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An Analysis of the Career Progression of First-Term Navy Enlisted Women

March 2023

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Naval Postgraduate School

Prepared for the Naval Postgraduate School, Monterey, CA 93943.

ACQUISITION RESEARCH PROGRAM
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ABSTRACT

In this thesis, I analyze both pre-accession and post-accession characteristics of enlisted personnel in the Navy and evaluate how these traits specifically affect the career progression of enlisted women. To measure career progression, I use attrition, reenlistment, and promotion as observable outcomes. Using longitudinal files of personnel data on Navy enlisted personnel from accession until 2013, or until they separated, I estimate multivariate regression models to examine any differences in outcome between women and men. I find that pre- and post-accession characteristics do not explain away the gender differences in first-term attrition and retention. However, pre- and post-accession characteristics help explain part of the gender differences in fast-track promotion. Overall, enlisted women are more likely to separate from the Navy before the conclusion of their first-term enlistment contract compared to enlisted men. However, among those who do not attrite, they are more likely to remain on active-duty at least three months past their initial four-year obligation. Finally, among the E4 personnel, enlisted women are less likely to promote to the rank of E5 in less than four years compared to enlisted men. These findings support further research on potential factors that might explain the gender gap in the Navy.

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LIST OF ACRONYMS AND ABBREVIATIONS

ABHC	Aviation Boatswains Mate Chief Petty Officer
AECF	Advanced Electronics and Computer Field
ASVAB	Armed Services Vocational Aptitude Battery
BM	Boatswain's Mate
BUPERSINST	Bureau of Naval Personnel Instruction
CNP	Chief of Naval Personnel
CT	Cryptology Technician
DEP	Delayed Entry Program
DMDC	Defense Manpower Data System
FMS	Final Multiple Score
FY	Fiscal Year
GED	General Educational Development
HM	Hospital Corpsman
LPM	Linear Probability Model
MEPS	Military Entrance Processing Station
MTF	Medical Treatment Facility
NEAS	Navy Enlisted Advancement System
NF	Nuclear Field
NPS	Naval Postgraduate School
NRC	Navy Recruiting Command
NRD	Navy Recruiting District
NSO	Navy Special Operations
NSW	Navy Special Warfare
NTAG	Navy Talent Acquisition Group
NWAE	Navy-Wide Advancement Examinations
OCO	Oversees Contingency Operations

OUSD/P&R	Office of the Under Secretary of Defense for Personnel and Readiness
P.L.	Public Law
PQS	Personnel Qualification Standards
PRIDE	Personalized Recruiting for Immediate and Delayed Enlistment
PS	Personnel Specialist
RTC	Recruit Training Command
START	Standards Transition Acknowledgement Requirements Training
TIS	Time in Service
WAC	Women's Army Corps
WAVES	Women Accepted for Voluntary Emergency Service

I. INTRODUCTION

A. MOTIVATION FOR STUDY

While the United States has made significant strides in recruiting women in the enlisted ranks, a considerable gender gap exists in the representation of higher ranks of enlisted men and women. Specifically, this gap is prominently observed in E5 and above promotion rates, as enlisted men achieve senior leadership roles more frequently than enlisted women. According to the 2021 Demographics Profile of the Military Community, women form 20.5 percent of the enlisted force in the Navy (Military OneSource, 2021). This is a considerable increase from calendar year 2000 where women only comprised 13.6 percent. Although the Navy has increased the overall representation of enlisted women, women are overrepresented in junior grades and underrepresented in senior enlisted leadership positions. Military OneSource reports that in the ranks of E1 to E4, women comprise 10.7 percent of enlisted personnel in the Navy, 8.3 percent in the ranks of E5 to E6, and only 1.5 percent in the ranks of E7 to E9 (Military OneSource, 2021).

Certain contributing factors affect the leadership gap between men and women within the enlisted force. One factor is the low, overall continuation rates of enlisted women. Enlisted women consistently have higher first-term attrition than men. Also, in some ratings, reenlistment rates of women often lag compared to those of men. Another factor that contributes to the leadership gap is that women are often disproportionately concentrated in certain ratings, which often experience a slower promotion tempo than other ratings. As a result, slow first-term promotion tempo may contribute to lower reenlistment rates. Furthermore, a job mismatch can result during the recruitment process, which attempts to align the needs of the Navy with the preferences of the applicant. While the Navy considers the applicant's preferences, the Navy must also balance the applicant's qualifications, available positions, open training seats, etc. These requirements do not always support the applicant's personal preferences and professional aspirations. Consequently, the Navy often uses enlistment bonuses to induce applicants to select high-priority ratings, referred to as "skill channeling." If the applicant's

preferences do not match the Navy's manning need, job dissatisfaction often can lead to attrition or a sailor's failure to reenlist.

Many factors can help explain the disproportionate ratio of women to men in the enlisted force. These factors include, but are not limited to, rating assignment, marital/ dependent status, and education. Therefore, it is important to not only review the factors that contribute to the gender gap after an enlistee enters the Navy, but it is just as vital to examine the factors that affect an enlistee prior to entering military service. By encompassing both pre-accession and post-accession characteristics, the models I estimate provide a more accurate and inclusive picture of how these factors affect career progression.

B. PURPOSE AND APPROACH

In this thesis, I examine the relationship between the pre-accession characteristics of enlisted personnel in the Navy and the career progression of enlisted women compared to enlisted men. Career progression is measured by attrition, reenlistment, and promotion rates.

I use a multivariate regression approach, using individual-level data on naval enlisted personnel who accessed active duty from fiscal year (FY) 2001 to FY 2009 and are observed annually until 2013 or until separation. These cohorts were determined based on the desire to observe personnel sufficiently after accession to capture first-term attrition, first-term reenlistment, and promotion for an accurate reflection of enlisted men and women in the United States Navy. I aim to determine factors that explain the disproportionately low representation of women in senior enlisted leadership positions and shed light on why women tend to not remain in the Navy as long as their male counterparts. By determining the factors that affect the career progression of enlisted women in the Navy, my findings will support further research that might explain the low representation of women in hopes to close the gender gap and encourage women to remain in service longer.

C. RESEARCH QUESTIONS

1. Primary Research Question

- What are the differences in first-term career progression between enlisted men and women?

2. Secondary Research Questions

- What pre-enlistment factors explain the differences in attrition, reenlistment, and promotion rates of first-term enlisted women compared to those of enlisted men?

- Is there a differential gender gap in career progression for enlisted women in the Navy based on their occupational rating?

D. DATA

In this thesis, I expound on Bowers (2015) which uses longitudinal files to follow the career progression of enlisted personnel during and after their first-term contract. It implements multivariate analysis to evaluate pre-accession factors' effect on the performance and retention of Hispanic enlistees. The data used by Bowers (2015) covers earlier cohorts and "contains 348,330 observations on Navy sailors who are non-prior service active duty and accessed in FY 2001 to FY 2009, observed annually until 2013 or until the service member separated from active duty" (p. 43). I evaluate the career progression of enlisted women compared to men, using a comprehensive data set that merges data from the Personalized Recruiting for Immediate and Delayed Enlistment (PRIDE) and the Defense Manpower Data Center (DMDC), which is drawn from Bowers (2015). The specified cohorts were determined based on the desire to observe them sufficiently after accession to capture first-term attrition, first-term reenlistment, and promotion for an accurate reflection of enlisted men and women in the United States Navy. Multiple cohorts were chosen to avoid observing outlier cohorts that may not accurately represent enlisted personnel in the Navy.

Attrition, reenlistment, and promotion are used as the dependent variables and measure the outcome for the specified model. Attrition signifies non-EAOS separation and reflects enlisted personnel who failed to complete their obligated enlistment contract and separated from the Navy earlier than expected. I observe personnel who separated within their first term. Reenlistment reflects enlisted personnel who remained on active duty past their initial obligated enlistment and signed a new contract to remain on active duty for an extended, specified time. I observe personnel who remained on active-duty at least three months past their four-year enlistment contract. Promotion reflects enlisted personnel who advanced to the rank of E5 in under four years. Independent variables that describe the pre-enlistment characteristics of enlisted personnel include gender, race, education, marital status, dependent status, and other factors that contribute to the difference in career progression for enlisted women compared to enlisted men.

E. ORGANIZATION OF THE THESIS

This thesis is comprised of six chapters. Chapter I is the introductory chapter and provides the purpose, approach, and motivation for my study. It presents the data and sources it originated from. Chapter II is the background chapter and provides institutional context as well as current statistics on the overall representation of women in the United States Navy. It compares the representation of women in the Navy to the representation of women in the civilian labor force and compares career progression for women in both sectors. Furthermore, it reviews the recruiting practices and policies currently in place that affect the retention and promotion rates of enlisted women. It explores the occupational rating assignment process and analyzes the effect job mismatches have on the career progression of first-term Navy enlisted women.

Chapter III presents the literature review and evaluates relevant academic publications that analyze the pre-enlistment factors that explain the differences in career progression between enlisted men and women in the Navy, the role recruiting practices play in the career success of women compared to men, and the effect of occupational ratings on the differential gender gap in career progression for enlisted women in the Navy compared to their male peers. Chapter IV provides a description of data and the

sources it derived from, a description of the dependent variables and independent variables, and presents summary statistics that provide the estimated differences in means for the explanatory variables between men and women. Chapter V expounds on the statistical approach I use and provides a breakdown of the multivariate analysis, specified econometric model, and delivers an analysis of the results. Finally, the conclusion and recommendations for future research are provided in Chapter VI.

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II. WOMEN IN THE UNITED STATES NAVY

This background chapter provides context for the research questions I address as well as institutional detail about the retention and promotion of enlisted personnel in the United States Navy to make the analysis framework easier to follow in subsequent chapters.

To offer context on the importance of this topic, I start with a brief history of women in the military from the time when they were first authorized to serve to their current representation today. I then compare the relationship between women in the military and women in the civilian sector, reviewing internal limitations in the workforce and evaluating common issues and points of comparison between women in both categories: occupational segregation, management roles, and traditionality of occupation. Additionally, in this chapter, I examine the current recruiting process for the Navy and provide context on the potential effect the occupational rating assignment has on enlisted women. I present the process Military Entrance Processing Stations (MEPSs) use to assign recruits to ratings and take note of the effects on retention rates for recruits who receive their desired rating assignment versus recruits who do not. Ultimately, this chapter will discuss the role the assignment process plays in the overall retention and career progression of enlisted women in the United States Navy.

A. THE EVOLUTION OF WOMEN IN THE MILITARY

The inclusion of women in the United States Navy has been an evolutionary affair. In response to personnel shortages in critically skilled positions during World War I, "Women were enrolled in the Naval Coast Defense Reserve in 1917 and provided with uniforms and enlisted rank in the ratings of yeomen (F), radio electricians, and 'such other ratings as the Commandants considered essential to the District Organization,'" as noted in *Lady in the Navy* (1972), cited in Devilbiss (1990, p. 12). This was the first time in the history of the United States women were provided with full military rank and status. The Naval Coast Defense Reserve allowed women to "receive the same pay as enlisted men of corresponding rank (but women were permitted to advance only up to the

rank of sergeant), wear uniforms and rank insignia, take an oath of office, be liable to military discipline, receive a service obligation (four years), and, as veterans, be 'afforded the full benefits of legislated into law, the same as their male counterparts,'" highlighted in *The Women's Army Corps* (1954), cited in Devilbiss (1990, p. 12).

Devilbiss (1990) emphasizes that prior to the launch of the Naval Coast Defense Reserve, "women served *with*, not *in*, the armed forces" (p. 10). Their role was merely to support men in combat positions and therefore was not recognized as a vital need for the military organization. A strategy that was popularized during World War II was the "free a man to fight" plan of action where women were expected to perform support roles that enabled men to participate in areas of combat. The strategy was used as an effort to recruit women and had lasting effects well throughout the 20th century. The historical context of women and military service provided by Devilbiss (1990) makes it clear that it was not until the end of the 20th century that the mentality behind the role of women in the military transitioned from support to essential.

Although the Naval Coast Defense Reserve was a key step forward in integrating women into the military, the component was provisional. Upon conclusion of World War I, "all women in the armed forces, apart from nurses, were transferred to inactive duty and discharged" (Devilbiss, 1990, p. 13). However, even nurses remained in partial military status as they "had no military rank, equal pay, or other benefits (of) military service such as retirement or veterans' benefits" as noted in *Women in the Military: An Unfinished Revolution* (1982), cited in Devilbiss (1990, p. 11). Even with the presence of the Naval Coast Defense Reserve and the Naval Nurse Corps, it was clear that women were still considered outsiders and not included in the true military hierarchy. After women in the Naval Coast Defense Reserve were discharged and barred from serving in the armed forces, women remained virtually non-existent in the military for the next two decades. It was not until July of 1942 with the enactment of Public Law (P.L.) 689, a response to the Navy's manpower shortages and crucially required skills, that the Navy saw a reemergence of women in service. The law established the Navy Women's Reserve. In contrast to the Army's Women's Army Corps (WAC) in 1943, women in the Navy Women's Reserve were incorporated in the Naval Reserve and not viewed as

distinct or separate based on their gender. However, despite efforts for women to be integrated into the Naval Reserve, "the Navy Women's Reserve soon became known as the Women Accepted for Volunteer Emergency Service (WAVES)," only further highlighting the preexisting perception of segregation between men and women in the Navy (Devilbiss, 1990, p. 15). Women were instinctively thought of as a "separate category of people. This perception came to be both legacy and institutionally reinforced as the various women's directors [sic] offices continued to function in the military from the 1940s until the 1970s" (Devilbiss, 1990, p. 15).

