Theses and Dissertations   1. Thesis and Dissertation Collection, all items

2015-03

Pre-accession factors in the performance and retention of Hispanic enlistees

Bowers, Ryan W.

Monterey, California: Naval Postgraduate School

http://hdl.handle.net/10945/45164

NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

PRE-ACCESSION FACTORS IN THE PERFORMANCE AND RETENTION OF HISPANIC ENLISTEES

by

Ryan W. Bowers

March 2015

Thesis Co-Advisors:

Stephen L. Mehay
Simona Tick

Approved for public release; distribution is unlimited

THIS PAGE INTENTIONALLY LEFT BLANK

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE March 2015	3. REPORT TYPE AND DATES COVERED Master's Thesis	
4. TITLE AND SUBTITLE PRE-ACCESSION FACTORS IN THE PERFORMANCE AND RETENTION OF HISPANIC ENLISTEES		**5. FUNDING NUMBERS**	
6. AUTHOR(S) Ryan W. Bowers			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000		**8. PERFORMING ORGANIZATION REPORT NUMBER**	
9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A		**10. SPONSORING/MONITORING AGENCY REPORT NUMBER**	

11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government. IRB Protocol number NPS.2014.0075-IR-EP5-A

12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited	12b. DISTRIBUTION CODE A

13. ABSTRACT (maximum 200 words)

This thesis applies quantitative methods to analyze the effect of pre-accession characteristics and early career experiences on the first-term attrition, retention, and fast-track promotion rates of Hispanic and Non-Hispanic enlistees in the United States Navy. Using data from the Personalized Recruiting for Immediate and Delayed Enlistment system and the Defense Manpower Data Center for enlistees that joined the Navy in FY 2001–2009, followed during their careers until FY 2013 or separation, the multivariate analysis main findings show that Hispanics serving in the Navy appear to be well adjusted to military service. These sailors are serving critical roles around the world, and, based on attrition and retention metrics, perform somewhat better than their non-Hispanic counterparts. On the other hand, Hispanic sailors are promoting at somewhat slower rates than their non-Hispanic peers. Based on the findings of this thesis, recommendations are formulated to support interventions that can make the U.S. Navy a stronger, more diverse organization.

14. SUBJECT TERMS Navy, Hispanic, Delayed Entry Program, DEP, enlisted, pre-accession, first-term, attrition, recruiting, promotion, promotion rates, retention, career success, citizenship, quality of education, education tier, HSDG, NHSDG, English language, personalized recruiting for immediate and delayed enlistment, PRIDE	15. NUMBER OF PAGES 145
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UU

THIS PAGE INTENTIONALLY LEFT BLANK

PRE-ACCESSION FACTORS IN THE PERFORMANCE AND RETENTION OF HISPANIC ENLISTEES

Ryan W. Bowers
Lieutenant Junior Grade, United States Navy
B.S., San Diego State University, 2011

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
March 2015

Author: Ryan W. Bowers

Approved by: Stephen L. Mehay
                 Thesis Co-Advisor

                 Simona Tick
                 Thesis Co-Advisor

                 William Gates
                 Dean, Graduate School of Business and Policy

THIS PAGE INTENTIONALLY LEFT BLANK

ABSTRACT

This thesis applies quantitative methods to analyze the effect of pre-accession characteristics and early career experiences on the first-term attrition, retention, and fast-track promotion rates of Hispanic and Non-Hispanic enlistees in the United States Navy. Using data from the Personalized Recruiting for Immediate and Delayed Enlistment system and the Defense Manpower Data Center for enlistees that joined the Navy in FY 2001–2009, followed during their careers until FY 2013 or separation, the multivariate analysis main findings show that Hispanics serving in the Navy appear to be well adjusted to military service. These sailors are serving critical roles around the world, and, based on attrition and retention metrics, perform somewhat better than their non-Hispanic counterparts. On the other hand, Hispanic sailors are promoting at somewhat slower rates than their non-Hispanic peers. Based on the findings of this thesis, recommendations are formulated to support interventions that can make the U.S. Navy a stronger, more diverse organization.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF FIGURES

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

AR	Arithmetic Reasoning
AFQT	Armed Forces Qualification Test
ASVAB	Armed Forces Vocational Aptitude Battery
DMDC	Defense Manpower Data Center
DEP	Delayed Entry Program
EST	Enlisted Screening Test
FMS	Final Multiple Score
GED	General Educational Development
HSDG	High School Diploma Graduate
HSG	High School Graduate
IRR	Individual Ready Reserve
IFA	Initial Fitness Assessment
EAF	Enhanced Applicant File
FY	Fiscal Year
NHSG	Non-High School Graduate
MK	Math Knowledge
MEPS	Military Entrance Processing Station
MTF	Military Treatment Facilities
NRC	Navy Recruiting Command
NRD	Navy Recruiting Districts
NRS	Navy Recruiting Stations
PC	Paragraph Comprehension
PQS	Personal Qualification Standard
PRIDE	Personalized Recruiting for Immediate and Delayed Enlistment
RTC	Recruit Training Command
SRB	Selective Re-enlistment Bonus
WK	Word Knowledge

THIS PAGE INTENTIONALLY LEFT BLANK

ACKNOWLEDGMENTS

First and foremost, I would like to thank my wife Mary for her patience, her advice, and for keeping me grounded and sane during the thesis writing process. Thank you for being an amazing wife, wonderful mother, and best friend. To my beautiful Harper, thanks for brightening our lives and filling our home with love and laughter.

I would also like to thank my thesis advisors, Dr. Stephen Mehay and Dr. Simona Tick for providing infinite wisdom, patience, and insight throughout the entire process of this thesis. Their enduring support helped make the learning process enjoyable and they are substantial contributors in the quality of this thesis.

THIS PAGE INTENTIONALLY LEFT BLANK

I. INTRODUCTION

A. PURPOSE AND APPROACH

This thesis uses a quantitative approach to analyze pre-accession characteristics and early career factors, and their effect on the first-term attrition, retention, and promotion rates of Hispanic enlistees compared with that of Non-Hispanic enlistees in the United States Navy.

Pre-accession factors include enlistees' mental and moral background, body-fat measurement, citizenship status, and enlistment with dependents for different racial and ethnic groups. Early career factors examined in this thesis include enlistment bonuses, entry at advanced pay grade, enlistment programs, and initial rating assignments that might explain career success (attrition, promotion rates, and re-enlistment outcomes) independent of personal background characteristics.

The approach used by this thesis includes a quantitative multivariate analysis using individual level data on all enlistees that entered the U.S. Navy in fiscal years 2001 to 2009, with longitudinal records until the end of fiscal year 2013, or the service member separates.

B. RESEARCH QUESTIONS

1. Primary Research Questions

- What are the differences in attrition, retention, and promotion between Hispanic and other Navy enlistees?

- What pre-enlistment characteristics are important in explaining any differences in attrition, retention, and promotion rates of Hispanic enlistees compared with those of Non-Hispanic enlistees?

2. Secondary Research Questions

- Does citizenship or quality of education at enlistment affect first-term attrition, promotion, or retention?

- Are Hispanics more likely to enlist with a body-fat waiver and do Navy recruits who enlist with body-fat waivers experience greater attrition?

1

- Does accession with advanced pay grade or the assignment of personnel into technologically advanced versus manual labor occupations differ by demographic group? What is the effect on promotion and retention for applicants who access at an advanced pay grade?

C.   DATA

This thesis uses pre-accession data from the Personalized Recruiting for Immediate and Delayed Enlistment (PRIDE) system, which is merged with personnel data from the Defense Manpower Data Center (DMDC). Data obtained from the PRIDE system has not been used extensively previous to this study. Enlisted entry cohorts of fiscal year 2001–2009 are followed every year until fiscal year 2013, or separation.

Longitudinal files are created to track enlisted personnel career progress during and after the first contract. Multivariate estimating models are used to analyze the effects of demographics and pre-accession factors on enlisted personnel first-term attrition, promotion, and re-enlistment. The sample size of the analysis data set is 348,033 active duty non-prior service enlistees. First-term attrition is measured at 45 months.

D.   MOTIVATION FOR THE STUDY

Hispanic youth have a high propensity to enlist, yet remain underrepresented in the military (Carvalho, Krulikowski, & Marsh, 2011). This thesis will provide current estimates on any differences in attrition, re-enlistment, and promotion between Hispanic and non-Hispanic enlistees; as well as an in-depth examination of the early career and entry characteristics that recruits come into the Navy with, that might explain some of the differences in job-performance outcomes down the road. These estimates will present insight on enlisted Hispanic promotion rates and the Navy's ability to retain Hispanics. These estimates may also present decision support for interventions to enhance the opportunities of a military career to a diverse group of individuals, and to successfully attract and retain a diverse talent pool. The study seeks to identify characteristics that lead to successful first-term careers and retention of Hispanic enlistees. Navy Recruiting Command can benefit from the identification of these characteristics as well as the estimates on the effects of citizenship and quality of education at enlistment for Hispanics.

E.   ORGANIZATION OF THE THESIS

The thesis is organized into six chapters. Chapter II is the background chapter, which provides contextual and institutional background on the issues of Hispanic enlistees in the Navy. It defines the Hispanic demographic and its representation in the U.S. population, presents information on Hispanic representation in the U.S. military, a cultural shift toward younger Hispanic veterans, naturalization through service in the armed forces, propensity to serve, and the current representation of Hispanics in the military. The enlistment process is addressed from pre-enlistment screening to job classification, and ultimately contracting into the Delayed Entry Program (DEP). The Background chapter then provides an overview of attrition, and promotion. Chapter III reviews previous studies on Hispanic attrition, promotion, and retention. Chapter IV presents the data sources, variable descriptions, and summary statistics. Chapter V outlines the multivariate analysis of promotion and retention: methodology, model specification, and a discussion of the results. The summary, conclusions, and recommendations are discussed in Chapter VI.

THIS PAGE INTENTIONALLY LEFT BLANK

II. HISPANICS AND THE U.S. NAVY

This background chapter defines the Hispanic demographic in accordance with the Office of Management and Budget notice, *Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity* (Office of Management and Budget [OMB], 1997), and reports the current and projected growth rate of the Hispanic population in the United States. The chapter presents information on Hispanic representation in the military, on a cultural shift toward younger Hispanic veterans, and on naturalization through service in the armed forces. It also discusses the significant difference between Hispanics' propensity to serve and their current representation in the military. The enlistment process is addressed from pre-enlistment screening to job classification, and ultimately contracting into the Delayed Entry Program (DEP). The basic eligibility requirements for enlistment in the U.S. Navy as defined by the Navy Enlisted Recruiting Manual and Title 10 United States Code are compared to multiple RAND Corporation studies and data from the National Center for Education Statistics to evaluate how Hispanic candidates are affected by recruiting qualifications and criteria.

A. DEFINITION OF HISPANIC

A Hispanic individual is defined by the U.S. Census as someone who self classifies as Mexican, Mexican-American, Chicano, Puerto Rican, or Cuban, as well as those who indicate that they are another Hispanic, Latino, or Spanish origin (Humes, Jones, & Ramirez, 2011). Origin is the "heritage, nationality group, lineage, or country of birth of the person or the person's ancestors before their arrival in the United States" (Humes, Jones, & Ramirez, 2011, p. 2). Appendix A, Table 34, breaks down the growth of Hispanics by individual nationalities, identifying multiple countries and geographical regions that are associated with Hispanic ethnicity. Appendix B, Figure 8 reproduces the question on Hispanic origin from the 2010 Census.

B. HISPANIC REPRESENTATION IN THE UNITED STATES

The United States Census reports that 53 million Hispanics reside in the country as of July 1, 2012 (U.S. Census, 2014). U.S. Census (2014) identifies Hispanics as the

largest and fastest growing minority group in the United States with 17 percent of the 2013 population reporting Hispanic ethnicity. The Hispanic populace experienced considerable growth between the 2000 and 2010 censuses that has been unrivaled by any other demographic group. Table 1 shows the Hispanic population increased by 15.2 million people, a 43 percent increase between 2000 and 2010 (Ennis, Ríos-Vargas, & Albert, 2011).

Table 1.   U.S. Population Change, 2000 to 2010 (from Ennis, 2011).

Origin and type	2000		2010		Change, 2000 to 2010[1]	
	Number	Percent of total	Number	Percent of total	Number	Percent
HISPANIC OR LATINO ORIGIN						
Total	281,421,906	100.0	308,745,538	100.0	27,323,632	9.7
Hispanic or Latino	35,305,818	12.5	50,477,594	16.3	15,171,776	43.0
Not Hispanic or Latino.	246,116,088	87.5	258,267,944	83.7	12,151,856	4.9

In 2008, the U.S. Census updated the national projections of the population by race and Hispanic origin for the next four decades (Ortman & Guarneri, 2009). These projections indicate that the Hispanic population will grow to approximately 66.3 million people, and account for 19.4 percent of the population, by the year 2020 (Ortman & Guarneri, 2009). Appendix A, Table 35 presents the 2010 to 2050 U.S. Census projections. Ortman & Guarneri (2009) report that these projections would only differ by approximately 1 percent should the United States experience a significantly higher or lower level of net international migration. Not only is the Hispanic population in the United States growing, it is growing rapidly.

While the Census reports a significant growth in the population of Hispanics in the United States, there has been a slight decrease in the population of Hispanics in the Commonwealth of Puerto Rico (D'vera, Patten, & Lopez, 2014). The population of Puerto Rico is notable because native-born Puerto Ricans maintain both U.S. and Puerto Rican citizenship and are entitled to freely enter the U.S. to reside, gain employment, or serve in the U.S. Armed Forces (Jones-Shafroth Act, 1917). Native-born Puerto Ricans residing in one of the nation's 50 states are included in the U.S. population; however,

Puerto Ricans residing in the Commonwealth of Puerto Rico are not included in the U.S. population, despite their citizenship status.

A 2000 Census brief reported that 3.8 million Hispanics reside in Puerto Rico, accounting for 99 percent of the island's demographic (Guzman, 2001). Since the 2000 Census, the Hispanic population in Puerto Rico has declined to approximately 3.5 million and, according to the Pew Research Center, poor economic conditions are expected to stimulate the migration of Puerto Ricans from the island to the U.S. mainland over the next four decades (D'Vera et al., 2014). The Commonwealth of Puerto Rico is important to the Department of Defense as approximately 107,500 veterans of the U.S. Armed Forces were born in Puerto Rico (Lee & Beckhusen, 2012). Table 2 presents the U.S. Census' population projections for Puerto Rico through the year 2050; which identifies an anticipated decrease in population due to the expected negative migration through 2050. The migration from the Commonwealth of Puerto Rico will have significant long-term effects; Table 2 connects the migration from Puerto Rico with a decrease in the annual births in Puerto Rico from 39,000 to 25,000 by the year 2049.

Table 2.   U.S. Census Bureau's Population Projections for Puerto Rico (from Ortman & Guarneri, 2009).

Demographic Overview - Custom Region - Puerto Rico

Demographic Indicators	1995	2005	2015	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Population																													
Midyear population (in thousands)	3,683	3,821	3,598	3,476	3,466	3,454	3,442	3,429	3,414	3,399	3,383	3,366	3,348	3,330	3,310	3,290	3,269	3,248	3,226	3,203	3,180	3,157	3,133	3,109	3,084	3,059	3,035	3,010	2,984
Growth rate (percent)	(NA)	(NA)	-0.6	-0.3	-0.3	-0.3	-0.4	-0.4	-0.4	-0.5	-0.5	-0.5	-0.5	-0.6	-0.6	-0.6	-0.6	-0.7	-0.7	-0.7	-0.7	-0.7	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8
Fertility																													
Total fertility rate (births per woman)	(NA)	(NA)	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
Crude birth rate (per 1,000 population)	(NA)	(NA)	11	10	10	10	10	10	10	9	9	9	9	9	9	9	9	9	9	9	8	8	8	8	8	8	8	8	8
Births (in thousands)	(NA)	(NA)	39	36	35	35	34	34	33	32	32	31	30	30	29	29	28	28	28	27	27	27	27	26	26	26	26	25	25
Mortality																													
Life expectancy at birth (years)	(NA)	(NA)	79	81	81	81	81	81	81	81	81	81	81	82	82	82	82	82	82	82	82	82	82	82	83	83	83	83	83
Infant mortality rate (per 1,000 births)	(NA)	(NA)	8	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4
Under 5 mortality rate (per 1,000 births)	(NA)	(NA)	8	7	7	7	7	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	5	5
Crude death rate (per 1,000 population)	(NA)	(NA)	9	10	11	11	11	11	11	11	12	12	12	12	12	13	13	13	13	13	13	14	14	14	14	14	14	14	15
Deaths (in thousands)	(NA)	(NA)	31	36	37	37	38	38	38	39	39	40	40	40	41	41	41	42	42	42	43	43	43	43	43	43	43	44	44
Migration																													
Net migration rate (per 1,000 population)	(NA)	(NA)	-8	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
Net number of migrants (in thousands)	(NA)	(NA)	-29	-10	-10	-10	-10	-9	-9	-9	-9	-9	-9	-9	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-7	-7	-7	-7	-7

C. HISPANICS IN THE U.S. MILITARY

In accordance with the Office of Management and Budget, as stated in *Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity* (OMB, 1997), the Department of Defense no longer considers Hispanic a race. The revised standards were implemented prior to the 2000 Census, and federal reporting has been mandated to record any individual who claims "Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race" as having Hispanic ethnicity since no later than 1 January, 2003 (OMB, 1997). Based on the revised reporting standards, the 2012 *Demographics Report: Profile of the Military Community* from the Office of the Deputy Assistant Secretary of Defense [OASD] (2012), reports that 11.3 percent of the Active Duty Armed Forces are Hispanic, while, 10.1 percent of the Selected Reserves are Hispanic. Table 3 presents the number and percentage of active duty military members by race and ethnicity.

Table 3.   Number and Percentage of Active Duty Military Members by Race and Ethnicity (from Office of the Assistant Secretary of Defense, 2012).

Race	Hispanic or Latino		Not Hispanic or Latino		Total DoD	
	N	%	N	%	N	%
American Indian or Alaska Native	3,840	17.9%	17,575	82.1%	21,415	100.0%
Asian	1,685	3.3%	49,697	96.7%	51,382	100.0%
Black or African American	9,057	3.9%	224,326	96.1%	233,383	100.0%
Native Hawaiian or other Pacific Islander	945	6.7%	13,249	93.3%	14,194	100.0%
White	99,691	10.3%	867,942	89.7%	967,633	100.0%
Multi-racial*	6,295	16.1%	32,917	83.9%	39,212	100.0%
Other/Unknown	35,693	58.7%	25,116	41.3%	60,809	100.0%
Total DoD	157,206	11.3%	1,230,822	88.7%	1,388,028	100.0%

* The Army does not report "Multi-racial."
Note: Percentages may not total 100 due to rounding.

The U.S. Census identifies an additional 1.2 million Hispanic veterans of the U.S. Armed Forces, who account for 5.7 percent of the nation's 21.5 million veterans (Lee & Beckhusen, 2012). Figure 1 identifies a cultural shift in which younger Hispanics are more likely to be veterans than those in previous generations.

Figure 1.   Hispanic or Latino Veteran Status and Age for the Civilian
Population 18 Years and Older (after Lee & Beckhusen, 2012).
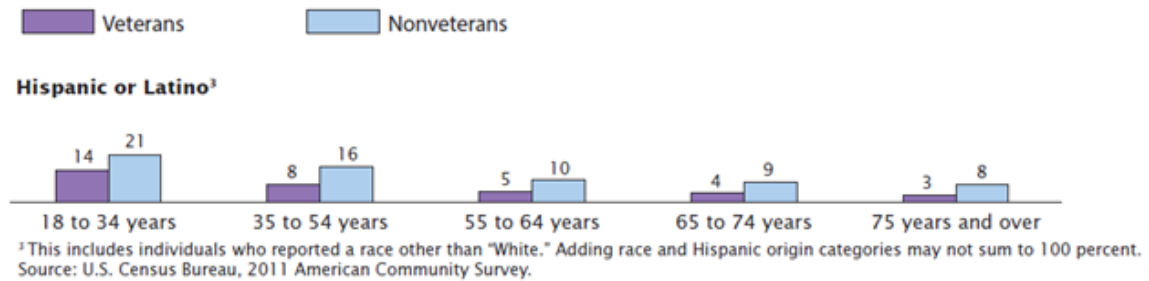
D.   RECRUITING FOR THE ALL-VOLUNTEER FORCE

The increase in Hispanic representation within the general population is of great interest to the Department of Defense, which has been tasked by Executive Order No. 9981 (1948) to ensure the "equality of treatment and opportunity for all persons in the armed services." In 2009, the National Defense Authorization Act, seeking to further ensure equality for all persons in the Armed Forces, established the Military Leadership Diversity Commission, which has recommended that Congress revise Title 10, Section 113 to:

> Require the Office of the Secretary of Defense to develop a standard set of strategic metrics and benchmarks to track progress toward the goal of having a dynamic and sustainable 20–30-year pipeline that yields (1) an officer and enlisted corps that reflects the eligible U.S. population across all Service communities and ranks. (MLDC, 2011, p. 125)

The Military Leadership Diversity Commission is requesting that Congress intervene to ensure that the nation's military reflects the demographic realities of the nation.

While Hispanic representation in the U.S. military has increased over the last decades, the number of Hispanics enlisting in the military has not increased at a rate comparable to the growth of Hispanics in the civilian population. In fiscal year 1978, the 6.1 percent Hispanic representation of accessions in the military mirrored the equivalent age group in the civilian population (Office of the Undersecretary of Defense [OUSD], 2013). The most current data from the Department of Defense, for the fiscal year 2012, indicates that Hispanics now account for 20.7 percent of 18- to 24-year old, civilian, non-

prior service applicants; yet, only 16.9 percent of all Department of Defense non-prior service accessions aged 18 to 24 are of Hispanic ethnicity (OUSD, 2013). Table 4 compares the growth in the crucial market of 18-to-24-year-old Hispanic civilians to the accessions of 18-to-24-year-old Hispanics, by military service.

Table 4.   Hispanic Non-Prior Service (NPS) Active Component Enlisted Accessions by Service with Civilian Comparison Group, FY 03–12 (from Office of the Undersecretary of Defense, 2013).

					SERVICE							18-24 YR-OLD	
FISCAL	ARMY		NAVY		MARINE CORPS		AIR FORCE		TOTAL DoD			CIVILIANS	
YEAR	#	%	#	%	#	%	#	%	#	%			%
2003[2]		10.7		13.2		14.6		8.1		11.5			17.3
2004	9,167	12.6	5,954	15.1	4,855	16.1	3,214	9.5	23,190	13.2		4,908,048	17.7
2005	7,721	12.2	6,086	16.1	5,206	16.3	2,094	11.0	21,107	13.9		4,929,807	17.6
2006	8,082	11.6	5,834	16.3	4,889	15.6	3,393	11.2	22,198	13.3		4,887,635	17.5
2007	7,110	11.3	5,734	16.6	5,555	16.3	3,052	11.0	21,451	13.5		5,000,221	17.8
2008	8,111	11.7	7,983	21.0	6,395	17.3	3,832	13.8	26,321	15.3		5,055,113	17.8
2009	7,381	11.6	7,936	22.5	5,098	16.5	5,059	15.9	25,474	15.8		5,113,217	17.9
2010	8,693	12.4	8,167	24.0	5,126	18.3	5,101	18.0	27,087	16.9		5,383,575	18.6
2011	8,289	13.4	6,459	19.4	5,801	19.5	5,380	19.0	25,929	16.9		5,712,160	19.4
2012	8,461	14.4	5,844	16.1	6,247	20.5	5,486	19.1	26,038	16.9		6,174,332	20.7

1. In FY 2003 there was a change in the way DoD reported race/ethnicity data. The new race/ethnicity data were only made available for the last three quarters of FY2003. Thus, the FY 2003 data includes percentages for NPS accessions by race/ethnic for the last three quarters of FY 2003 only. Since we do not have full year totals, we omit the total number of accessions.
Source: Civilian data from Bureau of Labor Statistics Current Population Survey monthly files. Military data are provided by the Defense Manpower Data Center (DMDC).

Table 4 identifies a concerning and significant decline in 18 to 24 year old Hispanic non-prior service accessions for the U.S. Navy in fiscal year 2012, a drop which none of the other services experienced.

The Navy needs a large and diverse applicant pool in order to enlist, promote, and retain the best service members in support of national security. OUSD (2013) identifies the Navy as one of the least popular military branches for Hispanic enlisted applicants. In 2012, 13.1 percent (8,494) of the Navy's enlisted applicants were of Hispanic ethnicity, compared to 14.8 percent (14,338) for the Army, 22.5 percent (10,362) for the Marine Corps, and 16.3 percent (7,904) for the Air Force. OUSD (2013) also reported that Hispanic enlisted applicants for the Navy are, however, more likely to access onto active duty than are Army or Marine Corps applicants. Navy recruiters convert 68.8 percent of Hispanic applicants into enlisted accessions, compared to 59 percent for the Army and

60.3 percent for the Marine Corps. On the other hand, 69.4 percent of Air Force applicants eventually become active duty accessions.

1. Navy Enlistment Eligibility, Procedures, and Criteria

In fiscal year 2012, the Navy recruited 36,329 enlisted service members for active duty (Kapp, 2013). Navy Recruiting Command is split between Region East and Region West, with each region consisting of 13 Navy Recruiting Districts (NRD). Each NRD maintains numerous Navy Recruiting Stations (NRS) where production recruiters divide territory by zip codes and seek out enlisted applicants who meet specified mental, moral and physical standards. The target market with the highest propensity to enlist consists of high school seniors and high school graduates between the ages of 17 and 22. The service branch that contracts a qualified applicant is often the first branch to contact the applicant and, therefore, it is the production recruiter's duty to contact as many applicants as possible and to develop a broad referral base.

When a recruiter and an applicant make first contact, the recruiter performs a pre-enlistment screening utilizing a standard background questionnaire to gather relevant enlistment information and to ascertain potentially disqualifying conditions. Volume II of the Navy Recruiting Manual: Enlisted, CRUITMAN-ENL 1130.8J (U.S. Navy, 2011) identifies basic eligibility requirements and mandatory rejections. A RAND study prepared for the Office of the Secretary of Defense, examines how the basic eligibility requirements for military service impact Hispanic enlistments by disproportionately disqualifying Hispanics (Asch, Buck, Klerman, Kleykamp, & Loughran, 2009). The enlistment eligibility requirements that result in the most disqualifications of Hispanic applicants are a failure to meet body composition standards, the requirement for a high school diploma, and poor scores on the Armed Forces Vocational Aptitude Battery (ASVAB) test.

Volume II of the Enlisted Navy Recruiting Manual states that "excess body fat and/or the inability to pass the Navy's physical fitness assessment are detrimental to health, longevity, and stamina, and detract from good military appearance" (U.S. Navy, 2011, p. 91). This requirement is based on a cultural view that service members need to

be fit for the fight, and that good military appearance is equated with productivity and order. The Navy requires applicants to meet weight restrictions based the individuals' height, and allows those who exceed weight standards to enlist if they meet a body-fat composition of 22 percent for males and 33 percent for female applicants. These body composition standards adversely affect Hispanics, with a RAND study deducing that,

> Hispanics are considerably heavier than others: on average, Hispanic males weigh almost ten pounds more than white males. Seventy-nine to 91 percent of white males meet the service weight standards (weight standards vary by service), compared with only 71 to 88 percent of Hispanic males. Among females, the percentage who meets the weight standards is even lower; 63 to 82 percent of white females meet the standards, compared with only 49 to 71 percent of Hispanic females. (Asch, Buck, et al., 2009, p. 20)

The Navy, could at its discretion, waiver applicants with body-fat composition of up to 25 percent for males and 36 percent for females; however, applicants accessed with body-fat waivers are required to meet the Navy's weight or body-fat standard prior to graduation from Recruit Training Command (RTC), and body-fat waivers are not routinely sanctioned. The PRIDE data set used by this thesis only contains observations of body-fat waivers that were authorized in FY 08–09. Table 5 reproduces the height and weight standards from the Navy Recruiting Manual, identifying the maximum weight for a given applicant's height.

Table 5.   U.S. Navy Height and Weight Standards (from U.S. Navy, 2011).

Applicant's Height (Inches)	Men Maximum Weight (pounds)	Women Maximum Weight (pounds)
57	127	127
58	131	131
59	136	136
60	141	141
61	145	145
62	150	149
63	155	152
64	160	156
65	165	160
66	170	163
67	175	167
68	181	170
69	186	174
70	191	177
71	196	181
72	201	185
73	206	189
74	211	194
75	216	200
76	221	205
77	226	211
78	231	216
79	236	222
80	241	227

For enlistment eligibility, a Navy applicant must be a Tier 1 High School Diploma Graduate (HSDG), or pending available quotas for non-Tier 1 enlistment, meet the requirements for Tier 2 High School Graduate (HSG) or Tier 3 Less than High School Diploma or Credential, Non-High School Graduate (NHSG). Each Navy Recruiting District employs an Educational Specialist who is responsible to the NRD Commanding Officer to ensure that the educational status (Tier Level/ Educational Code) of applicants are properly evaluated and assigned based on "applicant interviews, education documents provided, the education methodology used to facilitate the learning experience and education code definitions" that are listed in volume II, of the Navy Enlisted Recruiting Manual (U.S. Navy, 2011). Since 2008, Tier 1 education has progressed to include a

more liberal classification, and this classification is subject to change with evolving research on attrition rates. Typical Tier 1 applicants possess a High School Diploma from a "public or private 12-year, 'traditional,' credit-based day program of classroom instruction" or 15 college credits, 22 quarter hours, or 675 clock-hour credits in 100 series or above coursework or postsecondary education (U.S. Navy, 2011). In accordance with current educational standards in the 1130.8J, Adult/Alternative Diploma Graduates, Charter School Graduates, Home School Graduates, some Job Corps graduates, and applicants who have satisfied all requirements for graduation but have failed to pass state exit exams can also be designated as Tier 1 (U.S. Navy, 2011).

Department of Defense Instruction 1145.01 (2014) limits the number of non-Tier 1 high school diploma graduates that can enlist in the military to a maximum of 10 percent per fiscal year, "based on the relationship between education credentials and first-term attrition (adverse separation) rates." The authority to recruit non-Tier 1 accessions falls under Section 520 of Title 10, United States Code, which authorizes the enlistment of alternative high school credential holders (Tier 2) and non-high school graduates (Tier 3) if the enlistment of such applicants are required "to meet established strength requirements" (Limitation on Enlistment, 1988). Tier 2 applicants typically possess a test-based high school credential, such as the General Educational Development (GED) Certificate of High School Equivalency. Applicants who have completed the National Guard Youth Challenge Program, have received an attendance-based high school certificate, or have completed a 6-month vocational-technical program and 11 years of secondary education may also be designated as Tier 2 for enlistment. Tier 3 applicants are not high school graduates or holders of any recognized alternative credential (U.S. Navy, 2011). The enlistment of Tier 2 and 3 applicants requires an Armed Forces Qualification Test (AFQT) score of 50 or greater on the ASVAB, and additional statements of personal reference (Appendix B, Figure 9). Tier 2 and 3 applicants also require significantly more recruiter effort and time compared to Tier 1 applicants. Additionally, non-Tier 1 applicants who successfully enlist into the Navy are required to complete the Delayed Entry Program (DEP) Personal Qualification Standard (PQS) and

to retain in DEP for a minimum of 90 days prior to shipping to Recruit Training Command (RTC).

