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THESIS

**AN EXPLORATORY STUDY OF PERSUASIVE
INFLUENCES ON MIDSHIPMAN SERVICE SELECTION AT
THE UNITED STATES NAVAL ACADEMY: COMPARING
SERVICE SELECTION FOR THE SUBMARINE FORCE
AND THE UNITED STATES MARINE CORPS**

by

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June 2007

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FORCE AND THE UNITED STATES MARINE CORPS**

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The purpose of this thesis is to identify relevant characteristics associated with service choice at the United States Naval Academy (USNA). Specifically, this study compared male midshipmen from the classes of 2000–2006 who chose the United States Marine Corps as a first choice and male midshipmen who chose the submarine force upon graduation as a first choice, and measured the predictability of these service choices using appropriate independent variables. Analysis of variance (ANOVA) and Pearson Chi-square goodness-of-fit tests measured the independent variables before including them in the binary logistic regressions used to measure predictability. The data were collected from the Office of Institutional Research. This study concludes that there are differences between the midshipmen who chose USMC and the midshipmen who chose the submarine force in terms of personality, family experience, academic performance, military performance, physicality and prior experience.

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I. INTRODUCTION

A. AREA OF RESEARCH

The purpose of this thesis is to explain why the midshipmen desire to service select the United States Marine Corps (USMC) is unusually high while desire to select the naval submarine force is unusually low. In fact, demand for Marine billets exceeds the number of billets available. In contrast, available billets for the submarine force have not “filled” over the last several years. This phenomenon is perplexing, especially considering that service with the USMC involves greater wartime risk, less compensation incentives, slower rates of promotion, and a more aggressive deployment schedule than service with submarine forces. Using archival data from the Office of Institutional Research (IR) from USNA Classes 2000 through 2006, important factors that influence midshipmen to service select USMC and submarine forces at a disproportionately higher and lower rate, respectively, will be explored.

B. RESEARCH QUESTIONS

Primary Question

What are some factors that help to define why midshipmen choose USMC or submarines as a service choice?

Secondary Questions

1. What effect does personality and temperament have on service preference for either the USMC and the submarine force?
2. What effect does individual physicality have on service preference for the USMC and the submarine force?
3. What influence does familial experience have on service preference?
4. What influence does prior military experience have on service preference?
5. Are there differences between those midshipmen who prefer USMC as a service choice and those midshipmen who prefer the submarine force in terms of academic and military performance at USNA? Specifically, do CAQPR, CMQPR, SAT Math scores and SAT Verbal scores have an effect on service choice?

C. DISCUSSION

Periodically, the warfare communities within the Department of the Navy must renew their understanding of what type of men and women they want to serve as officers in their units. Since September 11, 2001, the face of war has dramatically changed for the United States, and, naturally, so have the general experiences of midshipmen at the United States Naval Academy. Amidst this crisis it has been noted among the Naval Academy community that demand for USMC has risen sharply in the past five years as compared to the submarine force, which has been struggling to make its yearly quotas (personal communication, CDR Hixenbaugh, March 2007).

During the Vietnam conflict, the Marine Corps had a difficult time meeting their quota for officers from the Naval Academy, which was traditionally 16.5% of each graduating class. According to the senior Marine assigned to the Naval Academy, Colonel Paulovich, USMC, due to heated political debates of that era, negative public sentiments associated with military service and the imminent danger for Marine Corps officers in Vietnam, many midshipmen averted service selection in the Marine Corps at all costs (personal communication, March 2007). Conversely, despite today's wartime environment, a record number of midshipmen are tending to embrace the Marine Corps as their number-one choice for service assignment. In fact, the quota was recently raised to 20% of each graduating class to accommodate the increasing numbers of midshipmen who make the Marine Corps their first choice (Memorandum of Agreement, 2005).

According to the Professional Programs Department Chair, CDR Frank Hixenbaugh, recently the Marine Corps has succeeded in recruiting midshipmen while the submarine community has failed (personal communication, March 2007). Today the submarine community has a difficult time capturing enough positive attention from USNA midshipmen to inspire them to earn their submarine officer warfare qualification. Since 2001, the submarine community has not reached its service assignment goals (United States Naval Academy, 2007), which raises some questions as to what causes midshipmen to avoid selecting this service specialty. Submarine officer candidates at the Naval Academy receive a signing bonus on service selection night, will enjoy an

accelerated promotion rate compared to their shipmates from other warfare communities, work in an environment with a better safety record with substantially less risk, and generally earn a higher total salary than most officers of the same paygrade in other warfare specialties. The goal of this research is to explain this service selection phenomenon.

The Marine Corps at the Naval Academy attracts the attention of midshipmen in many ways. This researcher has observed that Marine officers have uniforms, haircuts, and communication skills that are significantly different than those of navy officers. Midshipmen, therefore, understand early in their academy experience that joining the Marine Corps begets something new, different and unique from other branches of the naval service.

Moreover, Marine Corps officers at the Naval Academy are judged by their superiors on their ability to elicit the interest of midshipmen. Navy officers, conversely, according to CAPT O'Neill, are generally not judged on their ability to breed excitement about their warfare community (personal communication, March 2007). According to the senior Marine Officer on the Yard (who signs the Performance Evaluations of all the Marine Officers at USNA), Marines are judged on both their ability to train midshipmen and their ability to recruit midshipmen. In fact, this duty is seen partially as recruiting duty for Marines (personal communication, March 2007).

D. SCOPE OF THESIS

This thesis analyzed a data set that only included male midshipmen from the USNA Classes of 2000–2006. Gender and race were not included in this study; a robust analysis was conducted that only focused on USMC and the submarine force. Gender was not included because women are not permitted to select submarines as a service choice. Although there are numerous other service choices available to midshipmen, USMC and the submarine force have seen the most variance with demand from midshipmen in the past five years (USNA, Professional Development Department, 2007). Because of the recent trends of the service preference of midshipmen, only the classes of 2000–2006 were used.

F. METHODOLOGY

Archival data were collected from Institutional Research for USNA Classes of 2000 through 2006. The dependent variables in this study were midshipmen service selections into USMC and the submarine force. Independent variables were Meyer-Briggs Personality Type Indicators (MBTI) for each midshipman (specifically the categorical variables of Extravert vs. Introvert and Judging vs. Perceiving); level of athleticism as measured by participation in varsity sports, average Physical Education grades and average Physical Readiness Test scores; Cumulative Academic Quality Point Ratio (CAQPR), Cumulative Military Quality Point Ratio (CMQPR), SAT Mathematics scores, SAT Verbal scores, prior military experience and familial experience (specifically the influence of the father's military experience).

The categorical nature of the independent and dependent variables suggested that discrete quantitative statistics be applied. The bivariate and multivariate logit models were particularly appropriate since explicit independent and dependent variables were operationalized. Categorical and continuous independent variables were analyzed using the Pearson Chi-square Test and the ANOVA (Analysis of Variance) Test, respectively. Once each independent variable was determined to pass a goodness-of-fit test, it was entered into the final binary logistic regression for analysis. Use of these procedures enabled the researches to reach distinctive conclusions regarding the effects of independent variables upon the dependent variable of interest.

II. LITERATURE REVIEW

A. OVERVIEW

This study is being conducted to investigate why, during wartime, midshipmen demand for the United States Marine Corps as a career choice is unusually high compared to the Submarine Force. This chapter will focus on trends of career choices among 22 to 26-year-olds, adult development theory, the history of service selection at the United States Naval Academy, military recruiting techniques and an overview of the Myers-Briggs Type Indicator. Moreover, recent developments with service selection will be addressed.

B. SERVICE ASSIGNMENT AT THE UNITED STATES NAVAL ACADEMY

The service assignment process at the United States Naval Academy (USNA) was created to “meet the needs of the Navy and Marine Corps (USMC) by selecting the best qualified midshipmen for each available billet” (United States Naval Academy, 2005, p. 1). Midshipmen can be assigned one of the following services or billets: Naval Aviation, Surface Warfare, Surface Warfare (Nuclear), Naval Flight Officer, USMC Ground, USMC Pilot, USMC Naval Flight Officer, Special Warfare (SEAL), Special Operations, Submarines, and the various choices in the restricted line community. It is possible for a midshipman to apply and be assigned to another component of the Department of Defense, such as the United States Army (USA) or United States Air Force (USAF), but this thesis will disregard these rare cases and focus only on the service assignment process for the Submarine Force and the USMC. Because only men are authorized to select the submarine force, the scope of this thesis will only include males. Further, the data are drawn from the classes of 2000 – 2006; this study analyzes the most recent trends of midshipmen.

1. Service Assignment Process

The service assignment process at USNA is conducted in three phases: the Community Screening Phase, the Preference Designation Phase and the Assignment Phase (United States Naval Academy, 2005). Generally, the goal of this process is to determine whether or not a midshipman is eligible for a particular service, gather service preference data on each midshipman and then satisfy the needs of the Navy and Marine Corps by placing the best possible candidates in each service.

The Community Screening Phase consists of “medical screening and community specific, academic, physical and professional screening” (United States Naval Academy, 2005, p. 2). A midshipman must first be physically qualified for a particular service before he or she can select that service as a possible career choice upon graduation. For example, a midshipman who is color blind cannot select Naval Aviation as a career choice due to a physical disqualification. His or her choices will be limited to the service choices that admit individuals with color blindness.

The medical and physical screening process for commissioning can be rigorous. It is generally understood that the medical screening process for the USMC is less rigorous than that of the Submarine Force. For medical purposes, Submarine Duty is considered special duty while USMC is not. For a billet to be assigned as special duty it must be determined that superior physical health is required for overall mission success (Bureau of Medicine, 2005). For example, should a Submarine Officer who is prone to asthma attacks actually have an episode while onboard a submarine clandestinely conducting surveillance, a grave consequence potentially exists for mission failure. The Manual of the Medical Department (Bureau of Medicine, 2005) states that personnel who have been found deficient in the physical standards, or whose physical and mental performance in submarines would be bad for their health, other members of the crew or the overall mission of the submarine, should be processed for submarine disqualification. The conditions for physical disqualification can include but are not limited to poor hearing, inability to equalize pressure in the ears, a history of asthma, minimum uncorrected visual acuity of 20/300, defective color vision, a history of gastrointestinal

tract disease, any skin disease that can be aggravated by the submarine environment and personality disorders (Bureau of Medicine, 2005). There is not a physical fitness test associated with submarine force other than the standard Physical Readiness Test (PRT). The most obvious physical feature that ensures immediate disqualification is gender: only males have the option to select submarines as a career choice.

The medical screening for the United States Marine Corps is less rigorous than that of submarine force candidates. Only a fraction of the disqualifying criteria for submarine force applicants applies to the USMC. A USMC candidate must pass an HIV test, complete and pass a physical examination within two years of applying to the USMC (Preference Designation Phase) and receive an up-to-date dental evaluation (Bureau of Medicine, 2005).

The academic screening for the Submarine Force is just as rigorous as the medical screening requirements. According to CAPT John O'Neill, the senior Submariner assigned to USNA, students are pre-screened academically to even be eligible to apply for the Submarine Service (personal communication, March, 2007). This pre-screening looks as SAT scores, academic grade point average, and major (engineering or humanities). Furthermore, the Professional Development Department at USNA will not send a midshipman who did not pass the pre-screening phase on a summer cruise involving submarines. It is seen as an ineffective allocation of funds to send a midshipman on a submarine cruise who, it is predicted, will not be eligible to reach the application phase.

Once a midshipman passes the pre-screening phase for Submarine Service, he then undergoes a rigorous interview process that tests his knowledge in mathematics, physics and basic engineering. During the interview the applicant is given an oral examination that tests his knowledge and his ability to communicate under pressure. The final phase of this process is an interview with the Chief of Naval Reactors, a four star admiral. In the Naval Nuclear Propulsion Study Guide, the Admiral's interview is explained: "This man will determine in five minutes whether or not you will become a nuclear officer in the Navy" (Naval Nuclear Propulsion Study Guide, 2007, p. 1). This final interview is generally based on the interviews conducted by Admiral Hyman

Rickover, who was notorious for “frequently barking harsh questions at the midshipmen in an attempt to identify the most capable of the First Class” (Gelfand, 2006, p. 32). There was also a special chair Admiral Rickover used to sit the midshipmen in during the interview. This four-legged chair had a few inches sawed off the front legs, resulting in a dramatic lean forward. It was used to test how midshipmen responded to abnormal situations. This chair is currently displayed at Naval Reactors Headquarters in Arlington, Virginia.

Conversely, academic screening for the United States Marine Corps is limited to USNA standards. Academic grades are not weighted as heavily as they are in the submarine force; military order of merit, physical performance and performance in Leatherneck, which is an extensive USMC summer training experience for midshipmen who are interested in choosing USMC as a service choice. All weigh as much if not more than academics at the USMC selection board. According to Colonel Michael Paulovich, the senior USMC Officer assigned to USNA and thus the approving authority for USMC selection, academics is just one of the many criteria used to select midshipmen (personal communication, March, 2007). If a midshipman is intelligent enough to graduate from the Naval Academy, according to COL Paulovich, he or she is worthy of selection for the Marine Corps provided he has maintained good standing in honor, conduct and military performance. It should not be inferred that the submarine force does not regard good military performance attributes as essential qualities for service selection; academic screening is certainly more rigorous for those whose success at Nuclear Power School depends on superior degrees of intelligence.

Once the Community Screening Phase is complete and midshipmen understand whether they have or have not met the minimum requirements for each community, they can now “mark for the record their service and community preferences from among those communities for which they have been found fully qualified” (United States Naval Academy, 2005, p. 2). This process, otherwise known as the Preference Designation Phase, is intended to discern what the top three career choices are for each midshipman. This is a critical step in the USNA service assignment process. Because of the selective nature of the USMC and the submarine force, midshipmen generally must have “USMC”

or “Submarines” as their first or second choice to be considered for acceptance by each selection board. For example, a male midshipman who is physically and academically qualified for Nuclear Power School and is as interested in being a submariner as he is in being a surface warfare officer must decide what to enter as a first choice, because he will most likely receive his first preference a provided that each community’s quota has been filled.

