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THESIS

**RETENTION OF RECRUITED ATHLETES FROM THE
UNITED STATES NAVAL ACADEMY**

by

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June 2004

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**RETENTION OF RECRUITED ATHLETES FROM THE UNITED STATES
NAVAL ACADEMY**

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ABSTRACT

This study examines fleet retention rates of USNA graduates who participated in varsity athlete programs from 1988 to 1990 and retained beyond their initial service obligation (N = 2,735). It is based on a theoretical model which investigates two forces of influence on retention: varsity athlete status as a positive influence and recruit status as a negative influence. Results of the hierarchical logistic regression analyses validate the theoretical model and suggest that varsity athletic participation and recruit status do have an impact on fleet retention rates. The negative retention influence of recruit status and the positive retention influence of varsity athletic participation are observed through the interaction of these two forces. Results indicate that recruit status is significantly related to lower retention rates, however, this negative force is counterbalanced by the positive influence of sustained varsity athletic participation, should the athlete have the perseverance to letter in his or her sport. This study also identifies the walk-on varsity athlete as the true beneficiary of the human capital benefits associated with varsity athletic participation. The walk-on varsity athlete acquires leadership and teamwork skills attributed to participation in varsity athletics without the negative recruit influence.

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I. INTRODUCTION

Varsity athletes have been an integral part of the history and tradition of the United States Naval Academy (USNA). Their performance on the field affects the morale of the brigade and serves as a source of pride for the entire Navy. Like civilian colleges, the Naval Academy recruits high school athletes to participate in the various sports that are part of the varsity athletic program of the institution. However, varsity athletes who graduate from the Naval Academy incur an obligation to serve as officers in the Navy and Marine Corps. Studies of athlete performance have found that recruited athletes have higher graduation rates than regular midshipmen and that varsity athletes graduate at a rate comparable to the rest of the brigade (Reardon, 1997). In addition, varsity athletes and recruited athletes perform better and have higher promotion rates than non-varsity athletes (Leskovich, 2000). Finally, research suggests that retention of varsity athletes appears to be 1.4% lower than that of their USNA counterparts (Reardon, 1997).

While these studies suggest that participation in varsity athletic programs has a positive impact on a variety of performance outcomes, it is not clear whether these findings can be generalized to all types of athletes including recruited athletes. This study examines fleet retention rates of various types of recruited athletes who graduated from the United States Naval Academy from 1988-1990. This study provides valuable information to the senior leadership of the Naval Academy regarding the Naval Academy's current recruiting and admissions policies of varsity athletes. Specifically, it shows the effect that these policies have on retention of USNA graduates beyond their minimum service obligation.

A. BACKGROUND

In addition to the academic rigors of the Naval Academy, there is a strong emphasis on the physical development of midshipmen. In fact, physical development is explicitly stated in the Naval Academy's mission: The mission of the United States Naval Academy is "to develop midshipmen morally, mentally, and physically" (United States

Naval Academy, 2004). This mission is accomplished through an active intramural and extramural sports program administered by the physical education department.

Through midshipmen development the Naval Academy strives to produce combat leaders as evidenced in The Commandant's Intent, addressing orientation on combat; "Our orientation at the Naval Academy should focus on creating an officer capable of operating in and withstanding the demands of leading Sailors and Marines in combat" (Allen, 2002). Additionally, the Naval Academy endeavors to produce career military officers, "graduates who are dedicated to a career of Naval Service" (United States Naval Academy, 2004).

While the Naval Academy strives to produce career oriented combat leaders, it also supports midshipmen competition in 29 different Division I sports. Athletes who play on these teams are comprised of both recruited athletes and walk-ons. Recruited athletes include blue chip recruits and non-blue chip recruits. Blue chip recruited athletes are aggressively recruited and receive additional points towards their whole man multiple in the admissions process. Non-blue chip recruited athletes are not recruited to the same extent and do not receive additional points on their whole man multiple in the admissions process. However, the admissions board is aware of their recruit status.

Like other colleges, the Naval Academy limits the number of blue chip recruits that can be admitted in each class. There is no limit on the number of non-blue chip recruits the Academy may have in each class.

The Naval Academy strives to strike a balance between competing on the Division I level and producing quality graduates who are ready to lead the next generation of Sailors and Marines.

B. PURPOSE

The Naval Academy strives to compete on the athletic field without negatively impacting the quality of officers it produces. This study examines whether or not the Naval Academy's current practices of actively recruiting varsity athletes supports or counters the goal of producing officers who are dedicated to a career of Naval service.

By analyzing the retention rates of recruited athletes and varsity athletes beyond one's minimum service obligation, this study will determine if belonging to one of these categories is significantly related to one's propensity to stay in the service. This study will examine the value of this policy for producing career oriented officers.

This study makes a significant contribution to the literature on performance of college athletes by examining job performance of college athletes at the Naval Academy. In addition, the study makes a significant contribution to the literature on retention of military personnel by examining retention of Navy and Marine Corps officers who participated in varsity athletics and graduated from the United States Naval Academy. This study is among the first to analyze the retention of recruited athletes beyond their minimum service obligation.

C. THEORETICAL MODEL

This study is based on a theoretical model which investigates two forces of influence on retention: varsity athlete status and recruit status. Research indicates that the lessons learned on the playing field carry over to life, which in turn influences midshipmen performance and fleet performance. Accordingly, it is expected that this will positively influence one's propensity to remain in the military beyond one's minimum service obligation. Recruits consist of blue chip and non-blue chip recruited athletes. Their decision to attend the Naval Academy was influenced by where they could play college sports. A desire to be a Naval Officer was not their only reason for attending the Naval Academy. Accordingly, it is expected that recruits will be less likely to remain in military service beyond their minimum obligation.

D. METHODOLOGY

Data for this project was obtained from the Naval Academy Institutional Research (IR) Department. Data from the Classes of 1988 to 1990 was used to test these hypotheses. The data includes (1) minority status, (2) gender, (3) military parent status, (4) Cumulative Academic Quality Point Rating, (5) Cumulative Military Quality Point Rating, (6) major group, (7) service community, (8) graduating year, (9) recruit status,

(10) blue chip status, (11) varsity athlete status, and (12) fleet retention data for all graduates from the Classes 1988 to 1990. Several regression models were developed to test the proposed hypotheses. Sequential logistic regression models controlled for demographic and academic performance variables on the relationship between varsity athlete membership and retention. These analyses determined whether athlete status type (e.g., recruited or blue chip) is significantly related to retention at the end of the active duty service obligation.

E. ORGANIZATION OF STUDY

This thesis is organized into five chapters. Chapter II reviews the import of the retention topic and examines previous studies on retention and varsity athlete performance. Chapter III describes the data set and outlines the theoretical model underlying the hypotheses examined in this study. It also outlines the regression models, which were constructed to test the hypothesis. Chapter IV presents the results of regression analyses and evaluates whether or not the findings supported or countered the proposed hypothesis. Chapter V provides a summary of the research, conclusions of the study, and suggestions for further research.

II. LITERATURE REVIEW

This chapter is divided into three sections: junior officer retention, research on the performance of USNA varsity athletes, and research on the performance of varsity athletes at civilian colleges and universities. The first section, junior officer retention, reviews current studies on officer retention and addresses the import of this topic. The second section reviews previous studies on the performance of Naval Academy varsity athletes both at the Naval Academy and in the fleet. The third section reviews the existing literature regarding the academic performance of varsity athletes at civilian colleges and universities and how well these former athletes perform in the workforce.

A. JUNIOR OFFICER RETENTION

The Naval Academy strives to produce officers who are “dedicated to a career of Naval service” (United States Naval Academy, 2004). Adhering to this institutional goal is essential for the Navy to meet its manpower and operational requirements. Declines in retention rates after the post cold war draw down prompted the Navy to evaluate why its personnel were leaving the Navy. This thorough examination, followed by the appropriate corrective action, made great strides in rectifying the problem. However, retention remains a critical issue that the Navy must continue to address.

Retaining junior officers beyond their minimum service obligation is necessary for the navy to meet its operational requirements. Typically, officers have their first opportunity to leave the service just before they would be heading back to the fleet for a department head billet on a ship, submarine, or aircraft. Filling these billets with qualified personnel is critical to the Navy’s being able to accomplish its mission, therefore the highest priority is placed on retention at this juncture. In 1999, when unrestricted line (URL) officer retention was at a historic low Vice Admiral Oliver stated to the House Armed Services Committee “it is absolutely essential that we place the highest priorities on initiatives and programs that ensure success in recruiting and retention – the heart and soul of military readiness” (Oliver, 1999).

A 12DEC03 brief by the Office of Secretary of Defense (OSD) and Office of Management and Budget (OMB) on officer personnel issues reported the current status of retention in the Navy. In the URL communities the Navy was above manning requirements in the O-1 and O-2 pay grades. This manning surplus continued into the O-3 level until the eight year mark. The significance of this point is that it is close to the time when most officers are at the end of their minimum service requirement. From this point until the 16th year of service, the Navy's officer inventory is below what is required. "In the 5-11 years of service cells, officers are making the decision to leave or stay in the Navy, or to lateral transfer to another community (RL or Staff) – the aggregate result of these decisions is the URL is under the DH requirement" (Office of Secretary of Defense/Office of Management and Budget, 2003). This shortage is in senior Lieutenants and Lieutenant Commanders and is precisely where officers are needed to return to sea to fill Department Head billets.

OSD/OMB(2003) reported the retention summary from fiscal years 1999 to 2003, as shown in Table 1. Retention in all of the URL communities has increased since 1999. However, with the exception of submariners and Special Operations officers all of the communities are still below required retention rates. The retention rates reported in Table 1. reflects the Cumulative Continuation Rates (CCR) for each warfare community. Pilots and NFOs CCRs represent the probability that these officers will remain in the Navy from the seventh through twelfth year of service. The CCRs of all other warfare communities reported reflects the probability that these officers will remain in the service through the third to eighth year of service. Of note, the 100 percent retention in special operations officers is due to a Stop Loss enacted in FY02.

Table 1. URL Cumulative Continuation Rate Retention Summary

COMMUNITY	FY-99 Actual	FY-00 Actual	FY-01 Actual	FY-02 Actual	FY-03 Actual	Average Required Retention FY03-05
Surface	23%	29%	25%	27%	34%	35%
SPECWAR	60%	62%	60%	60%	67%	76%
Submarine	30%	28%	28%	34%	43%	41%
Surface Nuclear	18%	20%	19%	18%	20%	22%
Pilot	28%	39%	33%	38%	47%	64%
NFO	37%	43%	45%	47%	53%	54%
SPEC OPS	42%	38%	33%	91%	100%	50%

Source: Office of Secretary of Defense/Office of Management and Budget, 12 DEC 03

The Navy has taken action to improve retention. Community specific special pays and bonuses, which will be addressed in the following sections, have significantly contributed to the increased retention numbers. However, retention initiatives have not been limited to monetary rewards. Additional initiatives include increasing the opportunity for post-graduate education, reductions in inter-deployment inspections and administration, and implementing quality of life improvements. The following sections will provide a brief overview of the current retention situation in the different warfare communities.

1. Surface Warfare Officer Community

As evidenced in Table 1, above, the retention of Surface Warfare Officers has increased dramatically since 1991. However, it is still slightly below the average required retention for FY03-05. “Retention among Surface Warfare department head (mid-grade) officers, typically with 6-10 years experience, has been a problem since Fiscal Year 1993 (Hoewing, 2004). The improved retention rates in the surface community can be contributed greatly to recent initiatives to improve retention.

Surface Warfare Officer Continuation Pay (SWOCP) and Surface Warfare Officer Critical Skills Bonus (SWOCS) have played a major role in reversing the negative retention trend in the Surface Warfare Community. “Surface Warfare Officer Continuation Pay (SWOCP) is designed to be a special pay that pays a Surface Warfare Officer up to a total of \$50,000 to stay in the community and remain on active duty through two afloat department head tours” (Bureau of Naval Personnel, 2004). SWOCP

not only entices junior officers to stay onboard for two department head tours, but it also provides the community a projection of future department head manning by offering the SWOCP one year prior to the completion of an officer's minimum service obligation. Commenting on the effectiveness of SWOCP, VADM Hoewing stated to the House Armed Service Committee, "the number of officers committing to serve as at-sea department heads continues to be encouraging and validates the effectiveness of SWOCP" (Hoewing, 2004). Surface Warfare Officer Critical Skills (SWOCS) Bonus "is designed to be an incentive, paying an eligible SWO LCDR up to \$46,000 to stay in the Navy, and SWO community, through the fifteenth year of commissioned service" (Bureau of Naval Personnel, 2004). SWOCP is targeted toward post department head LCDRs, who continue to be a retention challenge for the community. Initial indications at the first year of executing the program are very positive, with a "near 100% take-rate from eligible officers" (Office of Secretary of Defense/Office of Management and Budget, 2003).