The perception of women in the military drastically improved with the enactment of the Women's Armed Services' Integration Act of 1948 which "established for the first time a permanent role for women in the nation's armed forces" (Devilbiss, 1990, p. 16). The legislation meant that women were no longer to be immediately discharged at the conclusion of war, while men were permitted to remain on active duty until the termination of their contract or their voluntary separation (Devilbiss, 1990). Although the Integration Act formally recognized the value of incorporating women in the military, women were still severely constrained by strict limitations that prevented them from promoting to the senior ranks that their male counterparts had the freedom to be considered for. The Integration Act:

> Imposed a two-percent ceiling on the number of women who could be on active duty in each branch of the armed forces, limited each service to only one woman line colonel or Navy captain, excluded women entirely from flag rank (general and admiral), established that women's promotion lists would be separate from men's for all services except the Air Force, set differing enlistment standards and dependency entitlements for men and women, and authorized the service Secretaries to prescribe the military authority that women might exercise and the kind of military duty to which they might be assigned provided, in the case of the Navy and Air Force, that they may not be assigned to duty in the aircraft while such aircraft are engaged in combat missions: nor, in the case of the Navy, may they be assigned to duty on vessels of the Navy except hospital ships and naval transports. (Devilbiss, 1990, p. 16)

P.L. 90–130 in 1967 removed the two-percent ceiling and the restriction that prohibited women from promoting to flag rank. However, the ramifications of the Integration Act reflected early, negative effects on the retention rates of women in the

armed forces as they were prevented from professionally advancing in the military and achieving their full potential.[1]

The arrival of the All-Volunteer Force in the United States in 1973 marked a revolutionary turning point for women in the military. During the 1970s, the U.S. Congress passed numerous policies and legislation that directly transformed the role women played in the military (Devilbiss, 1990). It provided women with more opportunities and allowed them to enjoy more of the benefits that were already offered to their male peers. In 1973, the Supreme Court made a ruling in *Frontiero v. Richardson* that sanctioned a major benefit previously denied to women in the armed forces (Devilbiss, 1990). The Court ruled that it was:

> Unconstitutional for the armed forces to require a servicewoman to prove that her civilian spouse and/or unmarried minor children were dependent upon her for more than half of their support unless they required the same thing of servicemen (whose civilian wives and unmarried minor children were *automatically* classified as dependents by the armed forces). (Devilbiss, 1990, p. 20)

Therefore, all military branches of service were required to modify their dependents' entitlements so that the policy was equal for both women and men. Furthermore, in 1976, during the proceeding of *Crawford v. Cushman*, the 2nd District Court ruled that it was unconstitutional to discharge a woman from military service solely on the premise of pregnancy because it "violated the Fifth Amendment due process clause" (Devilbiss, 1990, p. 21). The Court stated that discharging a woman due to pregnancy "set up an irrefutable presumption that any pregnant woman in uniform was permanently unfit for duty" (Devilbiss, 1990, p. 21). The 1970s also observed the permittance of enlisted women to serve onboard noncombatant naval vessels. In 1978, President Jimmy Carter authorized women to be assigned duty aboard noncombatant ships and permitted women to be assigned duty aboard ships engaged in combat for tasks less than 180 days. Prior to 1978, women were prohibited from serving onboard "naval

[1] For more information on how the Integration Act of 1948 impacted women in the military, refer to Devilbiss, M.C. (1990).

vessels, except for hospital ships and naval transports," by the Integration Act (Devilbiss, 1990, p. 28).

Despite the Integration Act being enacted in 1948, the restriction of assigning women aboard platforms engaged in combat missions, what became known as the "combat exclusion" policy, remained in effect for 65 years until its removal in 2013. Defense Secretary Leon E. Panetta officially ended the exclusion of women in combat on January 24, 2013 (Yeung et al. 2017). The armed forces were provided a deadline of January 1, 2016, to provide equal opportunities to all genders in all roles of the military, including direct combat positions. Within the last seven years, the military has observed the positive effects of the inclusion of women in ground combat positions.

B. CURRENT REPRESENTATION OF ENLISTED WOMEN IN THE NAVY

Although the Navy has successfully increased the representation of enlisted women, women remain largely underrepresented overall. The 2021 Demographics Report published by Military OneSource, reports that women form 20.5 percent of the enlisted force in the Navy compared to 56.8 percent in the civilian labor force population. Since 2005, when women only comprised 14.8 percent of naval enlistees, the number of women has risen. However, there is a severe imbalance of women in the Navy's enlisted ranks. Women are largely concentrated in the junior grades of E1 to E4 and highly underrepresented in the senior enlisted leadership ranks of E7 to E9. Table 1 shows the "number of male and female active-duty members by service branch and pay grade in 2021" (Devilbiss, 1990, p. 20).

Table 1. Active-Duty Members Categorized by Gender, Service Branch, and Pay Grade. Source: Military OneSource (2021).

Pay Grade	Army		Navy		Marine Corps	
	Male	Female	Male	Female	Male	Female
E1-E4	176,512	33,497	99,240	30,604	97,712	9,717
E5-E6	111,531	18,356	100,413	23,915	32,602	3,680
E7-E9	43,005	5,745	28,718	4,289	13,343	923
W1-W5	13,237	1,449	1,772	193	2,110	122
O1-O3	38,660	10,711	25,354	7,723	11,320	1,438
O4-O6	24,319	5,091	17,255	3,501	6,204	418
O7-O10	279	24	206	15	86	3
O-Unknown	0	0	13	12	0	0
Subtotal	**407,543**	**74,873**	**272,971**	**70,252**	**163,377**	**16,301**
Total	**482,416**		**343,223**		**179,678**	

Pay Grade	Air Force			Space Force		Total DoD		
	Male	Female	Unknown	Male	Female	Male	Female	Unknown
E1-E4	96,744	28,904	0	188	57	**470,396**	**102,779**	**0**
E5-E6	65,744	19,515	1	344	82	**330,634**	**65,648**	**1**
E7-E9	26,860	6,943	0	133	43	**112,059**	**17,943**	**0**
W1-W5	N/A*	N/A*	N/A*	N/A*	N/A*	**17,119**	**1,764**	**0**
O1-O3	27,058	9,128	0	478	116	**102,870**	**29,116**	**0**
O4-O6	22,236	5,368	0	171	25	**70,185**	**14,403**	**0**
O7-O10	254	33	0	5	1	**830**	**76**	**0**
O-Unknown	0	0	0	0	0	**13**	**12**	**0**
Subtotal	**258,896**	**69,991**	**1**	**1,319**	**324**	**1,104,106**	**231,741**	**1**
Total	**328,888**			**1,643**		**1,335,848**		

* The Air Force and Space Force do not have warrant officers.
Source: DMDC Active Duty Military Personnel Master File (September 2021)

Although the number of enlisted women in the Navy has increased since 2005, their overall representation continues to significantly lag behind enlisted men. For all service branches, active-duty personnel in the ranks of E1 to E4 make up most of the active-duty force overall (Military OneSource, 2021). In 2021, there were 30,604 enlisted women in the Navy out of a total of 287,179 enlisted naval personnel. Thus, in the ranks of E1 to E4, enlisted women made up 10.7 percent of the total enlisted force in the Navy. In the ranks of E5 to E6, there were 23,915 enlisted women in the Navy, encompassing 8.3 percent of the total enlisted force in the Navy. And in the senior enlisted ranks of E7 to E9, there were 4,289 enlisted women in the Navy, making up 1.5 percent of the total enlisted force in the Navy. Statistics show that within the naval enlisted force, women are largely overrepresented in junior grades and underrepresented in senior enlisted leadership positions.

It is vital for the Navy to identify the factors that contribute to the gender gap between enlisted women and men to ensure the Navy is reaching its full talent management potential and retaining the best personnel. Reviewing the characteristics of individuals before they enter the Navy, in addition to their characteristics after they enter the Navy, can provide a more accurate and inclusive picture of how these contributing factors affect career progression in the long term. Factors such as rating assignment, marital/dependent status, and education can help explain the disproportionate ratio of women to men in the enlisted force.

Certain contributing factors affect the leadership gap between men and women within the enlisted force. One factor is the lower overall continuation rates of enlisted women. Enlisted women consistently have higher first-term attrition than men. Also, in some ratings, reenlistment rates of women often lag compared to those of men. Another factor that contributes to the leadership gap is that women are often disproportionately concentrated in certain ratings, which often experience a slower promotion tempo than other ratings. As a result, slow first-term promotion tempo also may contribute to lower reenlistment rates. Furthermore, there is often a job mismatch when attempting to align the needs of the Navy with the preferences of the applicant. While the Navy considers the applicant's preferences, they are also balancing the qualifications of the applicant, available positions, open training seats, etc. These requirements do not always align with the applicant's preferences. Due to this discrepancy, job dissatisfaction can result and lead to attrition or a sailor's failure to reenlist.

C. CURRENT REPRESENTATION OF WOMEN IN THE CIVILIAN SECTOR

The disproportionate representation of women in the Navy is not an accurate reflection of the representation of women in the United States. The United States Census Bureau reports that there are approximately 167 million women in the United States, encompassing 50.5 percent of the total population (*U.S. Census Bureau QuickFacts*, n.d.). The U.S. Census (2020) derives its data from the United States, "including states and counties as well as the Commonwealth of Puerto Rico and its municipios, which are county equivalents in Puerto Rico" (*U.S. Census Bureau QuickFacts*, n.d.). The Bureau

bases gender "on the biological attributes of men and women (chromosomes, anatomy, and hormones)" (*U.S. Census Bureau QuickFacts*, n.d.). In addition, the United States Department of Labor reports that 56.8 percent of women are currently participating in the labor force (Labor Force, 2022). Reflected in the data are women, aged 16 or older, who currently participate in the civilian labor market.

D. MILITARY WOMEN VS. CIVILIAN WOMEN

The role of women in society has profoundly evolved. Historically, women were solely seen as homemakers. Any role that removed a woman from the home was seen as negative and often discouraged. Eventually, society's perspective of women in the labor force changed and it was no longer seen as harmful to the family nucleus if a woman worked outside of the home. Even so, the roles that were deemed permissible were administrative in nature and included occupations such as secretary, typist, clerk, etc. Today, women fill a plethora of occupational roles within the military as well as the civilian sector. However, disparities in the occupational distribution between women and men persist, requiring further examination.

1. Occupational Segregation

The disproportionate distribution of employees across and within occupations based on demographic traits such as gender is known as occupational segregation. A 1992 study "compares the differential location of women and men across occupations in the civilian labor force to the distribution of women and men in military occupations" (Firestone, p. 363). The study finds that although the United States military is predominantly male-oriented, the ratio of men to women across occupational categories, is more proportionally reflective of the gender distribution in society compared to the ratio of women to men in the civilian labor force. The study contributes the military's more proportionate gender representation to the regulations and policies that govern the military, which is absent in the civilian labor force. Military occupations are determined by federal statute. Despite the disproportionate representation of women in the military, women perform the same duties and are assigned to the same available occupations as men in the military. This is not, however, true in the civilian workforce. Firestone (1992)

describes the difference as "in contrast to civilian jobs, where sex-based occupational segregation is the rule, women in the military compete for jobs and ranks within the military as soldiers rather than women" (p. 365). The study notes that military policies impose that women receive equal pay to men of the same rank and years of service (Firestone, 1992). However, in the civilian sector, women often receive a salary less than their male peers despite working in comparable occupations. Although women in the military are disproportionately represented compared to men in the military, they differ from women in the civilian sector because their salary structure is equitable to their male counterparts, which is not the case for women in the civilian labor force (Firestone, 1992).

2. Management Roles

In the civilian labor force, women are not promoted to management roles as often as men. Research finds that while women in the civilian sector are sorely underrepresented in management and executive categories, fundamentally, women are equivalently represented across officer and enlisted classifications (Firestone, 1992). Although this study is over thirty years old, the statistic holds true today. The 2021 Demographics Report details that enlisted women form 20.5 percent of the Navy compared to 79.5 percent of enlisted men (Military OneSource, 2021). Similarly, women who are officers in the Navy form 19.2 percent of the Naval force compared to 80.8 percent of men who are officers. The equivalent representation across officer and enlisted classifications in 1992 is representative of the current gender demographics in the Navy today. The Demographics Report illustrates that as of 2021, the current representation of enlisted women in the United States Navy is proportional to the representation of women in officer ranks who fill supervisory positions. However, the study states that despite the positive change in women's representation in the military, "evidence persists that the institutional role of [the] soldier remains stereotyped as male, and that the utilization of women in the military remains largely based on the conventional definition of women's work in American society" (Firestone, 1992, p. 366).

3. Traditionality of Occupation

An early study examines the retention of women in unconventional occupations in the military and the civilian labor force (Waite et al., 1986). While women in the civilian sector do not leave their job based on its traditionality, the same cannot be said for women in the military. Based on academic perspectives of job flexibility and the effects of out-group affiliation on approval, the study "develops hypotheses on the effects of one-year turnover of gender structure of the occupation in the national labor force" (Waite et al., 1986, p. 568). According to Waite et al. (1986), there is no statistical evidence that an atypical job will increase the likelihood that a woman will leave her job prematurely in the civilian labor force. However, the statement does not hold true for women in the armed forces. For women in the military, the study finds that working in an atypical occupation increases the probability that a woman will leave the military. This illustrates that an intricately complicated correlation exists between the traditionality of an occupation and a woman's separation from the armed services.

Waite et al. (1986) determine that, "for a number of reasons, the military is an important site for studying the effects of occupational traditionality on job turnover for women" (p. 569). One reason is attributed to the fact that "the services have opened all military occupations, except combat jobs, to women and have enlisted and trained them in these occupations" (Waite et al., 1986, p. 569). There is even more support for the statement today as the ban on women in combat was lifted in 2013, allowing women to fill combat positions. To reinforce this assertion, the military allows the study to "examine the effects of more extensive gender desegregation in an organization on women's decision to stay with the employer" (Waite et al., 1986, p. 569). Another reason is that in most cases, women who enter the military have less information on the nontraditional occupation they are placed into compared to women in the civilian labor force. Based on their Armed Services Vocational Aptitude Battery (ASVAB) test score and other factors such as medical limitations, future enlistees are eligible for certain occupational ratings. Due to their limited exposure to the military, enlistees often must choose their preferred occupational assignment with little background on what the occupation entails. Conversely, it is theorized that women in the civilian labor force

choose atypical occupations more confidently and with more information to support their decision. Furthermore, the military allows the study to assess female enlistees placed in traditionally female occupations who receive higher wages, formal and on-the-job training, promotion opportunities, and benefits due to the policies regulated by federal statute. In the civilian workforce, opportunities such as these are often reserved for traditionally male occupations. Therefore, the military allows the study to analyze the effect of such career opportunities on the retention of women.

Waite et al. (1986) find that in the civilian labor force, the conventionality of an occupation does not alter the probability of a woman resigning from her present position. However, for women in the military, the study finds a negative, albeit weak, correlation between occupational traditionality and a woman's propensity to leave "the service over a one-year period" (Waite et al., 1986, p. 588). The study observes that women in traditionally female-perceived occupations are less likely to attrite than women in traditionally male-perceived occupations (Waite et al., 1986). Despite the negative relationship between occupational traditionality and job turnover for women in the military, the study evaluates that enlisted women in the military have lower attrition rates than women in the civilian workforce. The study attributes this statistic to the military's regulated selection, training, contractual obligations, and federal policies that enable it to have more control over the type of women that enter the military. In addition, the study acknowledges that a further possible reason why the military has lower attrition rates than the civilian labor force is that the military does not have a pay differential between men and women that plagues the civilian sector. In the military, men and women are paid the same salary if they hold the same rank with comparable time in service. The study further expounds on possible explanations by emphasizing that women in the military are often assigned to occupations that they have little knowledge of and little taste for but must fill due to their enlistment contract.