Understanding the educational requirements and the difficulty faced by non-traditional high school diploma graduates are important as the RAND study, *What Factors Affect the Military Enlistment of Hispanic Youth? A Look at Enlistment Qualifications* (Asch et al., 2005), finds that Hispanics are significantly less likely to graduate from high school than non-Hispanics. Figure 2 reproduces the 2001 high school dropout statistics and identifies 31.6 percent of Hispanics aged 16 to 24 years old as dropouts (Asch et al., 2005). The most current data available from the National Center for Education Statistics [NCES] (2014) identifies a large reduction in the number of high school dropouts over the last decade; however, Hispanics are still significantly more likely to be dropouts than non-Hispanics. Figure 3 presents the 2012 high school dropout percentages, identifying 12.7 percent of the Hispanic 16-to-24 year-old population as dropouts, compared to 7.5 percent for Blacks, and 4.3 percent for Whites. These high school dropout percentages do not include individuals who possess the GED Certificate of High School Equivalency.

Figure 2.   2001 High School Dropout Percentage by Demographic, Ages 16–24 (from Asch et al., 2005).
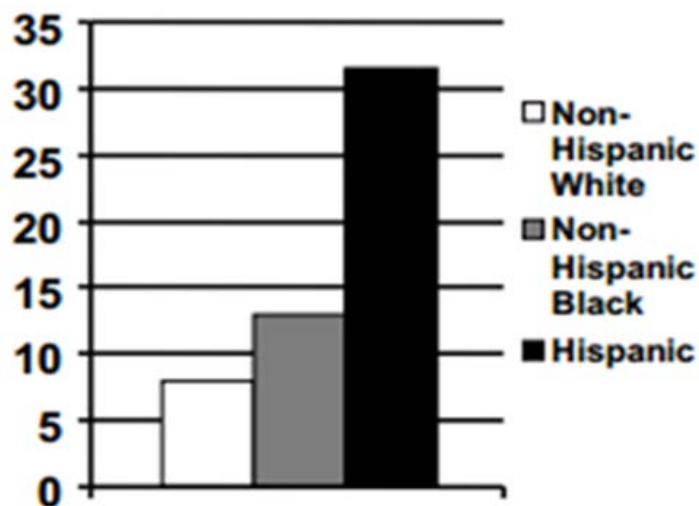
Figure 3.   2012 High School Dropout Percentage by Demographic, Ages 16–
           24 (after National Center for Educational Statistics, 2014).
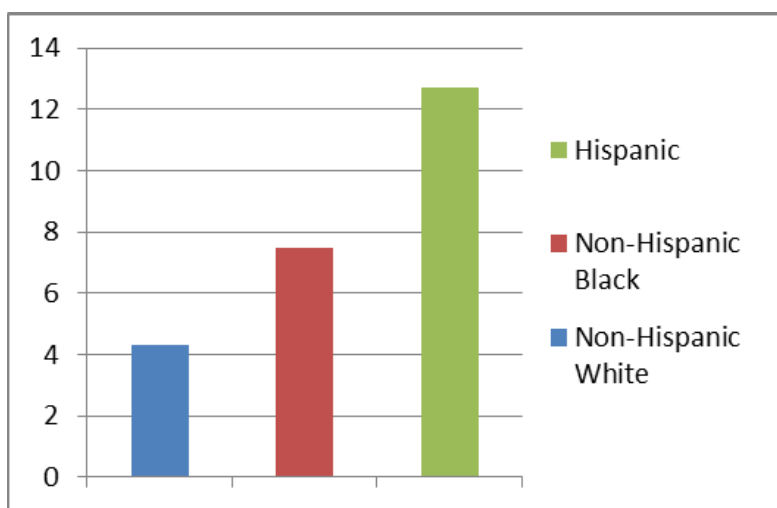
Asch, Buck, et al. (2009, p. xviii) finds that "only 36 percent of young Hispanic high school graduates would score in the AFQT Category IIIB or above, compared to 68 percent of white high school graduates." The Armed Forces Qualification Test (AFQT) is derived from four of the nine ASVAB subtests: Paragraph Comprehension (PC), Word Knowledge (WK), Arithmetic Reasoning (AR), and Math Knowledge (MK). The AFQT is used to determine eligibility for military service and the nine ASVAB subtest scores or "line scores" are utilized to establish Navy rating (job) and program eligibility. Volume IV of the 1130.8J presents the current line scores requirements for each Navy rating and program. With two of the four ASVAB subtests (PC and WK) that determine the AFQT score for enlistment eligibility requiring a strong ability to read and comprehend the English language, it is reasonable that individuals who learn English as a second language, or primarily speak another language in their home, may have greater difficulty attaining a passing AFQT score. Figure 4 reproduces the ASVAB test score categories with associated AFQT scores. Figure 5 reproduces Center for Naval Analysis [CNA] Corporations graphical representation of AFQT accessions for fiscal years 2000 to 2014. Department of Defense Instruction 1145.01 (2014) requires a minimum of 60 percent of recruits be accessed from test score categories I through IIIA and no greater than four percent may be enlisted from categories IVA-IVC. Category IV waivers are only utilized as a last alternative to meet end strength.

Figure 4.   AFQT Test Score Categories (from U.S. Navy, 2011)

AFQT Test Score	Test Score Category
99 – 93	I
92 – 65	II
64 – 50	IIIA
49 – 31	IIIB
30 – 21	IVA
20 – 16	IVB
15 – 10	IVC
9 – 1	V

Figure 5.   AFQT Category Accessions for FY 00–14 (from Center for Naval Analysis, 2014).
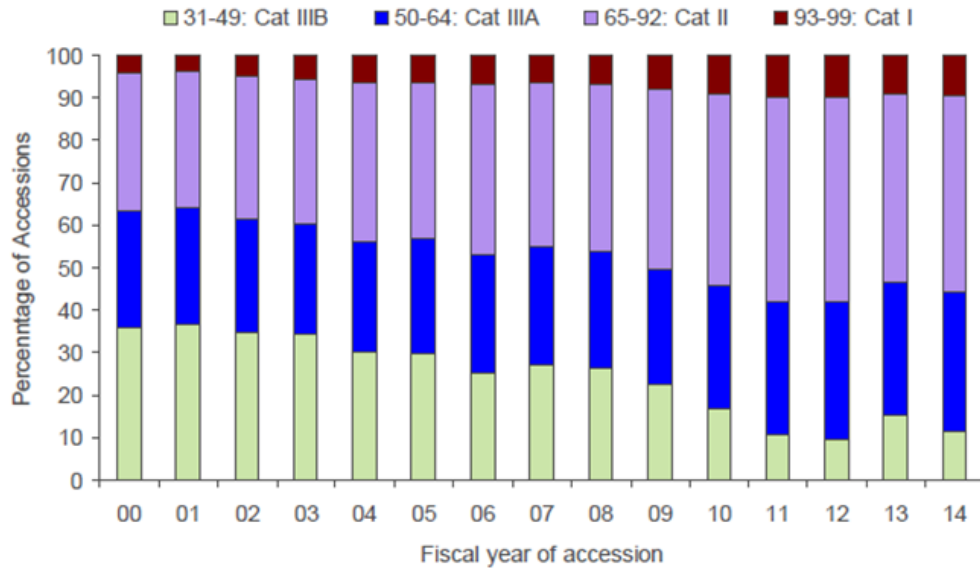
Propensity to serve in the U.S. military varies amongst both citizens and recent immigrants. With the population of Hispanics expected to grow from 54 million to 66.3 million people by the year 2020, one plausible appeal for the enlistment of non-citizen Hispanics to serve in the U.S. military may be an expedited naturalization process (Ortman & Guarneri, 2009). Immigration and Nationality Act 328 is a program that incentivizes the enlistment of non-citizens residing in the U.S. to serve in the U.S.

military by establishing a means for naturalization through service in the U.S. military. Title 8, Chapter 12 of U.S. Code Section 1439 states, "A person who has served honorably at any time in the Armed Forces of the United States for a period or periods aggregating one year, and who, if separated from such service, was never separated except under honorable conditions, may be naturalized" (Immigration and Nationality Act 328, 2008).

Naturalization through military service has benefited a significant number of service members. Between October 2002 and Sept 2014, 102,266 members of the armed forces were naturalized (U.S. Citizenship and Immigration, 2014). However, despite the significant number of non-citizen service members who have received naturalization, one study finds that the basic enlistment requirements largely undermine Immigration and Nationality Act 328's ability to attract non-citizen Hispanics to serve in the U.S. military (Asch, Heaton, et al., 2009). *Recruiting Minorities: What Explains Recent Trends in the Army and Navy*, finds that while non-citizens "may be attracted by the expedited naturalization process provided to service members and may have higher levels of patriotism than the general population," language skills may create too significant of barriers to military service (Asch, Heaton, et al., 2009). The percentage of Hispanics, who are disqualified due to the requirement for a high school diploma, and poor scores on the ASVAB test due to language proficiency, are conceivably higher for non-citizens, especially those who are newly immigrated. Table 6 reproduces the number of service members who received naturalization between fiscal years 2002–2014.

Table 6.   Service Members Naturalized Between FY 02–14 (after U.S. Citizenship and Immigration, 2014).
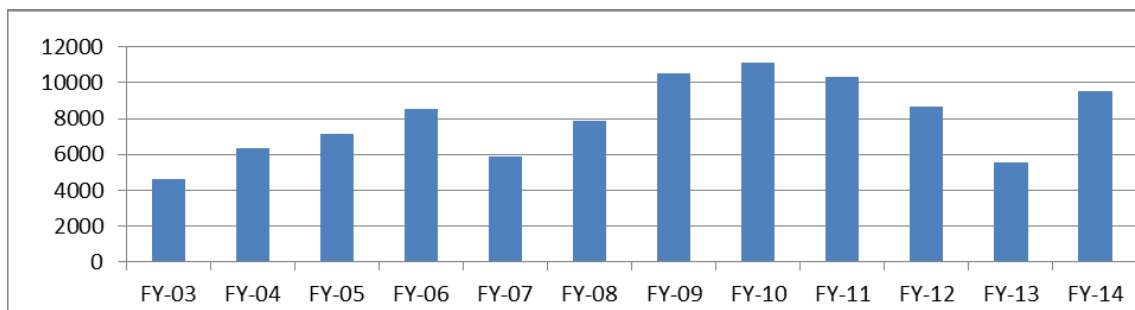
After a preliminary interview to establish basic eligibility requirements, a potentially qualified applicant is given the Enlisted Screening Test (EST) to verify that the applicant meets intellectual requirements. Recruiters perform in-depth interviews with individuals who pass the EST and politely inform those applicants who do not closely meet the passing score that they are ineligible for naval service. During the interview process the recruiter and the applicant develop rapport, identify the underlying needs of the applicant, overcome concerns, and develop a mutually agreed plan for moving forward with the enlistment process. The recruiter solicits referrals and seeks to create an ongoing referral base with both qualified and unqualified applicants.

Qualified applicants are scheduled for processing at the local Military Entrance Processing Station (MEPS). Processing includes taking the Armed Forces Vocational Aptitude Battery (ASVAB), a medical examination, job classification, and contracting. The "Production ASVAB" is given at MEPS. However, the ASVAB test is often completed at an earlier date, with some applicants completing the "Student ASVAB" during their junior or senior year of high school. The ASVAB score is valid for two years. Prior to an applicant completing a medical examination at MEPS, all required paperwork, medical records, waivers and parental authorization as applicable must be submitted. Once the approval to test or "floor the applicant" has been received the applicant is scheduled for testing through the Navy liaison office. All medical examinations for enlistment must be completed at a Military Entrance Processing Station (MEPS), with the exception of applicants who process in Japan, Guam, or Europe and use local Military Treatment Facilities (MTFs). MEPS, along with authorized MTFs overseas are tasked with performing quality control on military applicants, ensuring that only those individuals fit to fight are permitted to obligate themselves for military service (U.S. Navy, 2011).

2.   Job Classification

Eligible applicants who have passed physical, mental, and initial background screenings then interview with an enlisted classifier who is responsible for manning ratings with qualified individuals. The classifier seeks to find a mutually beneficial

agreement between the applicant and the Navy on the rating assignment. However, factors such as physical and mental requirements, as well as civil, and drug waivers can affect the ratings an applicant is qualified for. Additionally, the classifier is limited by rating availability and the requirement to meet shipping goals, as well as the goals for various programs, such as Full-Time-Support, National Call to Service 2/2/4, and New Accession Training/ Non-Prior Service Basic. The availability of monetary bonuses and advanced pay grade are often used for "skill channeling," that is, to incentivize the recruit to accept the rating that is the highest priority to the Navy. A monetary bonus requires a 12-month extension, and the ratings that offer advanced pay grades require a five- or six-year contract. Ratings in the nuclear power, special operations, and special warfare fields, as well as the Cryptologic Technician Interpretive (Linguist) rating, require additional testing before final classification. U.S. Navy (2011) provides guidance on eligibility for enlistment with advanced pay grade for applicants with college credit, experience in high school JROTC, the Young Marines, the Navy Sea Cadet Corps, and awardees of the Eagle Scout, Girl Scout Gold or Civil Air Patrol Billy Mitchell Award.

3. The Enlistment Contract and the Delayed Entry Program

The enlistment contract is completed by the applicant and classifier and discloses in writing the Navy rating/program guarantee, the service obligation length, and any bonus amount or additional guarantees. These guarantees are dependent on the applicant maintaining their eligibility for the program, and for the Navy, as well as the successful completion of any shipping requirements prior to RTC. The applicant participates in a final interview regarding their mental, moral and physical background and then completes the oath of enlistment. Once this oath has been completed, the applicant is fingerprinted and signs their Delayed Entry Program (DEP) enlistment contract. The DEP enlistment contract identifies the day that the new DEP recruit will report back to MEPS for the final enlistment oath, signing of the enlistment contract, and shipping to RTC.

The Delayed Entry Program places Navy applicants into the status of "DEP recruit." A DEP recruit has not yet fully affiliated with the Navy, and is classified as a civilian; however, the time spent in DEP will count toward the DEP recruit's Individual

Ready Reserve (IRR) obligation. All enlisting service members incur an 8 year mandatory service obligation that can be served on active duty, the Selected Reserve, or the IRR. IRR members do not drill or receive pay, but they are required to maintain their service uniforms and a valid recall once they separate from an active duty or Selected Reserve status.

As a DEP recruit, prospective sailors begin their orientation to naval service, to include basic military drill and familiarization training on subjects such as the chain of command, service terminology, shipboard life, and what to expect upon arrival at RTC. Volume V of the Navy enlisted recruiting manual authorize DEP recruits to retain in DEP for up to 365 days, with some high school senior DEP recruits being authorized a maximum of 455 days (U.S. Navy, 2011). During this transitory period the Navy recruiter maintains a professional relationship with the prospective sailor, serving as a mentor to ensure the DEP recruit maintains their enthusiasm, and eligibility. Prior to shipping to RTC, DEP recruits are required to pass a drug test, meet height and weight standards, and to have no pending civil infractions. DEP mentoring is expected to support individuals voluntarily participating in an Initial Fitness Assessment (IFA) prior to shipping to RTC as well the solicitation of Navy-eligible referrals (U.S. Navy, 2011). U.S. Navy (2011) explains how a DEP recruit can be advanced in pay grade for referring individuals who assess into the Navy, as well as for completing the DEP Personal Qualification Standard (PQS), and passing a PQS based exam and the IFA at RTC.

E.   ATTRITION

Attrition occurs when individuals who have signed an enlistment contract obligating themselves to the Navy for a specified period of time fail to complete the full term of their enlistment contract due to separation from military service. Attrition can occur prior to commencing active duty service while a prospective sailor is in the Delayed Entry Program or at any point during the contracted enlistment period. Department of Defense Form 4/1, the Enlistment Contract for service in the Armed Forces of the United States, requires enlistees to confirm their date of report for active

duty, the period of active duty obligation by years and weeks, as well as the requirement for all enlistees to incur an 8-year military service obligation.

1.   DEP Attrition

An early attrition study (Lane, 2006) reports the average Navy DEP attrition rate as 16 to 23 percent. Each loss from DEP must be replaced with a new recruit at an additional cost. Data provided to Lane by Navy Personnel Research, Studies, and Technology, and Commander Navy Recruiting Command presents the cost estimate of one Navy recruit at just over $13,000 in FY 03, approximately double the $6,700 recruiting costs in FY 98 (Lane, 2006).

Managing DEP attrition is important in order to reduce recruiting costs and to ensure a steady inventory of new recruits to fill training seats and ultimately man the fleet. A DEP recruit who attrites close to their shipping date and is not replaced, results in a fleet manning shortage, and wasted training capability. There may be one benefit of DEP attrition, as the cost of replacing a DEP attrite is significantly cheaper than first-term attrition. Separating recruits with a low desire to serve in the Navy may increase the average buy-in and productivity of first-term enlistees. DEP attrition may therefore serve a valuable purpose by separating low buy-in enlistees before they become an even costlier investment, or a burden on otherwise productive work centers.

2.   First-Term attrition

First-term attrition measured at 48 months of service has been steadily declining in the Navy, from an estimated 41 percent in fiscal year 2000, to approximately 23 percent at the end of fiscal year 2014 (CNA, 2014, p.15). Hispanics are leading the decline in first-term attrition rates. Table 7 presents the first-term attrition rates for Hispanic and Non-Hispanic enlistees, with Hispanics possessing lower first-term attrition rates than non-Hispanics for fiscal years 2000 to 2014.

Table 7.   48-Month First-Term Attrition by Ethnicity, FY 00–14 (from Center
for Naval Analysis, 2014).
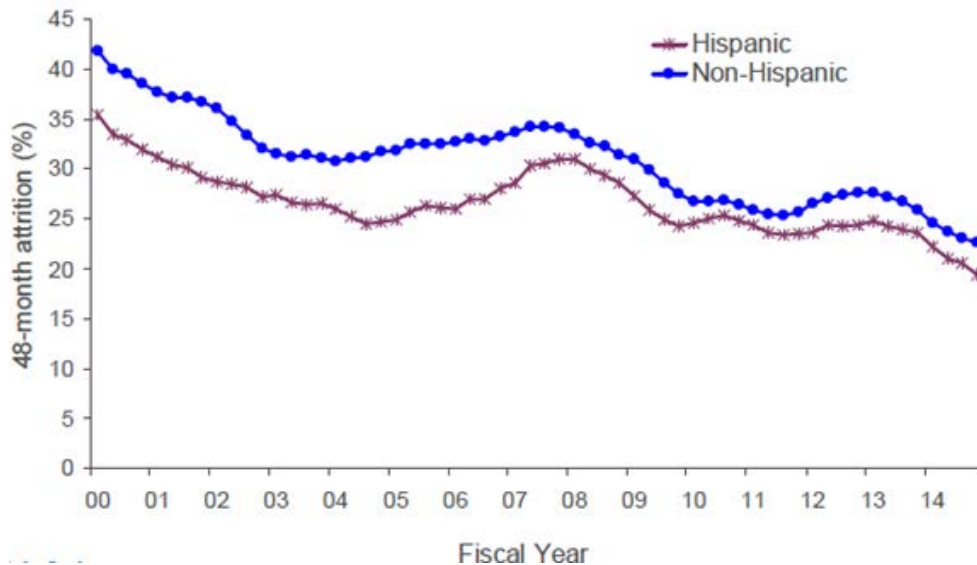
Analysis by CNA Corporation provides insight on the differences in first-term attrition for Navy enlistees who contract with four-, five-, and six-year obligations. Table 8 shows that individuals with a four-year military service obligation are one to two percent more likely to attrite in the first 48 months than an individual who with a five- or six-year military service obligation (CNA, 2014). The four-, five-, and six-year obligation is measured at both the initial enlistment years of active duty obligation (Table 8) and at the service member's 12 months of service point (Table 9) as a service member's obligation can change early in their enlistment if they are reclassified in boot camp, or "A" school. An enlistee's service obligation may also change if the enlistee fails or is disciplinarily removed from training and sent to the fleet undesignated. As of fiscal year 2014, 57 percent of enlisted accessions contract with an initial 5 or 6 year obligation (CNA, 2014).

Table 8.   48-Month First-Term Attrition. 4-Quarter Moving Average by Initial Program Years of Obligation, FY 00–14 (from Center for Naval Analysis, 2014).
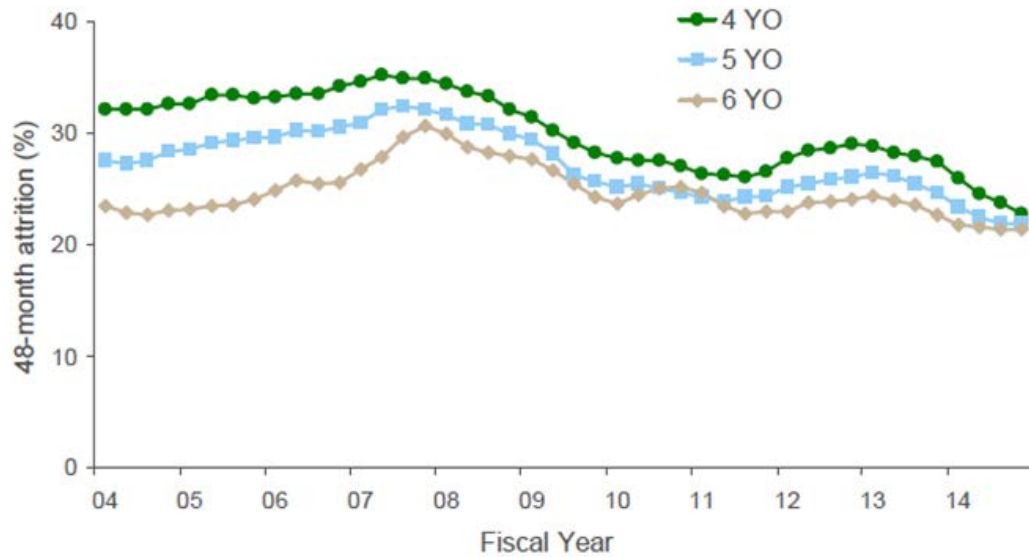
Table 9.   48-Month First-Term Attrition. 4-Quarter Moving Average by Obligation at 12 Months or Loss, FY 00–14 (from Center for Naval Analysis, 2014).
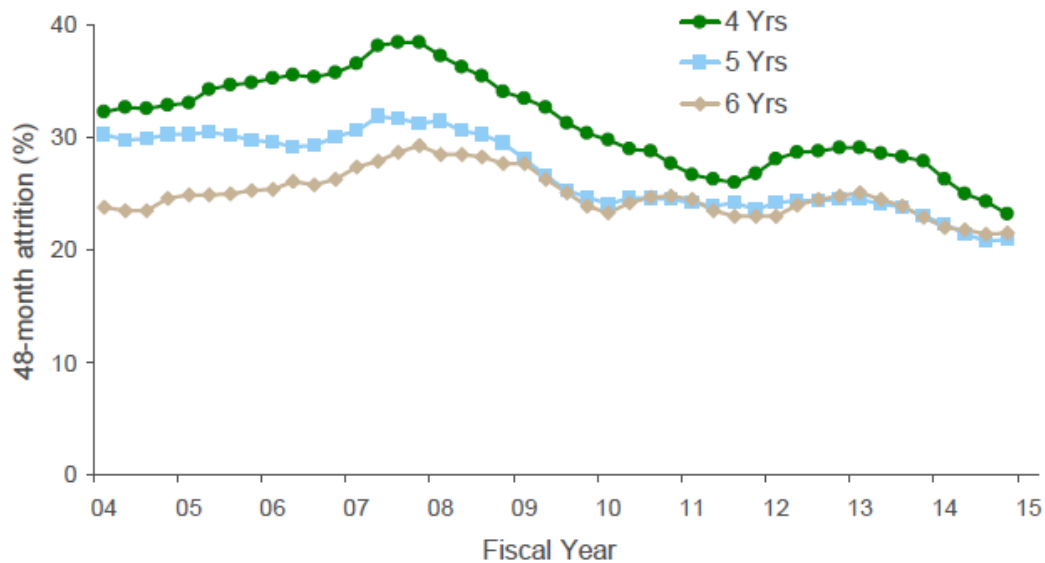
F.   PROMOTION

The Navy decides to promote sailors based on their current and past performance and the Navy's current needs. Advancement to E4, E5, and E6 occurs when an eligible service member exceeds a "Final Multiple Score" (FMS) assigned to their rating. To be eligible for advancement, service members must meet a minimum amount of time in their present rate, be recommended for promotion by their commanding officer, and pass the last bi-annual physical fitness assessment. The most recent change to the FMS calculation was released in NAVADMIN 114/14 and is presented in Appendix A, Table 36.

The FMS is comprised of points for service in pay grade, previous exam passed not advanced, a competitive examination that tests rating specific and basic military knowledge, performance mark average, awards, accredited degrees, and points for completing an individual augmentee tour. Eligible service members compete for advancement in bi-annual promotion cycles. The FMS system is intended to promote the best candidates based on knowledge, performance, and experience. Effective promotion or "pay" date for E4 to E6 selectees is based on a selectees standing amongst other selectees. As of fiscal year 2011, 3 percent of selectees are promoted per month for 5 months, with the remaining 85 percent of the selectees promoted in the last increment.

G.   SUMMARY

Hispanics are the fastest growing demographic group in the United States (U.S. Census, 2014). While Hispanic youth show higher propensity to serve in the military than other demographic groups, they do not always perform as well in long-term career outcomes. The many rules and policies that shape the enlistment process and the career path of Navy enlisted personnel highlighted in this chapter represent points of interest that deserve examining when conducting a study on factors that can explain the differences in job performance of different demographic groups. This thesis will focus on the pre-enlistment and early career characteristics and their effect on long-term career outcomes.

III. LITERATURE REVIEW

This literature review addresses the most relevant and current studies on the performance, attrition, and retention of Hispanic enlistees. The review focuses on studies of DEP and first-term attrition.

A. DELAYED ENTRY PROGRAM ATTRITION

The 2005 RAND study titled *Success of First-Term Soldiers: The Effects of Recruiting Practices and Recruit Characteristics* (Buddin, 2005) analyzes DEP attrition in the U.S. Army using data from the Enhanced Applicant File (EAF), the Enlisted Master File, Army Training Requirements and Resources System, USAREC recruiting information, and the Bureau of Labor Statistics. The EAF is the Army's applicant and enlistee pre-accession database, and it is similar to the PRIDE system in the U.S. Navy. In analyzing DEP attrition Buddin uses data on all non-prior service enlisted personnel who swore an oath and signed DEP contracts between FY 95–01. The sample size is approximately 550,000 observations. To examine the effect of various factors affecting DEP attrition, the study uses multivariate probit regression analysis.

Buddin's DEP attrition study analyzes several variables that might explain variation in the recruitment and attrition of Hispanics. The multivariate model employed by the 2005 study allows for an interpretation of variables that the *Military Enlistment of Hispanic Youth: Obstacles and Opportunities* (Asch, Buck, et al., 2009) study identifies as the most significant disqualifiers of Hispanics from service in the armed forces; namely, a failure to meet body composition standards, the requirement for a high school diploma, and poor scores on the Armed Forces Vocational Aptitude Battery. Table 10 reproduces Buddin's regression results for factors affecting DEP attrition; including the variables for being overweight (Overweight), holding a GED (GED), and AFQT test score (AFQT).

Table 10.   Regression Results for Factors Affecting DEP Attrition
(after Buddin, 2005).

Variable	Coefficient	Standard Error	Effect	Means
Recruit characteristics				
Female	0.2019*	0.0055	0.0492	0.2140
African American	−0.0586*	0.0065	−0.0132	0.2281
Hispanic	−0.1147*	0.0091	−0.0251	0.0966
Asian	−0.1756*	0.0174	−0.0368	0.0223
Married with no children	−0.3838*	0.0129	−0.0726	0.0468
Married with children	−0.2824*	0.0107	−0.0568	0.0706
Single with children	−0.0748*	0.0162	−0.0165	0.0220
Age at time of contract	0.0194*	0.0010	0.0045	20.3102
Overweight	−0.1065*	0.0048	−0.0241	0.3675
GED	−0.0129	0.0090	−0.0030	0.0953
Senior at time of contract	0.0864*	0.0077	0.0202	0.3048
Some college	0.0538*	0.0121	0.0127	0.0405
College degree	−0.0874*	0.0160	−0.0192	0.0264
Trigonometry	−0.0308*	0.0095	−0.0071	0.4910
Geometry	−0.0007	0.0090	−0.0002	0.4394
AFQT	0.0011*	0.0002	0.0003	58.4425
Unemployment at contract	−0.0089*	0.0021	−0.0021	5.3076
Unemployment at accession	−0.0004	0.0020	−0.0001	5.2967
Recruiting environment				
Contract in last 5 days of month	0.0664*	0.0060	0.0155	0.2819
Contract on last day of month	0.0391*	0.0084	0.0091	0.1136

* Significantly different than zero at the 5% confidence level

In Table 10 the variable "Overweight" is found to be statistically significant at the 5 percent confidence level, with overweight DEP recruits being 2.41 percentage points more likely to attrite from DEP than recruits who meet body composition standards, ceteris paribus. The Navy Recruiting Manual: Enlisted, CRUITMAN-ENL 1130.8J Volume V (U.S. Navy, 2011), states that "Future Sailors will be advised of the NRC Fitness and Nutrition plan, as well as the Navy's height/weight and body fat standards during the 72 Hour indoctrination," which is to occur within 72 hours of signing the DEP enlistment contract. Additional recruiter mentoring should occur for enlistees who struggle with weight management as DEP recruits who fail to maintain body composition standards cannot be shipped to recruit training (U.S. Navy, 2011). Hispanic DEP recruits may require

greater weight management mentoring as a 2009 RAND study finds Hispanics to be "considerably heavier" than non-Hispanics (Asch, Buck, et al., 2009, p. 20).

Regression analysis results from Buddin (2005) find the aptitude variable "AFQT" to be statistically significant, possessing a small positive effect in reducing DEP attrition. However, the AFQT mean effect of 0.0003 (Table 10), connotes that a 30 point increase in the AFQT percentile score would only reduce the probability of DEP recruit attrition by 0.9 percentage points, ceteris paribus. The GED variable is found to be statistically insignificant in Table 10.

In analyzing factors representative of the recruiting environment Buddin drew on what Navy Recruiters refer to as "Mission Day Wonders." These are applicants who contract on the last days of the recruiting month and are more likely to be border line in regards to aptitude and/or weight, and may be waiting on a motivated district seeking goal at the end of the month, i.e., mission day, to get their education waiver processed. Recruiters do in fact face unusual pressures to sign contracts late in the month if they, their station, their zone, or their district is short on goal, and it is likely that these applicants may possess lower educational credentials, test score categories, and/or a borderline body composition. These are traits that the Asch, Buck, et al. (2009) study reports are more likely to characterize Hispanic applicants than non-Hispanic applicants.

