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THESIS

THE IMPACT OF ATHLETIC ACHIEVEMENT AT THE UNITED STATES NAVAL ACADEMY ON FLEET PERFORMANCE

by

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June 2000

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Specifically, this study analyzes the role of achievement in varsity athletics on fleet performance. Using data on the Naval Academy classes of 1981-1985, six multivariate models are specified. The first analyzes variables identified in previous studies as being significant in explaining performance or promotion, and is used as a baseline for the remaining models. The second model analyzes the overall effect of athletic achievement on promotion. The next model analyzes the differential effects of achievement in a team sport versus an individual sport versus no sport at all. The effects of being a female athlete and minority athlete are then identified, followed by an analysis of blue-chip athletes. The results find that four of the variables indicating athletic achievement have positive and significant effects on promotion to LCDR. Being a Blue-chip team athlete increased the probability of promotion 18.9 percent, being a Team athlete increased the probability of promotion 11.4 percent, being a Varsity athlete increased the probability of promotion 7.7 percent, and being a Blue-chip non-athlete increased the probability of promotion 6.4 percent.

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THE IMPACT OF ATHLETIC ACHIEVEMENT AT THE UNITED STATES NAVAL ACADEMY ON FLEET PERFORMANCE

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B.S., United States Naval Academy, 1993

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I think there is one characteristic of the American people that contributes immensely to the greatness of our country, and that's our dedication to excellence in every way of American life. And I think we attach a high degree of significance to excellence in physical fitness. Intercollegiate sports more or less represent the ultimate in excellence in amateur sports - that's one of the real values of intercollegiate athletics. It's great for the spirit and morale of the country to have this demonstration of physical excellence at the collegiate level. Intercollegiate sports impart those values a military leader must have to a large degree.

- Vice Admiral William P. Lawrence,
  former Superintendent of the Naval Academy

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I. INTRODUCTION

> To develop midshipmen morally, mentally and physically and to imbue them with the highest ideals of duty, honor, and loyalty in order to provide graduates who are dedicated to a career of Naval service and have the potential for future development in mind and character to assume the highest responsibilities of command, citizenship, and government (Reef Points, 1998).

A. BACKGROUND

The mission of the United States Naval Academy speaks clearly of three distinct pillars of midshipmen development upon which each incoming candidate is expected to grow: morally, mentally, and physically. Each leg of the triad has its own area of responsibility, and none of the three is more important than the others.

Graduates of the Naval Academy are national resources, receiving over $200,000 worth of academic and professional education at the expense of the taxpayers of the United States. The expected returns for this investment are officers who hold themselves to a higher standard than the rest of society, officers who can be counted on to make sound, rational decisions that are in the best interest of the United States of America.

This standard goes beyond mere public expectation, it is an integral part of the warrior ethos. The military officer should accept nothing less than the absolute highest standards attainable. Unfortunately, as the Special Committee to the Board of Visitors concluded in 1997, "this mystique can be both a blessing and a curse."

It is a blessing because the norms and values of the Naval Academy not only enforce high standards of excellence, but through the development of midshipmen they allow these future officers to "police" themselves. Those who do not adhere to the standards may be considered outcasts and will either improve their level of performance, or in some manner be asked to leave the Academy.

This standard of excellence becomes a curse when those who do not adhere to the standards are put in the spotlight outside of the Academy walls. Despite the reality that midshipmen are our military leaders of tomorrow, they are in fact very much like college students at other selective universities in the United States. When a scandal is made public, it hits the Academy like a meteor shower even though the events that caused the scandal may be an every day occurrence at other universities. The curse lies in the dilemma that 4,000 18-to-25-year olds are expected to adhere to the same standards that admirals and generals hold dear, an expectation that sometimes cannot be considered to be realistic. Nonetheless, the standards are constant and their value in the development of leaders is certainly justified.

B. MORALLY, MENTALLY, AND ... PHYSICALLY

The Naval Academy never veers far from the media spotlight, and in the last decade there have been numerous episodes that have opened the floodgate to public scrutiny. These problems cause everyone to question the way in which midshipmen are taught to become leaders. The ensuing investigations of these events produced calls for serious changes in the overall program at the Naval Academy. These proposed changes

are in reaction to areas within the Naval Academy mission in which midshipmen development is not achieving the expected standards.

For example, the electrical engineering cheating scandal of 1992 left the quality of midshipmen honor in serious doubt, resulting in a complete overhaul of the ethics and honor system at the Naval Academy. Several other smaller incidents have led to further alterations in the ethical instruction of midshipmen, all of which have been viewed as positive improvements in the way midshipmen are taught the characteristics expected of future leaders.

The Academy is also currently undergoing a "bottom-up" review of the academic curriculum. For years the topic of what midshipmen should learn has been debated, and over the years the Academy has gone from a trade school in the late 1800's, to a school expected to develop engineers in the Rickover years, to the current curriculum that strikes somewhat of a balance between the sciences and humanities, but is still heavily oriented toward a technical core curriculum.

The areas of moral and mental development have time and again been questioned and changed to produce better leaders, but what of the third attribute, physical development? Physical development encompasses more than just mere physical fitness, but its importance to the development of leaders rarely receives much attention.

C. TIME FOR EVERYTHING?

The most precious commodity of a midshipman is time, and with that constraint comes the requirements of all the different facets of midshipmen development. Academics and professional duties require the majority of an average midshipman's time,

while physical performance attracts the lowest priority. Of all the requirements placed on midshipmen, the physical requirements are the ones most likely to be put aside until a later time. However, in the case of a varsity athlete, delaying physical development is not possible.

In order to become a competitive athlete at the Division I level, the NCAA level at which the Naval Academy competes, a midshipman athlete in-season must practice every day, for several hours each day. This is an important difference that sets the varsity athlete apart from other midshipmen. The time available to varsity athletes for academic and professional duties is drastically reduced compared to that of non-varsity athletes.

Time spent on varsity sports requires a trade-off with other activities, such as study time for academics and company functions. This deprives company leaders of the opportunity to observe the military performance of their varsity athletes. Moreover, the leadership qualities enhanced through varsity athletics often is not readily apparent in the classroom or military living environment, which may affect the varsity athlete's measured performance. The quote "out of sight, out of mind" is often used to describe varsity athletes because of their time spent away from the company. Consequently, conduct, performance, and academic grades often suffer for varsity athletes.

During the period of this study the Order of Merit, or numerical rank in the class used to select service communities, placed no value on athletic achievement. (USNAINST 1531.16R, 1982) Currently (as of spring, 2000) the Order of Merit includes 3.38 percent for athletic performance, which is received only if a midshipman is elected as a team captain. (USNAINST 1531.51A, 1996) Because athletic achievement of

midshipmen is not included in overall performance, typical athletes receive no reward at all for extra time and focus dedicated to their athletic programs.

Since service selection of graduates is based primarily on Order of Merit, varsity athletes with lower academic grades and lower performance ratings often rank lower in their class, which can result in some choosing less-preferred service communities. For the graduating classes of 1981-1985, the average Order of Merit for varsity athletes was almost 33 points lower than for non-athletes. This not only affects desire to perform in the fleet, but also affects desire to stay in the Navy, and may result in a greater probability of leaving the service upon the expiration of the initial service obligation.

D. OBJECTIVES

This thesis investigates the advantages or disadvantages of the established varsity athletic programs of the Naval Academy, in order to provide more accurate information on relative importance of athletics to post-graduation fleet performance for Academy policy makers. As such, the major purpose of this thesis is to analyze the relationship between athletic achievement at the Naval Academy and success in the Navy after graduation.

In a time when budget constraints and National Collegiate Athletic Association (NCAA) regulations limit the number of varsity athletic programs available, and the number of athletes that can participate, it is important to look at how varsity athletic programs contribute to the overall mission of the Naval Academy. As time has passed, a greater emphasis has been put on academic performance and character development as

indicators of midshipmen performance, while physical development has been viewed as least important.

E. RESEARCH QUESTIONS

This thesis examines the following questions related to the impact of varsity athletic achievement on officer performance:

- What is the effect of being an USNA varsity athlete on fleet performance?
- What is the effect of being a team or individual sport athlete on fleet performance?
- What is the effect of being a female athlete on fleet performance?
- What is the effect of being a minority athlete on fleet performance?
- What is the effect of being a recruit, blue chip, or walk-on varsity athlete on fleet performance?
- What sports are associated with better fleet performance, including promotion rates?

This research will use one primary measure of fleet performance, promotion to the O-4 (Lieutenant Commander) paygrade for those who survive to the 10-year point. Promotion to the O-4 level will indicate performance sufficient to survive the Navy's up-or-out screen.

In order to study promotion rates at the O-4 level, the classes of 1981 to 1985 will be examined in this thesis. The samples for these classes include all officers who have passed their minimum service obligation, and have been reviewed for promotion to O-4 (roughly in years 1991-1995). These classes will also allow the effect of women athletes to be studied, as the class of 1980 was the first class to include women graduates.

Though it is possible retention of USNA athletes may be affected by lower Order of Merit rankings, early regression models do not indicate any statistical significance by athlete status. As such, retention will not be addressed in this thesis.

F. ORGANIZATION OF THE STUDY

This study is divided into five chapters. Chapter II reviews previous studies related to fleet performance and studies related to the psychological advantages of athletic achievement. Chapter III presents the data set and methodology used for the statistical analysis. Chapter IV reviews the findings of the data analysis and determines whether or not the proposed hypotheses are supported. Finally, Chapter V provides a research summary, conclusion of findings, recommendations based on the findings, and suggestions for further research.

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II. LITERATURE REVIEW

> To provide the Naval Service with leaders of character who will serve the nation in peace and war (Reef Points, 1998).

A. PREVIOUS STUDIES ON FLEET PERFORMANCE

The purpose of the Naval Academy contains two key words upon which every evolution should be centered: leaders, and character. Without these two qualities, graduates of the Naval Academy would be no different than graduates of other universities around the country. What must be asked is what impact varsity athletics has on the development of leaders and character. Previous studies have identified characteristics that are important predictors of fleet performance, but none have specifically dealt with the issue of athletic achievement.

