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THESIS

**THE IMPACT OF PRIOR SERVICE ON PERFORMANCE
AS MIDSHIPMEN AT THE UNITED STATES NAVAL ACADEMY**

by

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**THE IMPACT OF PRIOR SERVICE ON PERFORMANCE AS MIDSHIPMEN
AT THE UNITED STATES NAVAL ACADEMY**

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ABSTRACT

The purpose of this research is to examine the relationship between prior-enlisted service and academic and military performance at the United States Naval Academy (USNA). Two prior Naval Postgraduate School theses have explored different aspects of poor performance at USNA, with mixed results. One study suggests prior-enlisted Midshipmen perform higher, and one suggests they represent a statistically significant contribution to the bottom 10 percent of graduating classes. The primary hypothesis used for this research is that prior enlistment develops time management and other skills that assist the Midshipmen in overcoming the academic and military hardships at USNA, allowing them to excel more than direct-entry Midshipmen. Through models and analysis, the research attempts to identify whether this hypothesis is accurate, using admissions and performance data from Midshipmen graduating between the years 2013 and 2019. The results indicate prior-enlisted Midshipmen from Nuclear Power School have superior performance early in their time in USNA, but tend to perform similarly to direct-entry students overall, while other prior-enlisted Midshipmen perform worse than other demographics during all four years at USNA, demonstrated by their respective Orders of Merit in all categories over each of the four years. This study summarizes results and makes recommendations for future work.

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LIST OF ACRONYMS AND ABBREVIATIONS

AOM	Academic Order of Merit
DE	direct-entry MIDN
DENAPS	direct-entry MIDN who attended NAPS before USNA
MIDN	Midshipman/Midshipmen
MOM	Military Order of Merit
NAPS	Naval Academy Preparatory School
OOM	Overall Order of Merit
PSDIR	direct-entry Prior Enlisted MIDN
PSNAPS	Prior Enlisted MIDN who attended NAPS before USNA
PSNUKE	Prior Enlisted MIDN who attended Nuclear Power School
ROTC	Reserve Officer Training Corps
SECNAV	Secretary of the Navy
USNA	United States Naval Academy

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I. INTRODUCTION

A. BACKGROUND

Over 6 percent of the class of 2025 Midshipmen (MIDN) at the United States Naval Academy (USNA) is made up of MIDN who have served as enlisted members of the United States Military (USNA, 2023). These prior enlisted applicants undergo a different nomination and application process than direct-entry applicants, with lower standards for nomination than direct-entry students. It is unclear whether and how these modified standards, coupled with the amount of time prior enlisted applicants have been removed from academic environments impact the overall performance of Prior Enlisted MIDN at USNA. The experiences of their Military service could impact their performances in ways that need to be determined. Exposure to military culture before college education, including Reserve Officer Training Corps (ROTC), military high schools, or family relationships within the service may provide a depth of knowledge that benefits MIDN in their time at USNA.

This research evaluates the possible impact that a military background, specifically prior enlisted service, has on MIDN performance at USNA. Since Prior Enlisted MIDN are typically older, more experienced, and provide valuable diversification of thought, they have higher expectations set on them when reporting to USNA. The focus of this study is to determine if their enlisted experience aids them in meeting this expectation and compare their academic, military, and overall performance to their direct-entry counterparts.

This research also evaluates the possible impact of attendance at the Naval Academy Preparatory School (NAPS) or a foundation program school before attending USNA. NAPS and foundation program schools allow MIDN to attend one year of preparatory school before USNA, to better set them up to succeed in the difficult academic and military environment presented by USNA. Since these students are given one year to acclimate to higher education and, in most cases, a regimented environment, it is possible that it will have an impact on their military, academic, and overall performance at USNA.

Past research has analyzed this topic, with mixed results. Wyrick's (2005) research focused on the same topic from the years 1999–2004. Wyrick performed his research as a continuation of Keith Minshoe's (2000) research, where he evaluated the retention of Officers at their ten-year point and compared the differences between those who were prior enlisted to direct-entry officers. In Wyrick's (2005) research, performance at USNA was analyzed, yielding results that indicated the prior enlisted population outperforms their direct-entry counterparts in academic and military performance. Minshoe (2000) found that Prior Enlisted MIDN were a significant contribution to the bottom 10 percent of graduating classes.

B. AREAS OF RESEARCH

1. Military Performance

Since Prior Enlisted MIDN have spent time in the fleet or Nuclear Power School, they have developed military related skills that can help their military performance at USNA, measured by their Military Order of Merit (MOM). MOM is calculated using aptitude, conduct, honor, and physical performance during each semester as a MIDN at USNA and shares metrics with the calculation of Overall Order of Merit (OOM). Contributing factors to MOM include physical education grades, athletic performance, aptitude performance, conduct performance, and grades in professional courses. Contributing factors to OOM include academic and professional course performance, physical education grades, athletic performance, aptitude performance and conduct performance. The skills that Prior Enlisted MIDN receive, and the maturity they may possess being older than their direct-entry counterparts, may afford them the opportunity to adapt to the stresses of USNA more easily, and the overall regimented lifestyle. This research attempts to isolate the MOM of prior enlisted and direct-entry MIDN over all four years at USNA to determine the difference between each demographic as their time at USNA progresses. It is expected that their military performance will see a prominently higher outcome during their plebe year, since it is the initial adjustment to life at USNA, and potentially higher performance overall.

2. Academic Performance

Most Prior Enlisted MIDN at USNA have not participated in academia in several years prior to their appointment to USNA. While some are appointed directly out of Naval Nuclear Power School, a majority are appointed from the fleet directly and attend NAPS prior to USNA. Based on their departure from academia, it is possible that their abilities in the classroom have diminished during their time performing specific jobs related to their rating and could have a negative impact on their academic performance at USNA. Those who are appointed from Nuclear Power School, while involved in classroom learning, are taught very specific and technical topics, which may not directly translate to undergraduate studies. Based on the potential that NAPS must aid in their performance, Prior Enlisted MIDN who attended NAPS will also be compared to those who were direct entry from the fleet to determine if there is a correlation between those demographics and their academic performance. Academic performance is measured via the Academic Order of Merit (AOM), which is calculated using only academic performance, which is a metric used to calculate OOM.

3. Attrition

It is possible that the different demographics analyzed in this research are separated from USNA at different rates. MIDN can be separated for a variety of reasons, outlined in Wyrick's (2005) research, including the following:

- Voluntary resignation during Plebe Summer due to motivation
- Voluntary resignation during Plebe Summer due to personal reasons
- Voluntary resignation during academic year due to motivation
- Voluntary resignation during academic year due to personal
- Conduct resignation
- Honor resignation
- Academic discharge
- Aptitude discharge
- Physical Education discharge
- Medical discharge
- Deceased
- Accident occurring

Since Prior Enlisted MIDN have the guarantee that they can return to the fleet as an enlisted sailor if they separate from USNA, this could possibly lead to the demographic having a higher attrition rate. Direct-entry students may leave USNA with no financial or service obligations if done so before the beginning of their third year at USNA. After their third academic year begins, these MIDN can only depart if they recoup a set monetary cost for their education or elect to serve as enlisted for a pre-set number of years. It is expected that the attrition rate for direct-entry students will be higher in their first two years at USNA, since they will have no repayment obligation.

C. SCOPE

The research conducted includes data collected on the academic, military, and overall performance of MIDN between the years 2013–2019. The data collected differentiates prior enlisted students and direct-entry students, including whether they attended NAPS. There are 8310 total MIDN in the data set, 1581 of whom attended NAPS prior to USNA. Foundation program school attendees were included with NAPS students since they received a previous preparatory school experience like NAPS. 7875 are direct-entry students, and 1695 of them attended NAPS or a foundation program school prior to USNA. 355 of them have prior enlisted service. 56 of the Prior Enlisted MIDN were appointed directly to USNA, 219 of the Prior Enlisted MIDN attended NAPS prior to USNA, and 80 attended Nuclear Power School prior to USNA.

D. RESEARCH QUESTIONS

1. How do MIDN with prior enlisted service perform at USNA compared to direct-entry MIDN? The main hypothesis of this research is that the military background provided during enlisted service provides skills that make Prior Enlisted MIDN more successful at USNA than their direct-entry counterparts during all four years at USNA.
2. Does the difference in performance change as MIDN progress through the Naval Academy? This question explores whether the Prior Enlisted MIDN and direct-entry MIDN have the same disparity in academic and military performance in each of their four years at USNA. The hypothesis is that

Prior Enlisted MIDN will have higher military performance during all four years, but the difference will become smaller over time as the direct-entry students gain more experience.

