Family/Spousal Stability/ Support	.04	.04	.01	.340	.951
ADF: Leisure & Mission Travel	-.08	.05	-.02	.150	.190
ADF: Career Benefits	.19	.01	.44	<.001	.610
ADF: Pride & Tradition	-.05	.41	-.05	<.001	.970
ADF: Other	-.08	.01	-.01	.843	.968
F	262.87			<.001	
R^2	.62				

Note. Dependent variable is single item direct assessment of intentions to remain (ITR1). 'ADF' stands for Active Duty Factor.

Results indicate that dual-military status does not serve as a moderator of ITR1, since no *p*-value lower than .10 was found. In fact, of the 17 independent variables in the model, 12 of them had *p*-values of .50 or higher, and overall the results offer no support for my hypothesis.

Table 19: Results from Ordinary Least Squares regression analyses, using ITR2 – 2017 dataset

Variable	Estimate	Error	β	*p*	Dual-Military as moderator (*p*)
Gender	.53	.23	.07	.021	.210
Pay Grade	-.07	.06	-.04	.206	.182
Family Status	-.09	.22	-.02	.654	.129
Dual Military	.46	.34	.05	.173	-
Dependents 0-5	.07	.20	.01	.736	-
Dependents 6-13	-.05	.20	-.01	.795	-
Dependents 14-18	-.06	.30	-.01	.833	-
Dependents 19-22	-.64	.53	-.04	.223	-
Dependents 23 & up	.32	.79	.01	.688	-
Stress	-.11	.05	-.05	.061	.997
Job Satisfaction	.05	.03	.06	.047	.074
Family Views	.31	.09	.12	<.001	.462
Spousal Views	.53	.08	.22	<.001	.528

POS	.24	.07	.03	.062	.062
Organizational Commitment – Affective	.13	.04	.12	<.001	.521
Organizational Commitment-Normative	.14	.08	.05	.075	.075
Organizational Commitment-Continuance	.05	.03	.04	.113	.113
Perceived Job Alternatives	.20	.12	.06	.095	.386
ADF: Job Environment	-.04	.19	-.01	.827	.819
ADF: Job Quality	-.17	.20	-.02	.402	.508
ADF: Military Benefits	.26	.21	.04	.202	.667
ADF: Military Pay	-.03	.18	-.06	.184	.493
ADF: Family/Spousal Stability/ Support	-.07	.19	-.01	.707	.997
ADF: Leisure & Mission Travel	.40	.22	.05	.069	.416
ADF: Career Benefits	-.13	.22	-.01	.562	.801
ADF: Pride & Tradition	.00	.25	.00	.993	.265
ADF: Other	-.08	.41	-.01	.843	.877
F	28.52			<.001	
R^2	.28				

Note. Dependent variable is sum of efforts to separate (ITR2). 'ADF' stands for Active Duty

As with ITR1, results from this analysis indicate that dual-military status does not serve as a moderator of ITR2, since no *p*-value lower than .10 was found. Within this analysis, eight of the independent variables in the model had *p*-values of .50 or higher. As such, neither ITR1 nor ITR2 results offer support for my hypothesis.

Post-hoc explorations. Additional variables in the dataset that were of interest to the study unfortunately had substantial amounts of missing data. For example, the High-Performance Work System (HPWS) measures: "How much do you agree or disagree with the following statement about your military career and Service? 'I will get the assignments I need to be competitive for promotion?'" and "How much do you agree or disagree with the following statement about your military career and Service? 'If I stay in the Service, I will be promoted as high as my ability and effort warrants?'", had 2,583 missing cases, meaning that only 1,851 valid responses were provided. Also, the single Autonomy measure: "To what extent does your unit

leader allow innovation, creativity, or openness to new ideas in your unit?" had 2,647 missing cases, and only 1,787 analyzable responses. In addition, when the completed HPWS and Autonomy measures were combined, number of cases with information on both variables dropped to 1742.

Although the extent of missing data prevented these variables from being included in the RF models, separate post-hoc OLS analyses were completed on them. The results, along with the associated sample sizes, are reported in Table 20. Results suggest that, within this limited sample, both Autonomy and HPWPs had some predictors capacity with regard to ITR1, but neither was moderated by gender. Also, the R-squared of .09 for the full model suggests that, even together, HPWS and Autonomy at best account for only modest variation in ITR1.

Table 20: Exploratory analyses with variables not included in previous analyses, using ITR1 – 2017 dataset (*n* = 1742)

Variable	Estimate	Error	β	*p*	Gender as moderator (estimate)	Gender as moderator (*p*)
Autonomy	.150	.029	.125	<.001	.021	.738
HPWPs	.153	.015	.244	<.001	.030	.382
F	92.388			<.001		
R^2	.094					

Note. Dependent variable is single item direct assessment of intentions to remain (ITR1).

Due to substantial amounts of missing data, exploratory analyses were unable to be performed with the ITR2 dependent variable, and the Autonomy and HPWPs independent variables. In the case of ITR2, there were 2,601 missing cases, and only 1,833 analyzable responses. The Autonomy measure had 1,787 valid responses, and HPWS had 1,851. When attempting to run a linear regression between ITR2, Autonomy, and HPWS, there were only 216 cases available. Due to the small *n* size, I was unable to explore the significance between ITR2

and Autonomy as well as HPWS. Also, as a result, I was also unable to determine if that relationship was moderated by gender.

The variables of Spillover and Job Embeddedness, which have been frequently cited as reasons for female turnover behaviors within both civilian and military organizations, were additional factors of interest to this study. Unfortunately, among the more than 4300 SOFS-A respondents, there were 3937 missing values and only 501 valid responses to the Spillover item. Furthermore, the Job Embeddedness item had 2598 missing values and just 1836 valid responses. That left a total of only 495 cases to work with for which information was available for both items. Due to the small size, a univariate regression, where there is only one predictor in each analysis, was completed. I also conducted univariate analyses on Autonomy and HPWS to see if anything would change with the results. While the sample size was very small, both job embeddedness and spillover were found to be significant predictors of ITR1, on their own. Once again, there was no moderation by gender. These results are shown in Table 21.

Table 21: Univariate associations between specified predictors and intentions to remain (ITR1).

Variable	*n*	Estimate	Error	β	*p*	Gender as moderator (estimate)	Gender as moderator (*p*)
Autonomy	1785	.25	.03	.20	<.001	.02	.74
HPWPs	1849	.18	.01	.28	<.001	.03	.38
Job Embeddedness	1836	-.35	.05	-.16	<.001	-.11	.37
Spillover	501	-.10	.03	-.18	<.001	-.00	.94

Again, there were substantial amounts of missing data with the ITR2 dependent variable. When checking for univariate associations between ITR2 and Autonomy there were only 106 available cases. Between ITR2 and HPWS there were 110 available cases. Due to the small *n* size, I was unable to explore the significance between ITR2 and Autonomy as well as HPWS. As

a result, I was also unable to determine if that relationship was moderated by gender. However, both the Job Embeddedness and Spillover measures had sufficient amounts of data to run the analysis. While the sample size was very small, both job embeddedness and spillover were found to be significant predictors of ITR 2, on their own. Once again, there was no moderation by gender. These results are shown in Table 22.

Table 22: Univariate associations between specified predictors and efforts to separate (ITR2).

Variable	*n*	Estimate	Error	β	*p*	Gender as moderator (estimate)	Gender as moderator (*p*)
Job Embeddedness	1724	-.53	.05	-.09	<.001	-.06	.49
Spillover	500	-.24	.05	-.19	<.001	-.02	.48

Table 23 provides an overview of hypotheses and the results relating to each. As it shows, three of the four hypotheses found at least partial support.

Table 23: Summary of Hypotheses and Analytic Strategies

Hypotheses	Results
H1: Factors that increase the odds of reporting intent to remain include; spousal views, and organizational commitment.	H1. Partially supported. In addition to spousal views and organizational commitment, the top five predictive variables of ITR1, for all three groups included; perceived job alternatives, family views, continuance commitment, and job satisfaction.
H2: Factors related to efforts to separate include; dual-military service, number of dependents, stress, and perceived job alternatives.	H2. Partially supported. Perceived job alternatives did serve as a predictor. However, dual-military status, number of dependents, and stress were not found to account for meaningful variation in ITR2.
H3: Gender will serve as a moderator in ITR1 and ITR2.	H3. Partially supported. Gender served as a moderator in AD: Military Pay and in Family Views within ITR1. Gender was not found to moderate any predictors in ITR2.
H4: Dual-military status will serve as a moderator in ITR1 and ITR2.	H4: Not supported. Dual-military status did not moderator the effect of any predictors on either dependent variable.