1. Development of Career Officers

In his 1997 study titled "The Development of Career Naval Officers from the U.S. Naval Academy: A Statistical Analysis of the Effects of Selectivity and Human Capital," Matthew Reardon examined background factors that can be used to predict officers who become careerists, or those who will stay in the Navy and continue to be promoted (Reardon, 1997). Reardon used a data set compiled of several smaller data sets for the Naval Academy classes of 1980 through 1985. USNA Applicant files from the Navy Personnel Research and Development Center, USNA Registrar files, Naval Academy Athletic Association (NAAA) files, and Officer Promotion History Data Files created by

Professor William Bowman and Professor Stephen Mehay were combined to provide a database that enabled all officers in the URL communities from these year groups to be analyzed (Reardon, 1997). This database not only identified which officers were selected for promotion, but also those who were not selected and those who were not reviewed by the selection board. This allowed for a thorough investigation of officers who stayed in the Navy long enough to be screened for LCDR, and those who were superior performers.

The variables Reardon found to be significant in predicting a careerist were: being from a military family; being a recruited athlete; age at graduation; academic QPR; professional development QPR; military performance QPR; and being a trident scholar. (Reardon, 1997) The two variables with which Reardon found to be the strongest indicators of career potential were growing up in a military family, and military performance grades at the Naval Academy (Reardon, 1997). Other studies have also found that being from a military family typically increases the likelihood of an officer becoming a careerist, most likely because these individuals know what the military is like in the long run, and are less likely to become disenchanted by common career paths.

During his research, Reardon interviewed the current Head of the Physical Education Department at the Naval Academy, CAPT Jeffrey K. Sapp, USN, who stated:

> "In addition to greater physical and athletic skills which may or may not enhance an individual's career potential, varsity athletes are assumed to have greater survival and teamwork skills which are critical to a successful naval career." (Reardon, 1997)

In examining the impact of varsity athletics on career potential, Reardon used a variable called *NLETTER*, which identified those midshipmen who earned a varsity letter during their first class year (Reardon, 1997). This was the extent of Reardon's

examination of athletic achievement or participation, and he found that *NLETTER* had no significant effect on career potential.

2. Impact of Academic Performance on Fleet Performance

Gremillion (1998), also examined the USNA classes of 1980 through 1985 to develop models which could predict fleet performance and retention. This study, titled "Undergraduate Academic Achievement as an Indicator of Fleet Performance and Retention," looked into the effects of academic performance at USNA as a predictor of fleet performance. Concentrating on the various academic areas at USNA, Gremillion used the same basic database as Reardon, but added several variables related to academic performance. Gremillion examined promotion in only the four major warfare communities in the Navy, and used the percentage of fitness reports recommended for accelerated promotion as the measurement of fleet performance (Gremillion, 1998).

The basic explanatory variables Gremillion used were the same as in Reardon's study, and roughly the same variables were found to be statistically significant in Gremillion's measure of fleet performance. In addition to the variables Reardon found to be significant, Gremillion found others, including being a blue-chip athlete, engineering QPR, humanities/social sciences QPR, math/science QPR, being a boy/girl scout, and being a boy/girl scout leader. The variable *NLETTER1* was used by Gremillion to measure varsity sport background, designating those officers who received a varsity letter in their first class year. This variable was found to have no significance in explaining the percentage of FITREPS recommended for accelerated promotion (Gremillion, 1998). Gremillion did find, however, that academic achievement was not a significant variable in

explaining the variation in FITREP scores, which was a significant finding. The Order of Merit at USNA is almost 80 percent academic, but Gremillion's study suggests this weight may be too high.

3. Promotion in the Submarine Community

Woelper (1998) examined the impacts of academic background on performance, retention, and promotion within the submarine community. This study analyzed those officers commissioned between 1977 and 1985, and included officers from all commissioning sources. (Woelper, 1998) Woelper used promotion to LCDR as the measure of performance, and used the percentage of FITREPs recommended for accelerated promotion during one's years as an O-3 (LT) as a measure of performance. In addition, an analysis of USNA and ROTC graduates was separately conducted in order to analyze differences in predicted effects by commissioning source. (Woelper, 1998)

Though this study did not use variables other than those that are academically related, its conclusions were important to policies governing the submarine community. The submarine community currently places a heavy emphasis on undergraduate academic performance in selecting officers for their community. Woelper (1998) found this policy to be justified, as officers with strong academic backgrounds had higher performance and promotion rates than those with less than stellar academic backgrounds. In addition, among OCS graduates, humanities majors had better retention and promotion rates than engineers did. This was the opposite for the subject USNA and NROTC officers, among whom engineers fared better.

4. Female Promotion

Because the combat ban on females was not lifted until 1993, previous studies regarding female promotion rates have generally been confined to the smaller communities outside of the four major warfare communities. However, Reed (1991) conducted an analysis of female officers considered for promotion from FY1981 to FY1990 across all of the communities that included females. Though she did not analyze the effect of athletic background on promotion, she did find that college GPA was a significant factor in promotion to LCDR for females. Reed also found that minorities had a lower probability of promotion (Reed, 1991).

B. QUALTIES OF LEADERSHIP ENHANCED BY ATHLETICS

There is no quantifiable explanation of exactly *why* athletes may or may not be better performers in the fleet, but it may be possible to identify proxy variables associated with the strong leadership attributes that may be enhanced by participation in athletics. There has been a wide variety of studies written on sports psychology, most of which concentrate on improving the performance of athletes. Other studies do not emphasize the impact of athletics on job performance, but rather examine the impact of athletics on various personal traits. Several of these traits are directly identified by the primary book in the leadership curriculum at the Naval Academy as being equated with a good leader. Since this book is used to teach midshipmen about what makes a good leader, it is from this text that previous studies can be tied to various qualities that are enhanced by athletic achievement.

Montor's *Naval Leadership, Voices of Experience* (1987) was developed to be used as the final leadership text midshipmen study before departing the Naval Academy for the fleet. This book was developed by an extensive method of research and personal experience that spanned more than twenty years. In the mid 1970's, input from over 1000 officers concerning their concept of what makes a good leader was combined with the information from the results of a study conducted by 1,750 students at the Naval War College, and materials developed by Montor and McNicholas for the leadership instruction courses.

In the 1980's, Montor and Lt. Col. Anthony Ciotti, Jr., USMC, then a leadership course coordinator at the Naval Academy, reviewed all the articles on leadership that had appeared in the Naval Institute's professional journal *Proceedings* since 1879. This information was combined with the previous research and was divided into 96 separate areas. Ninety midshipmen where then selected to complete a thorough study on one of the first 90 areas. The next step consisted of contacting 96 senior officers in the Navy and Marine Corps and asking them to write a paper on one of the ninety-six areas of leadership.

Since the text was designed to help the junior officer as well as officers throughout their careers, the project team secured inputs from several former Master Chief Petty Officers of the Navy. This was followed by inputs from all the former living Chiefs of Naval Operations, including Admirals Burke, Moorer, and Zumwalt, as well as inputs from former Commandants of the Marine Corps. Finally, on the advice of Admiral Burke, and in a effort to encompass a worldly viewpoint, inputs were solicited

and included by former Chiefs of Naval Operations from several foreign countries, including West Germany, and Japan. This final database was supplemented by interviews with Admirals Larson, Long, McKee, Ramage and Taylor, General Rice, USMC, and then Assistant Secretary of Defense James Webb.

John Paul Jones, in describing the qualifications of a Naval Officer said:

> In one word, every commander should keep constantly before him the great truth, that to be well obeyed, he must be perfectly esteemed. (Reef Points, 1998)

This is to say that in order to be a good leader of men, an officer must be willing to set the example of behavior expected of the troops. The Division Officer who wears soiled uniforms to work cannot demand his troops to wear spotless uniforms. The order may be given and followed, but the hypocrisy of the order is readily apparent and causes problems such as low morale and lack of respect. The platoon commander who expects the members of his platoon to score an outstanding on the physical fitness test, but cannot achieve that level himself is deemed a poor leader. The Department Head who makes his department work until 1900 everyday, but is the first officer off the ship when "liberty call" is sounded, cannot expect the sailors to want to work for him. These examples are relatively simple, but they directly show the influence a leader may have by setting, or not setting, a proper example.

Leading by example cannot be defined by one specific personal trait, for the number of traits included are many. Montor (1987) suggests several traits that have been identified by other research to be influenced by sports involvement. In particular, he suggests that self-improvement, goal achievement and motivation, sociability,

performance under stress, teamwork and responsibility, and competitiveness are all important leadership traits affected by participation in sports. The next section examines each of these traits.

1. Self-improvement

A leader must always strive for self-improvement, whether it is knowledge of troops, knowledge of the job at hand, or knowledge of what it takes to motivate people. This does not imply that high academic grades necessarily equate to a better leader. Instead, knowledge includes the above areas and much more. It can be said that a leader should be expected to gain expertise in all subjects in order to gain increased respect and improve overall team performance. This is because, during difficult times, it will be the leader that people turn to for answers. Admiral Zumwalt said, "Expertise is the most effective tool for improving personal group performance and minimizing morale problems." (Montor, 1987)

Varsity athletes, because of the sheer nature of collegiate competition, are required to practice almost every day for their events in order to increase their level of performance. In order to win their competition they must be able to out perform the other team or athlete, and doing so usually requires performing at as high a level as possible. Those athletes who exhibit high levels of athletic achievement would likely exhibit higher levels of expertise. It is true that many high performing athletes are able to do so in small part because of natural ability, but the extra edge that enables them to out-play their competitors comes from working towards an expert status.

