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THESIS

EXAMINING THE RELATIONSHIP BETWEEN UNDERGRADUATE EDUCATION AND PERFORMANCE, MISCONDUCT AND RETENTION IN ACTIVE DUTY U.S. MARINE CORPS PERSONNEL

by

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March 2022

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There are limited studies on the impact of education on service member performance, and almost zero research on the impact education has on enlisted service members. The Commandant of the Marine Corps has made better talent management the focus of the Marine Corps. This research is to determine if enlisted Marines with a bachelor's degree or higher in their first contract outperform their peers over the course of their careers. This MBA project uses data on Marines from 2005–2020. Regression analyses were used to determine the impact that education has on the performance of enlisted service members, using physical fitness scores, fitness report averages, misconduct, and retention as outcome variables. Models controlled for AFQT, gender, race/ethnicity, and first PFT scores. Results supported the hypothesis of education being positively associated with performance. Generally, if a Marine had a bachelor's degree by the end of their first contract, they had significantly higher fitness report averages and physical fitness test averages, were less likely to have misconduct charges, and had a higher probability of retention. Based on these preliminary findings, it is recommended that strategic changes be considered to increase the opportunities for education of the enlisted ranks.

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EXAMINING THE RELATIONSHIP BETWEEN UNDERGRADUATE EDUCATION AND PERFORMANCE, MISCONDUCT AND RETENTION IN ACTIVE DUTY U.S. MARINE CORPS PERSONNEL

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ABSTRACT

There are limited studies on the impact of education on service member performance, and almost zero research on the impact education has on enlisted service members. The Commandant of the Marine Corps has made better talent management the focus of the Marine Corps. This research is to determine if enlisted Marines with a bachelor's degree or higher in their first contract outperform their peers over the course of their careers. This MBA project uses data on Marines from 2005–2020. Regression analyses were used to determine the impact that education has on the performance of enlisted service members, using physical fitness scores, fitness report averages, misconduct, and retention as outcome variables. Models controlled for AFQT, gender, race/ethnicity, and first PFT scores. Results supported the hypothesis of education being positively associated with performance. Generally, if a Marine had a bachelor's degree by the end of their first contract, they had significantly higher fitness report averages and physical fitness test averages, were less likely to have misconduct charges, and had a higher probability of retention. Based on these preliminary findings, it is recommended that strategic changes be considered to increase the opportunities for education of the enlisted ranks.

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LIST OF ACRONYMS AND ABBREVIATIONS

AFQT	Armed Forces Qualification Test
AI/ML	Artificial Intelligence / Machine Learning
CCLEB	Commandant's Career-Level Education Board
CFT	Combat Fitness Test
CPIB	Commandant's Professional Intermediate-Level Education Board
DARPA	Defense Advanced Research Projects Agency
DOD	Department of Defense
GCM	General Court Martial
GPS	Global Positioning System
HQMC	Headquarters Marine Corps
JAIC	Joint Artificial Intelligence Center
JROTC	Junior Reserve Officers' Training Corps
LAF	Line of the Air Force
MBS	Master Brief Sheet
MCGEP	Marine Corps Graduate Education Program
MCO	Marine Corps Order
MMOA	Manpower Management Officer Assignments
MOS	Military Occupational Specialty
NCO	Noncommissioned Officer
NDS	National Defense Strategy
NJP	Non-Judicial Punishment
NPLC	Non-Punitive Letter of Caution
OCB	Organizational Citizenship Behavior
PES	Performance Evaluation System
PFT	Physical Fitness Test
PME	Primary Military Education
PMOS	Primary Military Occupational Specialty
POC	Person of Color
PT	Physical Training
QG	Quality Group

RO	Reviewing Officer
ROTC	Reserve Officers' Training Corps
RS	Reviewing Senior
SCM	Summary Court Martial
SNCO	Staff Noncommissioned Officer
SPCM	Special Court Martial
STEM	Science, Technology, Engineering, Mathematics
TA	Tuition Assistance
TFDW	Total Force Data Warehouse

EXECUTIVE SUMMARY

This document summarizes the results of a thesis examining the impact of higher education on the performance, retention and misconduct of enlisted Marines.

INTRODUCTION

The demands of the future operating environment need to be met by the most talented, intelligent and capable Marines our nation has ever produced. Given the high enlisted to officer ratio, the Marine Corps will benefit from increased investment in enlisted education. Prior to this research, there was little known about the impact of higher education on enlisted Marines' performance, misconduct and retention. The results of my research indicate that the Marine Corps can optimize recruiting and retention to improve the quality of the force by targeting potential enlistees with a desire for higher education and investing in the education of young Marines' careers.

Research shows that the percentage of civilians with higher education is increasing in America (U.S. Census Bureau, 2020). The proportion of enlisted Marines with higher education is much lower than that of their civilian counterparts. As careers in the Marine Corps evolve, demanding higher intelligence and greater technical knowledge, the Corps needs to meet those demands with the strength and aptitude of its enlisted force.

OBJECTIVE

Specifically, how do Marines with bachelor's degree s attained by the end of their first contract perform in comparison to those enlisted Marines who do not have a bachelor's degree by the end of their first contract? This research question is essential for informing talent management efforts through education. Should we recruit a more educated force? What type of investments should we make into entry-level Marines? How do we age the force and incentivize the "right" Marines to retain? Answers to these questions are contained in the results of this research.

CONCLUSION

The findings of this research show that enlisted Marines who attain their bachelor's degree within their first contract have better overall performance, higher physical fitness scores, are less likely to be involved in misconduct and are more likely to re-enlist.

In addition to the above findings, Marines who *join* the Marine Corps with a bachelor's degree (vs. attain a degree within their first contract) also perform better in overall performance, physical fitness scores and are less likely to be involved in misconduct. These individuals, however, are less likely to re-enlist than comparison groups. Overall, higher education of our enlisted personnel results in a better force.

BACKGROUND

Enlisted servicemembers receive limited opportunities in support of obtaining higher education. Unfortunately, a focus on increasing the educational standards for enlisted Marines is lacking. The proportion of officers in the Marine Corps with a master's degree or higher is more than 6 times the proportion of enlisted with a bachelor's degree . Given that nearly 90% of the Marine Corps is enlisted, this is a discouraging comparison. Some of this can be attributed to policy that does not include enlisted Marines in resident education opportunities. In addition, systemic anti-intellectualism that permeates enlisted culture stifles progress on this issue. Both are impediments to the advancement of the Marine Corps.

RECOMMENDATIONS

1. **Recruitment**: Reorganization of JROTC with emphasis on education and development of technical aptitudes.
2. **Investment:**
    a. Create ROTC-like program for enlisted personnel (e.g. RETC) to identify and educate the highest caliber enlistees and top MOS school graduates.
    b. Duplicate the Marine Corps Graduate Education Program for enlisted Marines who have their bachelor's and send them to in-resident higher education programs like those at Naval Postgraduate School.

3. **Retention:** Educational attainment within service is tied to retention. Additionally, research shows that promotion related to education increases retention of employees (Benson, Finegold & Mohrman, 2004). Policy that invests in entry-level education and supports aptitude/capability-driven promotions would increase the retention of the highest quality enlisted Marines.

References

Benson, G. S., Finegold, D., & Mohrman, S. A. (2004). You paid for the skills, now keep them: Tuition reimbursement and voluntary turnover. *Academy of Management Journal*, *47*, 315–331. https://doi.org/10.5465/20159584

U.S. Census Bureau (2020). *Education*. Retrieved from https://www.census.gov/topics/education.html

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Given the uniqueness of my residency in this NPS MBA program, it took a long list of steadfast and tremendous members of leadership to get me here. Though it is impossible to list them all, a select few played vital roles in my acceptance and success in this venture:

LtGen (Ret) Robert Ruark – In 2008, I was in need of a waiver for re-enlistment due to a court-martial I received in 2006. This transgression in my career gave me the opportunity to grow as a Marine and shape a new future for my life. Not only was "Colonel" Ruark the convening authority of the court-martial, but he was the "Brigadier General" who signed my waiver for re-enlistment two years later in 2008. He continued to support me throughout my career, with guidance and mentorship that helped shape the Marine I am today. Thank you.

SgtMaj Mike Walton – "First Sergeant" Walton mentored me through my post court-martial recovery. He spent time guiding me through the hardships of restriction and what it takes to overcome adversity. It was through him that I learned a bit more about grit, and what it takes to get through the hard parts of life so that you can enjoy hard-earned success. Thank you.

MGySgt Gilberto Rivera – I arrived to "Master Sergeant" Rivera's maintenance shop in 2007 as a junior Marine with a court-martial on record. He treated me with fairness and dignity from the start. As I promoted and showed my work ethic, he gave me increased responsibility through the rank of Sergeant and supported my desire for I&I duty as my

next assignment. His trust in me wasn't necessary, but it taught me the benefit of treating Marines with equity and ensuring that personal growth and redemption is possible, and probable with good leadership. Thank you.

GySgt Clint Inness – On I&I duty, you are relatively alone and have to carry out all the responsibilities of a Motor Transport shop by yourself. "Staff Sergeant" Inness was there to make sure I didn't fall. He is the best maintenance chief and mechanic I have ever known in the Marine Corps, and he taught me more than I would have ever learned anywhere else. It is because of him that I was proficient and depended on in our MOS. Thank you.

