NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

THE PERFORMANCE OF PREPARATORY SCHOOL CANDIDATES AT THE UNITED STATES NAVAL ACADEMY

by

Brian S. FitzPatrick

September 2001

Co-advisor:	Stephen L. Mehay
Co-advisor:	Roger D. Little

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, 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 this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.			
1. AGENCY USE ONLY *(Leave blank)*	**2. REPORT DATE** September 2001	**3. REPORT TYPE AND DATES COVERED** Master's Thesis	
4. TITLE AND SUBTITLE: Title (Mix case letters) The Performance of Preparatory School Candidates at the United States Naval Academy			**5. FUNDING NUMBERS**
6. AUTHOR (S) LT Brian S. FitzPatrick, USN			
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.			
12a. DISTRIBUTION / AVAILABILITY STATEMENT Distribution Statement (mix case letters)			**12b. DISTRIBUTION CODE**

13. ABSTRACT ***(maximum 200 words)***

This thesis analyzes the performance of midshipman at the United States Naval Academy who attended preparatory school prior to admission. Multivariate models are developed to estimate the effect of a preparatory school background on several measures of midshipmen performance at the U.S. Naval Academy. The data set covers the USNA classes of 1990 through 2000. Control variables include both math and verbal Scholastic Aptitude Test (SAT) scores and the high school class-ranking percentile. Ordinary Least Squares (OLS) regression models are employed to estimate the effect of prep school background on the Order of Merit of USNA graduates, and logit models are used to estimate the effect of prep school background on the probability of graduation of a midshipman, while controlling for SAT scores and rank in high school class. The findings reveal few significant differences in performance between those midshipmen who went to preparatory school and those who did not.

14. SUBJECT TERMS United States Naval Academy, Midshipmen, Preparatory School, Order of Merit, Graduation Probability, SAT Scores, High School Class Rank Percentile			**15. NUMBER OF PAGES** / **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** UL

NSN 7540-01-280-5500 Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18

THIS PAGE INTENTIONALLY LEFT BLANK

Approved for public release, distribution is unlimited

THE PERFORMANCE OF PREPARATORY SCHOOL CANDIDATES AT THE UNITED STATES NAVAL ACADEMY

Brian S. FitzPatrick
Lieutenant, United States Navy
B.S., United States Naval Academy, 1996

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN LEADERSHIP AND HUMAN RESOURCE DEVELOPMENT

from the

NAVAL POSTGRADUATE SCHOOL
September 2001

Author: _____
Brian S. FitzPatrick

Approved by: _____
Stephen L. Mehay, Co-advisor

_____
Roger D. Little, Co-advisor

_____
Ken Euske, Dean
Graduate School of Business and Public Policy

THIS PAGE INTENTIONALLY LEFT BLANK

ABSTRACT

This thesis analyzes the performance of midshipman at the United States Naval Academy who attended preparatory school prior to admission. Multivariate models are developed to estimate the effect of a preparatory school background on several measures of midshipmen performance at the U.S. Naval Academy. The data set covers the USNA classes of 1990 through 2000. Control variables include both math and verbal Scholastic Aptitude Test (SAT) scores and the high school class-ranking percentile. Ordinary Least Squares (OLS) regression models are employed to estimate the effect of prep school background on the Order of Merit of USNA graduates, and logit models are used to estimate the effect of prep school background on the probability of graduation of a midshipman, while controlling for SAT scores and rank in high school class. The findings reveal few significant differences in performance between those midshipmen who went to preparatory school and those who did not.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

LIST OF TABLES

THIS PAGE INTENTIONALLY LEFT BLANK

ACKNOWLEDGMENT

I would like to acknowledge those individuals who provided the support and faith needed for completion of this educational phase of my life. Alan Harmon of the Naval Academy's Institutional Research Center spent many hours of his time helping compile the data needed for this study. My advisors Dr. Roger D. Little and Dr. Stephen L. Mehay contributed much of their time to ensure the quality of this study. I would also like to acknowledge the insight and guidance given by all of the professors who participated in the Company Officer Master's program.

This paper is dedicated to the individuals who believed in me when I attended Northwestern Preparatory School during the fall of 1991. I would like to thank the late James Hoiby, former headmaster of Northwestern Prep, and his successor, Mrs. Barbara Durbeck. I would also like to thank Captain William Flight, director of the Naval Academy Foundation Program, and Mr. Tom Teshera, head of West Coast USNA Admissions. If not for these two men and their ability to recognize my potential, I would not have been given the opportunity to be a member of the Naval Academy Class of 1996. My greatest debt of gratitude is extended to my parents. I thank them deeply for their hard work, faith, love, and trust in me as I progressed through prep school, the Naval Academy, and the Company Officers Master's Program.

I. INTRODUCTION

A. BACKGROUND

United States Naval Academy graduates have been successful both inside and outside the Navy. One president, countless Congressmen, and numerous CEO's of Fortune 500 companies prove that the Academy is meeting its mission of "…providing graduates who are dedicated to a career of naval service and have potential for future development in mind and character to assume the highest responsibilities of command, leadership and government."

The road to these positions of leadership for these distinguished graduates begins with the application process for an appointment to the Naval Academy. The objective of this thesis is to analyze the academic performance of U. S. Naval Academy midshipmen who matriculated from a preparatory school. The reality is that these midshipmen tend to have weaker cognitive abilities as measured by high school academic records, SAT's and high school class standing. These weaker records prevented them from being awarded a direct appointment to the Naval Academy. Therefore, one would expect that prep school midshipmen would not perform as well at the Naval Academy or graduate at the same rate as midshipmen who did gain direct acceptance.

A primary measure of performance at the U.S. Naval Academy is class standing. Class standings are known as Order of Merit. The Order of Merit (OOM) for a class is computed by weighting performance in designated areas as listed in USNA INSTRUCTION 1531.51A. The two major grading criteria that enter into performance

are Academic Quality Point Rating (AQPR), which accounts for academic course work, and the Military Quality Point Rating (MQPR), which accounts for professional course work and professional performance throughout the semester as observed by faculty and staff. The ultimate measure of performance is graduation from the rigorous four-year program.

B. PURPOSE

The purpose of this thesis is to determine whether midshipmen who attend preparatory school perform as well at the Naval Academy as those who entered directly. Each year the United States Naval Academy has approximately 10,000 applicants who seek admission into the new class. The average accepted class size is about 1,200. The data for those not accepted are not maintained in Academy files.

However, there are a few determined individuals who seek application the following year. Some of these individuals who were initially turned down, attend a year of preparatory school in order to strengthen their candidacy. Some factors that may have prevented initial acceptance are low Math and Verbal SAT scores or poor rank in high school class. Those are the three primary factors that the Admissions Board reviews in order to predict graduation at the Naval Academy and to determine who is offered an appointment.

There are three primary preparatory school programs that rejected candidates may utilize. The Naval Academy Preparatory School (NAPS) was established to prepare enlisted sailors, minorities, women and athletes for the academic rigors of USNA. The

Broadened Opportunities for Officer Selection and Training (BOOST) program was established to help minority enlisted personnel gain acceptance into either the Reserve Officer Training Corps or the Naval Academy. Finally, the Naval Academy Foundation sponsors approximately 80 scholarships to a wide variety of college preparatory schools throughout the country for candidates who have been specifically recommended by the Admissions Board for that program. Many of these private prep schools specialize in preparing the students for the military academies.

C. SCOPE AND METHODOLOGY

1. Research Questions

The thesis will explore the following questions: (1) How do the characteristics of those who are sent to preparatory school differ from those who are accepted directly and from those who are denied entry? (2) Do midshipmen who attended prep school exhibit different outcomes on selected academic and other performance measures such as the Order of Merit than their non-prep school classmates? (3) Do midshipmen with prep school backgrounds have the same probability of graduating from the Naval Academy as their classmates? (4) What effect do SAT scores and high school class rank have on Order of Merit and probability of graduation? (5) Are there significant differences among the three prep school programs with respect to performance in terms of Order of Merit, Academic Quality Point Rating, Military Quality Point Rating, and graduation

probability? (6) Why do prep school students succeed at the Naval Academy even though their records were initially deemed unsatisfactory for direct admission?

2. Scope

The scope of this thesis will include: (1) a review of the Naval Academy admissions process; (2) a comparison of midshipmen who went to preparatory school with those who did not with respect to USNA midshipmen performance measures; and (3) the analyzing of specified performance factors such as Order of Merit, Academic Quality Point Rating, Military Quality Point Rating, and graduation probability and their relationship with attendance at preparatory school. The thesis will conclude with recommendations for further research and implications for the accession, training, and screening of candidates for admission to the Naval Academy.

3. Methodology

Over 10,000 graduates of the United States Naval Academy and over 103,000 applicants for the classes of 1990 through 2000 will be examined in this thesis. The academic variables, SAT Math and Verbal scores, and high school class rank, which Admissions Board uses for applicant admission are available for each applicant.

The analysis is conducted in two parts. Differences in Order of Merit by entry program will be examined first. Ordinary Least Squares (OLS) regression analysis is performed using the OOM variable as dependent and controlling for other explanatory

factors. The same process is used for Academic Quality Point Rating (AQPR) and Military Quality Point Rating (MQPR) as the dependent variables. The purpose of this analysis is to determine whether the preparatory school midshipmen perform as well at the Naval Academy as their direct admission classmates, all other factors constant. The second level of analysis uses maximum likelihood Logit regression models to analyze the probability of graduation of preparatory school candidates. The same explanatory variables are included for in these models as in the OLS regression models. The SPPS 10.0 Data Analysis software is used to perform all statistical analyses.

Implications of the statistical analysis for the preparatory school programs and the Naval Academy admissions programs will be developed. Based on the findings, conclusions and recommendations will be provided as part of the thesis.

D. ORGANIZATION OF STUDY

This thesis is organized into five chapters. The next chapter discusses the process of selecting applicants for appointment as midshipmen to the United States Naval Academy. Chapter II also discusses relevant studies concerning the three preparatory school programs that the Naval Academy has utilized in the past for candidate appointments. Chapter III describes the data used in this study and details each of the explanatory and dependent variables. The explanatory variables include applicant demographic characteristics, applicant-scoring data used to compute the Candidate Multiple, and current midshipman performance measures. Chapter IV details the statistical findings of the Ordinary Least Squares regression models and the Logit

Maximum Log-likelihood model. Finally, Chapter V provides conclusions about the utilization of the Naval Academy's preparatory school programs as a determinant of successful midshipman performance and graduation from the Naval Academy. Recommendations for further research are provided.

II. LITERATURE REVIEW

A. BACKGROUND

The United States Naval Academy is a national treasure established in 1845 by then Secretary of the Navy, George Bancroft. The purpose of the school was to provide an ample foundation for young men and prepare them for service to the United States as professional naval officers.

> "For many of these officers…the service academy provides the most complete on technical education that they will get during their careers. For all of them this experience comes at an age when they are still relatively impressionable. Even if this were not so, the academies would warrant close examination because *they are peculiarly the repositories of service ethos*. It is at their academies that the services define the ideals to which they expect their officers, from whatever source derived, to aspire. Here they formulate the standards of excellence suggested by their corporate experience. Here they confront the prospective martial leader with the great models of the past. Hopefully and prayerfully the desired characteristics of heart and mind are laid before young men, and every incentive and contrivance than can be imagined is employed to encourage them to follow."[1]

The above observation by John W. Masland and Laurence I. Radway highlights the need to examine closely all aspects of the military academies. The service academies carefully review their applicants so that they choose the best and brightest of young America for inculcation into the "repositories of the service ethos." This thesis highlights a small sub-group of midshipmen who attended a preparatory school program before they were awarded an appointment to the United States Naval Academy. The process of

---

[1] Masland, John W. and Radway, Laurence I. (1957) Scholars and Soldiers Military Education and National Policy. Princeton University Press: Princeton, New Jersey: p. 171.

selecting applicants, and more specifically how applicants are recommended to preparatory schools is the primary focus of this chapter. The second area of concern in this chapter is the performance at USNA and graduation rates of the midshipmen who attended a prep school program. This thesis seeks to determine whether prep school midshipmen are performing at Naval Academy standards.

This chapter is divided into three major sections. The first section explores how the Naval Academy determines who receives an appointment. The second section briefly describes past studies of the three preparatory school programs--the Naval Academy Preparatory School (NAPS), the Naval Academy Foundation program (FOUNDATION), and the Broadened Opportunity for Officer Selection and Training (BOOST) program. The final section covers miscellaneous studies primarily concerned with what types of people apply to the Naval Academy and attend the prep school programs.

Nearly one-fifth of each USNA class attends a preparatory school. The majority of these prep school candidates attend the Naval Academy Preparatory School (NAPS) in Newport, Rhode Island. A lesser but significant number of prep school candidates attend civilian prep schools via the Naval Academy Foundation (FOUNDATION). Finally, a select few came from the Broadened Opportunity for Officer Selection and Training (BOOST) program. Although many studies have been conducted concerning the performance of Naval Academy midshipmen, few actually address the performance of prep school midshipmen while at the Naval Academy.

B. THE ADMISSIONS PROCESS AT USNA

The Naval Academy is a highly selective, nationally ranked college as well as an institution for leadership training. Its engineering programs rank amongst the top in country. U.S. News and World Report has consistently listed USNA as 'most selective.'[2]

However, the Naval Academy admissions process differs greatly from that of other colleges and universities. Title 10 U.S. Code, details the Byzantine process of applying for a nomination from various political sponsors, such as the President, the Vice-President, members of Congress, or the Secretary of the Navy. Each of these sources builds an appointment slate of ten nominees who will compete for one appointment. An applicant must not only be academically qualified for admittance, but he must also compete against the nine other nominees within a congressional representative's district or a senatorial appointment slate.[3] A few are eligible for Presidential appointments as children of veterans, or Vice-Presidential, and Secretary of the Navy appointments as enlisted sailors or Marines.

The Admissions Board strives to select the best 'Whole Person.' The Superintendent's guidance to Board of Admissions is to seek individuals who are:

---

[2] (2000). "College Rankings." *U.S. News Online* [On-line]. Available Internet: http//www.usnews.com/usnews/edu/ugrad01/drglance_2101.html. Internet.

[3] Title 10 U.S. Code, Section 6954

> "... Mentally and physically able to participate in rigorous academic, professional, and physical training programs; show high interest in serving their country as professional officers in the Naval Service; are likely as a group to choose fields of study that reflect the needs of the Naval Service; show high potential for leadership; appear likely to complete the four-year course and to remain in the service beyond the period of obligated service after commissioning; and are of excellent moral character and support enthusiastically the Naval Service Core Values."[4]

The Admissions Board convenes in September and meets each Thursday to brief 'cases.' Each of the eighteen members presents ten cases to the board to determine if the candidate meets the academic qualifications needed to complete the course of study. The Admissions Board is a microcosm of the academy itself. A Navy Captain generally presides over the Board. Members also include two company officers, the head of Professional Development, the head of the Learning Center, a representative from each of the academic divisions, the Officer in Charge of Plebe Summer, two battalion officers, a member of the Naval Academy Athletic Association and representatives from other departments around the school.

A simple majority vote decides whose record meets the academic qualifications. The Dean of Admissions uses those candidates who are academically qualified by the Admissions Board to build the class within the guidelines of Title 10 U.S. Code. Personal statements are taken very seriously. A genuine interest in military service to country must be observed. The recommendations of high school officials are used as additional data points combined with the Blue and Gold officer (a USNA representative

for a specific geographic region) interview to determine character and desire. Major infractions of the law will generally disqualify even the best academic candidates.

The Naval Academy Admissions Office uses a statistically-based scoring model to sort applicants. Bowman and Mehay explain this quantitative index, called the Candidate Multiple, in full detail in their study, "A Validation of Statistical-Based Scoring Models for Selecting Applicants to the United States Naval Academy", prepared for the 1999 Annual Western Economic Association Meeting in San Diego, California, July 1999.[5] The study validates the Admissions Board and its continued use of the SAT scores, high school class rank percentile, and teacher recommendations. The population for their study consisted of 6,000 graduates of the classes for 1994-1998. Non-linear logit models were specified and estimated to examine the candidate multiple and its relationship to a midshipman being ranked in the top 50% of the cumulative grade point average. Their analysis found that midshipmen possessing high candidate multiples (meaning the top 50%), high SAT scores and high teacher recommendation scores will perform in the top 50% of their class both academically and militarily.

High school preparation to build a strong candidate record must include: (1) Mathematics - four years of mathematics courses, including a strong foundation in

---

[4] Guidance from the Superintendent of the U.S. Naval Academy to the Board of Admissions for the Class of 2005.