The final selection for each community occurs via Service Assignment Boards during the Assignment Phase of the service assignment process. According to USNA Instructions (United States Naval Academy, 2005), “service assignment boards for each community will select the best qualified midshipmen from among those applying per the quotas provided by the Chief of Naval Personnel.” (p. 3) The members of each board do not intend to determine qualification for respective communities; rather, they seek to pick the best candidates from those midshipmen who have already been deemed academically and physically qualified. It is interesting to note that the selection board for USMC makes no distinction between midshipmen who desire to become Marine aviators and those who desire a USMC ground Military Occupational Specialty – in fact, that is never even briefed in the board (Wadle, 2004). The board simply selects those midshipmen they deem worthy of the Marine Corps. The voting members of the Service Assignment Boards for each community are composed of the senior officer of the respective community assigned to USNA, various field-grade officers (USMC) and post-command Commanders and Captains (United States Navy).

Once the board has completed the selection process, the final list for each community is then sent to an Executive Review Board (ERB), presided over by the Commandant of Midshipmen (United States Naval Academy, 2005). This board is intended to ensure adequate diversity within each community. Once the ERB approves the lists from each community, they are then sent to the Superintendent of the Naval Academy for approval. Once the Superintendent approves the selections of each community, the lists are ready for distribution to the midshipmen.

This research implies that there are differences between the midshipmen who prefer USMC and the midshipmen who prefer submarines. According to the senior

submariner and the senior Marine assigned to USNA, there are considerable differences in the way academic and military performance affects service choice. Submariners boast a greater emphasis on academic performance while Marines put great emphasis on military performance. This study used the Cumulative Academic Quality Point Ratio (CAQPR), the Cumulative Military Quality Point Ratio (CMQPR), SAT Verbal scores, SAT Math scores and a Physicality Index to analyze these differences. This is discussed in the methodology section.

C. CAREER CHOICE IN EARLY ADULTHOOD

Many sociologists assert that college graduates, both male and female, display common attitudes when choosing a career upon graduation. Adults in their twenties and thirties generally tend to explain their occupational and social role aspirations in terms of their desire to “fit in” or to “succeed” (Hart, 1992). The U.S. Service Branches have capitalized on this reality, as can be seen by the slogans in their advertisements – “be all you can be” for the Army (recently replaced by “Army of One”), “accelerate your life” in the Navy, and join “the few, the proud, the Marines.” The leaders of the Public Relations and advertising campaigns, it seems, have used adult development theory to improve recruiting efforts. The service communities at the United States Naval Academy are no different.

In Levinson’s study of the Early Adult Transition, 65% of his subjects used the military in some fashion as a means of transition into the early adult world. Most of the men in his study viewed their time in the military as extremely formative and as an experience that turned “boys into men” (Levinson, 1978, p. 172). Indeed, it is important to view the military experience of men in their twenties as “formative,” as individuals in the Early Adult Transition do not wish to decide on an occupation as much as they desire to form one – young adults generally do not enjoy being “pigeonholed” in one career (Levinson, 1978, p. 101).

In general (O’Neil, Ohlde, Barke, 1980, as cited in Newman & Newman, 1975, p. 433) the process of choosing a career includes six factors: individual, psychosocial / emotional, socioeconomic, societal, familial and situational. These factors correlate

significantly with sex-role socialization, which in turn creates a powerful filter through which choices related to career development are made. In other words, these factors also affect how one perceives one's gender role, which consequently impacts career choice. This sex-role socialization, as it is known, shapes career decisions via two psychological factors: expectations of a particular gender's ability to succeed in a particular occupation and value hierarchies reflecting long-range life goals relative to gender (Newman & Newman, 1975). Young adults about to enter the job market, therefore, have a tremendous amount of external influences that serve to impact career choice.

One cannot overemphasize the influence of family on career choice. Because the earliest and most powerful source of gender-role socialization is the family (Stephan & Stephan, 1990), it can consequently be postulated that family thus affects career choices of young adults. Family influence can also specifically affect men; some researchers have indicated that level of parental education directly enhances sons' occupational status (Griffin & Alexander, 1978; Sewell & Hauser, 1980; Tinto, 1984 as cited in Pascarella & Terenzini, 1991 p. 485).

Personality also has a significant impact on an individual's predisposition to choose a particular field of study or career. Boone, van Olffen and Roijackers (2004) found strong support for personality differences between students in different study programs. Furthermore, in meta-analysis of studies of the relationship between job congruence and satisfaction, Tsabari, Tziner and Meir (2005) found results indicating that persons tend to choose occupational environments consistent with their personality types and find more success in a job that is congruent with their personality, as defined by MBTI (as cited in Harrington & Harrigan, 2005).

Another factor affecting the career choices of college students is prior work experience. Pascarella and Staver (1985) and Kuijpers, Schyns and Schreenens (2006) found a significant correlation between prior work experience and career choice. Pascarella et al., for example, found that most college graduates who had prior work experience in engineering chose to be engineers upon graduation. Furthermore, Jagacinski, Lebold and Shell (1986) found that prior work-related experience is positively correlated with satisfaction of career choices among college students (Pascarella et al.,

1991). One aspect of this study focuses on the prior work-related experiences of midshipmen – specifically experiences in Nuclear Power School (NPS) and USMC. NPS is directly related to the submarine service (one of the variables in this study) and prior USMC experience certainly applies to USMC service selection.

D. MYERS-BRIGGS TYPE INDICATOR

The Myers-Briggs Type Indicator (MBTI) is a personality inventory that is grounded on the theories Carl Jung developed that he explains in his work *Psychological Types* (1921). The inventory that is used today was originally developed by Katharine C. Briggs and Isabel Briggs Myers, who spent almost 20 years reading Jung’s work on psychological analysis and carefully observing individual behavior (Quenk, 2000). Since 1956, various forms of MBTI assessments of type have been available. Over the past half-century, sources have been developed that extrapolate on Carl Jung’s theories and MBTI results. Today, about 2 million people complete an MBTI assessment annually, making it the most widely used instrument for assessing personality functioning in the world (Quenk, 2000).

Originally, Jung’s work revealed his observation of the two ways people get “energy”: through themselves via time alone (introversion) and from other people via group interactions (extraversion) (Quenk, 2000). Through further observations, Jung was able to determine that the dichotomy of extraverts and introverts was oversimplification of the complexities of personality; amplifying information was needed to provide a more accurate understanding of personality and behavioral tendencies. He expanded on extraversion and introversion by identifying two more pairs of mental functions: perceiving functions and judging functions. Originally, Jung’s personality theory was based upon three dichotomies. Myers and Briggs added the Judging and Perceiving dichotomy when developing the MBTI. Today’s MBTI measures an individual’s preferences in four dichotomies: kinds of attitude and energy, Extraversion (E) and Introversion (I); kinds of perception, Sensing (S) and Intuition (N); kinds of judgment, Thinking (T) and Feeling (F); and orientations to the outer world, Judging (J) and Perceiving (P).

The four dichotomies result in 16 possible four-character combinations that describe the 16 different personality types that MBTI uses. Table 1 shows the types with descriptions.

Table 1. Type Table of MBTI

<p style="text-align: center;">ISTJ</p> <p>Serious, quiet, earn success by concentration and thoroughness. Practical, orderly, matter-of-fact, logical, realistic and dependable. See to it that everything is well organized. Take responsibility. Make up their own minds as to what should be accomplished and work toward it steadily, regardless of protests or distractions.</p>	<p style="text-align: center;">ISFJ</p> <p>Quiet, friendly, responsible and conscientious. Work devotedly to meet their obligations and serve their friends and school. Thorough, painstaking, accurate. May need time to master technical subjects, as their interests are not often technical. Patient with detail and routine. Loyal, considerate, concerned with how other people feel.</p>
<p style="text-align: center;">ISTP</p> <p>Cool onlookers, quiet, reserved, observing and analyzing life with detached curiosity and unexpected flashes of original humor. Usually interested in impersonal principles, cause and effect, or how and why mechanical things work. Exert themselves no more than they think necessary, because any waste of energy would be inefficient.</p>	<p style="text-align: center;">ISFP</p> <p>Retiring, quietly friendly, sensitive, modest about their abilities. Shun disagreements, do not force their opinions or values on others. Usually do not care to lead but are often loyal followers. May be rather relaxed about assignments or getting things done, because they enjoy the present moment and do not want to spoil it by undue haste or exertion.</p>
<p style="text-align: center;">ESTP</p> <p>Matter-of-fact, do not worry or hurry, enjoy whatever comes along. Tend to like mechanical things and sports, with friends on the side. May be a bit blunt or insensitive. Can do math or science when they see the need. Dislike long explanations. Are best with real things that can be worked, handled, taken apart or put back together.</p>	<p style="text-align: center;">ESFP</p> <p>Outgoing, easygoing, accepting, friendly, fond of a good time. Like sports and making things. Know what's going on and join in eagerly. Find remembering facts easier than mastering theories. Are best in situations that need sound common sense and practical ability with people as well as with things.</p>

<p style="text-align: center;">ESTJ</p> <p>Practical realists, matter-of-fact, with a natural head for business or mechanics. Not interested in subjects they see no use for, but can apply themselves when necessary. Like to organize and run activities. Tend to run things well, especially if they remember to consider other people's feelings and points of view when making their decisions.</p>	<p style="text-align: center;">ESFJ</p> <p>Warm-hearted, talkative, popular, conscientious, born cooperators, active committee members. Always doing something nice for someone. Work best with plenty of encouragement and praise. Little interest in abstract thinking or technical subjects. Main interest is in things that directly and visibly affect people's lives.</p>
<p style="text-align: center;">INFJ</p> <p>Succeed by perseverance, originality and desire to do whatever is needed or wanted. Put their best efforts into their work. Quietly forceful, conscientious, concerned for others. Respected for their firm principles. Likely to be honored and followed for their clear convictions as to how best to serve the common good.</p>	<p style="text-align: center;">INTJ</p> <p>Have original minds and great drive which they use only for their own purposes. In fields than appeal to them they have a fine power to organize a job and carry it through with or without help. Skeptical, critical, independent, determined, often stubborn. Must learn to yield less important points in order to win the most important.</p>
<p style="text-align: center;">INFP</p> <p>Full of enthusiasms and loyalties, but seldom talk of these until they know you well. Care about learning, ideas, language, and independent projects of their own. Apt to be on yearbook staff, perhaps as editor. Tend to undertake too much, then somehow get it done. Friendly, but often too absorbed in what they are doing to be sociable or notice much.</p>	<p style="text-align: center;">INTP</p> <p>Quiet, reserved, brilliant in exams, especially in theoretical or scientific subjects. Logical to the point of hair-splitting. Interested mainly in ideas, with little liking for parties or small talk. Tend to have very sharply defined interests. Need to choose careers where some strong interest of theirs can be used and useful.</p>

<p style="text-align: center;">ENFP</p> <p>Warmly enthusiastic, high-spirited, ingenious, imaginative. Able to do almost anything that interests them. Quick with a solution for any difficulty and ready to help anyone with a problem. Often rely on their ability to improvise instead of preparing in advance. Can always find compelling reasons for whatever they want.</p>	<p style="text-align: center;">ENTP</p> <p>Quick, ingenious, good at many things. Stimulating company, alert and outspoken, argue for fun on either side of a question. Resourceful in solving new and challenging problems, but may neglect routine assignments. Turn to one new interest after another. Can always find logical reasons for whatever they want.</p>
<p style="text-align: center;">ENFJ</p> <p>Responsive and responsible. Feel real concern for what other think and want, and try to handle things with due regard for other people’s feelings. Can present a proposal or lead a group discussion with ease and tact. Sociable, popular, active in school affairs, but put time enough on their studies to do good work.</p>	<p style="text-align: center;">ENTJ</p> <p>Hearty, frank, able in studies, leaders in activities. Usually good in anything that requires reasoning and intelligent talk, such as public speaking. Are well-informed and keep adding to their fund of knowledge. May sometimes be more positive and confident than their experience in an area warrants.</p>

Manual: A Guide to the Development and Use of the Myers-Briggs Type Indicator (1st Ed) p.20.

1. Uses of the Myers-Briggs Type Indicator

The MBTI is a relevant tool in many diverse areas – education, career development, organizational behavior, psychotherapy, group functioning, and team functioning are but a few of the areas where the MBTI can be utilized (Quenk, 2000). The goal of the MBTI is clear: to make the theory of psychological types described by Jung understandable to and useful in people’s lives (Myers, Quenk & Hammer, 1998). It is important to keep in mind these key factors when using the MBTI as an assessment tool: the MBTI identifies preferences rather than competencies and the eight characteristics that are defined in the MBTI (Extraversion or Introversion, Sensing or

Intuition, Thinking or Feeling and Judging or Perceiving) are “dichotomous constructs” that describe “equally legitimate but opposite ways in which we use our minds” (Myers, Quenk & Hammer, 1998, p. 1). Moreover, the MBTI is to be used as a counseling tool; merely mailing the results of the assessment to the client is an inadequate method of feedback. A professional interpreter who is trained to administer the MBTI should always be included in the verification and interpretation process (Myers, Quenk & Hammer, 1998).

The MBTI is extensively used in leadership and management development in civilian and government organizations. Because leaders and managers are responsible for organizational outcomes, it is important to have a basic understanding of how personality affects group dynamics (Fitzgerald & Kirby, 1997). Currently, the MBTI is being used at USNA to teach midshipmen about personality traits and how they apply to leadership.