Summary

Using the 2017 SOFS-A dataset, RF modeling and OLS regression were employed to explore predictive variables associated with intentions to remain as well as efforts to leave the Air Force. The results of these analyses suggest that partial support exists for three of my four hypotheses. These and other results are discussed in Chapter 5.

CHAPTER 5: SUMMARY AND CONCLUSIONS

This chapter discusses limitations and strengths of the study, then seeks to interpret results and integrate the study's findings with current literature. It concludes by identifying implications of the results for theory, practice, and policy, along with highlighting potential directions for future research.

Study Limitations

As described in Chapter 3, the SOFS-A, from which study data were drawn, is an annual survey of active-duty military personnel, and though responses were solicited from 123,508 servicemembers, a response rate of only about 15% was achieved. This study then focused on a subset of those--the 4,324 responses received from Air Force personnel. Their 19 percent response rate was better than the average for other services, but it is unclear how this rate affects the ability to draw conclusions. For example, one study that explored low response rates with alcohol- and drug-involved respondents found that population prevalence estimates were inaccurate (Zhao, et al., 2009). However, other research suggests low response rates do not always equate to biased results, especially if appropriate statistical analyses are performed (Rindfuss, et al., 2015). These authors suggest, in effect, that results of sufficient quality can be gained, even with low response rates, to make them better than no results at all. Also, research has found that ignoring data from low-response-rate surveys can exclude hard-to-reach populations, thus leaving gaps in knowledge (Weitzman, et al., 2003).

Another limitation was the absence of existing, validated scales that other turnover studies have been able to use. For example, with the frequently used Organizational Commitment Scale (OCS, Allen & Meyer, 1990), the eight items derived from the SOFS-A addressed similar issues as those of the 18 items of the OCS but were not identical. However, I

subjected these SOFS-A measures to a variety of tests (including bivariate correlations, checking parameter estimates, and completion of both RF and OLS analyses) whose results offer support for the factor structure and reliability of the measures. Also, the study's findings offer support for the construct validity of the SOFS-A measures. As an example, the affective dimension of the organizational commitment measure stood out in its importance for predicting of ITR. This mirrors other research that explored the relationship of organizational commitment and turnover. Similarly, the finding that job satisfaction and other variables were, as expected, moderately predictive of turnover risk, is consistent with existing research and suggests that the constructs were being measured in valid ways.

A third limitation is that several variables were measured using single items from the SOFS-A. For example, autonomy, HPWPs, job embeddedness, spillover, family views, spousal views, and job alternatives were all single-item measures. Traditionally, these are measured by multi-item scales (Weinstein, et al., 2012; Hanson, et al., 2006; Delery & Doty, 1996; Clinton, et al., 2012; Griffeth & Hom, 1988). One potential problem with this is that single-item measures can be vulnerable to random measurement errors, while multi-item instruments are less susceptible to this. Also, within single-item measurements, internal consistency cannot be calculated (Hoeppner, et al., 2011). But other research has shown that, with regard to predictive validity, single-item measures can yield results comparable to multi-item measures (Bergkvist & Rossiter, 2007). Also, a study that compared convergent validity in a single-item Satisfaction with Life Scale (SWLS) measure with that of a multi-item SWLS measure found that both approaches functioned equally well (r=.734 vs. r=.668) (Jovanović, 2016). In another study that compared convergent validity in a single-item Job Satisfaction measure with that of a 15-item measure also found both functioned fairly equally (r=.92 vs. r=.82) (Dolbier, et al., 2005).

Finally, research examining assessment burden found that single-item measures of unhealthy alcohol consumption provided results comparable to those from longer instruments but were less likely to be left blank (Kim & Hendershot, 2020).

A fourth limitation related to the SOFS-A is the absence of measures of some variables that have been found to be predictive of retention in previously published literature. For example, no items were available from the SOFS-A to measure trust in co-workers, trust in supervisor, burnout, and organizational culture, though all of these factors have been to found to influence ITR. This may raise concern about the possibility of specification error (Lee & Card, 2008), but the obtained R-squared values as high as .62 suggest that even though variables may be missing, the models still have comparable explanatory power to findings from studies that included a wider variety of predictor variables.

A fifth limitation is the use of the 2016 SOFS-A dataset to cross-validate models derived from the 2017 SOFS-A dataset. Important differences existed in the range of variable made available to this study as compared to those included in the 2016 version. For example, the 2016 dataset had information on only dependent variable – the single-item ITR measure. More broadly, the 2017 dataset offered information on 37 potential independent variables, while the 2016 dataset made available only seven of these. Most notably, the gender and dual-military identifiers were not included in the information I was able to access from the 2016 survey. This restricted comparisons that could be made and conclusions that could be drawn in the cross-validation process.

A sixth limitation is the amount of missing data, due to structural zeroes. One example is a series of questions on the number of dependents for each respondent, to which unmarried, childless Airmen did not respond because the items were not applicable to them. Other questions

related to transitioning out of the military, and these were not completed by Airmen who were not considering separation, leading to too few total responses for these variables to be included in the random forest models. They did become a part of post-hoc OLS analyses, but their inclusion in random forest models as well would have been preferred.

A final limitation of the study was its restriction to use only a random forest model in primary analyses. A single Classification and Regression Tree Analysis (CART) procedure, which has the advantage of producing one single readily interpretable tree, might have yielded more reproducible results (He, et al., 2018). Or the use of CART in addition to random forest modeling could have provided a comparison of predictive factors of ITR behaviors.

Study Strengths

Much of the literature on servicewomen's retention involves reports from qualitative studies. These are informative, but understanding is enhanced when qualitative results can be paired with quantitative results. Among other advantages, this enables mathematical assessment of relationships between independent and dependent variables. A second strength is as a military student, I have potentially relevant expertise on matters that may be overlooked by someone outside of the military, while I can also conduct academic-type research outside of the range of what is possible in military settings. A third strength of the study was its ability to examine turnover risk by means of both a direct question regarding intent to remain and a more indirect list of efforts each respondent might have made in anticipation of exiting. The advantages of this approach are indicated by results of the RF models showing differences in which independent variables predict variation in which dependent variable. A fourth strength of the study was its focus on analyzing retention/turnover from a gendered perspective, and the RF analyses indeed suggested that differences exist across genders on variables related to ITR. This information can

be used to create predictive models regarding policies most likely to be effective in retaining servicemembers, especially female Airmen.

Discussion

By way of brief review, this study tested four hypotheses relating to turnover risk. The first was that factors that would increase the odds of reporting intent to remain would include spousal views and organizational commitment. The second hypothesis was that factors related to job-search behavior and/or intent to quit would include dual-military service and number of dependents, stress, and perceived job alternatives. The third hypothesis was that both gender and dual-military service would influence ITR and job-search behavior.

Study hypotheses were partially supported. While dual-military status, number of dependents, and stress were not found to be predictive of job-search behavior and/or intent to quit, the perceived availability of job alternatives was predictive of job-search behaviors (H1). So were both spousal views and organizational commitment. Across the three groups (Air Force female, Air Force males, and the entire Air Force sample), the variables of perceived job alternatives, family views, continuance commitment, and job satisfaction were also found to be associated with ITR (H2). Also, gender was found to serve as a moderator for both "family views" and ADF: Military Pay (H3). Finally, dual-military status was not found to serve as a moderator of ITR and job-search behavior (H4).

Descriptive Statistics

How representative is the SOFS-A sample

To further address the question of whether SOFS-A responses can be used to accurately represent the Air Force as a whole, Chi-square tests were used to examine differences observed between the Air Force population and SOFS-A respondents. Results indicated that for the

variables examined (actual respondents, dual-military respondents, pay grade, number of dependents, and family status) differences between the Air Force population and the SOFS-A respondents were statistically significant. However, this could be an artifact of the large number of cases in both groups. For example, a visual examination of Figure 4show that, while categories differed somewhat with regard to the percent of cases in each, the overall shape of the bar graphs is not dramatically dissimilar. This is also true of Figures 5, 6, 7 and 8..