Duda (1989, 1992) found that achievement goals were related to views about the purpose of sport. In this research, Duda defined task goals as those that exist when an individual's actions are aimed at achieving mastery, learning, or performing a skill. Roberts, Hall, Jackson, Kimiecik and Tonymon (1995) used Duda's study as the basis for studying the impact of the sport experience on achievement desire. The hypothesis to be tested was that sports involvement would increase a subject's desire for mastery of learning and performance. This study was conducted by enrolling a total of 337 participants (143 women, 194 men) in physical activity classes at a large, midwestern university. The subjects had to be involved in a competitive sport concurrently, most of whom were involved at the university intramural level and had played the sport an average of 8.8 years.

The Perception of Success Questionnaire, developed by Roberts and Balague (1989) to assess the purposes of sport, satisfaction with the experience, achievement strategies in both learning and performing, and focus in competition was given to this group of 337 participants. The questionnaire was then given to a sample of 205 subjects not associated with the study to gather information on those who were not competing in sports (Roberts, et all, 1995).

The study supported the hypothesis that sports provided a clear task oriented function, with all subjects focused on achieving mastery criteria (Roberts, et all, 1995). This focus caused the athletes to turn their attention towards achieving a high level of both learning and performance. The study also supported the opinion of Ames (1992),

that the motivational climate established by coaches in practice enhances the athlete's desire to achieve that mastery.

2. Goal Achievement and Motivation

Goals can be defined in different ways, but the definition used by Montor is "that toward which effort is directed; an aim or end." (Montor, 1985) Goals can be personal in nature, such as wanting to achieve a 3.0 grade point average for the semester. They may be professional in nature, such as counseling subordinates three times per semester. Or they may be organizational goals in which all members are expected to play a small role. This definition of goals is one that clearly states the objectives of any military action. Without goals, effort can become abstract, with no intended meaning or value. With a goal clearly stated to the organization, all members can direct their efforts toward a common vision.

As in war, athletics requires goals to be set in every facet of the game. Long term, short term, and immediate goals are set to ensure all those involved understand what the group wants to achieve as a whole. This applies not only to team sports, but also to individuals who set personal performance goals to achieve success.

At the Naval Academy, midshipmen are expected to set goals for themselves and their units, as they will in the fleet, but varsity athletes are required to set additional goals that will govern their future commitments and behaviors. These commitments usually take on the form of time, where time must be dedicated to increase performance in order to achieve a goal.

Athletes are also required to show high levels of motivation, in some cases extreme levels, in order to increase their level of performance and the performance of others. Without motivation, it is unlikely an individual will put forth time and effort to achieve any type of goal or increased levels of performance, so athletes must use motivation as a tool much the same way that leaders do.

Admiral Burke stated that each member of the organization must be made aware of the importance of their contribution to the achievement of the organization's goals (Montor, 1985). In this respect, athletes will not be able to achieve their team goals if every member of the team does not understand how important their own input is to the achievement of the goals. A lineman in football, long a position not recognized for its glory, is often the player that allows the quarterback behind him to excel. If the lineman does not put forth the effort necessary to achieve the team goals, it will not be possible for the quarterback to even begin to perform his part.

McClelland (1961) developed the learned needs theory in which he proposed three levels of needs present in each individual; need for achievement (n Ach), need for affiliation (n Aff), and need for power (n Pow). He suggested that when a need is strong, its effect is to motivate people to use behavior leading to a satisfaction of that need. The need for achievement is developed early in athletes, as success is very much the measure of an athlete. This is reinforced time and again throughout an athletic career, through each match or competition, and with the high need for achievement is developed the high level of motivation needed to succeed. These high levels of motivation are likely to

become a personality trait of an athlete, one that is transferable, when required, to succeed in an arena other than athletics.

3. Sociability

It is said that being a great leader depends on how well one can establish relationships. Stogdill (1948) classifies all traits of leadership with six general headings, one of which was participation. Of the items included in participation were sociability, popularity, adaptability, and athletic ability. Stogdill also found these traits to be highly correlated with leadership in several studies he conducted (Stogdill, 1948). Other traits that fall into this category are speaking ability, knowing subordinates, and loyalty.

The ability to effectively communicate goals, desires, and visions to others is a key element of an effective leader. Without this, there would be no common vision that others comprehend in order to work towards a common goal. Likewise, a leader who can speak well, but has no ability to "connect" with another person, will likely be an ineffective leader.

The majority of sports are conducted, at some stage, in a social environment. The interaction involved in athletic participation can easily be overlooked; however, there are simple examples that demonstrate how athletics allow the facilitation of social growth. High school athletes are typically viewed as the popular or well-liked students. This is usually because they have been required to take part in social situations on a daily basis. Whether it is with teammates, coaches, or the opposition, athletes learn to develop "social grace" at an early stage.

4. Performance Under Stress

It is a frequent observation that the quality of performance is likely to be changed by a group of observers, which is typified by statements we make about athletes who are able to have outstanding performances in "the big one." Zajonc (1965) demonstrated that the presence of an audience would produce inferior performance at early stages and superior performances at later stages. This is to say that continuous performance in front of an audience will build an ability to perform at a superior level in front of the audience, and be less likely to fall prey to forces such as pressure.

Athletes begin to receive this reinforcement at an early stage, performing in front of parents and friends. As the child gets older, the audience grows. The athlete learns to perform in front of an entire high school student body. It is at the level of collegiate sports where audiences can have a significant impact on performance. Students, faculty, alumni, staff, and those who just love the school can lay a significant burden on an athlete to perform. At times, the added pressure of performing well enough to continue on to the professional level can be strenuous. An athletic achiever at the collegiate level has likely developed a strong ability to perform in despite the pressure of an audience, much like what would be required of a naval officer in a high-pressure situation.

5. Teamwork and Responsibility

These two traits often go hand in hand, as responsibility is often learned through teamwork. Today's fluid global environment has increased the importance of joint operations within the military, increasing the level of teamwork required for an operation.

The performance of one unit may not necessarily determine the outcome of a war, but the combined effort of several units may be the crucial factor in victory.

Teamwork is an integral part of navy life. The navy's core values: honor, courage, commitment, even reflect this truth. Operations on board a ship cannot run without the execution of the engineering team, and they cannot function without the meals provided by the supply department. Even a single seat pilot must rely on the maintenance performed on the aircraft by someone else. Marines on the shore may depend on naval gunfire support from surface ships, and pilots may depend on cruise missiles launched from submarines to destroy anti-aircraft sites. The examples of teamwork are endless.

With teamwork comes responsibility, about which Joe Montana, former NFL quarterback and four-time Super Bowl champion said, "you've got to be willing to take the blame." Montana says he owes part of his success to being able to say, "I dropped the ball," even if he didn't (Zaslow, 1998).

There is often no place to hide when mistakes are made on the athletic field, and in most cases everyone knows who made the mistake. Leaders who have earned the respect of their teams are the ones who are willing to take responsibility for the entire team, not just themselves. Montor (1987) discusses conscience, and moral courage as two of the attributes of responsibility, two attributes that are forced upon athletes at an early age, and reinforced throughout their career.

6. Competitiveness

The military exists in order to protect the people of the United States "against all enemies, foreign and domestic." (Reef Points, 1998) This quote from the oath of office is ingrained into midshipmen from the first day they report to the Naval Academy. This formation of an enemy is much like every athletic activity where success is usually based on performance against the opposition. In fact, western culture in general promotes and rewards competition, from a capitalist economy, to political elections, to sports. Government even passes laws to protect competition. Ideals such as hard work and improvement are not to be dismissed; however, it is the competition that ultimately drives most athletes.

At the collegiate level competition can be fierce, enabling athletes to develop a competitive nature that allows them to succeed, and can be utilized in other areas of life. Dickinson (1976) implied that competitiveness is a function of reinforcement when he determined that individuals who receive reinforcement for competing against others would be more likely to continue to do so. Athletes, more so than others, receive continual reinforcement in daily practices, increasing the likelihood of a competitive behavior.

Certainly, the areas discussed in this chapter are not the only attributes of leaders that may be enhanced by participation in athletics, but they are just a few of the important traits that are required of effective leaders. Nor does this chapter imply that midshipmen who do not participate in varsity sports do not develop these traits. Rather, the intent of

this chapter is to discuss several traits that may be affected by direct participation in sports.

III. DATA SET AND METHODOLOGY

A. DATA SET DESCRIPTION

The officer data set used in this study was compiled by Professor William Bowman of the Naval Academy and Professor Stephen Mehay of the Naval Postgraduate school. It is a combination of four separate data sets. There are three Navy Bureau of Personnel (BUPERS) data sets merged by officer identification code: (1) Navy Officer Promotion History Files 1981-1995; (2) Navy Officer Loss Files 1981-1995; and (3) Navy Officer Performance Fitness Reports, 1978-1995. Added to the BUPERS data is data obtained from the Naval Academy Center for Institutional Research that includes data for varsity athletes in the academic years 1980-1985.

As one of the primary missions of the Naval Academy is to produce line officers, only the four major warfare communities, surface warfare, submarines, pilot, and naval flight officer are used in this study. Anyone who selected general unrestricted line (GURL), supply, intelligence, or special warfare is not included. Similar fleet performance data for Marines is not available, therefore Marine officers are not included. After removing all foreign exchange students, a final data set of 2,935 observations remains for the classes 1980-1985. Distribution of the sample among the four warfare communities is shown in Figure 1, broken into athletes and non-athletes. A little over 40 percent of graduates during this period entered aviation, 30 percent entered the submarine force, and 28 percent entered surface warfare. The percentage of varsity athletes by

community are 51 percent aviation, 22 percent submarines, and 27 percent surface warfare.