It should be noted that personality typing is not a universally accepted psychological or psychiatric tool. Since its inception, the scientific foundation of the MBTI has been debated. Furthermore, it can often be incorrectly used to label individuals and thus form false justification for elitist behavior. The MBTI is not to be used as a tool to discern or identify mental disorders in clients (Myers et al., 1998).

2. Use of the MBTI at the United States Naval Academy

During a Midshipman’s first year at USNA, the MBTI is administered and used as a leadership tool. It is also used as a data tool for the IR Department at USNA. The results of the MBTI have shown relationships to such things as leadership characteristics, attrition and performance assessment (Roush 1989; 1992; 1997 as cited in Bowers, 2002). Furthermore, it has greatly enhanced leadership training at USNA and is particularly insightful in understanding how psychological preferences affect leadership behavior (Bowers, 2002). Company Officers and other staff members at USNA also use the MBTI as a leadership tool as well – it serves to help the leaders of midshipmen become more self-aware.

3. Introversion vs. Extroversion

Perhaps the cornerstone of Jung's theories on personality is the descriptions and concepts of extraversion and introversion (Myers, Quenk & Hammer, 1998). In his early studies, Jung postulated and observed that there were essentially two kinds of people in the world: introverts and extroverts (Myers, Quenk & Hammer, 1998). These two personality traits are seen as attitudes or orientations of energy. The extraverted attitude describes an individual whose energy and attention are drawn out to the environment. Introversion, conversely, is when energy is drawn from the environment toward inner experience, concepts and ideas. (Myers, Quenk & Hammer, 1998). Through his identification of these two types he was able to give broad-ranging descriptions of extraversion and introversion that gave insight into the attitudes, reactions and psyche of individuals (Myers, Quenk & Hammer, 1998).

Extraverts have a need for sociability and appear to be "energized" by others (Kiersey & Bates, 1978). Talking to, playing with and working with people are what motivate an extravert. Genuine loneliness is experienced when an extravert is somehow precluded from extended interaction with other human beings. Although extraverts may have introverted tendencies and vice versa, it should be noted that the preferred attitude is extraversion (Kiersey & Bates, 1978). Career interests for an extravert are generally related to social and enterprising activities and public speaking. They are generally viewed by their peers as affectionate, empathetic, inclusive and sociable. Moreover, they tend to be more assertive and dominant in their environment (Myers, Quenk & Hammer, 1998).

Introverts tend to draw energy from the environment toward inner reflection. Generally, an introverted individual tends to find value in the internal, subjective state and are therefore more interested in the world of ideas, concepts, recollected experience than on external events and social activities (Myers, Quenk & Hammer, 1998). Spending too little time alone while being forced into social situations can result in fatigue and low motivation for an introvert (Quenk, 2000). Table 2 shows the effects of extraversion and introversion on work situations.

Table 2. Effects of Extraversion – Introversion in Work Situations

Extraversion	Introversion
Like variety and action	Like quiet concentration
Tend to be faster, dislike complicated procedures	Tend to be careful with details, dislike sweeping statements
Are often good at greeting people	Have trouble remembering names and faces
Are often impatient with long, slow jobs done alone	Tend not to mind working on one project for a long time alone and uninterrupted
Are interested in the activities of their job, in getting it done and in how other people do it	Are interested in the details and/or ideas behind their job
Often do not mind the interruption of answering the telephone	Dislike telephone intrusions and interruptions
Often act quickly, sometimes without thinking it through	Like to think before they act, sometimes without acting
Like to have people around	Work contentedly alone
Usually communicate freely	Have some problems communicating to others since it's all in their heads

From Manual: A Guide to the Development and Use of the Myers-Briggs Type Indicator (1st Ed) p.79.

4. Judging vs. Perceiving

The Judging vs. Perceiving dichotomy was not an original aspect of Jung’s analysis on personality types. This particular dichotomy was developed by Briggs and Myers when first developing the MBTI (Myers et al., 1998). It describes both an individual’s preference of judgment or perception and it serves to extrapolate on the dominance of a judging or perceiving attitude. For example, if an individual is to be scored as a “J,” it can be said that the judging function (or T vs. F) is what is displayed to the outside world. Conversely, if an individual is to be scored as a “P,” the perceiving function (S vs. N) is displayed to the outside world (Myers, Quenk & Hammer, 1998). This orientation is an essential aspect of the type theory developed by Myers and Briggs; it serves to explain what personality traits individuals generally show to their environment.

Those who prefer closure over open options are likely to be judging types (Keirsey & Bates, 1978). Decision making skills of a “J” are generally well-developed and they are often more comfortable with their final decision than a “P.” Judging types tend to establish deadlines, value work more than play and shut off perception once decisions are made (Myers, Quenk & Hammer, 1998). Moreover, they often seem in their outer behavior to be organized, purposeful and decisive (Myers, Quenk & Hammer, 1998).

Perceivers tend to be more preoccupied with play. They are more open, curious and interested in their environment than their judging counterparts (Myers, Quenk & Hammer, 1998). Their outer behavior tends to be spontaneous, curious, and adaptable, which causes them to often put off decisions until excessive amounts of information are obtained. Generally, deadlines are not taken as seriously as they are for judging types (Keirsey & Bates, 1978). Table 3 shows the effects of judging and perceiving on work situations.

Table 3. Effects of Judging – Perceiving in Work Situations

Judging	Perceiving
Work best when they can plan their work and follow the plan	Adapt well to changing situations
Like to get things settled and finished	Prefer leaving things open for alterations
May decide things too quickly	May unduly postpone decisions
May dislike to interrupt the project they are on for a more urgent one	May start too many projects and have difficulty finishing them
May not notice new things that need to be done in their desire to complete what they are doing	May postpone unpleasant jobs while finding other things more interesting in the moment
Want only the essentials needed to begin their work	Want to know all about a new job
Tend to be satisfied once they reach a judgment on a thing, situation or person	Tend to be curious and welcome a new light on a thing, situation or person

From Manual: A Guide to the Development and Use of the Myers-Briggs Type Indicator (1st Ed) p.82.

Although there are many different ways to interpret the MBTI, this study only analyzed the extravert/introvert and judging/perceiving dichotomies. Because Bowers (2002) already conducted a study on the comparison of the MBTI 4-letter type and career choice, this study separates the MBTI and focuses on how certain personality traits effect career choice. According to Professor Ellie Malone, a political science professor at the Naval Academy and a seasoned and trained expert in the administration and interpretation of the MBTI, the extrovert/introvert and judging/perceiving dichotomies were the best ones to isolate due to their complete independence from one another (personal communication, February 2007). Keirsey (1978), Quenk (2000) and Myers et al. (1998), suggest that these dichotomies can be isolated and do show unique qualities when analyzed.

E. UNITED STATES MARINE CORPS

1. Recent History at the United States Naval Academy

Since 1887, the United States Naval Academy has been providing officers to the United States Marine Corps. Recently, the War on Terrorism has dramatically impacted the lives of new USMC Officers who are recent graduates of USNA. Despite the increased levels of casualties among the Officer Corps and increased numbers of deployments to war zones with remarkably short turnarounds, the USMC has enjoyed outstanding popularity among Midshipmen. In fact, it has become the second most popular choice (to Naval Aviation) of service selection in the Brigade in the past two years (United States Naval Academy, 2007).

Historically, the United States Marine Corps has been classified as a Naval Service. For a majority of the Twentieth Century, the USMC was subject to the Navy's senior leadership at the joint and national levels (Gannon, 2000). During the last half-century the Marines have departed from their traditional role and have become more autonomous from the Navy, particularly in regards to how they are led; currently, they are seen as a distinct service under the Department of the Navy with their own senior leadership at the national level (Gannon, 2000). The senior Marine assigned to the

Naval Academy, COL Paulovich, considers this USMC distinction from the Naval Service as a cornerstone for the Marines' popularity among Midshipmen (personal communication, March 2007).

Until World War II, the Naval Academy was the primary commissioning source for Marine Corps Officers. Today, Annapolis graduates make up a much smaller proportion of Marine Corps Officers (Gannon, 2000 and United States Naval Academy, 2007). Regardless, the Marine Corps still views the Academy to be an essential source of quality officers integral to mission success.

2. USMC Recruiting at the United States Naval Academy

The United States Marine Corps Officers assigned to the Naval Academy during the past few years have greatly enhanced recruiting in order to bring the highest caliber Midshipmen to The Basic School. Tools such as Leatherneck, the Semper Fi Society, Marine Corps Training for Midshipmen (MCTRAMID) and the Squad Challenge are used to educate and inspire curious and interested Midshipmen to be Marine Corps Officers. Moreover, with increasing frequency over the past three decades, officers from Quantico have been incorporated into the role of Midshipman instruction (Gannon, 2000). Their presence has been essential in the education of potential Marine Corps Officers.

One of the major factors of the recent midshipmen interest in USMC, according to COL Paulovich, is the association the Marine Corps has made with physical performance and physical challenges (personal communication, March 2007). He asserts that midshipmen today, unlike a few years ago, are more attracted to extreme sports and contests that measure physicality (personal communication, March 2007). As a Naval Academy graduate, this researcher's observations are similar to those of COL Paulovich. This researcher has observed that because of the Marine Corps identification with physical challenge, those midshipmen more inclined to physical activities and physically demanding sports show more interest in selecting Marines. This was studied in the data analysis portion of the research.

All Marines Assigned to the Naval Academy fall under the Senior Marine who is generally a colonel and the individual who signs all of the Fitness Reports for Marine Officers. The Marines on the Yard consider their mission at the Naval Academy to be:

1. To facilitate the accession of the highest quality Midshipmen to become Marine Officers.
2. To prepare those selected Midshipmen to succeed at The Basic School.
3. To demonstrate to all Midshipmen that that Marine member of the Navy-Marine team is dedicated and well trained – a professional. (Gannon, 2000, p.128).

Essentially, Marines consider their mission at the Naval Academy to be to train and recruit Midshipmen.

The Marine Officers assigned to the Naval Academy are given collateral duties that include participation in recruiting activities for interested Midshipmen. For example, to each of the 30 companies in the Brigade of Midshipmen there is a Marine Corps Officer assigned to answer questions, give professional guidance and provide feedback in performance. These officers can range from a Captain assigned to the Political Science Department, to a Major assigned as a Company Officer; therefore, it does not matter whether or not they are here in an academic or military training capacity.

The Marines also use the Semper Fi Society as a tool to recruit and inform Midshipmen. The mission of the Semper Fi Society is:

1. Develop Esprit de Corps and pride among the future Marines at USNA, and foster Marine Corps traditions on the yard.
2. Prepare Midshipmen for service in the Corps by providing the opportunity to develop professional skills relevant to Marine Corps Officers.
3. Educate members of the society on the Marine Corps in general, Marine Corps career opportunities and the lifestyle of the Corps.
4. Promote interest in the Marine Corps among the Brigade of Midshipmen and the Larger Academy community.

5. Increase the level of professionalism and military competence of a core of Midshipmen in order to increase the discipline and martial spirit of the Brigade.
6. Promote the Academy in military sponsored competitions (USNA, Semper Fi, para. 1-6).

It is clear from this mission statement that Marines assigned to the Naval Academy do not mask their intentions to form a unique band of individuals with a military ethic they consider to be separate from and superior to basic Naval Academy Esprit de Corps. Simply by forming this “society” the Marines have created a sub-culture on the Yard that is particularly fascinating and inspiring to a lot of Midshipmen. Furthermore, participation in this special training is not compulsory; one has to volunteer to be a Marine Officer.

Summer training is another opportunity for Marine Officers to educate Midshipmen about the Marine Corps. Leatherneck is the primary Marine Corps training opportunity provided for Midshipmen. It consists of four weeks of training at The Basic School and provides Midshipmen with their first credible leadership experience in the Marine Corps environment (Gannon, 2000). The stated mission of Leatherneck is as follows:

1. The primary mission of Leatherneck is to expose Midshipmen to introductory Marine Officer training and enhance their understanding of Marine Corps culture and training standards
2. While fulfilling the primary mission, the Naval Academy staff can accomplish the secondary mission, which is to observe and evaluate Midshipmen (Gannon, 2000, p. 141).

The “evaluation” of the Midshipmen is a key factor in the Leatherneck training process. According to the Senior Marine assigned to the Naval Academy, the evaluations a Midshipman receives at Leatherneck weighs heavily on the selection board; a negative evaluation is likely to result in failure to select Marine Corps (personal communication, March 2007). Other Marine Corps training opportunities are also seen as opportunities

to evaluate Midshipmen, but Leatherneck is clearly the most in-depth leadership experience a Midshipman can have in a Marine Corps environment.

3. Recent Trends and Target Numbers for the United States Marine Corps

According to the Chairman of the Professional Programs Department, there has been a noticeable surge in the number of Midshipmen selecting USMC in the past 5 years (personal communication, CDR Hixenbaugh, March 2007). Concurrently, the USMC has dramatically increased the number of Midshipmen it allows to service select USMC. The number of Midshipmen the USMC has taken from USNA has been 155, 165, 166, 193 and 208 for FY01, FY02, FY03, FY04 and FY05, respectively (United States Naval Academy, 2007). During all of these years there was a surplus of Midshipmen who desired to join the Marine Corp, but were not selected (United States Naval Academy, 2007).

During the past two decades, the Marine Corps has traditionally been allotted one-sixth of each graduating class from the Naval Academy. Recently, the Marine Corps and the Naval Academy have signed a Memorandum of Agreement that describes in detail the increased allocation of Naval Academy graduates to the Marine Corps. The Deputy Chief of Naval Operations for Manpower and Personnel and the Deputy Commandant of the United States Marine Corps for Manpower and Reserve Affairs agreed in FY05 that “Based on the number of Midshipmen who designate “USMC” as their first choice during service selection, the Marine Corps is authorized to select up to the above caps” (USNA Memorandum of Agreement, 2005, p. 1). “Above cap” for the Naval Academy is 208, but “any adjustments within +/- 25 of [the cap] may be approved by mutual agreement between MP and N13” (USNA Memorandum of Agreement, 2005, p.1). The Memorandum goes on to mention that “N13 will ensure...inventory at USNA is sufficient to support up to 210 USNA Midshipmen...selecting Marine Corps annually” (USNA Memorandum of Agreement, 2005, p.2).