Looking further into the percentages of SOFS-A respondents that fell into each category can provide addition insight as to how representative this sample was. Since the study was interested in exploring how dual-service marriages relate to ITR, it is important to understand if the SOFS-A respondents were reflective of the population. As can be seen in Figure 5, 10 percent of the Air Force population is in a dual-military marriage, and 10 percent of SOFS-A respondents were in a dual-military marriage. However, data from all Air Force personnel indicate that half of female Airmen (53%) are in a dual-military marriage, and to be equally representative, the SOFS-A should have around 53% of female respondents being in a dual-military marriage. However, only 25 percent of female SOFS-A respondents were in a dual-military marriage That is a sizable difference and as such is not representative of the Air Force population. This difference is important to consider as female service members, in dual-military marriages, have reported thoughts and actions of prioritizing one military career over the other so that the other can put more energy towards caring for their family (DACOWITS, 2016; DACOWITS, 2017; Curry-Hall, et al., 2018). Without a representative sample, it is difficult to explore if previous DACOWITS findings still ring true.

Pay grade distribution is another area that warrants further exploration. As seen in Figure 6, commissioned officers between the ranks of O3 and O4 made up 10.8% of the Air Force

population but accounted for 18.5% of the SOFS-A sample. Regarding gender, the distribution males (70%) to females (30%) within these categories in the SOFS-A group still mirrors that of the Air Force population. Another area within the pay grade distribution chart in which all Air Force personnel and SOFS-A respondents differ is the enlisted ranks of E1-E4. These pay grades were underrepresented in the SOFS-A group compared to the Air Force population. Further exploration showed female Airmen made up 18% of SOFS-A respondents in the E1-E4 categories, while accounting for 27% of the E1-E4 pay grade categories in the Air Force population. As such, females within these paygrades are underrepresented within this survey. Females within the O5-O6 pay grades were also underrepresented within this survey by nearly 10 percentage points.

Data from the Air Force population and SOFS-A respondents family status can be seen in Figure 7. Comparing the Air Force population to the SOFS-A sample we can see single Airmen without children were underrepresented in the SOFS-A sample, and single Airmen with children were overrepresented, but the ratio of single female-to-male Airmen in the SOFA-A group mirrors that of the Air Force population. Also, while single female Airmen make up 41% of single Airmen with children, within the SOFS-A sample, only 22% of the single with children sample is female. It is to be expected that differences between the population and sample may appear for certain variables and groups, but each such difference increases concern about how confidently results from the 2017 SOFS-A can be extrapolated to the full Air Force sample. On the other hand, as noted above, ignoring the potential value of sample data, in the absence of other sources of information about population parameters, comes with its own risks.

Range, Means, and Standard Deviations of SOFS-A Variables

Table 4, which lists the range, mean, and standard deviations of SOFS-A variables, shows several values that should be noted. First, the mean for number of dependents of SOFS-A respondents indicates that they have more children ages 13 and younger than older children. This is similar to values available for the full Air Force population, and intuitively it seems reasonable that servicemembers will tend to be earlier in their family years and thus have younger children.

The variables of Family Views and Spousal Views each consisted of a single-item. As shown in Chapter 3, the former was worded "Does your family think you should stay on or leave active duty?" with response options ranging from (1) strongly favors leaving to (5) strongly favors staying. The latter had the wording "Does your spouse or significant other think you should stay on or leave active duty?" and responses options ranged from (1) strongly favors leaving to (5) strongly favors staying. Means for both hovered around 3.45, with a standard deviation of 1.20 (family views) and 1.31 (spousal views). This suggests that family members and spouses are reasonably happy with military life, though while some love the military, others appear able to live without it.

Finally, the Job Satisfaction variable consisted of 10 items such as "How satisfied are you with the following aspects of your career: your level of responsibility on the job, your level of authority on the job, etc." Responses ranged from (1) very dissatisfied to (5) very satisfied, and an aggregate score was obtained by summing all 10 responses. This produced a mean score of 28.16 and a standard deviation of 9.09. While the latter score may appear large, it is consistent with the variability of scores from job satisfaction measures found in civilian retention literature, where values can hinge on many moderating factors such as organizational culture, and favorable work environments (Zangaro & Kelley, 2010). In addition, servicemembers in most cases cannot break their agreed-up contract length, thus if they (for example) dislike their leadership, a three-

year contract that feels interminable may negatively affect their job satisfaction. While this study did not have access to servicemembers' length of contract remaining, future research incorporating that information could shed more light on the interplay of these variables.

Comparing SOFS-A Mean and Standard Deviation Scores to Other Study Findings

The SOFS-A did not contain full versions of any existing, validated scales that other turnover studies have frequently utilized, so no comparisons against norms for typically used measures were possible. However, a variety of indirect comparisons could be made, and the following paragraphs will discuss the results for key variables such as turnover intention, efforts to separate, affective organizational commitment, spousal views, and perceived job alternatives.

Dependent Variable -- Intent to Remain

The federal Government Accountability Office (GAO) recently produced a statistical model showing the likelihood of servicewomen separating from the military to be 28 percent higher than that of males (GAO, 2020). While this study did not find gender, by itself, to moderate turnover intentions, its result mirrors findings of other research showing that other factors will influence job satisfaction and organizational commitment, which ultimately influence turnover intentions. The SOFS-A single-item question (ITR1) was phrased "Suppose that you have to decide whether to stay on active duty. Assuming you could stay, how likely is it that you would choose to do so?" Response options ranged from (1) very unlikely to (5) very likely. Results showed a mean of 3.62 for both male and female Airmen, with a standard for both of roughly 1.31. This indicates a greater than mid-level desire to remain in the military, and female and male Airmen do not differ with regard to the strength of that desire.

The other indicator of intent to remain (ITR2) was set of 12 yes-or-no items indicating actions taken by respondents that would lead toward separating from the military (Table 2). A

single score was created by summing the Yes responses, meaning that higher final values indicated more preparation to leave. The mean score for female Airmen was 5.87 with a SD of 3.01. For males the mean was slightly higher at 6.18, with a slightly higher standard deviation of 3.16. The female and male means were found to be statistically significantly different (p=.024). This indicates that female Airmen have taken fewer steps than males toward separating from the military.

It is worthwhile to determine (to the extent possible) how similar or different these values are to results from civilian research. One example is a study of hospital management staff by Wong and Laschinger (2015), who used a 3-item measure of turnover intent. Most respondents (92%) were female. Results showed that out of a possible score of 7 (indicated high intent to turnover), the mean was 2.71, with a standard deviation of 1.56. This is similar to findings from this study that indicating less than more desire to leave. Another study that examined nonteaching employees of a large university used a 3-item measure in which the highest possible score (indicating the strongest intention to leave, was again a 7. In a sample with 57% women, the mean score was 2.71, with a standard deviation of 1.76 (Webster, Beehr, & Love, 2011). Given that a mid-range response on this measure would have a value of 4, and higher values indicate higher intent to leave, this mean indicates a stronger intent to remain than to leave, and it once again echoes findings from SOFS-A respondents.

Key Independent Variables

Affective Organizational Commitment

As described in Chapter 4, the affective dimension of organizational commitment was found to be the most important predictor of both indicators of intent to remain. It was measured as the total score of four items in which response options for each ranged from 1 to 5. Final

scores were calculated by simply adding these four numbers, producing a possible range of 4 to 20, in which higher scores indicated higher affective commitment. The mean for this summed value was 13.48 (see Table 4), and there was no statistically significant difference between male and female respondents (p=.18). Given that the middle point of the possible range of scores was 12, this mean suggests that affective organizational commitment in SOFS-A respondents was moderately strong.

Results are available from other research on affective organizational commitment in military samples. One of these was a study of turnover intention among Army Captains (Langkamer & Ervin, 2008). Using four affective commitment items from Meyer and Allen's (1991) commitment scales, in which scores ranged from 1 to 5, with higher scores indicating higher affective organizational commitment, the authors found a mean of 3.62 (SD = .81). If affective OC scores from SOFS-A respondents are converted to a similar 1-to-5 scale, the mean value is 3.37 (SD = .75). This is somewhat lower than in the Langkamer and Ervin study, but it is from a sample that includes multiple ranks. Another study of military members (Hung, Tsai, & Wu, 2015) also examined affective OC, and on a similar scale. Using a sample comprised of military officers, they found a mean score of 3.36 (SD = .70). These findings suggest that affective OC in SOFS-A sample members is roughly similar to that found in other military samples. In both the Langkamer and Ervin as well as Hung and colleague articles, affective organizational commitment was found to be predictive of retention.