[5] Bowman, William R. and Mehay, Stephen L. (June, 1999). "A Validation of Statically-Based Scoring Models for Selecting Applicants to the Untied States Naval Academy." Unpublished paper, U.S. Naval Academy.

geometry, algebra and trigonometry and experience in pre-calculus or calculus is also very valuable and encouraged; (2) Chemistry - one year, with lab; (3) Physics - one year, with lab; (4) English - four years of course work with special attention to the study and practice of effective writing. Surveys of English and American literature are especially helpful as background for future study of literature; (5) Foreign language - at least two years. Course work should include regular use of the spoken language and encompass elementary syntax and grammar; (7) History - one full year of U.S. history and a full year of European or world history; and (8) Computer skills - familiarity with the use of personal computers, including the Windows Operating System, word processing, spreadsheets, and the Internet.[6]

The admissions process constructs a Whole Person Multiple based on the above in an attempt to numerically determine each candidate's potential. The multiple is computed from identified predictors of success at USNA: SAT Verbal and Math scores, Rank in Secondary School Class (RC), Secondary School Official Recommendations, Extracurricular Activities (ECAs), Technical Interest (determined by the Strong Campbell Interest Inventory Test (SCII)), and Career Interest (also determined from the SCII). Each of these predictors is weighted and a composite score, known as the Candidate Multiple (CM), is calculated.[7]

---

[6] U.S. Naval Academy Admissions Office. (2001). Key Ingredients for Successful Academy Admission. In Naval Academy Web Page [On-line]. Available Internet: http://www.usna.edu.Admissions/wpeval.html

[7] Guidance from the Superintendent of the U.S. Naval Academy to the Board of Admissions for the Class of 2005.

1. The Candidate Multiple

The Naval Personnel Research and Development Center (NPRDC) constantly monitors the Candidate Multiple at the request of the Naval Academy. The most recent published literature is a study by Edward Alf, Idell Neuman, and Joyce Mattson suggesting a modification of the selection composite used to predict academic suitability and likelihood of graduation. This 1988 study, "Revision of the United States Naval Academy Selection Composite," resulted in USNA adopting a modification of one of the proposed models and applying it to the candidate multiple for the Class of 1990.[8] This model is validated annually by NPRDC and new weights to the seven variables are assigned to fine tune the process. The effective weights of the predictors in the Candidate Multiple for the Class of 2005 are listed in Table 1 below.[9]

---

[8] Alf, E.F., Neumann, I., and Mattson, J.D. (1988). "Revision of the United States Naval Academy Selection Composite". (NPRDC Tech. Rep. 88-61). San Diego: Naval Personnel Research and Development Center.

[9] Guidance from the Superintendent of the U.S. Naval Academy to the Board of Admissions for the Class of 2005.

Table 1.1 Effective Weights of the Predictors in the Candidate Multiple Predictors

Predictor	Effective Weight
SAT-V, or ACT English	12%
SAT-M, or ACT Math	24%
Rank in High School Class (RC)	27%
Secondary School Official Recommendations (RECS)	11%
Extracurricular Activities (ECA)	8%
Technical Interest (TI)	14%
Career Interest (CI)	4%
Total	100%

Source: U.S. Naval Academy Admissions Office

A second conclusion drawn by NPRDC was that extracurricular activities, teacher recommendations, and SCII scores were not significant predictors of academic outcomes at USNA.[10] In 1989, NPRDC assessed these non-academic predictors and their relationship to officer performance to determine an Officer Potential Composite (OPC). The OPC would attempt to predict office performance using officer performance scores

[10]Alf, E.F., Neumann, I., and Mattson, J.D. (1988). "Revision of the United States Naval Academy Selection Composite". (NPRDC Tech. Rep. 88-61). San Diego: Naval Personnel Research and Development Center.

from existing officer fitness reports and correlate officer predictors from USNA predictors and criteria.[11]

Mathew G. Reardon's study of candidate admissions criteria highlighted two key weaknesses of the OPC study. Primarily, NPRDC only used the highly subjective Recommendation for Accelerated Promotion (RAP) on officer fitness reports as an indicator of officer potential.[12] Second, only first order correlations of variables were used as the statistical methodology in the NPRDC study. This approach ignores the interactions between variables that can be obtained with regression analysis.[13]

A brief explanation of each of the predictors in the Candidate Multiple for midshipmen performance is presented below.

2. The Predictors

a. Cognitive Ability

The Admissions Board places heavy emphasis on mathematical and technical skills. The Naval Academy has always been primarily an engineering school. Former Secretary of the Navy John F. Lehman Jr. states that in 1975; Admiral Hyman G. Rickover gained significant influence over the curriculum. The father of the "Nuclear

---

[11] Neumann, I. and Mattson, J.D. (1989). "Development and Evaluation of a Officer Potential Composite." (NPRDC Tech. Rep. 89-18). San Diego: Naval Personnel Research and Development Center.

[12] Reardon, M. (1997). "The Development of Career Naval Officers from the U.S. Naval Academy: A Statistical Analysis of the Effects of Selectivity and Human Capital." Master's Thesis, Naval Postgraduate School, Monterey, CA.

[13] Ibid.

Navy" tried to influence USNA to be more technically oriented because he needed one-third of the eight hundred graduates for his program.[14] Today, approximately 60 percent of the class chooses engineering or science-oriented majors. Even non-technical majors must take core classes that include three semesters of calculus plus a semester of differential equations or statistical analysis, two semesters of chemistry, two of calculus-based physics, at least one semester of electrical engineering, thermodynamics, and naval engineering. Accordingly, when a candidate's academic qualifications are evaluated, the Math SAT score receives the second highest weight in the Candidate Multiple at 24 percent.

Despite recent debate in California over the validity of the SAT, the majority of the nation's colleges and universities require SAT scores for admissions purposes. SAT defenders say that it allows for a national standard. The College Board argues that the use of SAT scores in the admissions process improves the correlation between admissions predictions and the student's first year GPA by 10%.[15] National SATI average scores, after the re-centering in 1995, are 500 Math and 500 Verbal.[16] The USNA Class of 2004 SAT averages were 668 Math and 637 Verbal. USNA students are in the top 20% of the national averages and are in high demand by the nation's best schools. Research at NPRDC continually validates both the math and verbal SAT scores

---

[14] Lehman, John F. Jr. (1988). Command of the Seas. "Rickover and the Navy Soul." 25.

[15] Cloud, John. (12 March 2001) "Should SATs Matter?" Time, p. 67.

[16] Hernandez, Michele A. (1997) A is for Admission. New York, NY: Warner Books Inc.

as highly significant predictors of Academic Quality Point Rating (AQPR) and Military Quality Point Rating (MQPR).

The best predictive measure of midshipmen performance is rank in high school class (RC). Matriculates to USNA average in the top 12 percent of their high school classes. Rank in class is a relative measure of the candidate's academic talent and receives the highest effective weight in the Candidate Multiple at 27 percent.

Additionally, because of the Naval Academy's emphasis on the engineering disciplines, the Admission's Board tries to identify the applicants with a proclivity towards technical fields. The Technical Interest (TI) scale consists of items from the Strong Campbell Interest Inventory (SCII), which have been keyed to identify Academy applicants with high interest in a technically oriented curriculum or major.[17] This predictor receives a weight of 14 percent.

The final data point for cognitive ability used in the Candidate Multiple is the Secondary School Official Recommendation (RECS). Typically one math teacher and one English teacher complete the recommendations. These recommendations give the Board a picture of the academic performance of a candidate in high school. Although these recommendations only count for 11 percent of the CM, when they are combined with SAT scores and high school class rank, cognitive ability accounts for 74 percent of

---

[17] Neumann, I., & Abrahams, N. M. (October 1974). "Identification of Naval Academy applicants with engineering and science interests." (NPRDC Tech Rep. 75-7). San Diego: Navy Personnel Research and Development Center. In Neumann, Mattson, and Abrahams. (1989). "The Development of an Officer Potential Composite." (NPRDC Tech. Rep. 89-18). San Diego: Naval Personnel Research and Development Center.

the multiple. When the 14 percent assigned to the technical interest (TI) inventory test score is added to the equation, the resulting mathematically proficient, technically oriented academic factors now account for 88 percent of the Candidate Multiple. But, USNA is not looking solely for the academic; rather they seek a well-rounded individual suitable for military leadership.

b. Leadership Potential

The Superintendent's instructions to the Admissions Board to select candidates who "show high potential for leadership" echoes the long-term goal of the service academies. In 1950 The Stearns-Eisenhower Board concluded the following:

> In the final selection of men for the service academies, appropriate weight should be attached to the personal qualities that indicate potentiality for leadership. Otherwise, some men will be selected who, while intellectually adequate, will lack aptitude for leadership.[18]

The Naval Academy's mission mandates developing midshipmen to assume the highest responsibilities of command, leadership, and government. The Naval Academy prides itself in being a "leadership laboratory." Thus, the Admissions Board must identify potential leaders. To achieve this end, the Board uses the Secondary School Official Recommendations combined with the personal essay and United States Naval Academy Candidate Activities Record (CAR). The CAR is a "bubble" form completed

---

[18] Stearns-Eisenhower Board. (1950). Service Academy Board Report. Cited in Reardon, M. The Development of Career Naval Officers from the U.S. Naval Academy: A Statistical Analysis of the Effects of Selectivity and Human Capital. Master's Thesis, Naval Postgraduate School, Monterey, CA.

by the candidate to delineate what athletic and non-athletic extra-curricular activities he has participated in during his high school career. The following activities can be found on the CAR: Student body/council/government president/vice president, class president or vice president, school club president or vice president, school publication staff, National Honor Society, varsity athletics, varsity letter winner, drama, public speaking, debating, leader of musical group, Eagle Scout/Gold Award, Boys/Girls State or Nation, Reserve Officer Training Program, Sea Cadets, and sons or daughters of alumni.

The scores on the CAR are standardized to range from 300-800 (similar to SAT scores). There is no minimum qualifying score but extracurricular activities do account for eight percent of the CM, sixth in order of precedent. Researchers at NPRDC examined the relationship of Candidate Multiple (CM) and its individual components with receiving a Recommendation for Early Promotion (REP) as a junior officer in the Fleet. They concluded in the 1989 Officer Potential Composite study that, "Although the operational selection measure (CM) is not related to the REP, two of its components, COMPECA (composite ECA's score from the Candidate Activities Record) and teacher recommendations (RECS), individually exhibit significant relationships."[19]

Determining leadership potential is the most subjective part of the admissions process. Board members recognize the leadership component in certain activities. For example, Eagle Scouts are looked upon favorably as the Scout's mission mirrors that of the Naval Academy. Also, the small percentage of young men who achieve the rank of

Eagle Scout illustrates the leadership potential and personal drive of a potential midshipman.

c. Career Officer Potential

The father of military sociology, Morris Janowitz, articulates the importance of career officer potential when selecting midshipmen he states,

> Professionalization of the officer corps means more than a lifetime career commitment. The history of professionalization of military leadership has established the principle that top posts should be assigned to graduates of the service academies-West Point and Annapolis, and, in the future, the Air Force Academy. Graduation from a service academy is assumed to insure that the officer will understand and appreciate the importance of command and military 'generalship'.[20]

Today, Flag ranks are not exclusively service academy graduates. Over the last 30 years, however, USNA has supplied 15 to 18 percent of the Navy's unrestricted line (URL) officers, yet, "USNA graduates comprise 27 percent of the Navy captains and 54

---

[19] Neumann, Mattson, and Abrahams. (1989). "The Development of an Officer Potential Composite." (NPRDC Tech. Rep. 89-18). San Diego: Naval Personnel Research and Development Center. p. 13.

[20] Janowitz, M. (1960). The Professional Soldier. New York: The Free Press pp. 56-57.

percent of the admirals."[21] Reardon's thesis concluded that these statistics are not a result of often suspected institutional favoritism.[22]

Furthermore, Stephen L. Mehay's study, "Analysis of Performance Data for Junior Navy and Marine Corps Officers," establishes the importance of career officer potential among Naval Academy graduates. His analysis makes three key points: (1) USNA graduates, females, and those married or with dependents are more likely to stay in the Navy until the O-4 selection board (or about 10 years of service); (2) USNA graduates, females, and those married or with dependents tend to receive better fitness report evaluations, all else equal; and (3) USNA graduates, NESEP (Naval Enlisted Service Education Program) graduates, and those married or with dependents are more likely to achieve a SWO (Surface Warfare Officer) qualification.[23]

During the nineties, the Navy saw many of its junior officers leave the service. Analysts are quick to point to the booming economy, but junior officer retention surveys indicate high operation tempos and lack of confidence in senior leadership as a reason for dissatisfaction. The most disturbing problem is that many Naval Academy graduates are

---

[21] Larson, Charles R. Admiral, USN. "Service Academies: Critical to our Future." *Proceedings*, October, 1995, p. 34. Statistics represent only URL captains and admirals. Cited in Reardon, M. "The Development of Career Naval Officers from the U.S. Naval Academy: A Statistical Analysis of the Effects of Selectivity and Human Capital." Master's Thesis, Naval Postgraduate School, Monterey, CA.

[22] Reardon, M. (1997). "The Development of Career Naval Officers from the U.S. Naval Academy: A Statistical Analysis of the Effects of Selectivity and Human Capital." Master's Thesis, Naval Postgraduate School, Monterey, CA. p. 175.

[23] Mehay, Stephen L. (October, 1995). "Analysis of Performance for Junior Navy and Marine Corps Officers". Report prepared for Mr. Keith A. Maxie, Director, Military Equal Opportunity Study. Naval Postgraduate School, Monterey, CA.

leaving after their minimum service requirement (MSR). Williamson Murray is a concerned citizen who argues that:

> In the first half of the 1990s the services were losing nearly 50 percent of academy graduates at the end of the obligatory time in uniform. The claims of the academy public affairs offices that such early leavers will pay the nation back in other ways sound hollow, especially given the mission of the academies to prepare young people for long-term service.[24]

Mr. Murray's statement is also a concern to the Admissions Board; hence the Career Interest score (CI) is computed in the Candidate Multiple. The CI score consists of items from the Strong-Campbell Interest Inventory (SCII), a commercially available career guidance instrument, which has been keyed to differentiate between high- and low-tenure Naval Academy Officers.[25] The predictor receives the lowest weight of the seven, 4 percent, and most analysis has been unable to correlate it to officer retention.

d. Recommendations of the Admissions Board

Board members can add Recommendations of the Admissions Board (RABs) points if special circumstances warrant. Examples of special circumstances include difficulty of high school educational program, legacy (son or daughter of alumni),

---

[24] Murray, Williamson (1999). Thinking about the service academies, The World and I, Vol. 14, No. 3, p. 291. Cited in Mishoe, Keith B. An Analysis of the Effect of Prior Enlisted Service on Midshipmen Performance, Graduation, and Fleet Retention at the U.S. Naval Academy. Master's Thesis, Naval Postgraduate School, Monterey, CA.

[25] Neumann, I., & Abrahams, N. M. (23 September 1982). *Development, validation, and evaluation of an SCII officer retention scale* (Unpublished report). San Diego: Navy Personnel Research and Development Center. In Neumann, Mattson, and Abrahams. (1989). The Development of an Officer Potential Composite. (NPRDC Tech. Rep. 89-18). San Diego: Naval Personnel Research and Development Center.

attendance at the Naval Academy Summer Seminar, a strong Blue and Gold Officer interview, Advanced Placement courses, special ECAs, the personal statement, and significant character traits. These extra points go into the Whole Person Multiple. The minimal qualifying Whole Person Multiple score is 58,000. From this pool of qualified candidates, the Dean of Admissions builds the class according to Title 10.

B. USNA STUDIES

When the board recognizes a candidate with strong extracurricular activities, intense motivation, and proven leadership skills, but a deficient academic record they may recommend that candidate for either the Naval Academy Preparatory School or the Naval Academy Foundation Scholarship program. The Dean of Admissions offers seats at the Naval Academy Prep School (NAPS) to 230 individuals. The Foundation has an endowment for about 80 students to attend one of 24 civilian prep schools. A typical prep school student may have one or more of the following combinations of characteristics: high grades/low SAT's, high SAT's/low grades, average grades/good leadership potential, high grades/weak leadership experience, distanced from academics for a year or more (usually fleet sailors and Marines recommended for USNA by their commands), or a poor background in math, chemistry, or physics.