F. SUBMARINE FORCE

1. Recent History at the United States Naval Academy

Compared to the other service choices provided to a midshipman, the Submarine Force is the newest and most secretive. Most of the philosophies, attitudes and procedures of the Submarine Force can be directly traced back to the “Father of the Nuclear Navy,” Admiral Hymen G. Rickover. He was an introverted officer obsessed with the pursuit of information and he firmly believed that the best officers, regardless of which warfare community, were those that possessed strong technical backgrounds (Polk, 2003). This belief has come to be known as the “Rickover Hypothesis,” and its effect on the manner in which submarine officers have been selected from the Naval Academy has been profound (Polk, 2003). During his time as the head of Naval Reactors, he sought to train an entire cadre of officers who were not bounded by previous methods and bureaucracies. His training method came to be known as the “Rickover Way” and can be described as never questioning higher authority and obsessively following technical directives (Polk, 2003). It can be argued that the current head of nuclear reactors at least loosely follows the “Rickover Way.”

Very few changes have been made in the requirements associated with becoming a Submarine Officer from the Naval Academy. The Submarine Force still only accepts males with good technical proficiency who can communicate their knowledge well during a strenuous interview. Although the missions of the Submarine Force have changed dramatically since the end of the Cold War, the nuclear training pipeline still remains very similar to the pipeline Admiral Rickover created.

According to the senior Submariner assigned to the Naval Academy, the submarine force used to enjoy enormous popularity among midshipmen during the Cold War (CAPT O’Neill, personal communication, March 2007). Because submarines played such an integral role in America’s victory in the Cold War and because they were shrouded by a secrecy most found intriguing, midshipmen naturally were interested in joining the force. Recently, the Submarine Force has not enjoyed the same popularity among midshipmen as it did during the Cold War. The target numbers for the Submarine

Force for Naval Academy Midshipmen were 140, 140, 140 and 130 for FY02, FY03, FY04 and FY05, respectively. The Submarine Force attained 128, 138, 126 and 101 for FY02, FY03, FY04 and FY05 respectively (United States Naval Academy, 2007). It is clear that during the past 4 years the Marine Corps has become more interesting to midshipmen than the Submarine Force. It should also be noted that there has not been significant changes in the number of midshipmen choosing Naval Aviation, SWO or Special Warfare as a career choice (United States Naval Academy, 2007). This study focuses on the USMC and the submarine force simply because of the dramatic changes they have seen in demand in recent years.

The Nuclear Incentive Bonus has been provided to midshipmen who volunteer to go to Nuclear Power School upon graduation from the Naval Academy. Once accepted into the Nuclear Program, a midshipman receives \$15,000 and will then receive another \$2,000 upon completion of Nuclear Power School. After receiving all of the qualifications required for a Submarine Officer, a Lieutenant Junior Grade (O-2) or a Lieutenant (O-3) has the opportunity to receive numerous special pay incentives that are aimed at retaining well-trained, qualified Officers. These incentives can be substantial; Submarine Officers who are qualified to supervise, operate and maintain naval nuclear propulsion can receive up to \$25,000 per year in addition to their normal salary if they obligate for a period of no less than 4 years past their current service requirement (OPNAVINST 7220.11a). Moreover, Submarine Junior Officers who do not want to be obligated to serve for a particular length of time past their current obligation but stay in the Navy anyway can still receive a bonus of up to \$22,000 annually for each year they serve past their obligation (OPNAVINST 7220.11a). This bonus is known as the Annual Incentive Bonus (AIB). Marine Corps Officers with a ground MOS enjoy no such incentive programs.

Midshipmen are well-aware of these incentive programs and have been for more than a decade. Despite these outstanding incentive programs, it is still a challenge to recruit Midshipmen to join the Submarine Force. In FY07, according to a Submarine Officer assigned to the Naval Academy, the Department of the Navy put out a direction that would require the Naval Academy send the minimum number of midshipmen to

Nuclear Power School required by Naval Reactors (LT Derek Dryden, personal communication, March 2007). The minimum number of midshipmen required to select submarines for FY07 was 110 (the maximum was 140). In FY07, 118 Midshipmen volunteered to select submarines as a career choice. The interesting development for the Class of 2007 at the Naval Academy was that they were told that even if they did not select submarines as their first choice, all eligible midshipmen (that is, those with a good technical background) would be considered to join the force. This is a change to the strictly voluntary submarine service in the Navy; it essentially requires the Naval Academy to make their numbers despite the interests of midshipmen (personal communication, March 2007).

2. Submarine Force Recruiting at the United States Naval Academy

Because of the recent difficulties associated with recruiting midshipmen for the Submarine Force, the Submarine Officers assigned to the Naval Academy and Naval Reactors have increased their efforts attract midshipmen. According to the Chairman of Professional Programs, the recruiting tools used by the Submarine Force are Submarine Training for Midshipmen (SUBTRAMID), Professional Training for Midshipmen (PROTRAMID), various Submarine Cruises, the Dolphin Club and a Top Secret brief conducted by the Commanding Officer of Submarine Development Squadron 12 (DEVRON 12).

The Chairman of Professional Programs at the Naval Academy, a Submarine Officer, asserts that submarine summer training assignments are good recruiting tools for recruiting midshipmen (personal communication, March 2007). Naval Academy midshipmen have three different opportunities to go underway on a submarine during summer training: SUBTRAMID, Submarine Cruise Assignment and PROTRAMID. SUBTRAMID is a relatively new program developed to attract midshipmen to be exposed to life on a submarine. According to the Chairman of Professional Programs, a deliberate decision was made to make SUBTRAMID assignments to Pearl Harbor, Hawaii and San Diego, California, which are exceptionally enticing locations for most midshipmen (personal communication, March 2007). This program was designed to

entice midshipmen enough to at least expose them to submarine life so that they may make an educated decision about whether or not to select submarines. Another opportunity for exposure to submarine life is PROTRAMID, where both males and females are exposed to submarines for one week, usually on board a Ballistic Missile Submarine (SSBN) stationed in Kings Bay, Georgia. Females are allowed to participate in this training evolution because, according to the Commanding Officer of DEVRON 12, leaders in the Submarine Force think it will be just “a matter of time” before women are allowed to select submarines (lecture, March 2007). Submarine Summer Cruise Assignments are also provided to male midshipmen. This is a three-week assignment to either a Fast Attack Submarine (SSN) or a Nuclear Ballistic Submarine (SSBN).

The Dolphin Club and the DEVRON 12 brief are two more tools that are designed to educate and recruit Midshipmen. The Dolphin Club, an organization of Midshipmen interested in submarines, is similar to the Semper Fi Society inasmuch as it serves to educate Midshipmen about a particular service. Occasionally the Dolphin Club conducts events at the Naval Academy specifically for submariners, such as the Submarine Birthday Ball. According to the Chairman of Professional Programs, The DEVRON 12 brief is known to be the best recruiting tool for Midshipmen. The brief, classified Top Secret / No Foreigners, serves to inform Midshipmen about the interesting, classified missions that submarines conduct around the globe. This is a one-of-a-kind opportunity to learn about the fascinating capabilities of the stealthiest machines of the United States Military.

A new development in submarine recruiting is the effort to recruit women. According to the Chairman of Professional Programs and the Senior Submariner Assigned to the Naval Academy, female Midshipmen are told that female acceptance into the submarine force is inevitable. Moreover, they are told that if they are interested in going submarines, it behooves them to serve as a Nuclear Service Warfare Officer, because they will be the first females assigned to submarines.

3. Assigning Submarine Force Target Numbers

Submarine Force target numbers are not as consistent as they are for the Marine Corps. The Head of Nuclear Reactors looks at manning requirements each year before assigning target numbers to the Naval Academy. Yet the Chief of Naval Personnel has provided the Naval Academy with strength and inventory numbers from FY07 to FY12. These strength and inventory numbers describe the accession requirements of the Submarine Force to be 120 – 126 USNA graduates each year.

G. CONCLUSION

This chapter provided some background on the service assignment process at USNA, adult development theories and how they apply to the career choices of college graduates, the Myers-Briggs Type Indicator and how certain dichotomies can be isolated and the recent histories of the Marine Corps and the submarine force at USNA. This research was used to justify the variables used in this study – a comparative analysis of USMC and submarine force service selection for midshipmen. Essentially, the variables chosen were limited by the data available for analysis in that. For example, the military father data does not show whether or not the father was a submariner or not; only Navy or Marine Corps experience is documented. Chapter III gives further information about the variables used and shows their appropriateness for this study.

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III. RESEARCH METHODOLOGY

A. INTRODUCTION TO VARIABLES

This study seeks to partially explain why midshipman demand for service selecting USMC is unusually high compared to the demand to service select the submarine force. This chapter describes the data and the specific variables being reviewed. The literature review explains the background of the dependent and independent variables that will be used in this study; it is an in-depth description of the service assignment process for midshipmen, along with adult development theories, the MBTI and the recent history of the submarine force and the USMC at USNA. From these studies, the appropriate variables were determined.

B. DATA AND VARIABLES DESCRIPTION

All the data were obtained for this study from the Data Warehouse in the Office of Institutional Research at USNA. The population analyzed were all male graduates from the Naval Academy Classes of 2000 – 2006 who were eligible for commissioning, thereby excluding all midshipmen who were deemed not physically qualified (NPQ) along with all foreign nationals (n = 5,710). This data encompassed Myers – Briggs Type Indicator (MBTI) results, SAT math scores, SAT verbal scores, military family background, cumulative academic quality point ratio (CAQPR), cumulative military quality point ratio (CMQPR), Physical Readiness Test (PRT) results and indications of participation in varsity athletics. Table 4 shows the distribution of data of graduating classes and service preference in terms of USMC, Subs and all others.

Table 4. Cross Tabulations of Graduation and Service Preference

		1st Choice Subs or USMC			
		All others	Subs	USMC	Total
2000	Count	507	129	163	799
	% within 1st Choice Subs or USMC	13.9%	15.0%	13.7%	14.0%
2001	Count	491	150	120	761
	% within 1st Choice Subs or USMC	13.4%	17.5%	10.1%	13.3%
2002	Count	548	120	169	837
	% within 1st Choice Subs or USMC	15.0%	14.0%	14.2%	14.7%
2003	Count	534	138	155	827
	% within 1st Choice Subs or USMC	14.6%	16.1%	13.0%	14.5%
2004	Count	534	124	173	831
	% within 1st Choice Subs or USMC	14.6%	14.4%	14.5%	14.6%
2005	Count	527	98	194	819
	% within 1st Choice Subs or USMC	14.4%	11.4%	16.2%	14.3%
2006	Count	515	100	220	835
	% within 1st Choice Subs or USMC	14.1%	11.6%	18.4%	14.6%
Total	Count	3656	859	1194	5709
	% within 1st Choice Subs or USMC	100.0%	100.0%	100.0%	100.0%

As discussed in the literature review for this study, the service assignment process for the USMC and the submarine force includes a robust review of each midshipman’s record who is interested in selecting the aforementioned services. The review includes a close look at cumulative academic quality point ratio (CAQPR), cumulative military quality point ratio (CMQPR), SAT test results, physical education course grades, physical readiness test scores, and participation in varsity athletic programs offered at the Naval Academy. Although the data from these sources are not the sole criteria for selection into the submarine force or the USMC, they are certainly important factors.

The career choice section of the literature review addresses the impact family experience has on career choices of college graduates. Stephan and Stephan (1990), Pascarella and Terrinzini (1991), Wadle (2004) and Newman and Newman (1975) all assert that familial experience have a dramatic impact on career choice. Moreover, Pascarella et al. (1991) showed the impact prior work experience has on the career choices of college graduates. As a result, data were obtained from the Office of Institutional Research at USNA to study these two variables.

The literature also discusses the association with physicality and USMC. COL Paulovich asserts that midshipmen interest in USMC is due partly to recent trends of midshipmen interest in extreme sports and physical challenge (personal communication, March 2007). From the data focusing on physical performance for Midshipmen, a Physicality Index was constructed that combined (for each midshipman) the average PRT scores, the average Physical Education (PE) grades and participation in varsity sports. The data also indicated whether or not each midshipman had a parent (or has a parent) in the United States Navy or USMC.

The Office of Institutional Research also had the MBTI results for each midshipman. These results were obtained from the MBTI assessment each midshipman takes during the first two weeks of Plebe Summer. The literature review addresses the unique qualities each of the four dichotomies address, specifically Extraversion vs. Introversion (E / I) and Judging vs. Perceiving (J / P). When these two dichotomies are isolated, they reveal some interesting results. From the four-letter MBTI code the first and the last letters were isolated. The first letter of the MBTI personality type (or code) is either an E (Extravert) or and I (Introvert). The last letter of the MBTI personality type is either a J (Judging) or a P (Perceiving).

1. Dependent Variables for this Study

Two dependent variables are being used for this study: midshipman selection of submarine force as first choice and all other midshipmen; and midshipman selection of USMC as first choice and all other midshipmen. These dependent variables will be used

to discern, via binary logistic regression, whether or not there are accurate predictors that are related to USMC or the submarine force as a first choice.

2. Independent Variables for this Study (Continuous)

CAQPR – Cumulative Academic Quality Point Ratio. This is a grade point average on all academic classes. It is a continuous variable with a range of 2.0 to 4.0, as 2.0 is the required minimum to graduate from USNA and 4.0 is the maximum possible QPR.

CMQPR – Cumulative Military Quality Point Ratio. CMQPR comprises military performance (44.56%), conduct (19.66%), physical education (16.78%), military courses (10.48%) and athletic performance (8.52%) (Boyd, 2003). It is a continuous variable and, like CAQPR, has a range of 2.0 to 4.0 for the same reasons as **CAQPR**.