E. NAVY RECRUITING PROCEDURES

Waite et al. (1986) identified a correlation between occupational traditionality and a woman's propensity to leave the military over a one-year period. Specifically, the less

female-dominated the occupation, the more likely a woman will end her contract early. The study shows that there is a statistically significant relation between occupational traditionality and first-term attrition for women in the armed forces. Waite et al. (1986) decision to observe women early in their career allows the analysis to focus on early detriments to job turnover and first-term attrition. It is vital to explore the Navy's occupational rating assignment to observe what role recruiting and classification practices play in the job-matching process in determining the relative success of women compared to men.

The Navy Recruiting Command (NRC) is the headquarter for Navy recruiting. Located in Memphis, Tennessee, NRC is comprised of 26 Navy Recruiting Districts (NRDs) commanded by two Navy Recruiting Regions; Region East and Region West (*Navy Recruiting Facts and Statistics*, n.d.). More than 4,000 active-duty enlisted and officer personnel man more than 1,400 Navy Recruiting Stations that are dispersed across the United States, Guam, Puerto Rico, and Europe. The primary mission of NRC is to "increase the quality of the total force by aggressively seeking qualified sailors in 72 total ratings in the active and reserve, maintain an eligible pool of men and women in the Delayed Entry Program (DEP) to promote a fluid flow of recruits into boot camp, and to provide support to Overseas Contingency Operations (OCO) demands by meeting the mission requirements for ratings that support Navy Special Warfare (NSW)/Navy Special Operations (NSO) missions" (*Navy recruiting facts and statistics*, n.d.).

The Navy recruiting process can begin in numerous, different ways. On January 10, 2023, personal communication was conducted by myself and an Aviation Boatswains Mate Chief (ABHC) Petty Officer who currently serves as the Senior Enlisted Classifier at a Navy Talent Acquisition Group (NTAG). According to the ABHC, one method that initiates the recruiting process is that a recruiter, referred to as a "National Lead," reaches out to a potential candidate via social media (ABHC, Senior Enlisted Classifier, personal communication, January 10, 2023). Another method is that a potential candidate provides their information online and the National Lead travels to their location and provides them with information about the Navy, attempting to recruit them for service. A third method is that recruiters travel to local high schools and attempt to recruit students completing

their senior year. The last method is the traditional method of knocking on doors in the local area.

Once a candidate is recruited for service in the Navy, they report to the closest Military Entrance Processing Station (MEPS) (ABHC, Senior Enlisted Classifier, personal communication, January 10, 2023). There are 65 MEPS locations across the United States that are responsible for providing candidates with medical physicals, the Armed Services Vocational Aptitude Battery (ASVAB) Test, and interviews to ensure they are eligible for military service in the Navy. Eligibility requirements originate from the *Navy Recruiting Manual*, which provides specific guidelines on how MEPSs are required to conduct their operations. Upon completion of the physical, the candidate reports to the liaison office and completes an interview. The goal of the interview is to not only collect requirements such as fingerprints, but to also determine if the candidate requires any waivers. It is not unusual for candidates to be dishonest to recruiters about medical restrictions or a past criminal record. The truth is often not revealed until the MEPS conducts its interview because a strong emphasis is placed on the repercussions that will arise if the MEPS discovers the candidate provided false information. When the recruit passes the interview and their eligibility is verified, they begin the occupational rating assignment process.

Recruits have a list of occupations they qualify for based on their ASVAB score and medical factors such as vision and hearing (ABHC, Senior Enlisted Classifier, personal communication, January 10, 2023). Once their eligibility is determined, the recruit is given a classifier preference sheet where they annotate the occupations they desire in order of predilection. While the MEPS considers the recruit's desires, they also must balance available positions, shipping dates, open training seats, etc. The need of the Navy always takes priority and, therefore, does not always coincide with the recruit's aspirations. To meet both the need of the Navy and the recruit's desire, the MEPS will try to provide a compromise that suffices both. This increases the chance of the recruit shipping and reporting to the Recruit Training Command (RTC) in Great Lakes, IL. To assist with meeting monthly quotas, bonus messages are frequently sent out to incentivize candidates to either choose a certain rating or to enlist in the Navy at all. Monetary

incentives serve as a major influence for enlistment in the Navy. Technical ratings are often incentivized by advanced pay grades and further monetary bonuses.

Trends based on gender are observed in the occupational rating assignment in the Navy. Many women who enlist in the Navy gravitate toward the Hospital Corpsman (HM) rating in hopes of eventually becoming a nurse (ABHC, Senior Enlisted Classifier, personal communication, January 10, 2023). HMs assist medical and dental professionals at Medical Treatment Facilities (MTFs) in the "prevention and treatment of disease and injury" (Goering, 2022). They provide their services to both naval personnel and their dependents. The second most sought-after rates amongst enlisted women are administrative ratings such as Yeoman (YN) and Personnel Specialist (PS). YNs specialize in clerical work. They are similar to secretaries as they answer calls, receive visitors, and organize files. My Navy HR defines a PS as an enlistee who "maintains and audits pay and personnel records of military personnel and determines military pay and travel entitlements and deductions" (Personnel Specialist, n.d.). A minority of women desire to enlist in hands-on ratings such as Boatswain's Mate (BM). My Navy HR describes BMs as enlistees who "repair, maintain, and stow ship equipment to prepare for underway operations" (Personnel Specialist, n.d.). They also serve as helmsmen, lookouts, and stand security watch to ensure the ship is always protected.

To increase female leadership in male-dominated ratings, the Navy highly incentivizes women to select technical ratings during the occupational rating assignment (ABHC, Senior Enlisted Classifier, personal communication, January 10, 2023). Due to the underrepresentation of women in technical rates, the promotion rates for women in these occupations tend to be faster so that they may reach senior leadership ranks. However, despite being qualified for these rates and monetary incentives, MEPSs still find it hard to sell these technical jobs to women.

1. The Delayed Entry Program

After an individual chooses their occupational rating and signs their enlistment contract, they will almost certainly enter the Delayed Entry Program (DEP). Although it is possible for an individual to sign their enlistment contract and immediately report to

boot camp, it is extremely rare. Less than 20 percent of recruits enter directly into their service branch without first spending time in DEP (Marrone, 2020). In most cases, candidates will enter DEP for a specified time before they are shipped off to the Recruit Training Command in Great Lakes. Volume V of the *Navy Recruit Manual: Enlisted*, CRUITMAN-ENL 1130.8K defines the Delayed Entry Program and provides the program's purpose, and responsibilities (U.S. Navy, 2016). In addition, it outlines the requirements candidates must meet to enlist in the fleet. Delayed entry is defined as:

> The military status gained by an enlistment in which a service member's entry on active duty (ACDU) or initial active duty for training (IADT) is postponed for up to 365 days (12 months) with the exception of juniors who will be mid-year graduates. All up and coming new high school seniors (scheduled to graduate at the completion of the next school year) entering DEP during the months of May, June and July are authorized to remain in DEP for a maximum of 455 days (15 months). (U.S. Navy, 2016, p. 547)

DEP is designed to assist candidates to prepare for military service both mentally and physically. Its purpose is to motivate future sailors as they prepare to begin their military service and to strengthen their commitment to the Navy. The main objective of the Delayed Entry Program is to reduce attrition and increase a candidate's propensity to remain in the Navy until the completion of their first-term contract, if not longer. During a candidate's time in DEP, they maintain a professional relationship with their recruiter to ensure they remain within physical standards and continue to meet enlistment criteria for their time in the fleet. During the program, candidates are considered "Navy future Sailors," and are therefore not yet in the military. They remain in this status from the time that they sign their enlistment contract until the time that they report to their first duty assignment.

To provide a solid foundation of mentorship between the DEP recruit and recruiter during the recruit's time spent in DEP, each candidate is required to complete the 72-hour indoctrination no later than three days after the Navy future sailor signs their contract unless scheduling conflicts for parents or spouses prevent them from attending (U.S. Navy, 2016). In this case, they are permitted to complete the indoctrination within five days of signing their enlistment contract. Topics covered in the indoctrination

include, but are not limited to, a review of the enlistment contract to ensure the Navy future sailor is aware that their transfer from DEP to boot camp is conditional on them remaining eligible for naval service, a review of the reporting process for illness or involvement with police authorities (regardless of magnitude), and a discussion of DEP Personnel Qualification Standards (PQS) that will ensure the Navy future sailor has a reasonable timeline of completing the PQS prior to their ship date.

DEP PQS is a vital component in preparing a Navy future sailor for the difficult transition from civilian life to life in the military. All Navy future sailors are required to begin the PQS while they are in DEP and are encouraged to complete it before their ship date to the Recruit Training Command (U.S. Navy, 2016). The DEP PQS includes topics encompassed in the Standards Transition Acknowledgement Requirements Training (START) Guide that provide the basic knowledge of the Navy's core value system, customs and courtesies, and ranking system. Furthermore, the PQS emphasizes the necessary skills required to successfully transition into the Navy. Recruiters are responsible for ensuring future sailors receive sufficient training during scheduled DEP meetings and other mentoring sessions. Once a future sailor demonstrates a thorough understanding of a topic, the recruiter will sign and date the subject.

F. ATTRITION

Attrition in the Navy arises when individuals who have already signed their enlistment contract separate from the Navy prior to completing their obligated service (Marrone, 2020). Attrition can occur either in DEP, prior to a recruit reporting to boot camp in Great Lakes, or once an enlistee reports to the fleet. I focus on the potential factors that may affect the high attrition rates of enlisted women compared to enlisted men in the Navy. Once statistically significant factors are identified, recommendations can be made to naval stakeholders in hopes to extinguish the escalating dilemma.

1. DEP Attrition

Buddin (2005) examines "the relationship between recruit characteristics and recruiting practices and conditions and the first-term success of Army soldiers" (p. iii). In his study, he assesses that recruit characteristics are statistically significant factors in

determining DEP attrition and that the DEP attrition for enlisted women in the Army is higher than their male counterparts. Ironically, DEP strives to reduce attrition by strengthening the future sailor's commitment to the military through mentoring programs with their recruiter and gaining a broader understanding of the Navy by completing DEP PQS. However, the longer an individual spends in DEP, the more time they have to reconsider their decision to enter the military. Buddin (2005) reveals that the time a future sailor spends in DEP has a significantly positive effect on DEP attrition, with "each extra month spent in DEP increasing the attrition rate by 1.8 percentage points" (p. 29). The longer a future sailor is in DEP, the higher the DEP attrition rate. Furthermore, he determines that recruit characteristics is a statistically significant factor in forecasting DEP attrition and discovers that "the DEP loss rate for women is about 19 percent as compared with about 14 percent for similar men" (Buddin, 2005, p. 25).

Another contributing factor to DEP attrition is the day an individual signs their enlistment contract. Buddin (2005) evaluates that individuals who sign their enlistment contract in "the last five days of a recruiting month have DEP attrition rates 1.5 percentage points higher than for comparable recruits entering earlier in the month" (p. 30). Additionally, Buddin (2005) finds that "recruits who enter on the last day of the recruiting month have loss rates nearly 2.5 percentage points higher than for those entering before the last week of the recruiting month" (p. 30). Buddin (2005) attributes these negative effects to the month-end race for recruiters to meet monthly recruiting goals. As a result, the quality of candidates is potentially diminished to meet the mission. He alludes that this places the recruit at a higher risk of DEP attrition due to a possible lack of caliber and commitment to serving.

Buddin (2005) identifies the following coefficients as significant as they statistically affect DEP attrition and are indicators of a recruit's likelihood of completing DEP and initiating their enlistment contract: recruit characteristics, features of the enlistment contract, the recruiting environment, and recruiter characteristics (Buddin, 2005). Recent trends have illustrated that DEP attrition is declining. Buddin (2005) concludes that the downward trend is significantly attributed to the time recruits spend in

DEP. The shorter time a recruit spends in DEP, the more likely they are to commence their contract.

Research also shows that participation in DEP may reduce first-time attrition because DEP reinforces the relationship between a future sailor and their chosen occupation (Marrone, 2020). For instance, a future sailor may choose to enter DEP so that they receive a preferred rating. They may also enter DEP to improve their physical standards or to complete high school. Motivations such as this help prepare future sailors for military service and strengthen their commitment to the armed forces. Despite the reason for entering DEP, DEP's potential effect in reducing first-time attrition is contingent on a future sailor completing DEP and entering the fleet.

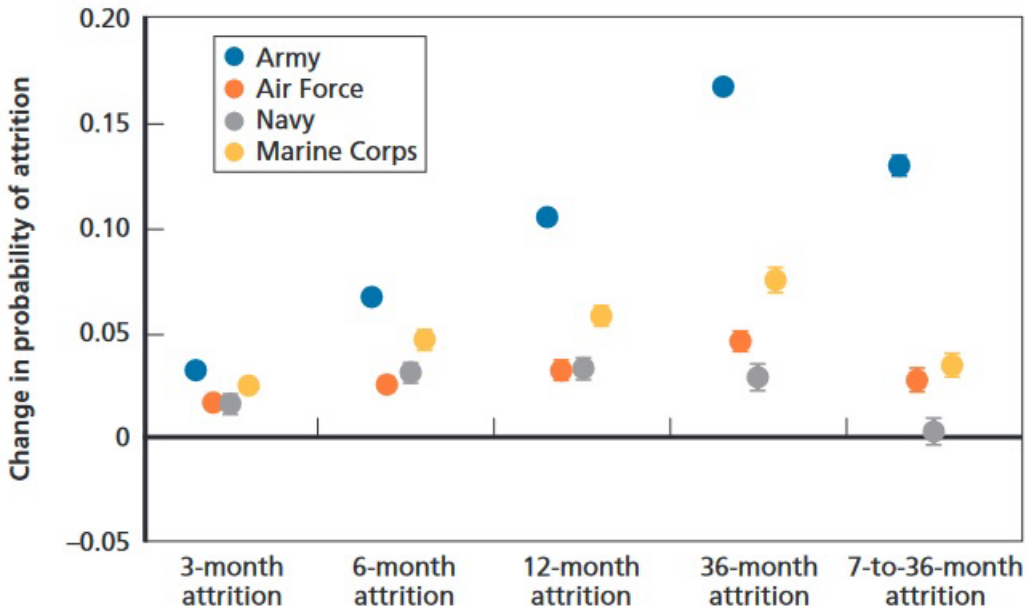
2. First-Term Attrition

First-term attrition occurs when a new enlisted recruit fails to complete the obligated military service annotated on their enlistment contract (Marrone, 2020). All military branches aim to minimize first-term attrition as much as possible due to the high costs of recruiting and training new recruits. The costs of first-term attrition include disbursements for training, wages, and other monetary incentives provided to recruits when they enlist in the military: "In FY 2008, these costs were valued at $209–$220 million for the Navy, (worth $245–$258 million in 2019)" (Marrone, 2020, p. 1). Not only does the military lose the money they expended preparing the recruit for military service, but they now must expend the same amount, if not more, to replace the recruit with a new individual.