The retention initiatives driven by, but not limited to, monetary bonuses have improved retention in the surface warfare community have not been limited to monetary bonuses. Increased post-graduate education opportunities, reductions in inter-deployment training, quality of life improvements, and revisions to the division officer sequencing plan have all contributed to the improved officer retention rates

2. Submarine Warfare Officer Community

Nuclear qualified submarine officers undergo a lengthy training pipeline which arms them with the technical training and knowledge necessary for them to operate nuclear propulsion plants. This extensive training not only enables submarine officers to perform their jobs in the Navy, it also makes them highly marketable in the civilian workforce. The extensive training and qualification process for submarine warfare officers results in a slow accession rate of nuclear qualified officers. These factors combine to create a situation where the retention of qualified personnel is essential to meeting manning and operational requirements. This notion is supported by the following quote from the Secretary of the Navy (SECNAV) instruction governing Nuclear Officer Incentive Pay, "Retention of experienced nuclear-qualified officers and steady accession of qualified junior officers into the nuclear propulsion training program

are required to support the Navy's nuclear powered ships" (SECNAVINST 7720.65L, 2003).

The Submarine Officer Community Status brief, obtained through the BUPERS website, highlights recent improvements in the submarine community's efforts regarding retention. The FY-03 submarine officer retention rate was 43%, which was above the nominal steady state requirement of 38% (Humm, 2004). Despite last year's retention success, however, the submarine community has been below its required nominal 38% retention rate from 1992 to 2002. These historically low submarine retention rates have created a situation in which department head tour lengths have been extended in order to meet manning requirements. This remedy does not really fix the retention issue, as extending department head tours merely puts more strain on the officers, making them more likely to leave the Navy. "Inadequate retention imposes extension of demanding sea tours on officers still serving in order to meet safety and readiness requirements. Excessively long department head tours adversely impact junior officer retention creating a downward spiral" (Hoewing, 2004). The poor retention rates in the submarine warfare community are evidenced by both the duration of department head tour lengths and the sizable bonuses paid to nuclear trained officers for remaining in the service.

Nuclear Officer Incentive Pay (NOIP) was established to "sustain retention of these highly trained officers and to attract officers into the nuclear propulsion training program" (SECNAVINST 7220.65L, 2003). NOIP is comprised of the following payments/bonuses: Nuclear Officer Accession Bonus, Nuclear Career Accession Bonus, Nuclear Officer Continuation Pay, and Nuclear Career Annual Incentive Bonus. Nuclear Officer Continuation Pay is a 3-5 year contract that pays \$22,000 a year and the Nuclear Career Annual Incentive Bonus pays \$12,500 a year. NOIP rate increases in FY01 and FY03 have resulted in a 9% increase in retention and have raised submarine officer retention rates above the nominal 38% required rate. Department head tour lengths, however, will continue to exceed the 36 month standard for the next several years due to under assessed year groups 96-99. (Office of Secretary of Defense/Office of Management and Budget, 2003).

3. Special Warfare Officer Community

Special Warfare Officers retain at a higher rate than the other unrestricted line warfare communities. This higher retention rate is necessary “to meet the demand for a relatively large number of Joint and Navy staff officer assignments for SEALs in pay grades O-4 through O-6” (Hoewing, 2004). Special Warfare Officers had a retention rate above 60% every year from 1999-2003. However, despite having a retention rate that exceeds the other URL communities, the retention rate is below the 76% required retention rate for FY03-05.

Special Warfare Officer Continuation Pay (SPECWAROCP) was implemented to influence the retention decisions of officers with 6-14 years of service, and has met its goals from FY01 forward (Office of Secretary of Defense/Office of Management and Budget, 2003). The success of SPECWAROCP “coupled with increasing accessions beginning in Fiscal Year 1995, has contributed to community stability and a favorable long-term retention outlook” (Hoewing, 2004).

4. Aviation Officer Community

Aviator retention was particularly bleak in 1999; the retention rate reported in the OSD/OMB brief for FY99 was 28% for pilots and 37% for NFO’s. This is far below the retention rates necessary to fill critical department head billets. A statement by VADM Oliver to the House Armed Service Committee in 1999 stated the following reasons for the poor aviation retention rates.

With the change in the overall mission of the Navy from a specific Cold War threat to a less defined program of peacetime engagement and contingency operations, it becomes harder to justify extended periods of time away from home and the resulting family separation. Additionally, concerns over lack of spare parts and equipment, lack of flying hours and more frequent deployments are all negative factors. The erosion of pay and benefits and dissatisfaction with application of past aviation bonus programs, coupled with the lure of a strong economy offering excellent opportunities for educated professionals along with a perception of increased quality of life in the civilian sector further decreases junior officer retention. (Oliver, 1999).

Aviator retention has improved dramatically since the grim picture painted by VADM Oliver in 1999. Naval aviation retention in Fiscal Year 2003 was 47%

for pilots and 53% for Naval Flight Officers. Admiral Hoewing contributed the improvement to “four consecutive successful years of our Aviation Career Continuation Pay (ACCP) program and the sluggish economy” (Hoewing, 2004). The ACCP targets aviators one year prior to their minimum service obligation, offering NFOs \$15,000 a year and pilots \$25,000 a year to stay in the service.

Retention in the aviation community has improved in the last few years, but there are still shortages “due to a combination of low accession, increased time-to-train and retention rates below requirements between Fiscal Years 1996-99” (Hoewing, 2004). According to 12DEC03 OSD/OMB brief, the required average retention rate for FY03-05 is 64% for pilots and 54% for NFOs.

5. Marine Corps Officer Community

Similar to the Navy URL warfare communities, the Marine Corps experienced success in terms of officer retention in fiscal year 2003. The Marine Corps officer retention rate “reached a nineteen-year high of 93.5% in fiscal year 2003” (Parks, 2004). Despite the high officer retention rate the Marine Corps is concerned with the retention of its aviators, as their retention rate is below that of non-aviators. Recent retention initiatives to accomplish this goal have reduced the time to train individuals and have provided monetary bonuses to aviators for remaining in the service beyond their minimum service obligation. Lieutenant General Parks stated to the House Armed service committee in March of 2004 that “Aggregate fiscal year 2003 retention targets for aviators were met, though deficiencies remain in some fixed wing pilot year groups based on attrition from the late 1990’s” (Parks, 2004).

The Navy and Marine Corps have made great strides to improve retention, as evidenced through the greater number of junior officers choosing to remain in the service beyond their minimum service obligation. However, the Navy is still below its retention goals in most warfare communities. This is a critical issue that must be readdressed as the needs of the Navy constantly evolve, and our Naval service’s ability to accomplish its mission is dependent on our ability to retain qualified personnel.

B. PERFORMANCE OF USNA VARSITY ATHLETES

Several studies conducted in recent years have examined the performance of Naval Academy athletes both while attending the Naval Academy and then out in the fleet. This research has analyzed the effects of varsity athletic participation and recruit status. The following chapter will first provide an overview of past research on the topic and then outline the framework for how this study will further explore the performance of recruited athletes in terms of retention beyond minimum service obligation.

1. Performance at the Naval Academy

Midshipman performance is best measured through ACQPRs (Academic Cumulative Quality Point Rating) and MCQPRs (Military Cumulative Quality Point Rating). ACQPR is a midshipman's grade point average. MCQPR is the measure of a midshipman's military performance. The MCQPR is derived from weighted averages of the following factors: physical education grade, athletic performance, military performance grade, conduct grade, and grades earned in professional courses (USNA Instruction 1531.51A, 1996). The ultimate test of a midshipman's performance is graduating and receiving a commission in the United States Navy or Marine Corps.

a. ACQPR

The consensus of previous research is that varsity athletic participation is not a predictor of a midshipman's ACQPR. Through defining varsity athlete status as lettering in a varsity sport, varsity athletes had slightly lower ACQPRs, however, varsity athlete status was not statistically significant as a predictor of a midshipman's ACQPR (Harvey, 2003). This study found that the strongest predictors of a midshipman's ACQPR were his or her SAT scores and minority status. Higher SAT math and verbal scores were positive predictors, while minority status was a negative predictor.

A 2002 study by Gregory Zettler took a more in depth look at the performance of varsity athletes by dividing athletes into the following categories: varsity letter winners, club sport letter winners, varsity or club sport letter winners, team sport letter winners, and individual sport letter winners. He also examined the effect of being a recruited athlete on this performance measure. For midshipmen who graduated from the Naval Academy, individual sport letter winner was the only positive predictor of academic success. The other varsity athlete categories were not significant predictors.

“We cannot conclude that athletic participation for graduates has any effect on academic performance, with the exception of participation on a sports team classified as an individual sport” (Zettler, 2002). Of note, Zettler found that “the combined total effects of athletic participation on academic performance are negative for varsity letter winners, letter winners as a whole, and team sport letter winners” (Zettler, 2002). The author reached this conclusion by comparing the percentage of midshipmen with above average ACQPRs in each of the varsity athlete categories. However, the conclusion was not supported by the requisite statistical significance of regression results. Additionally, Zettler found that only 42.2% of all recruited athletes at the Naval Academy had above average ACQPRs, but this status was not a significant predictor of academic success (Zettler, 2002).

b. MCQPR

Two recent studies examining the effects of varsity athletic participation on military performance at the Naval Academy reached conflicting results. When defining varsity athletic participation as lettering in a varsity sport, it was concluded that this status was not a predictor of a Midshipman’s MCQPR (Harvey, 2003). Although, varsity letter winners did have slightly higher MCQPR grades on average. Of variables included in this study, SAT math and verbal scores were positive predictors and minority status was a negative predictor.

In contrast to Harvey’s study, Zettler’s closer examination of the varsity athlete led to the conclusion that “in terms of military performance, there is now sufficient evidence that the maturity, stamina, aggressiveness, goal achievement, etc. that are learned on the athletic field are carried off the field and put to use at other venues at the Naval Academy” (Zettler, 2002). Varsity letter winners, club sport letter winners, individual sport’s team letter winners, and team sport’s team letter winners all earned above average MCQPRs at a higher rate than non-letter winners. This data was supported by regression results, which proved that all of these categories were positive predictors of a midshipman’s MCQPR. Of note, recruited athlete status was not found to be a predictor of military success.

c. Graduation

Graduating and receiving a commission in the United States Navy or Marine Corps is the ultimate illustration of a midshipman's success at the Naval Academy. A recent study examining the effect of recruit status and varsity athlete status on graduation determined that recruit status is a positive prediction of graduation, and that being a recruited athlete increases the likelihood of graduation by 2.2%. Additionally, when defining varsity athletic participation as lettering a midshipman's first class year, varsity athletic participation was not a significant predictor of retention. "The data here (significantly positive for RECRUIT and not significant for the ATHLETE variable) suggest that NAAA coaches are concerned with recruiting student-athletes who not only have the athletic talents to improve their sports programs, but also who are more likely to complete the rigorous four-year USNA program and be commissioned as officers in the Navy and Marine Corps" (Reardon, 1997).

2. Fleet Performance

The success of a midshipman at the Naval Academy is measured through ACQPRs, MCQPRs, and ultimately, graduation. However, the Naval Academy does not exist to merely produce graduates. An important goal of the institution is to produce to career oriented Navy and Marine Corps Officers; men and women who are prepared to lead our Sailors and Marines into combat. Therefore, the success of the Naval Academy can reasonably be measured by the quality of and fleet success of Naval Academy graduates.

The fleet performance of USNA graduates can be difficult to measure, as many aspects of an officer's performance are subjective. To objectify performance it may be measured through Officer Fitness Reports or promotion results. To evaluate the ability of the institution to produce career oriented officers retention is an effective measure. Past research has analyzed the promotion rates and retention of recruited athletes and varsity athletes.

a. Promotion

By defining fleet performance to selection to LCDR, athletes who earned a varsity letter, athletes who earned a varsity letter in a team sport, and athletes who earned a varsity letter in an individual sport all performed better in the fleet as compared to

graduates who were not varsity athletes. Being a varsity athlete “increases the probability to promotion to LCDR by 7.7%” (Leskovich, 2000). This notion is supported by findings from Reardon’s 1997 study; the promotion rate for those athletes who made it to the LCDR board was 82.84% compared to 77.98% for all graduates (Reardon, 1997).