SAT (V) – Score of the Verbal portion of the Scholastic Aptitude Test. It is a continuous variable and has a range of 0 – 800. This data is collected in the Admissions Department at the United States Naval Academy and stored in the Data Warehouse at the Office of Institutional Research. It should be noted that the data in this category are re-centered to account for the changes in the SAT in recent years.

SAT (M) – Score of the Mathematics portion of the Scholastic Aptitude Test. It is a continuous variable and, like **SAT (V)**, has a range of 0 – 800. This data is collected in the Admissions Department at the United States Naval Academy and is stored in the Data Warehouse at the Office of Institutional Research. It should be noted that the data in this category are re-centered to account for the changes in the SAT in recent years.

PHYS_INDEX – Physicality Index. This is a continuous variable that is an algorithm consisting of average grades in PE classes, average PRT scores, the PRT attempt index and the varsity sport index.

- a. **Average grades in PE Classes** – The average grades of Physical Education classes taken over 4 years. It is essentially a quality point ratio for PE class grades. The range, like CAQPR and CMQPR, is 2.0 – 4.0. All midshipmen must take a PE course every semester. All grades for classes

with “PE” prefixes were included in this data set irrespective of the types of classes taken (conditioning, sport, or recreation).

- b. *Average PRT Score*** – The average of the Physical Readiness Test scores taken over 4 years. A PRT uses a traditional 0% to 100% grading scale. The PRT final grade is determined by averaging the percent score of each of three elements: push-ups, curl-ups and the 1.5 mile run. Each element is valued at 33.3% (United States Naval Academy, 2005). There are minimum and maximum scores for each element that are pre-determined by the Physical Education Department of USNA. A minimum score of 60% must be earned in each element to pass the PRT. If a midshipman fails a PRT, a zero is entered in the first semester test field; however, that midshipman may retake the PRT until achieving a passing grade. The data vary for this variable; the Office of Institutional Research at USNA began recording PRT scores in 1998. Therefore, the PRT averages from the class of 2000 have a minimum of 4 entries, the class of 2001 has a minimum of 6 and the classes of 2002 – 2006 have a minimum of 8 (one for each semester).
- c. *PRT Attempt Index*** – A weighted negative index that accounts for initial failed PRT’s. As mentioned earlier in this chapter, each midshipman is required to take the PRT once in the spring and fall semesters at a time scheduled by the PE Department. If a midshipman fails this initial PRT, that midshipman is placed on PRT Remediation until he passes the minimum standards. The highest score possible for those who fail an initial PRT, then later pass a remedial PRT, is 60% (United States Naval Academy, 2005). Ergo, there are midshipmen in the data set with low averages and as many as 68 entries; the poor physical performers are generally the ones with many entries.

This negative index was created to account for those midshipmen who fail the initial PRT’s and then pass the remedial PRT’s – although they may eventually earn a passing grade for the PRT, they are deemed to have unfavorable physicality when compared to their classmates who pass every

initial PRT given. If a midshipman does not fail a PRT in any semester, the index score is 0. If a midshipman takes up to one additional attempt for any or all semesters (5 – 8 attempts total for the Class of 2000; 7 – 12 attempts total for the Class of 2001; and 9 – 16 attempts total for the Classes of 2002 – 2006), the PRT attempt index is -3. If a midshipman takes more than one additional attempts for ever semester (>8 total attempts for the Class of 2000; >12 attempts for the Class of 2001; and >16 attempts for the Classes of 2002 - 2006), the PRT attempt index is -5.

- d. ***Varsity Sport Index*** – an index that weighs the NCAA Division I varsity sports played at any time during their 4 years at USNA by each midshipman according to physical demand (strength, endurance and agility). There are 18 varsity sports available to men: basketball, cross-country / track, football, sprint football, wrestling, soccer, lacrosse, crew (lightweight and heavyweight), swimming and diving, water polo, baseball, squash, tennis, gymnastics, sailing (inter-collegiate and off-shore), golf and rifle. For the purposes of this study, certain varsity sports were combined: cross-country and track; lightweight crew and heavyweight crew; inter-collegiate sailing and off-shore sailing; and swimming and diving. This variable does not measure performance or playing time; rather, it only tracks participation in the each varsity sport as indicated by the active sport roster. It is assumed that if a midshipman is on an active sport roster, he possesses the skills necessary to compete at the collegiate level.

A midshipman can play up to three varsity sports each year during the fall, winter and spring seasons. Each sport varies in physical demand. The most demanding sports (basketball, cross-country / track, football, sprint football, wrestling, soccer, lacrosse, heavyweight and lightweight crew, swimming and diving and water polo) were given a weight of 3. Moderately demanding sports (baseball, squash, tennis and gymnastics) were given a weight of 2. Finally, the remaining sports (off-shore and inter – collegiate sailing, golf and

rifle) were given a weight of 1. Therefore, if a midshipman played three varsity sports – basketball, football and lacrosse – his varsity sport index would be 9.

By combining the above factors, the overall Physicality Index is achieved. All weights were determined as a function of the PRT average score. The PRT average is the percentage score, The PE grade average is weighted as 10 (10 multiplied by the PE grade average) and the varsity sport index is weighted as 3 (varsity sport index multiplied by 3). The PRT attempt index is weighted as a 5 (this will be either 0 or a negative number). Table 5 summarizes the physicality index.

Table 5. Physicality Index Algorithm

Variable	Max Possible	Calculation
Physical Education (Ave. grades)	40	(4.0 x 10)
Average PRT Scores	100	
Number of PRT's Taken	0	(# of extra PRT x 5)
Varsity Sport Index	54	(18 x 3)
MAX POSS	194	

Table 6 summarizes the descriptive statistics for the continuous variables. For this data set (all males from the classes of 2000-2006), n=5709. It is important to note that the SAT data for this data set have been re-centered to account for the 1996 change in the test. Normally, the maximum SAT score possible is 800, but to account for the change the re-centered data shows a maximum of 805.

Table 6. Descriptive Statistics for Continuous Variables

	N	Minimum	Maximum	Mean	Std. Dev.	Skewness
SAT Math	5709	420	805	667.07	63.40	-0.10
SAT Verbal	5709	360	805	636.51	65.77	0.01
CAQPR	5709	2	4	2.98	0.48	0.18
CMQPR	5709	2.1	3.92	3.12	0.33	-0.10
Average of all PE Courses	5709	1.625	4	3.17	0.44	-0.38
Average PRT Score	5706	4.14	99.9	82.22	14.01	-1.83
Number of PRT Tests	5709	0	68	7.64	2.55	4.45
Sport Index	5709	0	9	1.21	1.55	1.07
Physicality Index	5709	1.64	181.2	117.70	24.99	-1.24
Valid N (listwise)	5709					

Note: Bolded variables will be used in the analysis

3. Independent Variables for this Study (Categorical)

MIL_FATHER – Military Family identification (paternal). This dichotomous, categorical variable shows whether or not each midshipman in the data set has a father who is or has been in the Navy or Marine Corps. Table 7 shows the cross-tabulations of military fathers and service preference.

Table 7. Cross Tabulations of Military Fathers and Service Preference

	1st Choice Subs or USMC			Total
	All others	Subs	USMC	
All Others Count	2909	704	943	4556
% within 1st Choice Subs or USMC	79.6%	82.0%	79.0%	79.8%
Marine Count	147	23	124	294
% within 1st Choice Subs or USMC	4.0%	2.7%	10.4%	5.1%
Navy Count	600	132	127	859
% within 1st Choice Subs or USMC	16.4%	15.4%	10.6%	15.0%
Total Count	3656	859	1194	5709
% within 1st Choice Subs or USMC	100.0%	100.0%	100.0%	100.0%

PRIOR – prior military experience for each midshipman before attending USNA. The **PRIOR** independent categorical variable only includes those midshipmen whose commissioning source was the Marine Corps or Nuclear Power School (NPS); more specifically, this variable indicates whether or not each midshipman came *directly* from NPS or the Marine Corps. Indeed, there are other programs in place for enlisted personnel to become officers (such as BOOST and the Seaman to Admiral Program), but NPS and the Marine Corps are more specific to submarine force and USMC service preference. Table 8 displays the cross tabulations for prior military experience.

Table 8. Cross Tabulations of Prior Military Experience and Service Preference

	1st Choice Subs or USMC			Total
	All others	Subs	USMC	
All Others Count	3572	810	1101	5483
% within 1st Choice Subs or USMC	97.7%	94.3%	92.2%	96.0%
Prior Nuclear Power School Count	66	42	12	120
% within 1st Choice Subs or USMC	1.8%	4.9%	1.0%	2.1%
Prior USMC Count	18	7	81	106
% within 1st Choice Subs or USMC	.5%	.8%	6.8%	1.9%
Total Count	3656	859	1194	5709
% within 1st Choice Subs or USMC	100.0%	100.0%	100.0%	100.0%

EI_BRIGGS – Extravert or Introvert. This dichotomous variable shows the first letter of the four-letter Myers-Briggs personality type for each midshipman in the data set. “E” indicates extravert and “I” indicates introvert. Table 9 displays the cross tabulations for the **EI_BRIGGS** variable.

JP_BRIGGS – Judging or Perceiving. This dichotomous variable shows the last letter of the four-letter Myers-Briggs personality type for each midshipman in the data set. “J” indicates the Judging persuasion and “P” indicates the Perceiving persuasion. Table 10 displays the cross tabulations for the **JP_BRIGGS** variable.

Table 9. Cross Tabulations of Extrovert/Introvert and Service Preference

	1st Choice Subs or USMC			Total
	All others	Subs	USMC	
No MBTI Data Count	49	6	12	67
% within 1st Choice Subs or USMC	1.3%	.7%	1.0%	1.2%
E – Count	2065	410	630	3105
% within 1st Choice Subs or USMC	56.5%	47.7%	52.8%	54.4%
I – Count	1542	443	552	2537
% within 1st Choice Subs or USMC	42.2%	51.6%	46.2%	44.4%
Total Count	3656	859	1194	5709
% within 1st Choice Subs or USMC	100.0%	100.0%	100.0%	100.0%

Table 10. Cross Tabulations of Judging/Perceiving and Service Preference

	1st Choice Subs or USMC			Total
	All others	Subs	USMC	
No MBTI Data Count	49	6	12	67
% within 1st Choice Subs or USMC	1.3%	.7%	1.0%	1.2%
J – Count	2191	524	722	3437
% within 1st Choice Subs or USMC	59.9%	61.0%	60.5%	60.2%
P – Count	1416	329	460	2205
% within 1st Choice Subs or USMC	38.7%	38.3%	38.5%	38.6%
Count	3656	859	1194	5709
% within 1st Choice Subs or USMC	100.0%	100.0%	100.0%	100.0%

C. TESTS FOR ANALYSIS OF INDEPENDENT VARIABLES

This study includes both categorical and continuous independent variables. They will be analyzed via the analysis of variance (ANOVA) test and the chi-squared (χ^2) test. The ANOVA test will be used for the continuous variables and the chi-squared test will be used for the categorical variables. These tests will be used to determine the best fit for the binary logistic regression that will evaluate the probability of membership in a particular group, specifically, service preference for the submarine force and the Marine Corps.

The ANOVA test is a technique to compare three or more population means to determine whether they could be equal (Lind, Marchal & Wathen, 2005). In this study, the means of three different categories of midshipmen were compared: those who selected USMC as first choice, those midshipmen who selected submarine force as first choice, and all others. Three assumptions are made for this study: the populations follow the normal distribution, the populations have equal standard deviations and the populations are independent (Lind et al, 2005). The continuous variables to be evaluated in this study are **PHYS_INDEX**, **SAT(V)**, **SAT(M)**, **CAQPR** and **CMQPR**.

The chi-squared test works to judge the independence of categorical variables. It is limited by sample size and reveals nothing about how two variables are related; rather, it shows the extent to which they are not related (Siegrist, 2004). The chi-squared will be used in this study for the categorical variables **EI_BRIGGS**, **JP_BRIGGS**, **LEGACY**, and **PRIOR**. Once the analysis of the independent variables is completed, the appropriate variables will be entered in the logistic regression.

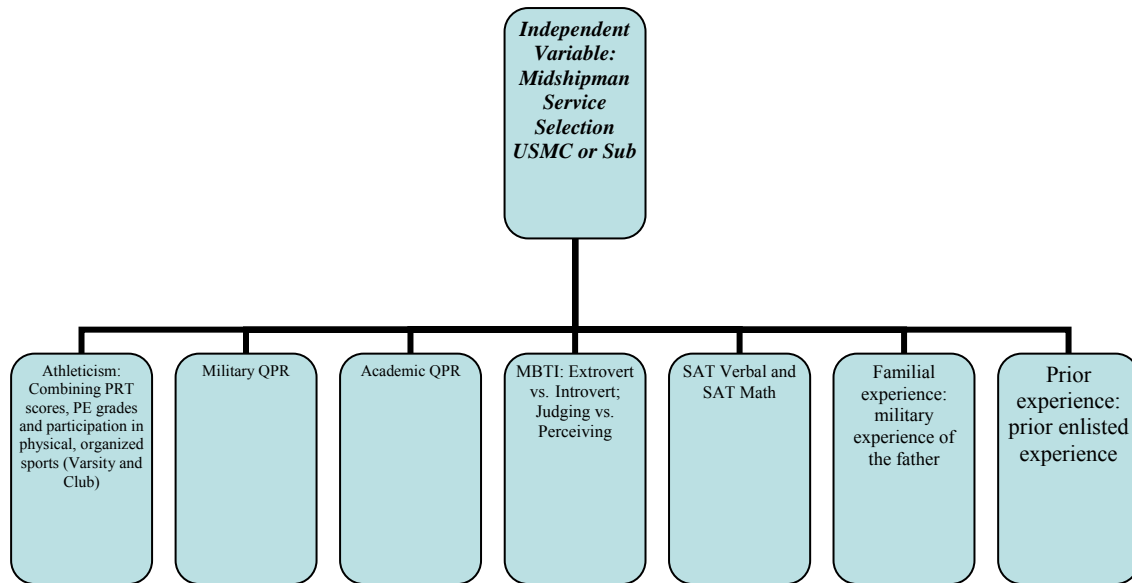
D. MODEL FOR THIS STUDY

This model is using logistic regression to predict a discrete outcome of service choice (USMC or submarine force). Logistic regression evaluates the probability of membership in a particular group based on combinations of values of predictor variables (Myers-Briggs, CAQPR, etc). The logistic regression is a non-linear model with an

outcome variable that indicates the probability of having one outcome or another based on the best linear combination of independent variables (Tabachnick & Fidell, 2001).