Maj Tim McPeak – "1st Lieutenant" McPeak was the Oscar Battery Commander when I was on I&I. Though he had no logistics or motor transport background, he valued the tenet of decentralized leadership down to the lowest level. He gave me space and supported me to grow as a leader and maintenance chief through experimentation and innovation. It was under his command that I built my first website supporting the motor transport maintenance community that was used for troubleshooting for years to come. Thank you.

Capt Sean Gilroy – "First Lieutenant" Gilroy was my company commander as I filled in for the Company First Sergeant billet as a Staff Sergeant for nine months. He showed me a kind of brotherhood and loyalty that can only be learned under tough circumstances. I am forever grateful of his trust and friendship. Thank you.

LtGen Mike Dana – General Dana was part of my recruitment to NavalX. This transition was a launchpad for my career, and he knew it. Putting his neck out for me, he put me on a team in D.C. while organizing support for me to work remotely from North Carolina where my family was, so I didn't have to leave their side. General Dana was also the authority that signed into motion my acceptance into residency at NPS. It is this type of leadership that makes all the difference in Marines' lives and should be a template for others to learn from. Thank you.

Col Jim Shelton – I often refer to Col Shelton as "My Marine Corps dad." I say this in the most endearing way because of the amount of personal investment he made into

the Marines who worked for him. Col Shelton drove to HQMC on a Thursday evening to knock on the doors of decision-makers in regard to my acceptance to NPS. He ensured that I was utilized for my strengths and mentored me in areas where I needed growth. I am forever indebted to him. Thank you.

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Col Todd Lyons and Col Randy Pugh – On the receiving end of my acceptance to NPS, there was no formal documentation or pathway to get me here. As much as it required efforts by those who were challenging policy to send me, similar efforts had to be made to receive me. Colonel Lyons (Ret) began the process and after turning over his command, Colonel Pugh did not miss a beat. At the end of the day, none of the hard work of people trying to send me to NPS would have made a difference if it wasn't for the two of them accepting me. Thank you.

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I. INTRODUCTION

Tomorrow's operating environment requires the most talented, capable, highly trained and educated force we have ever demanded of our servicemembers. In the summary publication of the 2018 National Defense Strategy (NDS), retired Marine General James Mattis (2018) states:

> Today, we are emerging from a period of strategic atrophy, aware that our competitive military advantage has been eroding. We are facing increased global disorder, characterized by decline in the long-standing rules-based international order—creating a security environment more complex and volatile than any we have experienced in recent memory. (p. 1)

As our adversaries continue to close gaps in technology and capabilities, our military advantage becomes more vulnerable, leaving our nation and its interests at risk. As we enter a new period in our defense strategy, the Marine Corps has also changed its priorities and strategic objectives in alignment with the guidance from the NDS. In the Commandant's Force Design 2030, he states that, "Such a profound shift in missions, from inland to littoral, and from non-state actor to peer competitor, necessarily requires substantial adjustments in how we organize, train, and equip our Corps" (Berger, 2020). To support these increasingly challenging mission sets, our Marines must be highly qualified, educated, trained and prepared to handle the unknown complexity of the next operating environment. Areas of drastic change and improvement in the force have focused on technology, equipment, systems and training but have fallen short of what may be the most vital component to the success of our future: educating the enlisted force.

Leaders from across the Marine Corps have differing opinions on the importance of educating enlisted Marines and the impact that doing so would have on other Marines, operations and the organizations they belong to, but there is currently very little empirical data to support either side of this argument. Because of this, little has been done to create demand or mandatory educational milestones for enlisted Marines in the same way that has been standardized for unrestricted officers. Standardized education for officers has proven to be successful and generates positive results through qualitative and quantitative research. For example Branigan's (2001) thesis on graduate education and promotion in the Marine

Corps found that graduate education has a positive effect on promotion and retention for Marine Corps Officers (see also Wielsma, 1996; Zamarripa & Lianez, 2003). The above research focused on graduate education impacting promotability, performance and retention of officers, whereas the research of this thesis asks about the impact that a bachelor's degree has on the performance of enlisted Marines. Currently, there is no research on enlisted performance based on educational attainment, which makes this thesis an important first step for understanding the impact that education has on the majority make-up of the Marine Corps.

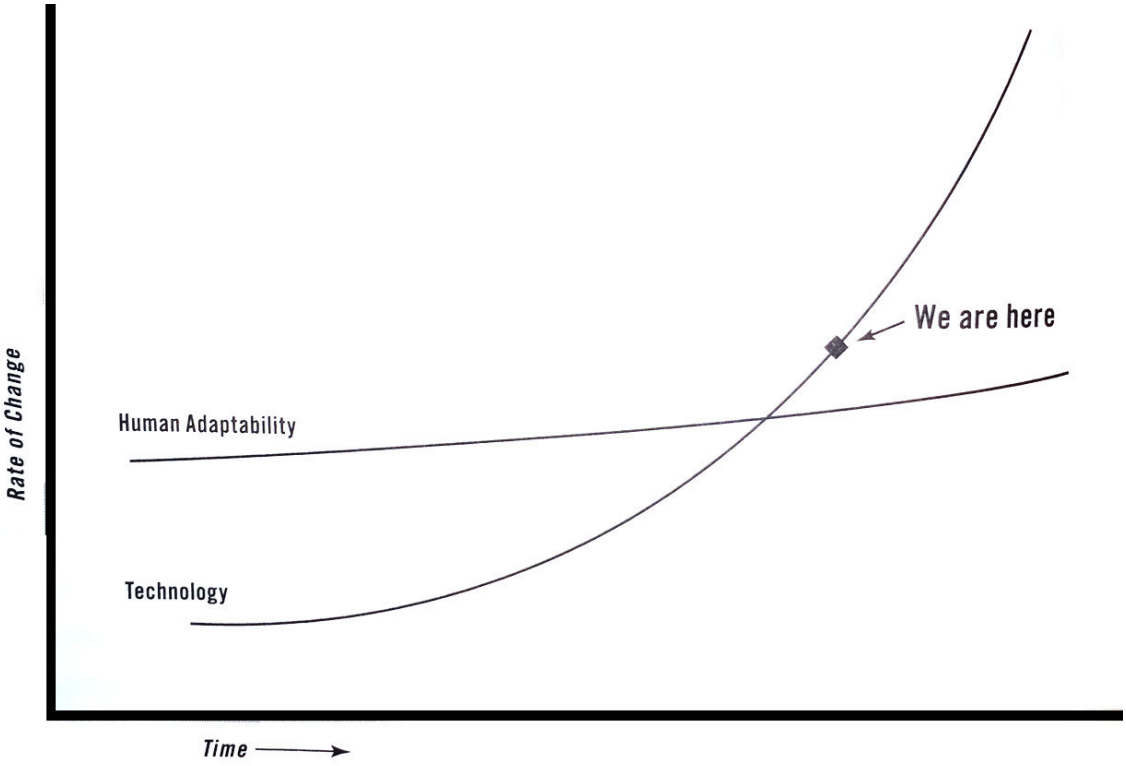
Science, Technology, Engineering and Math (STEM) plays an ever-increasing role in today's Marine Corps, requiring more aptitude and intellect from enlisted Marines than has ever been demanded of them before. Breakthroughs and changes in technology today are happening faster than ever, requiring significant support, understanding and specialization from Marines to keep up with these changes. As Commandant Berger states in *Force Design 2030* (2020),

> It is imperative that we comprehensively adapt our force to the demands of competition and conflict in multiple domains. The intersection of threat, technology, and a changing operating environment necessitate wide-ranging changes to the capabilities our expeditionary force in readiness must provide to Naval and Joint force commanders.

Unlike the evolving universities and war colleges that unrestricted officers are hand selected for and attend, enlisted Marines are in training pipelines that are relatively void of academic content and are resistant to change, even if the training is or was adequate. Because of this, it seems the Marine Corps has been comfortable developing enlisted Marines though experienced-based and routine-based practice. For instance, much of the training environment, tools and test equipment in the Motor Transport Maintenance Schoolhouse was the same in 2019 as it was in 2005. This type of training can slow down the process of developing enlisted Marines and without education as a complement, could be a detriment to the evolution of the Corps. This can be attributed to the ever-increasing complexity of equipment and systems that are used by Marines. Figure 1 is Teller's graph depicting the rate of human adaptability versus the rate of technological adoption (Friedman, 2016). As the graph illustrates, technology is advancing faster than

humans' adaptability to that technology. If Teller's analysis is correct, we can assume that without focused and structured educational opportunities to narrow the gap between current and future enlisted education opportunities, the Marine Corps will be ill-prepared for dealing with the challenges of maintaining and operating future technology.

Figure 1. Eric Teller's graph of human adaptability. Source: Friedman (2016).



In their article on experience in the intelligence community, Carter and Simmons (2015) state that:

> All skilled laborers use practice and performance as means for improving their trade. However, an enterprise development strategy for professionalization requires more than routine practice of a performance step; it requires study, research, analysis, testing, and review. These methods are historically academic and currently relevant. (p. 52)

Knowing this, an investment into enlisted education would prepare the Marine Corps for its future operating environment, both physical and cyber.