Recruited athletes, including athletes who lettered in a varsity sport and those who did not, promoted to LCDR at an above average rate. The increased probabilities for promotion to LCDR for blue chip athletes are: 18.9% higher for Blue Chip team athletes, 4.4% higher for Blue Chip individual athletes, and 6.6% higher for recruited Blue Chip athletes that did not earn a varsity letter (Leskovich, 2000). “There is a positive relationship between the probability of promotion and blue chips who earn a varsity letters in team sports, individual sports, and no varsity letter at all” (Leskovich, 2000). Of note, the existing research does not account for the self selection bias associated with the decision of these officers to remain on active duty until the promotion board.

b. Retention

Research has shown a positive correlation between being a varsity and recruited athlete and achieving promotion to LCDR. However, the above average promotion rates are for those graduates who remain in the military until the ten year mark, thus eligible for promotion to LCDR. Previous research indicates that the retention of varsity athletes to the LCDR promotion board is 48.73% compared to 50.13% for all graduates (Reardon, 1997). “While letter-winners stay at a below average rate, varsity athletes who do stay are promoted at a much higher rate than the USNA graduate average” (Reardon, 1997). The research does not indicate the retention rates of recruited and blue chip athletes, however, as a function of retention rates and promotion rates, Reardon concluded that “recruited athletes are associated with a significantly greater likelihood of becoming careerists” (Reardon, 1997).

Previous research suggests that there is a positive correlation between being a varsity athlete and performing well in the fleet. Most notably, the studies show the same positive correlation with being a recruited athlete. However, the research does suggest that the fleet retention of varsity athletes is below the fleet average and it remains unclear on the retention of recruited athletes. This study further examines this topic to

determine if the retention of the recruited Naval Academy athlete is comparable to the rest of the Naval Academy graduates.

C. PERFORMANCE OF CIVILIAN VARSITY ATHLETES

Research indicates that recruited athletes have an admission's advantage over non-recruited college applicants. "Recruited athletes who enrolled at Division I-A universities in the fall of 1988 were four times more likely to be admitted as exceptions to their institutions regular admissions standard" (Lederman, 1990). The studies which examine the academic performance of varsity athlete at the college level determine that these varsity athletes are less prepared to succeed academically in college. A Clemson University study which examined the academic performance of the entire Clemson student body in the academic year 1988-1989 concluded that athletes "high school rank is about 19 percentage points lower, and their SAT scores are on average 150 points less" (Maloney & McCormick, 1993). "Athletes come to college with inferior high school preparation in academics" (Maloney & McCormick, 1993).

William Bowen and Sarah Levin's 2003 publication Reclaiming the Game focuses on the varsity athletes admissions advantage. Their research looked at data from 33 higher learning institutions to include: Ivy League Universities, University Athletic Association (UAA) universities, Women's colleges, New England Small College Athletic Conference (NESCAC) colleges, and Co-ed liberal arts colleges. The authors found that "recruited athletes – defined as those applicants included on a coach's list – enjoy a significant admissions advantage over other applicants. This advantage was most pronounced at the Ivy League, where recruits were four times more likely to be admitted than similarly situated applicants who were not on a coach's list, but it was present and substantial in each group of schools for which we have data" (Bowen & Levin, 2003). In addition to the admissions advantage recruited athletes enjoy, the book also found that "recruited athletes arrive on campus with substantially lower SAT scores than both their fellow athletes and other students" (Bowen & Levin, 2003).

One may measure undergraduate academic performance through grade point average and ultimately, graduation. The workforce performance of college graduates is

quantifiably measured through income. The following sections will examine the undergraduate academic performance of recruited athletes and varsity athletes. It will also review research documenting varsity athletes' post college performance as measured through their income.

1. Undergraduate Academic Performance of Civilian Varsity Athletes

Academic success in college may be measured through undergraduates' grade point average, with the ultimate illustration of academic success being graduation. It was previously noted that collegiate varsity athletes generally enter college with weaker academic foundations than non-athletes. The literature on the academic performance of these students throughout their college careers indicates that varsity athletes have lower grade point averages than non-athletes. Despite the below average grade point averages of varsity athletes, however, the literature reports that varsity athletes graduate at a rate comparable, if not higher, than their non-athlete peers.

a. Grade Point Averages

The existing literature on the academic performance of intercollegiate varsity athletes contends that varsity athletes have lower grade point averages than non-varsity athletes. To describe this phenomenon, the former University of Michigan President, James Duderstadt, explained that "student-athletes are really athlete-students" (Duderstadt, 2000). Regardless of whether or not one agrees with this assessment, studies have documented the sub-par academic performance of collegiate varsity athletes.

A 1993 study analyzing the effect of athletic participation on academic success at the Clemson University concluded that "participating in sports reduces academic success" (Maloney & McCormick, 1993). Analyzing the entire student body in the academic year 1988-89, varsity athletes received lower grades. "The average grade for athletes is 2.379 which is lower by a statistically significant margin than the average grade for the overall student body, 2.681" (Maloney & McCormick, 1993). Further examination uncovered that only participation in revenue producing sports, football and men's basketball, was a negative predictor of academic success after controlling for economic factors. "The big time sports have athletes who do not perform as well as their peers" (Maloney & McCormick, 1993). Looking at the academic impact of being an in-season athlete, the results "indicate that there is a negative season effect in the revenue

producing sports but not in the nonrevenue sports” (Maloney & McCormick, 1993). Varsity athletes on revenue producing sports teams do worse academically when their team is in season.

James Schulman and William Bowen’s The Game of Life analyzes the academic success of high profile and low profile varsity athletes compared to students at large. High profile athletes are defined as those athletes who played football, basketball, or hockey; low profile athletes played on all other varsity teams. Comparing the grade point averages of athletes from the year groups 1951, 1976, and 1989, not only do high profile and low profile athletes have lower class standings than students at large, but there is a dramatic downward turn in the academic performance of varsity athletes over time (Shulman & Bowen, 2001). In 1951 the average GPA of a high profile athlete was only slightly below students at large; in 1989 the average high profile athlete stood in the 25th percentile of their class and the average lower profile athlete stood in the 40th percentile (Shulman & Bowen, 2001). Examining this downward academic trend with respect of SAT scores, the authors make the following assertion: “While the SAT scores of football, basketball, and hockey players in the Ivy League rose by over 60 points between 1976 and 1989, and while the SATs of students at large at these schools rose by only 38 points, the mean rank-in-class of Ivy League High Profile athletes continued to fall, and an ever larger share of them ended up in the bottom third of the class” (Shulman & Bowen, 2001).

William Bowen and Sarah Levin’s book Reclaiming the Game explores the difference in academic performance between varsity athletes and non-athletes. The authors found that “recruited athletes are more likely than students at large to major in the social science and business cluster of departments and less likely to major in the humanities and science cluster” (Bowen and Levin, 2003). This study also addresses the differences between recruited athletes and walk-on athletes. “Male walk-ons in the high profile sports were more inclined to study science than were the recruits: in the Ivies, for example, 36 percent of the male walk-ons concentrated in science as compared with 18 percent of the recruits and 41 percent of the students at large” (Bowen and Levin, 2003). Bowen and Levin also assessed the academic performance of recruited athletes compared to walk-ons and students at large. Recruited athletes performed considerably worse in the

classroom than the rest of the student body, while the academic performance of walk-ons was much closer to the non-athlete standard. “Recruited High Profile athletes had a cumulative grade point average that put them, as a group, in the 19th percentile of their class in the Ivies and in the 23rd percentile in the NESAC colleges” (Bowen and Levin, 2003).

b. Graduation Rates

Varsity athletes enter college with lower academic credentials than non-athletes, they perform worse academically as measured through their grade point averages, and yet they graduate at a rate that is comparable to, if not higher than, their non-athlete peers. With the exception of a 1993 study at Clemson which found that “graduation rates for athletes are about 10 percentage points below the rest of the student body” (Maloney & McCormick, 1993) the literature contends that varsity athletic participation does not negatively influence graduation rates.

“Both male and female athletes who attended colleges and universities in the early 1970s had higher graduation rates than other students.”(Long & Claudill, 1991). Further exploring this topic in a 1991 follow up study, Long and Claudill found that being a varsity athlete was a significant predictor of graduation. “Holding constant other determinants of graduation, athletic participation is estimated to raise the graduation probability of males by approximately 4%” (Long & Claudill, 1991). This status also increased females’ probability of graduating. Duderstadt, who was earlier quoted as saying that “student-athletes are really athlete-students” also said that “the academic success of most athletes is comparable to the student body generally” (Duderstadt, 2000). He too had data supporting the fact that athletes graduate at a rate comparable to non-athletes.

Examining the graduation rates of varsity athletes from 30 colleges and universities in the book The Game of Life, Shulman and Bowen concluded that “the overall graduation rates of athletes are roughly the same as, and actually slightly higher than, the overall graduation rates for all students” (Shulman & Bowen, 2001). Analyzing the effects of athletics over three cohorts, 1951, 1977, and 1989, there is a historical trend of higher graduation rates of varsity athletes. The gap of higher graduation rates of varsity athletes has decreased over time, but it is still present. Students who participated

in time consuming extra curricular activities experienced a similar elevated graduation rate over students at large. This study concluded that “time spent on an activity outside classes does not in any way lessen the chances that a student will earn a degree” (Shulman & Bowen, 2001).

In Reclaiming the Game Bowen and Levin expand on the previous research regarding the graduation rates of varsity athletes to include recruited and walk-on athletes. The higher graduation rates that were previously attributed to varsity athletics hold true for both recruited and walk-on athletes. In regards to academically selective schools, “athletes attending these colleges and universities-both recruited and walk-ons-generally graduate at a higher rate than their peers” (Bowen & Levin, 2003).

2. Civilian Varsity Athlete Performance in the Work Force

The literature has established that varsity athletes attending civilian colleges and universities enter college with lower academic credentials, achieve lower grades, and graduate at rate comparable to if not higher than their peers. Recent studies have further explored the effects of varsity athletic participation by investigating the performance of collegiate varsity athletes in the work force. While it can be difficult to quantify the job performance of college graduates, studies have examined the impact of varsity athletics on graduates obtaining advanced degrees, their profession choices, and their income compared to graduates who did not participate in athletics.

There are definite trends in the effects of varsity athletic participation on advanced degree attainment. “Athletes were more likely than other graduates to have earned an MBA and less likely to have earned a Ph.D. or an advanced degree in law or medicine.” (Schulman & Bowen, 2001). Athletes also proved less likely to earn a masters degree in the humanities, public policy, public health, urban planning, social work, and architecture (Schulman & Bowen, 2001). Categorizing the athletes into those who played on high profile sports and lower profile sports, the authors concluded that “those who played football, basketball, and hockey were less likely than lower profile athletes to earn advanced degrees, and especially degrees in law and medicine” (Schulman & Bowen, 2001).

Just as athletic participation may be an indicator for the type or likelihood of earning an advanced degree, it is also an indicator of the profession a graduate will enter. Male athletes were more likely than students at large to enter the business field (Schulman & Bowen, 2001). “Students at large were more likely than the athletes to be engineers, computer scientists, or to be working in the research, arts, clergy category. They were also more likely to be lawyers, doctors and academics” (Schulman & Bowen, 2001).

Research illustrates that varsity athletic participation results in higher earnings after graduation. “Early in their labor market careers, at around the ages of 28 to 30, males who participated in intercollegiate athletics were estimated to receive 4% higher incomes in 1980 than similar non-athletes. No such income premium associated with college athletics was observed among female athletes” (Long and Caudill, 1991). This trend of higher incomes for former varsity athletes holds true over time. The Game of Life, which examined the earnings from cohorts from 1956, 1971, and 1989, confirmed that varsity athletic participation does in fact result in higher incomes. “The average earned income of former athletes exceeds that of the students at large” (Shulman and Bowen, 2001). With respect to the literature documenting the lower academic preparation and lower academic performance of varsity athletes, the fact that they graduate at a rate comparable to their non-athlete peers and subsequently have greater earnings in the workforce is not only remarkable, but suggests that there are very valuable lessons learned on the playing field that athletes are able to apply later on in life.

D. CHAPTER SUMMARY

Retaining junior officers beyond their minimum service obligation is essential to the Navy meeting its operational requirements. The retention of junior officers has been a challenge for the Navy. Initiatives and incentives have improved retention rates, but this is a problem that is far from solved. As the Naval Academy develops midshipmen morally, mentally, and physically it strives to produce career oriented officers. The Navy Academy also competes in 29 Division I sports. While varsity athletic participation

contributes to the physical development of midshipmen this study analyzes the effects that being a recruited and varsity athlete has on retention.

A thorough review of literature regarding the undergraduate and post-graduation performance of midshipmen and civilian varsity athletes has led to the following hypotheses: recruit status is negatively related to retention; and sustained varsity athletic participation, defined through earning a varsity letter, is positively related to retention.

This study develops regression models to examine the effects of recruit status and varsity athletic participation on the fleet retention of Naval Academy graduates. It tests two hypotheses, and explores the interaction of recruit status and varsity athletic participation. The results contribute to the existing body of literature on retention and the performance of varsity athletes.

III. RESEARCH METHODOLOGY

This study analyzes the impact of specific variables, athlete status and recruit status, on Naval Academy graduates' decision to stay or leave the Naval service at the end of their minimum service obligation. Because past performance is the best predictor of future performance, this study focuses on historical retention data of unrestricted line graduates who entered the Navy and Marine Corps. To fully explore the effects of recruit status and varsity athletic participation, this study also examines the effects of demographic and midshipmen performance data. The only aspect of fleet performance to be analyzed is retention. This chapter will describe the data set used in this study, along with a description of the variables and the regression methodology used to analyze fleet retention.