The Asch, Buck, et al. (2009) study finds that less than 50 percent of 17 to 21 year old Hispanics who are not currently attending school possess both a high school diploma and a minimum AFQT score of 31 (Asch, Buck, et al., 2009, p. 32). The Navy requires a minimum AFQT score of 35 for active duty and 31 for the selected reserve for high school diploma graduates. The National Center for Education Statistics reports that the Hispanic high school dropout rate was 12.7 percent in 2012 compared to 7 percent and 4.3 percent for non-Hispanic Blacks and Whites. The higher percentage of high school dropouts equates to a greater proportion of Hispanics than non-Hispanics who may require a mission day waiver or may not qualify for enlistment at all. In Table 10 the "Contract in last 5 days of month" variable indicates that a DEP recruit is 1.5 percentage points more likely to attrite from DEP if they are recruited in the last recruiting week of the month, ceteris paribus. The "Contract on the last day of month" variable indicates that

a DEP recruit is 2.5 percentage points more likely to attrite from DEP if they are recruited on the last recruiting day of the month, compared to DEP recruits who contract in the first three recruiting weeks, ceteris paribus. However, it is also possible that the "Contract in last 5 days of month" and "Contract on the last day of month" variables capture other unobserved traits such as motivation or ability.

Overall, Buddin (2005) finds Hispanics are less likely to attrite from DEP than other race/ethnicities, with the exception of Asians. Buddin identifies the DEP attrition rate for Hispanics as approximately 13 percent compared to 12 percent for Asians, 14 percent for African Americans, and 15 percent for white non-Hispanics (Buddin, 2005, p. 25). Figure 6 reproduces the differences in DEP attrition by race/ethnicity.

Figure 6.   Differences in DEP Attrition by Gender and Race/Ethnicity
(from Buddin, 2005).
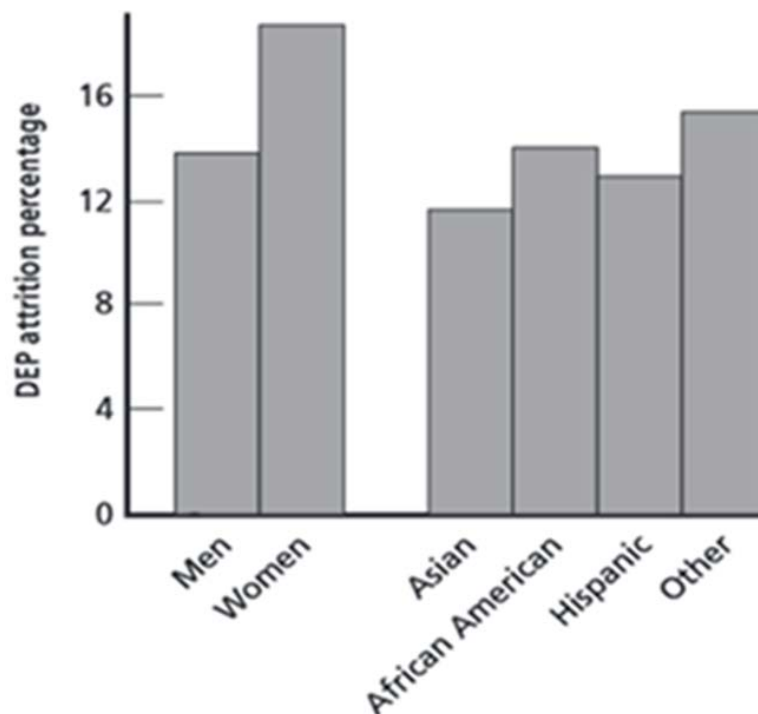
B.   FIRST-TERM ATTRITION

First-term attrition occurs when service members enter active duty, and then fail to complete their initial term of service obligation. For the scope of this thesis, first-term attrition is based on separation within the first 45 months of service.

The 2004 CNA study titled *Predictors of Attrition: Attitudes, Behaviors, and Educational Characteristics* (Wenger & Hodari, 2004) analyzes the effects of non-cognitive factors as well as race and ethnicity on first-term attrition. Logit regression models are estimated on a sample of 56,576 service members across the Army, Navy, Air Force, and Marine Corps. The sample includes 46,570 individuals who are classified as high school diploma graduates, and 10,006 individuals classified as non-high school diploma graduates. Data utilized includes responses to a CNA "Survey of Recruit's Education and Background" that was given to 65,000 recruits between March 1999 and February 2000. The survey provided information on non-cognitive and behavioral characteristics of new recruits. Information from the CNA surveys was merged with personnel data from the Defense Manpower Data Center (DMDC).

The regression results from the 2004 CNA study provide the marginal effect of being both a Hispanic high school diploma graduate and a Hispanic non-high school diploma graduate on first-term attrition at 36 months. Table 11 reproduces the regression results for HSDGs and reports that Hispanics have a first-term attrition rate that is 4.6 percentage points lower than that of a white non-Hispanic HSDG, ceteris paribus. 10.4 percent of the HSDG sample is classified as Hispanic and the results are statistically significant at the 10 percent confidence level. Public school graduate (HSDG) is the omitted education category.

Table 11.   Regression Results, HSDGs, First-Term Attrition
(after Wenger & Hodari, 2004).

Variable	Mean	Coefficient	z-ratio	Marginal effect
Age 17	0.057	0.1859	3.40	3.6
Age 19	0.243	0.0512	1.60	1.0
Age 20	0.109	0.0198	0.47	0.4
Age 21-22	0.105	-0.0471	-1.06	-0.9
Age 23 or more	0.076	0.0826	1.64	1.6
Married female	0.014	0.8033	8.48	17.4
Single female	0.174	0.4083	12.20	8.0
African-American	0.200	0.1056	2.90	2.0
Hispanic	0.104	0.2662	-4.89	-4.6
Asian-Pacific Islander	0.048	-0.2823	-4.34	-4.9
Other race	0.064	-0.0241	-0.37	-0.4
AFQT	59.2	-0.0079	-10.60	-0.2
DEP months missing	0.719	-0.0795	-1.05	-1.5
One month in DEP	0.117	0.1620	2.06	3.1
Two months in DEP	0.040	-0.1179	-1.26	-2.1
> 3 months in DEP	0.095	-0.2443	-2.97	-4.3
Ever expelled	0.047	0.3119	4.82	6.2
Determined	0.137	-0.3269	-7.89	-6.4
Light smoker	0.180	0.1883	5.44	3.6
Heavy smoker	0.317	0.6471	22.25	12.7
Army waiver	0.040	0.0196	0.30	0.4
Air Force waiver	0.033	0.0643	0.87	1.2
USMC waiver	0.099	0.2290	3.36	4.4
Navy waiver	0.105	0.2823	5.49	5.5
Private school graduate	0.043	0.0437	0.77	0.8

Table 12 presents the regression results for NHSDGs, and finds Hispanics have a first-term attrition rate that is 4.7 percentage points lower than a white non-Hispanic NHSDG, ceteris paribus.

Table 12.   Regression Results, NHSDGs, First-Term Attrition
(after Wenger & Hodari, 2004).

Variable	Mean	Coefficient	z-ratio	Marginal effect
Age 17	0.049	0.3256	2.84	8.1
Age 19	0.233	-0.0308	-0.45	-0.8
Age 20	0.138	-0.2189	-2.70	-5.4
Age 21-22	0.159	-0.3063	-3.90	-7.5
Age 23 or more	0.157	-0.1836	-2.25	-4.5
Married female	0.026	0.6125	3.82	15.1
Single female	0.099	0.2447	2.83	6.1
African-American	0.186	0.2290	3.12	5.7
Hispanic	0.117	-0.1916	-1.94	-4.7
Asian-Pacific Islander	0.054	-0.2430	-2.09	-6.0
Other race	0.069	0.1142	0.97	2.9
AFQT	56.3	-0.0072	-4.35	-0.2
DEP months missing	0.549	0.2655	1.92	6.6
One month in DEP	0.251	0.3139	2.42	7.8
Two months in DEP	0.053	0.3332	2.12	8.3
> 3 months in DEP	0.108	0.1218	0.86	3.0
Ever expelled	0.115	0.2136	2.83	5.3
Determined	0.370	-0.1699	-3.21	-4.2
Light smoker	0.163	0.3128	4.26	7.8
Heavy smoker	0.481	0.6091	10.53	15.1
Army waiver	0.050	0.0457	0.39	1.1
Air Force waiver	0.018	-0.0034	-0.03	-0.2
USMC waiver	0.101	-0.0389	-0.28	-0.9
Navy waiver	0.230	0.2462	3.28	6.1
GED	0.276	0.0005	0.01	0.01
1 sem college, academic	0.136	-0.1476	-1.67	-3.7
1 sem college, vocation	0.040	0.0638	0.48	1.6
Adult education	0.136	0.0517	0.56	1.3
Correspondence school	0.018	-0.3981	-1.88	-9.7
Occupational certificate	0.066	-0.3077	-2.51	-7.6
Cert of complete/attend	0.091	-0.4896	-4.11	-11.9
Twelve years of school	0.4314	-0.3687	-5.01	-9.1

Hispanics account for 11.7 percent of the NHSDG sample. Dropout (NHSDG) is the omitted education category. The regression results for NHSDGs in Table 12 find that Hispanic NHSDGs are significantly less likely than White or Black non-Hispanic NHSDGs to attrite during the first 36 months of enlistment.

C.   PROMOTION AND RETENTION

The promotion and retention of Hispanics is examined in a study titled *U.S. Navy Promotion and Retention by Race and Sex* (Golan, Greene, & Perloff, 2010). The authors apply a two-step decision model using recursive bivariate probit specification to estimate how promotion and retention rates for Navy enlisted personnel vary by race and ethnicity. It is important to note that the study uses three dummy variables for race, as the study includes a period where the Navy classified Hispanics as a race, rather than an ethnicity. An individual in the study can only be classified as one race such as White or Hispanic, whereas current demographic reporting standards allow an individual to be classified as racially White and ethnically Hispanic.

The authors utilize two equations to represent the Navy's decision to promote a sailor, and the sailor's decision on whether to remain on active duty or separate. Promotions from E4 to E7 are evaluated using data provided by Navy Personnel Research, Studies and Technology that includes nearly all Navy enlisted personnel serving from Jan 1997 to May 2008. The authors were required to drop approximately one seventh of the observations due to missing data. Figure 7 reproduces the bivariate probit model employed.

Figure 7.   Bivariate Probit Model utilized for Promotion and Retention by Race and Sex study (after Golan et al., 2010).

$$z_{i1} = \beta_1' x_{i1} + \varepsilon_1, \qquad y_{i1} = \text{sign}(z_{i1}),$$

$$z_{i2} = \beta_2' x_{i2} + \gamma y_{i1} + \varepsilon_2, \quad y_{i2} = \text{sign}(z_{i2})$$

z_{i1} = latent variable related to whether the individual is promoted by the Navy.

z_{i2} = latent variable for re-enlistment, and the errors are assumed to be distributed [ε1, ε2] ~ BVN (0,0,1,1,ρ), where BVN is the bivariate normal distribution and ρ is the correlation coefficient between the two equations.

In Figure 7, Y_{i1} is a binary variable that equals 1 if the service member is promoted and 0 if the sailor is not advanced. Y_{i2} is a binary variable that equals 1 if the sailor extends or re-enlists in the Navy and equals 0 if the sailor separates. The second equation reflects that a sailor's decision to retain or separate is influenced by whether the sailor has been promoted. The authors provide only one occupational specialty, administrative personnel. Table 13 reproduces the bivariate estimation results for sailors designated as administrative personnel.

Table 13.   Bivariate Probit Estimation Results for Administrative Personnel (after Golan et al., 2010).

Variable	Promote	Retain
Black × E4	**-.1510**	**.5831**
Hispanic × E4	**-.1927**	.3252
Other × E4	.0046	**.4679**
Female × E4	**-.2448**	-.1724
Black × E5	-.0486	**.7216**
Hispanic × E5	**-.2564**	.3825
Other × E5	-.0464	**.7212**
Female × E5	**-.2281**	**-.3139**
Black × E6	-.0960	**.8399**
Hispanic × E6	**-.2498**	**.6189**
Other × E6	-.1635	**.9129**

The results indicate that Hispanics in pay grades E4, E5, and E6 are less likely to promote than any other race or ethnicity in the Navy. Hispanics are found to be more likely to retain than white sailors in pay grade E6. Bold coefficients in Table 13 are statistically significant at the 5 percent level of confidence.

The Golan et al. (2010) study conducts simulations to show the effects of the race variables on predicted promotion and retention rates. The authors separate the periods before and after the 9/11 attacks as the probability of promotion and retention may have been significantly altered by the event. Table 14 presents how the predicted probability of promotion and retention for an E5 varies amongst race coefficients and non-racial characteristics.

Table 14.   Simulations for Predicted Probabilities (percent) by Race for E5 (after Golan et al., 2010).

Coefficients	Characteristics	Pre-9/11		Post-9/11	
		Promotion	Retention	Promotion	Retention
White	White	37.6	92.7	29.4	91.8
White	Black	36.5	95.0	25.1	94.4
White	Hispanic	43.0	95.2	24.7	93.9
White	Other	38.2	96.1	25.3	95.1
Black	White	35.0	92.6	27.1	91.7
Black	Black	33.7	95.0	23.2	94.3
Black	Hispanic	34.3	94.9	18.8	93.8
Black	Other	37.7	96.2	23.4	95.1
Hispanic	White	26.6	92.2	24.1	91.6
Hispanic	Black	33.4	91.1	21.3	94.3
Hispanic	Hispanic	31.9	94.8	20.7	93.8
Hispanic	Other	32.8	95.9	21.2	95.0
Other	White	36.6	92.6	28.9	91.7
Other	Black	33.4	95.0	24.7	94.4
Other	Hispanic	36.3	95.0	24.4	93.9
Other	Other	37.3	96.1	24.9	95.1
Overall Sample for E5		35.5	94.1	25.7	93.2

Characteristics other than race are assigned to coefficients in order to separate the contribution of coefficients. The study states that the contribution of coefficients "may capture unequal evaluations for promotion by superiors, and characteristics to the actual

differences in probabilities across demographic groups" (Golan et al., 2010, p. 19). This simulation allows the authors to determine how Hispanics would fare if they possessed the same coefficients as whites, as well as how Hispanics would fare if they had the same demographic (non-racial) characteristics as whites but their own coefficients.

A sailor with Hispanic coefficients and characteristics is estimated to have a 31.9 percent probability of advancement from E5 to E6 in the pre-9/11 period. Sailors with white coefficients and characteristics are estimated to be 5.7 percent more likely to be promoted to E6 and 2.1 percent less likely to retain than Hispanic sailors. Applying the demographic characteristics of Hispanics to white coefficients increases the probability of a promotion to 43 percent in the pre-9/11 period; an 11.1 percent increase in the probability of promotion compared to Hispanic coefficients/characteristics. The authors state that the difference in the coefficients may suggest that "Hispanics' superior average characteristic cut half the difference in promotion probabilities due to unequal treatment by supervisors" (Golan et al., 2010, p. 20). While prior to 9/11 the difference between white and Hispanic characteristics (White coefficients with Hispanic characteristics) is -5.4 percentage points, the post-9/11 difference increased to +4.7 percentage points. Significant changes in the non-racial characteristics of the Hispanics group are described as "so large that they swamp the coefficient effects that go in the other direction" (Golan et al., 2010, p.20). Demographic characteristics of Hispanics may no longer be as desirable partially due to changes in the Navy's FMS calculation. Appendix Table 37 presents NAVADMIN 301/07, which added education points to the Final Multiple Score calculation in 2007 for 2- and 4-year accredited degrees. Notable changes to the Navy's FMS since the Golan et al. study are presented in Appendix A, Tables 36 and 38.

The 2010 study finds Hispanics less likely to promote in the Navy than any other demographic, with the exception of the promotion of black sailors to E4 and E6 prior to 9/11. Table 15 presents the promotion probabilities by pay grade and race before and after 9/11.

Table 15.   Promotion Probabilities by Pay Grade and Race
(after Golan et al., 2010).

	White	Black	Hispanic	Other
Pre-9/11				
E4	56.7	47.9	51.1	55.3
E5	37.6	33.7	31.9	37.3
E6	40.6	33.6	34.9	35.7
Post-9/11				
E4	45.9	37.4	37.0	40.0
E5	29.4	23.2	20.7	24.9
E6	29.9	21.6	20.2	24.8

The estimates in Table 15 reflect a decline in promotion during the war period, largely due to a significant drawdown of Navy personnel prior to the attack, and the sudden increase in recruiting new accessions and the activation of reserve forces post-9/11. Regardless of the fluctuating end strength, Hispanics experienced a greater decline in promotion rates than any other demographic group. Post-9/11 a Hispanic sailor is 8.9, 8.7, and 9.7 percent less likely to promote to E5, E6, and E7, than a white non-Hispanic sailor.

D.   SUMMARY

The lower DEP attrition rates observed for Hispanics (Buddin, 2005) suggests that Hispanics who enter active duty may possess a greater level of buy-in to the Navy, and that the Navy should direct significant recruiting efforts in Hispanic communities. Wenger & Hodari (2004) find Hispanics have a first-term attrition rate that is significantly lower than White non-Hispanic enlistees. With a limited quota of non-Tier 1 enlistments, the Navy would benefit from providing Hispanic NHDGs preference.

Regardless of slower promotion rates, Golan et al. (2010) finds Hispanics choosing to stay Navy at a greater rate than their white non-Hispanic peers.

This thesis examines how entry characteristics of recruits might affect the job performance of Hispanic and non-Hispanic enlistees. The studies reviewed in this chapter provide insight into sets of variables that have been shown previously to explain any differences in job performance among demographic groups, and it presents a starting point for the multivariate analysis modeling approach that will be taken by this thesis. This thesis uses a rich data set to try to capture all the important factors that have been previously identified as relevant to explaining variations in attrition, promotion, and retention outcomes.

THIS PAGE INTENTIONALLY LEFT BLANK

IV. DATA DESCRIPTION AND SUMMARY STATISTICS

A. DATA SOURCE

This thesis merges pre-accession data on enlisted Navy recruits for fiscal years 2001 to 2009 from the Navy's Personalized Recruiting for Immediate and Delayed Enlistment (PRIDE) system, with personnel data from the Defense Manpower Data Center (DMDC). PRIDE is a system utilized by Navy Recruiting Command (NRC) to assist in the recruitment and assignment of future sailors. PRIDE enables NRC personnel to track each applicant's personal information to include factors such as demographics, education, enlistment program, mental and moral background, and physical characteristics. The PRIDE system 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 the needs of the Navy.

DMDC is the primary Department of Defense personnel and information management resource. DMDC maintains vast archives of Department of Defense data to include monthly and annual records of military personnel demographics, training, job assignment, promotion, and retention outcomes for the years a service member is on active duty.

1. Full Data Set

The PRIDE data set includes 768,554 observations on individuals who enlisted into the Navy's Delayed Entry Program (DEP) in fiscal years 1998 to 2012. The 768,554 observations include active duty, reserve, and full time support accessions, as well as many individuals who attrite prior to reporting to Recruit Training Command (RTC) for basic training. The DMDC data set used by this thesis includes 361,222 observations of active duty Navy enlistees who reported for basic training in FY 2001 to 2009. The DMDC data set provides longitudinal information on these enlistees until the end of FY 2013 or the service member separates.

Cohorts are created for non-prior service active duty individuals who enlisted in FY 2001 through 2009. Observations on individuals who enlist outside of FY

2001–2009 are dropped. Also, 7,737 prior Navy and other service veterans who enlisted in the Navy during this period are dropped, along with 8,907 National Call to Service enlistees, and 15,918 Non-Prior Service Basic enlistees. National Call to Service and Non-Prior Service Basic are Navy Reserve programs, with National Call to Service accessions serving two years on active duty and then affiliating with the reserve component for six years. Variables are generated to identify gender, marital status, number of dependents, occupational rating group, race, ethnicity, age at DEP, age at enlistment, education, citizenship, DEP PQS status, accession with an advanced pay grade, body fat waiver, AFQT, ASVAB line scores, enlistment bonus, and enlistment bonus value. The cleaned PRIDE data set includes 452,041 observations. Individuals in the DMDC data set are compared to those in the PRIDE data set and the data sets are cleaned to drop duplicate variables and variables with no recorded observations.

The PRIDE and DMDC data sets are merged to create longitudinal files which track enlisted personnel career progress during and after the first contract. There were 360,033 PRIDE observations for FY 01–09 that were merged with 361,222 DMDC observations for FY 01–09, yielding a 99.67% merge success rate. For 4,666 individuals (1.3 percent of the merged data set), the separation date is prior to the enlistment date. Reviewing these observations, the majority is found to have been prior service recruits, but which were not labeled as prior service by the DMDC or PRIDE data sets. These 4,666 observations are dropped from the sample. The working data set is limited to those who enlisted in pay grades E1 to E3. Those enlisting in pay grade E4 or above (N=253) are dropped.

The analysis data set is limited to enlistees who contract for four-, five-, or six-years of initial enlisted service. There are 13 observations for the contracted term that are either missing or recorded as two- or three-year enlistment contracts. By comparing the initial date when the enlistment began to the initial date when the enlistment ends, these 13 observations are found to have a four-year contract obligation. The 13 observations are re-coded to four-year obligations. The longest an enlistee can initially contract for on active duty is six-years; however, there are 6,451 individuals in the data set with eight-year contract obligations. These 6,451 observations are in disorder, with the initial

enlistment begin date and end date missing for the majority of the observations. The 6,451 observations (accounting for 1.8% of the merged data set) are dropped.

There are 3,803 observations with a DEP reservation date that falls between their RTC ship date and seven days later. The DEP reservation date is the day an applicant enlists into the DEP and is classified into a Navy rating or program. It is very likely that these 3,803 observations were reclassified during the first week of RTC, which is known as "P-days" or processing days. The reservation date changes when a DEP recruit changes his/her rating or program. Unfortunately, changes to ratings or programs negatively affect the ability to accurately measure the amount of time spent in DEP. Reclassification may occur prior to shipping to RTC to give the recruit a more favorable rating or in order to roll a DEP recruit into an earlier or later shipping date. Reclassification may also occur at RTC for other reasons, such as failing medical tests for depth perception or being color vision deficient, the rating's manning level, or failing the physical screening test for special programs. The 3,803 observations are retained in the working data set.

Finally, 312 observations possess an age at enlistment that is less than 17 or greater than 35. Non-prior service active duty enlistees must ship to RTC prior to their 35th birthday. The 312 observations with enlistment ages below 17 or above 35 are removed from the working data set.

2.   Analysis Data Set

The analysis data set contains 348,330 observations and represents non-prior service active duty accessions who enlisted in the Navy during FY 01–09. The analysis data set provides a complete overview of each enlistee's pre-accession characteristics, entry into naval service, and career outcomes. Individual recruits are followed from entry through the end of FY 2013 or until the service member separates. Table 16 presents the total number of observations in the analysis data set, and the reported number of Navy non-prior service accessions for each cohort year. Table 16 also shows the number of Hispanics per cohort from the analysis data set and compares this to the number of

Hispanic non-prior service accessions for FY 04–09 as reported by the Office of the Undersecretary of Defense (2013).

Table 16.   Total Observations and Number of Hispanics for FY 01–09 in the Analysis Data Set, and the Reported Number of Hispanic Non-Prior Service Active Component Accessions for FY 04–09 (after Office of the Undersecretary of Defense 2013).

Cohort (Fiscal Year)	Number of Observations (Analysis Data Set)	Reported Non-Prior Service Navy Active Component Enlisted Accessions (Office of the Undersecretary of Defense, 2013)	Hispanic Accessions (Analysis Data Set)	Reported Hispanic Non-Prior Service Navy Active Component Enlisted Accessions (Office of the Undersecretary of Defense, 2013)
2001	50,111	49,870	7,939 (15.8%)	N/A
2002	43,239	43,500	6,813 (15.8%)	N/A
2003	40,046	40,204	7,974 (19.9%)	N/A
2004	38,462	39,416	6,482 (16.9%)	5,954 (15.1%)
2005	35,741	37,729	6,589 (18.4%)	6,086 (16.1%)
2006	33,780	35,840	6,223 (18.4%)	5,834 (16.2%)
2007	35,277	34,565	6,693 (18.9%)	5,734 (16.6%)
2008	36,777	37,951	7,805 (21.2%)	7,983 (21%)
2009	34,997	35,233	7,840 (22.4%)	7,936 (22.5%
Total Observations	348,330	354,308	65,423 (18.4%)	

As Table 16 shows, the number of accessions for each cohort in the thesis data set matches the reported accessions fairly closely. The differences range from .003 percent in 2003 to six percent in 2005. The number of new accessions changes yearly, in accordance

with the Navy's authorized end strength. Hispanics account for 18.4 percent of the analysis data set. The Office of the Undersecretary of Defense (2013) reported number of Hispanic non-prior service active component Navy enlisted accessions for FY 04–09 compares closely to the Hispanic accessions in the analysis data set. However, the count of Hispanic accessions in the analysis data set exceeds the Department of Defense count in FY 04–07. This may be due to differences in enlistee's classification as Hispanic in the PRIDE data set compared to the DMDC archives. This thesis defines Hispanic as individuals who self-classified as Hispanic during their initial enlistment, as recorded by the Navy's PRIDE system. The Hispanic flag in the DMDC data set is found to change the ethnicity of some observations multiple times between FY 01–14. It is determined that the internal Navy recruiting accession ethnicity information recorded by PRIDE is potentially more accurate than the DMDC ethnicity data.

B.   VARIABLE DESCRIPTIONS

1.   Dependent Variables

This thesis uses the "analysis data set" to measure how pre-accession characteristics and early career factors affect selected career outcomes -- first-term attrition, promotion, and retention rates -- for Hispanic enlistees and Non-Hispanic enlistees in the U.S. Navy. Table 17 shows the definitions of the dependent variables (career outcomes) used in the thesis.

Table 17.   Definitions of Dependent Variables.

Variable Descriptions	
Variable	**Definition**
Dependent Variables	
E5 Fast Track	=1 if promoted to E5 in less than 48 months, otherwise =0
Attrite 45 Months	=1 if attrite before completing 45 months of active service, otherwise =0
Retention 4YO	=1 if not an attrite and months of active service is greater than initial 4 year obligation, otherwise =0
Retention 5YO	=1 if not an attrite and months of active service is greater than initial 5 year obligation, otherwise =0
Retention 6YO	=1 if not an attrite and months of active service is greater than initial 6 year obligation & they did not enlist in FY09, otherwise =0

a.   ***First-Term Attrition***

First-term attrition is measured by separation from the Navy prior to the completion of 45 months of military service. This thesis measures the length of a service member's enlistment contract at initial enlistment. Data is unfortunately not available to allow for measuring the length of the enlistment contract at the one year of service point, which would account for cases where a service member's contract length changes due to reclassification into a new rating at RTC or "A" school, or initially being sent to the fleet undesignated. Data on the length of the contract at one year of service excludes all observations that attrite prior to one year of active service. The contracted length of service at enlistment is found to be a better representation of first-term attrition for the analysis data set.

The binary variable used to measure first-term attrition is *Attrite45months.* The variable equals 1 if an enlistee attrites prior to completing 45 months of active military service, and equal 0 otherwise. Dummy variables for service members with four-, five-, and six-year military service obligations are used to account for the effect of a longer enlistment contract.

b.   ***E5 Fast-Track Promotion***

The relationship between pre-accession characteristics and advancement is measured by "fast-track" promotions. "Fast track" promotion is defined as achieving the rank of E5 in less than four years. The binary variable *E5FastTrack1* equals 1 if an enlistee promotes to E5 in less than 48 months of active military service, and has a value of 0 otherwise.

c.   ***Retention***

Retention is defined as not separating from the Navy before the initial enlistment contract expires, and remaining on active duty beyond the initial contracted obligation. Retention is based on the active months of military service exceeding the contracted months of obligation. It assumes that a service member with a four-year obligation who has served greater than 48 months has been "retained" through either a re-enlistment or

an extension. In the absence of a selective re-enlistment bonus, sailors often extend their contracts rather than re-enlist. A service member with a 5-year obligation who has served greater than 60 months is considered retained. Likewise, service members from FY 01–08 with 6-year obligations who have served greater than 72 months are considered retained. FY 09 six-year enlistees are not included in the *Retention6YO* variable as enlistees with six-year obligations in FY 09 have not had adequate time to complete their contract in the period covered by the data set. The binary variables used to measure first-term retention are *Retention4YO*, *Retention5YO*, and *Retention6YO*. These retention variables equal 1 if the enlistees stay beyond the initial enlistment contract and equal 0 otherwise.

2. Independent Variables

Table 18 defines the independent variables used in the analysis in the thesis.