Currently, there are opportunities for enlisted personnel to attain higher education, but they must typically do so on their own time, which comes at a cost to their family, personal life, sleep, and is at the mercy of the unit's op-tempo. Utilizing the Marine Corps' Command Profile web access to gather data, Tables 1 and 2 illustrate the education levels of enlisted Marines and unrestricted officers (O1–O6) as of April 2021. There was a total of 4,929 Enlisted Marines with a bachelor's degree or higher, representing just over 3% of the total enlisted force (160,010). By comparison, there were 3,883 Marine Corps Officers (unrestricted and only between O1 and O6) with a master's degree or higher, representing about 20% of the total unrestricted officer force (O1–O6). This comparison points to opportunities for furthering one's education in the Marine Corps whether officer or enlisted. There are different reasons why there is such a stark contrast between officer and enlisted servicemembers seeking and completing education during their time of service. These reasons are both real and perceived.

Table 1. USMC enlisted educational attainment data from command profile

	Rank									
Education Level	E1	E2	E3	E4	E5	E6	E7	E8	E9	Total
Bachelor's	17	156	284	390	744	732	902	666	351	4242
Master's	1	6	6	22	54	92	157	185	127	650
Prof/Post M	0	0	0	0	12	0	2	2	1	17
Doctorate	0	0	1	0	4	1	7	3	4	20
Total	18	162	291	412	814	825	1068	856	483	4929
Total Force	8075	17459	48753	33927	22831	14765	8685	3935	1580	160010
% Higher Education	**0.22%**	**0.93%**	**0.60%**	**1.21%**	**3.57%**	**5.59%**	**12.30%**	**21.75%**	**30.57%**	**3.08%**

Note: Data are from all active duty enlisted as of April 2021. Prof/Post M are professional / post-master's degrees.

Table 2. USMC officer education attainment data from command profile

	Rank						
Education Level	O1	O2	O3	O4	O5	O6	Total
Bachelor's	3065	3127	5079	2206	582	82	14141
Master's	36	72	505	1297	1118	507	3535
Prof/Post M	17	4	8	22	25	10	86
Doctorate	9	17	114	79	35	8	262
Master's and above	62	93	627	1398	1178	525	3883
Total	3127	3220	5706	3604	1760	607	18024
Total Force	3205	3398	6248	4019	1956	655	19481
% Master's and above	**1.93%**	**2.74%**	**10.04%**	**34.78%**	**60.22%**	**80.15%**	**19.93%**

Note: Data are from all active duty officers (O1-O6) as of April 2021. Prof/Post M are professional / post-master's degrees.

Real forces include how programs and opportunities for further education are structured within the Marine Corps. For officers, it is largely a "pull" mechanism: Officers are selected and subsequently ordered to resident graduate programs based on career demands. Officers who fail to complete their curriculum can face separation from the program and may be treated as an academic failure (United States Marine Corps, 2019a), which can jeopardize their fitness report evaluations and career progression. In contrast, those officers who graduate their programs are ordered to utilization tours where they pay back the Marine Corps for their education by filling a structured billet that requires a Marine with a specialized degree. Unlike officers' career paths, which are affected by their field of study in a utilization tour, enlisted Marines are rarely considered for any change in career, billet, or responsibility based off their degree level.

Enlisted programs for education beyond a high school diploma are self-paced, often on distance-learning platforms which have higher failure and withdrawal rates (Bacolod and Chaudhary,2017) and are limited to tuition assistance (TA) funding which drags out the process over many more years than would be normally required to complete a 4-year degree. Some of this is due to the $4,500 annual limit that a Marine can use for TA. At the average cost of $250 a credit hour, a Marine will max out at 18 credit hours a year which is roughly 6 classes total. At this pace, not taking other credits into consideration or

operational commitments, it would take nearly seven years of uninterrupted attendance in a standard 120-credit bachelor's degree .

A well-respected General Officer in the Marine Corps, Alfred Gray, is quoted saying that there were "too many intellectuals at the top of the military, that what we ought to have are some old fashioned gunslingers" (Cavanaugh, 2014). Though I am sure his quote is taken out of context, the fact remains that his words as the Commandant of the Marine Corps have influence over all Marines within the organization. Perceived forces that limit Marines' desire to attain higher education include: anti-intellectual culture, personal and professional obligations, self-doubt, ignorance of the college application and tuition assistance process, and command discouragement. Although these barriers may affect all Marines, Joyner (2020) reveals in a *War on the Rocks* article, that the U.S. has had funded service academies going back to 1802 for the purpose of training future military officers. This evidence of officer-centric educational support structure is a contrast to the figure-it-out-yourself structure enlisted Marines face if they want to attain a higher education.

Enlisted Marines may struggle to complete a college degree as they face the academic rigor of college while remaining a productive member of their unit. For example, young, enlisted Marines who makes it through the process of application and tuition assistance might fail classes due to being in the field for two weeks or in an environment not supporting their academic needs, resulting in incomplete assignments or poor test performance. These young Marines, fresh out of boot camp and indoctrinated to be quiet, might not alert their leadership to their difficulty completing assignments while headed to the field, and may be at greater risk of failing a class. In a common scenario, enlisted Marines are expected to work a full day, often have duty on weekends and nights and physical training (PT) early in the mornings and must balance time with their families with their academic studies. These hurdles can be overwhelming and significantly discouraging to the Marines who might be on the fence about furthering their education. As leaders, we can acknowledge the benefits of a well-educated enlisted force but should also be encouraging Marines to seek higher education for the economic and social value that it promotes.

Currently, Americans are attaining higher levels of education than ever before, making these attainments a societal norm that the Marine Corps is not matching in its enlisted ranks. In Ng and Feldman's report, they state more and more Americans are attaining higher education. The authors go on to note that the percentage of individuals completing high school has gone from 69% to 86% between 1980 and 2006, and completion of college through the same time period has risen from 17% to 28% (Ng & Feldman, 2009). These numbers have continued to increase. As of 2020, 91% of Americans have completed high school or higher, 38% of Americans have completed an undergraduate education or higher, and 48% have completed an associate's degree or higher (Bureau, 2020). With only 3% of our enlisted force attaining a 4-year degree or better, the Marine Corps is not keeping up with evolving social norms for education, which may greatly degrade our Corps' capabilities over time.

The enlisted force faces obstacles of policy that prevent the Marine Corps from tapping into their abilities and harnessing the innovative talents of the Corps' youth. Current policy limits academic advancement of enlisted Marines through Tuition Assistance funding caps, lack of resident education opportunities, and time granted to pursue a higher education. A Marine Corps Doctrinal Publication titled "Learning" largely recognizes the importance of education and differentiates the purpose of education from that of training: "A simple explanation of the differences between training and education is that training prepares Marines to deal with the known factors of war (e.g., the importance of good marksmanship), while education prepares Marines to deal with the unknown factors (e.g., effective decision-making in changing circumstances)" (United States Marine Corps, 2020). With the acknowledgement that education is critical to decision-making in future war, it would make sense that the Marine Corps would invest significantly into those decision-makers that find themselves in the most decentralized environments. However, this is not the case. In my observations, the enlisted force is less than qualified on much of the equipment and technology that they maintain and work with. An example of this is mechanics in the military do not have the certifications to make them professional mechanics in civilian sector. The same could be said about truck drivers and aviation technicians. As technology advances, so should the capabilities of those who work

with it. Currently, not just the enlisted force, but all the government is dealing with the problem of finding talent for our critical fields and expecting people to take significant pay cuts to join us. The prior director of the Joint Artificial Intelligence Center (JAIC) Lt General Jack Shanahan is quoted saying "How do I incentivize somebody to come in at 50 to 75% salary cut and work in a government where our rules and regulations are a little different than they are in commercial industry?" (United States Department of Defense, 2019). Understandably, there are funding concerns, but this does not preclude the possibility of increasing education for qualified and high aptitude enlisted personnel that could alter the fate of our next major conflict. Our leadership supports this concept, but we have failed to put it in motion.

The Commandant of the Marine Corps has produced several documents stressing the importance of advanced skillsets that would usually require higher education, and how it will impact the Corps' future. An example comes from the Commandant's Planning Guidance (CPG) that states, "We do not currently collect the data we need systematically, we lack the processes and technology to make sense of the data we do collect, and we do not leverage the data we have to identify the decision space in manning, training, and equipping the force" (Berger, 2019). Even in this, education is notably missing from the Commandant's list. As we continue to adapt to a changing environment, we must recognize that our standards of education for the force are dated and risk putting us behind in future conflict, if they have not already. The Chinese government is recruiting teenage girls and boys and educating them on intelligent weapons systems, artificial intelligence and machine learning (AI/ML), software engineering, and a litany of other critical areas of advancement (Perper, 2018). Our enlisted force, especially the entry-level, make up most of the Corps and do the majority of specialized tasks day-to-day. As our technology, systems and strategic operations increase in complexity, so must the capabilities of those who are working on and operating under these conditions. Our Commandant is asking the Marine Corps to evolve; our junior enlisted Marines can answer the call, but without a policy that *pulls* them into resident education programs, we will fail to meet the demands of the next fight.