The problem of a mismatch between high school grades and SAT scores has been observed nationally. Some 41 percent of students who attend four-year colleges have to

take at least one remedial class in basic math, reading, writing, or learning skills.[26] Moreover, grade inflation may be giving many students an unrealistic picture of their abilities. According to the College Board, the proportion of students taking the SAT with an A average in high school rose from 28 percent to 37 percent from 1987 to 1997, while combined SAT test scores fell 14 points. So, many admissions officers no longer see the GPA as a reliable barometer of achievement.[27]

The Academy is not the only top-notch school utilizing a preparatory program. The University of California-Berkeley accepts borderline candidates if they attend a six-week summer program. Rochester Institute of Technology gives students the option of first attending the University Program, a year of reduced course load and intensive academic advising that leads into the sophomore year.[28]

Service academies are different from other colleges or universities in their mission; the military must employ each one of these graduates. The Academy places its graduates in leadership positions immediately after graduation. Upon completion of specialty schools, a recent graduate can find himself in command of a platoon of Marines or issuing commands on the bridge of a billion-dollar AEGIS destroyer.

Mathew G. Reardon's Master's Thesis for the Naval Postgraduate School, "The Development of Career Naval Officers from the U.S. Naval Academy: A Statistical

---

[26] Sobel, Rachel K. (2001) "A Sizable Skills Gap" *U.S. News Online* [On-Line]; available from http//www.usnews.com/usnews/edu/college/articles/cogood.html Internet.

[27] Ibid.

[28] Ibid.

Analysis of the Effects of Selectivity and Human Capital," examined how the performance of USNA midshipmen translated to performance as officers. Although his study did not focus on whether one went to prep school or not, he concluded that the Candidate Multiple (calculated composite of predictors of successful graduation) is a significant determinant of the likelihood of graduation. Furthermore, "the measures of cognitive skills, secondary school class rank and Math SAT have the greatest impacts on a Midshipmen's probability of graduation and taking that first step towards a successful naval career."[29]

Reardon's conclusions concerning selectivity are of great interest to this study. He states, "In contrast, the selection criteria, which represent an individual's affective and communication skills, extracurricular activities, and the Verbal SAT, significantly increase the likelihood of development into a 'careerist'."[30] Finally, he asks the question that directly applies to a prep school candidate, "Is the Navy missing the boat on potentially gifted leaders with 550 Math SAT's, and instead selecting future engineers with 750 SAT's and minimal inter-personal skills?"[31]

David J. Albritton's Masters Thesis, "An Analysis of the Post-Commissioning Officer Performance for Graduates of the Naval Academy Preparatory School," examined the relationship between a selected measure of officer performance and being a

---

[29] Reardon, M. (1997). "The Development of Career Naval Officers from the U.S. Naval Academy: A Statistical Analysis of the Effects of Selectivity and Human Capital." Master's Thesis, Naval Postgraduate School, Monterey, CA. p. 127.

[30] Ibid p. 173

[31] Ibid p. 173.

NAPS graduate of USNA. He used the continuation rate past minimum service requirement (MSR) and recommendation for early promotion (REP) on fitness reports (FITREPs) to measure the performance of NAPS graduates and non-NAPS graduates. He found that NAPS graduates have higher continuation rates than non-NAPS graduates. He concluded that due to being at least a year older and due to the extra year of inculcation into the military, they might have a greater sense of commitment. However, as a sub-group of USNA graduates, the NAPS graduates do not perform as well on the fitness reports (as measured by REP scores). Albritton did not examine the performance of NAPS graduates at USNA for factors that contribute to their successful graduation from USNA.

The Government Accounting Office's (GAO) March, 1992 report to the Chairman, Senate and House Committees on Armed Services committee, "Academy Prep Schools Need a Clearer Mission and Better Oversight," sought to assess how well these schools accomplished their missions and whether they were cost efficient. The GAO found that for the years 1986 though 1990, NAPS graduated 78 percent of its matriculates from USNA (a percentage rate somewhat greater than other midshipmen).[32] NAPS had the highest graduation rate compared to their Air Force and Army counterparts, and NAPS was the most cost efficient at $39,800 per midshipman candidate. The GAO reports that these costs are almost as much or more than the cost of sending someone to

---

[32] GAO, 1992. DOD Service Academies "Academy Preparatory Schools Need a Clearer Mission and Better Oversight." GAO/NSIAD-92-57.

the corresponding academy for a year and are 2.5 to 4 times as much as the cost to send a student to a highly selective college for a year.[33]

James Talmadge Jackson, Jr. and Mario Renara Maddox examined BOOST in their Master's thesis, "The Role of the Broadened Opportunity for Selection and Training (BOOST) Program in Supporting the Navy's Minority Accession Policies." Their primary focus was the performance of minority midshipmen from BOOST for the years 1986 through 1990. Their study concluded that although the Naval Academy does not draw as many minority applicants as their goals dictate, BOOST complements NAPS in increasing the supply of minority matriculates. Jackson and Maddox's research indicates that the Navy is engaged in stiff competition with other college programs for the nation's top black and Hispanic scholars. Their recommendations include increasing the number of Naval Academy minority Blue and Gold officers and increasing the number of NROTC scholarships available at Historically Black Colleges (HBC). Finally, Jackson and Maddox conclude that the USNA attrition problem associated with BOOST midshipmen is largely attributed to academic failure.[34]

There are no published studies that have been completed concerning the performance of Naval Academy Foundation midshipmen. The Naval Academy Foundation and a few of its client prep schools have collected statistics that compare

---

[33] Ibid.

[34] Jackson, James Talmadge Jr. and Maddox, Mario Renara (1990), "The Role of the Broadened Opportunity for Selection and Training (BOOST) Program in Supporting the Navy's Minority Accession Policies." Master's Thesis, Naval Postgraduate School, Monterey, CA.

graduation rates of their students to the direct-entry midshipmen. However, no significant statistical analysis has been conducted drawing relationships between factors in the Candidate Multiple and Foundation midshipmen performance.

In his thesis, "An Analysis of the Effects of Prior Enlisted Service on Midshipmen Performance, Graduation, and Fleet Retention at the U.S. Naval Academy", Keith Mishoe examined the portion of prep school students from NAPS and BOOST who are drawn from the enlisted Fleet. His conclusions were that CM accurately predicted midshipmen performance. However, prior enlisted personnel could benefit from adding different predictors to reflect skills acquired in the Fleet. This finding coincides with the point made during an interview with Mr. Ron Beardon from the former Naval Personnel Research and Development Center (NPRDC) (now Naval Personnel Research Standard and Technology, NPRST), who states that validation of the Candidate Multiple does not account for the performance of prior enlisted personnel or prep school midshipmen.[35]

C. TYPES OF APPLICANTS

The Naval Academy promises high quality education, leadership training, a physically rigorous program, and a solid foundation in the naval sciences. Furthermore, this regime is administered in a constructive, military environment. The Naval Academy does not boast fraternity parties or many of the special interest extracurricular activities

[35] Beardon, Ron (20 February 2001) NPRSTC analyst. Telephone interview by author. Annapolis, MD: U.S. Naval Academy.

found in mainstream public colleges. Instead, it espouses discipline, tradition, honor, courage, and commitment.

With this 'no fun' college concept in mind, who wants to attend a service academy? Richard L. Hughes attempted to answer this question at the Annual Meeting of the American Psychological Association in Washington D.C. in 1982. His paper compared the characteristics of female cadets at the Air Force Academy to those of the male cadets and to females at other institutions. He concluded:

> "…a service academy is almost a professional school at the undergraduate level and the individuals who elect the Academy experience are pragmatic and serious-minded. High in need for social recognition, cadets selected a school and career where decorum and making a good impression are highly valued. Enjoying a structured environment and being systematic by nature, cadets attend an institution epitomizing consistency, rules, orderliness and planfulness."[36]

Each year approximately 10,000 young men and women, who think that life at the Naval Academy might suit them, apply. The Class of 2005 will offer almost 1,300 appointments for a class of 1,205 Plebes. Many applicants fail to qualify because they do not meet the academic requirements, while others are not physically qualified.

Candidates from congressional districts located in highly concentrated military areas: the Mid-Atlantic States, California and Florida face particularly stiff competition. Conversely, nominees from states without a significant naval presence, Wyoming, Montana, and Colorado, for example, have less competition and therefore greater

---

[36] Hughes, R.L. (1982). "Who Goes to a Service Academy?" (Paper Presented at Annual Meeting of American Psychological Association). Washington, D.C.

opportunities for an appointment. Candidates from these states may be less qualified than the qualified alternate in a more competitive district.

1. NAPS and the Admission of Underrepresented Groups

The service academies have long served as the foundation of the officer corps. When the nation called up its citizen soldiers during World War II, it was the service academy graduates who set the standards for military behavior. Furthermore, the officer corps must represent the enlisted personnel they are entrusted with. The enlisted ranks have a higher proportion of minorities than the officer corps and these minority groups must be represented within the chain of command. A representation of minorities proportionate to the country's population must also characterize service academy graduates.

The Naval Academy Preparatory School was founded in 1904 to prepare fleet sailors and Marines academically for work at the Naval Academy. Over the years, its mission has been expanded to prepare candidates with recognized athletic abilities, minorities, and women. NAPS is not a Naval Academy Affirmative Action program. The Naval Academy recognizes that certain groups come from historically disadvantaged backgrounds and it recognizes that they may need compensatory action to meet the

standards of competition. This concept of providing the tools to compete has seen great success amongst the Army enlisted. [37]

Course work at NAPS is ten months in length and includes math, English, chemistry, physics and information systems. NAPS also has an active athletic program. The football team competes against other service academy prep school and non-division I college teams. Basketball, lacrosse, soccer, and cross country are a few of the other sports the midshipmen candidates participate in.

a. Minority Representation

Historically, blacks average 186 points less than whites on the combined SAT. [38] Qualifying levels for prospective nominations at USNA are 530 SAT Verbal and 570 SAT Math. Competition for minorities with high SAT scores is fierce with other institutions that practice Affirmative Action Programs. The Naval Academy actively recruits minorities but will not lower its standards. Instead, an offer to attend NAPS is given with a contractual agreement stating that the NAPSTER needs at least a GPA of 2.0 while at NAPS and a nomination. Character is always considered. With these in hand, an appointment will be granted.

b. Athletes

NAPS also works with recruited athletes who express an intense interest in attending the Naval Academy but do not have the academic credentials to obtain a direct

---

[37] Moskos, Charles C. and Butler, John Sibley. (1996) All That We Can Be. New York, NY: BasicBooks. p 138.

[38] Bowen, William G. and Bok, Derek. (1998) The Shape of the River. Princeton: Princeton University Press. p 20.

appointment. These athletes have representation at the Admissions Board through the NCAA representative and a coach's code is placed on their case file to indicate their athletic sponsor. Assuming they show significant leadership potential, they will be recommended to a prep school program, NAPS or the Foundation, if one is necessary.

c. Women

Finally, women are also recommended for NAPS. This practice parallels the philosophy of representation of minority groups at the Academy. In 1976, Congress ordered gender integration at the service academies. Presently, the Brigade is comprised of about 15 percent women, which is proportionate to the number of women applicants, 17 percent. The women must compete with the men equally for an appointment. The problem lies in that women historically score lower than men on the SAT. The College Board reported that the average combined score of women bound for college in the fall of 2001 is 43 points below the average score for men.[39]

A large number of high-achieving classmates who help to create a climate in which graduation is the "expected thing" are needed for minority groups.[40] This concept is known as support groups. Males consist of 85 percent of the student body and the women need support from one another and support from their male classmates to survive

---

[39] FRONTLINE (2001). "The Test Score Gap." In Frontline Web Page, [On-Line]. Available Internet: http://www.pbs.org/wgbh/pages/frontline/shows/sats/etc/gap.html.

[40] Bowen, William G. and Bok, Derek. (1998) The Shape of the River. Princeton: Princeton University Press. p 58.

in this male-dominated environment. Again, USNA does not lower standards but provides the tools for success.

2. BOOST Applicants

The Broadened Opportunity for Officer Selection and Training program (BOOST) was established in 1969 for the expressed purpose of promoting minority accessions into the officer ranks. BOOST, whose primary client is the Naval Reserve Officer Training Corps (NROTC) program, is administered by the Center for Naval Education and Training (CNET).

The BOOST program mainly consists of fleet sailors and Marines recommended for officer programs by their chain of command. A few civilians have entered this program directly after completing boot camp but this practice has been suspended in recent years.

BOOST students may also apply for an appointment to the Naval Academy. Applications, however, are minimal and most BOOST students do not possess the academic background needed for direct appointment. Therefore, the number of BOOST appointments in recent years has been less than a dozen each year. In the future, BOOST students will no longer be able to apply for an appointment to the Academy. If an enlisted sailor or Marine seeks an appointment to the Naval Academy, he must apply to USNA directly, not through the BOOST program. The new program, Seaman-To-Admiral 21 (STA 21) will combine all enlisted commissioning programs, and these individuals will only be allowed to seek ROTC scholarships.

3. Naval Academy Foundation Applicants

The Admissions Board also recommends 600 individuals for a possible Naval Academy Foundation scholarship based on the criteria of motivation, athletics, or leadership potential. These are important intangibles that cannot be weighted and put into the Whole Person Multiple but are recognized by the Board in identifying a desirable midshipman and future officer. These students possess most of the same characteristics as the NAPSTERS but their SAT's are traditionally higher. Annually, 80 percent of Foundation students are academically qualified.[41] Usually, they have suffered from being in a competitive congressional district, need one more trait to stand out in the nomination slate, or need another year of academic preparation.

The Naval Academy Foundation Scholarship Fund was established in 1944 and is currently administered by Capt William Flight, USN (Ret) (Class of '56 and a NAPSTER). Eighty endowments established by alumni are awarded to candidates to be applied towards one of 24 recognized preparatory schools. These schools are mostly private military high schools that reinforce the Navy's core values and prepare the students for work at Annapolis. Upon completion of the year of prep school, the candidates must apply for a nomination and compete for an appointment like any other high school senior. However, significant consideration is granted to the Foundation candidates due to their commitment to spend an extra year becoming more competitive

---

[41] Flight, William Capt, USN(ret) (18 April 2001) Director of the USNA Scholarship Foundation. Interview by author. Annapolis, MD: U.S. Naval Academy.

for an appointment. If they are academically qualified, an appointment is virtually guaranteed.

4. Prep School Midshipmen at USNA

The prep school midshipmen consist of roughly one fifth of a USNA class. They are expected to graduate just as any other midshipmen, but they are not expected to perform as well academically as their direct-entry classmates because their measured cognitive skills (SATs and high school class rank, which consist of 63 percent of the Whole Person Multiple) are not as high.

In recent years, NAPS midshipmen have graduated at a rate of six to eight percent higher than the direct-entry midshipmen have. Foundation data also show that their students have a graduation rate that is five to eleven percent higher than the direct-entry midshipmen do. Last year the Naval Academy graduated 86 percent of its class.[42] Because it is ranked fifth in country for students most likely to get their undergraduate degrees in four years, surpassing Harvard and Dartmouth, the Naval Academy Admissions Board appears to be selecting the correct matriculates to complete its rigorous program.

---

[42] (2000). "College Rankings." *U.S. News Online* [On-line]. Available Internet: http//www.usnews.com…s/edu/college/rankings/cohigrd1.html. Internet.

According to the U.S. Department of Education, Center for Educational Statistics, only 50 percent of those who enter higher education actually earn a Bachelors degree.[43] Combine that astonishing fact with the graduation rates of the prep school midshipmen and it appears that attending a USNA prep school program is not a waste of a year that could be spent at a civilian college or a waste of tax-payer or endowment money.

5. Why Do Applicants Go To Prep School?

What inspires a high school graduate, who did not get accepted to the U.S. Naval Academy, to attend a year of prep school when he can be investing that year in a state college or private university or immediately enter the workforce?

A part of that inspiration may come from one of the tantalizing aspects of attending a service academy; full scholarship. Furthermore, a small stipend is paid to each attendee throughout the four-year period. Finally, upon successful completion of the USNA program, employment is guaranteed for at least five years. This is known as the Minimum Service Requirement (MSR) or what one owes for the "free" education.

If one enjoys the military service and feels that a regimented, military college life will suit them, then the U.S. Naval Academy can be a wise investment decision: it involves minimal cost to obtain a degree from a top-rated education. For the most part, a candidate who is recommended for preparatory school exudes the characteristics common to previously successful USNA graduates. He or she just might need to strengthen their

---

[43] Seidman, A. (1999) "Journal of College Student Retention: Research, Theory, and Practice." Journal of College Retention Web Page. [On-Line]. Available Internet:

academic records in order to graduate from the Academy. They realize the wise investment associated with attending the Naval Academy and they are willing to delay their college education by one year because the cost-benefit analysis makes sense from a life cycle standpoint.