3. Do Prior Enlisted MIDN separate at a higher rate than direct-entry MIDN? This question explores whether Prior Enlisted MIDN are more likely to separate from USNA. The hypothesis is that their time spent away from an academic environment will make them less likely to succeed academically, leading them to separate at a higher rate. It is expected that the attrition rate will be lower for 2/C year, since financial or service recoupment is required at that point for direct-entry MIDN.
4. Does NAPS lead to higher performance in either group of MIDN? This question explores the benefit of attending NAPS or a foundation program school prior to USNA. The hypothesis is that NAPS will not produce better results in either demographic. Since MIDN who attend NAPS are typically applicants with lower high school grade point averages, SAT or ACT scores, less extra-curricular activity performance, lower interview performance or some combination of these factors than those selected to attend USNA directly, their performance at USNA is believed to be lower.

E. ORGANIZATION

This research is divided into four remaining chapters. Chapter II includes a literature review, related to the performance of different demographics at USNA, and civilian universities. It discusses admissions requirements at USNA, and Naval instruction dictating requirements for prior enlisted applicants to USNA. This chapter provides a background on prior research used to formulate the hypothesis and basis for this research. Chapter III of this research describes the methodology for data collection and analysis. This chapter provides a description of the model created to analyze the data. Chapter IV of this research outlines the results of the data analysis. Chapter V of this research includes an interpretation of the results, and recommendations for future research to build upon this research.

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II. LITERATURE REVIEW

A. INTRODUCTION

This research focuses on the difference in academic and military performance of prior enlisted Midshipmen and direct-entry Midshipmen at USNA. This chapter outlines previous research conducted in examining performance at USNA, and factors that contribute to performance disparities between college students who began directly after high school and those who joined the workforce prior to beginning college.

Historically, there have been multiple instances of research to determine the difference in performance at the college level between direct-entry college students and those who were employed prior to attending college. One such research was conducted in 1984 by Leppel. *The Academic Performance of Returning and Continuing College Students* (Leppel, 1984) analyzes data taken from a survey conducted in 1981 at the University of North Carolina, which contained responses from 296 students. Leppel's intent was to analyze the difference in academic performance between returning college students and continuing college students. Leppel's hypothesis is that returning college students tend to perform more highly than continuing college students as they are "self-selected" (Leppel, 1984) and are more motivated to excel in college. Secondly, returning college students are more likely to understand the importance and benefits of having completed college than continuing students. Finally, returning college students have "real world experience" (Leppel, 1984) which has allowed them to develop skills which will aid in their studies. Leppel created a model to determine the amount of study time per course using the total number of courses students were enrolled in, their gender, marital status and income. Leppel calculated predicted grade point averages using study time per course, SAT scores, gender, marital status, and attitude. Leppel concludes that returning college students are more likely to perform better academically than continuing college students, determines which factors are more statistically significant in predicting the outcomes, and makes several arguments for the bases of these results. Leppel argues the number of courses in which students are enrolled, household income, marital status, and gender were the most statistically significant factors in predicting performance. Since this research was

conducted prior to considerable technological advancements and availability, these arguments must be considered in a more modern context.

A more recent piece written specifically about performance at USNA from 2005 discusses Leppel's article and contributing factors to MIDN performance. From *A Model Midshipman: Factors Related to Academic and Military Success of Prior Enlisted Midshipmen at the United States Naval Academy*:

Analyzes performance at USNA and attrition of MIDN who have prior enlisted experience in the Navy and Marine Corps. Results show that while prior enlisted arrive at USNA with lower academic standings in high school and lower SAT scores when compared to direct-entry MIDN, they still perform at a higher level than direct-entry MIDN in the areas of academic and military rankings when compared to a direct-entry MIDN with similar academic backgrounds. (Wyrick, 2005)

Wyrick's piece does not analyze the impact of NAPS, nor does it analyze the trend of performance over each year spent as a MIDN.

B. ADMISSIONS

Eligibility and admissions requirements for USNA can be found on the admissions website. Minimum requirements to apply include being at least 17 years of age, a United States citizen, unmarried, and having a valid social security number, and must be at least a senior in high school. Applicants are required to receive a nomination from one of the following sources:

- United States Senator
- United States Congressman
- Presidential
- ROTC/JROTC Unit Nomination
- Vice Presidential

Additionally, children of deceased or disabled veterans, children of, prisoners of war or servicemen missing in action, and children of Medal of Honor Awardees are eligible for automatic nominations (USNA, 2023).

In addition to these nomination sources, prior enlisted applicants may receive a nomination from the Secretary of the Navy (SECNAV). Annually, prior enlisted applicants for appointment to USNA compete for a total of 170 nominations to USNA provided by the Secretary of the Navy. The minimum requirements for a SECNAV nomination are “a SAT score of 550 math and 500 critical reading/verbal, or ACT scores of 24 math and 22 English” (Office of the Chief of Naval Operations, 2009). This score is considered below the minimum requirement and non-competitive for appointment to USNA, but often leads to appointment to the NAPS.

The believed reduced standards for admissions for prior enlisted applicants has been discussed in different lights. Specifically, *The Academy Can Do Better* was written by an English Professor at USNA who once sat as a voting member on the admissions board. Fleming (2005) argues that only half of those who receive appointments to USNA are based on their academic merit, and the other half are of “set asides” (Fleming, 2005), who do not meet the published minimum criteria for appointment to USNA. Professor Fleming (2005) considers Prior Enlisted Service Members as one of the three “set asides.”

C. ATTRITION

Past research has indicated some factors leading to attrition, and trends that have been seen in the past. In *Characteristics and Trends of Attrition from the United States Naval Academy*, Bishop (2006) analyzes the factors contributing to and rates of separation at USNA. Specifically, Bishop (2006) determines the common attributes that make MIDN more likely to separate from USNA during their time as MIDN. The research concluded that multiple PRT failures, females, and minorities are most likely to separate. Prior enlisted status correlated to higher attrition rates.

D. PERFORMANCE

In 2017 research by Imlach et al., *Age is no barrier: Predictors of Academic Success in Older Learners*, the argument that younger populations tend to learn better than older students was challenged. The study focuses on cognitive, psychosocial, and genetic factors to determine if older populations were negatively impacted as they age in an academic environment. Two multiple linear regression models were utilized to test the hypothesis, it was determined that age and associated factors were not negatively correlated to academic performance in a college setting. The models also produced results linking the experience gained as you age to higher academic performance. While the focus of the older population in this study were those 50–79 years of age, it does support the notion that life experience may have a positive impact on academic performance of college students. (Imlach et al., 2017)

Predicting MIDN's Outcomes at the United States Naval Academy (Jamison, 2021) analyzes the overall performance of all MIDN and USNA with the intention of predicting their outcomes based on a series of factors including demographic data, high school performance data, fitness data, and military background (to include prior enlisted service). Jamison's (2021) linear regression model was able to accurately predict the outcomes of the top 10% of the graduating class at a rate of 71.4%, and the bottom 10% at a rate of 66.7%. Although the intent is not to analyze the performance of prior-enlisted at USNA, the analysis shows that being prior enlisted was a statistically significant factor in predicting the bottom 10% of the graduating class.

III. DATA AND ANALYSIS

A. DATA COLLECTION

The data collection is performed through the USNA Admissions system, which includes students who initially applied to USNA but were redirected to attend NAPS as a preparatory year. At the end of the preparatory year, they must reapply to USNA for admission. Upon matriculation, basic data is transferred from the Admissions and the NAPS systems to the USNA student information system. For this analysis, the following fields are initially populated when the student is inducted into USNA: class year, unique identifier, and feeder source. Nuclear Power students are identified as candidates for USNA based on their aptitude as displayed in Nuclear Power School, but they have no Fleet experience beyond basic training and their nuclear power training and thus were measured with non-NAPS prior enlisted peers. The remaining data elements are populated from the grades system at the end of each semester for academic, military, and overall orders of merit. Each of the order or merit fields is calculated based on various relevant measurements throughout the four years.

B. METHODOLOGY

Following the data collection process described in Chapter 1 of this research, the Spring semester end of the academic year OOM/AOM/MOMs for each MIDN was analyzed. By taking the individual Merit number divided by the number of students in the class (at that time), a percentile ranking for each student's three grades was developed. After creating percentile categories, the MIDN performances were categorized into five different categories: Direct-entry (DE), direct-entry who attended NAPS (DENAPS), direct-entry prior enlisted (PSDIR), prior enlisted from NAPS (PSNAPS), and Nuclear Power School accessions (PSNUKE).

From there, the five subcategories were measured over each of the four academic years. Qualitative data representations were used to create histograms to outline the performance of each category and compare their performances using 20 histograms. This

representation would allow for identification of patterns, symmetry or even multimodalities we expected in our hypotheses.