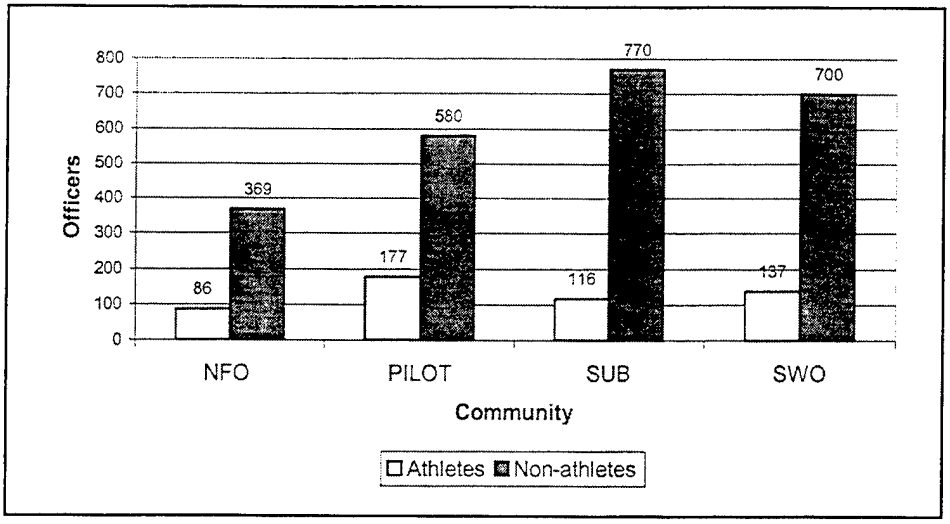

Figure 1. Distribution of Athletes and Non-athletes Among Communities.

B. VARIABLE CONSTRUCTION

From the basic data set of alpha code, name, and sport, a series of additional dichotomous variables have been created. The variable *ATHLETE* identifies those officers who earned varsity letters at any time during their time at USNA. This variable differs from that used in previous studies, which identified midshipmen who earned letters only as seniors. While it is recognized that there are also midshipmen who participate in varsity athletics and do not earn varsity letters, this study will focus upon those varsity athletes who have been recognized for exceptional performance. For a few, this may occur due to natural talent alone. But for the majority, earning a varsity letter at the collegiate level represents a significant performance achievement. It is for this reason that only letter winners are analyzed in this study. This study does not intend to downplay the effort or achievement of those athletes who do not earn letters, for they

deserve to be recognized, but rather it is intended to analyze only the top performers, be it in the fleet or on the playing field.

Because some midshipmen participate in more than one sport, variables for participation in a second and third sport have been created. An athlete is identified as having played a sport even if it is a second or third sport. For example, many track athletes also run cross-country, so the sport in which that athlete earned the most letters is designated the primary sport. Any other sport in which they earned a letter would be a second or third sport. Separate dichotomous variables have been created for each sport to measure the separate impact of each. Because of the similarities of their activities, indoor track and outdoor track are merged into one sport called *TRACK*, and rifle and pistol teams are merged into one variable called *RIFLE/PISTOL*. A total of twenty-one sports are used for this study.

After designating each sport by its own variable, a new set of variables has been constructed to account for different types of athletes. Binary variables designating athletes as "blue-chips", those marked by NAAA as top-notch athletes, recruited athletes, walk-ons (those who tried out for a sport and made it), and blue-chips and recruits who did not become varsity letter winners have been created.

Binary variables also are created for athletes who earned varsity recognition in team or individual sports. For the purpose of this thesis, team sports are defined as those in which an individual could not advance competitively without the rest of the team. For instance, even though a wrestling team may finish in last place in a division, any individual on that team could go on to become an individual champion. Likewise, some

sports such as track and swimming compete for the most part on an individual basis, despite having events such as relays in which the team concept is involved. For the purpose of this study these sports are designated as individual sports.

1. Variables

Table 1 lists the personal background variables used in this thesis. Table 2 lists USNA admissions variables. Table 3 lists variables associated with an officer's time and performance at USNA. Table 4 lists the athlete variables, and Table 5 lists the fleet variables. These variables have been identified in the previous studies discussed in the literature review as being significant to performance, and will be the explanatory variables used in the models in this thesis.

Variable	Description
FEMALE	1 = Female, 0 = Male
GRADAGE	Age upon graduation from USNA (30 May of 1st Class Year)
MINORITY	1= Minority, 0 = Non-Minority
MILFAM	1 = Subject comes from a military family, 0 = Non-military family

Table 1. Personal Background Variables.

Variable	Description
CLUBP	1 = President, leader or director of a high school club or group, 0 = Other
EAGLE	1 = Eagle Scout or Girl Scout equivalent, 0 = Other
SATM	Average Math score achieved on the Scholastic Aptitude Test (SAT)
SATV	Average Verbal score achieved on the Scholastic Aptitude Test (SAT)
SCOUT	1 = Member of Boy or Girl Scouts, 0 = Other

Table 2. USNA Admissions Variables.

Variable	Description
CLASS81	1 = Member of UNSA class of 1981, 0 = Other (Reference)
CLASS82	1 = Member of UNSA class of 1982, 0 = Other
CLASS83	1 = Member of UNSA class of 1983, 0 = Other
CLASS84	1 = Member of UNSA class of 1984, 0 = Other
CLASS85	1 = Member of UNSA class of 1985, 0 = Other
ENGQPR	QPR achieved in USNA Engineering classes
HUMSQPR	QPR achieved in USNA Humanities/Social Sciences classes
MTSCQPR	QPR achieved in USNA Math/Science classes
CONDQPR	QPR achieved in Conduct
PEQPR	QPR achieved in USNA Physical Education classes
PERFQPR	QPR achieved in Military Performance
PRDVQPR	QPR achieved in USNA Professional Development classes
GROUP1	1 = Group 1 academic major (Engineering), 0 = Other (Reference)
GROUP2	1 = Group 2 academic major (Math/Sciences), 0 = Other
GROUP3	1 = Group 3 academic major (Humanities/SS), 0 = Other

Table 3. USNA Variables.

Variable	Description
ATHLETE	1 = Awarded a USNA varsity letter, 0 = Other
NEWTEAM	1 = Awarded a USNA varsity letter in a team sport, 0 = Other
NEWIND	1 = Awarded a USNA varsity letter in an individual sport, 0 = Other
RBCNVL	1 = Recruit or Blue Chip, but did not earn a varsity letter, 0 = Other
FEMATH	1 = Female who earned a USNA varsity letter, 0 = Other
MINATH	1 = Minority who earned a USNA varsity letter, 0 = Other
BCVATEAM	1 = Blue-chip who earned a USNA varsity letter in a team sport, 0 = Other
OTHVATEM	1 = Non-blue-chip who earned a USNA varsity letter in a team sport, 0 = Other
BCVAIND	1 = Blue-chip who earned a USNA varsity letter in an individual sport, 0 = Other
OTHVAIND	1 = Non-blue chip who earned a USNA varsity letter in an individual sport, 0 = Other

Table 4. USNA Athlete Variables.

Variable	Description
NFO	1 = Naval Flight Officer (NFO), 0 = Other
PILOT	1 = Pilot, 0 = Other (Reference)
SUB	1 = Submarine Officer, 0 = Other
SWO	1 = Surface Warfare Officer (SWO), 0 = Other
PROMOTE	1 = Promoted to LCDR In/Below Zone, 0 = Other

Table 5. Fleet Variables.

2. Descriptive Statistics of Variables

Tables 6 through 10 list the means of each variable for the full sample, and separately for athletes and non-athletes.

Variable	Sample Mean	Athlete Mean	Non-athlete Mean
FEMALE	.0164	.0504	.0091
GRADAGE	21.85	21.87	21.85
MINORITY	.0981	.0698	.1042
MILFAM	.2092	.1783	.2158

Table 6. Descriptive Statistics for Personal Background Variables.

Variable	Sample Mean	Athlete Mean	Non-athlete Mean
CLUBP	.2627	.2558	.2642
EAGLE	.1353	.1047	.1418
SATM	675.26	655.56	679.46
SATV	581.00	559.10	586.85
SCOUT	.1744	.1783	.1757

Table 7. Descriptive Statistics for USNA Admissions Variables.

Variable	Sample Mean	Athlete Mean	Non-athlete Mean
CLASS81	.2422	.2306	.2447
CLASS82	.2497	.2771	.2439
CLASS83	.2354	.2287	.2369
CLASS84	.1700	.1686	.1703
CLASS85	.1026	.0950	.1042
ENGQPR	2.689	2.601	2.707
HUMSQPR	2.843	2.776	2.858
MTSCQPR	2.886	2.841	2.896
CONDQPR	3.775	3.742	3.782
PEQPR	2.551	2.862	2.485
PERFQPR	3.201	3.183	3.205
PRDVQPR	3.057	2.994	3.071
GROUP1	.4116	.4458	.4043
GROUP2	.1506	.1395	.1530
GROUP3	.4378	.4147	.4427

Table 8. Descriptive Statistics for USNA Variables.

Variable	Sample Mean	Athlete Mean	Non-athlete Mean
NFO	.1550	.1667	.1525
PILOT	.2579	.3430	.2398
SUB	.3019	.2248	.3183
SWO	.2852	.2655	.2894

Table 9. Descriptive Statistics for Fleet Variables.

Variable	Sample Mean	Athlete Mean	Non-athlete Mean
ATHLETE	.1758	--	--
NEWTEAM	.0988	.5620	--
NEWIND	.0770	.4380	--
RBCNVL	.1295	--	.1571
FEMATH	.0089	.0504	--
MINATH	.0123	.0698	--
BCVATEAM	.0484	.2752	--
OTHVATEM	.0504	.2868	--
BCVAIND	.0317	.1802	--
OTHVAIND	.0453	.2578	--

Table 10. Descriptive Statistics for USNA Athlete Variables.

Several differences in the means of athletes and non-athletes are worth noting. The mean of *MILFAM* for athletes is only 17.8 percent, almost four percentage points lower than for non-athletes. *SATM* and *SATV* also have large differences between athletes and non-athletes. Athletes in these year groups had an average *SATM* score almost twenty-four percentage points lower than non-athletes, and an average *SATV* score almost twenty-eight percentage points lower.