A. DATA SET DESCRIPTION

Data for this project was obtained from the Naval Academy Institutional Research (IR) Department. The data set contains demographic, athletic status, midshipmen performance, service community, and fleet retention data for the classes of 1988, 1989, and 1990.

An institutional goal of the Naval Academy is to produce combat leaders, therefore, this study only includes graduates who entered one of the following unrestricted line warfare communities: surface warfare, nuclear surface warfare, submarines, special warfare, special operations, Navy pilot, Navy NFO, Marine Corps ground, Marine Corps Pilot, and Marine Corps NFO. All restricted line and general unrestricted line graduates are excluded from this study. The sample size of all unrestricted line Navy and Marine Corps graduates is 2735. Table 2 shows the distribution of unrestricted line graduates among the different service communities.

Table 2. Service Selection of USNA Un-Restricted Line Graduates

Service Community	Class			Total
	1988	1989	1990	
SWO	263	292	243	798
NUC SURF	44	3	34	81
Navy Pilot	229	226	221	676
Navy NFO	79	104	111	294
NUC SUB	120	171	136	427
SPECWAR	20	20	21	61
SPECOPS	8	7	5	20
USMC ground	125	65	60	250
USMC NFO	5	14	6	25
USMC pilot	46	30	27	103
Total	939	932	864	2735

B. VARIABLE DESCRIPTION

This section provides an overview of the variables examined in this study. It clearly defines this study’s dependent variable, retention, and explains how this definition is derived based on the different minimum service obligations for each warfare community. Additionally, this section lists the descriptive statistics of the demographic and midshipmen performance variables and the expected impact of these variables on retention. Finally, this section reviews the independent variables recruit and varsity athlete status. It presents the descriptive statistics of the independent variables and the expected signs of the variables in the regression analysis.

1. Dependent Variable: Retention

Defining retention is the most significant step in the methodology of any retention analysis, as the definition may have a considerable impact on the results. This step is complicated by the fact that there are specific minimum service obligations for each warfare community and the duration of the different training pipelines varies as well. Previous studies have defined retention has retaining to a nominal point, for example, the ten year mark, or retaining to LCDR promotion. This study is unique in that the definition of retention varies by community to extend just past community specific minimum service obligations, and most importantly, the definition aligns with existing department head shortages in all warfare areas.

The minimum service obligation for Surface Warfare, Nuclear Surface Warfare, Submariners, Special Warfare, Special Operations, and Marine Ground Officers is five years. This study defines retention in the aforementioned communities as remaining in the service until the seven year mark. This allows ample time for those individuals who have no intention of making the military a career to process out of the service.

The minimum service obligation for Navy and Marine Corps Naval Flight Officers is six years. NFO flight school is, on average, a year and a half with an additional six months at TBS for all Marine Corps NFOs before reporting to flight school. Therefore, the retention definition for Navy and Marine Corps Naval Flight Officers is ten years. This ten year mark allows individuals who do not intend to make the military a career ample time to transfer out of the service, while also closely aligning with the time when NFOs return to the fleet to fill critical department head billets.

Flight school is, on average, two years for Navy and Marine Corps Pilots, with Marine Corps pilots spending approximately six months at TBS before reporting to flight school. The active duty service obligation is six years for rotor wing pilots and eight years for fixed wing pilots. For the purpose of this study, rotor and fixed wing pilots were grouped together. The resulting retention definition for Navy and Marine Corps Pilots is twelve years. Consequently, 1990 is the last graduating year in the data set as this allows for all pilots to have reached their defined retention point. The retention data set extends through September of 2002.

The retention variable is binary, coded: 1 = retained; 0 = did not retain. Table 3 shows the retention rates for each URL warfare community. Table 4 shows the retention across years of service for each URL warfare community. The statistics in bold in table 4 are the retention numbers at each community's retention definition.

Table 3. Retention by URL Service Community

Service Community	Frequency	Number Retained	Retention Rate
SWO	798	411	51.5%
NUC SURF	81	32	39.5%
Navy Pilot	676	215	31.8%
Navy NFO	294	141	48.0%
NUC SUB	427	217	50.8%
SPECWAR	61	29	47.5%
SPECOPS	20	11	55.0%
USMC ground	250	158	63.2%
USMC NFO	25	18	72.0%
USMC pilot	103	72	69.9%
Total	2735	1304	47.7%

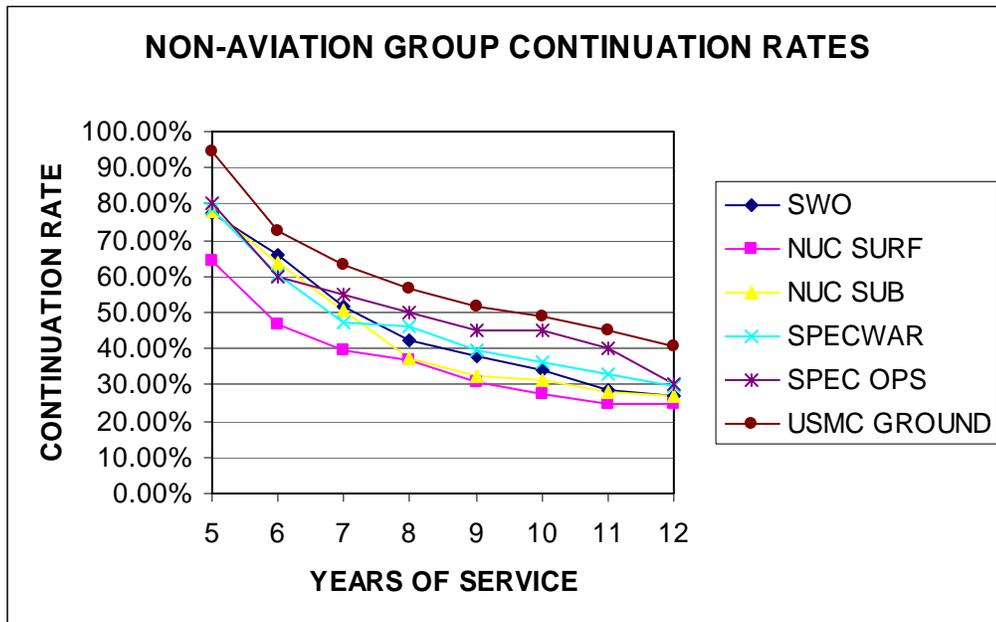
Table 4. Retention at Years of Service by URL Service Community

Service Community	Frequency	Year 5 N / %	Year 6 N / %	Year 7 N / %	Year 8 N / %	Year 9 N / %	Year 10 N / %	Year 11 N / %	Year 12 N / %
SWO	798	617 77.3%	525 65.8%	411 51.5%	339 42.5%	301 37.7%	273 34.2%	230 28.8%	216 27.1%
NUC SURF	81	52 64.2%	38 46.9%	32 39.5%	30 37.0%	25 30.9%	22 27.2%	20 24.7%	20 24.7%
Navy Pilot	676	626 92.6%	598 88.5%	574 84.9%	532 78.7%	442 65.4%	320 47.3%	243 35.9%	215 31.8%
Navy NFO	294	275 93.5%	267 90.8%	250 85.0%	226 76.9%	171 58.2%	141 48.0%	119 40.5%	115 39.1%
NUC SUB	427	334 78.2%	272 63.7%	217 50.8%	160 37.5%	138 32.3%	133 31.1%	120 28.1%	114 26.7%
SPECWAR	61	48 78.7%	37 60.7%	29 47.5%	28 45.9%	24 39.3%	22 36.1%	20 32.8%	18 29.5%
SPECOPS	20	16 80.0%	12 60.0%	11 55.0%	10 50.0%	9 45.0%	9 45.0%	8 40.0%	6 30.0%
USMC Ground	250	236 94.4%	181 72.4%	158 63.2%	142 56.8%	129 51.6%	122 48.8%	112 44.8%	102 40.8%
USMC NFO	25	25 100%	23 92.0%	21 84.0%	21 84.0%	19 76.0%	18 72.0%	16 64.0%	14 56.0%
USMC Pilot	103	99 96.1%	96 93.2%	93 90.3%	85 82.5%	78 75.7%	72 69.9%	68 66.0%	59 57.3%
Total	2735	2328 85.1%	2049 74.9%	1796 65.7%	1573 57.5%	1336 48.8%	1132 41.4%	956 35.0%	879 32.1%

The continuation rates by years of service are plotted in the three figures below. Figure 1 is the retention by years of service for all of the service communities with a five year minimum service obligation and a seven year retention definition. Figure 2 is the retention by years of service for Navy and Marine Corps NFOs, who have a ten year retention definition, and figure 3 is the retention by years of service for Navy and Marine Corps pilots, who have a 12 year retention definition.

Analyzing the retention rates of the unrestricted line warfare communities with the seven year retention definition highlights the similarities in these officers' decisions to stay and leave over time. The sharpest drop in retention occurred within one year of reaching their minimum service obligation (5 years), with a more gradual, steady decline proceeding from there. The Marine Corps Ground Officers have the highest continuation rate at every year mark of the communities included in this group.

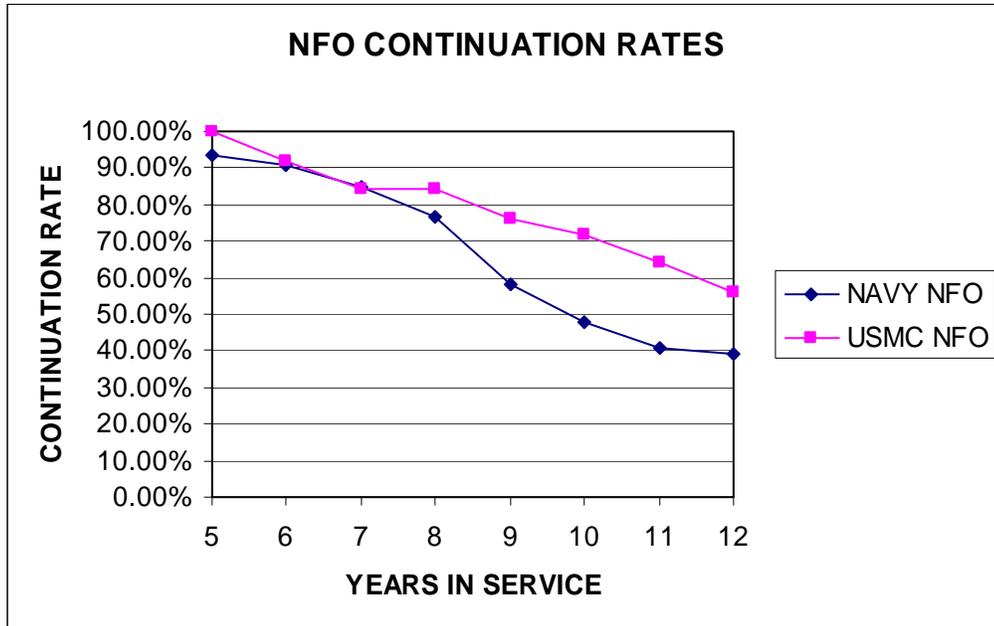
Figure 1. Non-Aviation Service Community Continuation Rates



The retention trends of Navy and Marine Corps NFOs over time is similar to that of Navy and Marine Corps pilots, with the exception of Navy NFO retention rates being 10% higher than Navy pilots at the twelve year mark. There is a sharp drop in retention

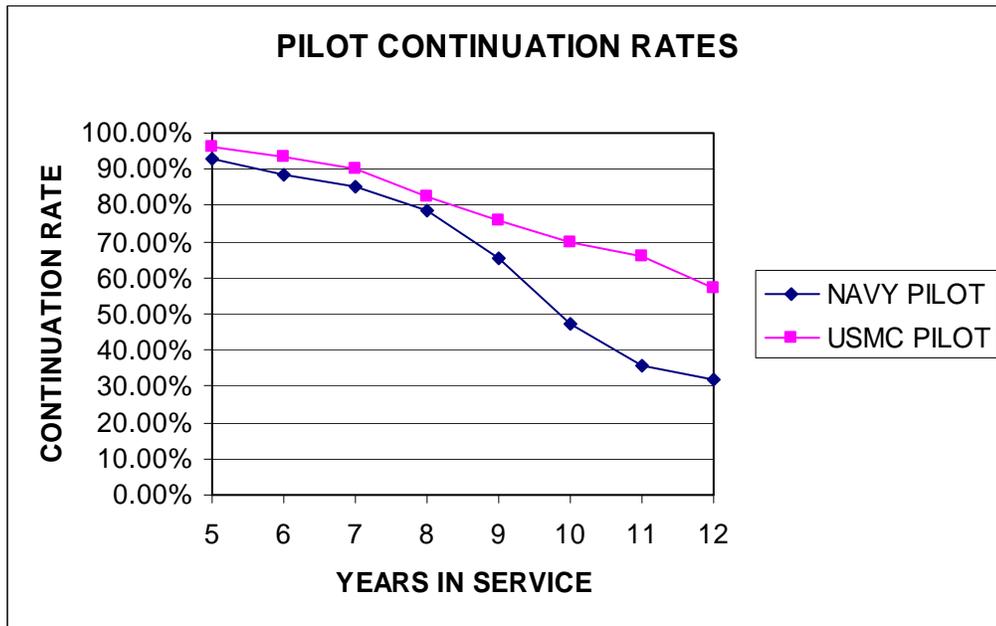
rates after Navy NFO's meet their minimum service obligation. This trend, however, has almost completely leveled off by the 12 year point. Data on Marine Corps NFOs is similar to Marine Corps pilots, with no sharp decline in retention after meeting the minimum service obligation.