Table 18.   Definitions for Independent Variables

Independent Variables	
Variable	**Definition**
AGE	
Age at DEP	=age at enlistment into the Delayed Entry Program
Age at Enlistment	=age at arrival to Recruit Training Command for basic training
Marital Status	
Female	=1 if female, otherwise =0
Male	=1 if male, otherwise =0
Married	=1 if married, otherwise =0
Single	=1 is single, otherwise =0
Married Female	=1 if married and female at enlistment, otherwise =0
Married Male	=1 if married and male at enlistment, otherwise =0
Single Female	=1 if single and female at enlistment, otherwise =0
Single Male	=1 if single and male at enlistment, otherwise =0
Dependent Status	
Enlist with Dependents	=1 if enlisted with dependents, otherwise =0
No Dependents	=1 if enlisted with NO dependents, otherwise =0
No Dependents Year 4	=1 if no dependents at 4 years of service, otherwise =0
Dependents at Year 4	=1 if dependents at 4 years of service, otherwise =0
No Dependents Year 5	=1 if no dependents at 5 years of service, otherwise =0

Independent Variables	
Dependents at Year 5	=1 if dependents at 5 years of service, otherwise =0
No Dependents Year 6	=1 if no dependents at 6 years of service, otherwise =0
Dependents at Year 6	=1 if dependents at 6 years of service, otherwise =0
Citizenship Status	
Not a U.S. Citizen	=1 if not a U.S. Citizen, otherwise =0
U.S. Citizen	=1 if U.S. Citizen, otherwise =0
Race & Ethnicity	
Non-Hispanic	=1 if Non-Hispanic, otherwise =0
Hispanic	=1 if classified as Hispanic at enlistment, otherwise =0
White	=1 if White, otherwise =0
White Non-Hispanic	=1 if White (race) & Non-Hispanic (ethnicity), otherwise =0
White & Hispanic	=1 if White (race) & Hispanic (ethnicity), otherwise =0
Black	=1 if Black, otherwise =0
Black Non-Hispanic	=1 if Black (race) & Non-Hispanic (ethnicity), otherwise =0
Black & Hispanic	=1 if Black (race) & Hispanic (ethnicity), otherwise =0
Asian PI	=1 if Asian or Pacific Islander, otherwise =0
Asian PI Non-Hispanic	=1 if Asian PI(race) & Non-Hispanic (ethnicity), otherwise =0
Asian PI & Hispanic	=1 if Asian PI (race) & Hispanic (ethnicity), otherwise =0
Other Race	=1 if Race is not White, Black, or Asian/PI, otherwise =0
Other Race Non-Hispanic	=1 if Other (race) & Non-Hispanic (ethnicity), otherwise =0
Other Race & Hispanic	=1 if Other (race) & Hispanic (ethnicity), otherwise =0
Academic & Aptitude	
AFQT	=Armed Forces Qualification Test Score
AO	=Assembling Objects line score
AR	=Arithmetic Reasoning line score
AS	=Automotive and Shop Information line score
EI	=Electronics Information line score
GS	=General Science line score
MC	=Mechanical Comprehension line score
MK	=Mathematics Knowledge line score
PC	=Paragraph Comprehension line score
WK	=Word Knowledge line score
VE	=Verbal Expression line score
Tier1 HSDG	=1 if Tier 1 High School Diploma Graduate, otherwise = 0
Tier2 HSG	=1 if Tier 2 High School Graduate, otherwise =0
Tier3 NHSG	=1 if Tier 3 Non-High School Graduate, otherwise =0
GED	=1 if enlistee has a GED, otherwise =0
Non-HSDG (Tier 1) 12 Years Seat Time	=1 if completed 12 years of classroom seat time & a Tier 2 HSG or Tier 3 NHSG enlistee, otherwise =0

Independent Variables	
Enlistment Features	
E1 Enlistment Rank	=1 if enlisted as E1 pay grade, otherwise =0
Advanced Pay Grade	=1 if enlisted as with advanced Pay Grade E2 or E3, otherwise =0
No Enlistment Bonus	=1 if no enlistment bonus, otherwise =0
Enlistment Bonus	=1 if received enlistment bonus, otherwise =0
Bonus Value	=dollar amount of enlistment bonus, otherwise =0
Enlistment Term	=length of initial enlistment contract in years
Enlist 4Year Obligation	=1 if enlisted with 4 year obligation, otherwise =0
Enlist 5Year Obligation	=1 if enlisted with 5 year obligation, otherwise =0
Enlist 6 Year Obligation	=1 if enlisted with 6 year obligation, otherwise =0
Overweight	=1 if received a body fat waiver at enlistment, otherwise =0 *body fat waivers only issued during FY 08–09
Enlistment Waivers	
Felony Waiver	=1 if enlisted with an adult or juvenile felony waiver, otherwise = 0
Serious Civil Waiver	=1 if enlisted with a serious traffic or non-traffic civil waiver, otherwise =0
Minor Civil Waiver	=1 if enlisted with a minor traffic or non-traffic civil waiver, otherwise =0
Alcohol or Drug Waiver	=1 if enlisted with a alcohol or drug use waiver, otherwise =0
DEP Characteristics	
Time in DEP	=number of months in DEP
DEP PQS Complete	=1 if DEP PQS is complete, otherwise =0
DEP PQS Unknown	=1 if DEP PQS status is unknown, otherwise =0
Occupational Rating Group	
Aviation Maintenance	=1 if enlisted in an aviation maintenance rating, otherwise =0
Aviation Support	=1 if enlisted in an aviation support rating, otherwise =0
Administrative	=1 if enlisted in an administrative rating, otherwise =0
Nuclear Field	=1 if enlisted in the nuclear field, otherwise =0
Undesignated Personnel	=1 if enlisted without a rating guarantee, otherwise =0
Shipboard Maintenance	=1 if enlisted in a shipboard maintenance rating, otherwise =0
Shipboard Engineering	=1 if enlisted in a shipboard engineering rating, otherwise =0
Shipboard Operations	=1 if enlisted in a shipboard operations rating, otherwise =0
Hospital Corpsman	=1 if enlisted in the medical field, otherwise =0
Intelligence and Cryptology	=1 if enlisted in an intelligence or cryptology rating, otherwise =0
Supply and Support Services	=1 if enlisted a supply or fleet support rating, otherwise =0
Ordnance, Law, and	=1 if enlisted in a ordnance, law enforcement, or weapons

Independent Variables	
Weapons Systems	system rating, otherwise =0
SEABEE Construction	=1 if enlisted in a SEABEE construction rating, otherwise =0
Submarine Volunteer	=1 if enlisted in a submarine rating, otherwise =0
Cohorts	
Fiscal Year 2001	=1 if enlisted during fiscal year 2001, otherwise=0
Fiscal Year 2002	=1 if enlisted during fiscal year 2002, otherwise=0
Fiscal Year 2003	=1 if enlisted during fiscal year 2003, otherwise=0
Fiscal Year 2004	=1 if enlisted during fiscal year 2004, otherwise=0
Fiscal Year 2005	=1 if enlisted during fiscal year 2005, otherwise=0
Fiscal Year 2006	=1 if enlisted during fiscal year 2006, otherwise=0
Fiscal Year 2007	=1 if enlisted during fiscal year 2007, otherwise=0
Fiscal Year 2008	=1 if enlisted during fiscal year 2008, otherwise=0
Fiscal Year 2009	=1 if enlisted during fiscal year 2009, otherwise=0

a. ***Occupational Rating Groups***

Enlisted sailors in the U.S. Navy serve in occupations known as "ratings" which are based on specific knowledge, skills, and abilities. Individuals serving in the same rating may have widely varying levels of experience and training depending on their assigned platforms, years of service, and assignment in rating. This thesis assigns ratings with similar work environments and responsibilities to occupational rating groups in order to assess if race or ethnicity is a determining factor in the occupational assignment of Navy recruits. The occupational rating groups used in this thesis are similar to the occupational groups used by Hansen and Wenger (2002).

Table 19 presents the ratings assigned to the occupational rating groups utilized by this thesis, which does not include all Navy ratings. Table 19 also identifies ratings in the analysis dataset that have been merged and/or discontinued. While ratings in the occupational groups share similar work environments and responsibilities, these ratings all differ in their membership size, training, promotion, and retention. Additionally, it should be noted that a rated individual may not work in their assigned rating specialty during their first enlistment.

Table 19.   Ratings Assigned to Occupational Rating Groups.

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)

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)

C.   SUMMARY STATISTICS

The means for the sample are presented in Appendix A, Table 39. Table 39 shows that the typical enlistee in the sample is an 18 year old, White, non-Hispanic, Tier 1 high school diploma graduate with an AFQT score of 62. He is single, without dependents, and enlists as an E1. There is a 34 percent chance that he will attrite prior to completing his initial four-year contract obligation. If he completes his initial four-year contract, there is a 55.4 percent chance that he will re-enlist or extend in the Navy past his initial

contract term. The typical enlistee has a 42.1 percent opportunity to promote to E5 in under four years. He spent 4.5 months in DEP and did not complete his DEP PQS prior to shipping to RTC.

The average Hispanic enlistee is similar to the typical enlistee. He is an 18 year old single male Tier 1 high school diploma graduate. He enlists for four-years as an E1, spends 4.5 months in DEP and does not complete the DEP PQS. Differences are greater when the Hispanic enlistee is compared to the average non-Hispanic enlistee

1.   Dependent Variables

The analysis data set provides variable means and standard deviations for the dependent variables used in this thesis. Table 20 presents the dependent variable means and standard deviations for the full sample, and separately for Hispanics and non-Hispanics. T-tests of differences in group means show that there is a statistically significant difference between Hispanics and non-Hispanics for promotion to E5 in less than four years, first-term attrition for four-, five-, and six- year enlistees, and retention for four-, five-, and six-year enlistees.

Table 20.   Means, Standard Deviations, and T-Statistic Confidence Level for Dependent Variables.

Variable	Full Sample Mean (SD)	Hispanic Mean (SD)	Non-Hispanic Mean (SD)	T-Statistic
E5 Fast Track	0.421 (.49)	0.380 (.49)	0.430 (.5)	16.46***
Attrition 4YO	0.340 (.47)	0.295 (.46)	0.352 (.47)	18.91***
Attrition 5YO	0.301 (.46)	0.268 (.44)	0.308 (.46)	11.44***
Attrition 6YO	0.269 (.44)	0.255 (.44)	0.271 (.45)	3.86***
Retention 4YO	0.554 (.5)	0.595 (.49)	0.545 (.5)	-15.91***
Retention 5YO	0.574 (.49)	0.608 (.49)	0.567 (.5)	-10.67***
Retention 6YO	0.563	0.573	0.561	-2.28 *

Variable	Full Sample Mean (SD)	Hispanic Mean (SD)	Non-Hispanic Mean (SD)	T-Statistic
	(.5)	(.49)	(.5)	
*** Statistically significant at the 99.9% confidence level * Statistically significant at the 95% confidence level				

The *E5FastTrack1* variable signifies that an enlistee promotes to pay grade E5 in less than four years of service and their date of rank occurs before 48 months of service. 48 months of service is measured by the enlistment date plus 1,460 days. The null hypothesis that Hispanics and non-Hispanics promote to E5 under four years at an equal rate is rejected at the 99.9 percent confidence level. Hispanics are on average 5.07 percentage points less likely to promote to E5 in under four years than non-Hispanics, ceteris paribus.

First-term attrition is estimated separately for enlistees with four-, five-, and six-year military service obligations to account for the effect of a longer enlistment contract. The null hypothesis that Hispanics and non-Hispanics attrite at an equal rate is rejected at the 99.9 percent confidence level for four-, five-, and six-year enlistees. Being Hispanic reduces the likelihood of first term attrition for four-year obligors by 5.66%, for five-year obligors by 4.07%, and for six-year obligors by 1.65%. Table 19 shows that the longer the service obligation at enlistment, the less likely an enlistee is to attrite during the first 45 months. The mean attrition rate at 45 months of service is 31.16 percent for the unrestricted sample.

Retention is when an enlistee who completes his/her initial contract choses to remain on active duty beyond the initial contracted obligation. Retention is important in order to retain individuals with the knowledge, skills, and abilities needed to properly man the fleet. The null hypothesis that Hispanics and non-Hispanics retain in the Navy at an equal rate is rejected at the 99.9 percent confidence level for four- and five-year enlistees. The null hypothesis is rejected at the 95 percent confidence level for six-year enlistees. Being Hispanic increases the likelihood of retention for four-year obligors *Retention4YO* by 5%, for five-year obligors *Retention5YO* by 4.09%, and for six-year

obligors *Retention6YO* by 1.19%. Table 19 shows that enlistees with initial five-year active duty obligations are more likely to retain in the Navy than enlistees with four- or six-year obligations.

2. Independent Variables

The analysis data set also provides variable means and standard errors for select independent variables deemed relevant after a review of the summary statistics. Table 39 in Appendix A presents the summary statistics for all variables used in the thesis. Table 21 presents the selected independent variable means and standard deviations for the full analysis data set, and when restricted to only Hispanics, or non-Hispanics. T-tests are conducted to investigate significant difference between Hispanics and non-Hispanics for the selected independent variables.

Table 21.   Means, Standard Deviations, and T-Statistic Confidence Level for Independent Variables.

Variable	Full Sample Mean (SE)	Hispanic Mean (SE)	Non-Hispanic Mean (SE)	T-Statistic
AFQT	61.504 (18.49)	59.543 (17.56)	61.949 (18.66)	29.84***
PC	53.537 (6.04)	52.896 (6.03)	53.680 (6.03)	29.89***
WK	52.530 (5.64)	51.418 (6.18)	52.782 (6.13)	50.9***
Advanced Pay Grade at Enlistment	.362 (.48)	.333 (.47)	.369 (.48)	17.16***
Overweight *limited to FY 08–09	.039 (.19)	.047 (.21)	.036 (.19)	-6.09***
Enlistment Bonus	.497 (.5)	.466 (.5)	.504 (.5)	17.38***
Enlistment Bonus Value	$6,329.71 (11,103.73)	$5,908.84 (10,984.27)	$6,425.09 (11,128.44)	10.65***
Minor Civil Waiver	.038 (.19)	.034 (.18)	.039 (.19)	4.89***
Alcohol or Drug Waiver	.018 (.13)	.022 (.15)	.017 (.13)	-8.56***
U.S. Citizenship	.954 (.21)	.907 (.29)	.964 (.19)	62.93***
Nuclear Field	.062 (.24)	.048 (.21)	.065 (.25)	16.61***

Variable	Full Sample Mean (SE)	Hispanic Mean (SE)	Non-Hispanic Mean (SE)	T-Statistic
Undesignated Personnel	.159 (.37)	.176 (.38)	.155 (.36)	-13.12***
Hospital Corpsman	.077 (.27)	.090 (.29)	.074 (.26)	-13.91***
Intelligence & Cryptology Occupational Group	.035 (.18)	.030 (.17)	.036 (.19)	7.45***
Aviation Support Occupational Group	.047 (.21)	.054 (.23)	.046 (.21)	-8.69***
Dependents at 4 Years of Service	.503 (.5)	.539 (.5)	.494 (.5)	-14.67***
Dependents at 5 Years of Service	.573 (.5)	.603 (.49)	.566 (.5)	-9.97***
Dependents at 6 Years of Service	.650 (.48)	.675 (.47)	.645 (.48)	-7.27***
*** Statistically significant at the 99.9% confidence level				

Differences between Hispanics and non-Hispanics in Table 21 are all statistically significant at the 99.9 percent confidence level. These descriptive statistics present the most significant independent variables in the analysis data set and illustrate the estimated differences between the typical Hispanic and non-Hispanic enlistee.

The average Hispanic enlistee's *AFQT* score is 2.4 points lower than the typical non-Hispanic enlistee, due to lower *PC* and *WK* line scores. Compared to non-Hispanics, the average Hispanic enlistee is 3.6 percent less likely to enlist with an *Advanced Pay Grade*, and 4.57 percent less likely to receive an enlistment bonus. Among those who do receive *Enlistment Bonuses*, Hispanics receive on average $516 less than non-Hispanics.

While there is only a .18 percent difference in the likelihood of *Enlisting with Dependents* between Hispanics and non-Hispanics, Hispanics are more likely to acquire dependents during their initial enlistment contract. The 4.55, 3.69, and 3.04 percent increased likelihood that a Hispanic has dependents at four-, five-, and six- years of service may partially account for Hispanics' higher retention rates. Hispanic enlistees are 5.76 percent less likely to be *U.S. Citizens*, which may partially explain why Hispanics are also 1.74 percent less likely to enlist in the *Nuclear Field*. Navy nuclear field

candidates must be U.S. citizens. Navy nuclear field enlistees enter with an advanced pay grade, an enlistment bonus, and enjoy high promotion rates. The lower level of Hispanic representation in the nuclear field may partially explain why Hispanics have a lower enlistment bonus value, are less likely to enlist with an advanced pay grade, and promote to E5 in under 4 years at a lower rate than non-Hispanics.

A Hispanic enlistee is 1.6 percent more likely to enlist as a *Hospital Corpsman*, and 2.1 percent more likely to enlist as an *undesignated* sailor than a non-Hispanic enlistee. Other differences include Hispanics being 1.06 percent more likely to enlist with a body-fat waiver (*Overweight)*, and 0.5 percent more likely to enlist with an A*lcohol or Drug Waiver*. Hispanics are however, 0.4 percent less likely to enlist with a M*inor Civil Waiver*.

D.   SUMMARY

This thesis employs an analysis data set that provides an in depth overview of 348,330 Navy enlistee's pre-accession characteristics, entry into naval service, and career outcomes. Compared to non-Hispanics, Hispanics in the analysis data set are estimated to be 5.07 percent less likely to promote to E5 in under four-years, 5.66 percent less likely to attrite during the first-term (four-year obligor), and 5 percent more likely to retain in the Navy past the initial enlistment contract obligation (four-year obligor), ceteris paribus. Summary statistics present additional estimated differences between the average Hispanic and non-Hispanic enlistee's pre-accession characteristics, to include: age, marital status, dependent status, citizenship, academic background, aptitude scores, enlistment contract features, enlistment waivers, DEP characteristics, and occupational rating group assignment.

THIS PAGE INTENTIONALLY LEFT BLANK

V. MULTIVARIATE ANALYSIS OF ATTRITION, RETENTION, AND PROMOTION

A. METHODOLOGY

This thesis uses multivariate estimating models to analyze the effects of demographics and pre-accession factors on first-term attrition (at 45 months), promotion to E5 (in less than four-years), and retention beyond the initial enlistment contract for Navy enlistees. The analysis uses a sample consisting of 348,330 individuals who enlisted in the Navy during FY 01–09.

Binary dependent variables are used to model first-term attrition (*Attrite45Months)*, promotion (*E5FastTrack1)*, and retention for four-year obligors (*Retention4YO)*, retention for five-year obligors (*Retention5YO)*, and retention for six-year obligors (*Retention6YO)*. Therefore, the estimating models will use probit regression equations. A probit regression model has the general form as presented in equation (1) below (Wooldridge, 2008):

(1)   *Probit Model* $Y_{i=}\beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \ldots + U_i$

where Y_i is the dependent variable, which represents the binary career outcome for the ith recruit, β_0 is a constant term and β_i is a (k+1)×1 vector of estimated coefficients of the binary independent variables, with k being the number of explanatory variables in the model. X_i is a 1x (k+t) vector of independent variables such as ASVAB line scores, advanced pay grade at enlistment, enlisting with dependents, or receiving an enlistment bonus, and U_i is the error term.

A probit model is "a model for binary responses where the response probability is the standard normal cumulative distribution function evaluated at a linear function of the explanatory variables" (Wooldridge, 2008, p. 224). The cumulative distribution function provides the probability that a random variable will be less than or equal to a quantified real number. The coefficient estimates provided by a probit model are used to confirm the sign and statistical significance of the effect of each independent variable on the probability of the outcome. However, the estimated probit coefficients are difficult to

interpret. For ease of information the marginal effect of each independent variable is calculated. The marginal effects estimate how much the probability of the dependent variable changes when a binary (0/1) independent variable goes from 0 to 1, or a continuous independent variable changes by one unit, holding all else constant. This thesis uses STATA 13 software to estimate the probit coefficients and the marginal effects. STATA 13 is also used to estimate Pearson's correlation coefficient which tests for association between the independent variables determined relevant by this thesis. The independent variables selected are found to possess weak linear relationships, and are therefore included in the probit regression models.

B.   MODEL SPECIFICATION

1.   First-Term Attrition Models

The binary dependent variable used to measure first-term attrition is *Attrite45Months*, which equals 1 if an enlistee attrites prior to completing 45 months of active military service, and equals 0 otherwise.

The foundation of the first-term attrition models are based on a first-term attrition model proposed by Wenger and Hodari (2004). Wenger and Hodari analyze how various characteristics such as age, race, ethnicity, being married, AFQT score, waiver status, time in the Delayed Entry Program, and education level affect first-term attrition of Navy enlistees. The models I have specified seek to determine if citizenship, English-language based ASVAB line scores, or completion of 12 years of classroom education for non-Tier 1 enlistees affect the first-term attrition outcome for Navy recruits. With two of the four ASVAB subtests (PC and WK) that determine the AFQT score (PC, WK, AR, MK) for enlistment eligibility requiring a strong ability to read and comprehend the English language, it is reasonable that individuals who learn English as a second language, or primarily speak another language in their home, may have greater difficulty attaining a passing AFQT score.

The models I have specified also seek to measure the effect on first-term attrition outcome for enlistees who receive an enlistment bonus, have dependents at enlistment, or enlist at an advanced pay grade. Typically individuals who receive an enlistment bonus

and later voluntarily separate or are discharged at fault prior to completing the 12-month extension associated with the enlistment bonus, are required to pay back all or a portion of the enlistment bonus. It is hypothesized that enlisting with dependents may proxy for an increased maturity level or commitment to secure employment. Dummy variables for service members with four-, five-, or six-year military service obligations are used to estimate the effect of a longer enlistment contract. Additionally, the models employ occupational rating groups to determine if a Navy recruit is more likely to attrite during the first-term due to his/her initial rating assignment.

a.   *First-Term Attrition Model, Unrestricted Sample FY 01–09*

Equation (2) lists the explanatory variables used in the probit first-term attrition model.

(2)   Prob($Attrite45Months=1$)= β_0 + β_1 *Hispanic* + β_2 *Black* + β_3 *Asian and Pacific Islander* + β_4 *Other Race* + β_5 *Age at Enlistment* + β_6 *Female* + β_7 *Married* + β_9 *Enlist with Dependents* + β_{10} *Non-Citizen* + β_{11} *PC* + β_{12} *WK* + β_{13} *AR* + β_{14} *MK* + β_{15} *Tier 2 HSG* + β_{16} *Tier 3 NHSG* + β_{17} *Non-HSDG 12 Years education* + β_{18} *Advanced Pay Grade* + β_{19} *Enlistment Bonus* + β_{20} *Five-Year Enlistment* + β_{21} *Six-Year Enlistment* + β_{22} *Civil Waiver* + β_{23} *Alcohol or Drug Waiver* + β_{24} *Time in DEP* + β_{25} *DEP PQS Complete* + β_{26} *Aviation Maintenance* + B_{27} *Aviation Support* + β_{28} *Administrative* + β_{29} *Nuclear Field* + β_{30} *Undesignated* + β_{31} *Shipboard Maintenance* + β_{32} *Shipboard Operations* + β_{33} *Hospital Corpsman* + β_{34} *Intelligence and Cryptology* + β_{35} *Supply and Support Services* + β_{36} *Ordnance, Law, and Weapons Systems* + β_{37} *SEABEE Construction* + β_{38} *Submarine Volunteer* + *U*.

b.   *First-Term Attrition Probit Regression Results, Unrestricted Sample FY 01–09*

Table 22 presents the estimated probit coefficients, marginal effects, standard errors and the statistical significance for the estimated coefficients of the first-term attrition model. For the dummy variables, the reference categories that are omitted from the regression are: *White, Non-Hispanic, Male, Single, No Dependents at Enlistment, U.S. Citizen, Tier 1 HSDG, E1 at Enlistment, No Enlistment Bonus, Four-Year Enlistment, No Civil Waivers, No Alcohol or Drug Waiver, Shipboard Engineering Occupational Group,* and *DEP PQS Incomplete.*

Table 22.   Probit Regression Results for First-Term Attrition, Full Sample
FY01-09.

First-Term Attrition *Attrite45*	Probit Coefficient	SE	Marginal Effect	Z Score
Hispanic	-0.104	0.006	-0.036	-17.44***
Black	0.001	0.005	0.000	0.12
Asian or Pacific Islander	-0.192	0.013	-0.064	-14.62***
Other Race	-0.011	0.006	-0.004	-1.71*
Age at Enlistment	-0.006	0.001	-0.002	-6.80***
Female	0.180	0.006	0.065	30.17***
Married	-0.042	0.020	-0.015	-2.12**
Enlist with Dependents	0.020	0.020	0.007	0.97
Non-Citizen	-0.352	0.013	-0.112	-28.11***
PC	-0.003	0.000	-0.001	-6.41***
WK	0.003	0.000	0.001	6.94***
AR	-0.001	0.000	0.000	-1.69*
MK	-0.015	0.000	-0.005	-32.62***
Tier 2 HSG	0.366	0.012	0.137	31.84***
Tier 3 NHSG	0.384	0.016	0.145	24.69***
Non-HSDG 12-Years Education	-0.204	0.032	-0.067	-6.36***
Advanced Pay Grade	-0.103	0.003	-0.036	-30.31***
Enlistment Bonus	0.044	0.007	0.016	6.53***
5 Year Enlistment	-0.056	0.008	-0.019	-6.89***
6 Year Enlistment	-0.058	0.010	-0.020	-5.89***
Time in DEP	-0.027	0.001	-0.010	-40.84***
Civil Waiver	0.153	0.011	0.056	14.15***
Alcohol or Drug Waiver	-0.009	0.017	-0.003	-0.54
DEP PQS Complete	-0.103	0.008	-0.035	-13.49***
Aviation Maintenance	-0.098	0.011	-0.033	-8.68***
Aviation Support	-0.003	0.012	-0.001	-0.29
Administrative	0.007	0.016	0.002	0.42
Nuclear Field	0.129	0.013	0.046	10.00***
Undesignated Personnel	0.035	0.009	0.012	4.04***
Shipboard Maintenance	-0.030	0.010	-0.010	-3.08***
Shipboard Operations	0.079	0.014	0.028	5.52***
Hospital Corpsman	-0.054	0.012	-0.019	-4.68***
Intelligence & Cryptology	-0.110	0.014	-0.038	-8.05***
Supply & Support Services	0.104	0.011	0.037	9.19***
Ordnance, Law, & Weapons	-0.020	0.009	-0.007	-2.36**
SEABEE Construction	-0.057	0.016	-0.020	-3.59***
Submarine Volunteer	0.187	0.012	0.068	15.95***
_Constant	0.767	0.037		

N= 348,330	Pseudo R^2= 0.0312	Log Likelihood = -209339.23

*** Indicates coefficient is statistically significant at 99% level or better.

** Indicates coefficient is statistically significant at 95% level or better.

* Indicates coefficient is statistically significant at 90% level or better.

Multiple pre-accession characteristics in Table 22 are found to be statistically significant predictors of attrition. In particular, Hispanics are 3.6 percentage points less likely to attrite during the first 45 months of service than non-Hispanic sailors. Since the overall attrition rate in the sample is .31, -.036 points represents a difference of -11 percent. After education, not being a U.S. citizen is found to be the most significant demographic characteristic in the model, with *Non-Citizen* estimated to reduce first-term attrition by 11.2 percentage points (or 36 percent), ceteris paribus. The citizenship variable is noteworthy as descriptive statistics in chapter four found Hispanics in the analysis data set to be 5.76 percent less likely to be U.S. citizens than non-Hispanics. Both the *Hispanic* and the *Non-Citizen* variable are statistically significant at the 99 percent confidence level.

Pre-accession education and aptitude variables are all found to be statistically significant at the 90 percent or greater confidence level. Compared to a Tier 1 enlistee, recruits who enlist as a Tier 2 HSG are estimated to be 13.7 percentage points (44 percent) more likely to attrite during the first-term. A Tier 3 NHSG enlistee is estimated to be 14.5 percentage points (47 percent) more likely to attrite than Tier 1 enlistees. Tier 2 and Tier 3 enlistees who have completed 12 years of formal classroom seat time on the other hand, are 6.7 percentage points less likely to attrite than their Tier 2 and Tier 3 peers without 12 years of classroom seat time.

ASVAB line scores are referred to as standard scores. Standard scores report a test takers placement in comparison to a national sample of testers. Approximately half of the population scores at or above a standard score of 50. The mean scores for ASVAB line scores in the analysis data set that are used in this model are *PC* (53.54), *WK* (52.53), *AR* (53.25), and *MK* (55.48). A one point increase in the *PC* line score above the sample mean is estimated to reduce the likelihood of first-term attrition by 0.1 percentage point. The *WK* line score is unexpectedly estimated to increase the likelihood of attrition by 0.1 percentage point, per point scored above the sample mean. The estimates for *PC* and *WK* are found to be statistically significant at the 99 percent confidence level but only result in a minor effect on first-term attrition.

Female enlistees are estimated to be 6.5 percentage points more likely to attrite than male enlistees. The *Female* attrition estimate is statistically significant. *Married* recruits are found to be 1.5 percentage points less likely to attrite during the first-term, with a statistical significance of 95 percent. However, the variable *Enlist with Dependents* is not statistically significant.

Enlisting with an *advanced pay grade* is estimated to reduce first-term attrition by 3.6 percentage points, while receiving an *enlistment bonus* is unexpectedly estimated to increase first-term attrition by 1.6 percentage points. Recruits who enlist with *five-* and *six- year enlistment contracts* are found to be 1.9 and 2.0 percentage points less likely to attrite, respectively.

Due to a limited number of observations for civil waivers in the data set, 13,131 minor civil waivers, 2,020 serious civil waivers, and 539 felony waivers are combined into one *Civil Waiver* variable. There are 15,135 individuals who possess one or more civil waiver at the time of enlistment (4.35 percent of the analysis data set). Holding all else constant, enlisting with a *civil waiver* is estimated to increase first-term attrition by 5.6 percentage points, and is statistically significant at the 99 percent confidence level.

Recruits who successfully complete the DEP PQS are 3.5 percentage points less likely to attrite during the first-term than recruits who fail to complete the DEP PQS. The DEP PQS is optional for Tier 1 and Tier 2 enlistees; however, recruits are awarded the rank of E2 if they successfully complete the DEP PQS as well as a knowledge test and initial fitness assessment at RTC. The model finds *Time in DEP* to be a positive investment with each additional month beyond 4.5 months spent in DEP, resulting in a 1.0 percentage point reduction in the likelihood of active duty attrition. *DEP PQS Complete* and *Time in DEP* are both found to be statistically significant at the 99 percent confidence level.

Finally, the occupational rating group variables show that many of the enlistment ratings or programs can affect first-term attrition. Hispanics in analysis data set are less likely to enlist in the *nuclear field* and more likely to enlist as *Hospital Corpsman* or *undesignated personnel*. Enlisting in the *nuclear field* is estimated to increase first-term

attrition by 4.6 percentage points, holding all else constant. Enlisting as a *Hospital Corpsman* is estimated to reduce first-term attrition by 1.9 percentage points and enlisting undesignated is estimated to increase first-term attrition by 1.2 percentage points, ceteris paribus. The occupational rating group with the largest effect is *Submarine Volunteer*, which is estimated to increase first-term attrition by 6.8 percentage points, ceteris paribus. The *Nuclear Field*, *Hospital Corpsman*, *Undesignated Personnel*, and *Submarine Volunteer* occupational rating groups are all found to be statistically significant at the 99 percent confidence level.

  c. ***First-Term Attrition Models, FY 01–09, For Hispanic and Non-Hispanic Sub-Samples***

  The first-term attrition models are estimated separately for Hispanics and non-Hispanics to identify if the two groups are affected differently by the independent variables in our attrition model. Table 23, presents the marginal effects for the sample of Hispanics only, while Table 24 presents the marginal effects for non-Hispanics only. In the attrition model for Hispanics the *PC* line score and enlisting as *Undesignated Personnel* do not have statistically significant effects for Hispanics. Hispanics who possess a *Civil Waiver* are 6.4 percentage points more likely to attrite than Hispanics who do not possess a *Civil Waiver*. Unexpectedly, Hispanics who have enlisted with an *Alcohol or Drug Waiver* are 2.7 percentage points less likely to attrite. Non-Hispanics who possess a *Civil Waiver* are 5.4 percentage points more likely to attrite, than non-Hispanics who do not possess a *Civil Waiver*.

  Enlisting as a *Hospital Corpsman* reduces first-term attrition by 3.2 percentage points for Hispanics but by only 1.6 percentage points for non-Hispanics. Non-Hispanics who are Tier 3 enlistees are 14.9 percentage points more likely to attrite during the first-term than Tier 1 enlistees; while Hispanic Tier 3 enlistees are only 12.5 percentage points more likely to attrite than Tier 1 enlistees. Tables 23 and 24, show that non-Hispanic *Tier 2 HSG* (0.138) enlistees with alternative education credentials are more likely to be first-term attrites than Hispanic *Tier 3 NHSG* (0.125) enlistees with no education credential. *Female* non-Hispanic enlistees are 0.8 percentage points more likely to attrite than female Hispanic enlistees.

Table 23.   First-Term Attrition Model, FY 01–09 Marginal Effects, Hispanics Only.