Spousal Views

In this study, spousal views of the military were found to be the second most predictive variable related to turnover risk. As noted earlier, the spousal views measure consisted of a single item using a 1-5 scale in which higher scores indicated a higher desire on the part of the

spouse to stay in the military. In the SOFS-A sample, the mean score for females was 3.41 (SD = 1.35), and for males it was 3.45 (SD = 1.31). This was not statistically different (p=.55).

The OPA used the 2012 Survey of Active Duty Spouses (2012 ADSS) and 2014 administrative data to examine the relationship between spousal support of the military and actual retention of the military member two years following the completion of the ADSS. While mean and SD scores were not presented in the write-up, the logistic regression results indicated that for each 1-point increase in spousal support to stay, the military members' odds of staying increased by 1.95 (Exp(*B*) = 1.95, p < .01) (OPA, 2017). This finding offers evidence that positive spousal views of the military is influential and correlated to servicemembers' ITR.

Perceived Job Alternatives

The variable measuring perceived job alternatives was also found to be importantly associated with ITR among respondents. It was again a single item ranging from 1 to 5, with higher scores indicating more perceived job alternatives (Table 4). In the SOFS-A sample, the mean score for female Airmen was 3.70 (SD = .96), and for males it was 3.68 (SD = .94). This was not a statistically significant difference, but given that the center of the range of possible scores was a value of 3, these means suggest that both female and male Airmen believed they had at least some alternative job opportunities outside the Air Force.

Examples of other research that explored the relationship of perceived job alternatives with turnover risk was a study of information technology workers (Thatcher, et al., 2002). On a scale of 1 to 5, with higher values indicating more perceived job alternatives, the authors found a mean of 2.92 (SD = .89). Another study, again using a measure of perceived alternatives with a 1-to-5 metric found a mean score of 4.36 (SD = .36) in a sample of university staff. Finally, a study that included 462 manufactures by Huang, Chen, Liu, and Zhou (2017) produced a mean

score of 4.09 on a 1-5 measure (SD = .96). These findings suggest that the means and standard deviations for SOFS-A respondents on this often-predictive variable were within a similar range as found in other studies.

Hypothesis Testing

As described in Chapter 4, methods used to test my hypotheses began with calculating bivariate correlations to examine zero-order relationships between predictor variables and the two dependent variables. Next, I used the RF algorithm to create seven models (derived from my hypotheses) that sought to identify in a combined analysis which independent variables would contribute importantly to predicting retention intentions in three groups: the full Air Force sample, female Airmen, and male Airmen. Six of the seven models used the 2017 SOFS-A dataset and the seventh, a cross-validation model, used the 2016 SOFS-A dataset. The third set of analyses used Ordinary Least Squares (OLS) regression to test for significance of predictive capacity for each dependent variable net of all other independent variables. A fourth set of analyses use the exploratory RF approach to examine independent variable for which there were substantial numbers of missing values in the data.

Bivariate Correlations

ITR1.

Both spousal views and the affective dimension of organizational commitment were strongly positively correlated with ITR1 (the single-item measure of intent to remain). The correlation between spousal views and ITR1 was ($r = .654$, $p<.001$), meaning that the more the respondent's spouse favored remaining, the more the respondent did as well. The corresponding value for r-squared indicates that almost 43 percent of the variation in ITR1 was accounted for by this predictor. The correlation between affective OC and ITR1 was ($r = .639$, $p<.01$), meaning

that the higher the affective OC, the higher the intent to remain, and this factor accounted for about 41 percent of variation in ITR1, although as with spousal views this was not unique variation separate from that explained by other predictors. Examples of these were the other two dimensions of organizational commitment, which were found to be moderately positively correlated with ITR1. These included normative OC ($r=.316$, $p<.01$) and continuance OC ($r=.233$, $p<.01$).

These findings are consistent with other research. Examples in military populations include Creighton (2012) and Boling (2017), who each found that all three types of organizational commitment were positively associated with retention intent in reserve as well as current and former military samples, respectively.

Rounding out the independent variable that showed meaningful predictive capacity with respect to ITR1 in bivariate analyses were perceived job alternatives, family views, HPWPs, and perceive autonomy. Values for r for these predictors ranged from .541 (perceived job alternatives) to .202 (autonomy), and all such values were statistically significantly different from zero ($p<.01$). Importantly, gender was found to have no measurable correlation with ITR1 ($r = .000$, $p<.05$) at the bivariate level, and dual-military status was found to be minimally positively correlated ($r = .023$, $p<.05$). These relationships will be discussed further below in the section of results of RF analyses.

ITR2.

The ITR2 variable comprised a list of 12 questions regarding efforts to separate from the military. Positive relationships were expected to the found with the independent variables and the number of separation efforts the respondent had made. This was determined by counting the

number of "yes" responses, meaning that the higher the final total, the more preparations to leave had occurred.

Among independent variables, the one with the strongest bivariate correlation with ITR2 was spousal views in favor of remaining in the military ($r = -.442$, $p<.01$). This is in the expected direction, and it means that spousal views alone account for slightly less than 20 percent of the variation in ITR2. This is less than half the amount accounted for by the variable with the strongest bivariate correlation with ITR1. The next strongest correlates were family views in favor of remaining ($r =-.379$, $p<.01$), the affective dimension of organizational commitment ($r = -.374$, $p<.01$), and job satisfaction ($r = -.297$, $p<.01$). As with ITR1, dual-military status ($r = .032$, $p<.05$), and gender ($r = .053$, $p<.01$), were not strongly correlated with ITR2. Finally, all other family variables (such as the ages of dependent children) showed correlations with ITR2 of .159 or less, meaning that there was little evidence of predictive capacity at the bivariate level.

Random Forest Models

Seven models were created to determine variables that made the greatest individual contribution toward predicting intention to remain, while holding constant the effect of other predictors. As discussed earlier, the 2017 dataset was used to create three models using ITR1 across three groups—the full Air Force sample, female Airmen, and male Airmen. Three other models were tested on ITR2 using the same three groups. Finally, the 2016 dataset was used to cross-validate findings from the 2017 dataset, testing a single model on the full Air Force sample, without the gender variable.

Predictors of ITR1.

I hypothesized that two variables, spousal views and organizational commitment, would be related to both ITR1 and ITR2. Results supported this, in that both the variables were among the most predictive variables for each dependent variable (see Figures 10a through 11c).

For ITR1, in the full 2017 Air Force sample, the top five predictors, in order of importance, were affective OC, spousal views, perceived job alternatives, family views, and continuance OC (Figure 10a). For the female-only sample in the 2017 SOFS-A dataset, the top five predictors for ITR1 were the same predictors in the same sequence (Figure 10b). In the male-only sample, the two most important predictors were the again affective OC and spousal views, whereas the final three were family views, perceived job alternatives, and job satisfaction (Figure 15c).

Organizational Commitment

In these results, as with the bivariate results discussed earlier, the primacy of affective organizational commitment as a predictor stands out, and this is consistent with earlier work research on military samples (Gade, et al., 2002; Allen, 2003; Demir, et al., 2009). In addition, its importance is mirrored in studies non-military employees such as police officers (Brunetto, et al., 2012), nurses in high-paced health care environments (Se Jin, et al., 2013), and STEM fields (Block, et al., 2018). Put simply, employees tend to want to stay in organizations that engender affective commitment. In addition, this influence as a commitment based on a desire to work there appears to be considerably stronger than the other two types of commitment, based on a sense of obligation or need to remain.

Spousal Views

Also as in the bivariate results, RF analyses show that spousal views toward staying the military also have an important connection to ITR1, and this holds for both female and male

Airmen. This finding may be particular to military organizations, in which spouses and family members are expected to uproot their lives every few years. However, it appears frequently in studies of these populations.