The X-axis was made up of ten percentile bins (99th-90th, 89th-80th, etc.) with a bar for each of the three Merits. By creating ten bins, one for each 10 percent of the class, we assessed what percent of each subcategory fell into each percentile. The Y-axis showed frequency of each occurrence. By plotting all three Orders of Merit alongside each other, one would be able to see if the rankings all followed the same statistical model for each accession program.

Since this was a measurement of percentile rankings, the data group should, by definition, have an equalized distribution with approximately ten percent in each of the bins. If one of the groups (“Prior, Direct entry,” for example) was over-represented in one of the bins, it would then be easily identifiable.

IV. RESULTS

A. PLEBE YEAR

The average AOM/MOM/OOM percentiles for each of the six categories are shown in Table 1.

Table 1. Orders of Merit percentiles Plebe year

	AOM	MOM	OOM	Number of observations
DE 4/C	0.566	0.561	0.560	6180
DENAPS 4/C	0.288	0.324	0.285	1695
PSDIR 4/C	0.534	0.589	0.534	56
PSNAPS 4/C	0.436	0.426	0.421	219
PSNUKE 4/C	0.651	0.519	0.621	80

Based on the results in Table 1, it is evident that between the class of 2013 through the class of 2019, the highest overall performance during Plebe year was from PSNUKE, and the lowest performing was DENAPS. DENAPS received the lowest average scores in all three Orders of Merit. PSNAPS also were below average in all three orders of Merit during Plebe year.

The most frequently occurring percentiles are displayed in Table 2 for each category.

Table 2. Most frequently occurring percentiles along Orders of Merit Plebe year

	AOM	Proportion (%)	MOM	Proportion (%)	OOM	Proportion (%)
DE 4/C	Top 10%	13.56	Top 10%	13.67	Top 10%	12.78
DENAPS 4/C	Bottom 10%	23.60	Bottom 10%	22.71	Bottom 10%	24.60
PSDIR 4/C	31st-40th	17.86	11th-20th	16.07	31st-40th	16.07
PSNAPS 4/C	71st-80th	12.79	71st-80th	14.16	71st-80th	15.53
PSNUKE 4/C	11th-20th	20.00	11-20th	13.75	31st-40th	22.50

Table 2 demonstrates that DENAPS were a significant contributor to the bottom 10% of the class during Plebe year in all three Orders of Merit.

The next set of figures illustrate the distribution of performance by group. A graphical representation of DENAPS 4/C performance distribution in each Order of Merit category can be found on Figure 1. 81% of DENAPS were in the bottom 50 percentile for OOM, 81% were in the bottom 50 percentile for AOM, and 75.81% were in the top 50 percentile for MOM.

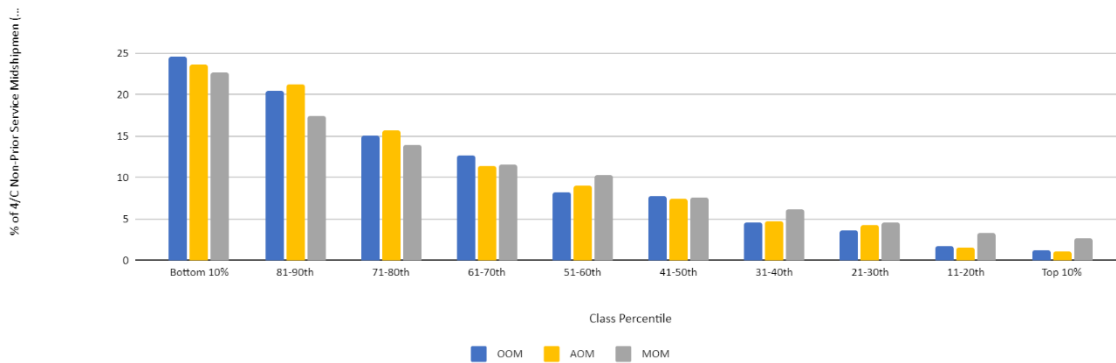


Figure 1. DENAPS Order of Merit histogram Plebe year

In contrast to Figure 1, DE were a significant contributor to the top 10% in all three Orders of Merit during Plebe year. A graphical representation of DE 4/C performance distribution in each Order of Merit category can be found on Figure 2. 58.75% of DE were in the top 50 percentile for OOM, 59.77% were in the top 50 percentile for AOM, and 59.03% were in the top 50 percentile for MOM.

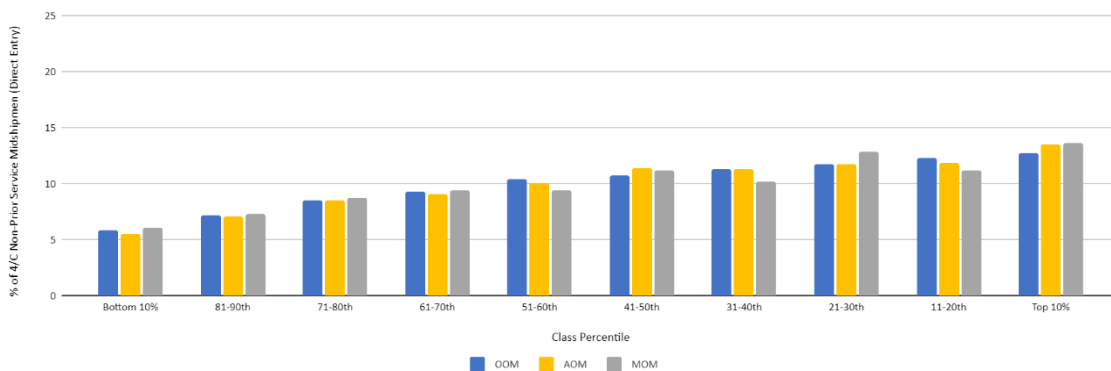


Figure 2. DE Order of Merit histogram Plebe year

A graphical representation of PSDIR 4/C performance distribution in each Order of Merit category can be found in Figure 3. PSDIR saw the most significant portion in the 31–40 percentile of AOM, 11–20 percentile of MOM, and 31–40 percentile of OOM.

53.57% of this category was in the top 50 percentile for OOM, 57.14% were in the top 50 percentile for AOM, and 66.07% were in the top 50 percentile for MOM.

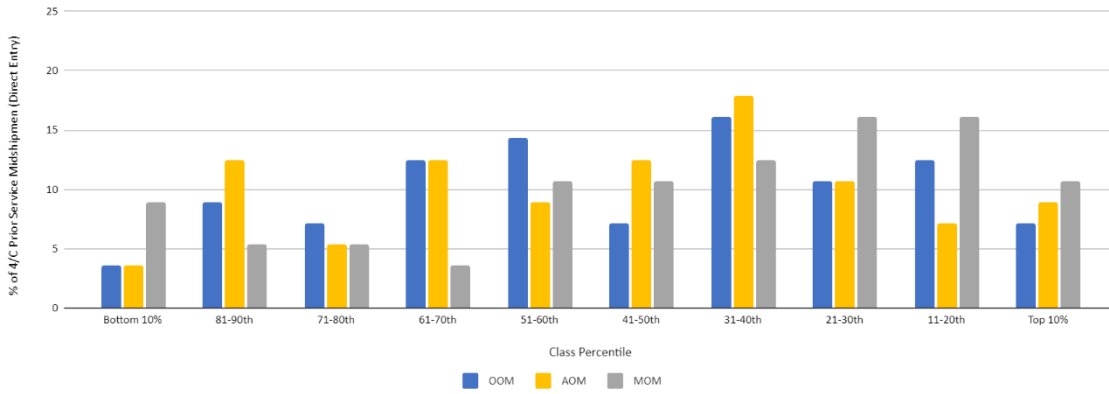


Figure 3. PSDIR Order of Merit histogram Plebe year

A graphical representation of PSNAPS 4/C performance distribution in each Order of Merit category can be found in Figure 4. PSNAPS saw the most significant portion in the 71–80 percentile in AOM, 71–80 percentile for MOM, and 71–80 percentile for OOM. 61.19% of this category were in the bottom 50 percentile in OOM, 58.90% were in the bottom 50 percentile in AOM, and 58.45% were in the bottom 50 percentile in MOM.