As articulated by the opening quote from General Mattis, the battlefield and operating environment are more technical, demanding and complex than we have ever seen in the history of our nation. We must require the most out of our servicemembers. As we evolve through the information age era, laden with artificial intelligence, cyber threats, 21st century war-machines and an enemy that is trained in all the above, we must prepare our service members in one of the areas we have not exploited to the full extent: education. General Berger writes, "Throughout this period of uncertainty and change Marines must continue to think, write, debate, innovate, and adapt to not only keep pace with the ever-changing character of warfare, but to ultimately drive it and force others to adapt to us" (Berger, 2021, p. 2). We have always expected a lot out of our Marines, but now they must not only be the die-hard, lean-mean, fighters of the past, but must also possess enhanced intelligence (IQ and EQ), extreme discretion, and a steadfast desire to increase their skillsets beyond basic trainings.

The purpose of my thesis is to examine the impact that education has on the career performance of enlisted Marines. For the Marine Corps, this research will have relevance for several reasons:

Results of my research using data from Marine Corps personnel from 2005–2020 indicate that enlisted Marines with higher education tend to perform significantly better than their peers in most areas of overall performance, shown in fitness report scores and physical fitness tests. The same Marines, with higher educational attainment, are involved in significantly less misconduct. Additionally, those enlisted Marines who attain a bachelor's degree by the end of their first contract are more likely to be retained for a second contract than any other enlisted group. Since the data indicates significant gains in performance for enlisted Marines with a higher education, the Marine Corps should consider an investment into policy that mandates/increases enlisted education opportunities through suitable programs. This change to strategy could potentially attract a new pool of enlisted candidates who are more interested in furthering their education. This empirical data on the relationship between education and performance is a step towards generating support for funding to the Marine Corps for higher education opportunities and career paths for enlisted servicemembers. This could then increase the overall performance and

capabilities of the entire force, making it more capable and ready for the unexpected complexities of future conflict.

The Marine Corps has identified a need to keep intelligent and capable Marines in the service longer (Berger, 2019, 2021b). Policy investing in educating enlisted Marines will support this need. Since this research shows that investing in education at the earliest stage of an enlisted Marine's career enhances retention, this move is a strength instead of a liability. This is the basis of investing in human capital; we will get a larger return on investment by educating our enlisted force. We will get a larger return on investment by educating our enlisted force.

II. BACKGROUND

The purpose of this chapter is to recognize some of the historical milestones in military educational reform while spotting key differences in the opportunities between officer and enlisted servicemembers.

The lack of opportunities for enlisted education are rooted in military history. In his book on the psychology of military incompetence, Norman Dixon (2016) identifies a theme of anti-intellectualism that serves as a backdrop for understanding barriers to education in the military:

> Those intellectual shortcomings which appear to underlie military incompetence may have nothing whatsoever to do with intelligence, but usually result from the effect upon native ability of two ancient and related traditions. The first of these, originally founded in fact, is that fighting depends more upon muscle than brain, the second that any show of education is not only bad form, but likely to be positively incapacitating.

Notably, military educational policy seems to reflect these sentiments with respect to enlisted servicemembers more than with officers. Officers are afforded many opportunities for resident education programs that are ordered by higher headquarters. Enlisted servicemembers do not have most of these opportunities and are definitely not ordered to go to resident education programs. This apparent divide has been anecdotally evident in many enlisted experiences and conversations, but more blatantly it is displayed in policy that prevents enlisted servicemembers from seeking the same education opportunities (United States Marine Corps, 2019a), receiving balanced pay scales based on educational attainment, and receiving other freedoms/liberties (e.g., gold card policies[1]) granted upon entry to the Marine Corps in comparison to their officer counterparts.

Currently, Marine Corps officers are afforded the opportunity to attend a number of resident undergraduate, graduate and PhD level education programs (Johnson-Freese, 2012). Some of these were developed as early as 1884, and military officers have been

[1] Gold card policies are essential curfew and driving privilege limitations delivered to new enlisted servicemembers and not officers, regardless of age, marital status, prior misconduct, etc.

attending them since. Along with the multitude of locations and fields of study available to military officers, the amount of time permitted, encouraged, and most often ordered to attend resident educational programs is tremendous. Joyner describes the average time spent in resident education for military officers, which is months spent in school before first unit, a career course up to nine months of education, a master's program before their 10-year mark, another master's or PhD program opportunity before their 20-year mark, amongst a litany of opportunities for those that seek out above-and-beyond education (Joyner, 2020). This minimum amount generally equates to nearly five years and hundreds of thousands of dollars of investment into the education of our officer leadership to ensure they are prepared for operating in a complex and ever-changing environment. This amount of investment is necessary, as the world is evolving and our leaders must be prepared to defend the nation's people and interests in hostile and disputed spaces as is discussed in Mattis's summary of the National Defense Strategy (Mattis, 2018).

According to the Commandant's Career-Level Education Board (CCLEB) results, the Marine Corps sends over 250 field grade officers annually through graduate degree programs. This is not something these officers apply for, but rather they are screened and ordered to attend. As stated by Marine Corps doctrine, "Selection to graduate education programs will be conducted on an annual basis by the Commandant's Education Boards, the Top Level School Board, and other boards and panels as deemed necessary by HQMC (MMOA)" (United States Marine Corps, 2019, p. 1-3). Unlike most other boarding processes in the military, the MCGEP screens the entire population of officers to determine those that fit the requisites necessary for selection into resident postgraduate programs. Once selections have been made and announced, Marine officers must accept the orders, or risk ending their careers as officers.

Over time, policy has been created to increase and reform the standards of officer education. In 1986, the Goldwater-Nichols Act reorganized the DOD, resulting in education reforms for servicemember. There is no mention of enlisted education reform; all comments and directives were targeted at officer education and development. In the document it states, "The Secretary of Defense shall establish policies, procedures, and practices for the effective management of officers of the Army, Navy, Air Force and

Marine Corps on the active-duty list" (Senate and House of Representatives of the United States of America, 1986). Though this statement concerns officers selected for joint billets, there are several other examples throughout the document that continue to cite officer exclusivity in education, such as "The secretary, with the advice of the Chairman of the Joint Chiefs of Staff, shall establish career guidelines for officers" (Senate and House of Representatives of the United States of America, 1986, p. 37), where those guidelines expressly include education as a top priority. As another example, under the Function chapter 855 of U.S. Code Title 10, the purpose of the Naval Postgraduate School is to "provide advanced instruction and professional and technical education and research opportunities for *commissioned officers*" [emphasis added] for preparation for current and future naval operations. Collectively, these doctrines point to the different opportunities afforded to officers and enlisted servicemembers for education. Whereas officers are screened without application, enlisted servicemembers must go to college on their own time, often at night and weekends when permitted by operational tempo, and most often using Tuition Assistance (TA) for distanced learning rather than resident.

Much of this divide between enlisted and officer opportunities and treatment dates back to eras of enlisted conscription which, unlike today's all volunteer force, relied on force and mass numbers to win wars rather than critical thought by individual warfighters at the lowest level. As an example of the consideration given to enlisted servicemembers, the Duke of Wellington viewed enlisted servicemembers and recruited them with the same discretion as "the misfits of society who could only be held in check by punishment and repression" (Blanco, 1966, p. 63). This was not uncommon at the time and continued as a foundation for thinking about enlisted servicemembers. The Crimean war (1854-1856) changed this as educational reform was required in the face of enlisted incompetence leading to starvation, ailments and loss of strategic advantage (Blanco, 1966). This was the precursor to modern day Professional Military Education.

This chapter provides background on the process that enlisted servicemembers must go through to enroll in higher education while on active duty, as well as the evolution of officer educational development, opportunity differences, and culture related to this gap between the two. Given the lack of research and data examining the impact of education

on enlisted servicemembers, it is necessary to find comparative studies that relate performance, misconduct and attrition to educational attainment in both officer communities and industry. Identifying trends and generalizing them to the context of enlisted education will help frame the findings of my research.

III. LITERATURE REVIEW

Although there has been extensive research relating education attainment to many different facets of job performance, there has been little research conducted within the military on the same subject. Interestingly, research in a military context has focused on graduate education and its impact on military officers' promotions and retention, demonstrating that officers who receive graduate education have a higher probability to promote and reenlist (Ugurbas & Korkmaz, 2015; see also Bacolod & Chaudhary, 2018; Branigan, 2001; Wielsma, 1996). Within these reports, an overarching theme is that the findings are inconclusive because officers are selected for graduate education programs, so it can be argued their promotion and retention is already determined prior to selection for graduate school. Wielsma (1996) notes that "actual on-the-job performance is an important factor in determining promotion, retention, and who attends graduate education" which introduces a bias towards selection to school and promotion. Furthermore, those who are selected, and do not want to reenlist, can decline their selection to grad school and therefore leave the Marine Corps. As a result, researchers cannot observe, definitively, whether officers are more prone to promotion because of graduate education or because it a selection process that takes them on a predestined career path. These two hurdles limit any conclusion that graduate education is a causal factor to promotion and retention. Additionally, very little research in the military has examined performance metrics outside pass/fail promotion standard and retention/attrition counts, which limits the scope of understanding of the ways performance is affected by educational attainment. Central to this thesis, detailed research and analysis on the impact of education on the performance, retention, or misconduct of the enlisted ranks is scarce. Lacking this knowledge negatively impacts the Marine Corps' overall understanding of enlisted performance and behavior, degrading our ability to invest properly in their lives in ways that better the individual and the institution.