D. SUMMARY

This thesis examines the performance of individuals who were not admitted directly to the Naval Academy due to inadequate academic credentials. The evidence detailed in the preceding review indicates that the Admissions Board is using the correct predictors in selecting appointees from their applicant pool. The Naval Academy recognizes the need to represent historically underprivileged groups so that the officer corps reflects the diversity of the enlisted ranks. However, the Naval Academy will not make concessions to its academic criteria as studies prove that the selection criteria are key to successful completion of the four-year program. Instead, when the Admissions Board recognizes a candidate with character, motivation, leadership potential, and athletic capability, they will recommend them to a contractual preparatory program in order to attract that individual to the following year's class.

This thesis will examine whether the Admissions Board is choosing highly motivated people whose prep school backgrounds allow them to compete on equal footing with their direct-entry classmates. Then it will examine if these prep school midshipmen graduate at the same rate as their direct-entry classmates.

---

http//www.collegeways.com/JournalCSR.html.

III. DATA AND METHODOLOGY

This chapter is divided into four parts: (1) a description of the data set; (2) a description of the dependent variables used in the multivariate and bivariate models; (3) a description of the explanatory variables, especially those measuring cognitive background; and (4) a discussion of the model specifications used to test the null hypotheses that there is no difference in either midshipmen performance or graduation rates between those who entered the United States Naval Academy directly from high school and those who entered via a preparatory school.

The research questions are as follows: (1) How do the characteristics of those who are sent to preparatory school differ from those who are accepted directly and from those who are denied entry? (2) Do midshipmen who went to prep school exhibit different outcomes on selected academic and other performance measures, such as Order of Merit, than their non-prep school classmates? (3) Do preparatory school midshipmen have the same probability of graduating from the Naval Academy as their classmates? (4) What effect do SAT scores and high school class rank have on Order of Merit, Academic Quality Point Rating, Military Quality Point Rating and probability of graduation? (5) Are there significant differences among the three prep school programs with respect to Order of Merit and graduation probability? (6) Why do prep school students succeed at the Naval Academy even though their records were initially deemed unsatisfactory for direct admission?

The major objective of this thesis is to model the statistical relationship between one's pre-Academy characteristics, more especially, cognitive credentials, and performance as a midshipman at the Naval Academy. Two models are utilized to provide answers to the above research questions. The first is an Ordinary Least Squares (OLS) regression model that analyzes the differences in the means of Order of Merit (OOM), cumulative academic quality point rating (AQPR), and cumulative military quality point rating (MQPR) between those midshipmen who went to prep school and those midshipmen who did not. The second model is a non-linear logit model of the probability of graduating from USNA.

A. DATA SOURCES AND DESCRIPTION

The data set is built from applicant files from the Classes of 1990 through 2000 gathered from the U. S. Naval Academy's Office of Institutional Research (USNA-IR). These data are provided to analysts at the Naval Personnel Research Studies and Technology (NPRST) Center in Millington, Tennessee.[44] Three files have been combined for this thesis: (1) Admissions Applicant Scores; (2) Admissions Applicant Demographics; and (3) USNA Performance Criteria for midshipmen.

The data include 103,403 applicants for the eleven class years. A candidate number (CANDNR), specific to each class year, identifies each applicant. Of those,

---

[44] NPRST was formally known as the Naval Personnel Research and Development Center (NPRDC). They have been evaluating the effectiveness of the predictors in the Candidate Multiple (CM) since 1975 using applicant data gathered from the Naval Academy's Admissions Office.

5,143 applicants were from preparatory school programs. Of the 103,403 applicants, 13,702 (13.15 percent) became USNA midshipmen and 3,146 (3 percent) declined an offer of appointment. Of those candidates that became midshipmen, 72.8 percent graduated. USNA attendees are identified by a midshipmen identification code (MIDID) known to the midshipmen as their 'alpha code.'

B. THE DEPENDENT VARIABLES

This section first explains selected dependent variables from the applicant data and their relationship to the models. It also explains selected dependent variables from the midshipman data, their relationship to the models, and their hypothesized effects.

Midshipman performance data were supplied by USNA-IR. The four variables used as outcomes are the Order of Merit, Academic Quality Point Rating, Military Quality Point Rating, and Final Graduation probability. The following sections describe each of these four variables. Table 3.1 summarizes the statistical performance data pertinent to this study.

Table 3.1 Midshipman Performance Outcomes at USNA[45]

Variable	Cases	Mean/Representation	Std. Deviation	Range
OOM	10800	467.68	287.38	1-class size
AQPR	13370	2.5684	.9478	0.00-4.00
MQPR	13370	2.8307	.9043	0.00-4.00
Final Grad	13702	.7276	.4452	0.00-1.00

[45] The differences in the number of cases for OOM, AQPR, MQPR, and Final Grad are due to the following reasons: Final Grad accounts for all of the midshipmen who started on Induction Day, 72.76 percent is the actual number of midshipmen who graduated. A number of midshipmen resign plebe summer and do not receive AQPR or MQPR scores. An Order of Merit place is only assigned to midshipmen who graduate.

1. Order of Merit (OOM)

The Order of Merit for a graduating class is computed by weighting performance in designated areas over the four-year period by the coefficients identified in Table 3.3 below. The multiple for each factor in Table 3.2 is obtained by multiplying the coefficient of that factor by the semester quality point ratio (SQPR). The Semester Multiple is the sum of the multiples assigned for a given semester. The Annual Multiple is the sum of the multiples assigned for a given academic year.[46] The null hypothesis is that there is no statistical difference in the means of OOM between those midshipmen who attended a prep school and those who did not.

Table 3.2 Table of OOM Component Factors and Coefficients

Factor Total Percent	4/C year Semester 1 2	3/C year Semester 1 2	2/C year Semester 1 2	1/C year Semester 1 2
Academic and Professional Courses 248.0 64.48%	31.0 31.0	31.0 31.0	31.0 31.0	31.0 31.0
Physical Education 25.6 6.66%	3.2 3.2	3.2 3.2	3.2 3.2	3.2 3.2
Athletic Performance 13.0 3.38%	3.0	3.0	3.0	3.0
Military Performance 68.0 17.68%	7.0 7.0	8.0 8.0	9.0 9.0	10.0 10.0
Conduct 30.0 7.80%	3.0 3.0	3.5 3.5	4.0 4.0	4.5 4.5
TOTAL 384.6 100.00%				

Source: USNA INSTRUCTION 1531.51A. Class Standings and Merit Lists.

46. USNA INSTRUCTION 1531.51A. Class Standings and Merit Lists.

2. Academic Quality Point Rating (APQR)

The AQPR is calculated by weighting course grades by the number of credit hours for a course. Consequently, the professional courses listed above (in Table 3.1) are also tallied as part of the AQPR; thus these courses are counted twice in OOM. This variable is being analyzed to test the theory that the prep school applicants lacked the cognitive background, as validated by NPRST, needed to complete the four-year rigorous academic load at the Naval Academy. The null hypothesis is that there is no statistical difference in AQPR between those midshipmen who attended a prep school and those who did not.

3. Military Quality Point Rating (MQPR)

The MQPR is a significant part the OOM variable listed above. MQPR's major components consist of Physical Education, Athletic Performance (score derived from the semi-annual Physical Readiness Test (PRT)), Military Performance, and Professional Courses. All midshipmen take required professional courses during the four-year program in addition to course work in their academic major and the core curriculum. These professional courses include: (1) Ethics and Moral Reasoning (introduced in '99); (2) Fundamentals of Naval Science; (3) Leadership I; (4) Leadership II (suspended in '98); (5) Leadership III; (6) Law for the Junior Officer; (7) Navigation I; (8) Naval

Weapons Systems; (9) Tactics (introduced in '94); (10) Junior Officer Practicum (Warfare specialty specific.)[47]

MQPR is being examined to determine if prep school midshipmen, theoretically lacking in cognitive background, make up for their academic abilities in military professionalism and motivation. This motivation is best measured by performance grades assigned by daily interaction with the USNA military chain of command. Professional courses such as Leadership and Tactics may interest prep school midshipmen more than calculus and physics. The null hypothesis is that there is no statistical difference in MQPR between those midshipmen who attended a prep school and those who did not. Table 3.2 shows descriptive statistics for the performance measures.

4. Final Grad

Final Grad is a binary variable simply indicating a '1' for a graduate of the Naval Academy and a '0' for a non-graduate. The null hypothesis for Final Grad is that there is no statistical difference in graduation rates from the U.S. Naval Academy between midshipmen who attended a prep school and those who did not.

C. THE EXPLANATORY VARIABLES

Unlike the current composite score used by the Admissions Board, this study will build a parsimonious model based on the three most significant factors in the Candidate Multiple (CM)--the SAT Math highest scores reported (SATMHI), the SAT Verbal highest scores reported (SATVHI) and rank in high school class (RC). Table 3.3 shows

---

[47] Ibid.

the descriptive statistics of the SAT scores and the rank in high school class for the applicant pool.

Table 3.3 Applicant/Midshipman Background Characteristics

Variable	Mean	Range	Standard Deviation	N	Description
SATMHI	615.44	200-802	108.08	94428	Highest SAT Math Score Reported
SATVHI	544.41	200-802	101.99	94508	Highest SAT Verbal Score Reported
RC	472.43	0-800	218.77	63661	Standardized Score

Tables 3.4 and 3.5 compare the cognitive statistics between those who matriculated to the academy and those who did not by prep school accession source. Table. 3.4 also provides midshipmen performance statistics for those who came from prep school.

Table 3.4 Descriptive Characteristics for Midshipmen by Accession Source[48]

ENTRY SOURCE MIDSHIPMEN		SATMHI	SATVHI	RC	AQPR	MQPR	OOM	Final Grad
Direct -entry	**Mean**	669.90	587.44	587.13	2.6103	2.8224	429.16	.7247
	N	10254	10260	10232	10131	10131	8162	10430
	Std. Deviation	60.47	70.33	143.86	1.0032	.9618	281.79	.4467
NAPS	**Mean**	596.99	516.77	478.25	2.3615	2.8113	620.97	.7100
	N	2127	2127	2117	2130	2130	1706	2148
	Std. Deviation	85.81	85.18	120.39	.7195	.6903	272.16	.4539
FOUNDATION	**Mean**	654.70	573.85	499.21	2.5998	2.9485	514.96	.7983
	N	960	961	956	953	953	812	967
	Std. Deviation	89.90	90.11	123.14	.7591	.7154	260.41	.4014
BOOST	**Mean**	628.69	531.08	492.79	2.4832	2.9178	588.52	.7261
	N	155	155	155	156	156	120	157
	Std. Deviation	59.87	69.42	111.52	.5768	.5261	238.95	.4474
Total	**Mean**	656.85	574.70	562.68	2.5684	2.8307	467.68	.7276
	N	13496	13503	13460	13370	13370	10800	13702
	Std. Deviation	72.51	78.79	145.42	.9478	.9043	287.38	.4452

[48] The differences in the number of cases for OOM, AQPR, MQPR, and Final Grad are due to the following reasons: Final Grad accounts for all of the midshipmen who started on Induction Day, 72.76 percent is the actual number of midshipmen who graduated. A number of midshipmen resign plebe summer and do not receive AQPR or MQPR scores. An Order of Merit place is only assigned to midshipmen who graduate.

Not every applicant reported SAT scores or rank in high school class. Some of these missing scores are attributed to prior enlisted appointees. Regression analysis in Chapter IV compensates for these incomplete scores.

Table 3.5 Descriptive Statistics for Applicants to USNA by Accession Source[49]

Accession Source non-MIDSHIPMEN		SATMHI	SATVHI	RC
Direct-entry	**Mean**	609.33	540.12	448.49
	N	79149	79222	48811
	Std. Deviation	111.57	104.61	230.21
NAPS	**Mean**	567.06	504.89	433.38
	N	1035	1035	989
	Std. Deviation	107.09	101.66	163.17
FOUNDATION	**Mean**	648.84	560.85	451.04
	N	162	162	157
	Std. Deviation	92.36	83.39	193.80
BOOST	**Mean**	562.59	490.69	453.16
	N	586	586	244
	Std. Deviation	75.47	75.37	124.12
Total	**Mean**	608.53	539.36	448.22
	N	80932	81005	50201
	Std. Deviation	111.44	104.51	228.59

1. Rank in High School Class (RC)

The Naval Academy Admissions Board standardizes rank in high school class so the scale is similar to the SAT score. The score is calculated by taking into account not only where one stood in their class relative to their peers, but also the size of their class. The average RC should be approximately 500 like the average SAT score. A significant reason for candidates going to a prep school is that their academic record (cognitive skills) was deemed not strong enough to succeed at USNA. Tables 3.4 and 3.5 show the differences in RC between those who went to prep school and those who did not. Direct-

[49] Ibid 48.

entry applicant's average 587, NAPS average is 478.25, the FOUNDATION average is 499.21, and the BOOST average is 562.68. The direct-entry applicants do have the higher RC average as expected by the Admissions process. Foundation is third and NAPS is last. Surprisingly, BOOST is only 25 points away from the average and well within the standard deviation of the direct-entry midshipmen.

The Naval Academy seeks to accept candidates with the strongest academic records for, historically; these records predict a higher graduation success rate. However, not everyone can be a valedictorian. Consequently, a valedictorian from a 54-person high school senior class might not be as strong as the 200th person from a 1,200-person class. A significant statistical difference in the means of RC should exist between the prep school applicants and the direct-entry applicants.

2. SAT Math and Verbal High Scores (SATMHI & SATVHI)

The highest scores for SAT math and verbal were selected as independent variables because the Admissions Board currently places high weight on them, at 12 percent for verbal and 24 percent for math, in the CM. These scores range from 200-802 (some scores are converted from the ACT thus a score of 802 is possible).

Similar to RC, a significant statistical difference in the means of SATMHI and SATVHI should exist between the prep school applicants and the direct-entry applicants. Tables 3.4 and 3.5 illustrate these differences. They show that direct-entry midshipmen have means of 669.90 Math and 587.44 Verbal; NAPS has means of 596.99 and 516.77

respectively; the FOUNDATION has means of 654.70 and 573.85, and BOOST has means 628.69 and 531.08.

The applicant data set also includes numerous demographic characteristics, which will be added to the OLS and Logit models to control for varied types of applicants. The midshipmen population demographic variables of interest to this study are identified in Table 3.6 below.

Table 3.6 Midshipmen Demographic Characteristics

Variable	Representation	Std. Deviation	Description
Class of 1991[a]	.0947	.2928	= 1 if Class of '91, = 0 otherwise
Class of 1992	.0975	.2967	= 1 if Class of '92, = 0 otherwise
Class of 1993	.1009	.3013	= 1 if Class of '93, = 0 otherwise
Class of 1994	.0887	.2844	= 1 if Class of '94, = 0 otherwise
Class of 1995	.0816	.2738	= 1 if Class of '95, = 0 otherwise
Class of 1996	.0890	.2848	= 1 if Class of '96, = 0 otherwise
Class of 1997	.0847	.2784	= 1 if Class of '97, = 0 otherwise
Class of 1998	.0890	.2847	= 1 if Class of '98, = 0 otherwise
Class of 1999	.0856	.2798	= 1 if Class of '99, = 0 otherwise
Class of 2000	.0894	.2853	= 1 if Class of '00, = 0 otherwise
NAPS[b]	.1568	.3636	= 1 if NAPS, = 0 otherwise
FOUNDATION	.0706	.2561	= 1 if the FOUNDATION, = 0 otherwise
BOOST	.0115	.1064	= 1 if BOOST, = 0 otherwise
African-American[c]	.0658	.2480	= 1 if black, = 0 otherwise
Spanish-American	.0569	.2317	= 1 if Hispanic, = 0 otherwise
Oriental-American	.0270	.1621	= 1 if Asian, = 0 otherwise
Native-American	.0089	9.394E-02	= 1 if Native-American, = 0 otherwise
Puerto Rican	.0090	9.470E-02	= 1 if Puerto Rican, = 0 otherwise
Filipino	.0155	.1234	= 1 if Filipino, = 0 otherwise
Female	.1258	.0000	= 1 if Female, = 0 otherwise
Blue-chip Athlete	.1822	.3317	= 1 if Blue-chip Athlete, = 0 otherwise
African-American*NAPS	.0283	.1659	= 1 if a black from NAPS, = 0 otherwise
Spanish-American*NAPS	.0019	.1364	= 1 if a Hispanic from NAPS, = 0 otherwise
Oriental-American*NAPS	.0041	6.380E-02	= 1 if an Asian from NAPS, = 0 otherwise
Native-American*NAPS	.0019	4.352E-02	= 1 if a Native-American from NAPS, = 0 otherwise
Puerto Rican*NAPS	.0039	6.208E-02	= 1 if a Puerto Rican from NAPS, = 0 otherwise
Filipino*NAPS	.0046	6.765E-02	= 1 if a Filipino from NAPS, = 0 otherwise
Other Ethnicity*NAPS	.0000	.0000	= 1 if an other ethnicity from NAPS, = 0 otherwise
African-American*BOOST	.0029	5.395E-02	= 1 if a black from BOOST, = 0 otherwise
Spanish-American*BOOST	.0032	5.658E-02	= 1 if a Hispanic from BOOST, = 0 otherwise
Oriental-American*BOOST	.0007	2.701E-02	= 1 if an Asian from BOOST, = 0 otherwise
Native-American*BOOST	.0002	1.480E-02	= 1 if a Native-American from BOOST, = 0 otherwise
Puerto Rican*BOOST	.0005	2.260E-02	= 1 if a Puerto Rican from BOOST, = 0 otherwise
Filipino*BOOST	.0008	2.832E-02	= 1 if a Filipino from BOOST, = 0 otherwise
Other Ethnicity*BOOST	.0000	.0000	= 1 if an other ethnicity from BOOST, = 0 otherwise
Blue-chip Athlete*NAPS	.0422	.2010	= 1 if a Blue-chip Athlete from NAPS, = 0 otherwise
Female*NAPS	.0156	.1240	= 1 if a Female from NAPS, = 0 otherwise
Blue-chip Athlete*FOUNDATION	.005	2.260E-02	= 1 if a Blue-chip Athlete from the FOUNDATION, = 0 otherwise
Blue-chip Athlete*African-American*NAPS	.69	8.255E-02	= 1 if a black, Blue-chip Athlete from NAPS, = 0 otherwise

a. The Class of 1990 is the omitted variable and consists of 9.89% of the midshipmen population.

b. Caucasian non-NAPS or non-BOOST midshipman is the omitted variable and consists of 93.45% of the midshipmen population.

c. Direct-College is a dummy variable consisting of 76.11% of the midshipmen population.