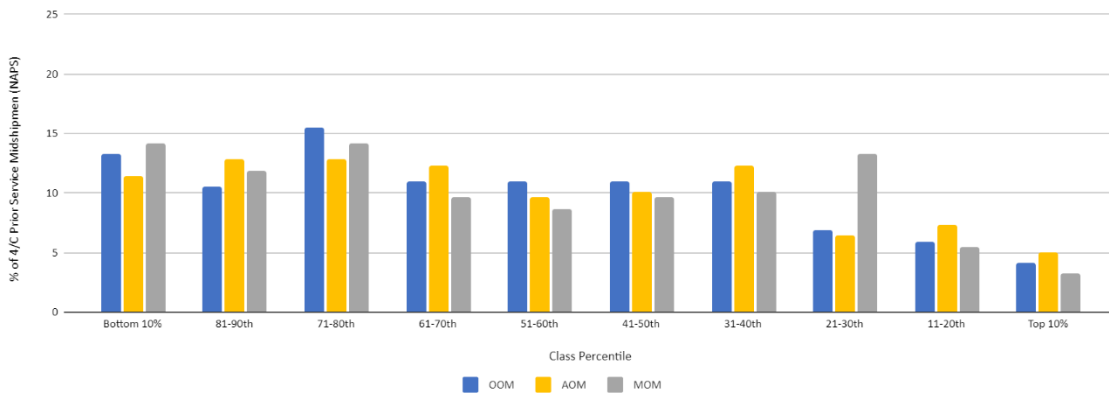


Figure 4. PSNAPS Order of Merit histogram Plebe year

A graphical representation of PSNUKE 4/C performance distribution in each Order of Merit category can be found in Figure 5. PSNUKE saw the most significant portion in the 11–20 percentile of AOM, 11–20 percentile in MOM, and 31–40 percentile on OOM. 71.25% of this category were in the top 50 percentile of OOM, 70.0% were in the top 50 percentile in AOM, and 52.50% were in the top 50 percentile of MOM.

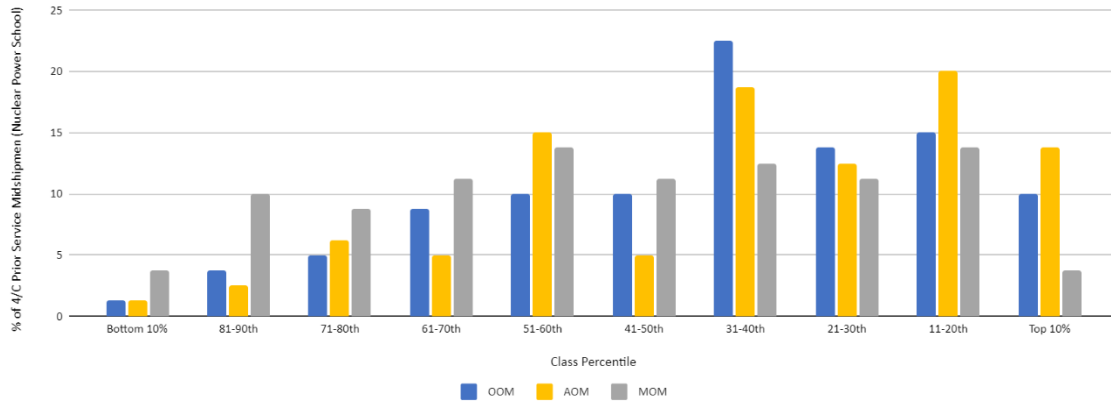


Figure 5. PSNUKE Order of Merit histogram Plebe year

During Plebe year, 176 out of 6180 DE were separated from USNA, 90 out of 1695 DENAPS were separated, one out of 56 PSDIR were separated, 14 out of 219 PSNAPS were separated, and two out of 80 PSNUKE were separated.

B. 3/C YEAR

The average AOM/MOM/OOM percentiles for each of the six categories for 3/C year are shown in Table 3.

Table 3. Orders of Merit percentiles 3/C year

	AOM	MOM	OOM	Number of observations
DE 3/C	0.566	0.560	0.563	6004
DENAPS 3/C	0.273	0.307	0.272	1605
PSDIR 3/C	0.497	0.555	0.502	55
PSNAPS 3/C	0.407	0.383	0.390	205
PSNUKE 3/C	0.602	0.462	0.571	78

Based on the results in Table 3, it is evident that between the class of 2013 through the class of 2019, the highest overall performance during 3/C year was from PSNUKE, and the lowest performing was DENAPS. DENAPS received the lowest average scores in all three Orders of Merit. PSNAPS also were below average in all three orders of Merit during 3/C year.

The most frequently occurring percentiles are displayed in Table 4 for each category.

Table 4. Most frequently occurring percentiles along Orders of Merit 3/C year

	AOM	Proportion (%)	MOM	Proportion (%)	OOM	Proportion (%)
DE 3/C	Top 10%	12.84	Top 10%	13.11	Top 10%	13.23
DENAPS 3/C	Bottom 10%	23.73	Bottom 10%	23.86	Bottom 10%	26.79
PS 3/C	71st-80th	16.36	21st-30th	18.18	51st-60th	14.55
PSNAPS 3/C	61st-70th	14.15	Bottom 10%	16.59	71st-80th	14.63
PSNUKE 3/C	21st-30th	16.67	51st-60th	15.38	31st-40th	21.79

Table 4 demonstrates that DENAPS were a significant contributor to the bottom 10% of the class after 3/C year in all three Orders of Merit. A graphical representation of DENAPS 3/C performance distribution in each Order of Merit category can be found in Figure 6. 82.99% of DENAPS were in the bottom 50 percentile in OOM, 82.43% were in the bottom 50 percentile of AOM, and 78.01% in MOM. This is a lower performance than Plebe year, indicating that this category performed worse during their 3/C year than their Plebe year.

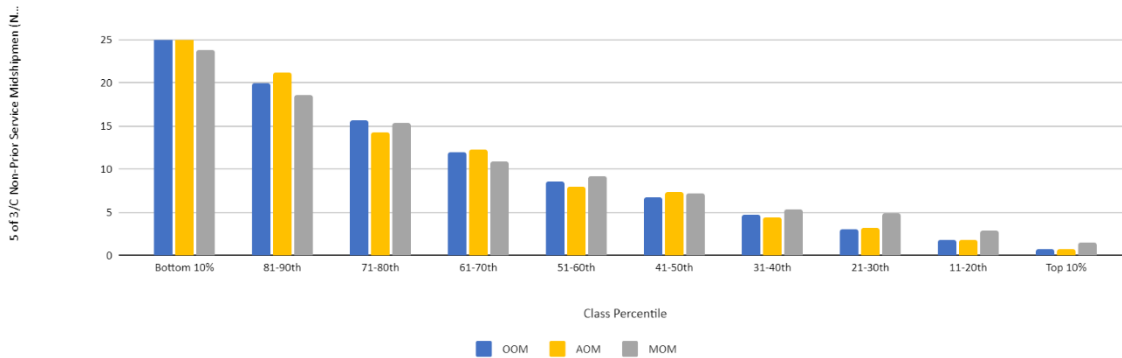


Figure 6. DENAPS Order of Merit histogram 3/C year

A graphical representation of DE 3/C performance distribution in each Order of Merit category can be found in Figure 7. DE were a significant contributor to the top 10% in all three Orders of Merit during Plebe year. 59.32% of DE were in the top 50 percentile for OOM, 59.45% were in the top 50 percentile for AOM, and 58.80% were in the top 50 percentile for MOM. This is very similar to performance during Plebe year.

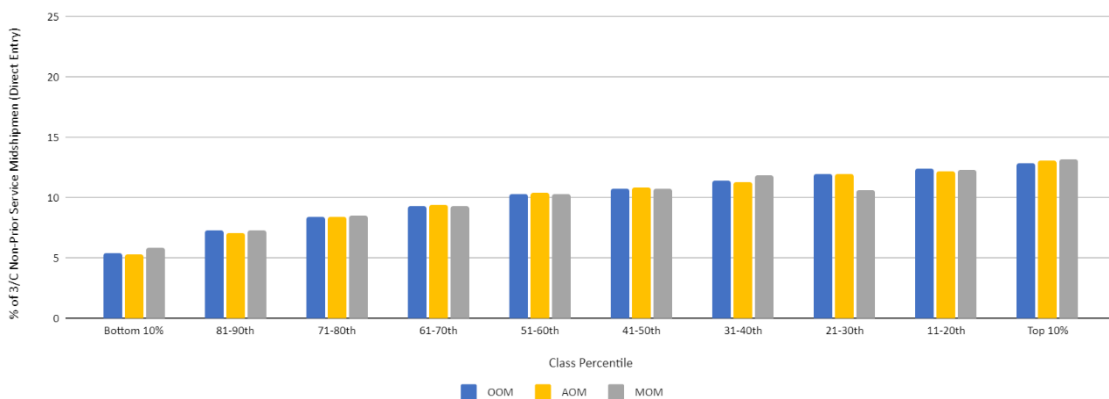


Figure 7. DE Order of Merit histogram 3/C year

A graphical representation of PSDIR 3/C performance distribution in each Order of Merit category can be found in Figure 8. PSDIR saw the most significant portion in the 71–80 percentile of AOM, 21–30 percentile of MOM, and 51–60 percentile of OOM. 52.73% of this category was in the bottom 50 percentile for OOM, 52.73% were in the

bottom 50 percentile for AOM, and 58.18% were in the top 50 percentile for MOM. This category saw a 6.3% increase in MIDN in the bottom 50 percentile in OOM, and 9.87% increase in MIDN in the bottom 50 percentile in AOM.