Figure 2. NFO Continuation Rates



Examining the continuation rate of Navy and Marine Corps pilots shows the expected high retention rates through the minimum service obligation for both communities. Once the minimum service obligation is met, however, there is a distinct difference in the retention between the two services. One observes a significant negative continuation trend in Navy pilots between the eight and nine year mark. This coincides with the time when the rotor wing pilots are first be able to leave the service. This steep negative trend continues through the eleven year mark and then begins to level off. The observed retention trend of Marine Corps pilots is remarkably different. While there is a gradual decline in the retention rates of Marine Corps pilots after their minimum service obligation, there is not the dramatic drop that is present with Navy pilots.

Figure 3. Pilot Continuation Rates



The continuation rates of the different warfare communities illustrate two significant trends over time. First, Marine Corps Officers have considerably higher continuation rates as compared to their Navy counterparts who have similar service obligations. Also, with the exception of Marine Corps pilots and NFOs, there is a sharp decline in continuation rates of all warfare communities after the minimum service obligation is reached and prior to the community specific retention definition.

2. Control Variables

To test the hypothesis of retention predicated on recruit and athlete status, this study controls for demographic, midshipmen performance, and service community variables. This section defines these variables, reviews the variables' descriptive statistics and hypothesizes the predicted effect of these variables on retention based on the existing literature.

The demographic variables of minority status, gender, and military parent are coded as binary variables. The minority status variable indicates that a graduate is either a minority or not. Previous research has found that black officers are more likely to stay in the military beyond the minimum service obligation, Hispanic officers are less likely to

retain and other minority statuses are not significant predictors of retention (Demeril, 2002). As all minority groups are classified together in this variable, and black officers represent the largest percentage of minority officers, it is predicted that minority status is positively correlated with retention. The gender variable identifies female graduates. Due to the fact that this study is limited to graduates who entered an unrestricted line warfare community there is only a small percentage of female graduates in the sample size: 3.5%. The officers in this study graduated before the Defense Authorization Act and before the repeal of the Combat Exclusion Act. The female graduates in this study were limited in their ability to choose an unrestricted line warfare community and typically commissioned into the restricted line communities, thus excluded from this study. It is hypothesized that being a female will have a negative influence on retention. Previous research has found that “female officers are 11.16% less likely to stay in the military beyond MSR” (Demirel, 2002). The military parent variable includes all graduates who had a parent that served in the armed forces. It is predicted that this status will have a positive influence on retention as these graduates were exposed to the military service before entering the Naval Academy.

The midshipmen performance variables of major group, ACQPR, and MCQPR are also included in the retention model. Major group is coded into three binary variables for Group I, Group II, and Group III majors. Group I includes engineering majors; Group II includes math and science majors; Group III includes humanities and social science majors. It is predicted that being a Group I major will have a positive impact on retention, and that being a Group II or Group III major will have a negative impact. As the military profession is becoming more technically orientated, it is predicted that an engineering undergraduate background will better prepare a graduate to serve in today’s modern military, and consequently make Group I majors more likely to retain. ACQPR and MCQPR are two continuous variables controlling for the graduates academic (ACQPR) and military (MCQPR) performance at the Naval Academy. It is hypothesized that graduates who demonstrate higher military performance, measured through their MCQPR, will be more likely to retain. These individuals demonstrate an affinity for the military lifestyle by excelling as midshipmen. Conversely, it is predicted that ACQPR will be a negative predictor of retention. The stronger academic background of these

graduates makes them more marketable in the civilian workforce. Three binary variables of graduating year are included in the retention model to capture varying labor market conditions and changes in the economy. The variables are: Grad year 1988, Grad year 1989, and Grad year 1990. There are a myriad of possible economic changes over the years of this study, therefore the potential effects of these variables are unknown.

Service community is coded into three binary variables representing the retention definition of the different service communities. As previously stated in this chapter, each warfare community has a different minimum service obligation and distinct trends exist within the retention of each community's members. The three service community variables in this study are non-aviation, NFO, and pilot. The non-aviation community variable includes all graduates who entered a community whose retention definition in this study was seven years. This variable includes the following communities: surface warfare, nuclear surface warfare, submariners, special warfare, special operations, and Marine Corps ground. The service community variable NFO includes the graduates who entered a community whose retention definition was ten years, to include Navy and Marine Corps NFOs. Finally, the service community variable pilot includes Navy and Marine Corps pilots, and their retention definition is twelve years. Figure 4 depicts the retention rates of the different community groups in this study. Table 5 lists the definitions of the control variables used in this study and shows their descriptive statistics.

Figure 4. Service Community Retention Rates

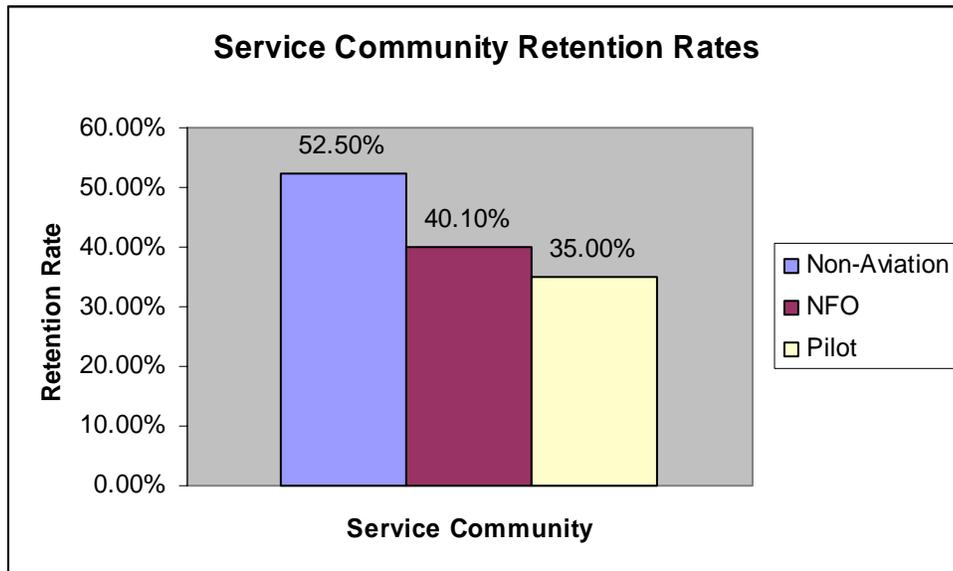


Table 5. Control Variable Definitions and Descriptive Statistics

Control Variables	Description of Code	Number	Percentage	Expected Sign
Minority	1 = Minority	N = 390	14.3%	+
Gender	1 = Female	N = 95	3.5%	-
Military Parent	1 = Military parent	N = 1492	54.6%	+
CAQPR	Continuous (range: 0 – 4)	N/A	Mean = 2.765	-
CMQPR	Continuous (range: 0 – 4)	N/A	Mean = 3.064	+
Group 1 Major	1 = Engineering major	N = 1049	38.4%	+
Group 2 Major	1 = Math and science major	N = 868	31.7%	-
Group 3 Major	1 = Humanities and social science major	N = 818	29.9%	-
Non-Aviation	1 = surface warfare, nuclear surface warfare, submariners, special warfare, special operations, Marine Corps ground	N = 1637	59.9%	?
NFO	1 = Navy and Marine Corps NFOs	N = 319	11.7%	?
Pilot	1 = Navy and Marine Corps pilots	N = 779	28.5%	-
Grad Year 1988	1 = Graduation year 1988	N = 939	34.3%	?
Grad Year 1989	1 = Graduation year 1988	N = 932	34.1%	?
Grad Year 1990	1 = Graduation year 1988	N = 864	31.6%	?

CAQPR Standard Deviation = 0.42103

CMQPR Standard Deviation = 0.33064

3. Recruit and Athlete Status Variables

The focus of this study is upon the fleet retention of recruited and varsity athletes.

Data is organized into 11 athlete groups including:

- varsity member
- varsity letter winner
- varsity member non-letter winner
- recruit
- blue chip
- recruit non-blue chip
- walk on varsity team member
- recruit letter winner
- recruit non-letter winner
- walk on varsity letter winner
- walk on non-varsity letter winner

Initial regressions specify varsity athlete and recruit status as separate entities before combining them to account for their interaction. This interaction may prove to be the key to the study, as the impact of the recruit status variables may change depending upon whether or not the recruit earned a varsity letter.

a. Varsity Athlete Status Variables

Previous studies define a varsity athlete as someone who either letters in a varsity sport or letters in a varsity sport his or her first class year. This study takes a more in- depth look at the effects of varsity athletic participation at the Naval Academy. The first varsity athlete status variable examined is varsity athletic participation at USNA. This binary variable is coded to represent participation in varsity athletics without limiting membership to lettering. All graduates who participated in varsity athletics and who appeared on a varsity sport's team roster for at least one season are included in this variable.

It is hypothesized that the human capital and resulting retention effects of varsity athletic participation will vary based on whether or not the varsity athlete letters in his or her sport. This study predicts that leadership, teamwork, and various other life lessons developed on the playing field are internalized by letter winners. Additionally, it

is predicted that those human capital benefits are not gained by one’s mere participation in a sport without lettering. This is a reasonable conclusion when one considers the number of seasons that letters winners compete on the athletic field compared to non-letter winners. Varsity athletes who earned a varsity letter played on an average of 5.20 seasons; varsity athletes who did not letter played on an average of 2.06 seasons. The disparity between the number of seasons played by letter winners and non-letter winners is significant for two reasons. First, letter winners commit a much more significant amount of time to athletics, making them more likely to acquire the human capital benefits associated with varsity athletics. Secondly, and perhaps most importantly, letters winners demonstrate great tenacity through remaining on their sports team through their midshipmen career. This persistence, which resulted in them staying on their sports team, may result in them being more likely to stay in the Naval service beyond their minimum service obligation. Therefore, two additional varsity athlete status variables are created: varsity athletes who lettered and varsity athletes who did not letter. This division of the varsity athlete status will isolate the effects of lettering in a sport and belonging to a sports team and not lettering. Table 6 defines the varsity athlete status variables used in this study and lists the varsity athlete status variables’ descriptive statistics.

Table 6. Varsity Athlete Status Variables

Variable	Definition	Number	Percentage	Expected Sign
Varsity Member	1 = Varsity Sports Team Member	N = 1133	41.4 %	?
Varsity Letter	1 = Varsity Letter Winner	N = 571	20.9 %	+
Varsity Member Non-Letter Winner	1= Varsity Member Non-Letter Winner	N = 562	20.5 %	-

b. Recruit Variables

The recruit variable is the broad category of recruit. The binary coded variable represents all recruited athletes, including blue chip recruits and recruited non-blue chip athletes. The recruit variable is then divided into the specific categories of blue chip and recruited non-blue chips, both of which are binary variables. Naval Academy varsity athletes are comprised of recruited athletes and walk-on athletes. The variable

walk-on athlete is included in this set of variables. A walk-on athlete is defined as any non-recruited athlete who participates on a sports team. Lettering is not a requirement for belonging to this group. It is predicted that being a recruited athlete will have a negative impact of retention. These students' decisions to attend the Naval Academy was influenced by the promise that they would have the opportunity to play Division I sports. It is predicted that they will have less of a propensity than other graduates to remain in the service. It is expected that the walk-on athletes will be more likely to retain, with the walk-on varsity letter winners driving the significance of this variable. The walk-on letter winners will gain the human capital benefits associated with varsity athletics; neither the walk-on letter winners nor walk-on non-letter winners will possess the predicted negative influence of recruit status. Table 7 defines the recruit status variables and lists the recruited athlete status variables' descriptive statistics.