To begin to understand how education might impact variables related to performance, retention, and misconduct in the military, I reviewed civilian research and analysis to generate hypotheses that will apply to the military context, specifically the

USMC. By applying these findings to the military context, I hope to better understand our current environment and how to make the institution more mission capable and lethal.

A. HOW BROADLY DOES EDUCATION CONTRIBUTE TO JOB PERFORMANCE?

Ng and Feldman (2009) explore the effectiveness of highly educated workers, defined as bachelor's level education or higher, to determine if there is value in hiring, staffing or promoting these individuals within organizations to increase overall performance. According to the authors, "If highly educated workers contribute only marginally more to organizational effectiveness than less educated workers do, then the higher costs of staffing with highly educated workers are unlikely to be recouped" (Ng & Feldman, 2009, p. 90). To assess this, the researchers conducted a meta-analysis across 293 empirical studies (including 14 unpublished dissertations and studies) containing 332 independent variables. They examined the relationship between education and several performance-based variables, including task performance, performance in training programs, Organizational Citizenship Behavior (OCB), creativity, general counterproductive work behavior, self-rated workplace aggression, self-rated on-the-job substance use, tardiness, and absenteeism.

The authors hypothesized that educational attainment would influence both task performance at work as well as areas beyond immediate task performance, including, but not limited to intrinsic motivation, ethical and moral values, and altruistic views. The authors reported mixed evidence for the relationship between education and job performance. First, they found that educational attainment was positively related to task performance. Second, educational attainment was positively related to OCB in ratings from superiors and self, but not as strongly related when rated by peers (Ng & Feldman, 2009).

Prior to data analysis, the authors hypothesized a negative relationship between counterproductive performance and education. Though the hypothesis proved unsupported for general counterproductive work behaviors, there were significant findings for specific behaviors (e.g., inverse relationships between education and workplace aggression and on-the-job substance abuse; Ng & Feldman, 2009). Moreover, the authors found that the

relationship between education and counterproductive workplace behavior is moderated by job complexity. They stated, "We found that the relationship between education level and counterproductive work behavior was less negative for high-complexity jobs than for low-complexity jobs" (Ng & Feldman, 2009, p. 109). These findings left the authors with mixed support for their hypothesis, recommending additional analysis. Fortunately, the Marine Corps has more data on their individuals that could provide a strong test for or against the relationship between education and misconduct, more generally.

All told, the evidence above supports the claims that education enhances workers' performance, as well as decreases counterproductive behaviors in certain instances (i.e., high complexity jobs). Nonetheless, there are areas that the Marine Corps can study further to understand the relationship between education and job performance in a military context. Research shows that, according to Howard (1986), "Education level, college major, and participation in extracurricular activities were most strongly related to job performance." Because research indicates the correlation between education and job performance, we can leverage the recruitment and retention models of the Marine Corps to bring about a more talented and capable force. "For instance, educational level can enhance cognitive ability, increase job-relevant knowledge, and promote the development of a strong work ethic, all of which can strengthen job performance in turn" (Ng & Feldman, 2009, p. 110).

B. INSTRUMENTAL VALUES OF ORGANIZATIONAL CITIZENSHIP BEHAVIOR FOR PROMOTION

Hui et al. (2000) identify Organizational Citizenship Behavior (OCB) as one performance variable that is positively associated with promotability in a sample of 293 tellers of a multinational bank. OCB is defined as "all the positive and constructive employee actions and behaviors that aren't part of their formal job description" (Verlinden, 2020, p. 1). In other words, this describes the things a worker voluntarily does for their organization outside their responsibilities based on their own drive and desire to benefit the organization. To better understand the relationship between OCB, employee performance, and promotion, Hui et al. (2000) studied two subsamples, tellers and their supervisors, and sampled each twice: before and after teller promotions. This was conducted through questionnaires that asked questions relating to promotability and

promotion, instrumentality, and OCB. The results of their research showed that OCB is significantly related to promotion, but also that perceived OCB declined in two circumstances: when a promotion is not received or when someone who rated themselves high on OCB in order to be promoted (i.e., an individual high in instrumental OCB) is subsequently promoted. For those who were not rated high on instrumental OCB, it is found that their OCB is not significantly lowered after a promotion is received (Hui et al., 2000).

This article raises questions regarding retention and attrition of enlisted persons, and whether access to higher education might encourage OCB. Education for enlisted servicemembers is largely voluntary. It requires a tremendous amount of off-duty time and energy, and does not directly increase pay, promotability, duty station preference or any other recognizable incentives for the hardship of seeking a higher education. The study by Hui et al. reported that OCB decreases after promotion for those who were only seemingly doing extra-voluntary work for the promotion. Similarly, one could ask whether enlisted service members are more likely to end their contract and pursue another career at the earliest opportunity after completion of their degree. So what of the current more-than 8,000 enlisted servicemembers in the military with a four year degree or higher? This compares the altruistic character of employees and servicemembers who are working hard outside their formal responsibilities to better their organization as much as themselves.

C. COLLEGE EDUCATION AND JOB PERFORMANCE

A study on a police department that had strict physical and mental requirements, as well as laws and regulations around professional conduct, serves as a close analog to military service considering the similar hierarchy, prerequisites, and standards. Police departments were a good fit in the absence of research on enlisted personnel for the subject. A 10-year study was conducted by Truxillo and colleagues (1998), examining the impact that educational attainment has on police job performance. In their studies, they found a statistically significant positive effect of education on both promotions and supervisor ratings of job performance, but mixed findings linking education to disciplinary action.

For their methodology, Truxillo et al. (1998) narrowed down their selection pool to 123 police officers who had been in the organization for at least ten years, and then further narrowed to 84 who attained higher education to compare differences with those who did not attain that level of education. They defined job performance as "criteria including disciplinary actions, promotions and supervisor ratings approximately 10 years after hire" (p. 271). In addition to educational attainment, they used entrance exam scores as a predictor of job performance.

The analyses of the Truxillo et al. study returned mixed results on the impacts that education had on job performance. There was not a significant correlation between education and suspensions or reprimand, however, there was a statistically significant negative correlation between entrance exam scores (which are related to education levels) and both of those consequences. Truxillo et al. found that education is significantly positively associated with promotability. Although these results are consistent with the hypothesis that education is associated with job performance, further discussion is necessary. It could be that the same motivational factors that predict success at obtaining a higher education also predict successful promotion, which would call into question whether education has a causal role on promotion. Similarly, given the small sample size, it is difficult to determine if Truxillo et al.'s findings would replicate in a more robust study that would include a larger dataset of educated police officers. However, these findings provide a useful starting point and initial data that speak to questions that will be examined in greater depth in my research.

D. GRADUATE EDUCATION AND EMPLOYEE PERFORMANCE: EVIDENCE FROM MILITARY PERSONNEL

Multiple studies relating education to promotion and performance among military officers have been conducted. Bowman and Mehay (1999) present several significant findings that support a positive relationship between graduate education and promotion and retention, where promotions are selected based on Fitness Reports that determine an officer's overall performance. For promotion, the authors claim that probabilities are 10–15 points higher for officers with a graduate degree versus those without, which increases to 15–17 points if it is a resident education by direction or order. Their paper investigates

relationships between graduate education and on-the-job performance utilizing data on undergraduate degrees, performance ratings, marital and dependent statuses, amongst other variables. Through research focused on ranks O4 and above in the Navy, where promotions are no longer automatic and require selection, the authors not only use performance metrics to help test their hypotheses, but also incorporate supervisor evaluations. They conducted a five-year study using data from more than 6,500 Naval Officers pulled from the Navy's Promotion History File, augmented with data from Sailors' fitness reports. This, along with consideration of three major elements, "aggregate promotion rate, the individual's own ability and effort, and the abilities and work effort of all others in grade at a time" allowed the authors to account for a number of variables in their study of an individual's promotion probability (Bowman & Mehay, 1999, p. 455).

What Bowman and Mehay were unable to attain was whether promotions and retentions were due to the attainment of graduate education, or whether the fact that these officers were selected for resident education already had them groomed for promotion and retention. As with findings from Truxillo et al. (1998), it could be that those who are high achievers already would be more likely to be selected for the graduate program, and more likely for the promotion regardless of the education itself. The authors acknowledge this by concluding that "unobserved attributes" could be misguiding their data and findings (Bowman & Mehay, 1999).

E. AN ANALYSIS OF THE RELATIONSHIP BETWEEN HIGHER EDUCATION AND MISCONDUCT

In addition to job performance, several articles examine the relationship between educational achievements and organizational misconduct. Gerding (2007) hypothesizes that "The number of sustained allegations of acts of police misconduct, both criminal and egregious administrative, will be less for those officers possessing higher levels of education at the time of the commission of the act" (p. 66). In order to determine the validity of this claim, Gerding analyzed existing data and records of police misconduct.