3. Class Year

Each graduation year, during the years of this study, sees the number of applicants decline due to falling interest in military service by the general populace. To account for this, separate dummy (0,1) variables for the years '91-'00 have been created with the Class of '90 being omitted. In addition, these dummy variables will account for differences in the overall tastes and propensity of each cohort.

4. Prep Schools

The Naval Academy Preparatory School (NAPS), the Broadened Opportunities for Officer Selection and Training (BOOST) program and the Naval Academy Foundation Scholarship (FOUNDATION) program are identified as separate dummy (0,1) variables as each tends to cater to different types of applicants. Each program is examined separately for the purposes of this study, using direct-entry as the omitted category. Table 3.4 above shows how the accession sources differ in cognitive characteristics and midshipmen performance. Table 3.5 above highlights the differences between those applicants from the different sources who became midshipmen and those who did not. Table 3.6 above shows 15.68 percent of USNA attendees entered via NAPS, 7.06 percent entered via the Foundation program, and 1.15 percent via BOOST.

The differences in the means of SAT scores, RC, AQPR, MQPR, OOM and Final Grad are readily apparent and expected. Lower cognitive skills are why certain applicants were selected for prep school.

5. Minorities, Women and Athletes

One of the primary missions of NAPS and BOOST is to prepare underrepresented groups for admission to USNA for a career as midshipmen. Six separate minority dummy variables have been created. These dummy variables are interacted with either NAPS or BOOST as shown above in Table 3.6.

The FOUNDATION and NAPS also sponsor many recruited athletes. Blue-chip Athletes are those candidates that are highly recruited by USNA coaching staffs and have special consideration at the Admissions Board. Varsity athletes at the Naval Academy have many additional obligations that may affect midshipmen performance and grades. Therefore, the Blue-chip Athlete*NAPS, Blue-chip Athlete*FOUNDATION and Blue-chip Athlete*African-American*NAPS interaction variables have been created to test for these differences between athletes from the various entry problems and non-athletes.

The Naval Academy Prep School also prepares female candidates for life at the Naval Academy. The Female*NAPS interaction variable has been created to examine the differences in their performance. Table 3.7 illustrates the differences in the means of the cognitive and performance measures between the demographic variables.

Table 3.7 Differences in the Means of the Cognitive and Performance Measures By Demographic Group[50]

VARIABLE		SATMHI	SATVHI	RC	AQPR	MQPR	OOM	Final Grad
Caucasian	Mean	663.95	581.62	567.50	2.6183	2.8631	440.92	.7387
	N	11024	11029	10994	10832	10832	8835	11098
	Std. Dev.	69.88	76.61	144.50	.9578	.9115	280.96	.4394
African-American	Mean	592.73	518.48	522.62	2.1853	2.6071	675.63	.6231
	N	891	891	885	885	885	635	902
	Std. Dev.	80.47	84.53	128.25	.7937	.8314	268.69	.4849
Spanish-American	Mean	633.02	552.50	535.03	2.3120	2.6409	560.64	.6551
	N	768	770	770	759	759	573	780
	Std. Dev.	62.18	73.66	150.00	.9644	.9501	279.22	.4756
Oriental-American	Mean	674.86	574.87	583.20	2.6251	2.8891	501.42	.8108
	N	362	362	361	363	363	315	370
	Std. Dev.	56.22	72.19	152.14	.8248	.7650	281.86	.3922
Native-American	Mean	641.90	572.19	551.36	2.4743	2.7621	563.80	.6557
	N	122	122	121	116	116	91	122
	Std. Dev.	54.69	64.47	156.57	.8273	.8324	271.04	.4771
Puerto Rican	Mean	616.55	538.15	525.18	2.3344	2.6465	589.45	.6855
	N	119	119	119	124	124	98	124
	Std. Dev.	82.10	86.10	149.24	.8981	.8873	285.92	.4662
Filipino	Mean	644.04	552.73	572.89	2.5686	2.8691	574.87	.8019
	N	210	210	210	207	207	178	212
	Std. Dev.	71.66	78.91	179.42	.6390	.7115	262.26	.3995
Female	Mean	645.93	586.01	599.63	2.4892	2.7279	471.24	.6549
	N	1710	1710	1707	1650	1650	1283	1724
	Std. Dev.	68.73	76.47	137.76	1.0623	1.0248	282.14	.4755
Male	Mean	658.44	573.06	557.31	2.5796	2.8452	467.20	.7381
	N	11786	11793	11753	11720	11720	9517	11978
	Std. Dev.	72.91	78.98	145.73	.9300	.8851	288.09	.4397
Blue-chip Athlete	Mean	619.65	529.59	513.63	2.3191	2.6966	580.99	.6627
	N	2485	2485	2472	2433	2433	1806	2496
	Std. Dev.	64.99	70.57	124.70	.8969	.9040	274.07	.4729

[50] Differences in cases sizes are attributed to the reasons presented previously in footnote 48.

VARIABLE		SATMHI	SATVHI	RC	AQPR	MQPR	OOM	Final Grad
African-American*NAPS	Mean	554.61	483.45	487.55	2.1703	2.6469	701.53	.6392
	N	383	383	379	384	384	285	388
	Std. Dev.	88.00	88.87	118.48	.6513	.7095	269.53	.4809
Spanish-American* NAPS	Mean	597.85	520.04	500.96	2.3313	2.7693	615.66	.7000
	N	256	256	256	258	258	201	260
	Std. Dev.	56.16	65.86	115.06	.7518	.7311	263.75	.4591
Oriental-American* NAPS	Mean	637.13	529.85	502.25	2.4300	2.7916	659.10	.8036
	N	55	55	55	56	56	48	56
	Std. Dev.	61.64	61.60	133.87	.6407	.6889	223.68	.4009
Native-American*NAPS	Mean	607.50	534.23	516.92	2.2540	2.5528	579.41	.6923
	N	26	26	26	25	25	22	26
	Std. Dev.	63.96	63.29	102.28	.8916	1.0635	255.29	.4707
Puerto Rican*NAPS	Mean	576.76	494.90	506.94	2.2285	2.7104	660.56	.6604
	N	51	51	51	53	53	43	53
	Std. Dev.	100.64	89.15	122.49	.7588	.6937	291.14	.4781
Filipino*NAPS	Mean	615.59	504.16	524.62	2.3927	2.8194	696.81	.8254
	N	63	63	63	63	63	53	63
	Std. Dev.	104.31	94.74	176.45	.5116	.6060	225.71	.3827
African-American* BOOST	Mean	608.50	512.25	497.08	2.3783	2.8488	675.10	.6500
	N	40	40	40	40	40	29	40
	Std. Dev.	55.89	71.45	102.68	.5365	.4628	214.38	.4830
Spanish-American* BOOST	Mean	639.89	526.14	488.57	2.5014	2.8512	602.88	.7273
	N	44	44	44	43	43	34	44
	Std. Dev.	70.14	70.60	109.46	.5863	.5688	219.49	.4505
Oriental-American* BOOST	Mean	618.33	518.33	531.89	2.6630	3.0140	556.33	.9000
	N	9	9	9	10	10	9	10
	Std. Dev.	51.84	71.76	78.40	.4199	.3591	201.87	.3162
Native-American *BOOST	Mean	658.33	540.00	341.67	2.0800	2.5967	1000.00	.3333
	N	3	3	3	3	3	1	3
	Std. Dev.	38.84	36.06	298.26	.2364	.3427	.0	.5774
Puerto Rican *BOOST	Mean	615.71	547.86	528.71	2.4900	2.8329	630.40	.7143
	N	7	7	7	7	7	5	7
	Std. Dev.	35.05	123.89	99.19	.4878	.3779	116.33	.4880
Filipino*BOOST	Mean	649.70	537.70	480.10	2.4764	3.1145	518.88	.7273
	N	10	10	10	11	11	8	11
	Std. Dev.	56.99	47.59	183.97	.5337	.3340	263.45	.4671
Blue-chip Athlete*NAPS	Mean	574.79	482.41	462.75	2.3082	2.7575	657.17	.6903
	N	575	575	573	574	574	451	578
	Std. Dev.	72.10	73.96	102.75	.6948	.6336	268.58	.4628
Female*NAPS	Mean	574.95	527.75	523.22	2.2001	2.7088	632.35	.6449
	N	214	214	213	211	211	168	214
	Std. Dev.	93.28	94.64	124.88	.9195	.8868	260.55	.4797
Blue-chip Athlete* FOUNDATION	Mean	608.57	540.00	500.00	1.9629	2.4500	772.00	.7143
	N	7	7	7	7	7	5	7
	Std. Dev.	21.35	77.19	97.89	.9107	1.1066	205.56	.4880
Blue-chip Athlete* African-American*NAPS	Mean	540.94	445.30	470.80	2.1490	2.6014	679.06	.6489
	N	94	94	93	93	93	69	94
	Std. Dev.	56.98	59.05	111.32	.6732	.7593	310.20	.4799

The table above simply illustrates that there are differences in the means of midshipmen performance scores among minorities, athletes, and females from the various preparatory schools. One hypothesis is that when the cognitive variables, minority, athlete and gender variables are controlled for, there will be no statistical difference between midshipman performance measures and graduation rates for these types of prep school students.

D. MODEL DESCRIPTIONS

1. Midshipmen Performance

Three of the midshipman performance measures -- OOM, AQPR, and MQPR -- will be utilized as dependent variables in three separate OLS regression models. The first models will include the prep school programs -- NAPS, FOUNDATION, and BOOST -- class year, ethnic group, females, and Blue-chip Athletes as dummy variables. Then RC, SATMHI, and SATVHI will be added to the model. The third model will include prep school midshipmen and minority group interactions in the three equations. These variables are: African-American*NAPS, Spanish-American*NAPS, Oriental-American*NAPS, Native-American*NAPS, Puerto Rican*NAPS, Filipino*NAPS, African-American*BOOST, Spanish-American*BOOST, Oriental-American*BOOST, Native-American*BOOST, Puerto Rican*BOOST, and Filipino*BOOST.

2. Graduation Rate

Graduation rate from the Naval Academy, Final Grad, is a binary (0,1) variable, indicating whether a student did or did not graduate. For this analysis a non-linear logit model is utilized. The model will account for accession source, class year, ethnic background, sex, and Blue-chip Athletes in the first version. RC, SATMHI, and SATVHI will be added in the second version to test for a shift in β coefficients on accession source. The third version will account for the interactions between minorities and prep schools similar to the OLS models. The final model will include the Blue-chip Athlete variables and female prep school variables similar to the OLS models.

E. SUMMARY

In summary, the rationale for the OLS and Logit models is threefold: First, they account for prep school attendance as well as the background characteristics of the applicant pool. Second, the models are designed to determine if prep school midshipmen make up for their cognitive deficiencies with the motivational intangibles measured in military performance. Third, the models will attempt to determine whether or not cognitive and demographic backgrounds are factors in successful Naval Academy graduation.

IV. ANALYSIS OF MULTIVARIATE MODELS

This chapter has five sections. The first section examines the differences in characteristics exhibited by applicants who became midshipmen, those applicants who were not accepted, and those who went to preparatory school before they received an appointment to the U.S. Naval Academy. The following sections use Ordinary Least Squares (OLS) regression analysis to determine the effect of the selected explanatory variables and prep school background on three performance measures: (1) Order of Merit; (2) Academic Quality Point Rating; and (3) Military Quality Point Rating. The final section uses binary logit analysis to estimate the effect of the selected explanatory variables on the probability of graduation from the U.S. Naval Academy vs. direct appointments.

Tables provided in each section display the results of the OLS models for academic performance and the logit estimates of the final graduation model. Three separate model specifications are estimated. The first model includes the dummy variables for the following: each of the 11 class years, attendance at the Naval Academy Prep School, FOUNDATION, BOOST, ethnic background, gender, and Blue-chip Athlete status. The second model controls for a midshipman's cognitive background by adding highest score reported SAT math (SATMHI), highest score reported SAT verbal (SATVHI) and rank in high school class (RC) to the first model. The third model includes interactions between demographic characteristics and entry program. The fourth model adds interactions between a Blue-chip Athlete from a prep school and being an

African-American Blue-chip Athlete from NAPS and being a female from NAPS. Each section then discusses the coefficient values.

The tables for the logit model also include the calculated marginal effect associated with the coefficient estimates of each variable. The marginal effect is provided since the binary logit coefficients do not indicate the impact of a small change in each independent variable on the probability of the outcome variables. The marginal effects are computed so the reader may see the effect of a change in the independent variable on the probability of the specific outcome.

A. DIFFERENCES IN VARIABLE MEANS

The Admissions Board places the greatest weight on three predictors of graduation from the Naval Academy: SATMHI, SATVHI and rank in high school class (RC). Table 4.1 below shows the student t-test for the differences in means between those applicants who became midshipmen and those who did not, including those applicants who turned down appointments.

Table 4.1 Student T-Test for Differences in Means of Cognitive Variables of Those Applicants Who Became Midshipmen and Those Who Did Not.

Variable	Midshipmen	N	Mean	Difference	t	sig
SATMHI	Midshipman	13496	656.85	48.32	65.575	.000
	Non-midshipman	80932	608.53			
SATVHI	Midshipman	13503	574.70	35.34	45.833	.000
	Non-midshipman	81005	539.36			
RC	Midshipman	13460	562.68	114.45	70.816	.000
	Non-midshipman	50201	448.22			

Note: equal variances not assumed.

The number of cases utilized for this comparison is based on those that reported their scores to the Admissions Office. The results reflect the Admissions Board's selection process. The differences in the means of SATMHI, SATVHI, and RC are statistically significant at the .01 level between applicants who became midshipmen and those who did not. Table 4.2 displays the difference in the means of the cognitive variables between those admitted midshipmen who went to prep school and those who did not. The significant differences in the means of the SAT scores between midshipmen who attended a prep school and those who did not highlight the first part of the thesis' initial hypothesis--prep school midshipmen have a weaker cognitive background. These differences are significant at the .01 level. However, there is no statistical difference in the means of RC between the two groups.

Table 4.2 Student T-Test for Differences in Means of Cognitive Variables of Midshipmen Who Went to Prep School and Those Who Did Not.

Variable	Prep school midshipmen vs. direct-entry	N	Mean	Difference	T	sig
SATMHI	Prep school Direct-entry	5025 89403	600.49 616.28	-15.79	-11.310	.000
SATVHI	Prep school Direct-entry	5026 89482	524.06 545.55	-21.49	-15.959	.000
RC	Prep school Direct-entry	4618 59043	471.22 472.52	-1.30	-.590	.555

Note: equal variances not assumed.