For example, one recent study explored spousal commitment levels, via survey, and compared those to actual retention numbers of military members two years after survey completion (OPA, 2017). Findings showed a strong correlation between spousal support and actual job retention. Also spousal support may reinforce the relationship between organizational commitment and intent to remain. This was suggested in results of a study by Gade, Tiggle, and Schumm (2003), who found that organizational commitment scales developed to measure spousal commitment to the military had a factor structure that was nearly identical to that of the service member, and were consistent with both the affective and continuance dimensions of organizational commitment.

Perceived Job Alternatives

Perceived job alternatives has received mixed reviews on how strongly it relates to turnover behavior (Hom & Griffeth, 1991; Blau, 1993). A 2000 meta-analysis found that while the perception of more available job alternatives is associated with turnover, it accounts for a comparatively small amount of variation (Griffeth, et al., 2000). More recent findings also suggest there are many interacting variables, such as job satisfaction, that cloud the role of perceived job alternatives (Swider, et al., 2010). This may be even more prevalent in organizations such as the military where employees are bound by contractual commitments. For example, even if servicemembers believe they could have an alternative job outside of the military, their contract may prevent them from taking advantage of it. This makes me think the

predictive capacity of perceived job alternatives is more difficult to interpret in military samples that in civilian organizations.

Predictors of ITR2.

I hypothesized that dual-military status, the number of dependents a servicemember has, stress, job satisfaction, and perceived job alternatives would be meaningful predictors of the ITR2 measure of job search behaviors. Results of random forest models shown in Figures 11a through 11c indicated that only one of these variables, job satisfaction, was among the five most important predictors of ITR2. In the full 2017 Air Force sample (Model 4), those predictors were, in order, affective organizational commitment, spousal views, job satisfaction, perceived organizational support (POS), and family views (Figure 11a). Within the female-only sample (Figure 11b) the most important predictor was again affective OC, followed by job satisfaction, spousal views, perceived job alternatives, and family views. In the male-only sample, the first four most important predictors were the same as for the full Air Force sample, with continuance organizational commitment occupying the fifth spot.

These results suggest that the most important predictors of ITR2 are similar to those of ITR1, especially affective OC and spousal views, except that for ITR2, job satisfaction appears more consistently among the most important predictors across samples. Job satisfaction has consistently been linked to turnover risk in the research literature. Examples include in the nursing fields (Lu, et al., 2019; Weale, et al., 2016; Wong & Laschinger, 2013, & Zhang et al., 2016), STEM fields (Hill, et al., 2010; Hewlett, et al., 2008, & Dubey & Singh, 2019), and in military populations (Valor-Segura, et al., 2020; Sanchez, et al., 2004). Results for ITR2 in this study add to that literature.

Others variables that I hypothesized would play an important role did not. They include dual-military status, number of dependents, and stress.

Dual-Military Status

Previous studies of turnover in military samples found dual-military status to be a strong predictor of intent to separate (DACOWITS, 2017; Long, 2008; Keller, et al., 2018; Holzer & LaLonde, 2000; Fuller, et al., 2002). One reason why that was not found here might have to do with lack of representativeness of the sample, which included only 4,324 of the over 320,000 Airmen in the Air Force in 2017.

A second possible reason is that the influence of the dual-military spouse variable works only through one or more moderators. For example, research on an Army sample that explored the relationship between dual-military service and turnover found that the relationship operated through the mediators of job satisfaction and "work-interfering-with-family" (Huffman & Payne, 2014). Other research has found that the influence of spillover, both positive and negative, is magnified within dual-military marriages (Huffman & Payne, 2006).

It is also possible that the dual-military status may function as a protective factor. For example, dual-military couples receive benefits that are not available to servicemembers married to civilians. These include the fact that military members living outside of the dorms receive a basic allowance for housing (BAH). When military members are married, whether to a civilian or other military member, the BAH rate increases due to the fact that the member receives the "with dependents rate." In dual-military marriages both service members qualify for BAH. If the dual-military couple does not have children they are both paid the BAH without dependents rate. If they do have children the higher-ranking Airman receives BAH with dependents rate and the lower ranking Airman receives BAH without dependent rate. As an example, an E5

servicemember, married to a civilian, with one child, would rate $1,761.00 a month to live in San Antonio, TX. But if the E5 servicemember with one child is married to a another E5 servicemember, they would jointly receive $3,195.00 a month to live in the same place. This difference may offset many other inconveniences associated with dual-military status.

Finally, it is possible that the survey items used to measure dual-military status and ITR2 were not comparable to those used in prior research. The fact that other variables expected to be predictive of intent to remain indeed performed in that manner mitigates this threat somewhat, but it is still plausible.

Number of Dependents

The increase in pay that servicemembers receive when they have dependents may be a reason why this factor was not found to be important, in the same way that monetary incentives may have offset some of the expected influence of dual military status. This benefit is not frequently found among civilian employers and allows servicemembers to rent/buy a larger home. Also, reasonably priced health care benefits available to military dependents are another reason servicemembers may choose to remain in the military, and they may be especially important for servicemembers with children having high needs.

Stress

The random forest model failed to find important effects for individual stress in any of the three samples address in Models 4 through 6. This is not entirely inconsistent with the literature, given that is has shown mixed results for stress as a predictor of intent to quit. For example, this result contradicts findings from other studies showing significant positive associations between turnover intentions and mental and emotional stress and work fatigue in a military sample (Frone & Blais, 2019) and in other samples (Labrague, et al., 2020; Pishgooie, et

al., 2019). On the other hand, Langley (2012) examined stress and burnout facets among Air Force intelligence personnel and retention behaviors. Findings indicated that, despite engaging in shift work and working long hours, no facet of burnout or stress played a meaningful role in separation intentions.

Another potential reason why I did not find a significant association between stress levels and the ITR variables was that the measure I used for stress was not comparable to ones used in prior research. In this case, stress was measured by two SOFS-A items that asked only about current stress levels at work and at home. Measures such as the Perceived Stress Scale (Cohen, 1983) includes items that measures stress over the past month, as opposed to only current stress levels, which the SOFS-A asked.

The inability of the two work and home stress items to appropriately capture stress among servicemembers is reflected within the alpha value. Cronbach's alpha for these items was .54 for the total sample, and .57 for male servicemembers and .41 for female participants. In the 2016 sample, Cronbach's alpha was .52 for the full sample. Alpha values that are considered acceptable range from .70 and higher, and would indicate at least 50% of variance in the scale is attributable to what is shared measurement across the items (Taber, Fraser, & Billingsley, 2018). In other words, these two items do not 'hang together' very well, and did not have the ability to appropriately capture stress as a predictive variable. Therefore, despite trying to keep as many stress items together, it may have been more beneficial to examine both items of stress individually, or to exclude both of them as being too narrowly focused to adequately capture a complicated variable such as stress.

Using the 2016 SOFS-A dataset to cross-validate.

The full 2016 SOFS-A dataset was used solely as an indicator of robustness and to cross-validate models developed from the 2017 SOFS-A dataset. Again, this dataset did not include many independent variables that were part of the original survey, including the gender or dual-military status variable, and it only included one dependent variable, ITR1.

As shown in Figure 12, the RF model created from the 2016 dataset found that the most important predictors of ITR were affective organizational commitment, family views, job satisfaction, continuance organizational commitment, and stress. Despite being absent of many variables, the top three predictive variables are among the top predictors of ITR1 in the 2017 dataset. And in both surveys, the affective dimension of organizational commitment was found to be by far the most important predictor. While not perfectly matching the 2017 results, those from the 2016 model do appear to cross-validate the 2017 models.

Which models fit best

To determine which models offer best fit, *p*-values, MSE values, and R-squared values were calculated. Within all models, the p-values were $p < .001$, offering support for rejecting the null hypothesis that the randomly assigned data will not differ significantly from the original dataset. The mean-square error (MSE) value, is an indicator of accuracy, or conversely, error, in models that are generated. While there is no perfect MSE value, those with values closer to zero mean there is less error in the model. While all models had low MSE values, the models that used the 'intent to remain' dependent variable had MSE values of .72 and under. Along with lower MSE values, the models that used 'intent to remain' as a dependent variable also had higher R-squared values, indicating a larger percentage of variance accounted for by the independent variables. This suggests that models using ITR1 'intent to remain' as the dependent variable would enable fuller predictive modeling.