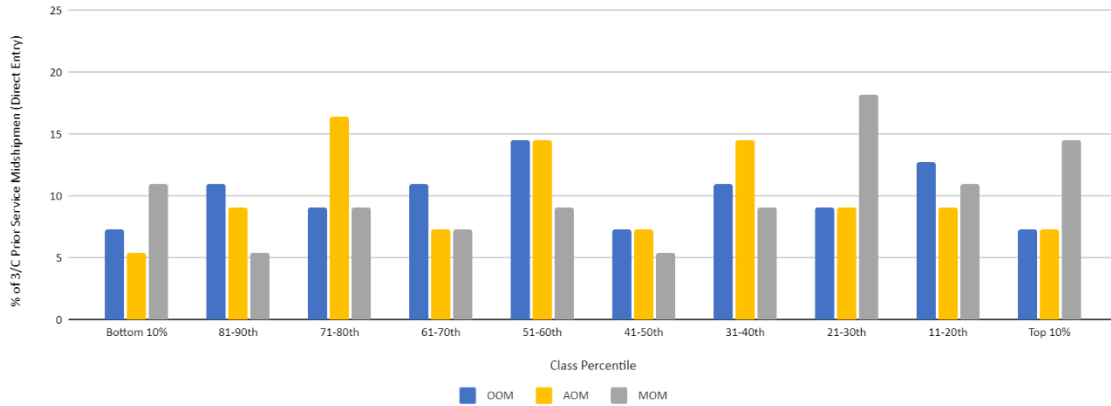


Figure 8. PSDIR Order of Merit histogram 3/C year

A graphical representation of PSNAPS 3/C performance distribution in each Order of Merit category can be found in Figure 9. PSNAPS saw the most significant portion in the 71–80 percentile in OOM, 61–70 percentile for AOM, and bottom 10 percentile for MOM. 66.34% of this category were in the bottom 50 percentile in OOM, 65.37% were in the bottom 50 percentile in AOM, and 66.83% were in the bottom 50 percentile in MOM. This category saw a significant drop in each Order of Merit following their 3/C year compared to their Plebe year.

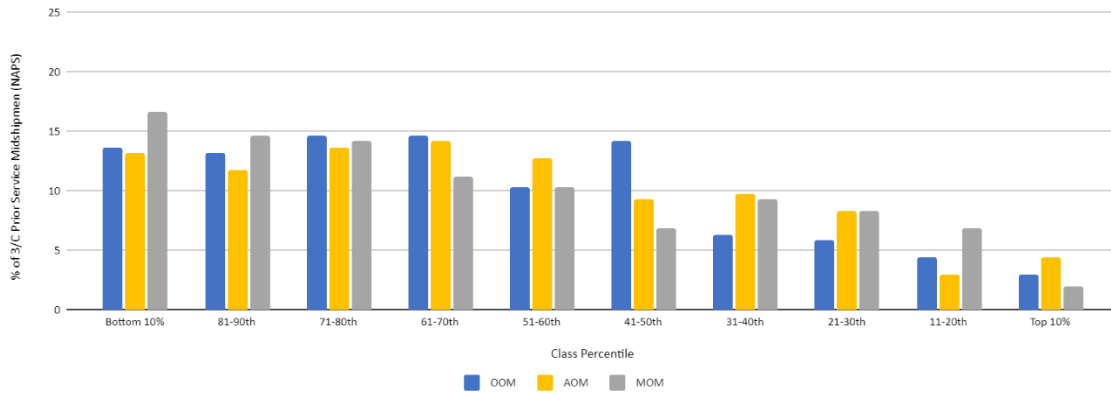


Figure 9. PSNAPS Order of Merit histogram 3/C year

A graphical representation of PSNUKE 3/C performance distribution in each Order of Merit category can be found in Figure 10. PSNUKE saw the most significant portion in the 21–30 percentile of AOM, 51–60 percentile in MOM, and 31–40 percentile on OOM. 62.82% of this category were in the top 50 percentile of OOM, 66.67% were in the top 50 percentile in AOM, and 57.69% were in the bottom 50 percentile of MOM. This category saw a significant decrease in performance in their 3/C year compared to their Plebe year.

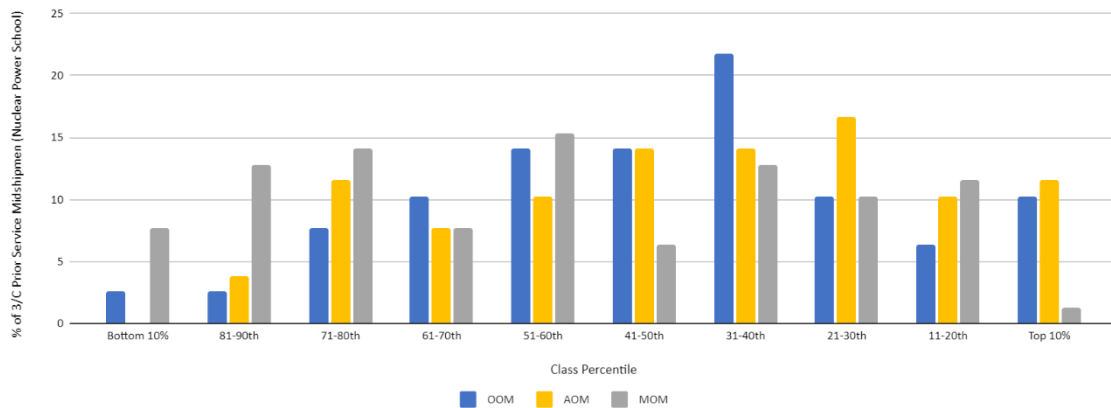


Figure 10. PSNUKE Order of Merit histogram 3/C year

During 3/C year, 192 out of 6004 remaining DE Were separated from USNA, 77 out of 1605 DENAPS were separated, four out of 55 remaining PSDIR were separated, 15 out of 205 PSNAPS were separated, and two out of 78 PSNUKE were separated.

C. 2/C YEAR

The average AOM/MOM/OOM percentiles for each of the six categories for 2/C year are shown in Table 5.

Table 5. Orders of Merit percentiles 2/C year

	AOM	MOM	OOM	Number of observations
DE 2/C	0.567	0.562	0.578	5812
DENAPS 2/C	0.267	0.298	0.288	1528
PSDIR 2/C	0.491	0.563	0.513	51
PSNAPS 2/C	0.387	0.372	0.395	205
PSNUKE 2/C	0.574	0.439	0.556	78

Based on the results in Table 5, it is evident that between the class of 2013 through the class of 2019, the highest overall performance after 2/C year shifted from PSNUKE to DE, and the lowest performing was DENAPS. DENAPS received the lowest average scores in all three Orders of Merit. PSNAPS also were below average in all three Orders of Merit during 2/C year.

The most frequently occurring percentiles are displayed in Table 6 for each category.

Table 6. Most frequently occurring percentiles along Orders of Merit 2/C year

	AOM	Proportion (%)	MOM	Proportion (%)	OOM	Proportion (%)
DE 2/C	Top 10%	12.98	Top 10%	13.22	Top 10%	13.22
DENAPS 2/C	Bottom 10%	28.23	Bottom 10%	23.62	81st-90th	23.71
PSDIR 2/C	71st-80th	21.57	31st-40th	21.57	51st-60th	17.65
PSNAPS 2/C	61st-70th	14.74	81st-90th	17.89	71st-80th	17.89
PSNUKE 2/C	21st-30th	18.42	71st-80th	14.47	31st-40th	17.11

Table 6 demonstrates that DENAPS were a significant contributor to the bottom 10% of the class after 2/C year in all AOM and MOM with the most significant contribution to OOM in the 81–90 percentiles. A graphical representation of DENAPS 2/C performance distribution in each Order of Merit category can be found in Figure 11. 82.32% of DENAPS prior to USNA were in the bottom 50 percentile in OOM, 82.24% were in the bottom 50 percentile of AOM, and 78.72% in MOM. This is a lower performance than 3/C year, indicating that this category performed worse during their 2/C year than 3/C year, and continued lower performance over time at USNA.