Logistic regression can be used to fit and compare models. The best fitting model includes the constant, all predictors and interactions among predictors (Tabachnick et al., 2001) – not all of which are related to the outcome. A goodness-of-fit test is used to choose the model that most appropriately predicts the outcome with the fewest predictors. This “goodness-of-fit” tests used in this study are the ANOVA Test and the Pearson Chi-square Test. Figure 1 shows the model for this study.

Figure 1. Model for This Study



E. SCOPE, ASSUMPTIONS AND LIMITATIONS

This study only analyzes those midshipmen who entered as their first preference the Submarine Force or the United States Marine Corps. Because one element of the study was the Submarine Force, only men were isolated for this data set (n=5,709). This is because women are not authorized to select the Submarine Force (although the leadership at Naval Reactors asserts that it is inevitable that women will soon be integrated on submarines). Ethnicity was not included as part of the study because this

was not an study on race or gender, rather it was an analysis of persuasive influences on service selection. Anyone who was eligible to select USMC or the Submarine Force was included.

Although there are numerous ways to include the Myers-Briggs Type Indicator results into this study, only the Extravert vs. Introvert and Judging vs. Perceiving dichotomies were included. There has not been a study that isolates the E vs. I and J vs. P dichotomies while comparing the Submarine Force to the USMC. The E vs. I dichotomy, as discussed by Quenk (2000) and Myers et al.(1998), is the cornerstone of Jungian psychology and can be isolated from the four-letter type, along with the J vs. P dichotomy that Myers and Briggs specifically isolated to identify dominant personality traits.

The data for this study are assumed to be the most current and accurate, as they isolate the most recent graduated classes from USNA and are thus used as a model for testing the factors associated with service selection into the Submarine Force and the USMC specifically. Because this data isolated men and included all ethnicities, the methodology may not transfer to a study involving other service selection choices, such as Aviation or Surface Warfare.

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IV. DATA ANALYSIS

A. REVIEW OF METHODOLOGY

This chapter analyzes the independent categorical and continuous variables and determines those which will fit into the binary logistic regression. The continuous variables will be analyzed using the ANOVA test and the Post-hoc Tukey method. This test compares the means of three different groups: those midshipmen who preferred USMC as a service choice, those midshipmen who preferred the submarine force as a service choice and all others. The categorical variables will be analyzed using the chi-squared test, which measures the independence of categorical variables. Once these two tests are completed, the variables to be entered in the binary logistic regressions and the results will be determined and analyzed.

B. ANOVA TEST FOR CONTINUOUS VARIABLES

The continuous variables to be analyzed in this study are **PHYS_INDEX**, **SAT(V)**, **SAT(M)**, **CAQPR** and **CMQPR**. Each variable will be analyzed using the ANOVA test and the Post-hoc Tukey method. The results will reveal the difference in the means of each continuous variable in three categories: USMC different from Subs, USMC different from all others and Subs different from all others. “USMC” indicates those midshipmen who preferred USMC as a service choice; “Subs” indicate those midshipmen who preferred the submarine force as a service choice and “all others” indicate those midshipmen who preferred neither the submarine force nor USMC as a service choice. The ANOVA test will show whether or not the mean of one of these groups (Subs, USMC and all others) is different from another.

The difference of each grouping (all others, USMC and Subs) will be measured using the Post-hoc Tukey method. This is a more detailed analysis of the ANOVA; it shows which groups have significantly different means (Sig. <.05). If the significance value (Sig) for the comparison of particular groups is less than .05 (<.05), they will be determined to have significantly different means. If, for example, the Post-hoc Tukey

method shows the means of the SAT Verbal (**SAT(V)**) scores are different for USMC and all others, the **SAT(V)** variable will be included as a variable in the binary logistic regressions.

1. Analysis of Physicality Index

As discussed in Chapter III, the Physicality Index measures the overall physicality of each midshipman by accounting for and weighing average grades in PE classes, average PRT score over 4 years, a PRT attempt index and a varsity sport index. The maximum possible value in the physicality index is 194. The mean for all midshipmen used in this study (n=5709) is 117.7. The minimum score for the physicality index is 1.64 and the maximum is 181.2. Tables 11, 12 and 13 display the results of the ANOVA test for the Physicality Index (**PHYS_INDEX**).

Table 11. Descriptives for Physicality Index

	N	Mean	Std. Deviation	Std. Error
All others	3654.00	117.39	25.63	0.42
Subs	858.00	112.05	26.01	0.89
USMC	1194.00	122.73	20.99	0.61
Total	5706.00	117.70	24.99	0.33

Table 12. ANOVA Results for Physicality Index

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	57972.84	2.00	28986.42	47.16	0.00
Within Groups	3505586.83	5703.00	614.69		
Total	3563559.67	5705.00			

Table 13. Post-hoc Tukey Results for Physicality Index

1st Choice Subs or USMC	1 st Choice Subs or USMC	Mean Difference	Std. Error	Sig.
All others	Subs	5.34	0.94	0.00
	USMC	-5.34	0.83	0.00
Subs	All others	-5.34	0.94	0.00
	USMC	-10.68	1.11	0.00
USMC	All others	5.34	0.83	0.00
	Subs	10.68	1.11	0.00

Note: The mean difference is significant at the .05 level

The ANOVA test for **PHYS_INDEX** shows that there, in fact, is a significant difference in the means of all others, Subs and USMC. The mean for all others is 117.39, the mean for Subs is 112.05 and the mean for USMC is 122.73. The ANOVA test resulted in a significance value of <.05 for all categories. The mean for those midshipmen who preferred submarine force as a service selection is different from all others, the mean for those midshipmen who preferred USMC as a service selection is different from all others and USMC is different from subs. This variable will be included in the binary logistic regressions.

2. Analysis of SAT Verbal Score

The SAT Verbal (**SAT(V)**) score is a measure of performance for the verbal portion of the Scholastic Aptitude Test. The scores range from 0 – 805 (805 because, as discussed in Chapter III, SAT scores have been re-centered in this data set). The minimum value in the data set is 360 and the maximum is 805. The mean for the data set is 636.51. Tables 14, 15 and 16 show the results of the ANOVA test for **SAT(V)**.

Table 14. Descriptives for SAT(V)

	N	Mean	Std. Deviation	Std. Error
All others	3656.00	634.44	64.63	1.07
Subs	859.00	644.49	65.78	2.24
USMC	1194.00	637.13	68.74	1.99
Total	5709.00	636.51	65.77	0.87

Table 15. ANOVA Results for SAT(V)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	70882.20	2.00	35441.10	8.21	0.00
Within Groups	24617601.88	5706.00	4314.34		
Total	24688484.09	5708.00			

Table 16. Post-hoc Tukey Results for SAT(V)

1st Choice Subs or USMC	1st Choice Subs or USMC	Mean Difference	Std. Error	Sig.
All others	Subs	-10.05	2.49	0.00
	USMC	-2.69	2.19	0.44
Subs	All others	10.05	2.49	0.00
	USMC	7.37	2.94	0.03
USMC	All others	2.69	2.19	0.44
	Subs	-7.37	2.94	0.03

Note: the mean difference is significant at the .05 level

The ANOVA test for **SAT(V)** delivered various results. The mean for all others is 634.44, the mean for Subs is 644.49 and the mean for USMC is 637.13. The ANOVA test resulted in various significance values for all others, Subs and USMC. The significance value for the difference in the means of Subs and all others was <.05. Thus, the difference in the means of Subs and all others is significant and will therefore be included in the binary logistic regressions. The significance value for the difference in the means of USMC and all others was .440. This value is greater than .05, showing that there is not a significant difference between the means of USMC and all others. Finally, the significance value for the difference in the means of Subs and USMC is .030, which is less than .05. Thus, the difference in means between Subs and USMC is significant.

3. Analysis of SAT Math Score

The SAT Verbal (**SAT(M)**) score is a measure of performance for the mathematics portion of the Scholastic Aptitude Test. The scores range from 0 – 805 (805 because, as discussed in Chapter III, SAT scores have been re-centered in this data set). The minimum value in the data set is 420 and the maximum is 805. The mean for the data set is 667.07. Tables 17, 18 and 19 show the results of the ANOVA test for **SAT(M)**.

Table 17. Descriptives for SAT(M)

	N	Mean	Std. Deviation	Std. Error
All others	3656	665.71	62.92	1.04
Subs	859	687.54	59.22	2.02
USMC	1194	656.50	64.48	1.87
Total	5709	667.07	63.40	0.84

Table 18. ANOVA Results for SAT(M)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	500187.52	2.00	250093.76	63.59	0.00
Within Groups	22441122.92	5706.00	3932.90		
Total	22941310.44	5708.00			

Table 19. Post-hoc Tukey Results for SAT(M)

1st Choice Subs or USMC	1st Choice Subs or USMC	Mean Difference	Std. Error	Sig.
All others	Subs	-21.84	2.38	0.00
	USMC	9.20	2.09	0.00
Subs	All others	21.84	2.38	0.00
	USMC	31.04	2.81	0.00
USMC	All others	-9.20	2.09	0.00
	Subs	-31.04	2.81	0.00

Note: the mean difference is significant at the .05 level.

The mean for all others is 665.71, the mean for Subs is 687.54 and the mean for USMC is 656.50. The ANOVA test resulted in a significance value of less than .05. The significance value for the difference in the means of Subs and all others was less than .05. The significance value for the difference in the means of USMC and all others was less than .05. Finally, the significance value for the difference in the means of Subs and USMC is, like all the others in **SAT(M)**, less than .05. Thus, the differences in means between Subs and USMC, Subs and all others and USMC and all others are significant. This variable will be included in the logistic regressions.

4. Analysis of Cumulative Academic Quality Point Ratio

The Cumulative Academic Quality Point Ratio (**CAQPR**) score is a parametric measurement of academic performance for each midshipman at the United States Naval Academy. The scores range from 2.0 – 4.0. The minimum value in the data set is 2.0 and the maximum is 4.0. The mean for the data set is 2.98. Tables 20, 21 and 22 show the results of the ANOVA test for **CAQPR**.

Table 20. Descriptives of CAQPR

	N	Mean	Std. Deviation	Std. Error
All others	3656	2.98	0.47	0.01
Subs	859	3.16	0.46	0.02
USMC	1194	2.87	0.49	0.01
Total	5709	2.98	0.48	0.01

Table 21. ANOVA Results for CAQPR

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	42.50	2.00	21.25	94.06	0.00
Within Groups	1289.16	5706.00	0.23		
Total	1331.66	5708.00			

Table 22. Post-hoc Tukey Results for CAQPR

1st Choice Subs or USMC	1st Choice Subs or USMC	Mean Difference	Std. Error	Sig.
All others	Subs	-0.19	0.02	0.00
	USMC	0.11	0.02	0.00
Subs	All others	0.19	0.02	0.00
	USMC	0.29	0.02	0.00
USMC	All others	-0.11	0.02	0.00
	Subs	-0.29	0.02	0.00

Note: the mean difference is significance at the .05 level

The mean for all others is 2.98, the mean for Subs is 3.16 and the mean for USMC is 2.87. The ANOVA test for CAQPR resulted in a significance value of less than .05. The significance value for the difference in the means of Subs and all others was less than .05. The significance value for the difference in the means of USMC and all others was less than .05. Finally, the significance value for the difference in the means of Subs and USMC is less than .05. Thus, the differences in means between Subs and USMC, Subs and all others and USMC and all others are significant. This variable will be included in the logistic regression.

5. Analysis of Cumulative Military Quality Point Ratio

The Cumulative Military Quality Point Ratio (**CMQPR**) score is a parametric measurement of academic performance for each midshipman at the United States Naval Academy. The scores range from 2.0 – 4.0. The minimum value in the data set is 2.1 and the maximum is 3.92. The mean for the data set is 3.12. Tables 23, 24 and 25 show the results of the ANOVA test for **CMQPR**.

Table 23. Descriptives of CMQPR

	N	Mean	Std. Deviation	Std. Error
All others	3656	3.10	0.33	0.01
Subs	859	3.15	0.32	0.01
USMC	1194	3.15	0.33	0.01
Total	5709	3.12	0.33	0.00

Table 24. ANOVA Results for CMQPR

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.43	2.00	1.22	11.48	0.00
Within Groups	604.03	5706.00	0.11		
Total	606.46	5708.00			

Table 25. Post-hoc Tukey Results for CMQPR

1st Choice Subs or USMC	1st Choice Subs or USMC	Mean Difference	Std. Error	Sig.
All others	Subs	-0.04	0.01	0.00
	USMC	-0.04	0.01	0.00
Subs	All others	0.04	0.01	0.00
	USMC	0.00	0.01	0.98
USMC	All others	0.04	0.01	0.00
	Subs	0.00	0.01	0.98

Note: the mean difference is significant at the .05 level

The mean for all others is 3.10, the mean for Subs is 3.15 and the mean for USMC is 3.15. The ANOVA test and the Post-hoc Tukey method used for **CMQPR** delivered various results. The ANOVA test for CMQPR resulted in various significance values for all others, Subs and USMC. The significance value for the difference in the means of Subs and all others was less than .05. The significance value for the difference in the means of USMC and all others was less than .05. Finally, the significance value for the difference in the means of Subs and USMC is .980, which is, unlike the other categories in **CMQPR**, greater than .05. Thus, the differences in means between Subs and all others and USMC and all others are significant enough to qualify this variable for the logistic regressions.