First-Term Attrition Attrite45	Probit Coefficient	SE	Marginal Effect	Z Score
Black	0.002	0.013	0.001	0.14
Asian or Pacific Islander	-0.149	0.030	-0.047	-4.93***
Other Race	0.015	0.014	0.005	1.05
Age at Enlistment	-0.002	0.002	-0.001	-1.05
Female	0.171	0.014	0.058	12.45***
Married	-0.029	0.044	-0.010	-0.66
Enlist with Dependents	-0.006	0.046	-0.002	-0.14
Non-Citizen	-0.295	0.021	-0.090	-14.19***
PC	-0.001	0.001	0.000	-0.72
WK	0.007	0.001	0.002	6.35***
AR	0.002	0.001	0.001	1.46
MK	-0.015	0.001	-0.005	-13.99***
Tier 2 HSG	0.359	0.027	0.129	13.39***
Tier 3 NHSG	0.346	0.036	0.125	9.62***
Non-HSDG 12-Years Education	-0.249	0.074	-0.076	-3.35***
Advanced Pay Grade	-0.095	0.008	-0.031	-11.62***
Enlistment Bonus	0.015	0.016	0.005	0.95
5 Year Enlistment	-0.037	0.019	-0.012	-1.90*
6 Year Enlistment	-0.038	0.024	-0.012	-1.58
Time in DEP	-0.027	0.002	-0.009	-17.03***
Civil Waiver	0.185	0.026	0.064	6.98***
Alcohol or Drug Waiver	-0.085	0.038	-0.027	-2.21**
DEP PQS Complete	-0.053	0.018	-0.018	-3.01***
Aviation Maintenance	-0.112	0.027	-0.036	-4.12***
Aviation Support	-0.056	0.027	-0.018	-2.09**
Administrative	-0.001	0.037	0.000	-0.03
Nuclear Field	0.113	0.033	0.039	3.41***
Undesignated Personnel	-0.009	0.020	-0.003	-0.46
Shipboard Maintenance	-0.037	0.023	-0.012	-1.58
Shipboard Operations	0.096	0.033	0.033	2.89***
Hospital Corpsman	-0.097	0.027	-0.031	-3.64***
Intelligence & Cryptology	-0.085	0.034	-0.028	-2.51***
Supply & Support Services	0.083	0.027	0.028	3.10***
Ordnance, Law, & Weapons	-0.022	0.020	-0.007	-1.08
SEABEE Construction	-0.051	0.042	-0.017	-1.21
Submarine Volunteer	0.192	0.029	0.067	6.65***
_Constant	0.164	0.089		

N= 64358   Pseudo R^2= 0.0272   Log Likelihood = -37018.611
***   Indicates coefficient is statistically significant at 99% level or better.
**   Indicates coefficient is statistically significant at 95% level or better.
*   Indicates coefficient is statistically significant at 90% level or better.

Table 24. First-Term Attrition Model, FY 01–09 Marginal Effects, Non-Hispanic Only.

First-Term Attrition Attrite45	Probit Coefficient	SE	Marginal Effect	Z Score
Black	-0.003	0.006	-0.001	-0.46
Asian or Pacific Islander	-0.205	0.015	-0.069	-13.99***
Other Race	-0.022	0.007	-0.008	-3.24***
Age at Enlistment	-0.007	0.001	-0.002	-6.91***
Female	0.183	0.007	0.066	27.49***
Married	-0.043	0.022	-0.015	-1.93*
Enlist with Dependents	0.028	0.022	0.010	1.24
Non-Citizen	-0.371	0.016	-0.119	-23.44***
PC	-0.004	0.001	-0.001	-6.79***
WK	0.002	0.001	0.001	4.61***
AR	-0.001	0.001	0.000	-2.37**
MK	-0.015	0.001	-0.005	-29.12***
Tier 2 HSG	0.367	0.013	0.138	28.78***
Tier 3 NHSG	0.392	0.017	0.149	22.73***
Non-HSDG 12-Years Education	-0.192	0.036	-0.065	-5.40***
Advanced Pay Grade	-0.105	0.004	-0.037	-28.02***
Enlistment Bonus	0.050	0.007	0.018	6.67***
5 Year Enlistment	-0.059	0.009	-0.021	-6.65***
6 Year Enlistment	-0.062	0.011	-0.022	-5.76***
Time in DEP	-0.028	0.001	-0.010	-37.09***
Civil Waiver	0.147	0.012	0.054	12.36***
Alcohol or Drug Waiver	0.011	0.020	0.004	0.55
DEP PQS Complete	-0.115	0.008	-0.040	-13.60***
Aviation Maintenance	-0.095	0.012	-0.033	-7.70***
Aviation Support	0.009	0.013	0.003	0.67
Administrative	0.008	0.018	0.003	0.44
Nuclear Field	0.133	0.014	0.048	9.51***
Undesignated Personnel	0.047	0.010	0.017	4.90***
Shipboard Maintenance	-0.029	0.011	-0.010	-2.74***
Shipboard Operations	0.075	0.016	0.027	4.73***
Hospital Corpsman	-0.045	0.013	-0.016	-3.49***
Intelligence & Cryptology	-0.115	0.015	-0.040	-7.67***
Supply & Support Services	0.108	0.013	0.039	8.65***
Ordnance, Law, & Weapons	-0.020	0.009	-0.007	-2.17**
SEABEE Construction	-0.059	0.017	-0.021	-3.43***
Submarine Volunteer	0.186	0.013	0.068	14.49***
_Constant	0.871	0.040		

N= 283972   Pseudo R^2= 0.0314   Log Likelihood = -172237.44

*** Indicates coefficient is statistically significant at 99% level or better.
** Indicates coefficient is statistically significant at 95% level or better.
* Indicates coefficient is statistically significant at 90% level or better.

d.   *First-Term Attrition Model, Restricted Sample FY 04–09*

Requirements for federal reporting of race and ethnicity transformed the Department of Defense reporting of Hispanic as an ethnicity rather than a race, effective January 1, 2003 (OMB, 1997). Enlistees in FY 01–02, as well as those who enlisted in the first quarter of FY 03 were recorded with Hispanic as a race and not an ethnicity. Therefore, an enlistee in FY 01–02 was either Hispanic or White, but could not be multiple races. The reporting change in January of 2003 now allows for an enlistee to be racially White and ethnically Hispanic. To determine the effects of being both a racial demographic and having Hispanic ethnicity a restricted first-term attrition model is estimated using only individuals who enlisted during FY 04–09. The model specification is comparable to equation (2), except that dummy variables for race and ethnicity have been dropped, and dummy variables accounting for enlistees possessing both a race and an ethnicity have been included. The sample size of the restricted model is 215,034.

e.   *First-Term Attrition Probit Regression Results, Restricted Sample FY 04–09*

Table 25 presents the estimated probit coefficients, marginal effects, standard errors and the statistical significance for the estimated coefficients of the restricted first-term attrition model. The reference categories omitted are similar to the unrestricted model, with a substitution of *White and Non-Hispanic* for the *White* race and *Hispanic* ethnicity variables.

Table 25. Probit Regression Results for First-Term Attrition, Restricted Sample FY 04–09.

First-Term Attrition Attrite45	Probit Coefficient	SE	Marginal Effect	Z Score
White & Hispanic	-0.111	0.010	-0.037	-11.12***
Black & Hispanic	-0.048	0.018	-0.016	-2.60**
Black & Non-Hispanic	-0.019	0.009	-0.006	-2.19**
Asian PI & Hispanic	-0.251	0.030	-0.080	-8.26***
Asian PI & Non-Hispanic	-0.204	0.016	-0.066	-12.99***
Other Race & Hispanic	-0.071	0.014	-0.024	-5.14***
Other Race & Non-Hispanic	0.021	0.009	0.007	2.32**
Age at Enlistment	-0.008	0.001	-0.003	-6.86***
Female	0.214	0.008	0.076	28.23***
Married	-0.054	0.026	-0.018	-2.07**
Enlist with Dependents	0.001	0.033	0.000	0.02
Non-Citizen	-0.310	0.017	-0.097	-18.05***
PC	-0.004	0.001	-0.001	-5.97***
WK	0.003	0.001	0.001	5.07***
AR	-0.003	0.001	-0.001	-4.22***
MK	-0.014	0.001	-0.005	-22.15***
Tier 2 HSG	0.351	0.015	0.129	22.76***
Tier 3 NHSG	0.377	0.025	0.140	15.12***
Non-HSDG 12-Years Education	-0.184	0.042	-0.060	-4.42***
Advanced Pay Grade	-0.096	0.004	-0.033	-22.54***
Enlistment Bonus	0.049	0.009	0.017	5.16***
5 Year Enlistment	-0.074	0.011	-0.025	-6.74***
6 Year Enlistment	-0.081	0.013	-0.027	-6.25***
Time in DEP	-0.025	0.001	-0.008	-29.40***
Civil Waiver	0.146	0.015	0.052	9.46***
Alcohol or Drug Waiver	-0.023	0.022	-0.008	-1.04
DEP PQS Complete	-0.095	0.008	-0.032	-11.81***
Aviation Maintenance	-0.096	0.015	-0.032	-6.24***
Aviation Support	-0.012	0.014	-0.004	-0.87
Administrative	0.020	0.020	0.007	1.01
Nuclear Field	0.162	0.016	0.057	10.13***
Undesignated Personnel	0.033	0.012	0.011	2.77***
Shipboard Maintenance	-0.026	0.012	-0.009	-2.13**
Shipboard Operations	0.052	0.018	0.018	2.88***
Hospital Corpsman	-0.033	0.015	-0.011	-2.21**
Intelligence & Cryptology	-0.098	0.016	-0.033	-6.03***
Supply & Support Services	0.105	0.015	0.037	7.13***
Ordnance, Law, & Weapons	-0.012	0.011	-0.004	-1.13
SEABEE Construction	-0.058	0.020	-0.019	-2.94***
Submarine Volunteer	0.199	0.014	0.071	14.01***
_Constant	0.848	0.047		

N= 215034   Pseudo R^2= 0.0277   Log Likelihood = -127305.7

*** Indicates coefficient is statistically significant at 99% level or better.
** Indicates coefficient is statistically significant at 95% level or better.
* Indicates coefficient is statistically significant at 90% level or better.

In the restricted model the effects of being both a racial demographic and having Hispanic ethnicity are statistically significant at the 95 percent or greater confidence level for all race and ethnicity interaction variables. Being White and Hispanic is estimated to reduce the likelihood of being a first-term attrite by 3.7 percentage points compared to being White and non-Hispanic, ceteris paribus. Table 23 shows that individuals who classify as racially White, Black, Asian / Pacific Islander or another race are all estimated to be less likely to attrite if they also classify as ethnically Hispanic. It is ethnicity, rather than race that is found to be important in estimating first-term attrition.

2.   Retention Models

The binary dependent variables used to measure first-term retention are *Retention4YO* for four-year obligors, *Retention5YO* for five-year obligors, and *Retention6YO* for six-year obligors. The use of four-, five-, and six-year obligation variables is based on the analysis in Center for Naval Analysis (2014), which recognizes that sailors enlist into programs with varying years of contracted obligation. Most sailors who accept an enlistment bonus are required to obligate for one additional year of service. This thesis measures years of obligation at enlistment.

 Retention is defined as not being a first term attrite, and remaining on active duty for more than 11-months beyond the initial contracted obligation, via either re-enlistment or an extension. The U.S. Navy MILPERSMAN 1160–040 manual provides the official policy for the extension of enlistments (2010). As of October 2009, all extensions are conditional (short-term) and no enlistment contract can be extended for longer than 24 months. Conditional extensions of up to 24 months can be granted for pregnancy, maternity care, to complete a deployment, or to meet service requirements for orders or training (U.S. Navy, 2010). The binary retention variables equal 1 if the enlistee does not attrite prior to 45 months, and remains in the Navy for more than 11-months beyond the expiration of the initial enlistment contract, and equal 0 otherwise.

a. ***Retention Model Four-Year Obligors, Restricted Sample FY 01–08***

Equation (3) lists the explanatory variables used in the probit retention model. The sample size of the restricted model is 94,626.

(3)　Prob(*Retention4YO/5YO/6YO=1)= β_0 + β_1 *Hispanic* + β_2 *Black* + β_3 *Asian and Pacific Islander* + β_4 *Other Race* + β_5 *Age at Enlistment* + β_6 *Female* + β_7 *Non-Citizen* + β_8 *VE* + β_9 *MK* + β_{10} *Tier 2 HSG* + β_{11} *Tier 3 NHSG* + β_{12} *Non-HSDG 12 Years Education* + β_{13} *Advanced Pay Grade* + β_{14} *Enlist with Dependents* + β_{15} *Dependents Year 3+* β_{16} *Time in DEP* + β_{17} *Civil Waiver* + β_{18} *Alcohol or Drug Waiver* + β_{19} *DEP PQS Complete* + β_{20} *Aviation Maintenance* + B_{21} *Aviation Support* + β_{22} *Administrative* + β_{23} *Undesignated* + β_{24} *Shipboard Maintenance* + β_{25} *Shipboard Operations* + β_{26} *Intelligence and Cryptology* + β_{27} *Supply and Support Services* + β_{28} *Ordnance, Law, and Weapons Systems* + β_{29} *Submarine Volunteer* + + β_{30} *Cohort 2002* + β_{31} *Cohort 2003* + β_{32} *Cohort 2004* + β_{33} *Cohort 2005* + β_{34} *Cohort 2006* + β_{35} *Cohort 2007*+ β_{36} *Cohort 2008* + U.

b. ***Retention Four-Year Obligors Probit Regression Results, Restricted Sample FY 01–08***

Table 26 presents the estimated probit coefficients, marginal effects, standard errors and the statistical significance for the estimated coefficients of the four-year obligation retention model. For the dummy variables, the reference categories omitted from the regression are: *White, Non-Hispanic, Male, Single, No Dependents at Enlistment, U.S. Citizen, Tier 1 HSDG, E1 at Enlistment, No Enlistment Bonus, No Dependents at Year 3, No Civil Waivers, No Alcohol or Drug Waiver, DEP PQS Incomplete,* and *Cohort 2001*. The *Hospital Corpsman, Nuclear Field,* and *SEABEE Construction* occupational rating groups require an enlistment greater than four-years and are therefore omitted. The *Enlistment Bonus* variable is not included as enlistment bonuses typically require a one-year contract extension. The Navy uses Selective Re-enlistment Bonuses (SRB) to manage the retention of first-term sailors across ratings. Because no information was available on SRB offers by rating, the dummy variables for the occupational rating groups will proxy for SRB offers. In addition, since SRB offers vary with civilian employment conditions; dummy variables for entry cohorts are included to capture changes over time in employment conditions.

Table 26. Probit Regression Results for Retention Four-Year Obligors, Restricted Sample FY 01–08.

Retention4YO	Probit Coefficient	SE	Marginal Effect	Z Score
Hispanic	-0.024	0.010	-0.009	-2.30**
Black	0.181	0.011	0.071	15.83***
Asian or Pacific Islander	0.156	0.022	0.061	6.96***
Other Race	0.207	0.013	0.081	15.91***
Age at Enlistment	0.026	0.002	0.010	15.12***
Female	0.084	0.011	0.033	7.77***
Enlist with Dependents	0.092	0.037	0.036	2.46**
Dependents Year 3	0.160	0.009	0.063	18.44***
Non-Citizen	0.118	0.017	0.046	6.88***
VE	-0.004	0.001	-0.002	-4.98***
MK	0.007	0.001	0.003	9.94***
Tier 2 HSG	0.012	0.026	0.005	0.48
Tier 3 NHSG	0.043	0.025	0.017	1.72*
Non-HSDG 12-Years Education	0.049	0.060	0.019	0.81
Advanced Pay Grade	0.085	0.006	0.034	13.66***
Time in DEP	0.009	0.001	0.003	6.82***
Civil Waiver	0.012	0.020	0.005	0.59
Alcohol or Drug Waiver	0.089	0.034	0.035	2.61***
DEP PQS Complete	0.006	0.016	0.002	0.37
Aviation Maintenance	0.071	0.020	0.028	3.64***
Aviation Support	-0.036	0.021	-0.014	-1.74*
Administrative	0.326	0.025	0.125	13.23***
Undesignated Personnel	0.013	0.013	0.005	1.04
Shipboard Maintenance	-0.082	0.017	-0.033	-4.85***
Shipboard Operations	0.054	0.022	0.021	2.49**
Intelligence & Cryptology	0.247	0.029	0.096	8.38***
Supply & Support Services	0.120	0.020	0.047	5.95***
Ordnance, Law, & Weapons	0.018	0.018	0.007	1.01
Submarine Volunteer	0.248	0.040	0.096	6.16***
Cohort 2002	-0.115	0.015	-0.046	-7.83***
Cohort 2003	-0.039	0.016	-0.015	-2.48**
Cohort 2004	-0.028	0.017	-0.011	-1.70*
Cohort 2005	0.034	0.017	0.013	1.98**
Cohort 2006	0.059	0.019	0.023	3.05***
Cohort 2007	-0.050	0.020	-0.020	-2.55**
Cohort 2008	-0.168	0.018	-0.067	-9.41***
_Constant	-0.942	0.068		

N= 94,626   Pseudo R^2= 0. 0192   Log Likelihood = -63962.622

*** Indicates coefficient is statistically significant at 99% level or better.
** Indicates coefficient is statistically significant at 95% level or better.
* Indicates coefficient is statistically significant at 90% level or better.

The four-year obligor retention variable includes only those who do not attrite and chose to retain for more than 11-months beyond their initial enlistment contract. In this dataset 54.44 percent of retention-eligible four-year enlistees (N=94,626) retain in the Navy past 59 months. Being (racially) *Hispanic* reduces retention for four-year enlistees by 0.9 percentage points, ceteris paribus. *Non-Citizen* four-year enlistees are, however, 4.6 percentage points more likely than U.S. Citizens to retain. Both the *Hispanic* and the *Non-Citizen* variable are statistically significant.

Enlisting with an Advanced *Pay Grade* increases retention by 3.4 percentage points, ceteris paribus. Possession of an *Alcohol or Drug Waiver* at the time of enlistment has the unexpected result of increasing retention by 3.5 percentage points. An interesting education characteristic in the model is *Tier 3 NHSG*, which increases retention by 1.7 percentage points. *Tier 3 NHSG* enlistees join the Navy with no high school diploma or alternative credential, which may lower their employability in the civilian labor market. In regards to aptitude, a higher *VE* line score decreases retention, while a higher *MK* line score increases retention. The Verbal Expression (*VE)* line score is a combination of the *PC* and *WK* line scores.

Four-year obligors who *Enlist with Dependents* are 3.6 percentage points more likely to retain; while those who have acquired *Dependents at Year 3*, are 6.3 percentage points more likely to retain. 1.34 percent of four-year obligors in the 01–08 sample *Enlist with Dependents,* while 40.41 percent of retention eligible enlistees in the sample have acquired *Dependents at Year 3*. Female enlistees are 3.3 percentage points more likely to retain than males. Being *DEP PQS Complete* prior to shipping to RTC is not statistically significant; however, enlistees are 0.3 percentage points more likely to retain on active duty, for every additional month of *Time in DEP* beyond 4.5 months.

The occupational rating groups with the highest retention rates are *Administrative*, *Intelligence and Cryptology*, and *Submarine Volunteer*, who are estimated to be 12.5, 9.6, and 9.6 percentage points, respectively, more likely to retain than individuals who enlist in *Shipboard Engineering*. Individuals who enlist in the *Aviation Support* or *Shipboard Maintenance* occupational rating groups are 1.4 and 3.3 percentage points less likely to

retain than enlistees in *Shipboard Engineering.* As previously noted, the retention models do not include individuals who attrite prior to their contracted obligation.

c.   ***Retention Model Four-Year Obligors, Restricted Sample FY 04–08***

To determine the effects of being both a racial demographic and having Hispanic ethnicity a restricted four-year obligor retention model is estimated using only individuals who enlisted during FY 04–08. The specified model is comparable to equation (3); however, *Cohorts 2001 – 2003* have been dropped from the sample. The sample size of the restricted model is 49,366.

d.   ***Retention Four-Year Obligors Probit Regression Results, Restricted Sample FY 04–08***

Table 27 presents the results of the restricted FY 04–08 four-year obligation retention model. The reference categories omitted are similar to the restricted FY 01–08 model, with a substitution of *White and Non-Hispanic* for the *White* race and *Hispanic* ethnicity variables.

Table 27.   Probit Regression Results for Retention Four-Year Obligors, Restricted Sample FY 04–08.

Retention4YO	Probit Coefficient	SE	Marginal Effect	Z Score
White & Hispanic	0.075	0.019	0.029	4.02***
Black & Hispanic	0.177	0.035	0.069	5.08***
Black & Non-Hispanic	0.358	0.016	0.139	22.39***
Asian PI & Hispanic	0.273	0.057	0.106	4.76***
Asian PI & Non-Hispanic	0.189	0.028	0.074	6.82***
Other Race & Hispanic	0.089	0.029	0.035	3.09***
Other Race & Non-Hispanic	0.028	0.021	0.011	1.33
Age at Enlistment	0.029	0.002	0.011	11.97***
Female	0.050	0.015	0.020	3.36***
Enlist with Dependents	0.118	0.069	0.047	1.72*
Dependents Year 3	0.148	0.012	0.059	12.34***
Non-Citizen	0.060	0.025	0.024	2.37**
VE	0.001	0.001	0.000	0.89
MK	0.012	0.001	0.005	11.39***
Tier 2 HSG	0.030	0.036	0.012	0.84
Tier 3 NHSG	0.003	0.041	0.001	0.07
Non-HSDG 12-Years Education	0.028	0.087	0.011	0.32
Advanced Pay Grade	0.085	0.008	0.034	10.08***
Time in DEP	0.007	0.002	0.003	4.04***
Civil Waiver	-0.029	0.030	-0.011	-0.97
Alcohol or Drug Waiver	0.034	0.046	0.014	0.74
DEP PQS Complete	0.009	0.016	0.004	0.57
Aviation Maintenance	0.191	0.029	0.075	6.59***
Aviation Support	-0.012	0.027	-0.005	-0.44
Administrative	0.320	0.031	0.123	10.26***
Undesignated Personnel	0.017	0.019	0.007	0.89
Shipboard Maintenance	-0.091	0.023	-0.036	-3.93***
Shipboard Operations	0.055	0.029	0.022	1.93*
Intelligence & Cryptology	0.261	0.037	0.101	7.04***
Supply & Support Services	0.124	0.026	0.049	4.74***
Ordnance, Law, & Weapons	0.106	0.025	0.042	4.16***
Submarine Volunteer	0.285	0.051	0.110	5.56***
Cohort 2005	0.067	0.017	0.027	4.07***
Cohort 2006	0.082	0.020	0.033	4.12***
Cohort 2007	-0.019	0.021	-0.007	-0.89
Cohort 2008	-0.137	0.019	-0.054	-7.12***
_Constant	-1.580	0.096		

N= 49,366	Pseudo R^2= 0.028	Log Likelihood = -33110.851

*** Indicates coefficient is statistically significant at 99% level or better.
** Indicates coefficient is statistically significant at 95% level or better.
* Indicates coefficient is statistically significant at 90% level or better.

In the restricted 04–08 four-year obligor retention model 53.94 percent of retention eligible four-year enlistees (N=49,366) retain in the Navy past 59 months. The effects of being both a racial demographic and having Hispanic ethnicity is statistically significant at the 99 percent confidence level for all racial demographic and Hispanic ethnicity combinations. While the FY 01–08 model found being (racially) *Hispanic* to slightly reduce retention by 0.9 percentage points, the 04–08 race and ethnicity model finds having *Hispanic* ethnicity to increase retention. This may be partially explained by the differences in representation in the samples. While 2.95 percent of the 04–08 four-year obligor sample are both *Black and Hispanic,* 21.74 percent of the sample is *Black and Non-Hispanic.*

Being *Black and Hispanic* increases retention by 6.9 percentage points compared to being *White and Non-Hispanic*; however, being *Black and Non-Hispanic* increases retention by 13.9 percentage points. Being *Asian PI and Hispanic* (1.07 percent of sample) increases retention by 10.6 percentage points, while, being *Asian PI and Non-Hispanic* (5.56 percent of sample) only increases retention by 8.3 percentage points. Being *White and Hispanic* increases retention by 2.9 percentage points (12.76 percent of sample), while being *Other Race and Hispanic* (4.39 percent of sample) increases retention by 3.5 percentage points. The *Non-Citizen* variable increases retention by 2.4 percentage points.

The FY 04–08 model finds that enlisting with *Advanced Pay Grade* increases retention by 3.4 percentage points, ceteris paribus. Possession of an *Alcohol or Drug Waiver* at the time of enlistment was found significant in the FY 01–08 sample; however, it is not statistically significant in the FY 04–08 sample. The *MK* line score increases retention by 0.5 percentage points for every one unit scored over the mean, and for every year of age greater than 20.5 an enlistee is 1.1 percentage points more likely to retain.

Four-year obligors who *Enlist with Dependents* are 4.7 percentage points more likely to retain; while those who have *Dependents at Year 3*, are 5.9 percentage points more likely to retain. Of four-year obligors in the 04–08 sample, 0.76 percent *Enlist with Dependents,* while 41.23 percent of retention eligible enlistees in the sample have acquired *Dependents at Year 3.* Enlistees are 0.3 percentage points more likely to retain

on active duty, for every additional month of *Time in DEP* beyond 4.5 months, and *Female*s are 2.0 percentage points more likely to retain than males. The effects of the occupational rating groups are similar to the FY 01–08 four-year obligor retention model with the exception that the *Ordnance, Law, and Weapons* occupational rating group is statistically significant and increases the likelihood of retention by 4.2 percentage points compared to *Shipboard Engineering*. Additionally, the *Aviation Support* occupational rating group is no longer statistically significant.

e. ***Retention Model Five-Year Obligor, Restricted Sample FY 01–07***

The specified model is comparable to equation (3), however the *SEABEE Construction, Hospital Corpsman*, and *Enlistment Bonus* explanatory variables have been included, and the *Undesignated Personnel* variable has been removed. Cohorts 2008–2009 are not included in the sample as five-year enlistees in FY 08–09 do not have enough time to complete their initial enlistment contract plus an additional 11 months in the period covered by the analysis data set. The sample size of the restricted model is 62,465.

f. ***Retention Five-Year Obligor Probit Regression Results, Restricted Sample FY 01–07***

Table 28 presents the estimated probit coefficients, marginal effects, standard errors and the statistical significance for the estimated coefficients of the five-year obligation retention model. The reference variables omitted are the same as the restricted four-year obligor model.

Table 28.   Probit Regression Results for Retention Five-Year Obligors,
Restricted Sample FY 01–07.

Retention5YO	Probit Coefficient	SE	Marginal Effect	Z Score
Hispanic	-0.003	0.013	-0.001	-0.23
Black	0.113	0.015	0.045	7.57***
Asian or Pacific Islander	0.154	0.027	0.060	5.67***
Other Race	0.119	0.016	0.046	7.48***
Age at Enlistment	0.016	0.002	0.006	8.02***
Female	-0.089	0.014	-0.035	-6.35***
Enlist with Dependents	0.141	0.042	0.055	3.37***
Dependents Year 3	0.180	0.011	0.071	16.88***
Non-Citizen	0.130	0.024	0.051	5.45***
VE	-0.010	0.001	-0.004	-9.32***
MK	0.004	0.001	0.001	4.21***
Tier 2 HSG	-0.020	0.026	-0.008	-0.77
Tier 3 NHSG	-0.005	0.048	-0.002	-0.11
Non-HSDG 12-Years Education	0.005	0.082	0.002	0.06
Advanced Pay Grade	0.049	0.007	0.019	6.74***
Enlistment Bonus	-0.014	0.019	-0.006	-0.75
Time in DEP	0.008	0.002	0.003	4.82***
Civil Waiver	-0.057	0.025	-0.022	-2.30**
Alcohol or Drug Waiver	0.140	0.042	0.054	3.32***
DEP PQS Complete	-0.013	0.019	-0.005	-0.68
Aviation Maintenance	0.040	0.020	0.016	1.95*
Aviation Support	-0.086	0.024	-0.034	-3.57***
Administrative	0.052	0.039	0.021	1.36
Shipboard Maintenance	-0.042	0.023	-0.017	-1.79*
Shipboard Operations	0.015	0.037	0.006	0.42
Hospital Corpsman	0.068	0.023	0.027	2.99***
Intelligence & Cryptology	0.225	0.044	0.087	5.08***
Supply & Support Services	0.155	0.024	0.060	6.48***
Ordnance, Law, & Weapons	-0.098	0.020	-0.039	-4.89***
SEABEE Construction	-0.010	0.029	-0.004	-0.34
Submarine Volunteer	0.141	0.021	0.055	6.86***
Cohort 2002	-0.119	0.018	-0.047	-6.56***
Cohort 2003	-0.017	0.022	-0.007	-0.78
Cohort 2004	0.114	0.023	0.045	4.94***
Cohort 2005	0.184	0.024	0.072	7.83***
Cohort 2006	0.090	0.022	0.035	4.00***
Cohort 2007	0.022	0.021	0.009	1.03
Constant	-0.153	0.084		

N= 62,465   Pseudo R^2= 0.0171   Log Likelihood =   -42140.778

***   Indicates coefficient is statistically significant at 99% level or better.
**   Indicates coefficient is statistically significant at 95% level or better.
*   Indicates coefficient is statistically significant at 90% level or better.

The five-year obligor retention variable includes only those who enlist on five-year enlistment contracts, are not first-term attrites, and choose to stay for more than 11-months beyond their initial enlistment contract. In this dataset, 55.81 percent of retention eligible five-year enlistees (N=62,465) retain in the Navy past 71 months. The five-year obligor retention model finds that being (racially) *Hispanic* does not affect the retention outcome for five-year enlistees. The *Non-Citizen* variable however, is statistically significant at the 99 percent confidence level. *Non-Citizen* five-year enlistees are 5.1 percentage points more likely than U.S. Citizens to retain.

The model finds that enlisting with *Advanced Pay Grade* increases retention by 1.9 percentage points. Possession of an *Alcohol or Drug Waiver* at the time of enlistment results in an enlistee being 5.4 percentage points more likely to retain, while receiving a *Civil Waiver* at enlistment reduces retention by 2.2 percentage points. The 01–08 four-year retention sample also found receiving an *Alcohol or Drug Waiver* at the time of enlistment to increase retention (+3.5 ppts). In regards to aptitude, a higher *VE* line score decreases retention, while a higher *MK* line score increases retention.

Five-year obligors who *Enlist with Dependents* (1.67 percent of sample) are 5.5 percentage points more likely to retain; while those who have *Dependents at Year 3* (40.88 percent of sample), are 7.1 percentage points more likely to retain. *Time in DEP* has a positive effect with enlistees being 0.3 percentage points more likely to retain on active duty, for every additional month of *Time in DEP* beyond 4.5 months. *Female*s with five-year obligations are 3.5 percentage points less likely to retain than males. The *Female* variable is interesting as the 01–08 four-year obligor model found females with four-year obligations to be 2.0 percentage points more likely to retain.

The occupational rating groups with enlistees that are more likely to retain are *Intelligence and Cryptology, Supply and Support Services,* and *Submarine Volunteer* who are estimated to be 8.7, 6.0, and 5.5 percentage points, respectively, more likely to retain than individuals who enlist in *Shipboard Engineering*. Individuals who enlist in the *Aviation Support* or *Ordnance, Law & Weapons* occupational rating groups are 3.4 and 3.9 percentage points less likely to retain than enlistees in *Shipboard Engineering*.