The final comparison of means is conducted on the midshipmen performance variables Order of Merit (OOM), Academic Quality Point rating (AQPR), Military Quality Point Rating (MQPR), and graduation rate (Final Grad) for those admitted

midshipmen from prep programs and those admitted directly from high school. The results are displayed in Table 4.3 below.

Table 4.3 Student T-Test for Differences in Means of Midshipmen Performance Variables Between Prep School and Direct-Entry Midshipmen.

Variable	Prep school midshipmen vs. direct-entry	N	Mean	Difference	t	sig
OOM	Prep school Direct-entry	2638 8162	586.86 429.16	157.71	25.701	.000
AQPR	Prep school Direct-entry	3239 10131	2.4374 2.6103	-.1728	-10.611	.000
MQPR	Prep school Direct-entry	3239 10131	2.8568 2.8224	.03440	2.221	.026
Final Grad	Prep school Direct-entry	3272 10430	.7369 .7247	.01212	1.369	.171

Note: equal variances not assumed.

Order of Merit is an ascending variable: as a midshipman's class standing decreases, the OOM variable increases. The average OOM for prep school attendees is 157 ranks higher than for non-prep attendees. The difference in the means of OOM between the two groups is significant at the .01 level. Prep school attendees also perform significantly lower in terms of AQPR.

A secondary hypothesis of this thesis is that prep school midshipmen may compensate for their weaker cognitive backgrounds by attaining a higher military quality point rating (MQPR). The initial student t-test analysis in Table 4.3 reveals prep school midshipmen achieving a higher MQPR average than their non-prep school classmates. However, the difference is small (.034) and is significant only at the .05 level.

Finally, prep school midshipmen graduate, on average, at a .012 percent higher rate than non-prep school midshipmen do. However, this difference is not statistically

significant. The null hypothesis concerning the difference in graduation rates between the two groups fails to be rejected because there is no statistical difference in the rate of graduation.

B. ORDER OF MERIT OLS MODELS

The results for the OLS regression analysis of OOM outcome for graduating classes 1990-2000 are shown in Table 4.4.

Table 4.4 OOM Linear Regression Models

SUMMARY STATISTICS	Model 1 Accession source, Minority, Gender, Blue-chip Athlete		Model 2 Model 1 + SATMHI, SATVHI, RC		Model 3 Model 2 + Minority and prep school interaction		Model 4 Model 3 + Prep school and Female, Blue-chip Athlete interaction	
INDEPENDENT VARIABLES	**Coeff**	**t-stat**	**Coeff**	**t-stat**	**Coeff**	**t-stat**	**Coeff**	**t-stat**
Constant	418.300	45.621	1148.836	37.004	1146.869	36.933	1139.326	36.630
NAPS	141.675	18.978	56.436	7.254	71.942	7.876	81.549	7.373
FOUNDATION	124.703	12.511	60.392	6.147	62.493	6.355	64.219	6.492
BOOST	98.595	3.941	24.137	.998	34.595	.784	37.273	.846
African-American	197.753	17.307	153.877	13.739	194.775	13.085	195.165	13.118
Spanish-American	117.791	9.890	89.842	7.810	102.341	7.077	104.131	7.198
Oriental-American	74.419	4.803	75.997	5.098	69.453	4.239	70.553	4.307
Native-American	145.521	5.146	125.188	4.603	145.331	4.624	146.963	4.677
Puerto Rican	140.738	5.113	107.802	4.067	109.151	2.943	110.955	2.992
Filipino	124.555	6.125	122.349	6.252	115.933	4.836	117.323	4.896
Female	10.945	1.365	21.280	2.729	21.307	2.735	18.775	2.245
Blue-chip Athlete	142.578	20.128	84.907	11.844	84.204	11.734	95.159	11.752
SATMHI			-.481	-10.913	-.487	-11.033	-.482	-10.915
SATVHI			-.207	-5.060	-.205	-5.019	-.207	-5.073
RC			-.442	-21.547	-.437	-21.276	-.433	-21.032
African-American*NAPS					-100.074	-4.399	-78.468	-3.134
Spanish-American*NAPS					-44.196	-1.801	-52.803	-2.110
Oriental-American*NAPS					46.222	1.114	37.638	.900
Native-American*NAPS					-103.507	-1.632	-113.027	-1.777
Puerto Rican*NAPS					-17.112	-.314	-26.653	-.487
Filipino*NAPS					25.786	.596	18.665	.430
African-American*BOOST					-37.433	-.565	-37.974	-.573
Spanish-American*BOOST					-18.219	-.286	-20.210	-.317
Oriental-American*BOOST					-43.207	-.424	-44.907	-.441
Native-American*BOOST					272.091	1.041	270.962	1.038
Puerto Rican*BOOST					13.415	.105	11.627	.091
Filipino*BOOST					-101.014	-.978	-102.613	-.994
Blue-chip Athlete*NAPS							-32.905	-1.836
Female*NAPS							6.642	.295
Blue-chip Athlete*FOUNDATION							77.605	.674
Blue-chip Athlete*African-American*NAPS							-99.026	-2.527
F	81.366		114.017		76.944		69.728	
ADJUSTED R^2	.137		.204		.205		.206	
DURBIN-WATSON	1.941							

Note: Dummy variables for class years 1990-2000 are included in all models.

The differences in OOM between prep school graduates and those who did not attend prep school are significant at the .01 level for Model 1. The mean OOM for the population is 467.68. A positive OOM coefficient indicates lower performance as OOM is a reverse scale variable. NAPS has the largest negative effect on OOM followed by FOUNDATION and BOOST. Each of the ethnic group explanatory variables is significant at the .01 level and their signs are positive indicating that they do not perform as well in terms of OOM. Being a female has no significant impact on OOM, and Blue-chip Athletes have a lower OOM than non-Blue-chip Athletes.

Model 2 adds the cognitive background variables SATMHI, SATVHI, and RC. Each of these variables has a significant and negative impact on OOM throughout the remaining models. The β coefficient for NAPS decreases substantially once the cognitive variables are included in the model, falling from 141.6 to 56.4. The FOUNDATION β coefficient also falls by about 50 percent and the BOOST coefficient is no longer significant. These changes suggest that the biggest difference between the prep school attendees and direct-entry students is their cognitive backgrounds. Each of the ethnic background variables remains significant at the .01 level or better. Females have a lower OOM coefficient, which becomes significant in Model 2. Blue-chip Athletes remain significant at the .01 level. As expected, RC, SATMHI, and SATVHI are significant predictors of Order of Merit, but their signs are negative. The signs of these predictors are negative because OOM is a reverse order variable. A negative effect by RC, SATMHI, and SATVHI indicates an inverse relationship, meaning the higher the

SAT score, the lower the OOM place in the graduating class, i.e. closer to being the number one graduate.

The ethnic and entry source interactions are included in Model 3. NAPS and the FOUNDATION remain significant at the .01 level. The same variables that were significant in Models 1 and 2 remain significant. Only the African-American NAPS and Spanish-American NAPS interactions are significant predictors of OOM at the .01 and .05 levels, respectively. Each has a negative coefficient indicating that African-Americans and Spanish-Americans from NAPS perform better in terms of OOM than their counterparts from other programs. The BOOST-minority interactions are all statistically insignificant.

The final model adds interactions for females and NAPS, Blue-chip Athlete and entry program, and an interaction for Blue-chip Athlete* African-American * NAPS. All of the previous explanatory variables remain significant with no sign changes. However, the Native-American NAPS interaction becomes significant at the .10 level with a negative coefficient. The Blue-chip Athlete NAPS interaction and Blue-chip Athlete African-American NAPS interacted variables are significant at the .10 and .05 level of significance and their signs are negative indicating a high level of OOM performance. It should be noted that cell sizes for several of the interactions are very small; hence the results for these variables should be viewed cautiously.

C. ACADEMIC QUALITY POINT RATING OLS MODELS

The analysis of AQPR OLS estimates uses the same model specifications used for OOM regressions. The results are displayed in Table 4.5.

Table 4.5 AQPR Linear Regression Models

SUMMARY STATISTICS	Model 1 Accession source, Minority, Gender, Blue-chip Athlete		Model 2 Model 1 + SATMHI, SATVHI, RC		Model 3 Model 2 + Minority and prep school interaction		Model 4 Model 3 + Prep school and Female, Blue-chip Athlete interaction	
INDEPENDENT VARIABLES	**Coeff**	**t-stat**	**Coeff**	**t-stat**	**Coeff**	**t-stat**	**Coeff**	**t-stat**
Constant	2.550	93.649	1.057	10.739	1.062	10.784	1.080	10.947
NAPS	-.153	-6.670	.013	.526	-.015	-.507	-.047	-1.333
FOUNDATION	-.103	-3.276	.011	.357	.007	.218	.003	.090
BOOST	.032	-6.670	.159	2.125	.042	.303	.036	.259
African-American	-.408	-3.276	-.312	-9.246	-.367	-8.318	-.368	-8.352
Spanish-American	-.343	.425	-.285	-8.069	-.343	-7.791	-.348	-7.907
Oriental-American	-.031	-12.235	-.035	-.715	-.022	-.410	-.026	-.487
Native-American	-.212	-9.643	-.160	-1.889	-.111	-1.143	-.116	-1.193
Puerto Rican	-.313	-.618	-.243	-2.897	-.256	-2.201	-.262	-2.251
Filipino	-.043	-2.469	-.030	-.465	.003	.040	-.002	-.021
Female	-.115	-3.694	-.128	-5.268	-.128	-5.275	-.108	-4.147
Blue-chip Athlete	-.305	-.656	-.187	-8.427	-.186	-8.372	-.217	-8.698
SATMHI			.001	8.204	.001	8.247	.001	8.163
SATVHI			.000	3.442	.000	3.441	.000	3.466
RC			.001	11.200	.001	11.011	.001	10.821
African-American*NAPS					.137	1.995	.147	1.936
Spanish-American*NAPS					.162	2.128	.203	2.605
Oriental-American*NAPS					-.086	-.631	-.044	-.319
Native-American*NAPS					-.171	-.826	-.125	-.603
Puerto Rican*NAPS					.036	.210	.076	.434
Filipino*NAPS					-.078	-.552	-.040	-.279
African-American*BOOST					.202	.989	.203	.995
Spanish-American*BOOST					.259	1.290	.265	1.318
Oriental-American*BOOST					.149	.443	.155	.461
Native-American*BOOST					-.252	-.459	-.248	-.451
Puerto Rican*BOOST					.199	.514	.205	.530
Filipino*BOOST					.030	.092	.036	.109
Blue-chip Athlete*NAPS							.132	2.346
Female*NAPS							-.126	-1.771
Blue-chip Athlete*FOUNDATION							-.185	-.537
Blue-Chip Athlete* African-American*NAPS							.027	.229
F	49.150		57.166		38.428		34.875	
ADJUSTED R^2	.071		.093		.093		.094	
DURBIN-WATSON	1.996							

Note: Dummy variables for class years 1990-2000 are included in all models.

The mean AQPR for the classes of 1990 through 2000 is 2.568. In Model 1, the Naval Academy Prep School and the FOUNDATION β coefficients are statistically significant at the .01 level with values of -.153 and -.103. BOOST is not significant. Six of the other explanatory variables are statistically significant: African-American, Spanish-American, Native-American, Puerto Rican, Females, and Blue-chip Athlete. All signs are negative indicating lower performance in AQPR.

Model 2 adds the cognitive variables to determine if SATMHI, SATVHI, and RC account for the differences in the means of AQPR. The positive effect of SATMHI and RC on AQPR is statistically significant at the .01 level in the remaining three models. The β coefficients for NAPS and FOUNDATION are no longer statistically significant, indicating the reason individuals were recommended for these programs is due to their SAT and RC scores. The previous six explanatory variables for ethnic groups remain statistically significant but the size of the differences in the means decreases for each.

The interaction of minority status with NAPS and BOOST is accounted for in Model 3. African-American and Spanish-American NAPS interactions have positive coefficients (significant at the .05 level) indicating that these two groups perform better in terms of AQPR than their counterparts when the cognitive variables are accounted for. The effect of being a Native American is no longer statistically significant.

The final model of the AQPR analysis includes the interactions of Female*NAPS and Blue-chip Athletes with NAPS and FOUNDATION. All of the significant coefficients in Model 3 remain significant in Model 4. The Blue-chip Athlete*NAPS

score .132 AQPR points above their counterparts whereas the females from NAPS score .126 below their counterparts.

D. MILITARY QUALITY POINT RATING OLS MODELS

The MQPR regression models follow the same set up as the previous two. The results are displayed in Table 4.6.

Table 4.6 MQPR Linear Regression Models

SUMMARY STATISTICS	Model 1 Accession source, Minority, Gender, Blue-chip Athlete		Model 2 Model 1 + SATMHI, SATVHI, RC		Model 3 Model 2 + Minority and prep school interaction		Model 4 Model 3 + Prep school and Female, Blue-chip Athlete interaction	
INDEPENDENT VARIABLES	**Coeff**	**t-stat**	**Coeff**	**t-stat**	**Coeff**	**t-stat**	**Coeff**	**t-stat**
Constant	2.718	102.370	2.121	21.902	2.121	21.882	2.122	21.838
NAPS	.051	2.268	.122	5.024	.116	4.030	.123	3.520
FOUNDATION	.060	1.938	.114	3.622	.112	3.571	.114	3.607
BOOST	.200	2.717	.256	3.462	.211	1.527	.211	1.530
African-American	-.292	-8.979	-.256	-7.723	-.266	-6.129	-.266	-6.128
Spanish-American	-.277	-7.998	-.255	-7.324	-.298	-6.891	-.298	-6.878
Oriental-American	.007	.150	.002	.034	.030	.555	.029	.555
Native-American	-.158	-1.882	-.135	-1.616	-.056	-.585	-.056	-.582
Puerto Rican	-.272	-3.285	-.246	-2.975	-.301	-2.630	-.301	-2.626
Filipino	-.013	-.203	-.014	-.224	.011	.141	.011	.141
Female	-.123	-5.170	-.128	-5.358	-.128	-5.348	-.125	-4.878
Blue-chip Athlete	-.166	-8.050	-.119	-5.472	-.120	-5.465	-.118	-4.804
SATMHI			.001	3.913	.001	3.956	.001	3.934
SATVHI			.000	-.254	.000	-.268	.000	-.262
RC			.000	6.418	.000	6.329	.000	6.332
African-American*NAPS					.023	.339	.011	.147
Spanish-American*NAPS					.125	1.676	.122	1.589
Oriental-American*NAPS					-.175	-1.313	-.179	-1.329
Native-American*NAPS					-.323	-1.588	-.328	-1.604
Puerto Rican*NAPS					.122	.716	.117	.682
Filipino*NAPS					-.096	-.692	-.098	-.702
African-American*BOOST					.084	.416	.084	.416
Spanish-American*BOOST					.085	.428	.085	.428
Oriental-American*BOOST					.018	.055	.018	.055
Native-American*BOOST					-.268	-.496	-.268	-.495
Puerto Rican*BOOST					.114	.299	.113	.298
Filipino*BOOST					.153	.474	.153	.475
Blue-chip Athlete*NAPS							-.015	-.276
Female*NAPS							-.023	-.332
Blue-chip Athlete*FOUNDATION							-.179	-.527
Blue-chip Athlete*African-American*NAPS							.045	.382
F	22.131		22.457		15.226		13.714	
ADJUSTED R^2	.033		.038		.038		.037	
DURBIN-WATSON	2.004							

Note: Dummy variables for class years 1990-2000 are included in all models.

The mean MQPR for the classes of 1990 through 2000 is 2.83. In Model 1, NAPS, FOUNDATION, and BOOST coefficients are positive and they are statistically significant, indicating that graduates of these programs perform better in terms of MQPR than the direct-entry midshipmen. The six demographic variables--African-American, Spanish-American, Native-American, Puerto Rican, Females and Blue-chip Athlete--are also statistically significant, all indicating a negative relationship with MQPR.

Model 2 controls for the cognitive variables. The SATMHI and RC coefficients are statistically significant at the .01 level throughout the remaining models. The coefficients of NAPS and FOUNDATION nearly double in size in Model 2. This suggests there is an independent effect of these programs in terms of boosting candidates' military performance. BOOST midshipmen have the largest difference in MQPR at .256. The Native-American coefficient is no longer statistically significant in this model.

When accounting for minority interactions between NAPS and BOOST in Model 3, the previous coefficients in Models 1 and 2 do not change. Only the Spanish-American*NAPS interaction coefficient is significant in this model and indicates this group performs better in terms of MQPR than their non-NAPS graduate Spanish-American counterparts.