The differences in USNA QPRs also yield an interesting comparison. Athletes had slightly lower QPRs in almost every category with the exception of *PEQPR*. This similarity indicates that even though Academy athletes have less time for other areas at USNA, they still have similar academic and professional performance. In addition, athletes make up a larger portion of *GROUP1*, or engineering majors, an area that typically requires more time.

Table 11 lists the number of athletes in the sample that participated in sports considered to be team sports, and Table 12 lists participation in sports considered to be individual sports.

Team Sport	Frequency	Percent of Sample	Percent of Athletes
Baseball	15	0.5%	2.9%
Basketball	9	0.3%	1.7%
Crew	68	2.4%	13.3%
Football	44	1.5%	8.5%
Lacrosse	25	0.9%	4.8%
Lightweight Football	60	2.0%	11.6%
Sailing	98	3.4%	19.1%
Soccer	27	0.9%	5.2%
Volleyball	3	0.1%	0.6%
Waterpolo	9	0.3%	1.7%
Total	358	12.3%	69.4%

Table 11. Distribution of Graduates by Participation in Team Sports.

Individual Sport	Frequency	Percent of Sample	Percent of Athletes
Boxing	12	0.4%	2.3%
Cross Country	9	0.3%	1.7%
Fencing	16	0.5%	3.1%
Golf	8	0.3%	1.6%
Gymnastics	9	0.3%	1.7%
Rifle/Pistol	19	0.6%	3.7%
Squash	11	0.4%	2.1%
Swimming	23	0.8%	4.5%
Tennis	7	0.2%	1.4%
Track	31	1.1%	6.0%
Wrestling	13	0.4%	2.5%
Total	158	5.3%	30.6%

Table 12. Distribution of Graduates by Participation in Individual Sports.

C. PERFORMANCE MEASUREMENT

The variable used to measure fleet performance will be *PROMOTE*. Promotion boards review all facets of an officer's career, including FITREPs, awards, letters from commands, and other intangibles that are not observed in this study. If an officer has been selected for promotion, it is assumed that the promotion board has decided the officer is a superior performer relative to their peers.

The promotion rates of each class are displayed in Table 13 for all graduates in column 1, and separately for athletes (col. 2) and non-athletes (col. 3).

Variable	Overall	Athletes	Non-athletes
CLASS81	84.3	90.6	83.3
CLASS82	80.7	90.1	78.5
CLASS83	76.0	82.3	74.7
CLASS84	70.4	75.6	69.2
CLASS85	75.9	75.0	76.0

Table 13. Promotion Rates of Each Class.

The differences in promotion rates of each of the twenty-one sports used in this study are listed in Tables 14 and 15. The differences are compared to the promotion rate of non-athletes, which is 77.2 percent. A T-test of differences in group means is displayed in column 2. Several sports have promotion rates of 100%, including fencing, gymnastics, squash, swimming, tennis, and volleyball. Several others have promotion rates above 90%, including football, lacrosse, and lightweight football. Five sports have promotion rates below that of non-athletes, including baseball, boxing, rifle/pistol, track, and water polo, which has the lowest rate at 50%. Despite these differences, only lightweight football is statistically different from the non-athlete promotion rate.

Team Sports	Promotion Rate Difference	T-value
Non-athlete Promotion = 77.2%	--	--
Baseball	-14.7%	-1.10
Basketball	+2.8%	0.09
Crew	+10.3%	1.26
Football	+13.7%	1.43
Lacrosse	+14.5%	1.12
Lightweight Football	**+19.2%**	**2.34**
Sailing	+7.7%	1.17
Soccer	+10.3%	0.63
Volleyball	+22.8%	0.52
Waterpolo	-27.2%	-1.38

Table 14. Promotion Rate Differences of Team Sport Athletes Versus Non-athletes.

Individual Sports	Promotion Rate Difference	T-value
Non-athlete Promotion = 77.2%	--	--
Boxing	-10.5%	-0.50
Cross Country	+6.1%	0.29
Fencing	+22.8%	1.29
Golf	+6.1%	0.29
Gymnastics	+22.8%	0.91
Rifle/Pistol	-12.9%	-1.29
Squash	+22.8%	1.05
Swimming	+22.8%	1.58
Tennis	+22.8%	0.91
Track	-7.2%	-0.92
Wrestling	+8.5%	0.47

Table 15. Promotion Rate Differences of Individual Athletes Versus Non-athletes.

Because the individuals in this study are from the graduating classes of 1981-1985, the analysis of women may be problematic for the following reasons:

- The sample includes the first several classes after the introduction of women at the Naval Academy, allowing only a small number of women to be analyzed.

- Few female varsity sports existed at the time, reducing the opportunities for females to earn a varsity letter.

- The study analyzes only graduates who entered into the line communities. Due to combat exclusion laws at this time, the number of women who can be analyzed is further reduced.

Although women are maintained in the sample, the results must be viewed cautiously.

D. METHODOLOGY

The analysis is broken into six major sections. Each section presents a non-linear LOGIT regression model used to predict the marginal effect of each explanatory variable on the probability of promotion to LCDR, holding other factors constant. For these analyses, *PROMOTE* is the dependent variable.

The first model analyzes the variables identified in previous studies to establish a baseline for later regressions. The second model adds the variable *ATHLETE* in order to determine the marginal effect and significance of being a varsity athlete alone. The third model measures the marginal effect of being a varsity athlete in a team or individual sport. The fourth model measures the effect of being a female athlete, while the fifth model measures the effect of being a minority athlete. The final model looks at the impact of being a blue-chip athlete, both in team and individual sports.

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IV. DATA ANALYSIS

A. THE BASE MODEL

In order to determine the independent effect of athletic participation, a base model is first estimated using variables previously identified as significant in the explanation of officer performance. The base LOGIT regression consists of the following variables where *PROMOTE* is the dependent variable:

$$\textbf{PROMOTE} = \alpha_0 + \beta_1 CLASS82 + \beta_2 CLASS83 + \beta_3 CLASS84 + \beta_4 CLASS85 + \beta_5 NFO + \beta_6 SUB + \beta_7 SWO + \beta_8 CLUBP + \beta_9 SCOUT + \beta_{10} EAGLE + \beta_{11} MILFAM + \beta_{12} SATM + \beta_{13} SATV + \beta_{14} ENGQPR + \beta_{15} HUMSQPR + \beta_{16} MTSCQPR + \beta_{17} CONDQPR + \beta_{18} PEQPR + \beta_{19} PERFQPR + \beta_{20} PRDVQPR + \beta_{21} GROUP2 + \beta_{22} GROUP3 + \beta_{23} GRADAGE$$

CLASS81, PILOT, and *GROUP1* are the reference variables in the set of categorical variables for class year, community, and academic major grouping respectively. Table 16 lists the calculated marginal effects based of the estimated LOGIT coefficients evaluated at the mean level of each variable, along with their level of significance. In this model, ten variables are statistically significant. *CLASS83, CLASS84, CLASS85* have a negative effect on promotion, indicating members of these classes have a lower probability of promotion to LCDR than *CLASS81. SUB* and *SWO* have a positive effect on promotion, indicating that officers in these two communities have a higher probability of promotion to LCDR than *PILOT. MILFAM* once again has a positive effect on promotion, whereas *SATM* has a negative effect. This indicates that for every 100-point increase in the math portion of the SAT, there is a 6 percent lower

probability of promotion to LCDR. It is possible that, even though individuals with high *SATM* scores may be more technically inclined, they may also be less capable to handle teamwork or personal situations, areas extremely important to effective leadership. Both *PEQPR* and *PERFQPR* show a positive effect on promotion. For a 1-point change in *PEQPR*, there is an increase of 3.1 percent in probability of promotion. Those with a higher *PEQPR* may set good examples for their subordinates, increasing their ability to lead. The academic related variables of *ENGQPR*

Variable	Marginal Effect	T-value
CLASS82	-0.0242	-0.82
CLASS83	**-0.0713**	**-2.38***
CLASS84	**-0.1119**	**-3.39****
CLASS85	**-0.0953**	**-2.27***
NFO	-0.0126	-0.46
SUB	**0.0892**	**2.97****
SWO	**0.0628**	**2.30***
CLUBP	-0.0097	-0.42
SCOUT	-0.0165	-0.53
EAGLE	0.0162	0.49
MILFAM	**0.0557**	**2.25***
SATM	**-0.0006**	**-3.26****
SATV	-0.0003	-1.70
ENGQPR	-0.0062	-0.21
HUMSQPR	0.0312	1.03
MTSCQPR	-0.0351	-1.06
CONDQPR	-0.0619	-1.88
PEQPR	**0.0307**	**1.93***
PERFQPR	**0.2099**	**8.55****
PRDVQPR	0.0614	1.52
GROUP2	-0.0423	-1.46
GROUP3	-0.0367	-1.51
GRADAGE	**-0.0317**	**-2.80****
***Denotes statistical significance at the .05 level**		
****Denotes statistical significance at the .01 level**		

Table 16. Marginal Effects and T-values of Base LCDR Promotion Model.

HUMSQPR, and *MTSCQPR* are statistically insignificant in this base model. This result is important given that these variables dominate the USNA Order of Merit multiple.

A 1-point change in *PERFQPR* increases the promotion probability by 21 percent. This represents a relatively large marginal effect in this model, and indicates a strong correlation between USNA military performance and subsequent fleet performance (among those who stay in the Navy to the O-4 promotion point). It should be noted that *PERFQPR* has the largest standardized coefficient among all regressors, almost three times that of *SATM* and *CLASS84*. It is possible that those who have demonstrated strong leadership abilities at USNA are better prepared to handle those situations in the fleet.

Finally, *GRADAGE* shows a negative effect on promotion. For every 1-year increase in graduation age, the probability of promotion drops by 3.2%. This indicates that those graduates who were prior enlisted, attended the Naval Academy Prep School, or had previous college experience, resulting in a higher *GRADAGE*, have a lower probability of promotion. Much has been written on the value of age and life experience in relation to job performance, but this model suggests otherwise. Naval Academy graduates who were enlisted prior to attending the Naval Academy would have no more than 5-6 years of service, and would not have retired prior to the O-4 point. Those who enter USNA directly from high school may exhibit higher motivation and stronger learning skills that carry over into their performance in the fleet than those who spend additional time prior to college or who take more years to graduate.