Undesignated Personnel and the *Nuclear Field* occupational rating groups are not included as they do not have a five-year enlistment option.

g.   ***Retention Model Five-Year Obligor, Restricted Sample FY 04–07***

To determine the effects of being both a racial demographic and having Hispanic ethnicity a restricted five-year obligor retention model is estimated using only individuals who enlisted during FY 04–07. The specified model is comparable to equation (3), but it deletes *Cohorts 2001 – 2003* from the sample. Also, the *SEABEE Construction, Hospital Corpsman*, and *Enlistment Bonus* explanatory variables have been included, and the *Undesignated Personnel* variable has been removed. The sample size of the restricted model is 34,270.

h.   ***Retention Five-Year Obligor Probit Regression Results, Restricted Sample FY 04–07***

Table 29 presents the estimated probit coefficients, marginal effects, standard errors and the statistical significance for the estimated coefficients of the restricted five-year obligation retention model. The reference categories omitted are similar to the restricted four-year obligor FY 04–08 model.

Table 29.   Probit Regression Results for Retention Five-Year Obligors,
Restricted Sample FY 04–07.

Retention5YO	Probit Coefficient	SE	Marginal Effect	Z Score
White & Hispanic	0.040	0.023	0.015	1.70*
Black & Hispanic	0.151	0.049	0.058	3.08***
Black & Non-Hispanic	0.268	0.022	0.102	12.47***
Asian PI & Hispanic	0.262	0.069	0.099	3.80***
Asian PI & Non-Hispanic	0.141	0.033	0.054	4.28***
Other Race & Hispanic	0.062	0.035	0.024	1.78*
Other Race & Non-Hispanic	-0.001	0.023	0.000	-0.03
Age at Enlistment	0.019	0.003	0.007	6.74***
Female	-0.084	0.019	-0.033	-4.33***
Enlist with Dependents	0.114	0.076	0.044	1.49
Dependents Year 5	0.190	0.014	0.074	13.12***
Non-Citizen	0.075	0.035	0.029	2.18**
VE	-0.009	0.001	-0.004	-6.48***
MK	0.005	0.001	0.002	3.57***
Tier 2 HSG	-0.034	0.038	-0.013	-0.91
Tier 3 NHSG	-0.095	0.079	-0.038	-1.21
Non-HSDG 12-Years Education	-0.030	0.114	-0.012	-0.26
Advanced Pay Grade	0.047	0.010	0.018	4.82***
Enlistment Bonus	0.013	0.026	0.005	0.50
Time in DEP	0.009	0.002	0.004	4.52***
Civil Waiver	-0.088	0.037	-0.035	-2.38**
Alcohol or Drug Waiver	0.141	0.061	0.054	2.31**
DEP PQS Complete	-0.005	0.019	-0.002	-0.27
Aviation Maintenance	0.048	0.028	0.019	1.72*
Aviation Support	-0.156	0.030	-0.062	-5.22***
Administrative	0.036	0.056	0.014	0.64
Shipboard Maintenance	-0.044	0.030	-0.017	-1.45
Shipboard Operations	-0.033	0.047	-0.013	-0.71
Hospital Corpsman	0.066	0.033	0.026	1.99**
Intelligence & Cryptology	0.222	0.064	0.084	3.48***
Supply & Support Services	0.167	0.034	0.064	4.96***
Ordnance, Law, & Weapons	-0.126	0.028	-0.050	-4.53***
SEABEE Construction	0.047	0.043	0.018	1.09
Submarine Volunteer	0.129	0.026	0.050	4.95***
Cohort 2005	0.074	0.021	0.029	3.54***
Cohort 2006	-0.012	0.022	-0.005	-0.54
Cohort 2007	-0.077	0.021	-0.030	-3.69***
Constant	-0.230	0.117		

N=34,270   Pseudo R^2= 0.0214   Log Likelihood = -22845.34

*** Indicates coefficient is statistically significant at 99% level or better.
** Indicates coefficient is statistically significant at 95% level or better.
* Indicates coefficient is statistically significant at 90% level or better.

In the restricted FY 04–08 five-year obligor retention model 57.72 percent of retention eligible five-year enlistees (N=34,270) retain in the Navy past 71 months. While the FY 01–07 model did not find Hispanic (as a race) to be statistically significant, the FY 04–07 "race and ethnicity" model finds having Hispanic ethnicity to increase retention for all racial demographics. Being *Black and Hispanic* increases retention by 5.8 percentage points; however, being *Black and Non-Hispanic* increases the likelihood of retention by 10.2 percentage points. Being *Asian PI and Hispanic* increases the likelihood of retention by 9.9 percentage points, while being *Asian PI and Non-Hispanic* only increases retention by 5.4 percentage points. Being *Other Race and Hispanic* increases retention by 2.4 percentage points, while being *White and Hispanic,* increases retention by 1.5 percentage points compared to being *White and Non-Hispanic*.

Receiving a *Civil Waiver* at enlistment reduces retention by 3.5 percentage points, while receiving an *Alcohol or Drug Waiver* at enlistment increases retention by 5.4 percentage points. The remaining FY 04–07 five-year obligor probit regression results are comparable to the FY 01–07 five-year obligor probit regression results in Table 28 with the exception that *Enlist with Dependents*, and the *Shipboard Maintenance* occupational rating group are no longer statistically significant.

i.   ***Retention Model Six-Year Obligors, Restricted Sample FY 01–06***

FY 07–09 six-year enlistees are not included in the six-year obligor retention model as enlistees with six-year obligations in FY 07–09 have not had adequate time to complete their contract plus 11-months of service in the period covered by the analysis data set. FY 01 will be the reference cohort for the sample. The specified model is comparable to equation (3); however, the *Undesignated Personnel, Aviation Maintenance, Aviation Support, Administrative,* and *Supply and Support Services* occupational rating groups are not included due to limited observations with six-year contracts. The sample size of the restricted model is 34,135.

j.   ***Retention Six-Year Obligors Probit Regression Results, Restricted Sample FY 01–06***

Table 30 presents the estimated probit coefficients, marginal effects, standard errors and the statistical significance for the estimated coefficients of the six-year obligation retention model. The reference categories omitted are similar to the restricted five-year obligor FY 01–07 model, with the exception that Shipboard Maintenance replaces Shipboard Engineering as the omitted reference due to sample representation. Additionally, the *Nuclear Field* occupational rating group is not omitted in the six-year obligor retention models.

Table 30.   Probit Regression Results for Retention Six-Year Obligors,
Restricted Sample FY 01–06.

Retention6YO	Probit Coefficient	SE	Marginal Effect	Z Score
Hispanic	-0.039	0.019	-0.015	-2.03**
Black	0.054	0.022	0.021	2.42**
Asian or Pacific Islander	0.055	0.037	0.022	1.49
Other Race	0.048	0.021	0.019	2.25**
Age at Enlistment	0.007	0.003	0.003	2.51**
Female	-0.171	0.021	-0.068	-8.19***
Enlist with Dependents	0.100	0.070	0.040	1.44
Dependents Year 3	0.242	0.015	0.096	16.36***
Non-Citizen	0.173	0.056	0.068	3.11***
VE	-0.010	0.002	-0.004	-5.94***
MK	0.005	0.002	0.002	3.19***
Tier 2 HSG	-0.104	0.046	-0.041	-2.26**
Tier 3 NHSG	-0.127	0.217	-0.051	-0.59
Non-HSDG 12-Years Education	-0.179	0.146	-0.071	-1.23
Advanced Pay Grade	0.043	0.010	0.017	4.10***
Enlistment Bonus	-0.005	0.021	-0.002	-0.23
Time in DEP	0.008	0.002	0.003	4.01***
Civil Waiver	-0.039	0.043	-0.015	-0.90
Alcohol or Drug Waiver	0.077	0.064	0.030	1.20
DEP PQS Complete	-0.045	0.028	-0.018	-1.60
Nuclear Field	-0.070	0.025	-0.028	-2.80***
Shipboard Engineering	-0.065	0.034	-0.026	-1.89*
Shipboard Operations	0.085	0.144	0.034	0.59
Hospital Corpsman	0.142	0.031	0.056	4.60***
Intelligence & Cryptology	0.019	0.029	0.008	0.65
Ordnance, Law, & Weapons	0.142	0.024	0.056	5.99***
SEABEE Construction	0.143	0.048	0.056	2.97***
Submarine Volunteer	0.319	0.048	0.123	6.66***
Cohort 2002	-0.047	0.025	-0.019	-1.87*
Cohort 2003	0.126	0.029	0.050	4.30***
Cohort 2004	0.143	0.031	0.057	4.68***
Cohort 2005	0.163	0.031	0.064	5.31***
Cohort 2006	0.133	0.029	0.053	4.60***
_Constant	-0.128	0.127		

N= 34,135   Pseudo R^2=   0.0174   Log Likelihood = -23179.318

***   Indicates coefficient is statistically significant at 99% level or better.

**   Indicates coefficient is statistically significant at 95% level or better.

*   Indicates coefficient is statistically significant at 90% level or better.

The six-year obligor retention variable includes only those who enlist on six-year enlistment contracts, are not first-term attrites, and chose to retain for greater than 11 months beyond their initial enlistment contract. 53.22 percent of retention eligible four-year enlistees (N=34,135) retain in the Navy past 83 months. The six-year obligor retention "race" model finds *Hispanic* decreases retention by 1.5 percentage points. *Non-Citizen* six-year enlistees are 6.8 percentage points more likely than U.S. Citizens to retain.

Six-year obligors, who have *Dependents at Year 3*, are 9.6 percentage points more likely to retain. *Dependents at Year 3,* is the most explanatory variable for six-year obligor retention with the exception of being a *Submarine Volunteer. Submarine Volunteers* are 12.3 percentage points more likely to retain than enlistees in Shipboard Maintenance.

The model finds that enlisting with *Advanced Pay Grade* increases retention by 1.7 percentage points. Receiving a *Civil Waiver* at the time of enlistment reduces retention by 1.5 percentage points. *Tier 2 HSG* enlistees are 4.1 percentage points less likely to retain than *Tier 1 HSDG* enlistees. A higher *MK* line score increases retention, while a higher *VE* line score reduces retention. *Female* six-year obligor enlistees are 6.8 percentage points less likely to retain than males.

The occupational rating groups with enlistees that are most likely to retain are *Submarine Volunteer, Ordnance, Law & Weapons,* and *Hospital Corpsman* who are estimated to be 12.3, 5.6, and 5.6 percentage points, respectively, more likely to retain than individuals who enlist in *Shipboard Maintenance.* Individuals who enlist in the *Nuclear Field* or *Shipboard Engineering* occupational rating groups are 2.8 and 2.6 percentage points less likely to retain than enlistees in *Shipboard Maintenance.* Enlistees in the *Nuclear Field* may be less likely to retain due to greater civilian employment and educational opportunities for nuclear trained sailors.

k.   ***Retention Model Six-Year Obligors, Restricted Sample FY 04–06***

To determine the effects of being both a racial demographic and having Hispanic ethnicity a restricted six-year obligor retention model is estimated using only individuals

who enlisted during FY 04–06. The specified model is comparable to the FY 01–06 six-year obligor retention model, however without *Cohorts 2001 - 2003*. The sample size of the restricted model is 18,817.

l.   ***Retention Six-Year Obligors Probit Regression Results, Restricted Sample FY 04–06***

Table 31 presents the estimated probit coefficients, marginal effects, standard errors and the statistical significance for the estimated coefficients of the restricted 04–06 six-year obligation retention model. The reference categories omitted are similar to the restricted six-year obligor FY 01–06 model.

Table 31.   Probit Regression Results for Retention Six-Year Obligors,
Restricted Sample FY 04–06.

Retention6YO	Probit Coefficient	SE	Marginal Effect	Z Score
White & Hispanic	-0.028	0.032	-0.011	-0.87
Black & Hispanic	0.078	0.081	0.031	0.96
Black & Non-Hispanic	0.203	0.034	0.079	5.93***
Asian PI & Hispanic	0.299	0.092	0.114	3.24***
Asian PI & Non-Hispanic	0.007	0.044	0.003	0.17
Other Race & Hispanic	-0.058	0.047	-0.023	-1.24
Other Race & Non-Hispanic	-0.025	0.030	-0.010	-0.85
Age at Enlistment	0.010	0.004	0.004	2.52**
Female	-0.189	0.027	-0.075	-6.89***
Enlist with Dependents	0.170	0.124	0.066	1.37
Dependents Year 3	0.231	0.020	0.091	11.60***
Non-Citizen	0.191	0.064	0.074	2.99***
VE	-0.007	0.002	-0.003	-3.40***
MK	0.005	0.002	0.002	2.57***
Tier 2 HSG	-0.132	0.066	-0.052	-2.00**
Tier 3 NHSG	-0.173	0.244	-0.069	-0.71
Non-HSDG 12-Years Education	-0.085	0.188	-0.034	-0.45
Advanced Pay Grade	0.029	0.014	0.011	2.02**
Enlistment Bonus	-0.093	0.032	-0.036	-2.93***
Time in DEP	0.006	0.003	0.002	2.40**
Civil Waiver	-0.129	0.060	-0.051	-2.15**
Alcohol or Drug Waiver	0.173	0.091	0.067	1.90*
DEP PQS Complete	-0.050	0.029	-0.020	-1.76*
Nuclear Field	-0.099	0.036	-0.039	-2.73***
Shipboard Engineering	-0.140	0.039	-0.055	-3.55***
Shipboard Operations	-0.025	0.164	-0.010	-0.15
Hospital Corpsman	0.127	0.037	0.050	3.41***
Intelligence & Cryptology	0.011	0.040	0.004	0.27
Ordnance, Law, & Weapons	0.114	0.031	0.045	3.67***
SEABEE Construction	0.137	0.058	0.053	2.37**
Submarine Volunteer	0.209	0.071	0.081	2.92***
Cohort 2005	0.022	0.025	0.009	0.85
Cohort 2006	-0.007	0.025	-0.003	-0.29
_Constant	-0.074	0.163		

N= 18,817   Pseudo R^2=   0.0187   Log Likelihood =   -12693.677

*** Indicates coefficient is statistically significant at 99% level or better.
** Indicates coefficient is statistically significant at 95% level or better.
* Indicates coefficient is statistically significant at 90% level or better.

In the restricted FY 04–06 six-year obligor retention model 55.34 percent of retention eligible six-year enlistees (N=18,817) retain in the Navy past 83 months. While the FY 01–06 "race" model found being *Hispanic* to reduce retention by 1.5 percentage points, the FY 04–06 "race and ethnicity" model only finds being *Black and Non-Hispanic* or *Asian PI and Hispanic* to be statistically significant.

Being *Asian PI and Hispanic* increases retention by 11.4 percentage points; while being *Black and Non-Hispanic,* increases retention by 7.9 percentage points compared to being *White and Non-Hispanic*. No other "race and ethnicity" variables are statistically significant. The *Non-Citizen* variable is statistically significant at the 99 percent confidence level and increases retention by 7.4 percentage points.

Receiving an *Enlistment Bonus* reduces retention by 3.6 percentage points, and is statistically significant at the 99 percent confidence level. Enlistees who are *DEP PQS Complete* are 2.0 percentage points less likely to retain. The 01–06 six-year obligor retention model did not find receiving an *Enlistment Bonus* or being *DEP PQS Complete* statistically significant, and neither did any of the other four- or- five-year obligor retention models. The FY 04–06 six-year obligor model finds enlisting with an *Alcohol or Drug Waiver* increases retention by 6.7 percentage points; while enlisting with a *Civil Waiver* reduces retention by 5.1 percentage points. Neither enlisting with a *Civil Waiver* or an *Alcohol or Drug Waiver* is statistically significant in the FY 01–06 model.

m.   ***Retention for Fast-Track Enlistees***

Appendix C Tables 40, 41, and 42 present the regression results for four-, five-, and six-year retention with *E5 Fast-Track* included as an explanatory variable. Promotion to E5 in less than four-years has a significant effect on retention. Enlistees who promote to E5 quickly are considerably more likely to retain, regardless of whether they are four-, five-, or six-year obligors. Tables 40–42 show that the E5FastTrack1 variable is statistically significant at the 99 percent confidence level for all three retention models.

3. Promotion Models

The binary dependent variable used to measure "fast-track" promotion is *E5FastTrack1*, which is defined as not being a first-term attrite and promoting to the rank of E5 in less than four-years. The binary variable equals 1 if the enlistee promotes to E5 in less than 48 months of active military service, and equals 0 otherwise.

a. *E5 Fast-Track Promotion Model, Restricted Sample FY 01–09*

The specified model is presented in equation (4). Individuals who attrite during the first 45 months of service have been removed to allow for estimating the fast-track promotion outcomes for a sample of enlistees whose have not been determined to be early failures due to separation. The sample size of the restricted model is 239,799.

(4)   Prob(*E5FastTrack1=1*)= β_0 + β_1 *Hispanic* + β_2 *Black* + β_3 *Asian and Pacific Islander* + β_4 *Other Race* + β_5 *Age at Enlistment* + β_6 *Female* + β_7 *Enlist with Dependents* + β_8 *Dependents at Year 3* + β_9 *Non-Citizen* + β_{10} *VE* + β_{11} *MK* + β_{12} *Tier 2 HSG* + β_{13} *Tier 3 NHSG* + β_{14} *Non-HSDG 12 Years education* + β_{15} *Advanced Pay Grade* + β_{16} *Enlistment Bonus* + β_{17} *Five-Year Enlistment* + β_{18} *Six-Year Enlistment* + β_{19} *Civil Waiver* + β_{20} *Alcohol or Drug Waiver* + β_{21} *Time in DEP* + β_{22} *DEP PQS Complete* + β_{23} *Aviation Maintenance* + B_{24} *Aviation Support* + β_{25} *Administrative* + β_{26} *Nuclear Field* + β_{27} *Undesignated* + β_{28} *Shipboard Maintenance* + β_{29} *Shipboard Operations* + β_{30} *Hospital Corpsman* + β_{31} *Intelligence and Cryptology* + β_{32} *Supply and Support Services* + β_{33} *Ordnance, Law, and Weapons Systems* + β_{34} *SEABEE Construction* + β_{35} *Submarine Volunteer* + β_{36} *Cohort 2002* + β_{37} *Cohort 2003* + β_{38} *Cohort 2004* + β_{39} *Cohort 2005* + β_{405} *Cohort 2006* + β_{41} *Cohort 2007* + β_{42} *Cohort 2008* + β_{43} *Cohort 2009* + U.

b. *E5 Fast-Track Promotion Probit Regression Results, Restricted Sample FY 01–09*

Table 32 presents the estimated probit coefficients, marginal effects, standard errors and the statistical significance for the estimated coefficients of the promotion model. Of the 239,799 sailors in the model who have not attrited prior to completing 45 months of service, 29.13 percent promote to E5 in less than 48 months.

Table 32.   Probit Regression Results for E5 Fast-Track Promotion, Unrestricted Sample FY 01–09.

E5FastTrack1	Probit Coefficient	SE	Marginal Effect	Z Score
Hispanic	-0.022	0.008	-0.007	-2.86***
Black	-0.079	0.009	-0.025	-9.32***
Asian or Pacific Islander	-0.045	0.015	-0.014	-3.03***
Other Race	-0.076	0.009	-0.024	-8.83***
Age at Enlistment	0.025	0.001	0.008	21.76***
Female	-0.100	0.008	-0.032	-12.18***
Enlist with Dependents	0.125	0.025	0.042	4.95***
Dependents at Year 3	0.053	0.006	0.017	8.53***
Non-Citizen	0.026	0.015	0.008	1.73*
VE	0.031	0.001	0.010	50.61***
MK	0.027	0.001	0.009	51.12***
Tier 2 HSG	-0.026	0.017	-0.008	-1.52
Tier 3 NHSG	-0.102	0.025	-0.032	-4.15***
Non-HSDG 12-Years Education	0.013	0.044	0.004	0.29
Advanced Pay Grade	0.184	0.004	0.060	44.83***
Enlistment Bonus	-0.111	0.009	-0.036	-11.99***
5 Year Enlistment	0.315	0.011	0.105	29.82***
6 Year Enlistment	0.446	0.012	0.154	36.11***
Time in DEP	-0.046	0.015	-0.015	-2.98***
Civil Waiver	0.050	0.022	0.016	2.23**
Alcohol or Drug Waiver	0.008	0.001	0.003	9.16***
DEP PQS Complete	0.115	0.010	0.038	11.37***
Aviation Maintenance	-0.134	0.015	-0.042	-9.19***
Aviation Support	0.061	0.015	0.020	3.98***
Administrative	0.124	0.020	0.042	6.29***
Nuclear Field	0.329	0.015	0.115	22.65***
Undesignated Personnel	-0.123	0.013	-0.039	-9.51***
Shipboard Maintenance	0.293	0.012	0.101	24.81***
Shipboard Operations	0.748	0.017	0.280	42.75***
Hospital Corpsman	-0.901	0.016	-0.213	-54.73***
Intelligence & Cryptology	0.587	0.015	0.215	38.55***
Supply & Support Services	0.052	0.016	0.017	3.26***
Ordnance, Law, & Weapons	0.188	0.010	0.063	17.89***
SEABEE Construction	-0.047	0.020	-0.015	-2.41**
Submarine Volunteer	0.600	0.015	0.220	41.07***
Cohort 2002	-0.082	0.012	-0.026	-6.89***
Cohort 2003	-0.176	0.013	-0.054	-13.33***
Cohort 2004	-0.118	0.014	-0.037	-8.73***
Cohort 2005	-0.078	0.014	-0.025	-5.69***
Cohort 2006	-0.080	0.014	-0.025	-5.90***
Cohort 2007	-0.190	0.014	-0.058	-13.88***
Cohort 2008	-0.242	0.013	-0.073	-17.98***
Cohort 2009	-0.042	0.013	-0.013	-3.15***
_constant	-4.733	0.047		

N=   239,799   Pseudo R^2= 0.166   Log Likelihood = -120661.36

*** Indicates coefficient is statistically significant at 99% level or better.
** Indicates coefficient is statistically significant at 95% level or better.
* Indicates coefficient is statistically significant at 90% level or better.

The promotion probit regression results for the FY 01–09 sample find that being *Hispanic* "race" results in a 0.7 percentage point decrease in fast-track promotion compared to being non-Hispanic. Being a *Non-Citizen,* however, increases fast-track promotion by 0.8 percentage points. The variables that have the greatest effect on fast-track promotion are the occupational rating group variables. *Shipboard Operations*, *Intelligence and Cryptology*, and *Submarine Volunteer* increase fast-track promotion by 28.0, 21.5, and 22.0 percentage points, respectively. Enlisting in the *Hospital Corpsman, Aviation Maintenance*, or *Undesignated Personnel* occupational rating groups reduces fast-track promotion by 21.3, 4.2, and 3.9 percentage points, respectively, compared to enlistees in *Shipboard Engineering*.

Female enlistees are 3.2 percentage points less likely to promote to E5 in under four-years than males. *Enlisting with Dependents* (1.34 percent of sample) increases fast-track promotion by 4.2 percentage points, while having *Dependents at Year 3* (39.76 percent of sample*)* increases fast-track promotion by 1.7 percentage points. The older an enlistee is at entry, the more likely they are to promote to E5 in less than four-years, with each year over 20.5 years of age increasing the likelihood of promotion by 0.8 percentage points.

Enlisting with an *Advanced Pay Grade* increases fast-track promotion by 6.0 percentage points. The minimum time in service for a Navy enlistee to promote is nine-months from E1 to E2, nine-months from E2 to E3, six-months from E3 to E4, and twelve-months from E4 to E5. Enlistees with an advanced pay grade are potentially nine-to-eighteen-months ahead of their peers who enlist at the rank of E1. The opportunity for promotion is largely dependent on the enlistees' rating, as represented by the large effects of the occupational rating group variables in this model. Receiving an *Enlistment Bonus* decreases fast-track promotion by 3.6 percentage points. Recruits who enlist with *five-* and *six- year enlistment contracts* are found to be 10.5 and 15.4 percentage points more likely to promote to E5 in less than four-years, ceteris paribus.

Tier 3 NHSG enlistees are 3.2 percentage points less likely to make E5 in under four-years than a Tier 1 enlistee. The higher the *VE* and *MK* line scores, the more likely an enlistee will promote quickly. Holding all else constant, enlisting with a C*ivil Waiver*

increases fast-track promotion by 1.6 percentage points, while enlisting with an *Alcohol or Drug Waiver* increases the likelihood of fast-track promotion by 0.3 percentage points. Recruits who successfully complete the DEP PQS are 3.8 percentage points more likely to promote to E5 in under four-years than recruits who do not complete the DEP PQS. The model finds *Time in DEP* decreases fast-track promotion by 1.5 percentage points for each additional month beyond 4.5 months spent in DEP.

Cohorts 2002- 2009 show that fast track promotion has declined in comparison to Cohort 2001, which ended on September 30th 2001. The decrease in promotion opportunity post 9/11 may be due to what Golan et al. (2010) identified as a decline in promotion during the war period due to a significant drawdown of Navy personnel prior to the attack, and the sudden increase in recruiting new accessions and the activation of reserve forces post-9/11.

c. ***E5 Fast-Track Promotion Model, Restricted Sample FY 04–09***

To determine the effects of being both a racial demographic and having Hispanic ethnicity a restricted fast-track model is estimated using only individuals who enlisted during FY 04–09. The specification for this model is comparable to equation (4). The sample size of the restricted model is 151,026.

d. ***E5 Fast-Track Promotion Probit Regression Results, Restricted Sample FY 04–09***

Table 33 presents the estimated probit coefficients, marginal effects, standard errors and the statistical significance for the estimated coefficients of the restricted promotion model. Of the 151,026 sailors in the model who have not attrited prior to completing 45 months of service, 31.1 percent promote to E5 in less than 48 months.

Table 33.   Probit Regression Results for E5 Fast-Track Promotion, Restricted Sample FY 04–09.

E5FastTrack1	**Probit Coefficient**	**SE**	**Marginal Effect**	**Z Score**
White & Hispanic	-0.076	0.013	-0.025	-6.07***
Black & Hispanic	-0.097	0.024	-0.032	-4.03***
Black & Non-Hispanic	-0.114	0.012	-0.037	-9.72***
Asian PI & Hispanic	-0.019	0.033	-0.006	-0.58
Asian PI & Non-Hispanic	-0.064	0.018	-0.021	-3.60***
Other Race & Hispanic	-0.056	0.017	-0.018	-3.24***
Other Race & Non-Hispanic	-0.051	0.012	-0.017	-4.30***
Age at Enlistment	0.026	0.001	0.009	17.90***
Female	-0.130	0.010	-0.043	-12.61***
Enlist with Dependents	0.104	0.038	0.036	2.70***
Dependents at Year 3	0.055	0.008	0.019	7.07***
Non-Citizen	0.021	0.019	0.007	1.06
VE	0.029	0.001	0.010	39.98***
MK	0.031	0.001	0.010	44.04***
Tier 2 HSG	-0.048	0.022	-0.016	-2.20**
Tier 3 NHSG	-0.219	0.039	-0.069	-5.66***
Non-HSDG 12-Years Education	0.028	0.057	0.009	0.49
Advanced Pay Grade	0.169	0.005	0.057	33.27***
Enlistment Bonus	-0.205	0.012	-0.069	-16.70***
5 Year Enlistment	0.377	0.014	0.131	27.31***
6 Year Enlistment	0.586	0.016	0.208	36.81***
Time in DEP	-0.072	0.021	-0.024	-3.41***
Civil Waiver	0.064	0.027	0.022	2.34**
Alcohol or Drug Waiver	0.008	0.001	0.003	7.20***
DEP PQS Complete	0.122	0.010	0.042	11.81***
Aviation Maintenance	-0.217	0.020	-0.068	-10.95***
Aviation Support	-0.024	0.019	-0.008	-1.29
Administrative	0.087	0.025	0.030	3.53***
Nuclear Field	0.273	0.018	0.097	15.16***
Undesignated Personnel	-0.136	0.018	-0.044	-7.69***
Shipboard Maintenance	0.220	0.014	0.078	15.21***
Shipboard Operations	0.713	0.022	0.270	32.82***
Hospital Corpsman	-0.898	0.020	-0.225	-44.94***
Intelligence & Cryptology	0.549	0.018	0.205	30.29***
Supply & Support Services	0.001	0.020	0.000	0.06
Ordnance, Law, & Weapons	0.154	0.013	0.053	11.88***
SEABEE Construction	-0.154	0.024	-0.049	-6.44***
Submarine Volunteer	0.568	0.017	0.212	32.45***
Cohort 2005	0.033	0.013	0.011	2.60***
Cohort 2006	0.020	0.013	0.007	1.46
Cohort 2007	-0.089	0.014	-0.029	-6.56***
Cohort 2008	-0.142	0.013	-0.046	-10.55***
Cohort 2009	0.053	0.013	0.018	3.99***
_constant	-4.889	0.059		

N=   151,026   Pseudo R^2 =   0.1715   Log Likelihood = -77564.732

*** Indicates coefficient is statistically significant at 99% level or better.

** Indicates coefficient is statistically significant at 95% level or better.

* Indicates coefficient is statistically significant at 90% level or better.

The FY 04–06 fast-track promotion "race and ethnicity" model finds the effect of Hispanic ethnicity to decrease the likelihood of fast-track promotion similarly to the FY 01–09 fast-track promotion "race" model. The effect of being ethnically *Hispanic* is statistically significant at the 99 percent for all race demographics with the exception of *Asian PI and Hispanic.* Being *White and Hispanic* reduces fast-track promotion by 2.5 percentage points, compared to being *White and Non-Hispanic.* Being *Black and Non-Hispanic* or *Black and Hispanic* decreases fast-track promotion by 3.7 and 3.2 percentage points respectively, compared to being White and Non-Hispanic. Being *Other Race and Hispanic* decreases fast-track promotion by 1.8 percentage points, while being *Other Race and Non-Hispanic* decreases fast-track promotion by 1.7 percentage points. The FY 01–09 fast-track promotion "race" model found being *Hispanic* to reduce fast-track promotion by 0.7 percentage points, ceteris paribus.

The restricted FY 04–09 sample does not find being a *Non-Citizen* statistically significant, while the FY 01–09 sample found being a *Non-Citizen* to increase fast-track promotion by 0.8 percentage points. *Tier 2 HSG* enlistees and Tier *3 NHSG* enlistees are 1.6 and 6.9 percentage points less likely to make E5 in under four-years than a Tier 1 enlistee. Enlisting for five- or six-years increases the fast-track promotion by 13.1 and 20.8 percentage points, respectively, compared to a four-year enlistment. The remaining probit regression results are similar to the FY 01–09 fast-track promotion model with the exception that *Aviation Support* and the *Supply and Support Services* occupational rating groups are no longer statistically significant.

VI. CONCLUSION AND RECOMMENDATIONS

A. SUMMARY

This thesis applied quantitative methods to analyze the effect of pre-accession characteristics and early career experiences on the first-term attrition, retention, and fast-track promotion rates of Hispanic and Non-Hispanic enlistees in the United States Navy. Chapter II (Background) and Chapter IV (Data Description and Summary Statistics) provide an in-depth examination of the early career and entry characteristics that recruits in the analysis data set possess at the time of enlistment, while Chapter III (Literature Review) reviews previous studies on job-performance of Hispanics and non-Hispanics in the military. Chapter V presents the results from multivariate models on estimates of differences in attrition, re-enlistment, and fast-track promotion between Hispanic and non-Hispanic enlistees using the dataset in this thesis.