A first-term attrition study analyzes first-term attrition across all branches of the armed forces at numerous points of the initial "contract: before three months, at six, 12, and 36 months, and between seven and 36 months" (Marrone, 2020, p. 47). The study determines that pre-accession characteristics can accurately "predict up to 60 percent of individuals who will attrite and who will not at each point in time" (Marrone, 2020, p. 47). The study reports that "in the first three months, across all services, women have a 1-to-3 percentage point higher probability of attrition than males" (Marrone, 2020, p. 30). Additionally, the study reports that in "the Navy, the difference [in attrition] in months 7

to 36 is zero, indicating that any sex-based differences in attrition occur early in the first term" (Marrone, 2020, p. 30). Figure 1 illustrates the marginal effect of being female on first-term attrition. Providing a snapshot, the figure visually exemplifies the statistical relationship between women and first-term attrition in the military.

Figure 1. Marginal Effect of Being Female on First-Term Attrition. Source: Marrone (2020).



G. PROMOTION

The Bureau of Naval Personnel Instruction (BUPERSINST) 1430.16G serves as a guideline for administering the advancement in rate system for enlisted members serving in the United States Navy or Navy Reserve (Bureau of Naval Personnel Instruction [BUPERSINST], 2022). Enlisted personnel are authorized to advance to the paygrades of E2 through E6 if they meet all criteria outlined in the Navy Enlisted Advancement System (NEAS). Personnel are automatically advanced to pay grades E2 and E3 by meeting the minimum time in rate requirements. If personnel meet all requirements and successfully compete in the NEAS, Commanding Officers and officers in charge have the

authority to advance personnel to pay grades E4 through E6. Advancement to pay grades E4 and E5 is sometimes achieved by either completing a required school or by an accelerated advancement program. Other times, advancement to the pay grades of E4, E5, and E6 is determined by quotas provided by the Chief of Naval Personnel (CNP) which are based on manpower requirements established by each Navy-Wide Advancement Examinations (NWAE) rate/competitive group. NWAE rates/competitive groups are ordered by rank by the Final Multiple Score (FMS) which is set to match the quotas. If a candidate has met the FMS cut, has not failed the NWAE, or has not had the advancement cycle invalidated, they are in advancement status.

The FMS is a weighted formula that provides a calculation to determine if a sailor is eligible to advance to pay grades E3 through E6. The computation uses factors such as service in pay grade, performance mark average, passed not advanced on previous advancement exams, standard score, awards, individual augmentee status, and education. Each line item is worth a certain number of points that are incorporated into the final score. The sailor's FMS is compared to the fixed cutoff point to see if the sailor will advance to the next pay grade, has passed but not advanced, or has failed within the advancement cycle.

H. SUMMARY

Although the representation of enlisted women in the Navy has increased tremendously since women were first authorized for military service, gender gaps still exist between enlisted women and enlisted men. Women continue to be disproportionately assigned to administrative ratings such as HM and YN, which have slower promotion rates than technical ratings such as Advanced Electronics and Computer Field (AECF) and Cryptology Technician (CT). Furthermore, women have higher DEP attrition rates and first-term attrition rates than their enlisted male counterparts. The points of comparison discussed when evaluating the relationship between women in the military and women in the civilian sector, as well as the occupational rating assignment process conducted by MEPSs across the United States,

offer potential factors that may serve as accurate predictors of attrition for Navy enlisted women. These potential factors should be investigated further.

I will analyze the effect of pre-accession factors and post-accession factors to provide a comprehensive evaluation of how these factors affect the career progression of enlisted women in the Navy. Chapter III will provide a literature review of relevant studies that seek to identify pre-enlistment factors that explain the differences in career progression between enlisted women and enlisted men in the Navy. In addition, Chapter III will aim to evaluate the effect occupational ratings have on the differential gender gap in the performance and retention of enlisted women compared to their male peers.

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III. LITERATURE REVIEW

This literature review focuses on studies that address the career progression of enlisted women in the United States Military. It focuses on the role that Navy recruiting policies and practices may play in the career success of women compared to men. I review prior studies on pre-enlistment factors that explain the differences in performance and retention between enlisted men and women in the Navy, and how the classification of new applicants to occupational ratings affects the differential gender gap in career progression for Navy enlisted personnel. My goal is to identify prior knowledge and methods used to generate existing results to inform the analysis framework used to address the research questions presented in Chapter I.

A. THE EFFECT OF RECRUITING AND CLASSIFICATION PRACTICES

Buddin (2005) analyzes the relation between procedures in recruitment and the first-term success of enlisted soldiers in the Army. Success is based on DEP attrition rates, first-term attrition rates, promotion rates, and reenlistment rates. Using multivariate regressions based on individual data on Army contracts from FY 1995 to FY 2001, Buddin (2005) finds that recruit characteristics are the strongest predictors of DEP attrition, first-term attrition, first-term promotion to sergeant, and first-term reenlistment. In his study, he finds statistically significant attrition effects for female recruits, the time recruits spend in DEP, and if recruits receive their General Educational Development (GED). Specifically, the amount of time a recruit spends in DEP has a significantly positive effect on DEP attrition, with each additional month spent in DEP increasing the attrition rate by 1.8 percentage points (Buddin, 2005).

Furthermore, Buddin finds that female recruits and recruits who do not finish high school have a higher rate of attrition in the first term of enlistment. His study reveals that the first-term attrition rate is 51 percent for females compared to 31 percent for males and above 50 percent for recruits who receive their GED compared to the attrition rate for recruits who complete high school. After determining the effects of first-term attrition,

Buddin recommends policies and management strategies the Army can utilize to minimize the cost of attrition and increase the continuation rate for soldiers.

While Buddin (2005) analyzes the pre-accession factors that affect the retention of all recruits, Yeung et al. (2017) specifically analyzes trends in female accessions and aims to identify different policies the Office of the Under Secretary of Defense for Personnel and Readiness (OUSD/P&R) can implement to reinforce an all-inclusive environment in the combat positions now available to women. The study evaluates the repeal of the Combat Exclusion Policy in January 2013 and its effects on recruiting practices in the United States Military.

The authors conducted a total of 15 recruiter interviews and focus groups. Yeung et al. (2017) included topics such as "the recruiter's experience and training prior to filling a recruiting position, methods for identifying new recruits, incentives for both the recruiters and the recruits, differences in recruiting men and women, the role of influencers, and the responses to the policy change allowing women in combat roles" (p. 9).

Like Buddin (2005), Yeung et al. (2017) cite that "women are harder to recruit and more likely to attrite from the DEP" (p. 49). An important difference between the Yeung et al. (2017) study and my methodology is that Yeung et al. (2017) uses a subjective methodology of interviews and focus groups. Unlike an analytical methodology such as multivariate analysis that can be statistically observed, the results of Yeung et al. are based on the assumptions and opinions of individuals that may not represent a random sample of recruiters or recruits. Therefore, bias in the sample size analyzed in the Yeung et al. (2017) study is inevitable. In contrast, I use a quantitative approach of regression models to evaluate the role recruiting practices play in the occupational rating assignment and in determining the relative career success of enlisted women compared to men. Although not perfect, the findings of an objective approach, like the regression model I use, provide impartiality and potentially more accuracy than a subjective method, such as the one used by Yeung et al. (2017).

B. GENDER DIFFERENCES IN CAREER PROGRESSION

The different factors that affect military attrition are vital in evaluating career progression. Once these factors are identified, they illuminate the reasons why service members either decide to remain in the military or separate. Bowers (2015) determines that certain pre-accession characteristics affect the first-term attrition, reenlistment, and fast-track promotion of enlistees in the United States Navy. He applies quantitative methods to evaluate the effect of characteristics and early life experiences before an individual's entrance into the Navy on the career progression of Hispanic enlistees. Merging data from the Defense Manpower Data Center (DMDC) and the Personalized Recruiting for Immediate and Delayed Enlistment (PRIDE), Bowers uses first-term attrition, reenlistment, and fast-track promotion rates as proxies for career progression. Focusing on Navy enlistees on active duty between FY 2001 and FY 2009, Bowers uses multivariate regression models to measure the effect of demographics and pre-accession factors on the specified career outcomes of enlistees in the Navy.

While Bowers specifically analyzes the effects these characteristics have on Hispanic enlistees, he also observes the effects that other characteristics, such as gender, have on the career progression of enlistees. He finds that for first-term attrition, reenlistment, and fast-track promotion, the female variable has a negative estimated effect on all these dependent variables, holding all other independent variables constant. An overall conclusion that can be made from Bowers' study is that in the provisions of first-term attrition, reenlistment, and fast-track promotion, females perform poorly in comparison to their male counterparts. In determining the career progression of women in the Navy, Bowers' analysis reveals that the pre-accession characteristics in comparison to the post-accession characteristics of women in the Navy have negative effects on the specified outcomes of first-term attrition, reenlistment, and fast-track promotion.

Wilcove et al. (1979) mirror the research goal I present to gain insight into the factors that contribute to female attrition in the Navy. In the study, Wilcove et al. (1979) presented two questionnaires to collect reasons participants believe female enlistees separate from military service sooner and more frequently than their male peers. As a basis for the questionnaires, the study ventured to detect pre-enlistment variables that

accurately explain attrition among female first-term enlistees. The questionnaires collected information on aspects such as turnover, mental health, sex roles, and vocational choice to identify attrition factors (Wilcove et al., 1979). The study identified eight categories and developed hypotheses that explained how each contributed to attrition amongst female enlistees. The eight categories were defined as "personal history, female role ideology, mental health, fear of success or motivation to fail, realistic expectations about the Navy, enlistment motivation, similarity to previous successful recruits, and occupational needs" (Wilcove et al., 1979, p. 5). After conducting the questionnaires, a multivariate regression model was used to predict attrition.

The results of the study found that 38 items presented in the questionnaires had statistically significant relationships to attrition. Out of the eight categories identified, mental health and occupational needs generated the most statistically significant items related to attrition. Mental health and attrition indicated a positive correlation and coincided with the authors' hypothesis that, "the more negative a woman's self-perception (e.g., nervous, headache-prone, depressed), the more likely she was to attrite." (Wilcove et al., 1979, p. 9) The authors did not articulate a hypothesis for occupational needs. However, a perceived need for an accurate job match did arise for the attritee.

While an obvious limitation of Wilcove et al. (1979) is that it is 43 years old, the study provides relevant factors that can help explain variations of attrition and the career progression of first-term Navy enlisted women today. It is acknowledged that societal views and expectations of women have changed drastically. Furthermore, the evolution of women in the military has significantly expanded the number of occupations available to female enlistees, such as combat roles, which were not available to women during the time of this study. Although many of the pre-enlistment variables used to predict attrition of Navy female enlistees in the study are no longer accurate, there is valuable depth within Wilcove et al. (1979) that provides guidance in conducting this study.

C. THE EFFECT OF OCCUPATIONAL RATINGS ON THE GENDER GAP IN ATTRITION

As reflected in Wilcove et al. (1979), occupational need is an important factor in predicting attrition. There is often a job mismatch when attempting to align the needs of the Navy with the preferences of the applicant. While the Navy considers the applicant's desires, they also balance the qualifications of the applicant, available positions, open training seats, etc. These requirements do not always support the applicant's aspirations. It is important to evaluate whether certain occupational ratings have larger gender gaps than other ratings and explore the relationship between gender disparity and attrition in the Navy.

Focusing on occupational need as a statistically significant variable in predicting attrition, Geraghty et al. (2018) explore gender patterns in attrition losses during the period after enlisted personnel complete boot camp and before they enter the fleet. This period coincides with A-school training for most (but not all) recruits. The study attempts to identify what factors contribute to the higher female attrition rate during this career period compared to men. It specifically compares the gender attrition rate differentials in three highly technical Navy Ratings (including Advanced Electronics and Computer Field (AECF), the Nuclear Field (NF), and Cryptology Technician Field (CT)) versus in less technical fields (including HM, MM, and OS).

Geraghty et al. (2018) use a linear probability model to analyze the effect of certain predictors such as gender, promised rating, and racial/ethnic background on the probability of whether a female enlistee enters the fleet. The results show that the difference in attrition between women and men in the highly-technical AECF, NF, and CT ratings is considerably larger than the Navy-wide averages for each rating. Geraghty et al. (2018) find that "for AECF, the post-boot camp and pre-fleet loss rate is 15 percent for women compared to 12 percent for men and for NF, the loss rate is 24 percent for women compared to 13 percent for men" (p. 7). The study also finds that other factors, such as test scores, career, and demographic attributes, do not explain the higher attrition rate of women, compared to men, during the post-boot camp, pre-fleet period (Geraghty et al., 2018).

The evaluation presented by Geraghty et al. (2018) asses the differences in attrition between enlisted men and women across occupational ratings. The study provides useful insight into the essence of the gender attrition gap among Navy enlistees. Although the study serves as a guide, there are key differences between the analysis in the Geraghty et al. (2018) study and the analysis I present. First, the scope of analysis presented by Geraghty et al. (2018) is narrow and specifically analyzes attrition differences in months 3–12 in an enlistee's career. This window primarily occurs during A-school training, where enlistees learn the fundamentals of their assigned occupation. Conversely, I observe attrition during the entire first term of service which covers boot camp through the first duty assignment. Second, all enlisted ratings are included in my analysis. The sample I analyze includes undesignated sailors, who represent approximately 20 percent of an enlisted cohort. Undesignated sailors immediately report to their first duty assignment after completing boot camp and do not attend an occupation-specific A-school as in the case of designated enlistees. Undesignated sailors are expected to receive on-the-job training at their command to receive essential skills required for designation. Finally, Geraghty et al. (2018) do not identify why attrition seems to be higher for females in technical ratings compared to less technical ratings. The study does not expound on whether higher female attrition is due to the training environment, the length of the training, or simply due to poor rating assignment. I apply regression models that attempt to discover alternate potential explanations for the gender attrition gap during the first term of naval service.

D. SUMMARY

Prior analyses of both the pre-accession factors and post-accession factors that affect the performance and retention of enlisted personnel in the United States Military find that recruit characteristics are predictors of DEP attrition, first-term attrition, first-term promotion to sergeant, and first-term reenlistment (Buddin, 2005). Within recruit characteristics, gender has a statistically significant relationship to attrition, affecting an enlistee's overall career progression. In determining the career progression of women in the Navy, Bowers (2015) finds that the pre-accession characteristics in comparison to the post-accession characteristics of women in the Navy have a negative effect on the

specified outcomes of first-term attrition, reenlistment, and fast-track promotion. Both Wilcove et al. (1979) and Geraghty et al. (2018) find that occupational ratings, specifically in highly technical fields, increase the attrition rate of enlisted women and are a direct contribution to the differential gender gap between men and women in the Navy.