Ordinary Least Squares (OLS)

Random Forest (RF) models are nonparametric and have no distributional assumptions for variables within the models. RF modeling also includes no formal testing of significance of parameters. Accordingly, OLS regression was used as a supplement to gauge the overall predictive capacity of the independent variables with each of the two dependent variables. Tables 10 and 15, show the results of OLS for each dependent variable, and Table 16 shows the OLS results from the 2016 dataset that utilized ITR1 as the dependent variable.

Results such as P-values, R-squared values, and Beta scores derived from OLS were highlighted in Chapter 4. Among the important findings was the fact that the affective dimension of organizational commitment, found to be most predictive of ITR1 in RF models, was also found to be most predictive of ITR1 in OLS analyses. Spousal and family views, as well as perceived job alternatives were also found to be significant predictors of ITR1, while affective commitment was the most predictive variable with regard to ITR2, along with spousal and family views and job satisfaction.

What stands out most prominently in the results, however, is the R-squared value of .62 for ITR1 (Table 7). This suggests that the variables in the total model accounted for 62 percent of variation in this measure of intent to remain. In turn, this implies that efforts to influence those predictors, especially the affective dimension of organizational commitment, may yield useful results. As shown in Table 12, the R-squared value associated with the ITR2 model was .28, meaning that 28 percent of the variation in this dependent variable is accounted for by the predictors in the model. While the ITR2 model has decent predictive capacity, ITR1 does better.

Does Gender Moderate ITR?

Within OLS analyses, gender was found to moderate two variables; Family Views and ADF: Military Pay with regard to ITR1, but it was not found to moderate any variables with ITR2. Post-hoc probing, to determine significant interaction effects, revealed a direct effect, between family views and ITR1 that was stronger for males (b = .55, $p < .001$) than for women (b = .44, $p < .001$). This finding suggests that family support may facilitate job satisfaction, and that the relationship may be slightly stronger among male servicemembers (Chin, et al., 2020). In examining military family files from 2017, the year which this data was collected, over 7,000 male Airmen were single parents, and nearly 5,000 female Airmen were single parents (DMDC Active Duty Military Family File, 2017). However, taking into consideration the ratio of males to females in the Air Force, male single parents made up approximately 3 percent of the Air Force, compared to female single parents, which made up approximately 8 percent. As such, it may be that as a single parent, family considerations may be a less important ITR predictive factor compared to things such as job security, a stable income, and health benefits, and an imbalance in the percentages of single parents may be why there are gendered moderation effects between family views and ITR1.

Another reason why gender was found to moderate family views and ITR could be related to negative and positive spillover between work and home. As work cultures that are supportive and inclusive have been found to explain positive work-home interferences, it is possible that male servicemembers feel more supported in their workplace, and that positive spillover influences their home and family (Sok, Blomme & Tromp, 2014). This positive spillover may leave family members with higher regard for the military lifestyle.

Gender was also found to moderate the ADF: Military Pay variable, which consisted of three items; having a thrift savings plan (TSP), which is a military retirement savings and

investment plan, the presence of pays and allowance, and the presence of special pays (i.e., flight pay). In regards to ADF: Military Pay, post-hoc probing revealed that the strength of this relationship was not significant for males (b = -.04, p = .55), whereas it was significant for females (b = .28, p = .02). This suggests that the opportunity for higher pay in the military is more important for women than it is for men. It may also support the argument that women perceive that there is more gender bias in business settings outside the Air Force. Perhaps servicewomen feel the Air Force is more progressive and can provide opportunities to earn more money and career advancement than outside it (Powell, 2018). In contrast, male servicemembers may perceive they have equal or better employment opportunities outside of the military. This interpretation doesn't imply there isn't gender bias in the military, but rather there is less gender bias compared to outside organizations.

Does Dual-Military status moderate ITR?

In the OLS analysis, dual military status was not found to moderate either ITR1 nor ITR2 relationship. Literature on dual-military status (and on work-linked relationships, in which civilian couples have jobs within the same organization) has been inconsistent as to whether these relationships are protective or risk factors, and this study does not strengthen one side or the other.

It is possible that the lack of any relationship is a function of the small sample size. Within the 2017 SOFS-A dataset 3,893 (90%) members were not a dual spouse, and 431 (10%) members were. Of those 431 dual-military couples, only 82 were females. Given that more than 50 percent of female Airmen are in a dual-military marriage, a more representative sample would have facilitated this type of analysis.

Post-hoc explorations

Four additional variables in the dataset that were of interest to the study had substantial amounts of missing data. For two of these (Autonomy and HPWPs variables) I was able to run an exploratory analysis on ITR1, and both variables showed significantly non-zero associations with ITR1 ($p < .001$). However the R-squared value of .09 indicates that those two variables accounted for only account for minimal variation. With regard to ITR2, the quantity of missing data left only 216 cases on complete a linear regression, and I believe that this is too few to support any conclusions.

Lastly, among the more than 4300 SOFS-A respondents, only 501 valid responses were available for the Spillover item. The situation was better for the Job Embeddedness item, but it stall had just 1836 valid responses. Due to the small sample sizes, univariate analyses were completed to determine if they were predictors of ITR. Results indicated that both Spillover and Job Embeddedness were significantly non-zero predictors of ITR1 and ITR2 ($p < .001$), which suggest that they should be considered in new research. Also, when gender was checked for any moderating effects, neither variable was found to be moderating by gender.

Implications for Practice and Theory

Findings from this study offered little evidence that gender or dual-military status account for meaningful variation in intent to remain or in the occurrence of retention/non-retention behaviors. This conclusion is mitigated somewhat by the limitations discussed at the first part of this chapter, and it is also appropriate to again make note of literature showing that gender and dual-military status do account for some variation in ITR. In particular, qualitative studies have indicated that there is an association between gender, dual military status and ITR, and that type of research may be able to detect effects that point-in-time, quantitative studies miss. So it would be incorrect to conclude from my findings that gender and dual military status have no influence

on turnover risk. The better conclusion is that their role is unclear, and that these results are unable to clarify what is already a muddled picture.

Meanwhile, results from this study do indicate that organizational commitment, especially the affective dimension, plays an important and consistent role in predicting turnover risk. Accordingly, more than any other variable I studied here, it deserves the attention of any effort to improve retention among servicemembers.

To do so, it is important to understand what variables predict variation in organizational commitment, especially affective commitment. One nuance has to do with the question: "Commitment to what?" In the SOFS-A dataset, affective commitment was measured through items that inquired about the Air Force in general. While this type of commitment is important, so too may be commitment to a servicemember's current unit, a much smaller and intimate group. For example, a study that explored the antecedents and outcomes of unit cohesion and affective commitment in the Army found that the effectiveness of immediate leadership partially moderated the relationship of ITR and organizational commitment (Charbonneau & Wood, 2018). Understanding other variables that moderate this relationship would be very helpful.

Spousal support also stood out for its predictive importance in several models. Prior research has shown that spousal support meaningfully decreases servicemember turnover, and this relationship can be moderated by higher job satisfaction and lower work interfering with family (Huffman, Casper & Payne, 2014). As such continued research that examines the moderators of affective commitment as well as spousal support is advised.

Implications for policy

Despite the fact that, in this study, gender was not found to be an important predictor of ITR, statistics reviewed early in the paper that show higher turnover among women

servicemembers remains a reality. Moreover, it is in the best interests of the Air Force to retain skilled servicemembers regardless of their gender, and results discussed here identify variables that are clearly associated with turnover risk, irrespective of gender.

First, given that the affective dimension of organizational commitment was found to be the strongest predictor of ITR, efforts to nurture emotional bonds between servicemembers and the Air Force seem logical. These bonds can begin to form prior to Airmen entering the service. For example, it is common practice for advertisers to employ emotional tactics to interest consumers in certain products, and "integral" emotions are those evoked by messages which embedded in commercials and advertisements specifically to influence a population (Achar, So, Agrawl & Duhachek, 2016). This is the goal of commercials that focus on military values and pride of service. Advertisements that portray a culture of inclusion and diversity may also be helpful in fostering pre-enlistment emotion attachments with the military on the part of women and other recruits who add to that diversity.