Gerding sourced his data from the New Jersey State Police headquarters between the years 2000 and 2004. His results indicated that between 2000 and 2004 4,674

misconduct of New Jersey Police allegations were made. Of the substantiated allegations (n=89), 36% of the implicated officers had no college, 23.6% had some college, 31.5% had a Baccalaureate, and 9% had a Graduate degree. Additionally, as years in service increased, so did the percentage of substantiated allegations: 19.1% of allegations implicated officers with less than 7 years of service, 25.8% between 8 and 15 years of service, and 55.1% over 16 years of service (Gerding, 2007). When Gerding controlled for the correlation between years of service and time for education attainment there is no discernable effect of education on misconduct, leading him to reject his hypothesis. What Gerding did find, though, is that criminal activity off-duty is substantial, and that not having college education proves as a predictor to criminal off-duty behavior. (Gerding, 2007).

In the military, all on– and off-duty misconduct jeopardizes the mission, as it takes away personnel on both the criminal and administrative side of the action. Without proper investment into misconduct deterrence, our military personnel will not be as effective or efficient as we need them to be in the future operating environment. The relationship between education and off-duty misconduct reported by Gerding is enough to hypothesize that an investment in education could reduce the levels of off-duty misconduct among servicemembers and therefore strengthen the production and mission accomplishment of our forces.

F. PERSONAL RESILIENCE, DISCIPLINE AND SAFETY OF MILITARY DRIVERS

Related to the article on misconduct in New Jersey State Police officers, a similar study on the conduct of Israeli military drivers by Tova Rosenbloom and Amotz Perlman focused on the relation between driver education and discipline and traffic violations. (Rosenbloom & Perlman, 2016). They hypothesized that higher education would decrease road accidents and law breaking. This prediction followed their general assumption that low education and cognitive ability were predictors of law-breaking behavior.

They broke their personnel down into two quality groups (low and high), where the high-quality group had higher education and higher resilience. In order to categorize the drivers, they used mathematical, vocabulary, analytic, non-verbal, spatial perception and

personality tests as well as education levels. They then graded and put the drivers in one of the two categories, with 150 military drivers in each category, and compared their driving records over the course of two years (2005-2006). In this study, all drivers in the analysis were males. They predicted that there will be more discipline and traffic violations and accidents in the low QG group than in the high QG group. The researchers expected that drivers with more discipline violations will have more traffic violations, which will result in more road accidents. Supporting their predictions, their findings indicated that the low quality group had more accidents, traffic offenses and more discipline offenses in the low QG than the high QG (Rosenbloom & Perlman, 2016).

These findings, though specific to military drivers, capture a cultural problem with personnel accountability and potentially a recruiting concern. Between both the research on police officers in New Jersey and military drivers in Israel, there appears to be a relationship between lower education and counterproductive organizational behavior that could help explain why the Marine Corps deals with as many disciplinary problems as it does, especially in the enlisted ranks. Evidence shows that job misconduct is less common among those with a higher education. Rosenbloom and Perlman (2016) discuss the possibility that those who are educated tend to understand the "why" of laws and regulations, while those who are uneducated may only follow laws based on fear of punishment. Their claim supports an argument about enlisted Marines who get into more off duty trouble because they believe there is less chance of getting caught, while officers tend to stay out of trouble even when off duty because they are more compliant with laws due to their understanding of them and why they exist.

G. DETERMINANTS OF FIRST-TERM ATTRITION FOR ENLISTED AND OFFICER SELECTED MARINE CORPS RESERVISTS

A study by Ugurbas and Korkmaz (2015) on first-term attrition for enlisted and officer reservists explores the variables that have the greatest effects on attrition. Data in this study spanned from 2001 through 2014 from existing information from Manpower and Reserve Affairs, which included 121,942 enlisted personnel and 10,254 officers. They used first-year information on sex, race, education, AFQT score, and waiver variables. Last-year information is used for all other variables such as age, marital status, and rank variables.

Other independent variables fell into five groups including demographics, ability and aptitude, military characteristics, geographic characteristics, and fiscal year cohort. In addition, the analysis controlled for the unemployment rates of the home states of the servicemembers as an indicating factor because reservists are generally still in the market for employment and generally search near their home of record.

In Ugurbas and Korkmaz's results, there was a positive statistically significant relationship between higher education and attrition among enlisted Marines where those with a higher than High School level education increased attrition by approximately 31 percentage points. Though there were other related factors that predicted increases and decreases in attrition rates (marital status, promotions, age, enlistment waivers, AFQT), the authors recommended specifically that policy should be created to keep these more capable enlisted personnel (Ugurbas & Korkmaz, 2015).

H. TUITION REIMBURSEMENT AND VOLUNTARY TURNOVER

Currently, the tuition assistance (TA) program does not require anything from the Marines who use it, other than to pass their classes or risk having to pay back the government. Arguably, there is a detriment to the Marine Corps for allowing Marines to use TA. Taking classes online or after work is tiresome, time consuming, and takes a toll on the mental and physical capacity of those Marines who take advantage of TA. Adding extra work at the end of the day and into the night rarely renders a more productive employee the following day at work. It also can put the Marine in a position to be ostracized by their peers, as they are not going out at night and sharing in the camaraderie-building experiences. Then, as the research above showed, educated enlisted Marines could have a tendency to get out of the Marine Corps once they attain their degree, leaving the Corps with a bill for the education and a gap in their MOS and overall manpower, with no return on investment for educating the enlisted Marine. So how do we keep turnover down and encourage our educated enlisted members to invest back into the Corps after completion of their degree programs?

Benson et al. (2004) explore how investing in employee education can reduce turnover. First, the article confirms what we already know: Largely, that turnover is

reduced while employees are benefitting from tuition assistance or tuition reimbursement programs while in school, but that voluntary turnover increases once the degree is earned. However, Benson et al. offer an interesting additional data point: turnover decreases again if employees are then promoted after they earn their degrees. Enlisted promotions are attributed, in some part, to education. This is due to promotion points awarded to E2-E4 promotions for college course completions and the potential of having better fitness report averages because the Reporting Senior/Reporting Officer have subjective grading ability. The issue with both is that the composite score change is miniscule, the grading is subjective, and neither result in a definitive promotion.

The research above provides a better understanding of how education impacts performance, retention and misconduct from examples in and out of the military. Most of the literature on the topic suggests positive benefits of an educated workforce, but also supports the purpose of conducting the analysis laid out in this thesis.

IV. DATA AND METHODOLOGY

This chapter will discuss the data extracted and statistical modeling used to examine the impact of education on enlisted job performance. Several variables and performance indicators were considered, including: at processing and cumulative performance reviews (fitness report relative values), physical fitness test scores, misconduct incidents, and attrition. The data extracted includes, but is not limited to, basic demographic information on each Marine: age, gender, race/ethnicity, rank, intelligence classification scores (AFQT), education status, location, date of birth, years of service, misconduct events, physical fitness test scores, and fitness report values.

The data collected for this thesis comes from the Marine Corps' Total Force Data Warehouse (TFDW) and totaled 679,850 unique individual active-duty Marines observed monthly between July 31, 2005, and December 31, 2020, for a total of 35,250,341 person-month observations. Person-month observations are monthly data points for each area of collected data on an individual over the period of time that the data was collected. Encrypted unique identifier information from TFDW sets was then cleaned of information that is not useful, inspected for errors, and duplicate data was identified then removed from the data set.

A. SAMPLE RESTRICTIONS

For the primary analyses, sample size was limited by the availability of data on predictor and control variables.

For analyses examining retention, I limited observations based on years of service. From the original data, all individuals who joined the Marine Corps prior to July 1, 2005, were dropped from the analysis. Additionally, incomplete or corrupt observations were dropped from the analysis. Lastly, individuals who would not have the opportunity to begin receiving fitness reports, or who re-enlist before Dec 31, 2020, were dropped from the analysis. The results of this cleaning of data were a sample composed of 322,753 individual Marine observations.

For the other analyses, I drop additional observations to ensure that individuals in the analyses would have a cradle-to-grave observation period. My data begins in July 2005, so I only examine Marines who joined in July 2005 or later. Some data observations were delimited incorrectly causing corrupt and incomplete information on individuals, which did not allow proper analysis. Any Marine's career that could not be tracked to a point past re-enlistment or an averaging of three fitness reports at minimum, was excluded from analysis.

B. SUMMARY STATISTICS

Table 3 reports summary statistics of the data used in my analysis, including the sample size (n), mean, standard deviation, and minimum and maximum values for each variable. As an example, for relative value, we observe a minimum value of 80 and a maximum value of 100). Similarly, for average career PFT, the minimum observed value is 103 and maximum observed value is 300. I review Table 3 data in the following sections.