I will provide an updated multivariate analysis to determine the use of pre-enlistment variables to predict the first-term attrition of enlisted women in the Navy. By encompassing both pre-accession and post-accession characteristics, I will provide a more accurate and inclusive picture of how the factors affect career progression. My intent is to determine factors that explain the disproportionately low representation of women in the Navy and illuminate the reasons why women frequently do not remain in the Navy as long as their male counterparts. The articles reviewed in this chapter provide both pre-enlistment and post-enlistment factors analysts believe contribute to the underrepresentation of women in the military. Furthermore, the articles provide methodologies like the linear probability regression model I use to measure the difference in attrition, promotion, and retention between enlisted men and women.

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IV. DESCRIPTION OF DATA AND SUMMARY STATISTICS

In this chapter, I describe the data I use to answer my research questions. I start with presenting the data source and describe the data set. I then define the variables used as the dependent variables and independent variables to evaluate the effect pre-accession and post-accession characteristics have on measures of career progression. Finally, I provide summary statistics for the samples I use for estimation to show that the samples are representative of the population of enlisted sailors I study. Further, I present differences in means for career progression outcomes for enlisted men and women. Ultimately, I provide an overview of the data used in the analytical framework introduced in Chapter V.

A. SOURCE OF DATA

I use data drawn from Bowers (2015), which examined the predictors for differences in career progression for Hispanic enlistees compared to their non-Hispanic enlistee counterparts. I seek to do the same, but for female enlistees in the Navy compared to their male counterparts.

My initial goal was to expand Bowers (2015) data to include individual-level data on enlisted personnel who accessed from FY 2012 to FY 2017, observed annually until September 2022 or until separation. However, due to administrative obstacles and a compressed timeline for completion, I am not able to access additional data and, therefore, I draw data from Bowers (2015).

Like Bowers (2015), I use a combined file that merges data from the Personalized Recruiting for Immediate and Delayed Enlistment (PRIDE) system and the Defense Manpower Data Center (DMDC) to follow the career progression of enlisted personnel during and after their first-term contract.

PRIDE is the data source for the *pre-accession* characteristics used in Bowers (2015). The PRIDE system is maintained by the Navy Recruiting Command (NRC) and provides personal information for applicants such as basic demographic information to include, but not limited to, age, gender, race and family status and other factors such as

education level and physical characteristics. As noted by Bowers (2015), "PRIDE enables NRC personnel to track each applicant's personal information…[and] provides information on each applicant's qualifications which assists the classification of qualified applicants into Navy ratings (jobs) in accordance with the applicant's desires and needs of the Navy" (p. 41).

Conversely, DMDC is the data source for the *post-accession* characteristics used in Bowers (2015). The DMDC is "the primary Department of Defense personnel and information management source" (Bowers, 2015, p. 41). Like PRIDE, the data from DMDC also contains demographic information on service members. However, in contrast, the data from DMDC also includes service factors such as the initial month and year an enlistee accessed into the Navy, occupational specialty, waiver history, and retention and promotion outcomes (Bowers, 2015).

B. DATA SET

The analysis data set includes individual-level observations on a total of 348,330 sailors. The data set offers a comprehensive view of both the pre-accession and post-accession characteristics of naval enlistees accessed between FY 2001 and FY 2009 and observed annually until the end of FY 2013 or when they separated (Bowers, 2015). The data allows a thorough analysis of enlistees from before enlistment, during enlistment, and their overall career progression. My focus is on the difference in outcomes between female and their male counterparts in probability of separation within their first-term of enlistment, rate of remaining on active duty at least three months past their initial obligated enlistment, and probability of being "promoted to the rank of E5 in less than four years" to determine the differences in first-term career progression between enlisted men and women (Bowers, 2015, p. 89).

C. VARIABLE DESCRIPTIONS

1. Dependent Variables

I examine the relationship between the pre-accession characteristics and the career progression of enlisted women compared to enlisted men. Career progression is the

observed outcome and used as a measure for success. Attrition, reenlistment, and promotion rates are used as proxies for career progression to determine the relative success of enlisted women in the Navy compared to their male counterparts. I use these outcome measurements as dependent variables used in my analysis. Their definitions are presented in Table 2.

Table 2. Definitions of Dependent Variables.

Variable Descriptions	
Variable	**Definition**
Dependent Variables	
Attrition Analysis: Whether a person attrited within 45-months of service.	A binary indicator that takes on the value of 1 if a person separated from the Navy in less than 45 months, otherwise=0
Retention Analysis: Whether a person remained on active-duty three months longer than initial 48-month contract.	A binary indicator that takes on the value of 1 if a person remained on active-duty three months longer than the initial 48-month contract, otherwise=0
Promotion Analysis: Whether a person promoted to E5 in less than four years.	A binary indicator that takes on the value of 1 if a person promoted to the rank of E5 in less than 48 months, otherwise =0

a. First-term Attrition

As defined by Marrone (2020), first-term attrition occurs when a new enlisted recruit fails to complete the obligated military service annotated on their enlistment contract and separates prior to 45 months of active-duty service.

In the attrition analysis, the dependent variable is a binary variable that takes on a value of 1 if an enlistee separated from the Navy in less than 45 months and a value of 0, otherwise.

b. Retention

An enlistee is considered retained in the Navy not only if they make it to their obligated service, but if they remain on active duty beyond the enlistment contract. Four-

year obligors are considered "retained" if they serve on active duty longer than their 48-month obligation.

In the retention analysis, the dependent variable is a binary variable that takes on a value of 1 if an enlistee did not attrite and their months of service is three months longer than their four-year obligation and a value of 0, otherwise.

c. Fast-Track Promotion

In the promotion analysis, the dependent variable is a binary variable that takes on a value of 1 if an enlistee promotes to the rank of E5 in less than four years and a value of 0, otherwise.

2. Independent Variables

To examine the effect the independent variables have on the career outcome of enlisted women in the Navy compared to enlisted men, I use a combination of pre-accession characteristics and post-accession characteristics as the independent variables. The independent variables include demographic characteristics, pre-accession characteristics, enlistment characteristics, the occupational rating groups, and the cohort years when the enlisted personnel accessed in the Navy.

- Demographics: sex (male is reference), race (White is reference, Hispanic, Asian or Pacific Islander, Black, Other race), number of dependents (no dependents is reference), married (single is reference).
- Pre-accession Characteristics: Armed Forces Qualification Test (AFQT) Score, educational attainment at accession (high school diploma, GED, and some college experience).
- Enlistment Characteristics: time in the Delayed Entry Program (DEP), age of enlistee when entered DEP, DEP PQS complete (incomplete DEP PQS is reference), whether reported to the Recruit Training Command (RTC) with an advanced paygrade, whether received an enlistment bonus, enlisted with a five- or six-year obligation (four-year obligation is

reference), whether recruit received a waiver at accession, the length of the initial contract.

- Occupational Rating Groups: using the same groupings as Bowers (2015), I include 13 occupation groups to compare male-female outcome differences within the occupation categories (more details below). The administrative rating is left out of the econometric models as the reference group.

Once MEPS determines that an enlistee meets the eligibility criteria to serve in the Navy, the enlistee is assigned to an occupational rating. Ratings are specialized job positions within the military that enlistees are trained for and typically perform throughout their entire career. Although most enlistees select an occupational rating at MEPS, roughly 20 percent of an enlisted cohort report to their first duty assignment without a rating guarantee. In such circumstances, enlistees receive on-the-job training at their command to receive essential skills required for designation.

I aim to determine if there is a differential gender gap in career progression for enlisted women in the Navy based on their occupational rating. To assist in answering this research question, occupational rating groups have been included as independent variables in the regression models for attrition, retention, and promotion career outcomes. As noted by Wilcove et al. (1979) and Geraghty et al. (2018) in Chapter III, occupational ratings, specifically in highly technical fields, increase the attrition rate of enlisted women and are a direct contribution to the differential gender gap between men and women in the Navy. The differentiating factor between technical ratings and less technical ratings is that the former requires, "high ASVAB scores for entry and [have] long training pipelines because these Sailors are the most expensive to recruit and train" (Geraghty et al., 2018, p. iii).

The model presented in Bowers (2015) "assigns ratings with similar work environments and responsibilities to occupational ratings groups in order to assess if race or ethnicity is a determining factor in the occupational assignment of Navy recruits" (p. 50). I use a similar approach. However, I focus on if gender is a decisive predictor vice

race or ethnicity. Table 3 reflects the "ratings assigned to occupational rating groups" as produced by (Bowers, 2015, p. 50-51).

Table 3. Ratings Assigned to Occupational Ratings Groups. Source: Bowers (2015).

Occupational Rating Group	Ratings Assigned
Aviation Maintenance	Aviation Machinist's Mate (AD) Aviation Electrician's Mate (AE) Aviation Structural Mechanic (AM) Aviation Structural Mechanic -Safety Equipment (AME) Aviation Electronics Technician (AT) Aircrew Survival Equipmentman (PR)
Aviation Support	Aviation Boatswain's Mate- Equipment (ABE) Aviation Boatswain's Mate- Fuels (ABF) Aviation Boatswain's Mate -Aircraft Handling (ABH) Air Traffic Controller Aviation Support Equipment Technician Aviation Maintenance Administration Aerographer's Mate
Administrative	Disbursing Clerk (DK) *merged into PS (2005) Personnelman (PN) *merged into PS (2005) Personnel Specialist (PS) Journalist (JO) *merged into MC (2006) Lithographer (LI) *merged into MC (2006) Photographers Mate (PH) *merged into MC (2006) Mass Communication Specialist (MC) Religious Programs Specialist (RP) Yeoman (YN)
Nuclear Field	Nuclear Field Accession
Undesignated Personnel	Airman (AN) Seaman (SN) Fireman (FN)
Shipboard Maintenance	Boatswain's Mate (BM) Damage Controlman (DC) Electrician's Mate (EM) Hull Maintenance Technician (HT) Interior Communications Electrician (IC) Machinery Repairman (MR) Information System Technician (IT)
Shipboard Engineering	Engineman (EN) Gas Turbine System Technician –Electrical (GSE) Gas Turbine System Technician-Mechanical (GSM) Machinist's Mate (MM) Shipboard Engineering Program (SENG) *shipboard engineering rating assigned at RTC
Shipboard Operations	Operations Specialist (OS) Quartermaster (QM) Signalman(SM) *merged into QM
Hospital Corpsman	Dental Technician (DT) *merged in HM (2005) Hospital Corpsman (HM)
Intelligence and Cryptology	Cryptologic Technician-Interpretive (CTI) Cryptologic Technician-Maintenance (CTM)

(continued on next page)

Occupational Rating Group	Ratings Assigned
	Cryptologic Technician-Networks (CTN) Cryptologic Technician-Collection (CTR) Cryptologic Technician-Technical (CTT) Intelligence Specialist (IS)
Supply and Support Services	Culinary Specialist (CS) Logistics Specialist (LS) Mess Management Specialist (MS) *renamed CS (2004) Postal Clerk (PC) *merged into LS (2009) Ship's Serviceman (SH) Aviation Storekeeper (AK) *merged into SK (2003) Storekeeper (SK) *renamed LS (2009)
Ordnance, Law, and Weapons Systems	Aviation Ordnanceman (AO) Gunner's Mate (GM) Master-at-Arms (MA) Mineman (MN) Advanced Electronics Computer Field (AECF) *AECF accessions are classified as either Fire Controlman (FC) or Electronics Technician (ET) during training
SEABEE Construction	Builder (BU) Construction Electrician (CE) Construction Mechanic (CM) Engineering Aid (EA) Equipment Operator (EO) Steelworker (SW) Utilitiesman (UT)
Submarine Volunteer	Culinary Specialist Submarine (CSS) Machinist's Mate Submarine (MMS) Mess Management Specialist Submarine (MSSS) *renamed CSS (2004) Missile Technician (MT) Submarine Electronics Computer Field (SECF) Storekeeper Submarine (SKS) * renamed LSS (2009) Logistics Specialist Submarine (LSS) Yeomen Submarine (YNS)

D. SUMMARY STATISTICS

Summary statistics are provided to show that the data draw is representative of the enlisted population I study, and to compare the sample average of the career progression outcomes, as measured by the dependent variables, for female sailors and their male counterparts.

1. Dependent Variables

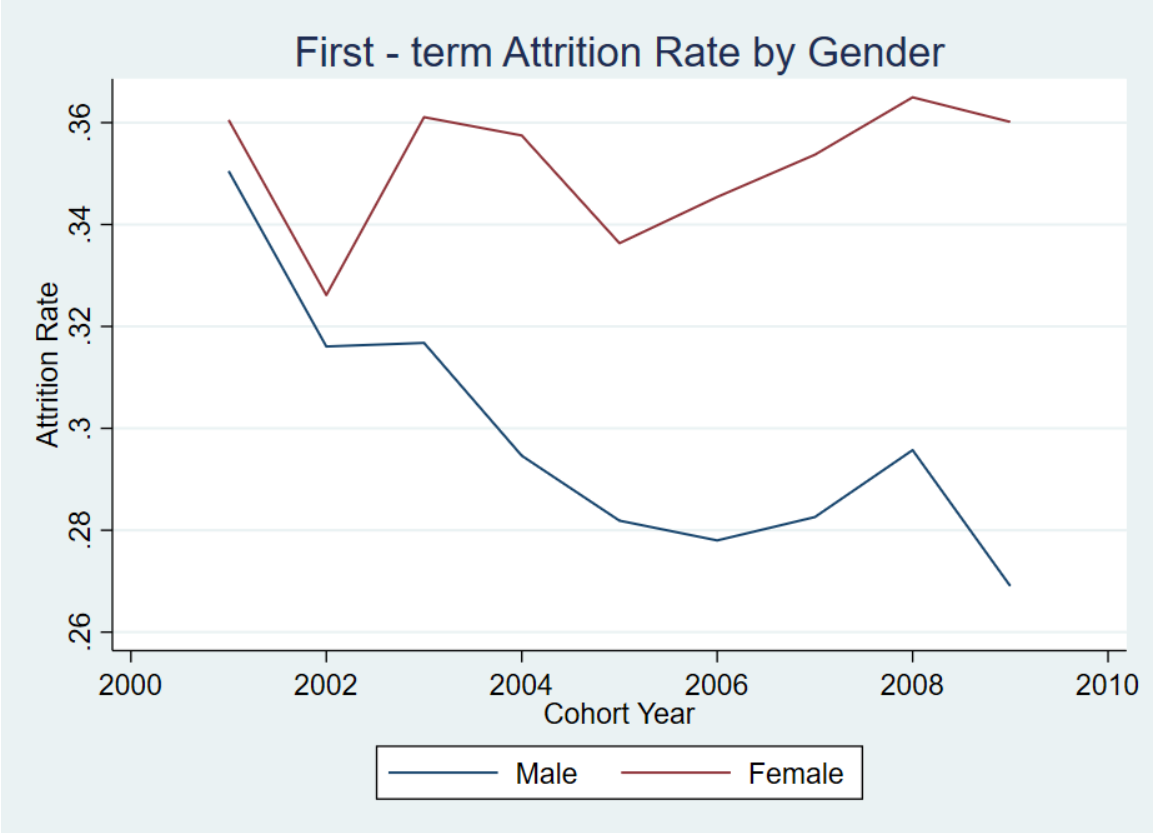
a. First-Term Attrition

Table 4 shows the mean first-term attrition rate, overall and by gender. The summary statistics show that the attrition rate for enlisted women is five percentage points higher than that of enlisted men. The mean attrition rate for enlisted women is 35 percent compared to 30 percent for men and 31 percent for the entire sample. Figure 2 depicts the annual mean attrition rates for enlisted men and women by cohort year. It illustrates that the gender gap in attrition has widened overtime, with the attrition rate for women increasing and the attrition rate for men decreasing.