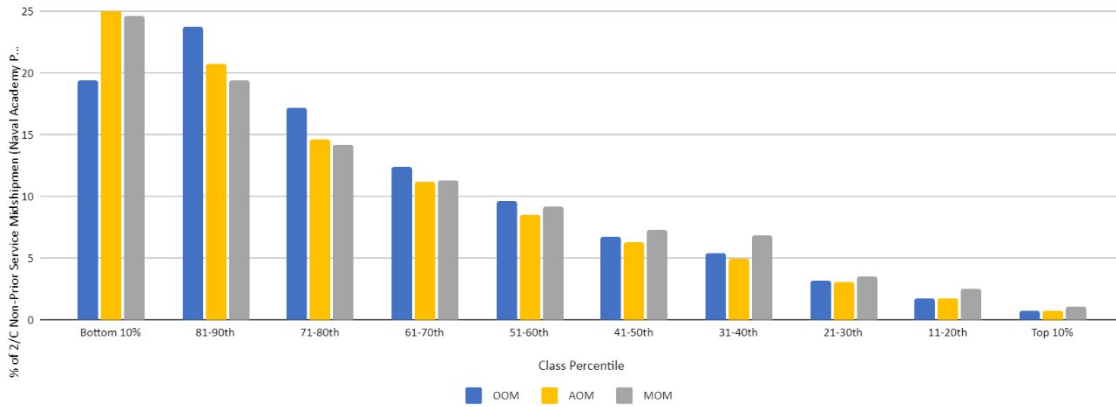


Figure 11. DENAPS Order of Merit histogram 2/C year

A graphical representation of DE 2/C performance distribution in each Order of Merit category can be found in Figure 12. DE were a significant contributor to the top 10% in all three Orders of Merit during 2/C year. 51.26% of DE were in the top 50 percentile for OOM, 59.49% were in the top 50 percentile for AOM, and 58.91% were in the top 50 percentile for MOM. This is a slightly higher performance than the prior 3/C year.

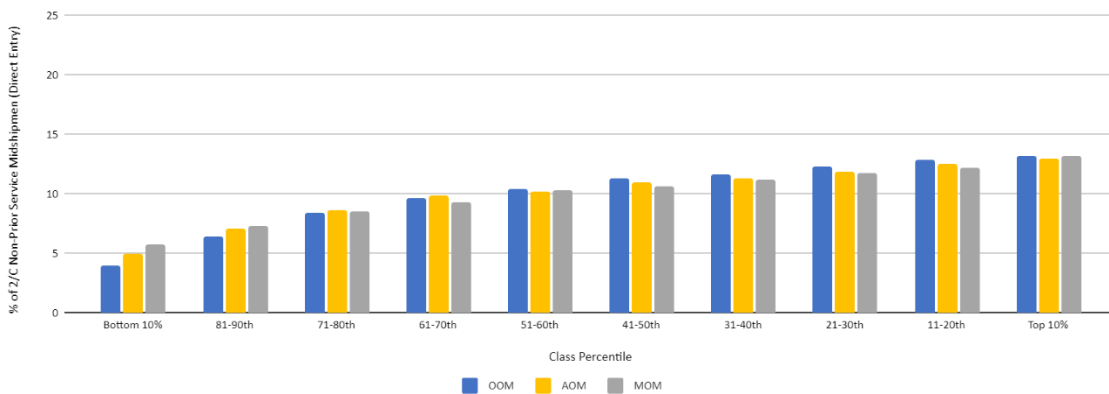


Figure 12. DE Order of Merit histogram 2/C year

A graphical representation of PSDIR 2/C performance distribution in each Order of Merit category can be found in Figure 13. PSDIR saw the most significant portion in the 71–80 percentile of AOM, 31–40 percentile of MOM, and 51–60 percentile of OOM.

50.98% of this category was in the bottom 50 percentile for OOM, 50.98% were in the bottom 50 percentile for AOM, and 62.75% were in the top 50 percentile for MOM. This category saw a significant improvement in performance in all three Orders of Merit following 2/C year than following 3/C year.

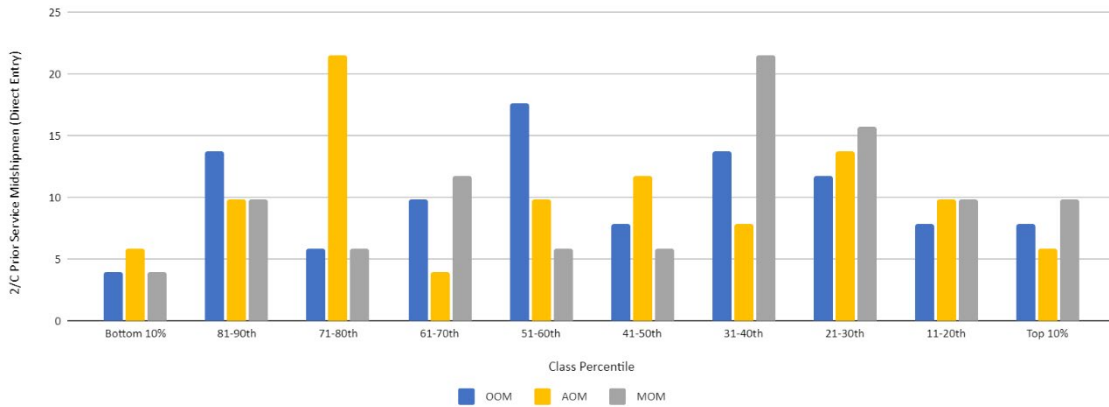


Figure 13. PSDIR Order of Merit histogram 2/C year

A graphical representation of PSNAPS 2/C performance distribution in each Order of Merit category can be found in Figure 14. PSNAPS saw the most significant portion in the 61–70 percentile in AOM, 71–80 percentile for OOM, and 81–90 percentile for MOM. 68.42% of this category were in the bottom 50 percentile in OOM, 66.84% were in the bottom 50 percentile in AOM, and 69.47% were in the bottom 50 percentile in MOM. This category saw a significant drop in all three Orders of Merit following their 2/C year compared to their 3/C year.

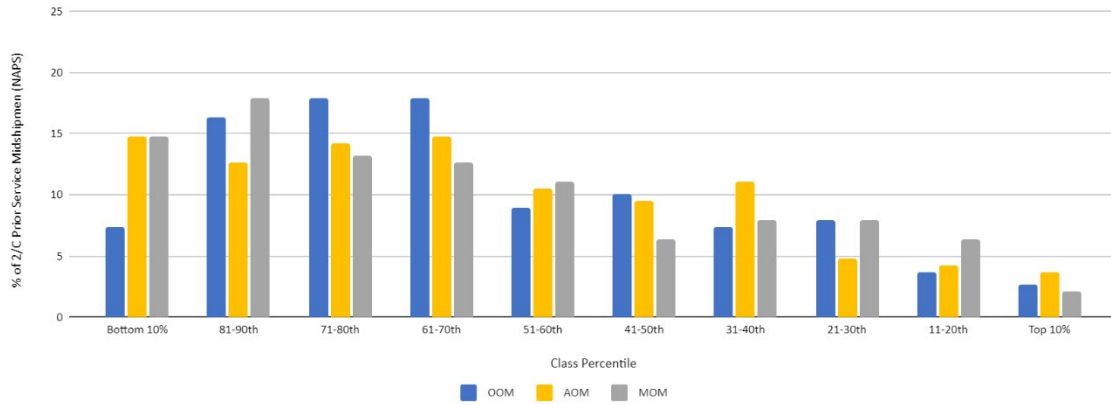


Figure 14. PSNAPS Order of Merit histogram 2/C year

A graphical representation of PSNUKE 2/C performance distribution in each Order of Merit category can be found in Figure 15. PSNUKE saw the most significant portion in the 21–30 percentile of AOM, 71–80 percentile in MOM, and 31–40 percentile on OOM. 62.82% of this category were in the top 50 percentile of OOM, 66.67% were in the top 50 percentile in AOM, and 57.69% were in the bottom 50 percentile of MOM. This category saw a significant decrease in performance in their 3/C year compared to their Plebe year.