B. RESULTS OF ADDING THE ATHLETE VARIABLE

The variable *ATHLETE* is now added to the base model described above in order to measure the independent effect of athletic achievement, holding all other things constant. The new model is:

PROMOTE = $\alpha_0 + \beta_1 CLASS82 + \beta_2 CLASS83 + \beta_3 CLASS84 + \beta_4 CLASS85 + \beta_5 NFO + \beta_6 SUB + \beta_7 SWO + \beta_8 CLUBP + \beta_9 SCOUT + \beta_{10} EAGLE + \beta_{11} MILFAM + \beta_{12} SATM + \beta_{13} SATV + \beta_{14} ENGQPR + \beta_{15} HUMSQPR + \beta_{16} MTSCQPR + \beta_{17} CONDQPR + \beta_{18} PEQPR + \beta_{19} PERFQPR + \beta_{20} PRDVQPR + \beta_{21} GROUP2 + \beta_{22} GROUP3 + \beta_{23} GRADAGE + \beta_{24} \boldsymbol{ATHLETE}$

Variable	Marginal Effect	T-value
ATHLETE	**0.0774**	**2.48****
CLASS82	-0.0301	-0.97
CLASS83	**-0.0804**	**-2.55****
CLASS84	**-0.1229**	**-3.54****
CLASS85	**-0.1025**	**-2.33***
NFO	-0.0115	-0.40
SUB	**0.0966**	**3.07****
SWO	**0.0659**	**2.30***
CLUBP	-0.0135	-0.56
SCOUT	-0.0211	-0.65
EAGLE	0.0197	0.57
MILFAM	**0.0606**	**2.33***
SATM	**-0.0006**	**-3.00****
SATV	-0.0003	-1.46
ENGQPR	-0.0040	-0.13
HUMSQPR	0.0381	1.19
MTSCQPR	-0.0397	-1.14
CONDQPR	-0.0629	-1.82
PEQPR	0.0244	1.45
PERFQPR	**0.2234**	**8.65****
PRDVQPR	0.0568	1.33
GROUP2	-0.0403	-1.32
GROUP3	-0.0375	-1.47
GRADAGE	**-0.0327**	**-2.77****
***Denotes statistical significance at the .05 level**		
****Denotes statistical significance at the .01 level**		

Table 17. Marginal Effects and T-values of Promotion Model with *ATHLETE*.

Table 17 lists the marginal effects of each variable in this model and the level of significance. In this model specification the same variables are significant as in the base model, with the exception of *PEQPR*, which is no longer significant. The correlation between *ATHLETE* and *PEQPR* can be expected because the physical nature of athletics increases the likelihood athletes will have a higher *PEQPR*. The remaining nine significant variables retain the same sign and relatively same effects.

ATHLETE increases the probability of promotion to LCDR by 7.7%, and is highly significant. Despite lower QPRs in almost every USNA performance measure, this result supports the hypothesis that superior athletic achievement at the Naval Academy has a positive effect on fleet performance.

C. RESULTS OF ADDING TEAM VS. INDIVIDUAL SPORTS VARIABLES

Because the Navy places great emphasis on teamwork, an analysis is done to determine the probability of promotion for athletes who earned varsity letters in team sports compared to those from individual sports and non-athletes. The variables *NEWTEAM* (team sport varsity athletes), *NEWIND* (individual sport varsity athletes), and *RBCNVL* (recruit or blue-chip who does not earn a varsity letter) are added to the base model to form the following model:

$$\textbf{PROMOTE} = \alpha_0 + \beta_1 CLASS82 + \beta_2 CLASS83 + \beta_3 CLASS84 + \beta_4 CLASS85 + \beta_5 NFO + \beta_6 SUB + \beta_7 SWO + \beta_8 CLUBP + \beta_9 SCOUT + \beta_{10} EAGLE + \beta_{11} MILFAM + \beta_{12} SATM + \beta_{13} SATV + \beta_{14} ENGQPR + \beta_{15} HUMSQPR + \beta_{16} MTSCQPR + \beta_{17} CONDQPR + \beta_{18} PEQPR + \beta_{19} PERFQPR + \beta_{20} PRDVQPR + \beta_{21} GROUP2 + \beta_{22} GROUP3 + \beta_{23} GRADAGE + \beta_{24} \boldsymbol{NEWTEAM} + \beta_{25} \boldsymbol{NEWIND} + \beta_{26} \boldsymbol{RBCNVL}$$

Table 18 lists the marginal effects of each variable in this model and its level of significance. Again, this model also identifies the same variables as being statistically significant as in the base model, with the exception of *PEQPR*, which is no longer significant. The remaining nine significant variables retain the same sign and relatively same effects.

Variable	Marginal Effect	T-value
NEWTEAM	**0.1144**	**2.86****
NEWIND	0.0527	1.24
RBCNVL	0.0624	1.90
CLASS82	-0.0296	-0.98
CLASS83	**-0.0775**	**-2.54****
CLASS84	**-0.1207**	**-3.60****
CLASS85	**-0.0909**	**-2.13***
NFO	-0.0089	-0.32
SUB	**0.0924**	**3.03****
SWO	**0.0662**	**2.39***
CLUBP	-0.0100	-0.43
SCOUT	-0.0152	-0.48
EAGLE	0.0196	0.59
MILFAM	**0.0630**	**2.49****
SATM	**-0.0005**	**-2.71****
SATV	-0.0002	-1.33
ENGQPR	-0.0021	-0.07
HUMSQPR	0.0393	1.27
MTSCQPR	-0.0393	-1.17
CONDQPR	-0.0627	-1.88
PEQPR	0.0206	1.25
PERFQPR	**0.2165**	**8.66****
PRDVQPR	0.0564	1.37
GROUP2	-0.0349	-1.18
GROUP3	-0.0316	-1.28
GRADAGE	**-0.0298**	**-2.61****
***Denotes statistical significance at the .05 level**		
****Denotes statistical significance at the .01 level**		

Table 18. Marginal Effects and T-values of Promotion Model with Team vs. Individual Sport Variables.

Though all three added variables show a positive effect on the probability of promotion to LCDR, only *NEWTEAM* is significant, and *RBCNVL* shows marginal significance at the .05 level. This model identifies *NEWTEAM* participants as having an 11.4 percent increase in the probability of promotion, confirming the hypothesis that achievement in a team varsity sport has a positive, significant effect on fleet performance. It is important to note that, even though the previous effect of *ATHLETE* on promotion was positive and significant, that variable combines team and individual athletes. When the variable *ATHLETE* is further broken down into type of sport, only team sports reveal a positive promotion effect.

As previously discussed, team athletes are required to perform in a team environment on a routine basis, as are officers in the fleet. They are required to trust that their teammates will complete their jobs and in turn be trusted by their teammates. On the contrary, individual athletes typically are required to trust only themselves. The ability to improve oneself is not discounted; however, individual athletes may be less willing to display trust of their subordinates in the fleet, damaging their ability to be good leaders. They may be more likely to want to micro-manage their troops, to ensure things are being done the way they would complete them.

Individual athletes are also less likely to experience the "take one for the team" situation where it is required for the individual to put the good of the unit, or team, ahead of their own well being. This is an important attribute of a leader to be selfless in the pursuit of effective leadership, and may be a less comfortable position for individual athletes.

D. RESULTS OF ADDING GENDER VARIABLES

This study does not intend to ignore the differences in athleticism by gender groups, rather it examines the overall effect of athletic achievement on fleet performance. Because this study is restricted to the line communities, the sample includes only 48 women, of whom only 24 stayed in the Navy until the LCDR board. Thus, the results must be viewed cautiously. The variables *ATHLETE, FEMALE,* and an interaction variable *FEMATH* are added to the base variables to form the following model:

$$\textbf{PROMOTE} = \alpha_0 + \beta_1 CLASS82 + \beta_2 CLASS83 + \beta_3 CLASS84 + \beta_4 CLASS85 + \beta_5 NFO + \beta_6 SUB + \beta_7 SWO + \beta_8 CLUBP + \beta_9 SCOUT + \beta_{10} EAGLE + \beta_{11} MILFAM + \beta_{12} SATM + \beta_{13} SATV + \beta_{14} ENGQPR + \beta_{15} HUMSQPR + \beta_{16} MTSCQPR + \beta_{17} CONDQPR + \beta_{18} PEQPR + \beta_{19} PERFQPR + \beta_{20} PRDVQPR + \beta_{21} GROUP2 + \beta_{22} GROUP3 + \beta_{23} GRADAGE + \beta_{24} \boldsymbol{ATHLETE} + \beta_{25} \boldsymbol{FEMALE} + \beta_{26} \boldsymbol{FEMATH}$$

Table 19 lists the marginal effects of each variable in this model and its level of significance. Like the previous three models, the results show that the same variables are statistically significant as in the base model, with the exception of *PEQPR*, which is no longer significant. The remaining nine significant variables retain the same sign and relatively same effects. *ATHLETE* also retains its significance and approximate value. However, *FEMATH* shows a negative effect but is not significant. This indicates that the effect of being a female athlete is not significantly different from that of a male athlete.