Table 4. Mean First-term Attrition Rate for Full Sample and By Gender

Variable	**Sample Mean N= 348,330 (SD)**	**Male Mean N= 286,005 (SD)**	**Female Mean N= 62,325 (SD)**	**Female-Male Differences in Sample Mean**
First-term Attrition	0.31 (0.46)	0.30 (0.46)	0.35 (0.48)	0.05***
*** Statistically significant at the 99.9% confidence level.				

Figure 2. Annual Mean First-Term Attrition Rates, by Gender



b. Retention

Table 5 shows the mean retention rate, overall and by gender. For retention, the statistical summary of the sample reveals that the retention rate for enlisted women is four percentage points more than the retention rate for enlisted men, a difference that is significantly different than zero at the 99.9 confidence level. Therefore, women are more likely to remain in the Navy with months of services three months greater than four-year obligations compared to men. Enlisted women have a 64 percent mean retention rate to four-year obligations compared to 60 percent for men and 61 percent for the entire sample. Figure 3 depicts the annual mean retention rates for four-year obligors between enlisted men and women by cohort year. It illustrates that the differential gap between men and women for enlistees who sign four-year enlistment contracts decreases overtime.

Table 5. Mean Retention Rate for Full Sample and By Gender

Variable	Sample Mean N= 104,350 (SD)	Male Mean N= 84,398 (SD)	Female Mean N= 19,952 (SD)	Female-Male Differences in Sample Mean
Retention	0.61 (0.49)	0.60 (0.49)	0.64 (0.48)	0.04***
*** Statistically significant at the 99.9% confidence level.				

Figure 3. Annual Mean Retention Rates, by Gender

c. Fast-Track Promotion

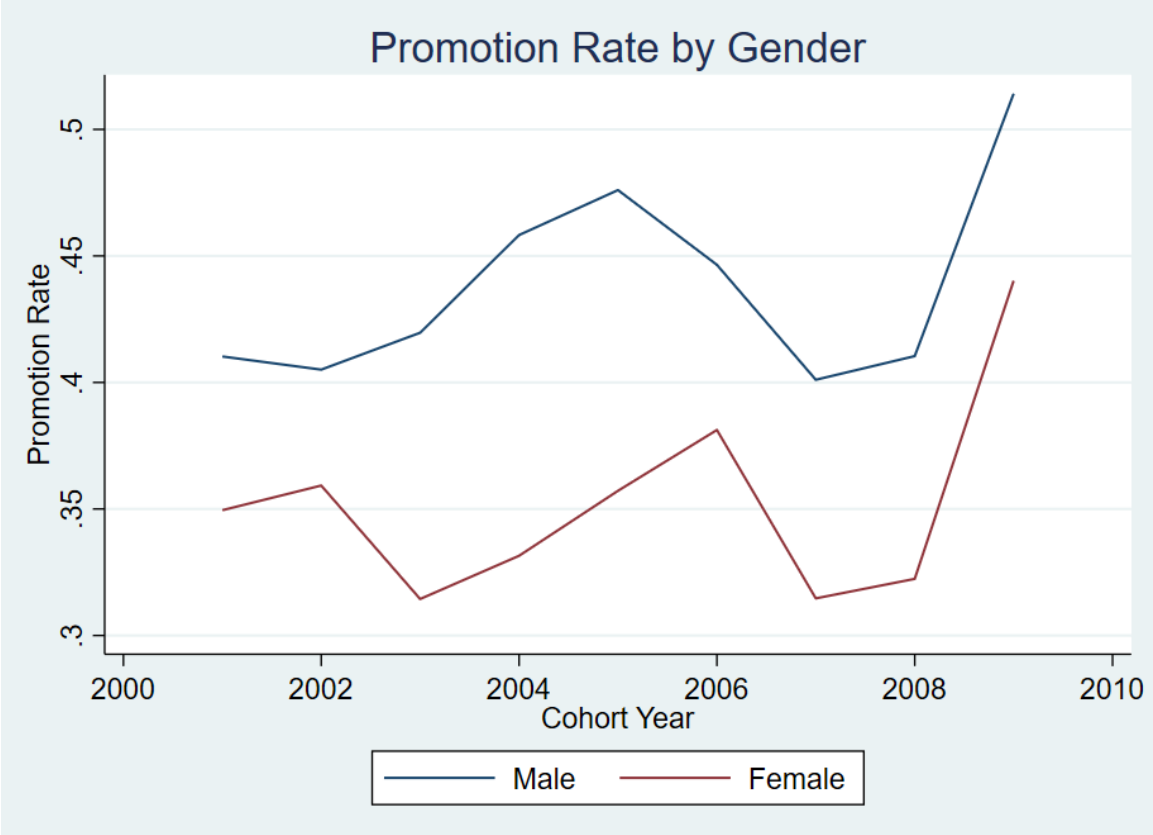
Table 6 shows the mean fast-track promotion rate, overall and by gender. The summary statistics show that the promotion rate for enlisted women is nine percentage points lower than the promotion rate for enlisted men. Therefore, women are less likely to promote to the rank of E5 in under four years compared to men. Enlisted women have a

mean promotion rate of 35 percent compared to 44 percent for men and 42 percent for the entire sample. Figure 4 depicts the annual mean promotion rates for enlisted men and women by cohort year. It illustrates that the gender gap in fast-track promotion has narrowed overtime. The promotion rate for women is consistently below the promotion rate for men, suggesting that enlisted women do not promote to the rank of E5 in less than four years as frequently as enlisted men.

Table 6. Mean Fast-Track Promotion Rate for Full Sample and By Gender

Variable	**Sample Mean N= 165,839 (SD)**	**Male Mean N= 138,071 (SD)**	**Female Mean N= 27,768 (SD)**	**Female-Male Differences in Sample Mean**
Fast-Track Promotion	0.42 (0.49)	0.44 (0.50)	0.35 (0.48)	-0.09***
*** Statistically significant at the 99.9% confidence level.				

Figure 4. Annual Mean Fast-Track Promotion Rates, by Gender



2. Independent Variables

Table 7 presents key summary statistics for the sample. The sample size is 348,330 with 18 percent female and 82 percent male. 89 percent of the female population has a high school diploma, and 98 percent of enlisted women in the data set are single. Furthermore, 19 percent of enlisted women are undesignated and do not receive a rating until they report to their first duty station. Like the summary statistics presented for the dependent variables, the means and standard deviations are calculated for the selected explanatory variables for the entire sample and separately for men and women. Statistically significant variables that describe both pre-accession characteristics and post-accession characteristics for enlisted personnel are included in the subset.

Table 7. Summary Statistics for Subset of Sample: Independent Variables

Variable	Full Sample Mean N= 348,330 (SD)	Male Mean N= 286,005 (SD)	Female Mean N= 62,325 (SD)	Female-Male Differences in Sample Mean
Demographics				
Female	0.18 (0.38)	0 (0.00)	1 (0.00)	
Male	0.82 (0.38)	1 (0.00)	0 (0.00)	
Married	0.02 (0.12)	0.01 (0.12)	0.02 (0.14)	0.01***
Not Married	0.98 (0.12)	0.99 (0.12)	0.98 (0.14)	-0.01***
Dependents	0.02 (0.20)	0.02 (0.20)	0.02 (0.20)	-0.00
No Dependents	0.99 (0.12)	0.99 (0.12)	0.99 (0.12)	0.00***
Hispanic	0.18 (0.39)	0.18 (0.39)	0.20 (0.40)	0.02***
Non-Hispanic	0.82 (0.39)	0.82 (0.39)	0.80 (0.40)	-0.02***
White	0.60 (0.49)	0.62 (0.49)	0.54 (0.50)	-0.08***
Black	0.20 (0.40)	0.19 (0.39)	0.26 (0.44)	0.07***
Asian or Pacific Islander	0.05 (0.22)	0.05 (0.22)	0.05 (0.22)	-0.00
Other Race	0.14 (0.35)	0.14 (0.35)	0.15 (0.36)	0.01***
Pre-accession Characteristics				
AFQT	61.5 (18.49)	62.01 (18.72)	59.17 (17.20)	-2.84***

HS Diploma	0.85 (0.36)	0.84 (0.36)	0.89 (0.32)	0.04***
College Experience	0.06 (0.24)	0.06 (0.24)	0.07 (0.25)	0.00***
GED	0.06 (0.24)	0.07 (0.25)	0.04 (0.19)	-0.03***
Enlistment Characteristics				
Enlist 4 Year Obligation	0.45 (0.50)	0.44 (0.50)	0.51 (0.50)	0.06***
Enlist 5- and 6-Year Obligation	0.55 (0.50)	0.56 (0.50)	0.49 (0.50)	-0.06***
Time in DEP	4.47 (3.65)	4.49 (3.61)	4.36 (3.85)	-0.12***
Age at DEP	20.12 (2.91)	20.15 (2.90)	19.96 (2.93)	-0.19***
DEP PQS Complete	0.11 (0.31)	0.11 (0.31)	0.11 (0.32)	0.01***
Advanced Paygrade	1.56 (0.80)	1.55 (0.80)	1.59 (0.80)	0.04***
Enlistment Bonus	0.50 (0.50)	0.51 (0.50)	0.44 (0.50)	-0.07***
Waiver	0.06 (0.24)	0.06 (0.24)	0.04 (0.19)	-0.03***
*** Statistically significant at the 99.9% confidence level				

The summary statistics in Table 7 reveal that for pre-accession variables such as the Armed Forces Qualification Test (AFQT) Score, women are estimated to score 2.84 points lower on the AFQT compared to men. With regards to education, enlisted women are four percentage points more likely to have a high school diploma compared to enlisted men and three percentage points less likely to have their General Educational Development (GED) than their male equivalent. Enlisted characteristics, such as the

Delayed Entry Program (DEP), also provide insight into the gender differential between enlisted women and men in the Navy. The summary statistics show that on average, women spend 0.12 fewer months in DEP than men do. This equates to roughly 3.7 days. However, they are neither more likely nor less likely to complete the DEP PQS than their male equivalent. Further, women are seven percentage points less likely to receive an enlistment bonus than men, ceteris paribus. If enlisted women do receive a bonus at enlistment, the value of the bonus is approximately $270.69 dollars less than what men receive.

The summary statistics for the occupational rating groups are presented in Table 8.

Table 8. Summary Statistics for Occupational Rating Group Full Sample

Variable	**Full Sample Mean N= 348,330 (SD)**	**Male Mean N= 286,005 (SD)**	**Female Mean N= 62,325 (SD)**	**Female-Male Differences in Sample Mean**
Occupational Rating Group				
Aviation Maintenance	0.06 (0.24)	0.07 (0.25)	0.05 (0.22)	-0.01***
Aviation Support	0.09 (0.28)	0.09 (0.28)	0.09 (0.29)	0.01***
Administrative	0.03 (0.16)	0.02 (0.16)	0.03 (0.17)	0.01***
Shipboard Maintenance	0.08 (0.26)	0.08 (0.26)	0.08 (0.27)	0.00**
Shipboard	0.08 (0.26)	0.08 (0.27)	0.06 (0.24)	-0.02***

Variable	Full Sample Mean N= 348,330 (SD)	Male Mean N= 286,005 (SD)	Female Mean N= 62,325 (SD)	Female-Male Differences in Sample Mean
Occupational Rating Group				
Engineering				
Shipboard Operations	0.07 (0.25)	0.07 (0.25)	0.07 (0.26)	0.01***
Intelligence and Cryptology	0.04 (0.20)	0.04 (0.18)	0.06 (0.25)	0.03***
Special Ordinance	0.12 (0.32)	0.12 (0.33)	0.09 (0.29)	-0.03***
Seabee Supply	0.09 (0.29)	0.09 (0.29)	0.09 (0.29)	0.00
Undesignated Personnel	0.16 (0.37)	0.15 (0.36)	0.19 (0.39)	0.04***
Hospital Corpsman	0.08 (0.27)	0.07 ().26)	0.10 (0.30)	0.02***
Nuclear Field	0.06 (0.24)	0.07 (0.25)	0.03 (0.17)	-0.04***
Yeomen Submarine	0.00 (0.04)	0.00 (0.05)	0.00 (0.00)	-0.00***
Machinist's Mate Submarine	0.01 (0.11)	0.01 (0.12)	0.00 (0.00)	-0.01***
Cohort Year				

Variable	Full Sample Mean N= 348,330 (SD)	Male Mean N= 286,005 (SD)	Female Mean N= 62,325 (SD)	Female-Male Differences in Sample Mean
Occupational Rating Group				
fy01	0.14 (0.35)	0.14 (0.35)	0.14 (0.35)	-0.00***
fy02	0.12 (0.33)	0.13 (0.33)	0.12 (0.32)	-0.01***
fy03	0.11 (0.32)	0.12 (0.32)	0.11 (0.31)	-0.01***
fy04	0.11 (0.31)	0.11 (0.32)	0.10 (0.30)	-0.01***
fy05	0.10 (0.30)	0.10 (0.31)	0.09 (0.29)	-0.01***
fy06	0.10 (0.30)	0.10 (0.29)	0.11 (0.31)	0.01***
fy07	0.10 (0.30)	0.10 (0.30)	0.10 (0.31)	0.00
fy08	0.11 (0.31)	0.10 (0.31)	0.11 (0.31)	0.01***
fy09	0.10 (0.30)	0.10 (0.30)	0.12 (0.32)	0.02***
Statistically significant at the 99.9% confidence level				

The summary statistics presented in Table 8, indicate that women are two percentage points more likely to enlist as a Hospital Corpsman compared to men. Furthermore, enlisted women are four percentage points more likely to report to their first duty undesignated and without a rating, having not attended an occupation-specific A-school compared to enlisted men. In such cases, enlisted women with an undesignated rating are expected to receive on-the-job training at their command to receive essential skills required for designation.

E. SUMMARY

I expound on and use data drawn from Bowers (2015) which used a data set with 348,330 observations from the Personalized Recruiting for Immediate and Delayed Enlistment (PRIDE) system and the Defense Manpower Data Center (DMDC) to follow the career progression of enlisted personnel during and after their first-term contract.