The final model adds the interactions of Female*NAPS and Blue-chip Athletes status for NAPS and FOUNDATION and Blue-chip Athlete*African-American*NAPS. None of these variables make a significant impact on the MQPR score. When these variables are included in the model, the Spanish-American NAPS interaction coefficient is no longer significant.

E. FINAL GRADUATION LOGIT MODELS

Table 4.7 displays maximum likelihood estimates of the logit model for the graduation outcome. The models include class year, cognitive background, and demographic background. Table 4.8 displays the marginal effects for each variable, which represents the effect of a one-unit change in each explanatory variable on the probability of graduation from USNA.

Table 4.7 FINAL GRAD Logit Model

SUMMARY STATISTICS	Model 1 Accession source, Minority, Gender, Blue-chip Athlete		Model 2 Model 1 + SATMHI, SATVHI, RC		Model 3 Model 2 + Minority and prep school interaction		Model 4 Model 3 + Prep school and Female, Blue-chip Athlete interaction	
INDEPENDENT VARIABLES	**Coeff**	**Wald**	**Coeff**	**Wald**	**Coeff**	**Wald**	**Coeff**	**Wald**
Constant	1.228	316.703	.117	.239	.125	.275	.161	.454
NAPS	.073	1.658	.196	10.296	.148	4.108	.073	.645
FOUNDATION	.283	10.852	.374	18.191	.369	17.605	.357	16.258
BOOST	.155	.682	.234	1.536	.343	.801	.328	.732
African-American	-.593	60.358	-.522	44.445	-.550	29.776	-.553	30.078
Spanish-American	-.502	37.086	-.462	31.031	-.551	29.898	-.561	30.879
Oriental-American	.357	6.768	.340	6.094	.346	5.222	.340	5.050
Native-American	-.532	7.463	-.488	6.267	-.462	4.284	-.472	4.462
Puerto Rican	-.332	2.644	-.284	1.929	-.143	.251	-.154	.291
Filipino	.362	4.132	.359	4.050	.314	2.110	.307	2.020
Female	-.382	45.626	-.373	42.297	-.374	42.471	-.372	36.611
Blue-chip Athlete	-.378	57.229	-.305	33.176	-.303	32.471	-.354	35.877
SATMHI			.002	22.582	.002	22.701	.002	22.255
SATVHI			-.001	3.689	-.001	3.667	-.001	3.579
RC			.001	14.603	.001	13.875	.001	12.844
African-American*NAPS					.110	.471	.065	.135
Spanish-American*NAPS					.268	2.177	.328	3.079
Oriental-American*NAPS					-.085	.051	-.030	.006
Native-American*NAPS					.096	.039	.163	.111
Puerto Rican*NAPS					-.258	.374	-.193	.205
Filipino*NAPS					.223	.303	.267	.431
African-American*BOOST					-.206	.159	-.202	.153
Spanish-American*BOOST					.133	.065	.143	.075
Oriental-American*BOOST					.364	.103	.372	.107
Native-American*BOOST					-1.665	1.624	-1.658	1.611
Puerto Rican*BOOST					-.412	.183	-.402	.174
Filipino*BOOST					-.323	.126	-.317	.121
Blue-chip Athlete*NAPS							.201	2.077
Female*NAPS							.038	.051
Blue-chip Athlete*FOUNDATION							-.188	.050
Blue-chip Athlete*African-American*NAPS							.268	.897
Chi-square	430.132		473.745		479.551		484.588	
PSUEDO R^2	.046		.050		.051		.051	
-2 log Likelihood	15275.237		15231.624		15225.818		15220.781	

Note: Dummy variables for class years 1990-2000 are included in all models.

Table 4.8 FINAL GRAD Marginal Effects (in percentage points)

SUMMARY STATISTICS	Model 1 Accession source, Minority, Gender, Blue-chip Athlete	Model 2 Model 1 + SATMHI, SATVHI, RC	Model 3 Model 2 + Minority and prep school interaction	Model 4 Model 3 + Prep school and Female, Blue-chip Athlete interaction
INDEPENDENT VARIABLES				
Constant	23.85%	2.26%	2.42%	3.12%
NAPS	1.41%	3.79%	2.87%	1.41%
FOUNDATION	5.49%	7.26%	7.15%	6.93%
BOOST	3.02%	4.54%	6.64%	6.35%
African-American	-11.52%	-10.12%	-10.66%	-10.72%
Spanish-American	-9.74%	-8.96%	-10.68%	-10.86%
Oriental-American	6.94%	6.59%	6.70%	6.60%
Native-American	-10.33%	-9.46%	-8.96%	-9.14%
Puerto Rican	-6.45%	-5.51%	-2.77%	-2.98%
Filipino	7.03%	6.97%	6.09%	5.96%
Female	-7.42%	-7.24%	-7.25%	-7.22%
Blue-chip Athlete	-7.33%	-5.92%	-5.87%	-6.85%
SATMHI		0.03%	0.03%	0.03%
SATVHI		-0.01%	-0.01%	-0.01%
RC		0.01%	0.01%	0.01%
African-American*NAPS			2.13%	1.27%
Spanish-American*NAPS			5.20%	6.35%
Oriental-American*NAPS			-1.66%	-0.58%
Native-American*NAPS			1.85%	3.16%
Puerto Rican*NAPS			-5.01%	-3.73%
Filipino*NAPS			4.31%	5.17%
African-American*BOOST			-3.99%	-3.92%
Spanish-American*BOOST			2.58%	2.78%
Oriental-American*BOOST			7.06%	7.20%
Native-American*BOOST			-32.26%	-32.12%
Puerto Rican*BOOST			-7.99%	-7.79%
Filipino*BOOST			-6.27%	-6.14%
Blue-chip Athlete*NAPS				3.89%
Female*NAPS				0.73%
Blue-chip Athlete*FOUNDATION				-3.65%
Blue-chip Athlete*African-American*NAPS				5.20%

Note: Marginal effects calculated from logit coefficients in Table 4.7. Marginal effects represent the difference in the probability of graduation for a one-unit change in a continuous variable or from setting a dummy variable = 1.

The overall sample graduation rate for the USNA Classes of 1990 through 2000 was 72.8 percent. Table 4.8 displays the marginal effects for each explanatory variable expressed as changes in the probability of graduation. These percentage point changes were calculated using an algorithm to convert coefficients to marginal effects. Model 1 shows that among the prep school programs only the FOUNDATION is statistically significant with a probability of graduating from USNA that is 5.49 percentage points higher than the direct applicant. The marginal effects of African-American, Spanish-American, Native-American, Female, and Blue-chip Athlete are all negative. The Oriental-American and Filipino coefficients indicate positive and significant effects on the probability of graduation.

When the cognitive variables are added in Model 2, the coefficients of NAPS and BOOST become significant (along with the FOUNDATION). This shows that, controlling for differences in SAT scores, there are positive direct effects imparted by these programs. The FOUNDATION has the largest effect on the probability of graduation (7.26 percentage points higher than direct-entry midshipmen). The same demographic marginal effects in Model 1 remain significant and they retain their respective signs. SATMHI and RC are positive and significant at the .01 level. The coefficient of SATVHI is negative and significant at the .10 level. These cognitive marginal effects remain significant at these levels for the final two models.

Model 3 controls for the interactions of minority status between NAPS and BOOST midshipmen. None of these interactions is significant.

Model 4 controls for the interactions of athlete status and NAPS and FOUNDATION midshipmen, females and NAPS, and the African-American Blue-chip Athlete from NAPS. The only variable that exhibits a change in magnitude is the Spanish-American NAPS interaction with a 6.35 percentage points difference, significant at the .10 level.

F. SUMMARY

The analysis of the four dependent variables, OOM, AQPR, MQPR, and Final Grad, reveals the statistical performance of midshipmen who went to prep school before they were awarded an appointment to the United States Naval Academy. With respect to AQPR, MQPR and Final Graduation rate, the prep school attendees generally performed as well, and sometimes better, than the direct-entry midshipmen did when all variables were accounted for in the final model. The only performance measure on which the prep school programs significantly under performed when compared to their direct-entry classmates was Order of Merit. Once the perceived intellectual disadvantage in background cognitive ability was controlled for, performance on Academic Quality Point Rating (AQPR), Military Quality Point Rating (MQPR) and graduation rate was on par or better for NAPS, the FOUNDATION, and BOOST students.

V. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

A. SUMMARY

This study examined the effects of entering the United States Naval Academy via a preparatory school program on the performance of midshipmen and their rate of graduation from the institution. Various predictors from the USNA Admissions Board applicant data files were examined for their ability to predict the success of prep school midshipmen at the Naval Academy. The findings of this thesis suggest that midshipmen who attended either the Naval Academy Preparatory School, received a scholarship from the Naval Academy Foundation, or attend the Broadened Opportunities for Officer Selection and Training program perform as well, and in some cases better, than their direct-entry classmates.

Chapter I introduced the reader to the characteristics of Naval Academy prep schools and provided a brief background of their role in the Naval Academy admissions process. It also provided the six research questions which this thesis examines: (1) How do the characteristics of those who are sent to preparatory school differ from those who are accepted directly and from those who are denied entry? (2) Do midshipmen who attended prep school exhibit different outcomes on selected academic and other performance measures, such as the Order of Merit, than their non-prep school classmates? (3) Do midshipmen with prep school backgrounds have the same probability of graduating from the Naval Academy as their classmates? (4) What effect do SAT scores and high school class rank have on Order of Merit and probability of graduation?

(5) Are there significant differences among the three prep school programs with respect to performance in terms of Order of Merit and graduation probability? (6) Why do prep school students succeed at the Naval Academy if their records were initially deemed unsatisfactory for direct admission?

Chapter II described in detail the Naval Academy admissions process and how an applicant becomes a midshipman. Focus was placed on the cognitive characteristics needed for an appointment to the Naval Academy and the role that the SAT scores and rank in high school class play in midshipman performance. Chapter II provided a brief history of the three prep school programs and a summary of the studies that have been completed concerning these schools. These later discussions highlighted the prep schools' role in providing the tools needed for successful completion of the Naval Academy for minority groups.

Chapter III described the study's data and illustrated the importance of the performance and explanatory variables chosen for this thesis. Chapter III also stated the null hypotheses for the explanatory variables in each of the four midshipmen performance regression models.

Chapter IV statistically examined the relationship between having attended a preparatory school before attending the Naval Academy and midshipmen performance. With respect to AQPR, MQPR and Final Graduation rate, the prep school attendees generally performed as well, and sometimes better, than the direct-entry midshipmen did when all variables were accounted for in the final model. The only performance measure on which the prep school programs significantly under performed when compared to their

direct-entry classmates was Order of Merit. Once the perceived intellectual disadvantage in background cognitive ability was controlled for, performance on Academic Quality Point Rating (AQPR), Military Quality Point Rating (MQPR) and graduation rate was on par or better for NAPS, the FOUNDATION, and BOOST students.

The Naval Academy Admissions Board appears to utilize its Candidate Multiple well. This study joins with many others in validating the usage of high SAT scores and one's rank in their high school class as predictors of success at the Naval Academy. However, the selection process is not perfect. Some candidates fail to be appointed due to the difficult competition in their political sponsor's appointment slate. Others do not have the right combination of academics, leadership and athleticism to obtain a direct appointment. Despite their perceived shortcomings, this study found that prep school midshipmen are performing as well if not better than their classmates are.

B. CONCLUSIONS

1. Differences in Characteristics

The first research question asks how do the characteristics of those applicants who attended prep school differ from those who are accepted directly and those who are denied entry. The differences in the means of SAT scores and rank in high school class (RC) scores between direct-entry and prep schoolers were positive and they were significant. The Admissions Board appears to be adhering to its edict of choosing the best academically qualified for direct admission.

The differences in the means of SAT scores between prep school midshipmen and direct-entry midshipmen are negative and significant. There is no significant difference in the mean RC scores between these two groups. The conclusion here is that the RC, which constitutes 27 percent of the candidate multiple (CM), was not a significant factor in recommending these students for a prep school. This discrepancy of a mediocre RC score to below USNA standard SAT scores for prep school applicants, these two constituting 36 percent of the CM, is what might have earned an academic disqualification and the loss of a subsequent initial appointment to the Naval Academy.

2. Differences in Performance Measures

Do midshipmen who attended prep schools exhibit different outcomes on selected academic and other performance measures such as Order of Merit than their non-prep school classmates? The mean OOM position for the entire midshipmen population is 467.68. Model 1, Naval Academy Prep School attendees' OOM position is 141.675 places higher than the direct-entry midshipmen, FOUNDATION was 124.703 places higher, and BOOST was 98.75 places higher. All of these differences are significant and they indicate that the prep school midshipmen are not performing as well in as their direct-entry classmates in terms of OOM. In the final model, when the cognitive variables of SAT scores and rank in high school class and specific demographic backgrounds are controlled, the differences in OOM decrease by about half but the differences remain significant. BOOST becomes insignificant when ethnicity is controlled. Of particular note, the ethnic groups--African-American, Spanish-American,

Oriental-American, Native-American, Puerto Rican, Filipino, Females and Blue-chip Athletes--have coefficients that are positive and significant. OOM is the only performance variable where the three prep school programs do not perform as well as the direct-entry midshipmen.

With respect to Academic Quality Point Rating, the NAPS and FOUNDATION midshipmen are receive significantly lower grades than their classmates. When the cognitive variables are included the second model, NAPS and FOUNDATION are no longer significant. When the minority interaction with prep schools are included for in the third model, only African-American and Spanish-American NAPS midshipmen have coefficients higher than their counterparts. When athletic background and gender are controlled in the fourth model, the results suggest that Blue-chip Athlete*NAPS graduates are better prepared for life at Annapolis than the non-NAPS Blue-chip Athletes. Also, African-Americans and Spanish-Americans perform better at the Naval Academy, other things equal, once they have completed a year at the Naval Academy Preparatory School. Finally, females from NAPS do not perform as well at the Naval Academy. However, in all of the models, African-Americans, Spanish-Americans, Puerto Ricans, and females that enter directly all score significantly below the mean.

A tertiary hypothesis of this thesis is that the prep school midshipmen enter the academy at a slight academic disadvantage and that they compensate for that disadvantage through motivation and military professionalism as measured by the Military Quality Point Rating (MQPR). Model 1 shows that MQPR is higher for each of the prep programs than for the direct-entry midshipmen. However, African-Americans,

Spanish-Americans, Native-Americans, and Puerto Ricans, females, and Blue-chip Athletes have lower MQPR's. When the academic disadvantage is accounted for by adding cognitive variables, the prep schoolers continue to outperform their direct-entry classmates in terms of MQPR. But, minority groups, women, and Blue-chip Athletes, who entered USNA directly from high school, still under perform (with the exception of Native-Americans) compared to white males. When minority status is accounted for in the third model, only NAPS and FOUNDATION continue to outperform direct-entry applicants; BOOST is no longer significant. Spanish-American NAPS midshipmen have superior performance.

The Order of Merit score consists of 64.48 percent academic and 17.68 percent military and miscellaneous measures as detailed in chapter three. Initially, all prep school programs have positive coefficients in the MQPR models. All of the prep school midshipmen exhibit no statistical difference in AQPR when compared to the direct-entry midshipmen. However, NAPS and FOUNDATION do not do as well in OOM and those results are significant. Only when ethnic background is controlled do the BOOST midshipmen remain on par with the direct-entry midshipmen with respect to OOM. That could result from the fact that BOOST applicants are mainly minorities.

The first conclusion reached is that the Foundation midshipmen, who are mostly white, male, athletes, are performing on par with their classmates.[51] For the most part, these Foundation midshipmen were academically qualified the previous year but suffered

---

[51] Flight, William Capt, USN(ret) (18 April 2001) Director of the USNA Scholarship Foundation. Interview by author. Annapolis, MD: U.S. Naval Academy.

from competitive appointment slates. In the final models, Foundation graduates only average 64.219 places less in OOM, but exhibit no statistically different AQPR coefficients and they have a higher MQPR. The Foundation appears to be selecting the correct candidates for their program. The difficulty in examining the Foundation lies in that, unlike BOOST and NAPS where there is one preparatory school regime, the Foundation utilizes up to 24 different prep schools. The differences in those 24 regimes could account for the poor performance in OOM despite the performances in AQPR and MQPR.

NAPS caters to prior enlisted, minorities, and women. This thesis did not examine the interaction effect of prior enlisted experience but it did control for minority background and the gender of the NAPS midshipmen. In the final models, NAPS graduates have lower OOM, by no significant difference in AQPR, and they perform significantly better in MQPR than their direct-entry classmates. Of particular note, the African-American NAPS Blue-chip Athlete graduates perform better in terms of OOM than their counterparts. Furthermore, there is no significant difference between these midshipmen and their counterparts with respect to AQPR or MQPR. NAPS appears to be preparing these special midshipmen for the time management problem of balancing academics and varsity athletics.