Variable	Marginal Effect	T-value
ATHLETE	**0.0712**	**2.38***
FEMALE	0.6239	0.79
FEMATH	-0.5317	-0.66
CLASS82	-0.0278	-0.94
CLASS83	**-0.0757**	**-2.53****
CLASS84	**-0.1133**	**-3.45****
CLASS85	**-0.0977**	**-2.34***
NFO	-0.0113	-0.42
SUB	**0.0934**	**3.13****
SWO	**0.0629**	**2.32***
CLUBP	-0.0143	-0.63
SCOUT	-0.0197	-0.64
EAGLE	0.0204	0.62
MILFAM	**0.0568**	**2.31***
SATM	**-0.0006**	**-3.01****
SATV	-0.0002	-1.44
ENGQPR	-0.0029	-0.10
HUMSQPR	0.0349	1.15
MTSCQPR	-0.0366	-1.11
CONDQPR	-0.0608	-1.86
PEQPR	0.0233	1.45
PERFQPR	**0.2097**	**8.60****
PRDVQPR	0.0528	1.31
GROUP2	-0.0374	-1.29
GROUP3	-0.0336	-1.39
GRADAGE	**-0.0310**	**-2.77****
***Denotes statistical significance at the .05 level**		
****Denotes statistical significance at the .01 level**		

Table 19. Marginal Effects and T-values of Promotion Model with Gender Variables.

E. RESULTS OF ADDING MINORITY VARIABLES

The data includes 288 minorities, approximately 9.8 percent of the sample, of which 36 were varsity athletes. Again, these results must be viewed cautiously due to the

small number of observations. The variables *ATHLETE, MINORITY,* and an interaction variable *MINATH* are added to the base variables to form the following model:

$$\textbf{PROMOTE} = \alpha_0 + \beta_1 CLASS82 + \beta_2 CLASS83 + \beta_3 CLASS84 + \beta_4 CLASS85 + \beta_5 NFO + \beta_6 SUB + \beta_7 SWO + \beta_8 CLUBP + \beta_9 SCOUT + \beta_{10} EAGLE + \beta_{11} MILFAM + \beta_{12} SATM + \beta_{13} SATV + \beta_{14} ENGQPR + \beta_{15} HUMSQPR + \beta_{16} MTSCQPR + \beta_{17} CONDQPR + \beta_{18} PEQPR + \beta_{19} PERFQPR + \beta_{20} PRDVQPR + \beta_{21} GROUP2 + \beta_{22} GROUP3 + \beta_{23} GRADAGE + \beta_{24} \boldsymbol{ATHLETE} + \beta_{25} \boldsymbol{MINORITY} + \beta_{26} \boldsymbol{MINATH}$$

This result identifies the same variables as the base model as being statistically significant, with the exception of *PEQPR*, which is no longer significant. The remaining nine significant variables retain the same sign and relatively same effects. Table 20 lists marginal effects of each variable in this model and their level of significance. The added variable *ATHLETE* again retains its positive effect and significance, while *MINATH* shows a strong effect of 15.2 percent, but is not statistically significant. Given the low number of minorities in the data set, it is possible this insignificance is due to a small sample size. These results only show that minority athletes promote to LCDR at least at the same rate as non-minority athletes.

Variable	Marginal Effect	T-value
ATHLETE	**0.0709**	**2.19***
MINORITY	-0.0122	-0.31
MINATH	0.1524	0.93
CLASS82	-0.0295	-0.94
CLASS83	**-0.0806**	**-2.52****
CLASS84	**-0.1241**	**-3.54****
CLASS85	**-0.1047**	**-2.35***
NFO	-0.0102	-0.35
SUB	**0.0984**	**3.08****
SWO	**0.0676**	**2.32***
CLUBP	-0.0141	-0.58
SCOUT	-0.0217	-0.66
EAGLE	0.0197	0.56
MILFAM	**0.0620**	**2.33***
SATM	**-0.0006**	**-3.01****
SATV	-0.0003	-1.43
ENGQPR	-0.0022	-0.07
HUMSQPR	0.0394	1.22
MTSCQPR	-0.0418	-1.18
CONDQPR	-0.0635	-1.81
PEQPR	0.0240	1.40
PERFQPR	**0.2253**	**8.62****
PRDVQPR	0.0572	1.33
GROUP2	-0.0409	-1.32
GROUP3	-0.0374	-1.45
GRADAGE	**-0.0333**	**-2.78****
***Denotes statistical significance at the .05 level**		
****Denotes statistical significance at the .01 level**		

Table 20. Marginal Effects and T-values of Promotion Model with Minority Variables.

F. RESULTS OF ADDING BLUE-CHIP VARIABLES

The final model to be analyzed determines the effect of being a blue-chip athlete on the probability of promotion to LCDR. The NAAA invests much time, effort and money into identifying blue-chip athletes and drawing them to the Naval Academy, so it

is important to analyze how well these athletes perform in the fleet. This model also looks at the differences between blue-chips in team and individual sports. The interaction variables *BCVATEAM* (blue-chip team athlete), *OTHVATEM* (non-blue chip team athlete), *BCVAIND* (blue-chip individual athlete), *OTHVAIND* (non-blue-chip individual athlete) and *RBCNVL* (recruit or blue-chip who did not earn a varsity letter) are added to the base variables to form the following model:

$$\textbf{PROMOTE} = \alpha_0 + \beta_1 CLASS82 + \beta_2 CLASS83 + \beta_3 CLASS84 + \beta_4 CLASS85 + \beta_5 NFO + \beta_6 SUB + \beta_7 SWO + \beta_8 CLUBP + \beta_9 SCOUT + \beta_{10} EAGLE + \beta_{11} MILFAM + \beta_{12} SATM + \beta_{13} SATV + \beta_{14} ENGQPR + \beta_{15} HUMSQPR + \beta_{16} MTSCQPR + \beta_{17} CONDQPR + \beta_{18} PEQPR + \beta_{19} PERFQPR + \beta_{20} PRDVQPR + \beta_{21} GROUP2 + \beta_{22} GROUP3 + \beta_{23} GRADAGE + \beta_{24} \boldsymbol{BCVATEAM} + \beta_{25} \boldsymbol{BCVAIND} + \beta_{26} \boldsymbol{RBCNVL} + \beta_{27} \boldsymbol{OTHVATEM} + \beta_{28} \boldsymbol{OTHVAIND}$$

As was the case in the previous models, this model identifies the same variables as the base model as being statistically significant, with the exception of *PEQPR*, which is no longer significant. The remaining nine significant variables retain the same sign and relatively same effects. Table 21 lists marginal effects of each variable in this model and their level of significance.

The added variables *BCVATEAM, BCVAIND,* and *RBCNVL* all have positive signs, indicating a positive relationship between the probability of promotion and blue-chips who earn varsity letters in team sports, individual sports, and those who earn no varsity letter at all. *BCVATEAM* shows strong significance and a large positive effect of 18.9 percent on the probability of promotion to LCDR. *RBCNVL* also is significant, showing a 6.4% increase in the probability of promotion for those blue-chips that do not

earn varsity letters. *BCVAIND*, though not showing significance, does show a positive effect compared to non-athletes.

Variable	Marginal Effect	T-value
BCVATEAM	**0.1892**	**2.89****
BCVAIND	0.0442	0.66
RBCNVL	**0.0637**	**1.96***
OTHVATEM	0.0619	1.30
OTHVAIND	0.0580	1.12
CLASS82	-0.0313	-1.05
CLASS83	**-0.0755**	**-2.50****
CLASS84	**-0.1170**	**-3.52****
CLASS85	**-0.0900**	**-2.13***
NFO	-0.0081	-0.30
SUB	**0.0886**	**2.94****
SWO	**0.0653**	**2.38***
CLUBP	-0.0097	-0.42
SCOUT	-0.0136	-0.44
EAGLE	0.0208	0.63
MILFAM	**0.0643**	**2.56****
SATM	**-0.0005**	**-2.55****
SATV	-0.0002	-1.26
ENGQPR	-0.0001	0.00
HUMSQPR	0.0372	1.22
MTSCQPR	-0.0404	-1.21
CONDQPR	-0.0615	-1.86
PEQPR	0.0204	1.25
PERFQPR	**0.2155**	**8.71****
PRDVQPR	0.0585	1.44
GROUP2	-0.0359	-1.22
GROUP3	-0.0319	-1.31
GRADAGE	**-0.0297**	**-2.62****
***Denotes statistical significance at the .05 level**		
****Denotes statistical significance at the .01 level**		

Table 21. Marginal Effects and T-values of Promotion Model with Blue-Chip Athlete Variables.

It is important to note that the marginal effect of 11.4 percent of *NEWTEAM* in Table 18 was an average of the effect of *BCVATEAM* and *OTHVATEM*. Separated into these two variables, the marginal effect of being a blue-chip team athlete is even stronger.

Blue-chip team athletes may develop essential skills prior to entry in USNA that are fine-tuned during their time as midshipmen. Likewise, blue-chips that do not earn a varsity letter experience the same pre-USNA growth, but do not receive the fine tuning USNA varsity athletes do. This would explain why *RBCNVL* has a smaller marginal effect than those who letter on a team sport, but it remains unclear why they should be more likely to promote to LCDR than those lettering in an individual sport. This model indicates that the overall effect of being a blue-chip athlete on fleet performance is positive and significant and supports the NAAA process of identifying and recruiting these athletes.

V. CONCLUSIONS AND RECOMMENDATIONS

While stationed at West Point as Superintendent of the Corps of Cadets, General Douglas MacArthur made the following statement about the importance of athletics:

> Upon the fields of friendly strife, are sown the seeds that, upon other fields, on other days, will bear the fruits of victory. (USMA, 1998)

Despite the lack of focus on the physical dimension of midshipmen development in performance measurement at the Naval Academy, this study has supported General MacArthur's belief that athletics play an important role in the development of officers. During the period of this study, classes 1981-1985, achievement in varsity athletics at the Naval Academy did in fact have a statistically significant impact on later fleet performance.

A. SUMMARY

The following is a summary of this study's major findings:

- Athletic achievement has a significant, positive effect on the probability of promotion to LCDR of 7.7 percent.
- Athletic achievement as a member of a team sport has a significant, positive effect on the probability of promotion to LCDR of 11.4 percent.
- Blue-chip athletes who are members of a varsity team sport have an 18.9 percent higher probability of promotion to LCDR.
- A blue-chip athlete who does not earn a varsity letter has a significant, positive effect on the probability of promotion to LCDR of 6.4 percent.