Table 7. Recruited Athlete Status Variables

Variable	Definition	Number	Percentage	Expected Sign
Recruit	1 = Recruited Athlete	N = 593	21.7 %	-
Blue Chip Recruit	1 = Recruited Blue Chip Athlete	N = 469	17.1 %	-
Recruited Non-Blue Chip	1 = Recruited Non-Blue Chip Athlete	N = 124	4.5 %	-
Walk On Varsity Athlete	1 = Walk On Varsity Athlete	N = 659	24.1 %	+

c. Combined Recruit and Athlete Status Variables

Recruit and athlete status variables are analyzed individually, as described in the previous sections, then recruit and athlete status are merged to create combined recruit and athlete status variables. Combining recruit and athlete status shows the interaction of these factors on retention outcomes. The recruit statuses used when creating the combined recruit and athlete status variables include: recruit, including both blue chip recruited athletes and recruited non-blue chip recruited athletes, and walk-ons. The recruit status is then combined with whether or not the athlete earned a varsity letter to create the combined variables. The resulting binary variables show the impact of

being a recruit versus a walk-on athlete, and the effect that lettering has on each of these recruit groups. The combined recruit and athlete status variables include:

- recruited varsity letter winner
- recruited non-varsity letter winner
- walk-on varsity letter winner
- walk-on non-varsity letter winner.

It is hypothesized that the recruit letter winners will graduate at a rate comparable to non-athlete graduates. The negative influence of being a recruit will be counterbalanced by the benefits of varsity athletics. Additionally, it is predicted that recruit non-letter winners will have lower retention rates than other graduates. These individuals possess the negative recruit influence and lack the human capital benefits of varsity athletics. It is expected that walk-on varsity letter winners will be more likely to remain in the Naval service beyond their minimum service obligation. Walk-on letter winners reap the benefits of varsity athletic participation without the negative recruit influence. The walk-on non-letter winners are expected to retain at a rate comparable to non-athletes, as these individuals have neither the negative recruit status influence nor the positive athletic influence. Table 8 defines the combined recruit and athlete status variables and lists the combined recruit and athlete status variables' descriptive statistics.

Table 8. Combined Recruit and Athlete Status Variables

Variable	Definition	Number	Percentage	Expected Sign
Recruit Varsity Letter Winner	1 = Recruited Varsity Letter Winner	N = 294	10.7 %	No impact
Recruit Non-Varsity Letter Winner	1 = Recruited Non-Varsity Letter Winner	N = 299	10.9 %	-
Walk On Varsity Letter Winner	1 = Walk On Varsity Letter Winner	N = 277	10.1 %	+
Walk On Non-Varsity Letter Winner	1 = Walk On Non-Varsity Letter Winner	N = 382	14.0 %	No impact

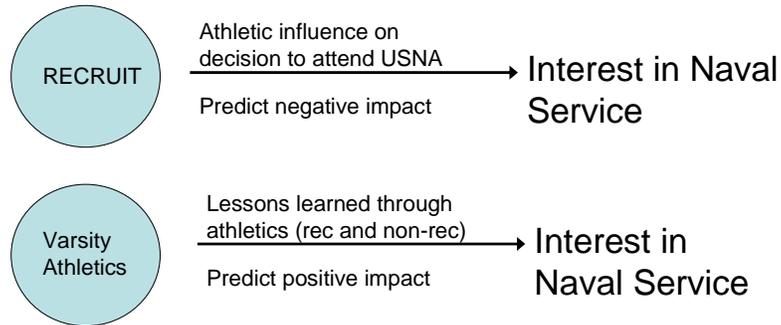
C. MODEL OF REGRESSIONS

The theoretical model driving this study predicts negative retention effects for recruited athletes and positive retention effects for varsity athletes. Several logistic regressions are developed to test the above hypotheses. Figure 5 is a diagram of the theoretical model.

Figure 5. Theoretical Model

Theoretical Model

- 2 forces of influence on retention



The regressions are specified to examine both the independent and interaction effects of recruit status and varsity athletic participation on fleet retention. All of the models control for demographic, USNA background, year group, and service community variables. The control variables are entered into the first three steps of each model. Recruit and athletic participation is entered into the last step of the equation. A total of five hierarchical regressions are modeled. The first regression model only looks at varsity membership; the second model compares letter winners and non-letter winners; the third model looks only at the broad category of recruit; the fourth model looks at recruit status (blue chip and recruit non-blue chip) and walk-on athletes; the fifth model merges recruit and athlete status into interaction variables to examine at the sum effects

of both. These analyses will determine to what extent recruit and varsity athlete status predict retention following the end of one's active duty service obligation.

D. CHAPTER SUMMARY

This chapter provides an overview of the data set and methodology used to determine if recruit and varsity athlete status are, in fact, predictors of fleet retention. Chapter IV will review the results of the logistic hierarchical regressions. Table 9, below, shows the actual retention rates of all the recruit and varsity athlete groups examined in this study. The bold lines in the table separate the recruit and varsity athlete status by the separate regressions. Of note, this table only shows the actual retention rates; whether or not these different statuses are statistically significant after controlling for other factors will be analyzed in the following chapter.

Table 9. Retention by Recruit and Varsity Athlete Status

Recruit and Varsity Athlete Status	Frequency	Number Retained	Percentage
<i>Model 1</i>			
Varsity Member	1133	531	46.9%
<i>Model 2</i>			
Varsity Letter	571	296	51.8%
Varsity Member – No Letter	562	235	41.8%
<i>Model 3</i>			
Recruit	593	268	45.2%
<i>Model 4</i>			
Blue Chip	469	215	45.8%
Recruit Non-Blue Chip	124	53	42.7%
Walk On Varsity Team Member	659	316	48.0%
<i>Model 5</i>			
Recruit Letter Winner	294	143	48.6%
Recruit Non-Letter Winner	299	125	41.8%
Walk On Letter Winner	277	153	55.2%
Walk On Non-Letter Winner	382	163	42.7%
Non-Athletes (Control Group)	1602	773	48.3%
Total Sample	2735	1304	47.7%

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IV. DATA ANALYSIS

A. INTRODUCTION

A series of regressions are conducted to evaluate the impact of recruit status and varsity athletic participation on fleet retention. This chapter is divided into four sections: the first section evaluates the results of the control variables as they are entered into the regression equations; the second section presents results of the regression analyses for two models that examine the effect of varsity athletic status; the third section reviews the regression results of two models that investigate the impact of recruit status; and the fourth section analyzes the regression results of a model that interacts the variables of recruit and varsity athletic status.

B. CONTROL VARIABLES

The first three steps of each regression modeled in this study are identical, as they enter the same demographic, midshipmen performance, and service community control variables. This section reviews the results of entering the control variables into the regression equations. Table 10 presents the results of entering the control variable into the regression.

Table 10. Regression of Demographics, Academic Performance, and Service Community on Retention

Variables	B	P	Odds Ratio	Marginal Effect
<i>Step 1</i>				
<i>Demographic Variables</i>				
Minority	0.171	0.119	1.187	0.0172
Gender	-0.418	0.052	0.658	-0.0764
Military Parent	0.014	0.930	1.014	0.0015
<i>Step 2</i>				
<i>MIDN Performance Variables</i>				
CAQPR	-0.377	0.004	0.686	-0.1279
CMQPR	0.517	0.002	1.676	0.1769
Group II Major	0.144	0.126	1.155	0.0437
Group III Major	-0.132	0.171	0.877	-0.0297
<i>Step 3</i>				
<i>Community and Grad Year Variables</i>				
NFO	-0.134	0.284	0.875	-0.0339
Pilot	-0.672	0.000	0.511	-0.1675
Grad Year 1989	0.274	0.004	1.315	0.0681
Grad Year 1990	0.240	0.014	1.272	0.0601

Note. N = 2735; $\chi^2(3) = 6.273$, $p = 0.099$, $R^2 = .003$ for Step 1; $\chi^2(7) = 25.070$, $p = .001$, $R^2 = .012$ for Step 2; $\chi^2(11) = 90.999$, $p < 0.001$, $R^2 = .044$ for Step 3; Percent correctly classified = 57.0% (62.0% correctly classified retained, 52.6% correctly classified not retained).

The first group of control variables are demographic variables, including minority status, gender, and military parent. None of the variables entered in this step are statistically significant. It is interesting that having a military parent does not increase one's likelihood of retaining; this study predicted that the prior exposure that these individuals had to the military would make them more likely to remain in the service.

The second group of control variables is midshipmen performance variables, including: CAQPR, CMQPR, Group II major, and Group III major. The variable CAQPR is statistically significant (Wald(1) = 8.347, $p = 0.004$) and the variable CMQPR is statistically significant (Wald(1) = 9.404, $p = 0.002$). The impact of these variables may be measured through their odds ratio and marginal effect. The odds ratio reflects the

relative change in the outcome (i.e. retention) as a function of one unit of change in the predictor. The odds ratio of CAQPR of 0.686 indicates that a one point increase in CAQPR reduces the odds of staying beyond the minimum service obligation by 0.686. The marginal effect of CAQPR is -0.1279, indicating that a one point increase in ACQPR equates to a graduate being 12.79% less likely to retain. The odds ratio of CMQPR of 1.676 indicates that a one point increase in CMQPR increases the odds of staying beyond the minimum service obligation by 1.676. The marginal effect of CMQPR is 0.1769, which illustrates that a one point increase in MCQPR results in a graduate being 17.69% more likely to retain. The variables, Group II major and Group III major are not statistically significant.

The third group of variables in the model identifies the warfare community groups and the year group of graduates. The variable NFO includes Navy and Marine Corps NFOs and controls for both belonging to the NFO community and the community's minimum service obligation and resulting retention definition. The variable pilot includes all Navy and Marine Corps pilots and controls for being a pilot, pilots' minimum service obligations, and the retention definition. The variables year group 1989 and year group 1990 control for graduating in the class of 1989 and 1990, respectively. The service community variable NFO is not statistically significant. However, the service community variable pilot is statistically significant ($Wald(1) = 54.805, p < 0.001$). The odds ratio of the pilot variable is 0.511, indicating being a pilot reduces the odds retaining by 0.511. The marginal effect for pilots of -0.1674, illustrates that pilots are 16.74% less likely to retain than non-aviators. The variable year group 1989 is also statistically significant ($Wald(1) = 8.338, p = 0.004$). The odds ratio for year group 1989 is 1.315, indicating that graduating in 1989 increases the odds of retaining by 1.315. The marginal effect of year group 1989 is 0.0681, indicating that graduating in 1989 results in an officer being 6.81% more likely to retain. Additionally, the variable year group 1990 is statistically significant ($Wald(1) = 6.011, p = 0.014$). The odds ratio for year group 1990 is 1.272, indicating that graduating in 1990 increases the odds of retaining beyond the minimum service obligation by 1.272. The marginal effect of graduating in 1990 is 0.0601, which equates to these graduates being 6.01% more likely to retain. The results of this regression show a decrease in the odds of retention for pilots, and an increase in

the odds of retention for individuals who graduated in the years 1989 and 1990. The lower retention rates of pilots is curious, considering that the length of the minimum service obligation for pilots brings them closer to the twenty year retirement point than any other community. However, these lower retention rates are expected due to the lucrative employment opportunities available for pilots in the civilian world. This, in turn, also explains the higher bonuses paid to pilots who choose to remain in the service beyond their minimum service obligation. The fact that NFO is not significant is expected, as the NFO training is not as easily transferable to the civilian workforce.

The following sections review the results of entering the different recruit and varsity athlete statuses into the regression models. All of the regressions enter the control variables in the same order, therefore a detailed discussion of the aforementioned results of the control variables will not be repeated in each section.

C. ANALYSIS OF VARSITY ATHLETIC STATUS

Two logistic regressions are modeled to examine the effect of varsity athletic participation on retention. The first model evaluates the effects of simply belonging to a varsity team, while the second model analyzes the effects of earning a varsity letter versus not earning a varsity letter.

1. Varsity Athletic Membership Model

Varsity athletic membership is defined as any individual who appears on a varsity sports team roster for at least one season while at the Naval Academy. The variable varsity athletic participation is not statistically significant when it is entered into the regression equation, which means that varsity athletic participation has no statistical impact on these graduates' decisions to stay or leave the military service at the end of their minimum service obligation. The predicted retention rates of graduates who are members of a varsity athletic team differs only 0.82% points from non-athletes; 47.21% for members of a varsity athletic team compared to 48.03% for non-athletes

It was expected that graduates who participate in varsity athletics would have retention rates comparable to non-athletes, and that this status would not be significantly related to retention. This broad classification includes both athletes who earn a varsity

letter and those who do not earn a varsity letter. The following section will further examine the impact of varsity athletics on retention by examining letter winners and non-letter winners separately. Table 11 shows the regression results of the model that examined the effects of varsity athletic membership.