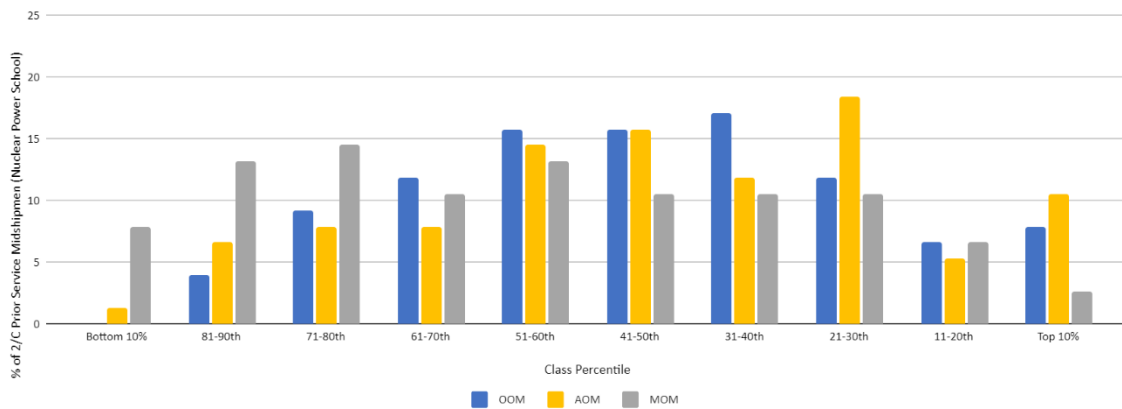


Figure 15. PSNUKE Order of Merit histogram 2/C year

During 2/C year, 63 out of 5812 remaining DE were separated from USNA, 52 out of 1528 DENAPS were separated, one out of 51 remaining PSDIR were separated, seven out of 205 PSNAPS were separated, and zero out of 78 PSNUKE were separated.

D. 1/C YEAR

The average AOM/MOM/OOM percentiles for each of the six categories for 1/C year are shown in Table 7.

Table 7. Orders of Merit percentiles 1/C year

	AOM	MOM	OOM	Number of observations
DE 1/C	0.575	0.561	0.572	5812
DENAPS 1/C	0.279	0.302	0.278	1528
PSDIR 1/C	0.493	0.556	0.498	51
PSNAPS 1/C	0.395	0.375	0.389	205
PSNUKE 1/C	0.554	0.427	0.517	78

Based on the results in Table 7, it is evident that between the class of 2013 through the class of 2019, the highest overall performance after 1/C year was from DE, and the lowest performing was DENAPS. DENAPS received the lowest average scores in all three Orders of Merit. PSNAPS also were below average in all three orders of Merit during 1/C year.

The most frequently occurring percentiles are displayed in Table 8 for each category.

Table 8. Most frequently occurring percentiles along Orders of Merit 1/C year

	AOM	Proportion (%)	MOM	Proportion (%)	OOM	Proportion (%)
DE 1/C	Top 10%	13.15	Top 10%	13.34	Top 10%	12.99
DENAPS 1/C	Bottom 10%	24.39	Bottom 10%	23.71	Bottom 10%	24.32
PSDIR 1/C	71st-80th	16.00	31st-40th	16.00	61st-70th	16.00
PSNAPS 1/C	71st-80th	15.85	81st-90th	19.67	71st-80th	17.49
PSNUKE 1/C	31st-40th	17.11	71st-80th	15.79	31st-40th	14.47

Table 8 demonstrates that DENAPS were a significant contributor to the bottom 10% of the class after 1/C year in all three Orders of Merit. A graphical representation of DENAPS 1/C performance distribution in each Order of Merit category can be found in Figure 16. 82.66% of DENAPS were in the bottom 50 percentile in OOM, 82.25% were in the bottom 50 percentile of AOM, and 78.05% in MOM. This is a similar performance following 1/C year.

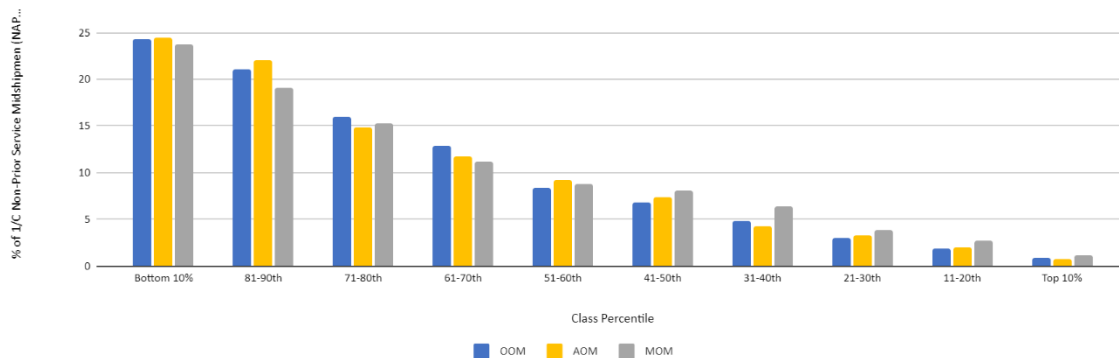


Figure 16. DENAPS Order of Merit histogram 1/C year

A graphical representation of DE 1/C performance distribution in each Order of Merit category can be found in Figure 17. DE were a significant contributor to the top 10% in all three Orders of Merit during 1/C year. 60.53% of DE were in the top 50 percentile for OOM, 60.67% were in the top 50 percentile for AOM, and 58.74% were in the top 50 percentile for MOM. This is a slightly higher performance than following 2/C year.

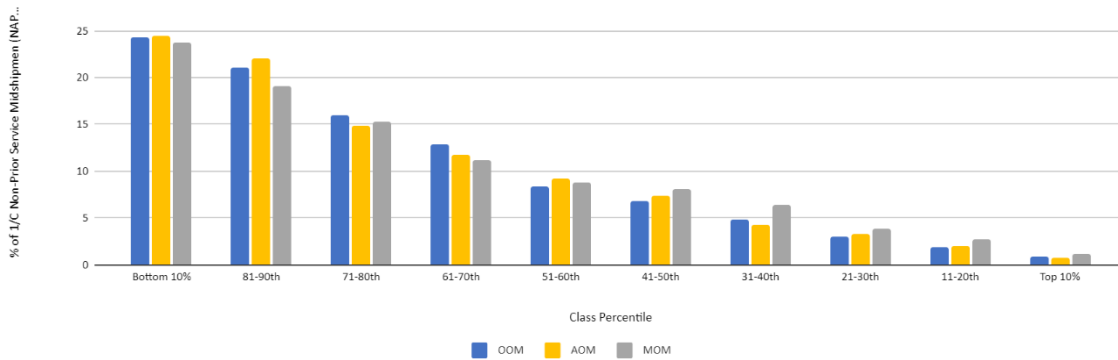


Figure 17. DENAPS Order of Merit histogram 1/C year

A graphical representation of PSDIR 1/C performance distribution in each Order of Merit category can be found In Figure 18. PSDIR saw the most significant portion in the 71–80 percentile of AOM, 31–40 percentile of MOM, and 61–70 percentile of OOM. 52% of this category was in the bottom 50 percentile for OOM, 50% were in the bottom 50 percentile for AOM, and 60% were in the top 50 percentile for MOM. This is a slightly higher performance following 1/C year compared to 2/C year.

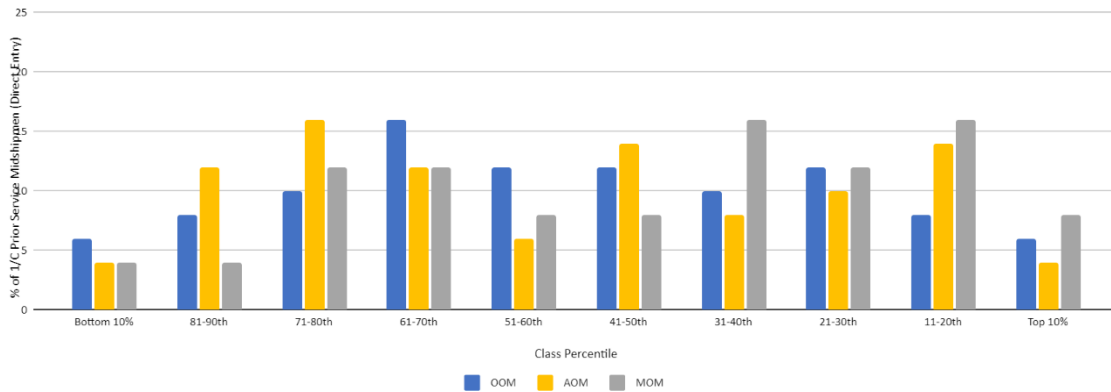


Figure 18. PSDIR Order of Merit histogram 1/C year

A graphical representation of PSNAPS 1/C performance distribution in each Order of Merit category can be found in Figure 19. PSNAPS saw the most significant portion in the 71–80 percentile in OOM, 71–80 percentile for AOM, and 81–90 percentile for MOM. 72.13% of this category were in the bottom 50 percentile in OOM, 67.21% were in the bottom 50 percentile in AOM, and 68.85% were in the bottom 50 percentile in MOM.