Once a servicemember has joined the Air Force, proper socialization to the organization can help build emotional attachments and securely embed new employees (Bauer, et al., 2007). This socialization process helps new employees learn their organizational expectations as well as the organizational norms and value systems, and evidence suggests that this can foster higher levels of affective commitment (Hellman & McMillin, 1994). One example of socialization efforts for newly enlisted Airmen is the First Term Airman Course (FTAC). FTAC is a mandatory, weeklong program that prepares incoming, first-time enlistees for Air Force operations. The course covers resiliency training, teambuilding, and skills to manage both work- and family-related stressors. At some Air Force installations, Air Force officers can participate in "First Fridays," which are informal social gatherings held the first Friday of the month. They

provide a time for officers to engage with others outside of their career field, broadening their understanding of the Air Force and expanding their range of potential mentors or mentees. Some flying squadrons have first Fridays that include both enlisted and commissioned members. These can help servicemembers build attachments to their crew, squadron, and the service as a whole. Meyer and Allen (1991) suggest that both formal and informal gatherings such as these help servicemembers strengthen emotional bonds at both the unit and service levels, and this suggest that they should be emphasized, regardless of current operational tempo.

Efforts to create an inclusive culture with a community-like feel represent another possible approach for strengthening affective commitment. For example, research has shown that organizational cultures in which people feel challenged, rewarded and valued tend to experience lower levels of turnover (Huhtala, et al., 2015). Also, in their book *Building an Inclusive Organization*, Frost and Alidina (2019) argue that two things need to happen to create an inclusive organization—addressing people and addressing systems and processes. Addressing people starts with improving leadership behaviors, such as through training on diversity and inclusion, and enhancing leadership buy-in. These authors also call attention to the importance of marketing, recruitment, and promotions, ensuring that they reflect the organization's culture.

The goal of these efforts is sustainable improvement, but this requires long-term commitment, as organizational cultures tend to be resistant to change and do not do so overnight. In fact, single trainings, such as a one-time workplace diversity training course have been found to make unconscious biases even worse (Dobbin, et al., 2015). One danger is that in such trainings people learn about biases, learn that these biases exist within themselves, and learn that they can be a product of the larger society. This can lead to trainees believing these biases are not their fault but that of the broader culture, with the result that they embrace rather than reject these

biases. Behavioral psychologists term this 'moral licensing,' and it can explain why, when people initially behave in moral ways (i.e., attending a diversity course) they become more likely to adopt an immoral follow-up behavior (i.e., stereotyping other groups) (Merritt, Effron, & Monin, 2010). A clear implication for leadership is thus to look beyond easy fixes when seeking to influence organizational culture.

Another factor worthy of discussion is spillover. Although it did not appear as an important predictor in this study, perhaps due to the large number of missing values, it has been found in other studies to be meaningfully associated with retention (Curry-Hall, et al., 2019; Keller, et al., 2018; DACOWITS, 2017). These results suggest that efforts to help service members balance work and family stressors may be especially valuable at around 5-8 years into a military career. All Airmen are required to engage in initial counseling and then annual counseling sessions with their direct supervisor. Family strengthening is not a required discussion point, so adding issues such as family stressors and local helping resources to the counseling checklist would send a message that the organization is looking out for them and their family's well-being. Also, helping resources such as the evidenced-based Families OverComing Under Stress (FOCUS) program, and the Family Advocacy Program (FAP) already exist on most Air Force installations, but are often not well known. FOCUS seeks to improve emotional regulation, communication, problem-solving, goal-setting and managing trauma, while the FAP program concentrates on a variety of family support services (Lester, et al., 2012).

With regard to the important predictor of spousal views, some recent efforts have sought to help military spouses find employment. For example, certain federal jobs offer a non-competitive hiring process to military spouses who meet qualifications and pass background-check requirements (Exec. Order No. 13473, 2018). Also, the Military Spouse Preference (MSP)

program can be helpful when positions are filled using competitive procedures and the spouse is considered to be one of the most qualified applicants, especially when the spouse accompanies the servicemember during a change of duty stations.

A particular challenge for military spouses is when frequent relocations make staying credentialed and able to work difficult. As Vergun (2020) notes, the most recently available information indicates that 34% of military spouses needed license reciprocity when they moved to their new military location. Also, the 2018 National Defense Authorization Act enabled each branch of the military to set its own guidelines for spousal reimbursement for expenses related to relicensing after a military move, and the Air Force authorized up to $1,000. Still, military spouses often still have to take time off of work to take review classes, pass exams in a different state, and pay fees that can exceed what is authorized. Not surprisingly, military spouses and politicians have been advocating for the past decade for license reciprocity for military spouses who relocate due to military orders. But though the Defense State Liaison Office (DSLO) is currently working with all 50 states through the DoD to establish license reciprocity only a few states thus far have fully embraced license reciprocity. Occupations such as nursing have had more success with establishing license reciprocity, but approval is needed by all 50 states to use interstate compacts and allow for interstate issue of license portability expedited job procurement.

Another way to strengthen spousal support is to help rebuild support networks and community ties following relocations. This may be even more important among careers fields that are at risk for deployments and/or frequent separations. The Air Force Key Spouse Program is a commander-appointed program that is established to help build resiliency and establish a sense of community among Air Force families. However, the success of these programs is often

dictated by the involvement of the spouses. As some military spouses may be reluctant or feel less obliged to attend a formal key spouse meeting, offering this support through multiple platforms may be more successful. For example, in addition to monthly face-to-face key spouse meetings, some spouses may feel more comfortable going on an outing that showcases their new military location, while some may prefer to download Apps such as Discover SpouseLink, which is an online, interactive, app that provides military spouses with a variety of information.

Future Research Directions

The results of this study offer insights into retention and turnover, but it is a small piece toward the creation of a predictive ITR model that can be used to help retain servicemembers. One suggestion for moving forward is to allow public researchers access to all variables in order to build more complete models. Similarly, greater consistency across time in items and their wording will improve researchers' ability to cross-validate.

Second, researchers will continue to need access to the most current datasets. For example, this study used information from a 2017 survey, but within the past year important changes have occurred in the Air Force with regard to leadership and inclusion. As an example, the Air Force has a Diversity and Inclusion Task Force that works to most effectively leverage the diverse backgrounds of servicemembers. In 2015, the Women's Initiative Team (WIT), which falls under the Diversity and Inclusion Task Force, began working to change Air Force approved hairstyle for females, with a goal of incorporating hairstyles that were professional looking for all hair textures as well as minimizing hair loss and headaches from wearing one's hair in a tight bun. After six years of data collection, female Airmen hair standards were altered as of February 2021 (AFI 36-2903).

Other recent changes have helped make Air Force leaders more closely resemble those who serve under them. In August 2020, JoAnne S. Bass, a servicewoman of Filipino origin, became the Chief Master Sergeant of the Air Force, holding its highest enlisted level of leadership and serving as an advisor to the Air Force Chief of Staff and the Secretary of the Air Force. Also in August 2020, General Charles Q. Brown Jr., an African American male, stepped into the role of Chief of Staff of the Air Force. These two appointments offer highly visible evidence that the Air Force is honoring its mission of diversity and inclusion, and they add to many other efforts undertaken over the past decade to help women feel heard, valued, and included.

Third, future studies examining ITR predictors among servicewomen will benefit from efforts to address variables that women mention during focus groups and other qualitative interviews as being important to them and their ITR behaviors. For example, the 2017 SOFS-A survey had only a single question related to spillover, which is a complex problem requiring more extensive information. A hopeful note is that DACOWITS has pushed to implement a gendered retention survey among all military branches. However, as of December 2020 not all military branches have implemented the survey, and those that have had yet to report any findings of the survey. Also, it is unclear whether a gendered retention survey would be something equal rights advocates would fully embrace. A better approach seems likely to be adapting existing efforts such as the SOFS-A to include both traditional ITR questions as well as those brought up during female focus groups.

Fourth, future studies should focus on correlates of affective organizational commitment. While the main goal of my research was to identify predictors of ITR, affective commitment was the strongest predictor regardless of gender, intent to remain, or intent to separate, as well as

dataset used. Therefore, further research that evaluates what factors influence or moderate affective OC may lead to fuller understanding.