Table 11. Regression of Demographics, Academic Performance, Service Community and Varsity Athletic Participation on Retention

Variables	B	P	Odds Ratio	Marginal Effect
Step 1				
Demographic Variables				
Minority	0.081	0.482	1.084	0.0202
Gender	-0.360	0.103	0.698	-0.0898
Military Parent	0.007	0.930	1.007	0.0017
Step 2				
MIDN Performance Variables				
CAQPR	-0.512	0.000	0.599	-0.1277
CMQPR	0.708	0.000	2.031	0.1766
Group II Major	0.175	0.067	1.192	0.0436
Group III Major	-0.119	0.224	0.888	-0.0297
Step 3				
Community and Grad Year Variables				
NFO	-0.136	0.275	0.873	-0.0339
Pilot	-0.671	0.000	0.511	-0.1674
Grad Year 1989	0.273	0.004	1.314	0.0681
Grad Year 1990	0.241	0.014	1.272	0.0601
Step 4				
Varsity Team Member	-0.033	0.682	0.967	-0.0082

Note. N = 2735; $\chi^2(3) = 6.273$, $p = 0.099$, $R^2 = .003$ for Step 1; $\chi^2(7) = 25.070$, $p = .001$, $R^2 = .012$ for Step 2; $\chi^2(11) = 90.999$, $p < 0.001$, $R^2 = .044$ for Step 3; $\chi^2(12) = 91.167$, $p < 0.001$, $R^2 = .044$ for Step 4; Percent correctly classified = 57.0% (61.5% correctly classified retained, 53.8% correctly classified non retained).

2. Varsity Athletic Lettering Model

The second varsity athlete model takes a more focused look at the varsity athlete. Previous studies on the performance of midshipmen, both at the Naval Academy and in the fleet, define varsity athletic participation as lettering in a varsity sport. These studies did not account for the affects of belonging to a varsity team and not lettering. Omitting

varsity athletes who did not letter results in a misspecification, as it excludes half of all graduates who participate in varsity athletics. The two varsity athletic statuses examined in this model are varsity letter winners and varsity team members who are non-letter winners.

Table 12. Regression of Demographics, Academic Performance, Service Community and Varsity Athletic Lettering on Retention

Variables	B	P	Odds Ratio	Marginal Effect
<i>Step 1</i>				
<i>Demographic Variables</i>				
Minority	0.090	0.433	1.094	0.0224
Gender	-0.447	0.046	0.640	-0.1115
Military Parent	0.002	0.981	1.002	0.0005
<i>Step 2</i>				
<i>MIDN Performance Variables</i>				
CAQPR	-0.479	0.000	0.619	-0.1195
CMQPR	0.681	0.000	1.975	0.1699
Group II Major	0.174	0.069	1.190	0.0434
Group III Major	-0.125	0.200	0.882	-0.0312
<i>Step 3</i>				
<i>Community and Grad Year Variables</i>				
NFO	-0.135	0.280	0.874	-0.0337
Pilot	-0.670	0.000	0.512	-0.1671
Grad Year 1989	0.265	0.005	1.304	0.0661
Grad Year 1990	0.231	0.019	1.260	0.0576
<i>Step 4</i>				
Varsity Letter Winner	0.176	0.086	1.192	0.0439
Varsity Member Non-Letter Winner	-0.234	0.021	0.792	-0.0584

Note. N = 2735; $\chi^2(3) = 6.273$, $p = 0.099$, $R^2 = .003$ for Step 1; $\chi^2(7) = 25.070$, $p = .001$, $R^2 = .012$ for Step 2; $\chi^2(11) = 90.999$, $p < 0.001$, $R^2 = .044$ for Step 3; $\chi^2(13) = 102.298$, $p < 0.001$, $R^2 = .049$ for Step 4; Percent correctly classified = 57.8%, (60.6% correctly classified retained, 55.3% correctly classified non retained).

The second varsity athlete model enters the variables varsity letter winner and varsity member non-letter winner in the fourth step. In this model, the variable gender is statistically significant (Wald(1) = 3.994, $p=0.046$). The odds ratio of gender is 0.640,

indicating that being female decreases the odds of retaining by 0.640. The marginal effect of gender is -0.1115, indicating that female graduates are 11.15% less likely to retain than male graduates. Gender is not statistically significant in the first model; however, the results of this model indicate that gender is statistically related to retention. Of note, gender is only significant in regressions in which the independent variable identifies whether or not the varsity athlete lettered in his or her sport.

The variable varsity letter winner is not statistically significant. The variable varsity member non-letter winner is, however, statistically significant (Wald(1) = 5.335, $p = 0.021$). The odds ratio of varsity member non-letter winner of 0.792 indicates that participating in a sport and not earning a varsity letter decreases the odds of retaining by 0.792. The marginal effect of varsity member non-letter winner is -0.0584, which equates to these graduates being 5.84% less likely to retain.

The predicted retention rates of graduates who letter in a varsity sport is 4.39% higher than non-athletes; 52.42% for letter winners compared to 48.03% for non-athletes. However, lettering in a varsity sport is not a significant variable in the regression analysis. On the other hand, athletes who participate in a varsity sport and do not letter had predicted retention rates that were 5.79% lower than non-athletes, 42.24% compared to 48.03%. Additionally, belonging to a varsity athletic team and not lettering is statistically significant in the regression model and a negative predictor of retention. The marginal effect of varsity member non-letter winners shows that these individuals are 5.84% less likely to remain in the service beyond their minimum service obligation.

The results of this model differ from those drawn in other recent studies on the retention of varsity athletes due to the specification of lettering winning status. Previous research led to the hypothesis that lettering in a varsity sport would be a predictor of retention. While the predicted retention rates of letter winners are higher than non-athletes, this status cannot be classified as a predictor of retention. Previous studies did not address the performance and retention of non-letter winners. This study shows that the retention trends of varsity athletes who did not letter differ from those who did letter. As hypothesized, participation in varsity athletics without lettering is a negative predictor of retention beyond one's minimum service obligation.

D. ANALYSIS OF RECRUIT STATUS

Two hierarchical logistic regressions are modeled to examine the effect of recruited athlete status on retention. The first three steps of both models are identical to the varsity athlete models, as they enter demographic, midshipmen performance, and service community control variables. Minority status, gender, and military parent status are entered in the first step of the regressions. The second step of the logistic regressions enters the variables CAQPR, CMQPR, Group II major, and Group III major. The service community control variables NFO and pilot, and year groups 1989 and 1990 are entered in the third step. The results of entering the control variables are identical to the previous models: CAQPR and pilot community are significant and negatively related to retention; CMQPR and year groups 1989 and 1990 are significant and positively related to retention. The fourth step of the recruit models enters the athletes' recruit status. The first model looks at the broad category of recruit; the second model examines the more specific statuses of blue chip recruited athlete, recruited non-blue chip athlete, and walk-on varsity athlete.

1. Recruit Model

The variable recruit is entered into the fourth step of the first model. The variable recruit is not statistically significant. Graduates who were recruited athletes have a predicted retention rate of 44.86% compared to 48.39% for non-recruits. The predicted retention rates of graduates who were recruited to play varsity sports is lower than non-recruits. However, the results of this regression prove that the broad category of recruited athlete status alone is not significantly related to retention. The regression results are shown in table 13.

It was expected that recruit status is negatively related to retention. The regression results discount this theory. The following section will explore the impact of recruit status by separating the recruits into blue chip recruits and non-blue chip recruits and analyze the effects of belonging to these specific recruit categories.

Table 13. Regression of Demographics, Academic Performance, Service Community and Recruit Status on Retention

Variables	B	P	Odds Ratio	Marginal Effect
<i>Step 1</i>				
<i>Demographic Variables</i>				
Minority	0.057	0.625	1.058	0.0142
Gender	-0.361	0.100	0.697	-0.0900
Military Parent	0.001	0.992	0.999	-0.0002
<i>Step 2</i>				
<i>MIDN Performance Variables</i>				
CAQPR	-0.536	0.000	0.585	-0.1337
CMQPR	0.715	0.000	2.045	0.1783
Group II Major	0.183	0.056	1.201	0.0456
Group III Major	-0.107	0.274	0.899	-0.0267
<i>Step 3</i>				
<i>Community and Grad Year Variables</i>				
NFO	-0.133	0.287	0.876	-0.0332
Pilot	-0.674	0.000	0.510	-0.1681
Grad Year 1989	0.276	0.004	1.318	0.0688
Grad Year 1990	0.243	0.013	1.274	0.0606
<i>Step 4</i>				
Recruit	-0.142	0.146	0.867	-0.0354

Note. N = 2735; $\chi^2(3) = 6.273$, $p = 0.099$, $R^2 = .003$ for Step 1; $\chi^2(7) = 25.070$, $p = .001$, $R^2 = .012$ for Step 2; $\chi^2(11) = 90.999$, $p < 0.001$, $R^2 = .044$ for Step 3; $\chi^2(12) = 93.120$, $p < 0.001$, $R^2 = .044$ for Step 4; Percent correctly classified = 56.7%, (60.9% correctly classified retained, 52.8% correctly classified non retained).

2. Recruit Status Model

The second recruited athlete model separates the recruits into blue chip recruits and recruited non-blue chip athletes. The variable walk-on varsity athlete is also included in this model. Walk-on varsity athlete is defined as any non-recruited midshipman who walks onto a sports team and appears on a varsity roster for at least one season.

Table 14. Regression of Demographics, Academic Performance, Service Community and Specific Recruited Athlete Status on Retention

Variables	B	P	Odds Ratio	Marginal Effect
<i>Step 1</i>				
<i>Demographic Variables</i>				
Minority	0.062	0.592	1.064	0.0155
Gender	-0.356	0.107	0.700	-0.0888
Military Parent	-0.001	0.989	0.999	-0.0002
<i>Step 2</i>				
<i>MIDN Performance Variables</i>				
CAQPR	-0.532	0.000	0.587	-0.1327
CMQPR	0.720	0.000	2.054	0.1797
Group II Major	0.180	0.061	1.197	0.0449
Group III Major	-0.109	0.266	0.897	-0.0272
<i>Step 3</i>				
<i>Community and Grad Year Variables</i>				
NFO	-0.132	0.291	0.876	-0.0329
Pilot	-0.674	0.000	0.510	-0.1681
Grad Year 1989	0.278	0.003	1.320	0.0693
Grad Year 1990	0.243	0.013	1.274	0.0606
<i>Step 4</i>				
Blue Chip	-0.114	0.311	0.892	-0.0284
Recruit Non-Blue Chip	-0.252	0.191	0.777	-0.0629
Walk On Varsity Team Member	-0.006	0.949	0.994	-0.0015

Note. N = 2735; $\chi^2(3) = 6.273$, $p = 0.099$, $R^2 = .003$ for Step 1; $\chi^2(7) = 25.070$, $p = .001$, $R^2 = .012$ for Step 2; $\chi^2(11) = 90.999$, $p < 0.001$, $R^2 = .044$ for Step 3; $\chi^2(14) = 93.564$, $p < 0.001$, $R^2 = .045$ for Step 4; Percent correctly classified = 56.9%, (61.0% correctly classified retained, 53.0% correctly classified non retained).

As shown in Table 14, even after breaking up recruit status into three categories, the estimated impact of the recruit classifications does not differ significantly from the non-varsity athlete. Neither of the recruit classifications, blue chip and recruit non-blue chip, are statistically significant. The predicted retention rate of blue chips is 45.67% and the predicted rate of recruit non-blue chips is 42.27%, compared to 48.39% for non-recruits. While the predicted retention rates are below the retention rates of the non-

recruits, the regression results do not provide the statistical significance necessary to conclude that these classifications of recruits are significantly related to retention. Additionally, walk-on varsity athlete is not statistically significant and these graduates retain at a rate comparable to non-athletes. The predicted retention rate of walk-on varsity athletes is 48.36% compared to 48.03% for non-athletes.

The results of this regression are contrary to the retention trends that were hypothesized. It was expected that recruit status, to include blue chip and recruit non-blue chip, would be negatively related to retention. It was also expected that being a walk-on varsity team member would be positively related to retention. The following section will further examine the effects of varsity athlete status and recruit status on retention, along with investigating the interaction of these variables.

E. ANALYSIS OF COMBINED RECRUIT AND VARSITY ATHLETE STATUS

After developing models to examine the isolated effects of varsity athlete and recruited athlete status, a hierarchical logistic regression is designed to analyze the combined effects of these forces on retention of Naval Academy graduates. The first three steps of this model are identical to the varsity athlete and recruit models, as they enter demographic, midshipmen performance, and service community control variables. Minority status, gender, and military parent status are entered in the first step of the regressions. The second step of the logistic regressions enters the variables CAQPR, CMQPR, Group II major, and Group III major. The service community control variables NFO and pilot, and year group 1989 and year group 1990 are entered into third step. The results of entering the control variables are identical to the previous models: CAQPR and pilot are significant negative predictors of retention; CMQPR, year group 1989, and year group 1990 are significant positive predictors of retention. The fourth step of the combined recruit and varsity athlete status model enters four variables, created to look at the total effect of both recruit and varsity athlete status on graduates. The combined variables are: recruited athlete who lettered in a varsity sport, recruited athlete who did not letter in a varsity sport, walk-on varsity athlete who lettered in a varsity sport, and walk-on varsity athlete who did not letter in varsity sport.