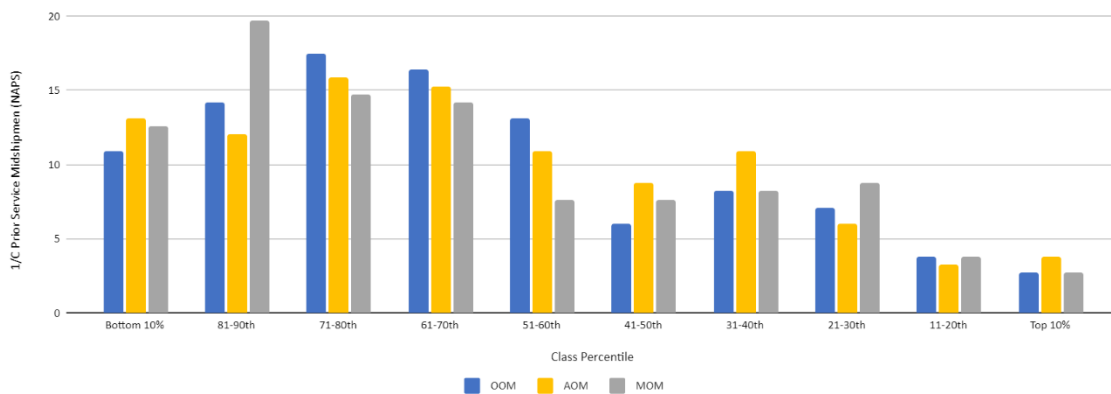


Figure 19. PSNAPS Order of Merit histogram 1/C year

A graphical representation of PSNUKE 1/C performance distribution in each Order of Merit category can be found in Figure 20. PSNUKE saw the most significant portion in the 31–40 percentile of AOM, 71–80 percentile in MOM, and 31–40 percentile on OOM. 51.32% of this category were in the top 50 percentile of OOM, 60.53% were in the top 50

percentile in AOM, and 59.21% were in the bottom 50 percentile of MOM. This category saw a significant decrease in performance in their 1/C year compared to their 2/C year.

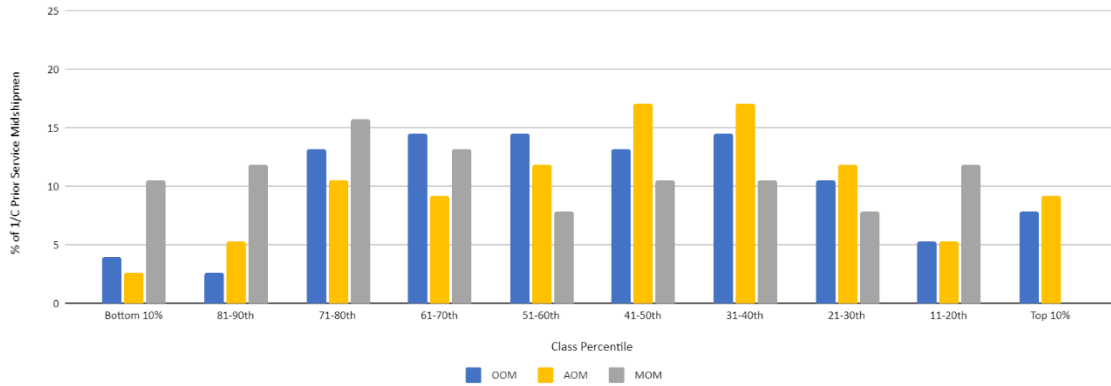


Figure 20. PSNUKE Order of Merit histogram 1/C year

E. OVERALL

Table 9 shows the performance change over all four years at USNA for each category. Additionally, it represents the percentage relative to the 50th percentile to display where most of the population in each category falls compared to the mathematically average MIDN.

Table 9. Orders of Merit change over four years

	AOM	% change	MOM	% change	OOM	% change
DE 4/C	0.566	+0.009	0.561	0.0	0.560	+.012
DE 1/C	0.575		0.561		0.572	
DENAPS 4/C	0.288	-0.009	0.324	-.022	0.285	-0.007
DENAPS 1/C	0.279		0.302		0.278	
PSDIR 4/C	0.534	-0.041	0.589	-.033	0.534	-0.036
PSDIR 1/C	0.493		0.556		0.498	
PSNAPS 4/C	0.436	-0.041	0.426	-0.051	0.421	-0.032
PSNAPS 1/C	0.395		0.375		0.389	
PSNUKE 4/C	0.651	-0.097	0.519	-0.092	0.621	-0.104
PSNUKE 1/C	0.554		0.427		0.517	

Over all four years, PSNUKE saw the largest change in their performance in all three Orders of Merit. DE had the most consistent performance over all four years, maintaining the smallest deviations in Orders of Merit change from Plebe year through 1/C year. DE was also the only demographic that had a positive trend, improving their performance in AOM and OOM over the four years. Prior Enlisted MIDN in all four demographics saw a larger change in their performance over time than direct-entry MIDN from both demographics.

Overall, 431 (6.9%) DE were separated from USNA, 219 (12.9%) DENAPS were separated, six (10.7%) PSDIR were separated, 36 (16.4%) PSNAPS were separated, four (5%) PSNUKE were separated.

V. CONCLUSIONS

A. INTERPRETATION

Based on the results, prior enlisted service is not correlated to higher performance over all four years at USNA, but rather lower performance. While PSDIR do perform above average in their plebe year, they see a significant reduction in performance over the span of four years at USNA, resulting in below average AOM and OOM at graduation. It is possible that they perform highly at the beginning of their time at USNA as a result of their experience, as they are able to adapt to the regimented lifestyle more easily at USNA. Since they may acclimate easier to the culture, their academic performance may have been better due to having less stress and concern about other aspects of their lives. However, Prior Enlisted MIDN maintain their MOM above average over all four years. The slight reduction over time is likely the result of their peers catching up as their development from no Military experience to Commissioned Officers.

PSNUKE enter USNA with the highest academic performance during Plebe year. This demographic sees the largest reduction in their performance over the four years at USNA as they even out. It is possible that their performance during Plebe year is higher due to courses taken at Nuclear Power School directly translating to required classes during Plebe Year, causing them to excel in these courses early in their time at USNA. While the AOM remains high, the MOM and OOM drop significantly and 0% remain in the top ten percent militarily at graduation.

DE are the most consistent over their four years at USNA. DE maintained Orders of Merit that were above average during all four years at USNA and was the only demographic that continued to make up less than their fair share of the bottom ten percent of the class throughout their entire career.

Based on the results, there is a negative trend in performance in all categories for all demographics except for DE. The average performance of the other demographics was worse as time went on; it is shown that the performance of the DE improves over time. It is possible that they are in a position, having no military background, where they

experience more room for growth and ultimately see a rise in performance as they learn. It is also possible that, since they see the highest total number of attritions, that only higher performing MIDN from the DE demographic remain at USNA, cause their overall performance trend to be positive as more MIDN who perform below average separate.

The results for the MIDN who attended NAPS for each category were consistently poorer than average with over half of all non-prior NAPS students remaining in the bottom 25% of the class in all four years.

Prior enlisted in this set of data MIDN separate at a much higher rate than Direct-entry MIDN, supporting the hypothesis. A possible factor is the ability for Prior Enlisted MIDN to rejoin the enlisted Navy or Marine Corps at their previously attained rate and paygrade. It is also possible that the time spent away from academia leads to low enough performance that causes attrition. This possibility is supported by the performance of PSNUKE, since they had the lowest attrition rate of any demographic in the study. The academic rigors of Nuclear Power School, coupled with the experience gained as enlisted Sailors appears to assist these MIDN in performing and Commissioning from USNA. In line with the hypothesis, attrition rate was significantly lower during 2/C year and into graduation. The attrition rate for each category was lower than any preceding year at this point. It is likely that the requirement for financial or service recoupment at the beginning of 2/C year leads MIDN to be less likely to separate by choice after this point.

B. RECOMMENDATIONS

The intent of this research was to analyze specific variables to determine the overall disparity between prior enlisted and direct-entry MIDN and did not include the impact of any demographic or socioeconomic factors. Future research should be conducted to determine the impact of racial, gender, high school performance, grit/resilience, and family economic status to determine the impact on each demographic analyzed in this research.

Future research should be conducted to determine the impact of participation in different sports, including Varsity, club, and extracurricular activities. It is possible that

participation in these groups would have a different effect on each of the studied demographics.

Further research should also be conducted within the metrics. With physical performance, billet positions and other factors that go into the assessments, prior enlisted Midshipmen may be excelling or falling behind in a more specific aspect that can be identified.

Future research should also be conducted utilizing Fitness Report data on a similar set of USNA graduates to determine their long-term career performance and to determine if there is a correlation between their performance at USNA and as Officers in the fleet. Undertaking a longitudinal study that tracked career trajectories of Prior Enlisted MIDN versus their direct-entry counterparts could investigate whether the prior service provides advantages or disadvantages in terms of post-graduation success and progression.

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