Finally, this area of study can also benefit from additional research into the relationship between spousal attitudes and actual military member retention outcomes. Due to the difficulty of gaining access to military data, such as spousal surveys, as well as actual turnover data of servicemembers, this will be challenging. However, using service member military records, in addition to data from the 2012 Survey of Active Duty Spouses, the Office of People Analytics (OPA) has been able to explore the relationship between spousal attitudes and actual turnover (OPA, 2017), and though (as mentioned) much has changed within the past year and past decade, these kinds of efforts need to continue.

Conclusion

This present study used random forest modeling to identify predictive variables related to two dependent variables; intention to remain in the Air Force as well as efforts to leave/intentions to separate from the Air Force. Differences were found in the strength of predictive variables found across the two dependent variables, though the importance of affective organizational commitment and spousal views was important to both. This study also looked to explore any gendered differences among those predictive factors, but only two variables, family views and ADF: military pay, differed significantly across the two genders. Also, no differences were found between dual-military families and non-dual-military families with regard to ITR.

Overall, affective organizational commitment, spousal and family views, and to a lesser extent, job satisfaction and perceived job alternatives were found to be the most predictive independent variables. As discussed, this offers some implications for action, such as seeking to

increase emotional bonds between the servicemember and the Air Force, as well as between spouses and the Air Force.

Also, despite significant variables being missing from this dataset, the data mining technique used here offers the prospect of finding distinctive items that are relevant to turnover among servicewomen. Also, as other researchers have argued, predictive models will need refinement along the way, as leadership and operational tempo are always changing. Therefore, ongoing research with these customized models should focus on reevaluation and potentially refinement.

APPENDICES

Appendix A. Frequencies of responses to original Active Duty Factor items

Original Item	Most Important Factor	Second Most Important Factor	Third Most Important Factor
Quality of the work environment	59	72	94
Quality of leadership	53	53	63
Choice of jobs	78	52	42
Sense of accomplishment	51	67	65
Opportunities to be assigned to station of choice	105	99	79
Amount of personal and family time you have	92	62	99
Amount of time you spend away from home station	38	54	47
Job security	148	122	102
Opportunities for career advancement	82	60	82
Opportunities for training and professional development	29	37	37
Opportunities for stabilized tours	24	26	28
Off-duty education opportunities	12	24	42
Opportunities to travel	46	66	76
Thrift Savings Plan	2	12	18
Pride in serving your country	50	81	79
Military values, lifestyle and tradition	48	55	53
Pay and allowances	147	213	170
Special pays	60	63	59
Health care for you	15	51	60
Health care for family	56	95	105
Military retirement system	195	114	110
Spouse/family attitudes	80	63	53
Family support issues	13	19	17
Child care	8	8	7
Military housing	1	4	6
Personal choice/freedoms	107	72	72
Family concerns	86	68	42
Family financial stability	106	106	98
Other	60	26	34

Appendix B: Organizational Commitment Dimensions

How much do you agree or disagree with each of the following statements?

Question	Commitment Dimension	Scoring
1. I enjoy serving in the military	Affective	1-5
2. Serving in the military is consistent with my personal goals	Affective	1-5
3. I am committed to making the military a career	Affective	1-5
4. Generally, on a day-to-day basis, I am happy with my life in the military	Affective	1-5
5. I would feel guilty is I left the military	Normative	1-5
6. I would have difficulty finding a job if I left the military	Continuance	1-5
7. I continue to serve in the military because leaving would require considerable sacrifice	Continuance	1-5
8. One of the problems with leaving the military would be the lack of available alternatives	Continuance	1-5

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CURRICULUM VITAE

Christine Leigh Kmiecik, LCSW, BCD

Education

University of Wisconsin-Milwaukee, Milwaukee, WI — PhD in Social Welfare – In Progress
University of Illinois at Chicago, Chicago, IL — Masters in Social Work, May 2012
University of Illinois at Chicago, Chicago, IL — B.A. in Sociology, May 2010

Research Experience

University of Wisconsin at Milwaukee — September 2017 – In Progress
Doctoral Researcher: Explored factors related to servicewomen, and dual-military relationships on retention. Developed, and implemented research project alongside interdisciplinary team. Utilized Random Forest algorithms, within R statistical package, as well as SPSS to examine gendered differences between retention rates. Statistical results were briefed to Air Force recruitment and retention leadership.

Work Experience

United States Air Force
Kadena Air Base, Okinawa, Japan — September 2016 – August 2017
Mental Health Clinic Deputy: Managed the outpatient Mental Health Clinic serving a joint-military population of 56,000 beneficiaries to include active duty service members, dependents, and retirees. Led 17 staff members in providing evidenced-based treatments in individual, family, and group psychotherapy. Charged with briefing key leadership on trends, safety concerns and safety planning. Oversees administrative operations and liaises with Wing leadership to ensure mission success.

United States Air Force
Kadena Air Base, Okinawa, Japan — September 2014 – September 2015
Family Advocacy Program Deputy: Managed the second largest Pacific Air Force's Family Advocacy Program (FAP), leading 9 staff members in providing family violence prevention and intervention services. Directed operations for FAP personnel, facilities, and funds. Developed, implemented, and evaluated programs and policies for prevention and treatment of domestic abuse and child maltreatment. Gathered and analyzed report data on over 600 domestic abuse and child maltreatment cases for the installation and the Air Force. Assessed and identified patients for psychosocial and mental health treatment needs. Provided expert training and consultation services to active duty service members, their families, unit leaders and other community agencies. Created a range of services to build community health and resilience by decreasing family violence and promoting family wellness, community outreach, and mission readiness.

United States Air Force
Kadena Air Base, Okinawa, Japan — November 2013 – August 2017
Clinical Social Worker: Provided direct clinical patient care in an outpatient Mental Health Clinic serving a joint-military population of 56,000 beneficiaries to include active duty service members, dependents, and retirees. Services incorporated a continuum of evidence-based treatments in individual, family, and group psychotherapy. Gained experience in treating individuals with post-traumatic stress disorder through the use of trauma focused interventions such as prolonged exposure and cognitive

processing therapy. Led psychotherapy groups for active duty service members at risk for suicide or self-harm to alleviate future risk and incorporate the need for a higher level of care. Utilized consultation among fellow colleagues to implement necessary community referrals for patients when indicated.

United States Air Force
Joint-Base Andrews, Maryland October 2012 – October 2013
Clinical Social Work Resident: Received twelve months of training in a clinical social work residency program for the US Air Force. Integrated as a new officer into the field of military social work through direct clinical practice in assessment and intervention for individuals, dependents, and retirees. Advanced through clinical rotations in different core specialties to include outpatient mental health, substance abuse, family violence, and optimized behavioral health in primary health care. Actively participated in a vast range of didactics, professional workshops, and seminars instructed by multidisciplinary professionals.

Byron Middle School
Byron, Illinois August 2011 – May 2012
Graduate Practicum Student: Assessed and evaluated all referred students and made plans to implement any needed services. Developed and performed necessary services in accordance with IEP's and consulted with classroom teachers to measure progress of students in relation to identified goals. Implemented and conducted programs for the school in order to meet social and emotional needs of the student population through community collaborations. Provided individual and group counseling. Managed crisis interventions involving the student population.

St. Joseph Provena Hospital
Elgin, Illinois September 2010 – May 2011
Graduate Practicum Student: Provided individual and group psychotherapy services for patients with psychiatric disorders in adult partial hospitalization program. Collaborated with treatment team of clinical social workers, psychiatrists, psychologists and nurses to develop individualized treatment plans. Led daily psychotherapy groups using multi-modal approaches: cognitive therapy, dialectical behavioral therapy, psycho-educational and expressive arts.

United States Army
Grafenwoher, Germany October 2003 – January 2008
Chemical Operations Specialist Soldier: Conducted Chemical, Biological, Radiological and Nuclear (CBRN) reconnaissance and surveillance; performed decontamination operations; conducted obscuration operations and sensitive site exploitation. Planned, conducted and evaluated individual and collective training, and provided technical advice on CBRN operations and hazards for company and higher-level organizations.

Training
Air Force Squadron Officer School August 2016 – September 2016
Commissioned Officer Training School August 2012 – September 2012
U.S. Army Basic Training October 2003 – December 2003

Key Accomplishments
- Licensed in Clinical Social Work
- Board Certified Diplomate
- Certified in Prolonged Processing Therapy
- Certified in Cognitive Processing Therapy

- Company Grade Officer of the Quarter

Affiliations

- Member of NASW