Table 3. Summary statistics for Marine Corps personnel July 2005–December 2020

	n	mean	std dev	min	max	sum
Enlisted w/o Bach by 1st contract	322753	0.944	0.231	0	1	304542
Enlisted w/ Bach at enlistment	322753	0.009	0.092	0	1	2779
Enlisted attains Bach by 1st contract	322753	0.004	0.065	0	1	1354
Officer - never enlisted	322753	0.044	0.204	0	1	14077
Fitness report relative value at processing	91493	90.450	4.494	80	100	8275520
Fitness report relative value cumulative	91494	90.181	4.306	80	100	8251051
Misconduct (incident = 1)	91493	0.068	0.252	0	1	6254
Re-enlists once	322753	0.503	0.500	0	1	162348
Re-enlists twice	162348	0.306	0.461	0	1	49729
Re-enlists three times	49729	0.247	0.431	0	1	12292
Re-enlists four times	12292	0.037	0.188	0	1	453
Average career PFT	83872	255.258	27.303	103	300	2.14E+07
First PFT	321462	251.379	30.068	116	300	8.08E+07
Armed Forces Qualification Test (AFQT)	236600	63.041	17.890	2	99	1.49E+07
Gender (female = 1)	322752	0.078	0.268	0	1	25137
Ethnicity (persons of color = 1)	322753	0.259	0.438	0	1	83530
N	322753					

1. Educational Groups

Marines to be analyzed were categorized into four education groups: enlisted who did not attain a bachelor's degree by the end of their first contract, enlisted who joined the Marine Corps with a bachelor's degree , enlisted who attained a bachelor's degree within their first contract, and officers who were never enlisted. Enlisted who did not attain their bachelor's degree by the end of their first contract comprised the majority population at nearly 94.35% of the total individual Marine observations. Enlisted who joined with a bachelor's made up just 0.86% of the sample, totaling 2,779 individual Marine observations. Enlisted who attained their bachelor's within their first contract totaled 1,354 individual Marine observations or 0.65% of the sample. Officers who were never enlisted comprised about 4.36% of the total individual Marine observations at 19,653.

2. Sample Restrictions

To ensure that we could observe Marines' performance after they'd reached at least E5 I limited my analysis to Marines who had received at least three fitness reports. This was for all outcome variables except retention. Retention was not restricted by reception of fitness reports.

The start of a Marine's career is observed to gather their baseline performance and give them time to obtain a degree within their first contract. Thus, the analysis is limited to Marines who started in 2005 or later and are seen past first contract with three or more fitness reports on record, or those who joined later than 2016 so they could not be reviewed past the data cutoff of Dec 31, 2020; all except in the case for retention data where the Marines were analyzed at the point of retention regardless of rank.

For the retention data, Marines of each education group were observed every four years to determine if they were still in the Marine Corps. Additionally, to ensure the analysis was not accounting for any separations before the first contract was completed, Marines must have made it to the end of their first contract before they were considered as a second term Marine. Then, for follow-on re-enlistment considerations, parameters were set to only account for the Marines within the next enlistment status to be considered for a

third, then fourth enlistment. This ensured Marines were not being counted twice, to reduce bias towards re-enlistment.

3. Outcome Variables

This research examines five outcome variables. The first four are: relative values at processing and cumulative relative values of Marines' fitness reports, Marines' average physical fitness test, and misconduct. These four were analyzed utilizing a code which created a "post" variable that ensured analysis was conducted when a minimum of three fitness reports were captured. Once a minimum of three fitness reports were captured on an individual, they were given a fitness report average (both at processing and cumulative). This average included the first three fitness reports, and any that followed. If the individual had two or less fitness reports, they were omitted from the analysis of the first four outcome variables. Retention was analyzed by four-year observation periods as was described above.

a. Fitness Report Relative Values at Processing and Cumulative

The Marine Corps uses annual performance reviews, known as fitness reports, within the Performance Evaluation System (PES) to evaluate a "Marine's performance to support the Commandant's efforts to select the best qualified personnel for promotion, career designation, retention, resident schooling, command, and duty assignments" (United States Marine Corps, 2018, p. 2). Within this system are a number of distinct components that determine an overall average of a Marine's performance over a given reporting period or cumulative average over their time spent in one rank. For the purposes of this thesis, the focus for fitness reports is on the average relative values and cumulative relative values of the individual Marines.

Relative value is not a part of the fitness report writing process of the individual Marine, rather it is a metric that determines an average based on the rating history of that reporting senior (RS). The PES manual (2018) states that relative value is used to compare the average of the fitness report to the reporting senior's (RS) average of all their written fitness reports of the same rank, and their highest fitness report average written on Marines of the same rank. Output of a Marine's relative values are on a point system between

80 and 100. Individuals can find themselves in three categories of their RS's average: upper third is between 93.34 and 100, middle third is between 86.67 and 93.33, and bottom third is between 80.00 and 86.66.

There are two forms of relative value: at processing and cumulative. At processing is the individual's calculated relative value at the time of that report, where cumulative is the calculated average over time as the RS continues to write more reports on individuals withing that paygrade. Over time, cumulative relative value can change where at processing relative value cannot. A Marine's performance in many areas contributes to the officer's grading of their report during the reporting period, some of these areas include, but are not limited to: mission accomplishment, individual character, leadership, intellect and wisdom, and fulfillment of evaluation (for officers only). Each of these attributes is further broken down into more distinct areas of evaluation.

Fitness report relative value averages were only captured if the Marine had three or more fitness reports on record to determine an average. Additionally, they had to be past their first contract. The mean relative value for the sample is 90.45. The same method is used for cumulative relative value where the mean is 90.18. The sample for each is 92,242 and 92,243, respectively.

b. Physical Fitness Test

The Marine Corps utilizes two fitness tests, physical fitness test and combat fitness test, to numerically evaluate Marines' physical performance throughout their careers. The intent of the Marine Corps' fitness tests are that, "Every Marine must be physically fit, regardless of age, grade, gender, or duty assignment and that all Marines should adopt a healthy lifestyle and a lifelong commitment to fitness" (United States Marine Corps, 2019). The physical fitness tests (PFT) and the combat fitness tests (CFT) are conducted in the first six months and last six months of every year, respectively. Though some of the standards of each exercise have changed over the period covered by my analysis, namely the amount of repetitions and times it takes to conduct them, they have largely been the same. For the physical fitness test, three events are recorded: pull-ups, crunches, and a three-mile run. Each of these events are in a range from zero to 100 in points, totaling a

maximum of 300 points on the entire physical fitness test. The combat fitness test also has three events: movement to contact, ammo can lifts and movement under fire. Similarly, each event is worth up to 100 points totaling a maximum of 300 points for the entire combat fitness test. Due to limitations in combat fitness test data, since it is not being evaluated for the first few years of my observation period, it has been omitted from consideration of my analysis.

The PFT variable is a representation of the individual Marine's average PFT score if they met the parameters determined by the fitness report relative value variable. The mean PFT score is 255.4. 84,444 individual Marine observations were captured.

c. Misconduct

The Uniformed Code of Military Justice is federal law that falls under chapter 47 of U.S. Code, Title 10. Within this chapter there are descriptions of the types of misconduct: Non-Judicial Punishment (NJP) and Courts-Martial. Courts-Martial come in three forms: Summary (SCM), Special (SPCM) and General (GCM), with summary being the least severe and General being the most. NJP is less severe than any form of Courts-Martial. There are other forms of documentation and handling of misconduct within the Marine Corps, such as non-punitive letters of caution (NPLC), page 11's and 6105's. For the purposes of this analysis, only misconduct incidents found in chapter 47 of Title 10 in U.S. Code, NJP and Courts-Martial, were examined as part of the research.

Any misconduct that is conducted prior to the post variable parameters set by relative value is excluded from the analysis. Similar to the other outcome variables, the purpose of this research is to determine the effects education has on the careers of Marines *after* they reach a certain point in their careers. Additionally, anything that isn't an NJP or Courts-martial is excluded from the analysis. Page 11 entries and 6105's, lesser forms of administrative discipline actions, are less consistent and do not always constitute disciplinary actions (e.g., every Marine has to sign several Page 11 entries throughout a career as a letter of understanding on a subject even when it is not disciplinary in action). Also, individuals with multiple misconduct incidents were coded as 1 so the variable would be binary. This ensured that a Marine with multiple incidents would not skew the data.

Individuals with any misconduct (Nonjudicial Punishment, Summary Court Martial, Special Court Martial, General Court Martial) received a "1." All who have not had any misconduct on their records received a "0." The total individual Marine observations for misconduct is 6,258.

d. Retention

Retention and attrition are determined by both the Marine's willingness to re-enlist and the Marine Corps' desire to keep the Marine based on, but not limited to, needs of the Marine Corps, military occupational specialty readiness, total personnel strength, and the individual's performance and conduct. An individual can want to re-enlist but be found ineligible, or not want to re-enlist and the Marine Corps could desperately need them. These situations and everything in between play vital roles in the retention and attrition of Marine Corps personnel. Retention is generally conducted on a four-year basis, and so it is defined every 4 years for this analysis.

To ensure a Marine finishes their contract, retention variables were created with parameters that excluded individuals who did not reach the end of their contracts. Essentially, to consider someone in their second contract, they must have made it to four years first, and then to five years to show a re-enlistment took place. This trend is continued through 16 years of service to ensure Marines were making milestones in their careers before being considered as retentions or attritions.

Re-enlistment is also made binary to display whether an individual Marine re-enlisted in their career. The sample size is 322,753. Of that, 162,348 re-enlisted at least once.