Summary statistics are calculated for both the dependent variables and independent variables to assess whether there is a statistically significant difference that will help explain the gender-based disparity in career progression between enlisted women and men in the Navy. For the specified outcomes used to measure career progression, the summary statistics show that enlisted women are five percentage points more likely to leave the Navy with less than 45 months of service compared to enlisted men, as indicated by first-term attrition rates. For retention, women are four percentage points more likely to remain in the Navy with months of services at least three months greater than the initial 48-month enlistment contract compared to enlisted men and for promotion, women are nine percentage points less likely to promote to the rank of E5 in under four years compared to enlisted men, as indicated by fast-track promotion rates. Based on the summary statistics for the explanatory variables, it is observed that enlisted women are more likely to report to their first duty station as a Hospital Corpsman in an administrative rating compared to enlisted men.

V. MULTIVARIATE ANALYSIS AND EVALUATION OF RESULTS

This chapter expounds on the methodology and delivers an analysis of the results. It identifies the explanatory variables included in the model to annotate their measured effect on career progression for first-term enlisted women in the Navy. Ultimately, this chapter critically evaluates the findings to determine recommendations for future research, which is presented in Chapter VI.

A. METHODOLOGY

I use linear probability models (LPM) to determine the effect pre-accession and post-accession characteristics have on the career progression of enlisted women in the Navy. The models use binary variables as the specified outcomes to determine whether the explanatory variables increase or decrease the probability of an enlisted woman leaving the Navy before the conclusion of 45 months of service, staying on active-duty three months longer than the obligated four-year enlistment contract, or promoting to the rank of E5 in less than four years.

Four regressions are run for each outcome to determine the impact of pre-accession and post-accession factors on the gender gap in the Navy. The first model for each outcome integrates demographics as the explanatory variables and includes traits such as gender, race, and marital/dependent status. In addition to the demographic variables already included in the first model, the second model adds pre-accession characteristics such as the level of education for enlistees. The next model integrates enlistment characteristics and includes attributes such as the time enlisted personnel spend in DEP before reporting to the Recruit Training Command and whether enlistees receive an enlistment bonus. Lastly, the fourth model incorporates occupational rating groups in addition to demographics, pre-accession characteristics, and enlistment characteristics to determine the effect rating assignment has on the differential gender gap in career progression for enlisted women in the Navy. All models incorporate cohort years to control for macro shocks that apply to all observations in the data set. This

includes changes in the labor market when considering an enlistee's decision to reenlist as well as the annual variation in promotion quotas.

The data reflects binary variables for the outcomes. For attrition, the outcome equals 1 if an enlisted service member left the Navy prior to completing 45 months of active military service, and 0 otherwise. For reenlistment, the outcome equals 1 if an enlisted service member remained on active duty three months past their four-year obligated service, and 0 otherwise. For fast-track promotion, the outcome equals 1 if an enlisted service member received a promotion to the rank of E5 in less than four years, and 0 otherwise. The basic structure of the regression models is presented in equation (1), cited in (Wooldridge, 2016, p. 224):

$$(1) \qquad y = \beta_0 + \beta_1 x_1 + \cdots + \beta_k x_k + U_k$$

The decision to use LPMs as the multivariate methodology to evaluate the effect explanatory variables have on career progression of enlisted women in the Navy compared to men is influenced by prior studies that have analyzed similar topics and the methodologies they used to reach their results. All models are estimated using Stata version 16 (STATA, 2019).

B. RESULTS

1. First-Term Attrition Models

For the first-term attrition models, all enlisted personnel in the dataset are included in the analysis. This includes enlistees who signed four-, five-, and six-year enlistment contracts. Table 9 reflects the results for the four first-term attrition models.

Table 9. Regression Results for First-Term Attrition

Variable	Model 1	Model 2	Model 3	Model 4
Dependent Variable				
Attrition: Whether a person attrited within 45-months of service				
Explanatory Variable Categories				
Key Variable of Interest:				
female	0.050*** (0.002)	0.049*** (0.002)	0.052*** (0.002)	0.055*** (0.002)
Demographics				
Dependents	0.012*** (0.004)	0.007* (0.004)	0.003 (0.004)	0.003 (0.004)
Married	-0.018*** (0.007)	-0.022*** (0.007)	-0.023*** (0.007)	-0.023*** (0.007)
Hispanic	-0.041*** (0.002)	-0.049*** (0.002)	-0.050*** (0.002)	-0.050*** (0.002)
Asian or Pacific Islander	-0.107*** (0.004)	-0.115*** (0.004)	-0.108*** (0.004)	-0.108*** (0.004)
Other Race	0.009*** (0.002)	0.007*** (0.002)	0.002 (0.002)	0.002 (0.002)
Black	0. 009*** (0.002)	-0.009*** (0.002)	-0.015*** (0.002)	-0.016*** (0.002)
Pre-accession Characteristics				
AFQT		-0.002*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
College Experience		0.042*** (0.003)	0.061*** (0.003)	0.064*** (0.003)
GED		0.134*** (0.003)	0.120*** (0.003)	0.121*** (0.003)
Enlistment Characteristics				
Enlisted with a 5/6 Year Obligation			-0.029*** (0.002)	-0.026*** (0.003)
DEP Time			-0.011*** (0.000)	-0.010*** (0.000)
Age in DEP			-0.003*** (0.000)	-0.002*** (0.000)
DEP PQS Complete			-0.022*** (0.003)	-0.021*** (0.003)
Advanced Paygrade			-0.036*** (0.001)	-0.041*** (0.001)
Enlistment Bonus			0.022*** (0.002)	0.014*** (0.002)
Waiver			0.041***	0.042***

Variable	Model 1	Model 2	Model 3	Model 4
			(0.003)	(0.003)
Occupational Rating Group				
Aviation Maintenance				-0.036*** (0.005)
Aviation Support				-0.023*** (0.005)
Shipboard Engineering				0.012** (0.005)
Shipboard Maintenance				-0.021*** (0.005)
Shipboard Operations				-0.002 (0.005)
Intelligence and Cryptology				-0.043*** (0.006)
Special Ordinance				0.002 (0.004)
Seabee Supply				0.021*** (0.005)
Undesignated				-0.002 (0.005)
Other Occupation				-0.002 (0.005)
Hospital Corpsman				-0.024*** (0.005)
Nuclear Field				0.032*** (0.005)
Constant	0.354*** (.002)	0.451*** (0.003)	0.552*** (0.007)	0.553*** (0.008)
N= 348,310				
Note: *p**p***p<0.01; cohort year dummies are included in all models.				

Using only demographic characteristics as explanatory variables, the first-term attrition model estimates that enlisted women are 5 percentage points more likely to separate from the Navy prior to completing their first-term enlistment contract compared to their male equivalents. Controlling for all other factors, women have a higher probability of leaving service earlier than men. As additional controls are included in the subsequent models, a more distinct understanding of which variables influence a woman's decision to remain on active-duty emerges. Model 1 is the baseline model for

first-term attrition. I observe the change in the *female* coefficient as more explanatory variables are added.

Examination of the female coefficients across the 4 models shows that additional pre- and post-accession variables did not explain away the gender differences in first-term attrition. In fact, when comparing the attrition rate within occupation differences (i.e., model 4, which controlled for occupational specialty), I observe the largest gender difference at 5.5 percentage points, representing an 18 percent higher attrition by female enlisted (based off overall mean attrition rate of 31 percent in Table 4).

In addition to gender, model 1 reveals that married enlistees are 1.8 percentage points less likely to separate from the Navy within the first term of enlistment than single individuals. Conversely, having dependents increases the probability of first-term attrition by 1.2 percentage points. Regarding race, Hispanic enlistees are 4.1 percentage points less likely to attrite prior to the completion of their enlistment obligation, Asians or Pacific Islanders are 10.7 percentage points less likely to attrite and Black enlistees are 0.9 percentage point more likely to attrite prior to 45 months of service compared to White enlistees. Overall, the demographics category within model 1 reveals that enlisted women are more likely to attrite than enlisted men, ceteris paribus.

Model 2 shows that with the addition of pre-accession characteristics, the female coefficient essentially remains the same, suggesting that inclusion of the pre-accession characteristics I observe do not change the gender gap in first-term attrition.

In relation to pre-accession characteristics, an enlistee's level of education has a statistically significant effect on first-term attrition. Enlistees with some college experience are 4.2 percentage points more likely to separate from the Navy before the completion of 45 months of service. Additionally, enlistees with a GED are 13.4 percentage points more likely to attrite than enlistees who do not have a GED. This result was surprising as I initially hypothesized that enlistees with a GED have a lower probability of attrition due to limited career opportunities in the civilian sector. On the contrary, the results indicate that enlistees with college experience or with a GED have a higher likelihood of attrition because they may seek better financial opportunities and

pursue their interests in the civilian sector. Overall, the pre-accession characteristics category within model 2 reveals that enlistees with college experience or who receive their GED are more likely to attrite than enlistees who receive their high school diploma, ceteris paribus.

Model 3 indicates that enlisted women are 5.2 percentage points more likely to separate from the Navy prior to the conclusion of their first-term enlistment contract compared to men. With the addition of enlistment characteristics to the model, the *female* coefficient increases from the predicted estimate from the prior two models.

Including enlistment characteristics in the first-term attrition model indicate that enlistees who sign a five- or six-year enlistment contract are 2.9 percentage points less likely to leave the Navy prior to the commencement of their contractual obligation than enlistees who sign a four-year obligation. Additionally, enlistees who complete their DEP PQS are 2.2 percentage points less likely to attrite than those who do not complete their PQS. A potential reason is that enlistees who complete their DEP PQS are possibly more committed to serve in the military and report to the Recruit Training Command (RTC), hence their motivation to complete the PQS. Furthermore, enlistees who report to RTC with an advanced paygrade are 3.6 percentage points less likely to leave the Navy within the first term compared to those who do not receive an advanced paygrade. Enlistees who receive a waiver to join the Navy are 4.1 percentage points more likely to separate from the Navy before the end of their first-term enlistment contract than those who do not receive a waiver. Overall, the enlistment characteristics category within the first-term attrition model reveals that enlistees who sign a five- or six-year obligation, complete their DEP PQS, and report to RTC with an advanced paygrade are less likely to leave the Navy prior to completing 45 months of service and those who receive a waiver are more likely to leave the Navy prior to completing 45 months of service.

Model 4 reveals that enlisted women are 5.5 percentage points more likely to leave the Navy prior to completing 45 months of service compared to their male counterparts. With the addition of the occupational rating groups, the *female* coefficient increased from 5.2 percentage points to 5.5 percentage points. This suggests that within the same occupational rating, there is a wider gender gap.

The occupational rating group was the last category added to the first-term attrition model. The occupational rating group was distinguished from the other categories to evaluate if there is a differential gender gap in career progression for enlisted women in the Navy based on their occupational rating. Out of the 13 groups included in the model, the results indicate that enlistees in an Aviation Maintenance rating are 3.6 percentage points less likely to separate from the Navy within 45 months of service compared to enlistees in an administrative rating. Enlistees in an Aviation Support rating are 2.3 percentage points less likely to attrite in the first term of enlistment. Furthermore, enlistees in a shipboard maintenance rating, an intelligence and cryptology rating, and a Hospital Corpsman are 2.1, 4.3, and 2.4 percentage points less likely to attrite before the conclusion of their first-term enlistment, respectively. Conversely, enlistees in a nuclear field rating are 3.2 percentage points more likely to separate from the navy before the end of their first-term enlistment. The results reveal that first-term attrition varies by occupational specialty, and gender gap is slightly wider when comparing enlisted women and men within the same occupational specialty.

2. Retention Models

Like the first-term attrition models, the retention models are categorized by distinct groups to determine the differences in career progression between enlisted men and women and to observe the pre-accession factors that explain these differences. Hospital Corpsman, Nuclear Field, and Seabee Supply are removed from the occupational rating group category as these ratings "require an enlistment greater than four-years" (Bowers, 2015, p. 71).

The retention models are defined by a sample population. The sample population observes enlistees who completed a four-year obligation and did not attrite prior to the conclusion of their first-term enlistment contract. Therefore, enlistees who signed either a five- or a six-year enlistment contract are dropped from the models. The outcome for retention is defined by 51 months of service, three months beyond the end of the 48-month contract. It is important to note that this reenlistment measure might include

extensions and not an obligation to complete three more years of service. Table 10 reflects the results for the retention models.

Table 10. Retention Regression Results, Four-Year Obligors

Variable	Model 1	Model 2	Model 3	Model 4
Dependent Variable				
Retention: Whether a person remained on active-duty three months longer than initial 48-month contract.				
Explanatory Variable Categories				
Key Variable of Interest:				
female	0.033*** (0.004)	0.034*** (0.004)	0.034*** (0.004)	0.031*** (0.004)
Demographics				
Dependents	0.036*** (0.008)	0.034*** (0.008)	0.024*** (0.008)	0.024*** (0.008)
Married	0.090*** (0.014)	0.082*** (0.014)	0.051*** (0.014)	0.048*** (0.014)
Hispanic	0.014*** (0.004)	0.018*** (0.004)	0.019*** (0.004)	0.019*** (0.004)
Asian or Pacific Islander	0.086*** (0.006)	0.088*** (0.007)	0.080*** (0.007)	0.079*** (0.007)
Other Race	0.018*** (0.005)	0.018*** (0.005)	0.019*** (0.005)	0.018*** (0.005)
Black	0.110*** (0.004)	0.119*** (0.004)	0.118*** (0.004)	0.113*** (0.004)
Pre-accession Characteristics				
AFQT		0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
College Experience		0.072*** (0.007)	0.030*** (0.007)	0.028*** (0.007)
GED		0.011 (0.007)	0.012* (0.007)	0.012* (0.007)
Enlistment Characteristics				
DEP Time			0.003*** (0.000)	0.003*** (0.000)
Age in DEP			0.008*** (0.001)	0.008*** (0.001)
DEP PQS Complete			-0.009 (0.005)	-0.007 (0.005)
Advanced Paygrade			0.030*** (0.002)	0.029*** (0.002)

Variable	Model 1	Model 2	Model 3	Model 4
Enlistment Bonus			0.003 (0.004)	-0.001 (0.005)
Waiver			0.013** (0.006)	0.015** (0.006)
Occupational Rating Group				
Aviation Maintenance				-0.035*** (0.007)
Aviation Support				-0.093*** (0.007)
Shipboard Engineering				-0.113*** (0.007)
Shipboard Maintenance				-0.104*** (0.006)
Shipboard Operations				-0.061*** (0.008)
Intelligence and Cryptology				-0.004 (0.009)
Special Ordinance				-0.061*** (0.007)
Undesignated				-0.062*** (0.006)
Other Occupation				-0.027*** (0.008)
Constant	0.571*** (0.003)	0.507*** (0.006)	0.317*** (0.013)	0.386*** (0.014)
N= 104,346				
Note: p*p**p***<0.01; cohort year dummies are included in all models.				