C. CHI-SQUARE TEST FOR CATEGORICAL VARIABLES

The categorical variables that were analyzed in this study, as discussed in Chapter III, were **MIL_FATHER**, **PRIOR**, **EI_BRIGGS** and **JP_BRIGGS**. For these categorical variables, the Pearson Chi-Square Test was used. Chi-square analysis is a nonparametric test that makes comparisons between two or more samples on the observed frequency of values with the expected frequency of values (George & Mallery, 2005). In this analysis, it was determined whether or not the actual data differed significantly from results predicted from the model that was created for this analysis. In essence, the chi-square test was used as a goodness-of-fit test for the binary logistic regression model used in this study. Although N for this study was 5709, only 5642 subjects had MBTI data. The tables for **EI_BRIGGS** and **JP_BRIGGS** display this N-value.

The results of the Pearson Chi-square test determined what variables were used in the binary logistic regressions. Like the ANOVA test, a significance value (Sig.) of less than .05 indicated that the groups being analyzed were independent of each other. The independence of the groups from one another (Extravert and Introvert, for example) is what permitted them to be included in the regression model – such variables passed the goodness-of-fit test.

1. Analysis of Military Father Data

As discussed in Chapter III, the **MIL_FATHER** variable shows those midshipmen in the data set who have fathers from either the Navy or Marine Corps. The cross-tabulations of this variable yielded a total count of 294 midshipmen with USMC Fathers and 859 midshipmen with Navy Fathers. 23 midshipmen with USMC Fathers preferred submarines as a service choice and 124 midshipmen with USMC fathers preferred USMC as a service choice. 132 midshipmen with Navy Fathers preferred submarines as a service choice while 127 midshipmen preferred USMC as a service choice.

As indicated in Table 26, The Pearson chi-square test yielded a significance value (Sig.) of less than .05 for the **MIL_FATHER** variable. This significance value categorized this variable as acceptable to be entered in the binary logistic regressions. Table 26 shows the results of the chi-square test for **MIL_FATHER**.

Table 26. Results of Chi-square Test for MIL_FATHER

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	103.440	4.00	0.00
Likelihood Ratio	93.398	4.00	0.00
Linear-by-Linear Association	5.121	1.00	0.02
N of Valid Cases	5709		

2. Analysis of Prior Military Experience Data

The **PRIOR** military experience data shows those midshipmen who had prior military experience in either the Navy (specifically, Nuclear Power School) or USMC. The cross-tabulations for this variable yielded a total count of 120 midshipmen with prior experience from NPS and 106 midshipmen with prior experience in USMC. Forty-two midshipmen with prior experience in NPS preferred submarines as a service choice while 12 midshipmen with prior NPS experience preferred USMC. There were 81 midshipmen with prior USMC experience preferred USMC as a service choice while 7 prior Marines preferred submarines as a service choice.

As indicated in Table 27, The Pearson chi-square test yielded a significance value (Sig.) of less than .05 for the **PRIOR** variable. This significance value categorized this variable as acceptable to be entered in the binary logistic regressions. Table 27 shows the results of the chi-square test for **PRIOR**.

Table 27. Results of Chi-square Test for PRIOR

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	241.062	4.00	0.00
Likelihood Ratio	186.882	4.00	0.00
Linear-by-Linear Association	132.960	1.00	0.00
N of Valid Cases	5709		

3. Analysis of MBTI Extravert/Introvert Data

The **EI_BRIGGS** data show whether or not each midshipman in the data set tests as an Extravert or an Introvert on the MBTI. Cross tabulation for this yielded a total of 67 midshipmen without MBTI data. Furthermore, there were a total of 3105 midshipmen who tested as Extroverted and 2537 midshipmen who tested as Introverted. 410 extroverted midshipmen preferred submarines as a service choice while 630 midshipmen preferred USMC. There were 443 introverted midshipmen who preferred submarines as a service choice while 552 preferred USMC as a service choice.

As indicated in Table 28, The Pearson chi-square test yielded a significance value (Sig.) of less than .05 for the **EI_BRIGGS** variable. This significance value categorized this variable as acceptable to be entered in the binary logistic regressions. Table 28 shows the results of the chi-square test for **EI_BRIGGS**.

Table 28. Results of Chi-square Test for Extravert/Introvert

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	25.331	2.00	0.00
Likelihood Ratio	25.249	2.00	0.00
Linear-by-Linear Association	10.877	1.00	0.00
N of Valid Cases	5642		

4. Analysis of MBTI Judging/Perceiving Data

The **JP_BRIGGS** data shows whether or not each midshipman in the data set tests as Judging or Perceiving on the MBTI. Cross tabulation for this yielded a total of 67 midshipmen without MBTI data. Furthermore, there were a total of 3437 midshipmen who tested as Judging and 2205 midshipmen who tested as Perceiving. There were 524 judging midshipmen who preferred submarines as a service choice while 722 midshipmen preferred USMC. Conversely, 329 perceiving midshipmen preferred submarines as a service choice while 460 preferred USMC as a service choice.

Unlike the other categorical variables, the chi-square test yielded a significance value of .93, which is greater than .05. Thus, this variable is not going to be used in the binary logistic regressions. Table 29 shows the results of the chi-square tests for **JP_BRIGGS**.

Table 29. Results of Chi-square Test for Judging/Perceiving

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	0.154	2.00	0.93
Likelihood Ratio	0.154	2.00	0.93
Linear-by-Linear Association	0.077	1.00	0.78
N of Valid Cases	5642		

D. BINARY LOGISTIC REGRESSIONS

This study used regression analysis to predict the values of two dependent variables: midshipman preference for USMC and midshipmen preference of submarines as a service choice. Regression analysis is a statistical technique designed to predict values of a dependent variable from knowledge of the values of one or more independent (predictor) variables. This study used two binary logistic regressions as a model to predict midshipmen service selection using the following independent variables: **EI_BRIGGS**, **SAT(M)**, **SAT(V)**, **MIL_FATHER**, **CAQPR**, **CMQPR**, **PHYS_INDEX** and **PRIOR**.

In this study the results were analyzed using the significance values, the overall percentage of correct predictions for the dependent variable and the B-values. Like the ANOVA and chi-square tests, the significance values in the binary logistic regressions indicated the rarity of a particular statistical outcome given that there was actually no effect (George et al., 2005). If the significance values were less than .05, they were deemed to have a unique impact on the dependent variable as related to the other independent variables. The overall percentage of correct predictions is a self-explanatory output that measures how many midshipmen from the data set were correctly predicted to prefer either USMC or Subs (depending on the dependent variable used). The cut value for this test was .500. The B-values are regression coefficients and the constants for the final regression equation (as seen in the regression outputs). This value may be viewed as a weighted constant that describes the magnitude of influence a particular independent variable has on a dependent variable. So, where significance values indicate how independent variables relate to other independent variables, the B-value shows the strength of influence of each independent variable on the dependent variable.

As mentioned earlier, two binary logistic regressions were used for this study. One regression analysis compared those midshipmen who preferred USMC as a service choice to all others the other regression analysis compared those midshipmen who preferred submarines as a service choice to all others. The **JP_BRIGGS** variable was not included in the regressions because it did not pass the goodness-of-fit test (Sig. greater than .05). The **PRIOR** variable was split up to those who had prior NPS experience or not and those who had prior USMC experience or not; thus, NPS midshipmen were used in the regression analysis for subs and USMC midshipmen were used in the regression analysis for USMC.

1. Binary Logistic Regression Output for USMC

The overall percentage of correct predictions for preference for USMC as a service choice among midshipmen was 79.85%. This was a fair value and shows that the independent variables used in this study have some measure of predictability on the

tendency of midshipmen to prefer USMC as a service choice. Table 30 shows the prediction outcomes for the regression analysis of USMC.

Table 30. Prediction Outcomes for Regression Analysis of USMC

	Predicted		
	1st Choice USMC		Percentage Correct
	All others	1st Choice USMC	All others
All others	4413.00	44.00	99.01
1st Choice USMC	1092.00	90.00	7.61
Overall Percentage			79.85

The only independent variable that yielded a significance value of greater than .05 was **MIL_FATHER**. Indeed, this value was greater than .05, but not by much. **MIL_FATHER** yielded a significance of .07. Although .05 is the most widely used parametric value to measure significance among researchers, it can be argued that **MIL_FATHER** is still a significant variable.

The B-values yielded some interesting results. With a B-value of 2.51, **PRIOR** experience had the most magnitude of influence on those midshipmen who preferred USMC as a service choice. That means that those midshipmen who had prior USMC experience tended to prefer to select USMC as a service choice. **CAQPR** had the next highest magnitude of influence (although negative) followed closely by **CMQPR**. A B-value of -1.51 showed that those with a higher CAQPR were less inclined to prefer USMC as a service choice. Conversely, those with a higher CMQPR were more inclined to prefer USMC as a service choice. These findings are what the senior Marine assigned to the Naval Academy Predicted (personal communication, COL Paulovich, March 2007). **EI_BRIGGS** had a moderately high B-value (.17), showing that the Extravert/Introvert dichotomy had some positive magnitude of influence on the preferences of midshipmen. The data show that, in fact, more extraverted midshipmen choose USMC while more introverted midshipmen choose “all others” and that the E/I variable is a good predictor of service choice into USMC. Table 31 shows the results of the logistic regression for 1st choice USMC and all others.

Table 31. Results of Logistic Regression for 1st Choice USMC and All Others

Variables in the Equation	B	S.E.	Wald	df	Sig.	Exp(B)
EI_BRIGGS	0.17	0.07	6.31	1.00	0.01	1.19
SAT(M)	0.00	0.00	5.01	1.00	0.03	1.00
SAT(V)	0.00	0.00	37.11	1.00	0.00	1.00
MIL_FATHER	-0.09	0.05	3.20	1.00	0.07	0.92
CAQPR	-1.51	0.11	180.15	1.00	0.00	0.22
CMQPR	1.48	0.16	84.26	1.00	0.00	4.41
PHYS_INDEX	0.01	0.00	37.07	1.00	0.00	1.01
PRIOR_MC	2.51	0.24	104.87	1.00	0.00	12.25
Constant	-4.28	0.52	68.73	1.00	0.00	0.01

2. Binary Logistic Regression Output for Subs

The overall percentage of correct predictions for preference for Subs as a service choice among midshipmen was 85.10%. This was a fair value and shows that the independent variables used in this study have some measure of predictability on the tendency of midshipmen to prefer USMC as a service choice. Table 32 shows the prediction outcomes for the regression analysis of Subs.

Table 32. Prediction Outcomes for Regression Analysis of Subs

	Predicted		
	1st Choice Subs		Percentage Correct
	All others	1st Choice Subs	All others
All others	4778.00	9.00	99.81
1st Choice Subs	831.00	21.00	2.46
Overall Percentage			85.10

Similar the USMC regression results, the only independent variable that yielded a significance value of greater than .05 was **MIL_FATHER**. Unlike USMC, this value

was significantly greater than .05. **MIL_FATHER** yielded a significance of .34. For this regression analysis, **MIL_FATHER** was not seen as a significant variable.

Like the regression analysis for USMC, the B-values for Subs yielded some interesting results. With a B-value of 1.23, **CAQPR** had the most magnitude of influence on those midshipmen who preferred Subs as a service choice. That means that those midshipmen who had higher CAQPR's tended to prefer to select Subs as a service choice. Given that, as discussed in Chapter II, academic screening for submarine service is more rigorous than that of USMC, this B-value makes sense. **PRIOR_NPS** had the next highest magnitude of influence followed by **CMQPR** (negative). A B-value of 1.02 showed that those with prior experience in NPS were more inclined to prefer Subs as a service choice. Conversely, those with a higher CMQPR were less inclined to prefer Subs as a service choice. Similar to USMC, **EI_BRIGGS** had a moderately high positive B-value (.19), showing again that the Extravert/Introvert dichotomy had some magnitude of influence on the preferences of midshipmen. This shows that more introverted midshipmen are attracted to subs more than all others and that this variable is a good predictor of submarines as a service choice. Table 32 shows the results of the logistic regression for 1st choice Subs and all others.

Table 33. Results of Logistic Regression for 1st Choice Subs and All Others

Variables in the Equation	B	S.E.	Wald	df	Sig.	Exp(B)
EI_BRIGGS	0.19	0.08	6.09	1.00	0.01	1.21
SAT(M)	0.00	0.00	27.52	1.00	0.00	1.00
SAT(V)	0.00	0.00	12.39	1.00	0.00	1.00
PRIOR_NPS	1.02	0.21	24.69	1.00	0.00	2.77
MIL_FATHER	-0.05	0.05	0.92	1.00	0.34	0.95
CAQPR	1.23	0.13	94.30	1.00	0.00	3.41
CMQPR	-0.66	0.18	12.87	1.00	0.00	0.52
PHYS_INDEX	-0.01	0.00	43.30	1.00	0.00	0.99
Constant	-3.33	0.58	33.16	1.00	0.00	0.04

V. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

A. INTRODUCTION

This chapter summarizes the main results of this study and addresses some recommendations for further research. The primary purpose of this thesis was to investigate specific U.S. Naval Academy student predictors of service selection to the Marine Corps and the submarine force. This study has presented an approach to explaining the persuasions of midshipmen career choices explicitly for the USMC and the submarine force. Two models of prediction were used that analyzed CAQPR, CMQPR, SAT Math scores, SAT Verbal scores, familial experience, prior experience, physicality and personality traits in terms of the MBTI. These independent variables were first analyzed using goodness-of-fit tests and then entered into binary logistic regressions. The results were explained in Chapter IV.