B. CONCLUSION

This thesis has identified pre-enlistment and early career characteristics that affect the first-term attrition, retention, and fast-track promotion of Hispanic enlistees. One overall conclusion can be drawn from the analysis in this thesis: Hispanics serving in the Navy appear to be well adjusted to military service. These sailors are serving critical roles around the world and, based on attrition and retention metrics, perform somewhat better than their non-Hispanic counterparts. On the other hand, Hispanic sailors are promoting at somewhat slower rates than their non-Hispanic peers. The main findings for the research questions addressed in this thesis are presented below.

1. Primary Research Questions

- What are the differences in attrition, retention, and promotion between Hispanic and other Navy enlistees?

The results of the estimates in the multivariate models indicate that Hispanics are less likely to attrite during the first 45 months of active service than their non-Hispanic peers. Moreover, it is ethnicity rather than race that appears to be important in predicting

first-term attrition. When Hispanic is defined as a race rather than an ethnicity (as was the federal data definition prior to 2003), being Hispanic decreases retention for four- and six-year obligors. However, when Hispanic is defined as an ethnicity (using the post-2003 data standards), the effect of race and being ethnically Hispanic has varying positive effects on reenlisting or extending, depending on the enlistee's race. Enlistees who are White and Hispanic, Black and Hispanic, or Asian PI and Hispanic are more likely to retain than White-Non-Hispanic enlistees. However, Hispanic ethnicity reduces the likelihood of promotion to E5 in under four-years, with the exception of those enlistees who are Asian or Pacific Islander and Hispanic, which is not statistically significant.

- What pre-enlistment characteristics are important in explaining any differences in attrition, retention, and promotion rates of Hispanic enlistees compared with those of Non-Hispanic enlistees?

While the difference between Hispanics and non-Hispanics who enlist with dependents is only 0.18 percent, Hispanics are 4.83 percent more likely to acquire dependents during the first three-years of service. Having dependents at year three is one of the most important predictors of four-, five-, and six- year retention, and also is associated with an increase in the likelihood of fast-track promotion.

A Hispanic enlistee is 1.62 percent more likely to enlist as a Hospital Corpsman, and 2.1 percent more likely to enlist as an 'undesignated' sailor than a non-Hispanic enlistee. Enlisting as a Hospital Corpsman reduces the likelihood of receiving a fast-track promotion by more than 20 percentage points (compared to enlisting in Shipboard Engineering). On the other hand, serving as a Hospital Corpsman reduces first-term attrition by 3.2 percentage points for Hispanics but by only 1.6 percentage points for non-Hispanics. Hispanic preferences for and assignment to the medical field may partially account for their lower levels of first-term attrition and their lower rates of fast-track promotion.

Female non-Hispanic enlistees are more likely to attrite than Female Hispanics. In regards to education, among enlistees with non-traditional education Hispanics perform better than their Non-Hispanic peers. Non-Hispanics who are Tier 2 HSG or Tier 3 NHSG enlistees are more likely to attrite during the first-term than otherwise similar

Hispanics. Another significant feature in the data is that Hispanics are 0.5 percent more likely to complete their DEP PQS. This is important because completing the DEP PQS results in lower first-term attrition and higher fast-track promotion.

Hispanics are less likely to enlist with a civil waiver than non-Hispanics; however, possessing a civil waiver increases first-term attrition for Hispanics more than for Non-Hispanics. Hispanics also are more likely to enlist with an alcohol or drug waiver. Unexpectedly, Hispanics who have enlisted with an alcohol or drug waiver are less likely to attrite. This is important because enlisting with an alcohol or drug waiver increases retention for four-, five-, and six- year obligors, and also increases fast track promotion.

2. Secondary Research Questions

- Does citizenship or quality of education at enlistment affect first-term attrition, promotion, or retention?

In general, non-citizens have lower first-term attrition, higher retention rates, and higher fast-track promotion. The Navy appears to benefit from the enlistment of non-citizens. However, non-citizens are not eligible for all enlistment opportunities. Hispanic enlistees are 5.76 percent less likely to be U.S. citizens, which may partially explain why Hispanics are also 1.74 percent less likely to enlist in the nuclear field. Not only does the Navy nuclear field require citizenship, but those who enter the nuclear field receive an advanced pay grade, an enlistment bonus, and enjoy faster promotion rates. The lower level of Hispanic representation in the nuclear field may partially explain why Hispanics have a lower enlistment bonus value, are less likely to enlist with an advanced pay grade, and have slower E5 promotion rates than non-Hispanics. Additionally, ratings such as those in the Intelligence and Cryptology occupations often necessitate security clearances which often require U.S. citizenship.

The quality of education is measured by this thesis as Tier 1 HSDG, Tier 2 HSG, and Tier 3 NHSG. Tier 2 and Tier 3 enlistees are less likely to promote to E5 in less than four-years than their Tier 1 peers. Five- and six-year obligor Tier 2 enlistees are less likely to retain than Tier 1 enlistees. Tier 3 four-year obligors are more likely to retain

than Tier 1 four-year enlistees. The quality of education has a large effect on first-term attrition rates with Tier 2 and Tier 3 enlistees being substantially more likely to attrite during the first 45 months of service than their Tier 1 peers.

- Are Hispanics more likely to enlist with a body-fat waiver and do Navy recruits who enlist with body-fat waivers experience greater attrition?

The data set used for this thesis only provides information on the enlistment with body-fat waivers for FY 08–09. Due to the limited representation in the sample, the *Overweight* explanatory variable could not be used in the multivariate models. Chapter IV (Data Description and Summary Statistics) shows that for FY 08–09, Hispanics are 1.06 percent more likely to enlist with a body-fat waiver. This thesis recommends further research into the effect of enlisting with a body-fat waiver since such individuals exceed height-weight and body composition standards.

- Does accession with advanced pay grade or the assignment of personnel into technologically advanced versus manual labor occupations differ by demographic group? What is the effect on promotion and retention for applicants who access at an advanced pay grade?

Compared to non-Hispanics (36.9 percent), the average Hispanic enlistee (33.3 percent) is 3.6 points less likely to enlist with an advanced pay grade. This is important because enlisting with an advanced pay grade decreases first-term attrition and increases fast-track promotion. Four-, five-, and six-year enlistees with an advanced pay grade are also more likely to retain than enlistees who report to RTC as an E1.

The Navy adage "Pick your rate, pick your fate" holds true as this thesis recognizes occupational rating groups as important predictors of fast track promotion. Individual ratings have varying levels of promotion opportunity and the occupational rating groups utilized by this thesis finds sailors in Intelligence and Cryptology promoting faster and Hospital Corpsman promoting more slowly. Hispanics are more likely to enlist as Hospital Corpsman than non-Hispanics and Hospital Corpsman are significantly less likely to receive a fast-track promotion than enlistees in shipboard engineering. Hispanics are also more likely to enlist as 'undesignated' personnel than non-Hispanics and 'undesignated' personnel are less likely to receive a fast-track promotion. On the other hand, Hispanics are less likely to enlist in the nuclear field than

non-Hispanics, and enlistees in the nuclear field promote at faster rates. Hispanics are also less likely to be in the Intelligence and Cryptology occupations which have better fast-track promotion rates.

C.   RECOMMENDATIONS

Establish Minimum Time in DEP.

The Navy could reap benefits by reducing the number of enlistees who ship to RTC shortly after enlisting. While shipping a DEP recruit quickly reduces the likelihood of the recruit becoming a DEP attrite, time spent in DEP reduces first-term attrition and increases reenlistment and extension rates. The additional time spent in DEP may be important because it allows enlistees to better prepare for naval service and prevents buyer's remorse. The savings in the costs associated with first-term attrition and non-reenlistment are likely to exceed the additional costs associated with the longer time spent in DEP and higher DEP attrition.

1.   Institute DEP PQS Completion Requirement for Tier 2 and Tier 3 Enlistees.

The Navy would likely benefit by assigning DEP PQS completion goals to NRS DEP pools. Tier 2 enlistees should be required to complete the DEP PQS as well as Tier 3 enlistees. Currently all enlistees have the option of completing the DEP PQS, but only Tier 3 enlistees are required to complete the PQS.

Completing the DEP PQS reduces first-term attrition rates by an estimated 3.2-3.5 percentage points. First-term attrition is extremely expensive in regards to operational capability and monetary costs. Current estimates on the effect of completing the DEP PQS in regards to retention are not statistically significant with the exception of the FY 04–06 six-year obligor retention model which finds completing the DEP PQS slightly reduces reenlistments and extensions. However, completing the DEP PQS results in enlistees being more likely to receive fast-track promotion and enlistees who promote quickly may have greater satisfaction with military employment and therefore greater reenlistment rates. Tables 40–42 in Appendix C, show that four-, five-, and six-year enlistees who have made the rank of E5 in less than 48 months are 22–51 percentage

points more likely to retain. Completing the DEP PQS predicts that a sailor will promote faster and promoting quickly greatly increases the opportunity costs for sailors contemplating separation.

DEP PQS completion requires mentoring of DEP recruits by Navy recruiters. Requiring all Tier 2 enlistees to complete the DEP PQS will require significantly more interaction between the recruiter and DEP recruit and may only be possible through increasing the number of production recruiters. An alternative policy to achieve increased PQS completion could involve utilizing sailors freshly graduated from RTC who can be placed on home town recruiting duty while they await a seat in A-school. The increase in DEP mentorship would likely reduce DEP attrition and increase DEP referrals. Lane (2006) reports the average Navy DEP attrition rate as 16–23 percent with each DEP attrite requiring a replacement at an additional cost in both resources and recruiter time.

Completing the DEP PQS and subsequently passing a written exam and initial fitness assessment at RTC results in a recruit receiving the advanced pay grade of E2. Depending on the number of Tier 2 HSG enlistees this policy may need to be modified to include the requirement of referring a qualified recruit in order to receive the advanced pay grade of E2. This would increase the number of qualified referrals and reduce the number of Tier 2 enlistees receiving advanced pay grade.

2. Assign Approval Authority for all Alcohol and Marijuana Use Waivers for Self-Disclosing Non-Dependent Applicants with no Current Dependency to the Commanding Officer NRD Level.

Applicants who self-disclose previous alcohol and/or drug use are estimated to be less likely to become a first-term attrite, more likely to retain, and are more likely to promote to E5 in less than four-years. These unexpected beneficial effects may be due to self-disclosing for alcohol or drug use being a proxy for seeking a positive change in environment, or an unobserved trait such as honesty or personal responsibility. Thus, I recommend approval authority for all alcohol and marijuana use waivers for self-disclosing non-dependent applicants with no current dependency to be at the Commanding Officer NRD level. Previous marijuana use is a common requirement for

an alcohol and drug waiver and current NRD level waiver authorization only extends to 11 times experimental use.

D.   FUTURE RESEARCH

Future research should analyze the effect of enlisting on body-fat composition due to exceeding height and weight standards. DMDC provides accession height and weight information for enlistees. The future availability of DMDC data for FY 14 and later will provide the ability to analyze the effects of receiving an enlistment waiver for body-fat composition greater than 22 percent for males (33 percent for females) who enlisted during FY 08–09.

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX A. TABLES

Table 34.   Hispanic or Latino Origin Population by Type: 2000 and 2010
(from Ennis et al., 2011).

Hispanic or Latino Origin Population by Type: 2000 and 2010

(For information on confidentiality protection, nonsampling error, and definitions, see www.census.gov/prod/cen2010/doc/sf1.pdf)

Origin and type	2000		2010		Change, 2000 to 2010[1]	
	Number	Percent of total	Number	Percent of total	Number	Percent
HISPANIC OR LATINO ORIGIN						
Total	281,421,906	100.0	308,745,538	100.0	27,323,632	9.7
Hispanic or Latino	35,305,818	12.5	50,477,594	16.3	15,171,776	43.0
Not Hispanic or Latino	246,116,088	87.5	258,267,944	83.7	12,151,856	4.9
HISPANIC OR LATINO BY TYPE						
Total	35,305,818	100.0	50,477,594	100.0	15,171,776	43.0
Mexican	20,640,711	58.5	31,798,258	63.0	11,157,547	54.1
Puerto Rican	3,406,178	9.6	4,623,716	9.2	1,217,538	35.7
Cuban	1,241,685	3.5	1,785,547	3.5	543,862	43.8
Other Hispanic or Latino	10,017,244	28.4	12,270,073	24.3	2,252,829	22.5
Dominican (Dominican Republic)	764,945	2.2	1,414,703	2.8	649,758	84.9
Central American (excludes Mexican)	1,686,937	4.8	3,998,280	7.9	2,311,343	137.0
Costa Rican	68,588	0.2	126,418	0.3	57,830	84.3
Guatemalan	372,487	1.1	1,044,209	2.1	671,722	180.3
Honduran	217,569	0.6	633,401	1.3	415,832	191.1
Nicaraguan	177,684	0.5	348,202	0.7	170,518	96.0
Panamanian	91,723	0.3	165,456	0.3	73,733	80.4
Salvadoran	655,165	1.9	1,648,968	3.3	993,803	151.7
Other Central American[2]	103,721	0.3	31,626	0.1	−72,095	−69.5
South American	1,353,562	3.8	2,769,434	5.5	1,415,872	104.6
Argentinean	100,864	0.3	224,952	0.4	124,088	123.0
Bolivian	42,068	0.1	99,210	0.2	57,142	135.8
Chilean	68,849	0.2	126,810	0.3	57,961	84.2
Colombian	470,684	1.3	908,734	1.8	438,050	93.1
Ecuadorian	260,559	0.7	564,631	1.1	304,072	116.7
Paraguayan	8,769	–	20,023	–	11,254	128.3
Peruvian	233,926	0.7	531,358	1.1	297,432	127.1
Uruguayan	18,804	0.1	56,884	0.1	38,080	202.5
Venezuelan	91,507	0.3	215,023	0.4	123,516	135.0
Other South American[3]	57,532	0.2	21,809	–	−35,723	−62.1
Spaniard	100,135	0.3	635,253	1.3	535,118	534.4
All other Hispanic or Latino[4]	6,111,665	17.3	3,452,403	6.8	−2,659,262	−43.5

– Percentage rounds to 0.0.

[1] The observed changes in Hispanic origin counts between Census 2000 and the 2010 Census could be attributed to a number of factors. Demographic change since 2000, which includes births and deaths in a geographic area and migration in and out of a geographic area, will have an impact on the resulting 2010 Census counts. Some changes in the Hispanic origin question's wording and format since Census 2000 could have influenced reporting patterns in the 2010 Census. Additionally, changes to the Hispanic origin edit and coding procedures could have impacted the 2010 counts. These factors should especially be considered when observing changes for detailed Hispanic groups.

[2] This category includes people who reported Central American Indian groups, "Canal Zone," and "Central American."

[3] This category includes people who reported South American Indian groups and "South American."

[4] This category includes people who reported "Hispanic" or "Latino" and other general terms.

Sources: U.S. Census Bureau, Census 2000 Summary File 1 and 2010 Census Summary File 1.

Table 35. Projections and Distribution of the Population by Race and Hispanic Origin for the United States: 2010 to 2050 (from Ortman & Guarneri, 2009).

Projection Series, Race, and Hispanic Origin[1,2]	Number (in thousands)								
	2010	2015	2020	2025	2030	2035	2040	2045	2050
2008 National Projections	310,233	325,540	341,387	357,452	373,504	389,531	405,655	422,059	439,010
One Race	304,734	319,105	333,913	348,831	363,621	378,263	392,875	407,640	422,828
White	246,630	256,306	266,275	276,281	286,109	295,729	305,247	314,852	324,800
Black	39,909	42,137	44,389	46,594	48,728	50,810	52,868	54,911	56,944
AIAN	3,188	3,472	3,759	4,039	4,313	4,590	4,875	5,167	5,462
Asian	14,415	16,527	18,756	21,109	23,586	26,169	28,836	31,577	34,399
NHPI	592	662	734	808	885	965	1,048	1,134	1,222
Two or More Races	5,499	6,435	7,474	8,620	9,883	11,268	12,781	14,418	16,183
Non-Hispanic White alone	200,853	203,208	205,255	206,662	207,217	206,958	206,065	204,772	203,347
Hispanic	49,726	57,711	66,365	75,772	85,931	96,774	108,223	120,231	132,792
High Net International Migration Series	312,504	329,230	346,687	364,555	382,612	400,854	419,398	438,419	458,176
One Race	306,971	322,736	339,124	355,811	372,566	389,374	406,351	423,672	441,594
White	248,137	258,750	269,785	280,992	292,161	303,266	314,414	325,785	337,631
Black	40,105	42,457	44,852	47,218	49,533	51,817	54,097	56,382	58,678
AIAN	3,206	3,501	3,801	4,097	4,388	4,683	4,989	5,304	5,624
Asian	14,922	17,350	19,930	22,667	25,561	28,595	31,745	34,997	38,358
NHPI	601	677	756	838	923	1,012	1,106	1,203	1,303
Two or More Races	5,534	6,495	7,563	8,743	10,046	11,479	13,047	14,747	16,582
Non-Hispanic White alone	201,235	203,816	206,110	207,786	208,633	208,685	208,124	207,180	206,118
Hispanic	50,918	59,659	69,184	79,582	90,860	102,956	115,793	129,320	143,527
Low Net International Migration Series	308,282	322,371	336,836	351,353	365,683	379,810	393,856	408,012	422,554
One Race	302,812	315,986	329,438	342,839	355,941	368,723	381,305	393,878	406,717
White	245,336	254,208	263,261	272,237	280,914	289,257	297,377	305,465	313,783
Black	39,741	41,863	43,992	46,058	48,036	49,946	51,813	53,647	55,455
AIAN	3,172	3,446	3,722	3,990	4,249	4,510	4,776	5,049	5,323
Asian	13,979	15,821	17,748	19,771	21,890	24,087	26,340	28,642	31,004
NHPI	584	649	715	783	852	924	999	1,075	1,153
Two or More Races	5,470	6,384	7,397	8,514	9,742	11,087	12,551	14,134	15,837
Non-Hispanic White alone	200,524	202,686	204,520	205,696	206,002	205,474	204,296	202,704	200,967
Hispanic	48,702	56,039	63,945	72,501	81,699	91,466	101,724	112,428	123,576
Constant Net International Migration Series	307,907	321,085	334,123	346,655	358,407	369,339	379,551	389,200	398,528
One Race	302,442	314,719	326,767	338,215	348,783	358,427	367,244	375,397	383,129
White	245,300	253,740	262,044	269,917	277,108	283,558	289,359	294,678	299,755
Black	39,735	41,765	43,740	45,586	47,276	48,823	50,250	51,563	52,765
AIAN	3,169	3,436	3,701	3,953	4,192	4,426	4,660	4,895	5,124
Asian	13,658	15,137	16,582	18,000	19,393	20,747	22,044	23,274	24,443
NHPI	581	641	700	758	815	873	931	987	1,042
Two or More Races	5,465	6,366	7,356	8,440	9,624	10,913	12,307	13,803	15,400
Non-Hispanic White alone	200,639	202,755	204,484	205,491	205,562	204,732	203,183	201,146	198,888
Hispanic	48,531	55,451	62,664	70,216	78,071	86,133	94,304	102,516	110,743
Zero Net International Migration Series	296,505	303,209	309,300	314,442	318,346	320,965	322,432	322,985	322,949
One Race	291,214	297,135	302,372	306,582	309,478	311,011	311,322	310,645	309,308
White	237,521	241,514	245,016	247,746	249,447	250,062	249,711	248,614	247,067
Black	38,735	40,213	41,604	42,833	43,873	44,740	45,458	46,038	46,489
AIAN	3,078	3,293	3,501	3,691	3,862	4,024	4,183	4,337	4,482
Asian	11,344	11,545	11,651	11,683	11,640	11,507	11,271	10,939	10,536
NHPI	535	570	601	629	655	679	700	718	733
Two or More Races	5,291	6,073	6,928	7,860	8,869	9,953	11,111	12,340	13,642
Non-Hispanic White alone	198,560	199,548	200,097	199,879	198,678	196,535	193,644	190,255	186,647
Hispanic	42,504	45,906	49,275	52,668	56,036	59,276	62,308	65,100	67,672

Projection Series, Race, and Hispanic Origin [1,2]	Percent								
	2010	2015	2020	2025	2030	2035	2040	2045	2050
2008 National Projections	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
One Race	98.2	98.0	97.8	97.6	97.4	97.1	96.8	96.6	96.3
White	79.5	78.7	78.0	77.3	76.6	75.9	75.2	74.6	74.0
Black	12.9	12.9	13.0	13.0	13.0	13.0	13.0	13.0	13.0
AIAN	1.0	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2
Asian	4.6	5.1	5.5	5.9	6.3	6.7	7.1	7.5	7.8
NHPI	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3
Two or More Races	1.8	2.0	2.2	2.4	2.6	2.9	3.2	3.4	3.7
Non-Hispanic White alone	64.7	62.4	60.1	57.8	55.5	53.1	50.8	48.5	46.3
Hispanic	16.0	17.7	19.4	21.2	23.0	24.8	26.7	28.5	30.2
High Net International Migration Series	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
One Race	98.2	98.0	97.8	97.6	97.4	97.1	96.9	96.6	96.4
White	79.4	78.6	77.8	77.1	76.4	75.7	75.0	74.3	73.7
Black	12.8	12.9	12.9	13.0	12.9	12.9	12.9	12.9	12.8
AIAN	1.0	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2
Asian	4.8	5.3	5.7	6.2	6.7	7.1	7.6	8.0	8.4
NHPI	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
Two or More Races	1.8	2.0	2.2	2.4	2.6	2.9	3.1	3.4	3.6
Non-Hispanic White alone	64.4	61.9	59.5	57.0	54.5	52.1	49.6	47.3	45.0
Hispanic	16.3	18.1	20.0	21.8	23.7	25.7	27.6	29.5	31.3
Low Net International Migration Series	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
One Race	98.2	98.0	97.8	97.6	97.3	97.1	96.8	96.5	96.3
White	79.6	78.9	78.2	77.5	76.8	76.2	75.5	74.9	74.3
Black	12.9	13.0	13.1	13.1	13.1	13.2	13.2	13.1	13.1
AIAN	1.0	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.3
Asian	4.5	4.9	5.3	5.6	6.0	6.3	6.7	7.0	7.3
NHPI	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3
Two or More Races	1.8	2.0	2.2	2.4	2.7	2.9	3.2	3.5	3.7
Non-Hispanic White alone	65.0	62.9	60.7	58.5	56.3	54.1	51.9	49.7	47.6
Hispanic	15.8	17.4	19.0	20.6	22.3	24.1	25.8	27.6	29.2
Constant Net International Migration Series	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
One Race	98.2	98.0	97.8	97.6	97.3	97.0	96.8	96.5	96.1
White	79.7	79.0	78.4	77.9	77.3	76.8	76.2	75.7	75.2
Black	12.9	13.0	13.1	13.2	13.2	13.2	13.2	13.2	13.2
AIAN	1.0	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3
Asian	4.4	4.7	5.0	5.2	5.4	5.6	5.8	6.0	6.1
NHPI	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3
Two or More Races	1.8	2.0	2.2	2.4	2.7	3.0	3.2	3.5	3.9
Non-Hispanic White alone	65.2	63.1	61.2	59.3	57.4	55.4	53.5	51.7	49.9
Hispanic	15.8	17.3	18.8	20.3	21.8	23.3	24.8	26.3	27.8
Zero Net International Migration Series	100	100	100	100	100	100	100	100	100
One Race	98.2	98.0	97.8	97.5	97.2	96.9	96.6	96.2	95.8
White	80.1	79.7	79.2	78.8	78.4	77.9	77.4	77.0	76.5
Black	13.1	13.3	13.5	13.6	13.8	13.9	14.1	14.3	14.4
AIAN	1.0	1.1	1.1	1.2	1.2	1.3	1.3	1.3	1.4
Asian	3.8	3.8	3.8	3.7	3.7	3.6	3.5	3.4	3.3
NHPI	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Two or More Races	1.8	2.0	2.2	2.5	2.8	3.1	3.4	3.8	4.2
Non-Hispanic White alone	67.0	65.8	64.7	63.6	62.4	61.2	60.1	58.9	57.8
Hispanic	14.3	15.1	15.9	16.7	17.6	18.5	19.3	20.2	21.0

[1] Race refers to each of the race groups alone and the Two or More Races category represents the population reporting more than one race.

[2] Hispanics may be of any race.

Abbreviations: Black = Black or African American; AIAN = American Indian and Alaska Native; NHPI = Native Hawaiian and Other Pacific Islander

Note: The original race data from Census 2000 are modified to eliminate the "some other race" category. This modification is used for all Census Bureau projections products and is explained in the document entitled "Modified Race Data Summary File Technical Documentation and ASCII Layout" that can be found on the Census Bureau website at http://www.census.gov/popest/archives/files/MRSF-01-US1.html.

Source: U.S. Census Bureau, 2008 and 2009.

Table 36. NAVADMIN 114, Change to Performance Mark Average
(after U.S. Navy, 2014).

A. STANDARD SCORE (SS) AND PERFORMANCE MARK AVERAGE (PMA). TO ACCOUNT FOR MEASURING PERFORMANCE DIFFERENTLY AT DIFFERENT PAYGRADES, SS AND PMA POINTS AND PERCENTAGES WILL BE ADJUSTED.
THESE CHANGES EMPHASIZE TECHNICAL KNOWLEDGE AS MEASURED BY EXAM SCORES FOR JUNIOR PAYGRADES AND EMPHASIZE THE CO'S ASSESSMENT OF THE SAILOR'S PERFORMANCE AS MEASURED BY EVALUATIONS FOR SENIOR PAYGRADES.
   B.   AWARDS. WHILE THE GOOD CONDUCT MEDAL AND NAVY RESERVE MERITORIOUS SERVICE MEDAL ARE VALUED, THEY WILL NO LONGER BE INCLUDED IN THE AWARD POINT CALCULATION AS THEY HAVE NOT BEEN USEFUL AS DISCRIMINATORS. COMMANDS WILL CONTINUE TO RECOGNIZE TOP PERFORMANCE OF SAILORS AND POINTS WILL CONTINUE TO BE AWARDED FOR SPECIFIC PERFORMANCE-BASED AWARDS SUCH AS THE FLAG LETTER OF COMMENDATION, NAVY AND MARINE CORPS ACHIEVEMENT MEDAL, AND NAVY AND MARINE CORPS COMMENDATION MEDAL.
   C.   SERVICE IN PAYGRADE (SIPG). TO EMPHASIZE PERFORMANCE OVER LONGEVITY, SIPG POINTS HAVE BEEN REDUCED IN WEIGHT.
   D.   PASSED NOT ADVANCED (PNA). TO EMPHASIZE CURRENT RATING KNOWLEDGE OVER PAST EXAM PERFORMANCE AND TO REWARD TOP PERFORMANCE, PNA POINTS WILL ONLY BE AWARDED TO SAILORS RANKED IN THE TOP 25 PERCENT OF PMA AND SS AMONG ALL ELIGIBLE CANDIDATES COMPETING FOR ADVANCEMENT.

E. THE NEW FMS COMPUTATION FOR E4/5 IS AS FOLLOWS:

FACTOR	COMPUTATION	MAX POINTS	MAX PERCENT
PMA	(PMA*80) - 256	64	36%
SS	EXAM SCORE	80	45%
AWARDS	PER ADVANCEMENT MANUAL AND THIS NAVADMIN	10	6%
IA	INDIVIDUAL AUGMENTEE PTS	2	1%
PNA	PTS FOR TOP 25 PERCENT SS AND PMA FOR LAST FIVE EXAM CYCLES	15	9%
SIPG	SIPG/4	2	1%
EDUCATION	2 PTS AA/AS; 4 PTS BA/BS OR HIGHER	4	2%
TOTAL		177	

F. THE NEW FMS COMPUTATION FOR E6 IS AS FOLLOWS:

FACTOR	COMPUTATION	MAX POINTS	MAX PERCENT
PMA	(PMA*80) - 206	114	50%
SS	EXAM SCORE	80	35%
AWARDS	PER ADVANCEMENT MANUAL AND THIS NAVADMIN	12	5%
IA	INDIVIDUAL AUGMENTEE PTS	2	1%
PNA	PTS FOR TOP 25 PERCENT SS AND PMA FOR LAST FIVE EXAM CYCLES	15	6%
SIPG	SIPG/4	3	1%
EDUCATION	2 PTS AA/AS; 4 PTS BA/BS OR HIGHER	4	2%
TOTAL		230	

G. THE NEW FMS COMPUTATION FOR E7 IS AS FOLLOWS:

FACTOR	COMPUTATION	MAX POINTS	MAX PERCENT
PMA	(PMA*50) - 80	120	60%
SS	EXAM SCORE	80	40%
TOTAL		200	

Table 37.   NAVADMIN 301, Introduction of Education Points for
Advancement (after U.S. Navy, 2007).

THIS NAVADMIN ANNOUNCES THE INTRODUCTION OF EDUCATION POINTS
IN THE E4-E6 FMS, AND REITERATES A CONTINUED EMPHASIS ON EDUCATION IN
E7-E9 SELECTION BOARD PRECEPTS. EFFECTIVE WITH THE ACTIVE/FULL TIME
SUPPORT (FTS) CYCLE 200 (SEPTEMBER 2008) AND RESERVE CYCLE 083 (AUGUST
2008) ADVANCEMENT EXAMINATIONS, SAILORS COMPETING FOR ADVANCEMENT TO
PAYGRADES E4-E6 WILL BE AWARDED TWO POINTS FOR AN ACCREDITED ASSOCIATES
DEGREE, AND FOUR POINTS FOR AN ACCREDITED BACCALAUREATE DEGREE OR
ABOVE.
EDUCATION POINTS WILL BE AWARDED FOR THE HIGHEST DEGREE HELD, AND WILL
INCREASE THE TOTAL OVERALL FMS POINTS WITH NO REDUCTION IN POINTS FROM
OTHER FACTORS. WHILE THE E7 FMS DOES NOT INCLUDE EDUCATION POINTS,
BOARD PRECEPTS FOR E7-E9 WILL EMPHASIZE FAVORABLE CONSIDERATION OF
ACCREDITED DEGREES. THE IMPLEMENTATION OF THESE POINTS, AND THE
EMPHASIS ON EDUCATION IN PRECEPT LANGUAGE, REFLECT THE IMPORTANCE OF
CRITICAL THINKING SKILLS REQUIRED FOR A MORE EFFICIENT, MORE
TECHNICALLY CAPABLE FUTURE FORCE.

2. THE NEW FMS COMPUTATION FOR E4/5 IS AS FOLLOWS:

FACTOR	COMPUTATION	MAXIMUM POINTS	PERCENTAGE
PERFORMANCE MARK AVERAGE (PMA)	(PMA*80) - 230	90	42 PERCENT
EXAM STD SCORE (SS)	AS INDICATED ON PROFILE SHEET	80	37 PERCENT
SERVICE IN PAYGRADE (SIPG)	SIPG + 7.5	15	7 PERCENT
PASS NOT ADVANCED (PNA)	AS INDICATED ON PROFILE SHEET	15	7 PERCENT
EDUCATION	2 AA OR 4 BA/BS	4	2 PERCENT
AWARDS	PER WORKSHEET	10	5 PERCENT
TOTAL		214	

3. THE NEW FMS COMPUTATION FOR E6 IS AS FOLLOWS:

FACTOR	COMPUTATION	MAXIMUM POINTS	PERCENTAGE
PERFORMANCE MARK AVERAGE (PMA)	(PMA*80) - 204	116	47.5 PERCENT
EXAM STD SCORE (SS)	AS INDICATED ON PROFILE SHEET	80	33 PERCENT
SERVICE IN PAYGRADE (SIPG)	SIPG + 9.5	17	7 PERCENT
PASS NOT ADVANCED (PNA)	AS INDICATED ON PROFILE SHEET	15	6 PERCENT
EDUCATION	2 AA OR 4 BA/BS	4	1.5 PERCENT
AWARDS	PER WORKSHEET	12	5 PERCENT
TOTAL		244	

Table 38.   BUPERSINST 1610.10C, Implementation of Early and Must
Promote Limits for E5 (after Department of the Navy, 2011).

j. Changing the combined early and must promote upper limit promotion
recommendations to 60 percent for E5s effective 15 March 2011.