- Athletic achievement as a member of an individual varsity sport has a positive effect on the probability of promotion to LCDR of 5.3 percent, but the effect is statistically insignificant.

- Athletic achievement for female and minority athletes has the same effect on the probability of promotion to LCDR as non-minority, male athletes.

Figure 2 summarizes these results.

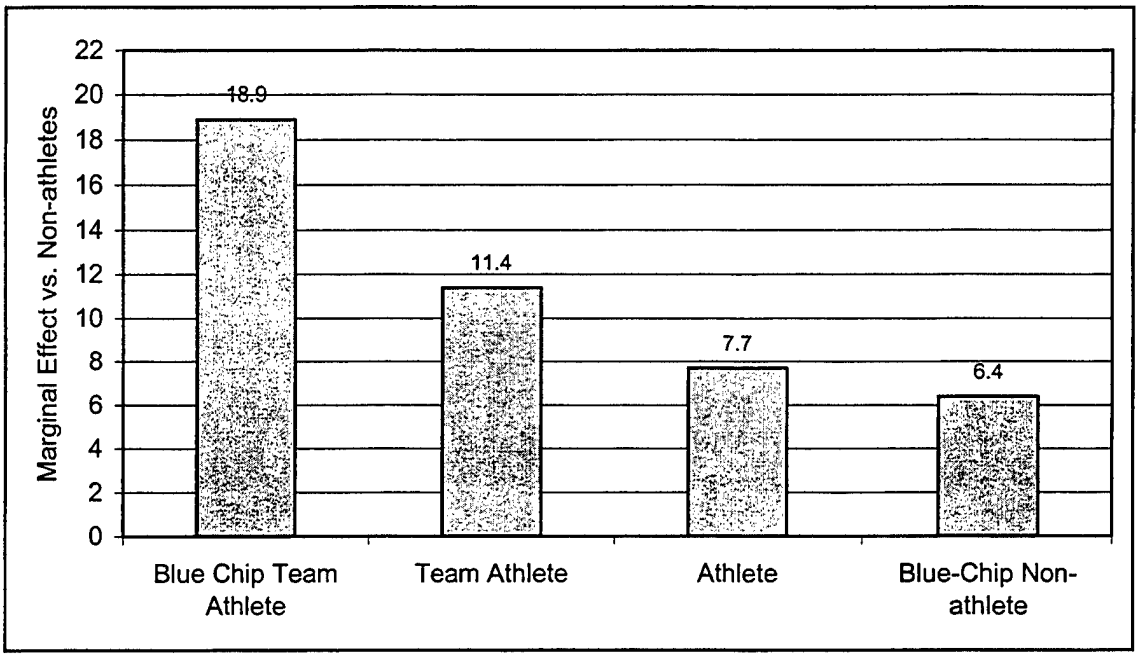

Figure 2. Marginal Effects of Significant Variables on Promotion.

This thesis does not show *what* causes athletes to promote at higher rates, but rather supports the hypothesis that there is some intrinsic value added by achievement in varsity athletic programs in relation to fleet performance. It is possible, however, to suggest reasons why athletes promote better.

Sports offer the opportunity for someone to demonstrate adaptability on an almost constant basis. Because human beings rarely exhibit perfect behavior or performances, it is not possible to know exactly how an opponent will respond in a given situation. This uncertainty often requires an athlete to adapt to an unplanned situation in a manner that

will produce effective results. Much like the military, this ability to adapt and overcome can mean the difference between victory and defeat.

This uncertainty also forces athletes to train and plan for all possible situations. Time restraints typically limit the ability to focus on every situation, but developing the ability to plan can drastically increase the likelihood of success if an unexpected situation arises.

Though most midshipmen cannot make it through the Naval Academy without help at some time, the significant emphasis placed on individual performance often prevents non-athletes from focusing on the performance of their subordinates and peers. Varsity athletes, on the other hand, are required to do this on a routine basis. This is also an important trait of effective leadership. Leaders that are able to increase their own performance while at the same time increasing the performance of those around them will realize substantial gains in productivity and effectiveness. This ability to form teams and successfully be a member of teams is a prime factor in athletic achievement and also in fleet performance.

A good leader must also have the ability to motivate themselves and those around them. An athlete has the opportunity to do this on a regular basis. The crew team that practices at the break of dawn, the football team that conducts two-a-day practices in the summer, the runners that put in a hundred miles a week, all have the personal motivation and dedication required to succeed. This is likely carried with them when they enter the fleet and allows them to continue to display superior performance.

B. POLICY RECOMMENDATIONS

Several policy recommendations appear to be warranted on the basis of the results in this study.

1. Start New Varsity Programs, Don't Cut

NCAA policies now dictate that varsity athletic scholarship programs have percentages of females that equal the percentages of female students enrolled. The spirit of this policy was to provide fair opportunities for both sexes, hoping that schools not in compliance with the policy would start new programs for whichever sex was lacking in opportunities. Unfortunately, budget problems have caused several universities to cut some varsity athletic programs for men in order to support programs for women.

The results of this study show that varsity athletic achievement is important in relation to officer job performance. Based on this, if the need arises to re-appropriate USNA and NAAA funds for athletic programs in order to comply with NCAA regulations, it is recommended that new programs be added instead of cutting existing programs. This would provide more opportunities to participate in athletics instead of changing which sexes have the opportunities. In addition, this study suggests that it would be best to add a team sport at the expense of the other gender's individual sport.

2. Expand Current Varsity Programs

If more midshipmen were given the opportunity to participate in intercollegiate athletics, the innate values added through sports would be available to a larger number of midshipmen. A policy could be adopted, for example, to upgrade several club team sports to varsity sports, and to expand the size of the rosters of existing varsity team

sports. Budget constraints could serve as an obstacle to expansion; however, several avenues exist such as the alumni association, individual classes, and former players, all of whom could provide funds required to upgrade or start new programs.

3. Re-evaluate the Order of Merit Index

Given the results of this study's analyses, it is recommended that the current Order of Merit Index be reviewed to include a factor that accounts for achievement in varsity athletics. The time and effort varsity athletes dedicate to their sport should be considered in their overall performance as midshipmen, but currently it is of little value (only 3.8% for team captains) in the Index. The mission of the Naval Academy is to produce well-rounded midshipmen, but those who excel in sports receive little, if any, acknowledgment of their performance. Captains of varsity sports receive a small percentage towards their Order of Merit, but this study indicates that athletic achievement among all varsity athletes is significant in relation to performance in the fleet.

The West Point equivalent of the Order of Merit, called the Cadet Performance Score (CPS) currently is weighted 55 percent from the Academic Program (APS), 30 percent from the Military Program (MPS), and 15 percent from the Physical Program (PPS). The PPS includes a component called the Athletic Performance Index (API), which makes up 25 percent of the PPS, or 4 percent of the overall Cadet Performance Score. The API distinguishes between varsity, junior varsity and intramural athletes. Even though this is just a small percentage of the CPS, it does recognize the importance of varsity athletics in relation to cadet performance. A small index such as this could be added to the USNA Order of Merit to account for athletic achievement.

C. RECOMMENDATIONS FOR FURTHER RESEARCH

This study focuses only on achievement in varsity athletics. However, there are several other facets related to athletics that should be explored. While athletic achievement is certainly an example of someone who is an excellent athlete, the athlete who has the same determination and drive, but is lacking in physical ability cannot be discounted. This being so, *participation* in varsity athletics could also lead to increased probabilities of promotion. It could even be possible that midshipmen who participate in varsity athletics but do not earn varsity letters will reveal greater performance in the fleet because of their ability to work hard within the team concept.

Likewise, an analysis of participation or achievement in club sports may provide more insight about the impact of athletics. Although the level of competition is often not as great, athletes in these sports generally dedicate a great deal of time toward their sport, and the same values and practices that are developed in varsity athletes may also be developed in club sport athletes.

An analysis regarding participation in various intramural sports may also provide interesting results. This study shows that team varsity athletes had higher promotion rates than individual and non-athletes, so the value of participation in a team intramural sport may produce the same results as this study. In addition, participation in other team related activities, such as cheerleading, glee club, gospel choir, and the drum and bugle corps may produce the same results.

Two policy changes that have taken effect since the time period of the data in this study may have an impact on future studies in this area. The combat exclusion for

women was rescinded in 1993, opening the door for many more women at the Naval Academy to select surface warfare and aviation. When year groups 1993 and beyond enter the LCDR selection zone, more reliable data on the impact of varsity athletics on promotion for women is likely to be available.

In 1995, a new service assignment policy was implemented at the Naval Academy in which midshipmen do not select warfare communities solely based on class rank. Midshipmen are now interviewed, the results of which account for 10 percent towards service assignment. The remaining 90 percent is accounted for by the Order of Merit. In this system, midshipmen are not guaranteed their first choice just because they have a higher class rank. This could have an impact on retention of varsity athletes, since the lower average Order of Merit that often characterizes athletes no longer becomes as significant a determinant in service selection as in the past.

Finally, this study analyzes only the Navy's four major warfare communities. Promotion rates of athletes in other warfare areas also should be examined. Because of the physical nature of the Marine Corps, many athletes select the Corps for their service assignment. For this reason it is possible that athletes may promote at even higher rates in the Marine Corps than those who were in the Navy's four major warfare communities. In addition, the Navy's Special Warfare community, or SEALS, is the most physically demanding assignment a midshipman can choose. This community would also tend to draw athletes who perform at high levels.

D. CONCLUSION

This study has been conducted in order to provide policy makers with insight as to the importance of the physical growth of midshipmen for later performance. The physical program at the Naval Academy consists of varsity athletics, club sports, intramurals, and the physical education curriculum. While this study has shown that achievement in varsity athletic programs has a significant impact on one measure of fleet performance, future studies in this area may provide even greater insight into the impact of physical training by examining other indicators of fleet performance. Such studies will allow the Naval Academy to continue its tradition of excellence.

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