Table 15. Regression of Demographics, Academic Performance, Service Community and Combined Recruit and Varsity Athletic Status on Retention

Variables	B	P	Odds Ratio	Marginal Effect
<i>Step 1</i>				
<i>Demographic Variables</i>				
Minority	0.055	0.636	1.057	0.0137
Gender	-0.467	0.037	0.627	-0.1165
Military Parent	-0.008	0.914	0.992	0.0020
<i>Step 2</i>				
<i>MIDN Performance Variables</i>				
CAQPR	-0.507	0.000	0.603	-0.1265
CMQPR	0.686	0.000	1.985	0.1711
Group II Major	0.188	0.050	1.207	0.0469
Group II Major	-0.108	0.271	0.898	-0.0269
<i>Step 3</i>				
<i>Community and Grad Year Variables</i>				
NFO	-0.126	0.314	0.882	-0.0314
Pilot	-0.675	0.000	0.509	-0.1684
Grad Year 1989	0.270	0.005	1.310	0.0673
Grad Year 1990	0.235	0.017	1.265	0.0586
<i>Step 4</i>				
Recruit Letter Winner	0.023	0.863	1.023	0.0057
Recruit Non-Letter Winner	-0.298	0.024	0.742	-0.0743
Walk On Letter Winner	0.295	0.031	1.343	0.0736
Walk On Non-Letter Winner	-0.214	0.070	0.807	-0.0534

Note. N = 2725; $\chi^2(3) = 6.273$, $p = 0.099$, $R^2 = .003$ for Step 1; $\chi^2(7) = 25.070$, $p = .001$, $R^2 = .012$ for Step 2; $\chi^2(11) = 90.999$, $p < 0.001$, $R^2 = .044$ for Step 3; $\chi^2(15) = 106.394$, $p < 0.001$, $R^2 = .051$ for Step 4; Percent correctly classified = 57.8%, (60.7% correctly classified retained, 55.2% correctly classified non retained).

The variable recruited letter winner is not statistically significant. The variable recruited non-letter winner, however, is statistically significant (Wald(1) = 5.074, $p = 0.024$). The odds ratio of recruited non-letter winner of 0.742 indicates that being a graduate who was recruited and did not earn a varsity letter decreases the odds of

retaining by 0.742. The marginal effect of recruited non-letter winner is -0.0743, which equates to these graduates being 7.43% less likely to retain. The variable walk-on letter winner is also statistically significant (Wald(1) = 4.673, $p = 0.031$). The odds ratio of walk-on letter winner of 1.343 indicates that walking onto a varsity sports team and earning a varsity letter increases the odds of retaining by 1.343. The marginal effect of recruited walk-on letter winner is 0.0736, which equates to these graduates being 7.36% more likely to retain. The variable walk-on non-letter winner is not statistically significant.

The results of the combined recruit and athlete status regression present the total effects of both forces on retention. The recruited athlete who letters in a varsity sport has a predicted retention rate comparable to non-athletes, 49.03% versus 48.03%. This status is not significantly related to retention. The recruited athlete who does not letter in a varsity sport has a predicted rate substantially lower than non-athletes, 41.10% versus 48.03%, and this status is significantly related to negative retention. The walk-on varsity letter winners have a predicted retention rate significantly higher than non-athletes, 55.80% versus 48.03%, and this status is significantly related to retention beyond the minimum service obligation. Finally, the walk-on non-letter winner has a predicted retention rate lower than non-athletes, 43.14% versus 48.03%, but this status is not significantly related to retention. Table 15 outlines the regression results of the combined recruit and athlete status variables.

F. CHAPTER SUMMARY

This study is based on a theoretical model which investigates two forces of influence on retention: recruited athlete status and varsity athlete status. The theoretical model predicted that being a recruited athlete would have a negative influence on retaining beyond one's minimum service obligation, and that participation in varsity athletics would be a positive influence on retaining beyond one's minimum service obligation. To examine their total effects, regression models were developed to look at each of these forces first individually and then combined.

Recruit status and varsity athlete status are not individually related to of retention, neither are the more specific groupings of blue chip, recruited non-blue chip, and status of walk-on varsity team member. In an individual analysis of varsity sport variables, neither being a member of varsity team nor lettering on a varsity team are predictors of retention. However, belonging to a varsity team and not lettering is a negative predictor of retention. From this assertion, one may draw the conclusion that participation in varsity athletics without the success achieved through lettering negatively impacts retention. Also, the human capital benefits gained through varsity athletic participation only apply to letter winners, with a converse effect occurring in instances of non-letter winners.

Recruit status and varsity athlete status have separate and unique impacts on retention, but it is *the interaction between these variables this is most important*. Combining recruit and varsity athletic status into a series of variables that evaluate the effects of both forces is the ultimate test of the theoretical model steering this study. Recruited athletes consist of letter winners and non-letter winners; letter winners are comprised of recruited athletes and walk-on athletes. Examining each status individually, as previous studies have done, overlooks the convergence of these two forces.

Combining recruit and varsity athlete status indicates that recruited athletes who lettered retain at a rate comparable to non-athletes. This result is in accordance with the theoretical model, which predicts the negative influence of recruit status and the positive influence of varsity athletic participation. Recruited athletes who achieve athletic success through lettering have their predetermined negative recruit status counterbalanced by the positive human capital benefits of varsity athletic participation.

The recruited athlete who does not letter in a sport faces the negative retention force of recruit status, and does not receive the positive retention force of the human capital benefits associated with varsity athletics. The result of the interaction of these two forces is a lower retention rate for graduates belonging to this category. The regression results confirm this hypothesis, as being a recruited athlete who does not letter in a varsity sport makes one less likely to stay in the military beyond one's minimum service obligation.

The walk-on varsity athlete who does letter in a varsity sport achieves the human capital benefits associated with varsity athletics and in turn, remains unaffected by the negative influence of recruit status. The result of this combination, is graduates who retain at a higher rate. As the regression results proved, this status is a positively related to retention.

The walk-on varsity athlete who does not letter, similar to the recruited athlete who does not letter, does not receive the human capital benefits associated with participating in varsity athletics. Unlike the recruited non-letter winner, however, the walk-on non-letter winner does not have the negative influence of recruit status. The end result is an athlete who retains at a rate above that of the recruited non-letter winner, but below the retention rate of non-athletes. This status is not significantly related to retention. Table 16 shows the summary of the regression results for all recruit and varsity athlete statuses. The bold lines on the table separate the different regressions. The variables that are in bold are those that are statistically significant.

Table 16. Summary of Recruit and Varsity Athlete Status Variables Regression Results

Variable	B	P	Odds Ratio	Marginal Effect
Varsity Member	-0.033	0.682	0.967	-0.0082
Varsity Letter	0.176	0.086	1.192	0.0439
Varsity Member – No Letter	-0.234	0.021	0.792	-0.0584
Recruit	-0.142	0.146	0.867	-0.0354
Blue Chip	-0.114	0.311	0.892	-0.0284
Recruit Non-Blue Chip	-0.252	0.191	0.777	-0.0629
Walk On Varsity Team Member	-0.006	0.949	0.994	-0.0015
Recruit Letter Winner	0.023	0.863	1.023	0.0057
Recruit Non-Letter Winner	-0.298	0.024	0.742	-0.0743
Walk On Letter Winner	0.295	0.031	1.343	0.0736
Walk On Non-Letter Winner	-0.214	0.070	0.807	-0.0534

Range of percent correctly classified: 56.7% to 57.8%

V. CONCLUSIONS AND RECOMMENDATIONS

This study examines retention beyond minimum service obligation of USNA graduates who were recruited and participated in varsity athletics. It highlights the import of retention and investigates whether or not the Naval Academy's practice of actively recruiting varsity athletes supports or counters the institutional goal of producing career oriented officers. Previous research notes that recruited athletes graduate a higher rate than non-recruits and that varsity athletes graduate at rate comparable to non-athletes. This research also indicates that recruited athletes and varsity athletes perform better in the fleet, as evidenced through their promotion rates to LCDR. However, the preexisting literature regarding the performance of recruits and varsity athletes did not address their fleet retention.

A thorough literature review led to a theoretical model investigating two forces of influence on retention: recruited athlete status and varsity athlete status. It is predicted that recruit status would be a negative influence on retaining beyond one's minimum service obligation and that varsity athletic participation would be a positive influence on retaining beyond one's minimum service obligation. This chapter summarizes this study's findings, make policy recommendations, and makes recommendations for future research.

A. CONCLUSIONS

The findings of this study are consistent with the theoretical model which predicted the negative influence of recruit status and the positive influence of varsity athletic participation on retention beyond USNA graduates' minimum service obligation. To reach this conclusion a series of regressions were modeled; the initial regressions examined the individual impact of recruit status and varsity athlete status and the final regression examined the interaction of these two forces.

Initial regression runs found that recruit status is not significantly related to retention and that participation in varsity athletics without lettering is significantly related to lower retention. The fact that participation without lettering results in lower retention

rates indicates that the human capital benefits attributed to varsity athletic participation only applies to athletes who letter in their sport. Therefore, it is also not surprising that recruit status by itself is not significantly related to retention, as recruits are composed of both letter winners and non-letter winners.

Recruit status and varsity athlete status do have unique impacts on retention, but this can only be seen through the interaction of these variables. Hence, a regression is modeled to examine the combined effects of these forces on retention. The resulting variables are: recruit letter winner, recruit non-letter winner, walk-on letter winner, and walk-on non-letter winner. A summary of the results of combined recruit and athlete status effects on retention is shown in Table 17.

Table 17. Recruit and Varsity Athlete Status Variables Regression Results

Variable	B	P	Odds Ratio	Marginal Effect
Recruit Letter Winner	0.023	0.863	1.023	0.0057
Recruit Non-Letter Winner	-0.298	0.024	0.742	-0.0743
Walk On Letter Winner	0.295	0.031	1.343	0.0736
Walk On Non-Letter Winner	-0.214	0.070	0.807	-0.0534

Range of percent correctly classified: 56.7% to 57.8%

The regression results show that recruit status negatively influences retention and that sustained varsity athletic participation positively influences retention. Recruited letter winners retain at a rate comparable to non-athletes, while the negative retention force of recruit status and the positive retention force of varsity athletic participation counterbalance each other. Recruited non-letter winners possess the negative recruit force and do not acquire the human capital benefits achieved through sustained athletic participation. Therefore, recruited non-letter winners retain at a lower rate than non-athletes.

The walk-on varsity athlete who letters in his or her sport is the true beneficiary of the human capital benefits attributed to varsity athletic participation. These individuals receive the positive retention force of varsity athletic participation without the negative retention force of recruit status. The walk-on varsity athlete who does not letter receives neither the negative recruit retention force nor the positive varsity athlete retention force and consequently, retains at a rate comparable to non-athletes.

B. POLICY RECOMMENDATIONS

This study was designed to evaluate whether or not the Naval Academy's practice of actively recruiting varsity athletes supports or counters the institutional goal of producing career oriented officers. The Naval Academy's policy does not counter this goal, as recruited athletes retain at a rate that is slightly below (3.1%), but comparable to non-athletes. However, Naval Academy leaders and policy setters must be aware that recruit status may have a negative influence on fleet retention. The effects of this negative force are counterbalanced by the positive influence of sustained varsity athletic participation, should the recruit have the tenacity to letter in his or her sport. Additionally, the results of this study reaffirm established beliefs regarding the benefits of athletic participation. The life lessons of leadership and teamwork learned on the athletic are applicable to military service. Recruited athletes and walk-on athletes both benefit from varsity athletic participation, but the walk-on athlete is the true beneficiary. While it is necessary to recruit varsity athletes in order for the Naval Academy to remain competitive on the Division I playing field, athletic teams comprised of more walk-on athletes would result in higher fleet retention rates.

C. RECOMMENDATIONS FOR FUTURE RESEARCH

Recent studies evaluating the performance of midshipmen who participated in varsity athletics have all defined such participation as lettering in a varsity sport. These studies, however, have excluded those midshipmen who did not letter in their sport. Just as there was a disparity between the retention rates of varsity athletes who lettered versus those who did not letter, it is suggested one should investigate if a similar trend is found in the academic and military performances of letter winners versus non-letter winners.

Broadening the scope of this study to include restricted line officers and women would prove both interesting and beneficial. Examining unrestricted line graduates from 1988-1990 limited the female representation to only 3.5% of the sample size in this study.

This topic should be addressed to assess whether or not club sport participants acquire similar human capital benefits to walk-on varsity athletes. Neither club sport athletes nor walk-on varsity athletes possess the negative retention influence of recruit status.

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