Upper Limits on Early Promote and Must Promote Recommendations
- Early Promote (all pay grades except non-Limited Duty Officer O1/O2)
-
 20 percent of each summary group (rounded up to nearest whole
number).

- Early Promote and Must Promote combined (percent of summary group,
rounded up to nearest whole number):
LDO O1-O2 - No limit O3 - No limit O4 - 50%
O5-O6 - 40% W2 - No limit W3-W5 - 50%
E1-E5 - No limit (see note) E6 - 60% E7-E9 - 50%
Note: Effective with the 15 March 2011 evaluations E5 will use
60 percent combined early and must promote upper limit.
- For Summary Groups of 30 or less, use table 1-3 on the following
page.
- For Summary Groups of more than 30 members, calculate the maximums
using the following example: Assume 42 E6s in a summary group, 60
percent maximum Early Promote and Must Promote combined:

Early Promote + Must Promote Maximum = 42 x 0.6 = 25.2, which = 26
rounded up).

Early Promote Maximum = 42 x 0.2 = 8.4 = 9 (rounded up).
Must Promote Maximum = 26 - 9 = 17.

Note: The Must Promote maximum is the difference between the rounded
numbers. Must Promote recommendations may be increased by one for each
Early Promote quota not used. All summary groups of two can receive
one Early Promote and one Must Promote.
E1-E4 - No limit
E5-E6 - 60%
E7-E9 - 50%

Table 39.   Summary Statistics for Analysis Data Set.

Variable	Full Sample	Hispanic	Non-Hispanic
E5 Fast Track	.4205575	.3794771	.430211
Attrition 4YO	.3403544	.2948945	.351489
Attrition 5YO	.3008755	.2676443	.3082581
Attrition 6YO	.2685801	.2547875	.2713007
Retention 4YO	.5544437	.5945764	.5446139
Retention 5YO	.5740688	.6074844	.5666452
Retention 6YO	.5629948	.5730337	.5610937
AGE	**Full Sample**	**Hispanic**	**Non-Hispanic**
Age at DEP	20.11572	20.10289	20.11862
Age at RTC ship	20.54797	20.54291	20.54911
Age 17	.0358367	.0431026	.03419
Age 18	.3124164	.3146462	.311911
Age 19	.2261907	.2211691	.2273288
Age 20	.1319065	.1321048	.1318616
Age 21 to 34	.2936497	.2889773	.2947086
Marital Status	**Full Sample**	**Hispanic**	**Non-Hispanic**
Female	.1789252	.1944436	.1754081
Male	.8210748	.8055564	.8245919
Married	.0153446	.0182417	.0146881
Single	.9831281	.9802045	.9837907
Married Female	.0035082	.0038379	.0034334
Married Male	.0118365	.0144038	.0112546
Single Female	.174995	.190326	.1715204
Single Male	.8081331	.7898785	.8122702
Dependent Status	**Full Sample**	**Hispanic**	**Non-Hispanic**
Enlist with Dependents	.0139753	.0154293	.0136457
No Dependents	.9860247	.9845707	.9863543
No Dependents Year 3	.7175437	.6781597	.7264695
Dependents at Year 3	.2824563	.3218403	.2735305
No Dependents Year 4	.4973991	.460521	.5059842
Dependents at Year 4	.5026009	.539479	.4940158
No Dependents Year 5	.4269263	.3969093	.4337739
Dependents at Year 5	.5730737	.6030907	.5662261
No Dependents Year 6	.3496225	.3247556	.3552459
Dependents at Year 6	.6503775	.6752444	.6447541
Citizenship Status	**Full Sample**	**Hispanic**	**Non-Hispanic**
Not a U.S. Citizen	.0464588	.0933373	.0358345
U.S. Citizen	.9535412	.9066627	.9641655

Race & Ethnicity	Full Sample	Hispanic	Non-Hispanic
Non-Hispanic	.8152384	0	1
Hispanic	.1847616	1	0
White	.4214653	.4340874	.4186047
Black	.3312089	.302107	.3378044
Asian / Pacific Islander	.0397698	.0386588	.0400216
Other Race	.2075561	.2251468	.2035694
Academic & Aptitude	**Full Sample**	**Hispanic**	**Non-Hispanic**
AFQT	61.50415	59.54332	61.94854
AO	45.43083	46.87443	45.09277
AR	53.25127	52.9599	53.31731
AS	49.16975	47.33311	49.586
EI	51.45651	50.03788	51.77802
GS	52.73047	51.11885	53.09572
MC	53.11774	52.17591	53.33119
MK	55.47931	55.52046	55.46998
PC	53.53671	52.89563	53.682
WK	52.53015	51.41825	52.78215
VE	53.04144	52.06111	53.26362
Tier1 HSDG	.9374501	.9360763	.9377615
Tier2 HSG	.0415956	.0423102	.0414337
Tier3 NHSG	.0209543	.0216135	.0208049
GED	.0350894	.034591	.0352024
Non-HSDG 12 Years	.0050154	.0052208	.0049688
Enlistment Characteristics	**Full Sample**	**Hispanic**	**Non-Hispanic**
E1 Enlistment Rank	.6376798	.6670189	.6310305
Advanced Pay Grade	.3623202	.3329811	.3689695
No Enlistment Bonus	.5032756	.5341838	.4962708
Enlistment Bonus	.4967244	.4658162	.5037292
Bonus Value	6329.707	5908.837	6425.091
Enlistment Term	4.769707	4.71601	4.781876
Enlist 4Year Obligation	.4541412	.4835918	.4474667
Enlist 5Year Obligation	.3220107	.316806	.3231903
Enlist 6 Year Obligation	.2238481	.1996022	.229343
Overweight	.0386482	.046946	.0363351
Enlistment Waivers	**Full Sample**	**Hispanic**	**Non-Hispanic**
Felony Waiver	.0015474	.0012275	.0016199
Serious Civil Waiver	.0057991	.0056403	.0058351
Minor Civil Waiver	.037697	.0343858	.0384475
Alcohol or Drug Waiver	.0175093	.0215047	.0166037

DEP Characteristics	Full Sample	Hispanic	Non-Hispanic
Time in DEP	4.465033	4.518547	4.452904
DEP PQS Complete	.1074096	.1110818	.1065774
DEP PQS Not Complete	.8925904	.8889182	.8934226
Occupational Rating Group	**Full Sample**	**Hispanic**	**Non-Hispanic**
Aviation Maintenance	.0534809	.0522701	.0537553
Aviation Support	.0475526	.0541347	.0460609
Administrative	.0225275	.0241773	.0221536
Nuclear Field	.0619126	.0476708	.0651402
Undesignated Personnel	.1590073	.1760776	.1551385
Shipboard Maintenance	.0739672	.0754219	.0736375
Shipboard Engineering	.052212	.0577551	.0509557
Shipboard Operations	.0282548	.0300507	.0278478
Hospital Corpsman	.0769041	.0900898	.0739157
Intelligence and Cryptology	.0352683	.030377	.0363768
Supply and Support Services	.0497172	.0506542	.0495049
Ordnance, Law, and Weapons Systems	.1059484	.1057211	.1059999
SEABEE Construction	.0253639	.0192828	.0267421
Submarine Volunteer	.0459047	.041207	.0469694
Cohorts	**Full Sample**	**Hispanic**	**Non-Hispanic**
Fiscal Year 2001	.1435736	.1233568	.1481555
Fiscal Year 2002	.1241323	.105861	.1282732
Fiscal Year 2003	.1149657	.1239007	.1129407
Fiscal Year 2004	.1104183	.1007179	.1126167
Fiscal Year 2005	.1026067	.1023804	.102658
Fiscal Year 2006	.096977	.0966935	.0970413
Fiscal Year 2007	.1012747	.1039964	.1006578
Fiscal Year 2008	.1055809	.1212747	.1020241
Fiscal Year 2009	.1004708	.1218186	.0956327

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX B. FIGURES

Figure 8.   Reproduction of the Question on Hispanic Origin: 2010 Census
(from Ennis et al., 2011).

Reproduction of the Question on Hispanic Origin From the 2010 Census

→ NOTE: Please answer BOTH Question 5 about Hispanic origin and Question 6 about race. For this census, Hispanic origins are not races.

5. Is this person of Hispanic, Latino, or Spanish origin?

☐ **No,** not of Hispanic, Latino, or Spanish origin

☐ Yes, Mexican, Mexican Am., Chicano

☐ Yes, Puerto Rican

☐ Yes, Cuban

☐ Yes, another Hispanic, Latino, or Spanish origin — *Print origin, for example, Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.* ↙

Figure 9.   Department of Defense Form 370, Request for Reference.

REQUEST FOR REFERENCE	OMB No. 0704-0167 OMB approval expires Oct 31, 2011

PLEASE RETURN YOUR FORM TO THE ADDRESS SHOWN IN THE "TO" BLOCK BELOW.

The public reporting burden for this collection of information is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to the Department of Defense, Washington Headquarters Services, Executive Services Directorate, Information Management Division, 1155 Defense Pentagon, Washington, DC 20301-1155 (0704-0167). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

THIS FORM CONTAINS INFORMATION SUBJECT TO THE PRIVACY ACT OF 1974, AS AMENDED.

TO: navyaccessions@navy.mil

Your timely reply will help the defense effort. Please fill out and return promptly. A return envelope, which requires no postage, is enclosed for your convenience.

APPLICANT IDENTIFICATION DATA

1. NAME (Last, First, Middle Initial)

2. MAILING ADDRESS (Street, Apartment Number, City, State, and ZIP Code)

3. DATE OF BIRTH (YYYYMMDD)

Omit

4. DATES OF SCHOOL ATTENDANCE OR EMPLOYMENT

a. FROM (YYYYMMDD)   b. TO (YYYYMMDD)

The above-named person has made application for enlistment in the Armed Service and has given your name as a reference. The information you provide will be appreciated since it will assist in determining whether or not the applicant meets the eligibility standards to become a member of the Armed Forces of the United States.

Service standards require that applicants be mature, intelligent, and possess high moral qualifications. Those applicants who are selected will have an opportunity to receive schooling and training in technical fields to improve and advance their knowledge and skills in subjects essential to national defense. Additionally, college opportunities will be available.

Enlistees who cannot adjust satisfactorily to military life must be discharged, causing emotional distress to the individual, as well as loss to the taxpayers. Therefore, by giving your frank opinion of the applicant, you can render a genuine service to the applicant as well as to the United States.

Your statements will be held in strict confidence, and you will not be considered personally responsible in any way for the applicant's conduct if enlisted or not enlisted.

Your answers to the questions listed on the back of this form are of particular interest in reaching a conclusion concerning the qualifications of the applicant. Any information you can provide will be appreciated.

RECRUITING OFFICER IDENTIFICATION DATA

5. TYPED NAME (Last, First, Middle Initial)	6. DATE SIGNED (YYYYMMDD)	7. UNIT/COMMAND NAME
JAGC Accessions Office		Navy Personnel Command (PERS 4416E)

8. SIGNATURE OF RECRUITING REPRESENTATIVE	9. UNIT/COMMAND MAILING ADDRESS (Street, City, State, and ZIP Code)
	5720 Integrity Drive Millington, TN 38055-4416

DD FORM 370, MAR 2009   PREVIOUS EDITION IS OBSOLETE.   Adobe Professional 8.0

APPLICANT'S NAME (Last, First, Middle Initial)

10. WHAT IS YOUR RELATIONSHIP TO THE APPLICANT? (Indicate with an "X")

☐ a. EMPLOYER	☐ b. SCHOOL OFFICIAL	☐ c. OTHER (Specify)

11. HOW LONG HAVE YOU KNOWN THE APPLICANT?	12. APPLICANT'S HIGHEST SCHOOL GRADE COMPLETED OR JOB TITLE
a. FROM (YYYYMMDD) b. TO (YYYYMMDD)	

13. INCLUSIVE DATES OF SCHOOL ATTENDANCE/ EMPLOYMENT IN YOUR SCHOOL OR FIRM	14. IF APPLICANT LEFT SCHOOL OR JOB, OR WAS EXPELLED, DISMISSED, OR TERMINATED, GIVE SPECIFIC REASON IF KNOWN.
a. FROM (YYYYMMDD) b. TO (YYYYMMDD)	

15. HOW DO YOU RATE THE APPLICANT'S:	(Indicate with an "X")			
	OUTSTANDING	AVERAGE	UNSATISFACTORY	NOT OBSERVED
a. TRUSTWORTHINESS				
b. ADAPTABILITY				
c. ABILITY TO WORK WELL WITH OTHERS				
d. INITIATIVE				
e. JUDGMENT				
f. PHYSICAL FITNESS				
g. LEADERSHIP				
h. MATURITY				
i. DEPENDABILITY				

PLEASE ANSWER THE FOLLOWING QUESTIONS TO THE BEST OF YOUR KNOWLEDGE. FOR "YES" ANSWERS, PROVIDE DETAILS IN REMARKS.	(Indicate with an "X")		
	YES	NO	UNKNOWN
16. IF APPLICANT IS KNOWN TO USE ALCOHOL OR DRUGS, HAS IT AFFECTED HIS OR HER PERFORMANCE? (If Yes, explain below)			
17. IS THERE ANY REASON WHY YOU WOULD NOT RECOMMEND THIS PERSON FOR THE ARMED FORCES? (If Yes, explain below)			

18. PLEASE WRITE A PERSONAL NARRATIVE EVALUATION OF THE APPLICANT BELOW, OR ON A PLAIN PIECE OF PAPER, AND ATTACH TO THIS FORM. SPECIFICALLY ADDRESS THE ABOVE ITEMS. IF ITEM 17 IS MARKED "YES", PLEASE EXPLAIN IN DETAIL.

19. PERSON COMPLETING QUESTIONNAIRE

a. TYPED OR PRINTED NAME (Last, First, Middle Initial)	b. TITLE

c. SIGNATURE	d. DATE SIGNED (YYYYMMDD)

DD FORM 370 (BACK), MAR 2009

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX C. FAST-TRACK PROMOTION AND RETENTION

Table 40. Probit Regression Results for Retention Four-Year Obligors,
Restricted Sample FY 01–08.

Retention4YO	Probit Coefficient	SE	Marginal Effect	Z Score
E5 Fast-Track Promotion	1.854	0.017	0.510	107.61***
Hispanic	-0.019	0.011	-0.008	-1.76*
Black	0.213	0.012	0.083	17.56***
Asian or Pacific Islander	0.173	0.024	0.066	7.25***
Other Race	0.258	0.014	0.099	18.56***
Age at Enlistment	0.019	0.002	0.007	10.14***
Female	0.099	0.012	0.038	8.56***
Enlist with Dependents	0.040	0.040	0.016	1.00
Dependents Year 3	0.157	0.009	0.061	17.03***
Non-Citizen	0.139	0.018	0.054	7.76***
VE	-0.016	0.001	-0.006	-17.25***
MK	-0.003	0.001	-0.001	-4.08***
Tier 2 HSG	0.009	0.028	0.004	0.32
Tier 3 NHSG	0.092	0.027	0.036	3.45***
Non-HSDG 12-Years Education	0.065	0.065	0.025	1.00
Advanced Pay Grade	0.018	0.007	0.007	2.71***
Time in DEP	0.005	0.001	0.002	3.72***
Civil Waiver	0.019	0.021	0.008	0.91
Alcohol or Drug Waiver	0.062	0.036	0.024	1.70*
DEP PQS Complete	-0.047	0.017	-0.019	-2.74***
Aviation Maintenance	0.135	0.021	0.052	6.53***
Aviation Support	-0.059	0.022	-0.023	-2.68***
Administrative	0.337	0.026	0.125	12.76***
Undesignated Personnel	0.059	0.013	0.023	4.40***
Shipboard Maintenance	-0.194	0.019	-0.077	-10.45***
Shipboard Operations	-0.308	0.025	-0.122	-12.42***
Intelligence & Cryptology	-0.131	0.035	-0.052	-3.79***
Supply & Support Services	0.093	0.021	0.036	4.34***
Ordnance, Law, & Weapons	-0.080	0.019	-0.032	-4.15***
Submarine Volunteer	-0.003	0.046	-0.001	-0.07
Cohort 2002	-0.088	0.016	-0.035	-5.66***
Cohort 2003	0.033	0.017	0.013	2.01**
Cohort 2004	0.032	0.018	0.012	1.80*
Cohort 2005	0.116	0.018	0.045	6.40***
Cohort 2006	0.131	0.021	0.051	6.32***
Cohort 2007	0.076	0.021	0.029	3.60***
Cohort 2008	-0.059	0.019	-0.023	-3.07***
_constant	0.167	0.074		

N= 94,626 Pseudo R^2= 0.1512 Log Likelihood = -55356.786
*** Indicates coefficient is statistically significant at 99% level or better.
** Indicates coefficient is statistically significant at 95% level or better.
* Indicates coefficient is statistically significant at 90% level or better.

Table 41.   Probit Regression Results for Retention Five-Year Obligors,
Restricted Sample FY 01–07.

Retention5YO	Probit Coefficient	SE	Marginal Effect	Z Score
E5 Fast-Track Promotion	0.581	0.013	0.220	45.36***
Hispanic	0.001	0.014	0.000	0.09
Black	0.130	0.015	0.051	8.61***
Asian or Pacific Islander	0.162	0.028	0.063	5.90***
Other Race	0.144	0.016	0.056	8.97***
Age at Enlistment	0.012	0.002	0.005	5.90***
Female	-0.067	0.014	-0.026	-4.72***
Enlist with Dependents	0.119	0.042	0.046	2.81***
Dependents Year 3	0.180	0.011	0.071	16.68***
Non-Citizen	0.127	0.024	0.050	5.32***
VE	-0.018	0.001	-0.007	-15.84***
MK	-0.001	0.001	-0.001	-1.57
Tier 2 HSG	-0.003	0.026	-0.001	-0.13
Tier 3 NHSG	0.031	0.049	0.012	0.63
Non-HSDG 12-Years Education	-0.008	0.082	-0.003	-0.09
Advanced Pay Grade	0.016	0.007	0.006	2.14**
Enlistment Bonus	0.036	0.019	0.014	1.83*
Time in DEP	0.007	0.002	0.003	4.39***
Civil Waiver	-0.039	0.025	-0.015	-1.55
Alcohol or Drug Waiver	0.148	0.042	0.057	3.48***
DEP PQS Complete	-0.041	0.019	-0.016	-2.15**
Aviation Maintenance	0.055	0.021	0.022	2.68***
Aviation Support	-0.105	0.024	-0.041	-4.29***
Administrative	0.074	0.039	0.029	1.91*
Shipboard Maintenance	-0.141	0.024	-0.056	-5.92***
Shipboard Operations	-0.194	0.038	-0.077	-5.14***
Hospital Corpsman	0.208	0.023	0.081	8.97***
Intelligence & Cryptology	0.062	0.045	0.024	1.38
Supply & Support Services	0.146	0.024	0.057	6.05***
Ordnance, Law, & Weapons	-0.138	0.020	-0.055	-6.83***
SEABEE Construction	-0.014	0.030	-0.005	-0.47
Submarine Volunteer	0.002	0.021	0.001	0.11
Cohort 2002	-0.105	0.018	-0.042	-5.70***
Cohort 2003	0.022	0.022	0.009	0.99
Cohort 2004	0.146	0.023	0.057	6.27***
Cohort 2005	0.201	0.024	0.078	8.47***
Cohort 2006	0.130	0.023	0.051	5.75***
Cohort 2007	0.078	0.022	0.031	3.60***
_constant	0.443	0.086		

N= 62,465	Pseudo R^2= 0.0417	Log Likelihood = -41087.908

*** Indicates coefficient is statistically significant at 99% level or better.
** Indicates coefficient is statistically significant at 95% level or better.
* Indicates coefficient is statistically significant at 90% level or better.

Table 42.   Probit Regression Results for Retention Six-Year Obligors,
Restricted Sample FY 01–06.

Retention6YO	Probit Coefficient	SE	Marginal Effect	Z Score
E5 Fast-Track Promotion	0.686	0.015	0.267	44.28***
Hispanic	-0.031	0.019	-0.012	-1.60
Black	0.089	0.023	0.035	3.94***
Asian or Pacific Islander	0.098	0.038	0.039	2.60***
Other Race	0.081	0.022	0.032	3.74***
Age at Enlistment	0.001	0.003	0.001	0.48
Female	-0.141	0.021	-0.056	-6.65***
Enlist with Dependents	0.109	0.071	0.043	1.54
Dependents Year 3	0.242	0.015	0.096	16.03***
Non-Citizen	0.195	0.056	0.077	3.49***
VE	-0.017	0.002	-0.007	-10.26***
MK	0.001	0.002	0.000	0.43
Tier 2 HSG	-0.092	0.047	-0.037	-1.96**
Tier 3 NHSG	-0.029	0.221	-0.012	-0.13
Non-HSDG 12 Years Education	-0.189	0.148	-0.075	-1.27
Advanced Pay Grade	0.011	0.011	0.004	1.02
Enlistment Bonus	0.034	0.022	0.014	1.58
Time in DEP	0.006	0.002	0.003	3.23***
Civil Waiver	-0.029	0.044	-0.012	-0.66
Alcohol or Drug Waiver	0.092	0.065	0.036	1.42
DEP PQS Complete	-0.073	0.029	-0.029	-2.55***
Nuclear Field	-0.201	0.026	-0.080	-7.84***
Shipboard Engineering	-0.026	0.035	-0.010	-0.74
Shipboard Operations	-0.034	0.149	-0.014	-0.23
Hospital Corpsman	0.305	0.031	0.119	9.75***
Intelligence & Cryptology	-0.161	0.030	-0.064	-5.41***
Ordnance, Law, & Weapons	0.082	0.024	0.033	3.41***
SEABEE Construction	0.125	0.049	0.049	2.56**
Submarine Volunteer	0.248	0.049	0.097	5.05***
Cohort 2002	-0.061	0.025	-0.024	-2.41**
Cohort 2003	0.124	0.030	0.049	4.17***
Cohort 2004	0.128	0.031	0.051	4.10***
Cohort 2005	0.134	0.031	0.053	4.29***
Cohort 2006	0.078	0.030	0.031	2.63***
_constant	0.427	0.130		

N= 34,135	Pseudo R^2= 0.06	Log Likelihood = -22174.907

*** Indicates coefficient is statistically significant at 99% level or better.
** Indicates coefficient is statistically significant at 95% level or better.
* Indicates coefficient is statistically significant at 90% level or better.

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF REFERENCES

Asch, B. J., Buck, C., Klerman, J. A., Kleykamp, M., & Loughran, D. S. (2005). *What factors affect the military enlistment of Hispanic youth?: A look at enlistment qualifications*. Santa Monica, CA: RAND Corp. Retrieved from http://www.rand.org/content/dam/rand/pubs/documented_briefings/2005/RAND_DB484.pdf

Asch, B. J., Buck, C., Klerman, J. A., Kleykamp, M., & Loughran, D. S. (2009). *Military enlistment of Hispanic youth: Obstacles and opportunities*. Santa Monica, CA: RAND Corp. Retrieved from http://www.rand.org/content/dam/rand/pubs/monographs/2009/RAND_MG773.pdf

Asch, B. J., Heaton, P., & Savych, B. (2009). *Recruiting minorities: What explains recent trends in the army and navy?* Santa Monica, CA: RAND Corp. Retrieved from http://www.rand.org/content/dam/rand/pubs/monographs/2009/RAND_MG861.pdf

Buddin, R. J. (2005). *Success of first-term soldiers: The effects of recruiting practices and recruit characteristics*. Santa Monica, CA: RAND Corp. Retrieved from http://www.rand.org/content/dam/rand/pubs/monographs/2005/RAND_MG262.pdf

Carvalho, R. S., Krulikowski, C. M., & Marsh, S. M. (2011). *Department of Defense youth poll wave 20 December 2010. Overview report*. (No. JAMRS-2011-05). Arlington, VA: Joint Advertising Market Research and Studies.

Center for Naval Analysis. (2014). *Attrition and reenlistment of first-term sailors. Update through end of FY14*. Alexandria, VA: CNA Corp.

D'Vera, C., Patten, E., & Lopez, M. (2014). *Puerto Rican population declines on island, grows on U.S. mainland*. Washington, DC: Pew Research Center's Hispanic Trends Project. Retrieved from http://www.pewhispanic.org/2014/08/11/puerto-rican-population-declines-on-island-grows-on-u-s-mainland/

Department of Defense. (2012, September 22). *Qualitative distribution of military manpower, Change 1 ed.* (DOD instruction: 1145.01.) Washington, DC: Undersecretary of Defense (Personnel and Readiness).

Department of the Navy. (2011, April 20). *Navy performance evaluation system*. (BUPERSINST: 1610.10C.) Millington, TN: Chief of Naval Personnel.

Ennis, S., Ríos-Vargas, M., & Albert, N. (2011). The Hispanic population: 2010 census briefs. Washington, DC: U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau.

Exec. Order No. 9981, 3 C.F.R. PAGE 1 (1948).

Golan, A., Greene, W. H., & Perloff, J. (2010). *U.S. Navy promotion and retention by race and sex*. UC Berkeley: Institute for Research on Labor and Employment. Retrieved from: https://escholarship.org/uc/item/73j2g8mq

Guzman, B. (2001). Census 2000 brief: The Hispanic population. Washington, DC: U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau.

Humes, Karen. R., Jones, Nicholas. A., & Ramirez, Roberto. R. (2011). Census 2010 brief: Overview of race and Hispanic origin: 2010. Washington, DC: U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau.

Immigration and Nationality Act, 328 U.S.C §1439 (2008).

Jones-Shafroth Act, Pub. L. No. 64–368 §1, 39 Stat. 951 (1917).

Kapp, L. (2013). *Recruiting and retention: An overview of FY2011 and FY2012 results for active and reserve component enlisted personnel.* Library of Congress Washington, DC Congressional Research Service. DTIC Document. Retrieved from http://www.fas.org/sgp/crs/natsec/RL32965.pdf

Lane, M. E. (2006). *Predictors of attrition from the U.S. Navy delayed entry program* (Unpublished doctoral dissertation, University of Memphis). Retrieved from http://www.researchgate.net/publication/228919072 _Predictors_of_Attrition_from_the_US_Navy_Delayed_Entry_Program

Lee, J., & Beckhusen, J. B. (2012). U.S. census., veterans' racial and ethnic composition and place of birth: 2011 American community survey briefs. Washington, DC: U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau.

Limitation on enlistment and induction of persons whose score on the Armed Forces Qualification Test is below a prescribed level, Title 10, U.S.C §520 (1988).

Military Leadership Diversity Commission. (2011). *From representation to inclusion: Diversity leadership for the 21st-century military*. Retrieved from http://diversity.defense.gov/Portals/51/Documents/Special%20Feature/MLDC_Final_Report.pdf

National Center for Educational Statistics (2014). *Percentage of high school dropouts among persons 16 through 24 years old (status dropout rate), by sex and race/ethnicity: Selected years, 1960 through 2012*. (Digest of Education Statistics). Retrieved from http://nces.ed.gov/programs/digest/d13/tables/dt13_219.70.asp

Office of the Assistant Secretary of Defense. (2012) *2012 Demographics report: Profile of the military community*. Washington, DC: Author. Retrieved from http://www.militaryonesource.mil/12038/MOS/Reports/2012_Demographics_Report.pdf

Office of Management and Budget. (1997). Revisions to the standards for the classification of federal data on race and ethnicity. Washington, DC Author. Retrieved from http://www.whitehouse.gov/omb/fedreg_1997standards

Ortman, J. M., & Guarneri, C. E. (2009). *United States population projections: 2000 to 2050*. Washington, DC: U.S. Census Bureau. Retrieved from http://www.census.gov/population/projections/files/analytical-document09.pdf

Office of the Undersecretary of Defense. (2013). *Population representation in the military services: Fiscal year 2012*. Washington, DC: Author. Retrieved from http://poprep.cna.org/2012/index.html

U.S. Census. (2013). *Hispanic origin: The Hispanic population in the united states: 2012*. Washington, DC: U.S. Census Bureau. Retrieved from https://www.census.gov/population/hispanic/data/2012.html

U.S. Census (2014) Facts for features: Hispanic heritage month 2014: Sept. 15–Oct. 15. Washington, DC: U.S. Census Bureau. Retrieved from http://www.census.gov/newsroom/facts-for-features/2014/cb14-ff22.html

U.S. Citizenship and Immigration Services. (2014). Naturalization through military service: Fact sheet. Retrieved Oct/30, 2014, from http://www.uscis.gov/news/fact-sheets/naturalization-through-military-service-fact-sheet

U.S. Navy. (2007). E*ducation points for E4-E6 final multiple score (fms) and emphasis on education for E7-E9 selection board precepts (NAVADMIN 301*). Navy Personnel Command: Millington, TN. Retrieved from http://www.public.navy.mil/bupers-npc/reference/messages/Documents/NAVADMINS/NAV2007/NAV07301.txt

U.S. Navy. (2010). *Extension of enlistments* (*MILPERSMAN 1160–040*). NAVPERSCOM Customer Service Center: Millington, TN. Retrieved from http://www.public.navy.mil/bupers-npc/reference/milpersman/1000/1100Recruitinig/Documents/1160-040.pdf

U.S. Navy. (2011). *Navy recruiting manual: Enlisted (CRUITMAN-ENL 1130.8 J)*. Navy Recruiting Command: Millington, TN. Retrieved from http://www.cnrc.navy.mil/publications/1130.8J.htm

U.S. Navy. (2014). *Advancement policy update (NAVADMIN 114)*. Navy Personnel Command: Millington, TN. Retrieved from http://www.public.navy.mil/bupers-npc/reference/messages/Documents/NAVADMINS/NAV2014/NAV14114.txt

Wenger, J. W., & Hodari, A. K. (2002). *Why do pay elasticity estimates differ?* Alexandria, VA: CNA Corp. Retrieved from https://www.cna.org/sites/default/files/research/D0005644.A2.pdf

Wenger, J. W., & Hodari, A. K. (2004). *Predictors of attrition: Attitudes, behaviors, and educational characteristics*. Alexandria, VA: CNA Corp. Retrieved from http://www.researchgate.net/publication/235059148_Predictors_of_Attrition_Attitudes_Behaviors_and_Educational_Characteristics

Wooldridge, J.M. (2008). *Introductory economics: A modern approach* (4th ed.). Mason, OH: Cengage Learning Inc.

INITIAL DISTRIBUTION LIST

1.   Defense Technical Information Center
        Ft. Belvoir, Virginia

2.   Dudley Knox Library
        Naval Postgraduate School
        Monterey, California