Applying only demographic characteristics as explanatory variables, the retention model estimates that enlisted women are 3.3 percentage points more likely to remain on active-duty at least three months longer than the initial four-year obligation contract compared to their male equivalents. This finding is interesting due to the findings of the first-term attrition model and prior research studies. Although the results of model 1 are perplexing, it is important to recognize that the defined outcome is the shortest contract an enlistee can sign prior to accessing on active-duty. Observing longer contracts will reveal different estimates.

Examination of the female coefficients across the 4 models shows that additional pre- and post-accession variables did not explain away the gender differences in retention. Contrary to the first-term attrition models, I observe the largest gender difference at 3.4 percentage points with the inclusion of both pre-accession characteristics and enlistment characteristics.

In addition to gender, model 1 reveals that married enlistees are 9 percentage points more likely to remain on active-duty past the initial enlistment contract compared to single individuals. In addition, having dependents increases the probability of first-term retention by 3.6 percentage points. Furthermore, Hispanic enlistees are 1.4 percentage points more likely to remain on active-duty past the completion of their enlistment obligation, Asians or Pacific Islanders are 8.6 percentage points more likely to retain and Black enlistees are 11 percentage points more likely to remain on active duty past the initial obligation compared to White enlistees.

Model 2 indicates that enlisted women are 3.4 percentage points more likely to remain in the Navy past the four-year obligation. Including pre-accession characteristics in the model slightly increased the *female* coefficient which indicates that pre-accession characteristics such as the level of education have a small, yet positive effect on an enlisted woman's choice to stay on active-duty past the conclusion of the initial enlistment contract.

The addition of pre-accession characteristics further reveals that enlistees with some college experience are 7.2 percentage points more likely to remain on active-duty past the initial four-year enlistment contract. Enlistees with a GED are 1.1 percentage points more likely to attrite than enlistees who receive their high school diploma.

Model 3 estimates that enlisted women are 3.4 percentage points more likely to remain in the Navy past the four-year obligation compared to enlisted men. With the addition of enlistment characteristics to the model, the *female* coefficient remains the same as the previous model, indicating that the enlistment characteristics I use do not affect the retention rate for women, at least for four-year obligations. Based on prior

studies such as Buddin (2005), the retention rate will most likely decrease for enlisted women as the length of enlistment increases.

Enlistment characteristics indicate that enlistees who complete their DEP PQS are 0.9 percentage points less likely to remain on active-duty past the initial four-year obligation than those who do not complete their PQS. Furthermore, enlistees who receive a waiver to join the Navy are 1.3 percentage points more likely to remain in the Navy at least three months longer than their four-year obligation contract than those who do not receive a waiver.

Model 4 estimates that enlisted women are 3.1 percentage points more likely to remain in the Navy past the four-year obligation compared to enlisted men. With the addition of occupational rating group, the *female* coefficient decreases from the predicted *female* estimate in the previous models. The results of the fourth model indicate that certain occupational ratings negatively affect the retention rate for enlisted women who sign four-year enlistment contracts compared to men. The decrease in the retention with the inclusion of rating assignments to the model provides further evidence that occupational rating assignments contribute to the differential gender gap in career progression for enlisted women in the Navy.

The addition of the occupational rating groups to the retention model indicates that enlistees in an Aviation Support rating, Shipboard Engineering rating, and Shipboard Maintenance rating are 9.3, 11.3, and 10.4 percentage points less likely to remain on active-duty past the initial enlistment contract of four years, respectively, compared to enlistees in an administrative rating. In addition, undesignated sailors are 6.2 percentage points less likely to remain in the Navy past their initial obligation.

3. Fast-Track Promotion Models

To measure promotion, the promotion models use a binary variable labeled *E5FastTrack1* that reflects a value of 1 if an enlistee promoted to E5 in less than four years. If an enlistee did not promote to E5 in under four years, the variable reflects a value of 0. The speed of achieving the rank of E5 is used as a proxy for promotion to

illustrate not only an enlistee's propensity to serve on active-duty, but their ability to serve at a high, competitive performance.

Like the retention model, the promotion model also includes a sample population to include enlistees who did not attrite prior to 45 months of service. Evidently, if an enlistee separates from the Navy, they are not eligible to promote to E5. Table 11 reflects the results for the four promotion models.

Table 11. Promotion Regression Results

Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Dependent Variable				
Promotion: Whether a person promoted to E5 in less than 5 years				
Explanatory Variable Categories				
Key Variable of Interest:				
female	-0.064*** (0.003)	-0.040*** (0.003)	-0.045*** (0.003)	-0.040*** (0.003)
Demographics				
Dependents	0.016*** (0.006)	0.021*** (0.006)	0.017*** (0.006)	0.018*** (0.005)
Married	0.081*** (0.01)	0.062*** (0.009)	0.044*** (0.009)	0.033*** (0.009)
Hispanic	-0.067*** (0.003)	-0.022*** (0.003)	-0.021*** (0.003)	-0.012*** (0.003)
Asian or Pacific Islander	-0.103*** (0.005)	-0.044*** (0.005)	-0.057*** (0.005)	-0.032*** (0.005)
Other Race	-0.028*** (0.004)	-0.020*** (.003)	-0.018*** (0.003)	-0.012*** (0.003)
Black	-0.168*** (0.003)	-0.048*** (0.003)	-0.055*** (0.003)	-0.046*** (0.003)
AFQT		0.009*** (0.000)	0.009*** (0.000)	0.007*** (0.000)
College Experience		0.073*** (0.005)	0.007 (0.005)	-0.003 (0.005)
GED		-0.048*** (0.005)	-0.031*** (0.005)	-0.022*** (0.005)
Enlistment Characteristics				
Enlisted with a 5/6 Year Obligation			-0.115*** (0.003)	-0.032*** (0.004)
DEP Time			0.004***	0.003***

Variable	Model 1	Model 2	Model 3	Model 4
			(0.000)	(0.000)
Age in DEP			0.004*** (0.000)	0.006*** (0.000)
DEP PQS Complete			0.030*** (0.004)	0.033*** (0.003)
Advanced Paygrade			0.080*** (0.001)	0.074*** (0.001)
Enlistment Bonus			0.054*** (0.003)	-0.041*** (0.003)
Waiver			-0.020*** (0.005)	-0.004 (0.005)
Occupational Rating Group				
Aviation Maintenance				-0.187*** (0.006)
Aviation Support				-0.160*** (0.005)
Shipboard Engineering				-0.057*** (0.005)
Shipboard Maintenance				0.025*** (0.005)
Shipboard Operations				0.009* (0.005)
Intelligence and Cryptology				0.136*** (0.006)
Special Ordinance				0.011** (0.005)
Seabee Supply				-0.067*** (0.005)
Undesignated				-0.169*** (0.006)
Other Occupation				-0.057*** (0.005)
Hospital Corpsman				-0.366*** (0.006)
Constant	0.462*** (0.004)	-0.145*** (0.005)	-0.288*** (0.01)	-0.116*** (0.011)
N= 165,839				
Note: p*p**p***<0.01; cohort year dummies are included in all models.				

Beginning with demographic characteristics, model 1 estimates that enlisted women are 6.4 percentage points less likely to promote to E5 in less than four years

compared to enlisted men. This is equivalent to a 15 percent lower promotion rate as the mean promotion rate of the sample is 42 percent. In addition to gender, married enlistees are 8.1 percentage points more likely to promote to the rank of E5 in less than four years compared to single individuals. Enlistees with dependents are 1.6 percentage points more likely to promote to E5 in less than four years than enlistees without dependents. Conversely, Hispanic enlistees are 6.7 percentage points less likely to promote to E5 in under four years, Asians or Pacific Islanders are 10.3 percentage points less likely to promote and Black enlistees are 16.8 percentage points less likely to promote to E5 in under four years compared to White enlistees.

Examination of the female coefficients across the 4 models shows that additional pre- and post-accession variables reduce, but do not eliminate, the gender differences in fast-track promotion.

Specifically, with the inclusion of pre-accession characteristics, model 2 estimates that enlisted women are 4 percentage points less likely to promote to the rank of E5 in under four years compared to enlisted men, which is a 2.4 percentage point smaller gap compared to model 1. This suggests that the variables included in the pre-accession category: AFQT score and educational levels have a positive effect on an enlisted personnel's probability of promoting to E5 in under four years; but when comparing women and men who had similar AFQT scores, college experience, and GED, the promotion gender gap is still present.

The addition of pre-accession characteristics further indicates that, regardless of gender, enlistees with some college experience are 7.3 percentage points more likely to promote to E5 in less than four years than enlistees without any college experience. Enlistees with a GED are 4.8 percentage points less likely to promote to E5 in less than four years compared to enlistees with a high school diploma.

For promotion, enlistment characteristics indicate that enlistees who complete DEP PQS are 3 percentage points more likely to promote to E5 in less than four years compared to those who do not complete DEP PQS. Furthermore, enlistees who receive an advanced paygrade are 8 percentage points more likely to promote to E5 in under four

years than those who do not receive an advanced paygrade. Enlistees who receive a waiver to join the Navy are 2 percentage points less likely to promote to E5 in under four years than those who do not receive a waiver.

With the inclusion of the occupational rating group in model 4, enlisted women are estimated to be 4 percentage points less likely to promote to the rank of E5 in less than four years. The smaller gender gap in model 4 indicates that promotion gap within the same occupational rating assignment is slightly smaller but still present.

The addition of the occupational rating groups to the promotion model indicates that enlistees in an Aviation Maintenance rating, Aviation Support rating, and Shipboard Engineering rating are 18.7, 16, and 5.7 percentage points less likely to promote to E5 in under four years, respectively, compared to enlistees in an administrative rating. Conversely, enlistees in an Intelligence and Cryptology rating are 13.6 percentage points more likely to promote to E5 in less than four years.

Overall, the results of the fast-track promotion models indicate that enlisted women are either not staying in the Navy beyond four years or, if they do remain on active-duty, they are not professionally advancing at the same rate as their enlisted male counterparts.

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VI. CONCLUSION

A. SUMMARY

In this thesis, I provide an analysis of the career progression of first-term enlisted women in the Navy compared to enlisted men. I use multivariate analysis to determine the affect pre- and post-accession characteristics have on first-term attrition, retention, and fast-track promotion on enlisted women compared to enlisted men. I find that pre- and post-accession variables do not explain away the gender differences in first-term attrition and retention. However, for fast-track promotion, pre- and post-accession variables explain the gender differences, with demographics having the largest gender difference at 6.4 percentage points.

B. RESPONSE TO RESEARCH QUESTIONS

Based on the multivariate analysis presented in Chapter V, I arrive at the following conclusions for the research questions:

1. Primary Research Question

- What are the differences in first-term career progression between enlisted men and women?

The multivariate analysis presented in Chapter V indicates that overall, enlisted women are more likely to separate from the Navy before the conclusion of their first-term enlistment contract compared to enlisted men. However, among those that did not attrite, they are more likely to remain on active-duty at least three months longer than the initial four-year obligation. Finally, among the E4 personnel, enlisted women are less likely to promote to the rank of E5 in less than four years compared to enlisted men.

The addition of pre- and post-accession variables to the first model presented in the first-term attrition analysis did not explain away the gender differences. Gender differences widened a bit when comparing attrition rates between women and men within the same occupation categories.

Among the remaining enlistees that did not attrite during the first term, enlisted women are more likely to remain on active-duty at least three months longer than their initial four-year obligation compared to enlisted men. The gender differences are consistent across the 4 models, ranged between 3.1 to 3.4 percentage points.

Lastly, enlisted women are less likely to promote to the rank of E5 in less than four years compared to enlisted men. When comparing the promotion rate solely controlled for demographics, I observe the largest gender difference at 6.4 percentage points (equivalent to 15 percent). Incorporating pre- and post-accession characteristics reduced the gender gap to 4 and 4.5 percentage points, respectfully.

2. Secondary Questions

- What pre-enlistment factors explain the differences in attrition, reenlistment, and promotion rates of first-term enlisted women compared to those of enlisted men?

The pre-enlistment factors I included in my models are the Armed Forces Qualifications Test (AFQT) Score and educational level to include college experience, the General Education Development (GED) Test, and high school diploma. The pre-enlistment factors did not influence the attrition or retention of enlisted women. However, incorporating pre-enlistment factors into the promotion model reduced the gender difference by 2.4 percentage points. This suggests that while these pre-accession characteristics (i.e., AFQT scores and better education levels) are positively associated with higher promotion rate; when comparing women and men who had similar AFQT score, college experience, and GED, the promotion gender gap is smaller but still present.

- Is there a differential gender gap in career progression for enlisted women in the Navy based on their occupational rating?

Based on the findings from the econometric models presented in Chapter V, I determine that there is a differential gender gap in career progression for enlisted women in the Navy based on their occupational rating.

Out of the 13 occupational rating groups included in the econometric models, the results indicate that enlistees in an Aviation Maintenance rating, Aviation Support rating, Shipboard Maintenance rating, Intelligence and Cryptology rating, and a Hospital Corpsman rating are less likely to leave the Navy before the conclusion of their first-term enlistment contract compared to enlistees in an administrative rating. Conversely, enlistees in a Nuclear Field rating are more likely to separate from the Navy before the end of their first-term enlistment. According to the summary statistics presented in Table 8, enlisted women are less likely to be assigned to an Aviation Maintenance and Nuclear Field rating and are more likely to be assigned to an Intelligence and Cryptology rating and designated as a Hospital Corpsman. In addition, enlisted women are more likely to report to their first duty station undesignated.

For retention, enlistees in an Aviation Support rating, Shipboard Engineering rating, Shipboard Maintenance rating, and Undesignated sailors are less likely to remain on active-duty past the initial enlistment contract of four years compared to enlistees in an administrative rating. Based on the summary statistics presented in Table 8, enlisted women are less likely to be assigned to a Shipboard Engineering rating compared to enlisted men.

For promotion, enlistees in an Aviation Maintenance rating, Aviation Support rating, and Shipboard Engineering rating are less likely to promote to E5 in under four years. Conversely, enlistees in an Intelligence and Cryptology rating are more likely to promote to E5 in less than four years.

The results of the first-term attrition, retention, and promotion models reveal that occupational rating groups statistically contribute to first-term attrition and affect the differential gender gap in career progression for enlisted women and men in the Navy.

C. RECOMMENDATION FOR FUTURE WORK

The primary limitation of my thesis is the absence of current data. The current labor market has changed dramatically since the years represented by the data analyzed in this thesis. The COVID-19 pandemic that started in early 2020 further changed the gender dynamics in the labor market. It is recommended that future work use updated

individual-level data on naval enlisted personnel who accessed on active duty from FY 2012 to FY 2017 and who were observed annually until March 2023 or until separation. While the dataset used in Bowers (2015) provides valuable information, more current data will provide accurate predictors that help explain attrition, retention, and promotion rates of first-term Navy enlisted women compared to their male counterparts in current environment, providing a renewed outlook on the career progression of Navy enlisted women.

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