B. SUMMARY OF FINDINGS

The empirical portion of this study yielded some interesting results. It was shown that the service choices of midshipmen are influenced by certain characteristics that are different for the Marine Corps and the submarine force. The first question proposed in this research was “What effect do personality and temperament have on service selection into the Marine Corps and the submarine force?” To study the influence of personality on service choice, certain traits were isolated from the Myers-Briggs Type Indicator – specifically the extravert/introvert and judging/perceiving dichotomies. The two dichotomies were tested for goodness-of-fit by using the Pearson Chi-square Test. The E/I dichotomy was found to have different frequencies than expected; the J/P dichotomy was not. E/I was included in the binary logistic regression and J/P was not. The prediction models showed that the E/I dichotomy was a significant predictor of service choice for both USMC and submarine force, although the B-values indicated that these personality traits did not have as much impact as CAQPR or prior experience. The B-values of the E/I dichotomy were very similar for the USMC and submarine force.

These results showed that from 2000-2006, introverted midshipmen were generally more interested in submarines and extraverted midshipmen were generally more interested in Marine Corps as a service choice. This was an appropriate finding in terms of MBTI personality types, especially in terms of extraversion and introversion. Myers et al. (1998), explain that extraverted people in work situations “like variety and action” and “are often impatient with long, slow jobs done alone” while introverted people “like quiet concentration” and “tend to be careful with details” (p.79). As discussed in the literature, submarine service requires more of a detailed and academic approach than does USMC (personal communication, CAPT O’Neill, March 2007). This is due in part to the requirement to complete Nuclear Power School before becoming a submarine officer and the academics associated with becoming an officer-of-the-deck. The Marine Corps, conversely, seems to appeal to more extraverted midshipmen.

These findings may suggest how both communities recruit midshipmen. Since the Marine Corps attracts more extraverted midshipmen, those midshipmen may naturally make themselves more accessible to interaction with Marines, which, in turn, makes it easier for them to be recruited. Conversely, if more introverted midshipmen are the ones who are generally interested in the submarine force, it may be more difficult for submarine officers on the Yard to have much interaction with them. This may partially explain why USMC recruiting has been more successful at the Naval Academy in recent years than submarine recruiting.

Physicality was also shown to be a significant predictor of service choice. Although the B-value for the physicality index of USMC was similar to the submarine force, the B-value for USMC was positive while the submarine force logistic regression yielded a negative value. This shows that those midshipmen with a higher degree of physicality chose USMC while the submarine force attracted those midshipmen with slightly lesser physicality. These findings were expected; both the senior Marine and the senior submariner at USNA concurred that the Marine Corps attracts those midshipmen with a higher degree of physicality (personal communication, March 2007).

One component of the physicality index was varsity sport participation. Those who engage in team sports may open themselves up to meeting other midshipmen who

are selecting USMC. This, in turn, provides more recruiting opportunities for USMC via influential midshipmen. Moreover, the results clearly show that those who generally have good physical abilities tend to be attracted to the physical challenge that is the Marine Corps. It may suggest that the manner in which the Marine Corps advertises itself – that is, as a physically challenging service – is working.

Familial experience (**MIL_FATHER**) was found to not be a significant predictor of service choice. The significance value was greater than .05 for both the Marine Corps and the submarine force; however, the significance value was slightly more than .05 for the Marine Corps. This shows that having a USMC father moderately influenced those midshipmen who wanted USMC as a service choice. Prior military experience, conversely, was found to be the most significant predictor of service choice for USMC and the second strongest predictor for the submarine force. The Prior Marine Corps experience yielded an exceptionally high B-value for USMC service choice. This shows that prior Marines generally choose USMC upon graduation. The same was shown for prior experience in NPS among those midshipmen who chose the submarine force as a service selection.

Prior experience was shown to have a strong influence on service choice, but it was stronger for USMC than it was for prior “Nukes.” Indeed, it was more likely for a prior Marine to choose USMC than it was for a prior “Nuke” to choose submarines upon graduation. These results may suggest the Naval Academy community is not doing enough to organize those midshipmen with prior nuclear experience into groups similar to the Semper Fi Society, which, as this researcher has observed, has a significant presence on the Yard. This is important, because organizations like the Semper Fi Society provide reminders to the midshipmen who are prior Marines that becoming a Marine Officer is a distinct possibility, if not a goal. This researcher has seen numerous events at the Naval Academy strictly for prior Marines; conversely, not one event has been organized solely for prior nuclear sailors.

For the submarine force, the most significant predictor was CAQPR. The logistic regression showed that those midshipmen with higher academic QPRs are more likely to select the submarine force as a service choice than USMC. This finding was congruent

with the literature reviewed in this study and in agreement with the senior submariner at the Naval Academy (personal communication, CAPT O'Neill, March 2007). The second most significant predictor for the submarine force was prior NPS experience. Although SAT values for both math and verbal were significant for both USMC and the submarine force, their B-values were low relative to CAQPR, CMQPR, prior experience and the E/I dichotomy.

These results show that, indeed, as discussed in the literature, the submarine service is selective in terms of academic performance. It may be suggested that one reason the submarine service has had a hard time meeting their quotas during the past few years is because a large portion of each class is ineligible to select submarines: women. Because of the strict academic screening associated with submarine service, the number of potential submariners is already significantly reduced at the time midshipmen submit their service choices. Adding women to the list of potential submariners could possibly add more eligible midshipmen to the recruiting pool and thus make it considerably easier to meet yearly quotas. Further research should be done on the positive impacts of adding women to the submarine force.

The USMC regression showed interesting results in terms of CAQPR and CMQPR. As the senior Marine at the Naval Academy suggested, those midshipmen with higher CMQPR's are more attracted to USMC, along with midshipmen with lower CAQPR's. (personal communication, March 2007). This is exactly what the predictor model showed; there was a positive correlation between CAQPR and USMC service choice and a negative correlation between CMQPR and service choice. The B-values were relatively high for both CAQPR and CMQPR in the USMC regression – CAQPR was positive while CMQPR was negative. Interestingly, the submarine force regression yielded the opposite. CAQPR, which was positively correlated to submarine force service choice, while CMQPR was negative. This is consistent with the literature reviewed in this study.

Where the submarine force is selective for and attractive to those midshipmen with good academic performance, the Marine Corps is attracted to those midshipmen with good military performance. In fact, the results show that they are almost inversely

related (as represented by the B-values). These findings hint at a possibility of the extraversion/introversion dichotomy having an influence on military performance grades. Further research should be conducted on this possibility.

C. RECOMMENDATIONS FOR FURTHER STUDY

This model yielded interesting results for predicting the service choice among midshipmen. There are other additional research topics that could be associated with the service choice of midshipmen. One recommendation for further research would be to analyze the impact that the Iraq War has had on the service choices of midshipmen and compare that to the service choices of midshipmen during the Vietnam War era. According to the senior Marine at the Naval Academy, USMC was the least popular service choice of midshipmen during the Vietnam War (personal communication, March 2007). Why, then, is the Marine Corps a more popular service choice amidst the Iraq War? What is the Marine Corps doing right at USNA to recruit midshipmen? This study focused on the factors that indicated service choice among the midshipmen who chose USMC and submarines. The question of “why” was not answered. A qualitative study needs to be conducted to research what societal, cultural and external factors influence midshipmen to do what they do.

Another study could look at the interests of women regarding the submarine force. Would the submarine force have an easier time making its yearly quota if women were allowed to select submarines out of USNA? Does the fact that women are not allowed in the submarine force have a negative effect on the desire for midshipmen to choose the submarine force? This study could be a qualitative or quantitative study on the potential impact women could have on submarine force selection.

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LIST OF REFERENCES

- Aronson, E. (1973). *Readings about the social animal* (6th ed.). New York: W. H. Freeman and Company.
- Boone, C.; van Olffen, W. & Roijackers, N. (2004). Selection on the road to a career: evidence of personality sorting in educational choice. *Journal of Career Development*, 31(1), 61.
- Bowers, K. M. (2002). *The utility of the Myers-Briggs Type Indicator and the Strong Interest Inventory in predicting service community selection at the United States Naval Academy*. Monterey, CA: Naval Postgraduate School.
- Boyd, A. E. (2003). *Analysis of determinants of student pilot success for United States Naval Academy graduates*. Monterey, CA: Naval Postgraduate School.
- Corey, G. & Corey, M. S. (1978). *I never knew I had a choice* (5th ed.). Pacific Grove: Brooks/Cole Publishing Company.
- Demick, J. & Andreoletti, C. (2003). *Handbook of adult development*. New York: Kluwer Academic / Plenum Publishers.
- Department of the Navy, Chief of Naval Operations (2006). *OPNAVINST 7220.11a*, Nuclear officer incentive pay program. Washington, D.C: Pentagon.
- Fitzgerald, C. & Kirby, L. K. (1997). *Developing leaders: Research and applications in psychological type and leadership development*. Palo Alto: Davies Black Publishing.
- Gannon, R. J. (2000). *The Naval Academy– Marine Corps relationship: an examination of the Marine Corps' influence on the academy's professional impact on the Marine Officer Corps*. Monterey, CA: Naval Postgraduate School.
- Gelfand, M. H. (2006). *Sea change at Annapolis: the United States Naval academy, 1949-2000*. Chapel Hill: The University of North Carolina Press.
- George, D., & Mallery, Paul (2005). *SPSS for windows step by step: a simpleguide an reference 12.0 update*. Boston: Pearson.
- Harrington, T. F., & Harrigan, T. A. (2005). Practice and research in career counseling and development. *The Career Development Quarterly*, (55)2, 98.

- Hart, D. A. (1992). *Becoming men: The development of aspirations, values and adaptational styles*. New York: Plenum Press.
- Howe, N., & Strauss, W. (2003). *Millennials go to college: strategies for a new generation on campus: recruiting and admissions, campus life, and the classroom*. Washington, D.C.: American Association of Collegiate Registrars and Admissions Officers, and Life Course Associates.
- Keirse, D., & Bates, M. (1978). *Please understand me: character and temperament types*. Del Mar: Prometheus Nemesis Book Company.
- Kuijpers, M., Schyns, B., & Scheerens, Jaap (2006). Career competencies for career success. *The Career Development Quarterly*, 55(2), 168.
- Kulik, Liat, (2000). Women face unemployment: a comparative analysis of age groups. *Journal of Career Development*, 27(1), 15.
- Levinson, D. J. (1978). *The seasons of a man's life*. New York: Alfred A. Knopf.
- Lind, D. A., Marchal, W. G., & Wathen, S. A. (2005). *Statistical techniques in business and economics* (12th ed). New York: McGraw-Hill Irwin.
- McCaulley, M.H., & Myers, I. B. (1985). *Manual: A guide to the development and use of the Myers-Briggs type indicator*. Palo Alto: Consulting Psychologists Press.
- Myers, I. B., & McCaulley, M. H. (1985). *Manual: a guide to the development and use of the myers-briggs type indicator* (1st ed). Palo Alto: Consulting Psychologists Press.
- Myers, I. B., McCaulley, M. H., Quenk, N. L., & Hammer, A. L. (1998). *MBTI manual: a guide to the development and use of the Myers-Briggs Type Indicator* (3rd ed.). Palo Alto: Consulting Psychologists Press.
- Newman, B. M., & Newman, P. R. (1975). *Development through life: a psychological approach*. Pacific Grove: Brooks/Cole Publishing Company.
- Pascarella, E. T., & Terenzini, P. T. (1991). *How college affects students*. San Francisco: Jossey-Bass.
- Polk, C. J. (2003). *Effective predictors of submarine junior officer technical competence*. Monterey, CA: Naval Postgraduate School.
- Quenk, N. L. (2000). *Essentials of Myers-Briggs Type Indicator assessment*. New York: John Wiley & Sons, Inc.

- Roblyer, M. D., & Knezek, G. A. (2003). New millennium research for educational technology: a call for a national research agenda. *Journal of Research on Technology in Education*, 36(1), 60.
- Sallop, L. J., & Kirby, S. L. (2007). The role of gender and work experience on career and work force diversity expectations. *Institute of Behavioral and Applied Management*, 122.
- Siegrist, A. (2004). *Parental divorce and midshipmen performance at the United States Naval Academy*. Monterey, CA: Naval Postgraduate School.
- Stephan, C. W., & Stephan, W. G. (1990). *Two social psychologies* (2nd ed). Belmont: Wadsworth Publishing Company.
- Tabachnick, B.G. & Fidell, L. S. (2001) *Using multivariate statistics* (4th ed.). Boston: Allyn and Bacon.
- United States Naval Academy, Commandant of Midshipmen (2005). *Midshipman physical readiness test (PRT) procedures*. Annapolis: COMDTMIDNINST 6110.2C. Annapolis, MD: U.S. Naval Academy.
- United States Naval Academy, Commandant of Midshipmen (2005). *Service assignment for Class of 2006*. Annapolis: COMDTMIDNINST 1301.1C. Annapolis, MD: U.S. Naval Academy.
- United States Naval Academy, Professional Development Department (2007). *Fiscal year accession plan*. Annapolis: U.S. Naval Academy.
- United States Naval Academy, Professional Development Department (2005). *Memorandum of agreement between the chief of naval personnel and the deputycommandant for manpower and reserve affairs of the Marine Corps*. Annapolis:U.S. Naval Academy.
- United States Navy, Bureau of Medicine and Surgery Publications (2005). *Manual of the medical department*. Washington, DC: Bureau of Medicine.
- United States Navy (2007). *Naval nuclear propulsion study guide*. Arlington: Naval Reactors.
- Wadle, S. W. (2004). *An analysis of Marine Corps service assignment at the United States Naval Academy*. Monterey, CA: Naval Postgraduate School.

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