The conclusion drawn here is that NAPS midshipmen have traditionally lower cognitive abilities and this translates into lower OOM performance. Certain ethnic groups score significantly lower on MQPR and AQPR but NAPS as a whole is competitive with the direct-entry midshipmen in terms of OOM. Being an athlete at

USNA is time consuming and cuts into academic and military performance. Being a recruited varsity athlete at USNA teaches a midshipman much about leadership and teamwork. These are highly valued experiences when determining military performance grades tend to lead to higher MQPR grades.

The BOOST program was designed to increase minority accessions into the officer ranks. The data here show that no minority group from BOOST differs significantly in performance from the direct-entry midshipmen, especially when compared with the performance of spectrum of direct-entry minority. However, BOOST midshipmen do exhibit higher MQPR coefficients than other accession programs, before demographic background is accounted for. It appears that those BOOST candidates who academically qualify for an appointment are so few, that those who are selected are carefully screened and well prepared. The positive performance on MPQR could be attributed to the prior enlisted experience that all BOOST midshipmen have in common.

3. Probabilities of Graduating

The third research question was whether or not midshipmen with prep school backgrounds have the same probability of graduating from the Naval Academy as their classmates. The FOUNDATION program graduates at 693 percentage points higher than direct-entry. In the final models, there is no statistical difference in the graduation rates for NAPS and BOOST. Even though being African-American, Spanish-American, or Native-American have a negative graduation marginal effect, when these groups are

interacted with the NAPS and BOOST prep schools, only the Spanish-American NAPS midshipmen exhibit a significant , positive difference.

Females have a probability of graduation that is –7.22 percentage points lower that the direct-entry midshipmen. Blue-chip Athletes are –6.85 percentage points less likely to graduate.

Considering the fact that only half of all U.S. high school freshmen actually complete a bachelor's degree in a six-year period and that the lowest performers of any group in this thesis, African-Americans, exhibiting a completion rate 61 percent, the Naval Academy appears to be selecting the correct applicants. African-American recruited athletes have lower graduation rates from other colleges. USNA seems to be better than average in this respect. Furthermore, prep school midshipmen are graduating at the same rate or higher than direct-entry midshipmen are. It appears that prep school programs are adequately preparing candidates who were otherwise deemed not academically qualified for successful completion of the rigorous USNA four-year program.

4. The Effect of SAT Scores and Rank in High School Class

What effect do SAT scores and high school class rank have on Order of Merit or probability of graduation? With respect to OOM, each of the three prep school programs' coefficients suggests they are associated with lower OOM positions. When minority status is controlled, the difference for the BOOST program is no longer significant and the NAPS and Foundation β coefficients continue to decrease. The

literature review in Chapter II found that nationwide, minorities score lower on the SAT. These minorities start with lower cognitive scores and their OOM is significantly lower when these scores are taken into account. This substantiates past studies of predictors of midshipmen performance reviewed in Chapter II. However, when these same cognitive predictors are controlled for in the AQPR and MQPR models, differences between the prep school programs become statistically insignificant.

SAT scores and rank in high school class do have a significant impact on each of the performance measures. SATVHI has a significant negative but small impact on graduation rate. The conclusions drawn here are that the Admissions Board is once again correct in setting high standards for SAT scores and class rank. However, a level of concern should be raised when a higher SAT verbal score has a significant negative impact on graduation probability. The Admissions Board might be placing an improper weight on this predictor.

5. Differences Between the Preparatory School Programs

Are there significant differences among the three prep school programs with respect to performance in terms of Order of Merit and graduation probability? The answer is yes. The first significant difference is that the BOOST program reveals no significant difference in terms of OOM, AQPR, MQPR and Final Grad.

With respect to the Naval Academy Preparatory School, in the final models when minority status, gender, and Blue-chip Athlete status are controlled, there is a significant

difference in OOM and AQPR, a positive significant difference in MQPR, and no significant difference in the final graduation rate.

In the final models, the Foundation program exhibits a significantly lower OOM, no statistical difference in AQPR, and a positive difference in MQPR. The FOUNDATION is the only prep school program that exhibits a significant and positive difference in graduation rate.

With respect to MQPR, BOOST has no statistical effect but NAPS and FOUNDATION graduates score higher. BOOST has the highest proportion of prior enlisted, followed by NAPS. During Plebe Year, upper class midshipmen immediately identify NAPSTERS and prior enlisted for leadership positions. This 'halo' effect and prior enlisted training could account for better MQPR performance. However, African-Americans, Spanish-Americans, Puerto Ricans, Blue-chip Athletes, and females earn significantly lower MQPR grades than their classmates. The conclusion drawn to explain this difference between AQPR and MQPR performance is that the MQPR performance measure also consists of academic class grades. These groups also score lower in AQPR and exhibit lower SAT scores than the other midshipmen do. The explanation is that there is a link between MQPR and academic credentials as some of the MQPR score is determined by academic performance in professional courses. This is supported by the fact that FOUNDATION midshipmen, achieving the highest MQPR averages, are not likely to be prior enlisted candidates. FOUNDATION midshipmen are those prep school candidates perceived by the Admissions Board to posses high motivation and leadership potential, but are lacking in the needed academic credentials to obtain a direct

appointment. Some of these FOUNDATION midshipmen were also Blue-chip Athletes who required an extra year of preparation in order to attend the Naval Academy.

6. The Success of Preparatory School Students at the Naval Academy

Why do prep school students succeed at the Naval Academy even though their records were initially deemed unsatisfactory for direct admission? The analysis conducted in this thesis indicates that prep school midshipmen as a whole do not perform on par academically with their direct-entry classmates but they perform better in military and professional performance measures. The prep school midshipman's OOM may be significantly lower, but the Foundation program does graduate at a significantly higher rate than direct-entry midshipmen do. The conclusion is that once the Admissions Board identifies candidates for a prep school program, and they successfully complete the program, there is a high probability of graduating from the Naval Academy. Prep school midshipmen may not be the Brigade Commanders or Trident Scholars, but they are successful midshipmen. They graduate. It appears that the Naval Academy is selecting the correct individuals to attend prep schools.

C. RECOMMENDATIONS

1. United States Naval Academy

This research has shown that candidates who attend prep schools are successful midshipmen. Furthermore, this research has shown that these midshipmen exhibit higher

military performance as measured by the Naval Academy's Military Quality Point Rating. The Naval Academy should continue its policy of carefully reviewing the records of individuals that will be referred either NAPS or the Foundation.

Africa-American recruited athletes from NAPS have a 65 percent graduation rate for the years 1990 through 2000. Their average SAT scores were 540 Math and 445 Verbal. However, nationwide, graduation statistics for the '89 cohort of African-Americans with these SAT scores was only 68 percent graduation rate over a six-year period compared USNA's four-year program.[52] Also, the average graduation rate for all college students nationwide is only 50 percent. The NAPS/USNA program appears to be successful in facilitating the graduation of these traditionally disadvantaged groups from a top-notch college.

A final recommendation for USNA is that they need to utilize the Officer Candidate Composite. The Candidate Multiple receives its feedback from what constitutes a successful midshipman, a graduate. The Candidate Multiple should examine successful Naval Academy graduates in the Navy and Marine Corps, compare their midshipman records with their candidate records and determine what significant variables predict high fleet performance. The Admission's Board should strive to select candidates that closely match this paragon of military performance.

---

[52] Bowen, William G. and Bok, Derek. (1998) The Shape of the River. Princeton: Princeton University Press. p 60.

2. Preparatory Schools

The Naval Academy Preparatory School does an excellent job of tracking its students and how well they perform in specific classes during Plebe year. A recommendation here is for USNA and NAPS to develop a multiple similar to the Candidate Multiple. A possibility could be to select those characteristics in a candidate's record that significantly predict positive performance at NAPS and USNA when trying to identify the best candidates for the Naval Academy Preparatory School. This is vitally important as the current Candidate Multiple does not factor in those midshipmen who went to prep school. The performance characteristics of prior enlisted midshipmen and prep school midshipmen are left out when assigning weights to the seven predictors of success in the CM by NPRST.

The Naval Academy Foundation program keeps rudimentary statistics concerning their program. The Naval Academy should track the performance of these FOUNDATION midshipmen as well as it does the NAPS midshipmen. Then, the director of the Naval Academy Foundation program will be able to monitor the specific performance of each of its contracted prep schools and decide which of the schools is actually worth the investment of the limited scholarship funds. Currently, these prep schools do posses a feedback mechanism to allow them to judge whether not they are actually preparing their charges for successful performances at the United States Naval Academy.

3. Recommendations for Further Research

The obvious next step to this study is to examine how well prep school midshipmen perform in the Fleet. The first area of concern should be retention. It is not enough that these graduates continue past their minimum service requirement; the real retention measure is whether not they are continuing on to a Department Head tour or equivalent. The second area of Fleet performance should be selection to O-4 and O-5. The third area should be selection to Executive Officer and Commanding Officer billets of operational units. Achieving these three milestones truly meets the Naval Academy's mission of providing career naval officers.

A brief study comparing the graduation rates of minorities nationwide to the minorities who attend this highly selective institution would help the Naval Academy Admissions Board make better selections. Research should include the graduation rate of varsity athletics in Division I schools in the NCAA. The minority status of these athletes should be accounted for, as well as complexity of the degree of study and the difficulty level of the college or university itself. USNA and NAPS could benefit greatly by showing that it is not admitting minorities with lower test scores for the sake of competing in Division I football or basketball.

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF REFERENCES

Alf, E.F., Neumann, I., and Mattson, J.D. (1988). "Revision of the United States Naval Academy Selection Composite". (NPRDC Tech. Rep. 88-61). San Diego: Naval Personnel Research and Development Center.

Beardon, Ron (20 February 2001) NPRSTC analyst. Telephone interview by author. Annapolis, MD: U.S. Naval Academy.

Bowen, William G. and Bok, Derek. (1998) The Shape of the River. Princeton: Princeton University Press. p 20.

Bowman, William R. and Mehay, Stephen L. (June, 1999). "A Validation of Statically-Based Scoring Models for Selecting Applicants to the Untied States Naval Academy." Unpublished paper, U.S. Naval Academy.

Cloud, John. (12 March 2001) "Should SATs Matter?" Time, p. 67.

Flight, William Capt, USN(ret) (18 April 2001) Director of the USNA Scholarship Foundation. Interview by author. Annapolis, MD: U.S. Naval Academy.

FRONTLINE (2001). "The Test Score Gap." In Frontline Web Page, [On-Line]. Available Internet: http://www.pbs.org/wgbh/pages/frontline/shows/sats/etc/gap.html.

GAO, 1992. DOD Service Academies "Academy Preparatory Schools Need a Clearer Mission and Better Oversight." GAO/NSIAD-92-57.

Guidance from the Superintendent of the U.S. Naval Academy to the Board of Admissions for the Class of 2005.

Hernandez, Michele A. (1997) A is for Admission. New York, NY: Warner Books Inc.

Hughes, R.L. (1982). "Who Goes to a Service Academy?" (Paper Presented at Annual Meeting of American Psychological Association). Washington, D.C.

Jackson, James Talmadge Jr. and Maddox, Mario Renara (1990), "The Role of the Broadened Opportunity for Selection and Training (BOOST) Program in Supporting the Navy's Minority Accession Policies." Master's Thesis, Naval Postgraduate School, Monterey, CA.

Janowitz, M. (1960). The Professional Soldier. New York: The Free Press pp. 56-57.

Larson, Charles R. Admiral, USN. "Service Academies: Critical to our Future." *Proceedings*, October, 1995, p. 34. Statistics represent only URL captains and admirals. Cited in Reardon, M. "The Development of Career Naval Officers from the U.S. Naval Academy: A Statistical Analysis of the Effects of Selectivity and Human Capital." Master's Thesis, Naval Postgraduate School, Monterey, CA.

Lehman, John F. Jr. (1988). Command of the Seas. "Rickover and the Navy Soul." 25.

Masland, John W. and Radway, Laurence I. (1957) Scholars and Soldiers Military Education and National Policy. Princeton University Press: Princeton, New Jersey: p. 171.

Mehay, Stephen L. (October, 1995). "Analysis of Performance for Junior Navy and Marine Corps Officers". Report prepared for Mr. Keith A. Maxie, Director, Military Equal Opportunity Study. Naval Postgraduate School, Monterey, CA.

Murray, Williamson (1999). Thinking about the service academies, The World and I, Vol. 14, No. 3, p. 291. Cited in Mishoe, Keith B. An Analysis of the Effect of Prior Enlisted Service on Midshipmen Performance, Graduation, and Fleet Retention at the U.S. Naval Academy. Master's Thesis, Naval Postgraduate School, Monterey, CA.

Neumann, I., & Abrahams, N. M. (October 1974). "Identification of Naval Academy applicants with engineering and science interests." (NPRDC Tech Rep. 75-7). San Diego: Navy Personnel Research and Development Center. In Neumann, Mattson, and Abrahams. (1989). "The Development of an Officer Potential Composite." (NPRDC Tech. Rep. 89-18). San Diego: Naval Personnel Research and Development Center.

Neumann, I., & Abrahams, N. M. (23 September 1982). *Development, validation, and evaluation of an SCII officer retention scale* (Unpublished report). San Diego: Navy Personnel Research and Development Center. In Neumann, Mattson, and Abrahams. (1989). The Development of an Officer Potential Composite. (NPRDC Tech. Rep. 89-18). San Diego: Naval Personnel Research and Development Center.

Neumann, I. and Mattson, J.D. (1989). "Development and Evaluation of a Officer Potential Composite." (NPRDC Tech. Rep. 89-18). San Diego: Naval Personnel Research and Development Center.

Moskos, Charles C. and Butler, John Sibley. (1996) All That We Can Be. New York, NY: BasicBooks. p 138.

Reardon, M. (1997). "The Development of Career Naval Officers from the U.S. Naval Academy: A Statistical Analysis of the Effects of Selectivity and Human Capital." Master's Thesis, Naval Postgraduate School, Monterey, CA.

Seidman, A. (1999) "Journal of College Student Retention: Research, Theory, and Practice." Journal of College Retention Web Page. [On-Line]. Available Internet: http//www.collegeways.com/JournalCSR.html.

Stearns-Eisenhower Board. (1950). Service Academy Board Report. Cited in Reardon, M. The Development of Career Naval Officers from the U.S. Naval Academy: A Statistical Analysis of the Effects of Selectivity and Human Capital. Master's Thesis, Naval Postgraduate School, Monterey, CA.

Sobel, Rachel K. (2001) "A Sizable Skills Gap" *U.S. News Online* [On-Line]; available from http//www.usnews.com/usnews/edu/college/articles/cogood.html Internet.

Title 10 U.S. Code, Section 6954

U.S. Naval Academy Admissions Office. (2001). Key Ingredients for Successful Academy Admission. In Naval Academy Web Page [On-line]. Available Internet: http://www.usna.edu.Admissions/wpeval.html

USNA INSTRUCTION 1531.51A. Class Standings and Merit Lists.

U.S. News and World Report (2000). "College Rankings." *U.S. News Online* [On-line]. Available Internet: http//www.usnews.com…s/edu/college/rankings/cohigrd1.html. Internet.

THIS PAGE INTENTIONALLY LEFT BLANK

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center.....2
   8725 John J. Kingman Road, Suite 0944
   Ft. Belvoir, VA 22060-6218

2. Dudley Knox Library.....2
   Naval Postgraduate School
   411 Dyer Road
   Monterey, CA 93943-5101

3. Nimitz Library……...……..1
   U.S. Naval Academy
   589 McNair Rd.
   Annapolis, MD 210401-5029
   Clemens@usna.edu

4. Superintendent……..……..……..1
   United States Naval Academy
   Annapolis, MD 21402-5029
   jryan@usna.edu

5. United States Naval Academy……...…….…….1
   Office of Institutional Research
   Stop 2B
   Annapolis, MD 21402-5029
   gotts@usna.edu

6. Professor Stephen L. Mehay, CodeSM/SG……..1
   Naval Postgraduate School
   Monterey, CA 93943
   Smehay@nps.navy.mil

7. Professor Roger D. Little…….1
   Economics Department
   United States Naval Academy
   Annapolis, MD 21401-5029
   little@usna.edu

8. LT Brian S. FitzPatrick, USN……..4
   577 Francis Nicholson Way
   Annapolis, MD 21401
   fitzpatr@gwmail.usna.edu