4. Control Variables

Several variables were used to account for baseline differences between Marines who attain different levels of education and to act as proxies for less observable indicators, such as motivation. The control variables equate for baseline differences between Marines on variables other than educational attainment. Without these control variables the data could compare a female Marine against a male where one scored a 50 on the AFQT and

the other scored a 99 and both had completely different PFT scores. These control variables assisted in reducing the bias of the regressions by ensuring Marines with baseline attributes and abilities were compared against those most similar to them at enlistment. Below are descriptions of each control variable:

A variable capturing the entry PFT score of an individual Marine when they joined the Marine Corps was created as First PFT. 321,462 individual Marine observations were captured and the mean First PFT score is 251.38.

The Armed Forces Qualification Test (AFQT) score is captured in the variable AFQT, which denotes the AFQT score of the individual Marine at entry to the Marine Corps. The mean AFQT is 63.04.

A binary variable, Gender, was created to account for whether the individual Marine is a female or male.

A binary variable, Ethnicity, was created to code for whether an individual is a person of color or classified as white. More granular coding of race/ethnicity was not possible due to the limited sample size.

C. STATISTICAL MODELS

I used Stata 17 (1985-2021 StataCorp LLC) to analyze the data.

The primary model used for the four education groups is:

$$Y_i = \beta_0 + \beta_1 EnlistsWithBachelors_i + \beta_2 EnlistedAttainsBachelors_i + \beta_3 OfficerNeverEnlisted_i + X_i\theta + \varepsilon_i$$

where Y_i is the outcome of each regression of Marines that fall into the four education groups. The coefficients of interest (β1, β2, and β3) estimate how each group performs on the outcome variable in relation to the excluded variable (enlisted who do not possess a bachelor's degree by the end of their first contract). X_i represents controls for AFQT, entry PFT score, gender and race/ethnicity (coded as white or person of color [POC]) to account for baseline differences across education groups. To perform the analysis, heteroskedastic-robust standard errors were used in the regressions.

V. RESULTS

I present my results in the following section. For overall performance, physical fitness, and misconduct, I present the results as figures for simplicity. The associated regressions for these figures are included in the appendix. The regressions on retention are presented in a table showing up to 16 years of retention, dependent on total years of service for the individuals.

A. OVERALL PERFORMANCE

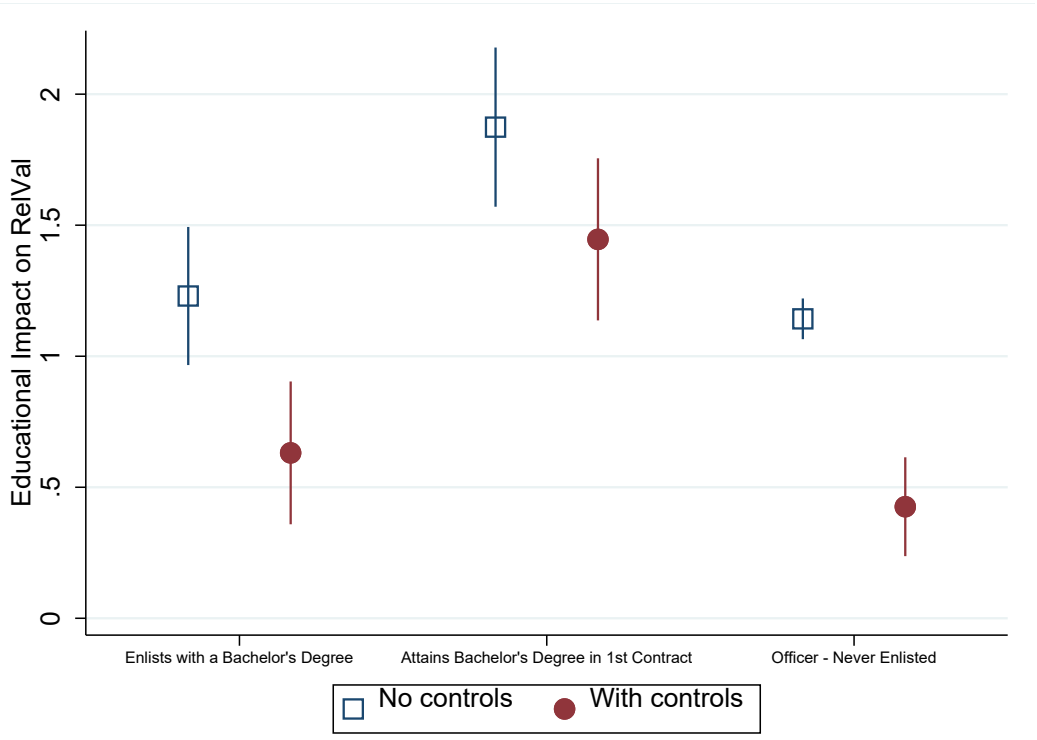
Figures 2 and 3 detail the numerical findings and differences in coefficients for each performance variable in relation to education attainment target groups.

1. Fitness Report Relative Value at Processing

Relative value at processing is an important variable as it shows the individual Marine's overall performance at a single point in time. A Marine could have done something that seemed spectacular or less than average, which would result in a higher or lower score than their peers, but only at the time of reporting. Results of my analysis indicate that of the enlisted education groups, Marines who attained a bachelor's degree within their first contract had the highest average fitness report relative values at processing.

Figure 2 shows the estimated change in relative value for each education group relative to the constant (an enlisted Marine who did not attain a bachelor's degree by the end of their first contract). Values plotted reflect these changes with and without controls.

Figure 2. Impact of education on fitness report relative value at time of processing



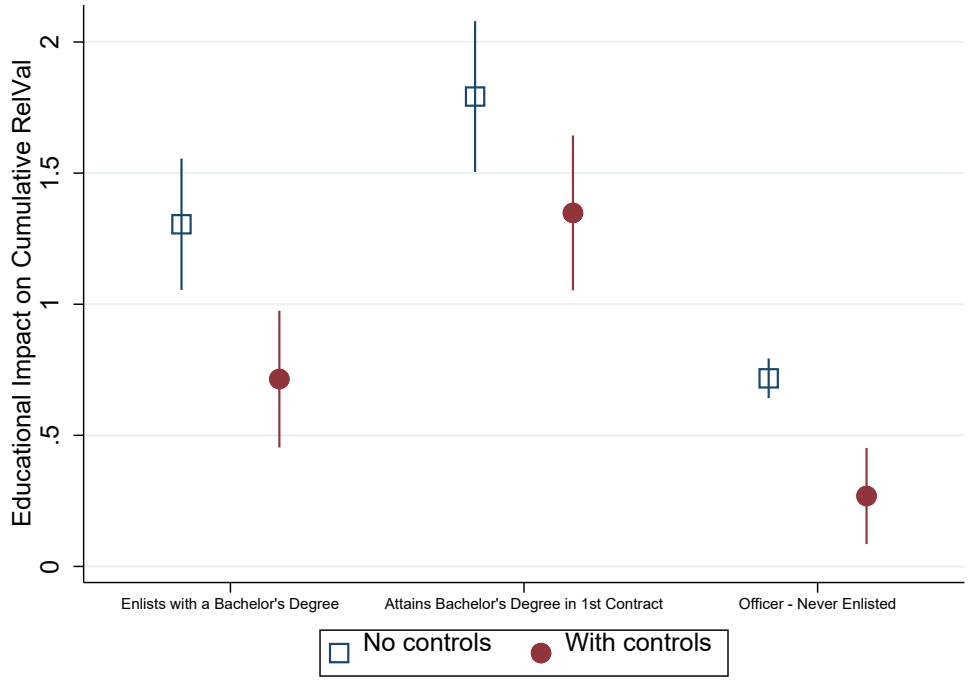
From this coefficient plot, it is evident that all three groups perform better than the group that does not attain their bachelor's degree , even after accounting for baseline ability and demographics. With controls, it can be estimated that a Marine who enlists with a bachelor's degree and a Marine who attains one in their first contract will perform, on average, 0.63 and 1.45 points better for relative value on their fitness reports, respectively, than those who did not have a bachelor's at the end of their first contract. Putting these results in perspective, these two changes represent a 9.5% and 21.8% point improvement, respectively, in one of the three terciles (bottom, middle, upper) of an RS average. These changes could move a Marine's Master Brief Sheet averages from one tercile of the RS profile (e.g., lower, middle, upper) to the next, increasing or decreasing their chances of promotion and retention.

2. Fitness Report Cumulative Relative Value

Though the relative value at time of processing is important, sometimes it can be inflated or deflated due to an officer's profile, the average Marine they have dealt with up until that time, or even just inexperience. Cumulative relative value seeks to balance that average. Over time, cumulative relative value can change as the officer (reporting senior) grades more Marines in that paygrade. Results of my analysis indicate that of the enlisted education groups, Marines who attained a bachelor's degree within their first contract have the highest average fitness report cumulative relative values.

Figure 3 depicts a coefficient plot showing the cumulative averages of relative value. In this plot, the values change very little from Figure 2, indicating that regardless of the time of fitness report (at processing vs. cumulative), education has a positive relationship with a Marine's overall performance. In both cases, the enlisted Marine who attains their bachelor's degree within their first contract is outperforming all other educational groups.

Figure 3. Impact of education on fitness report cumulative relative value

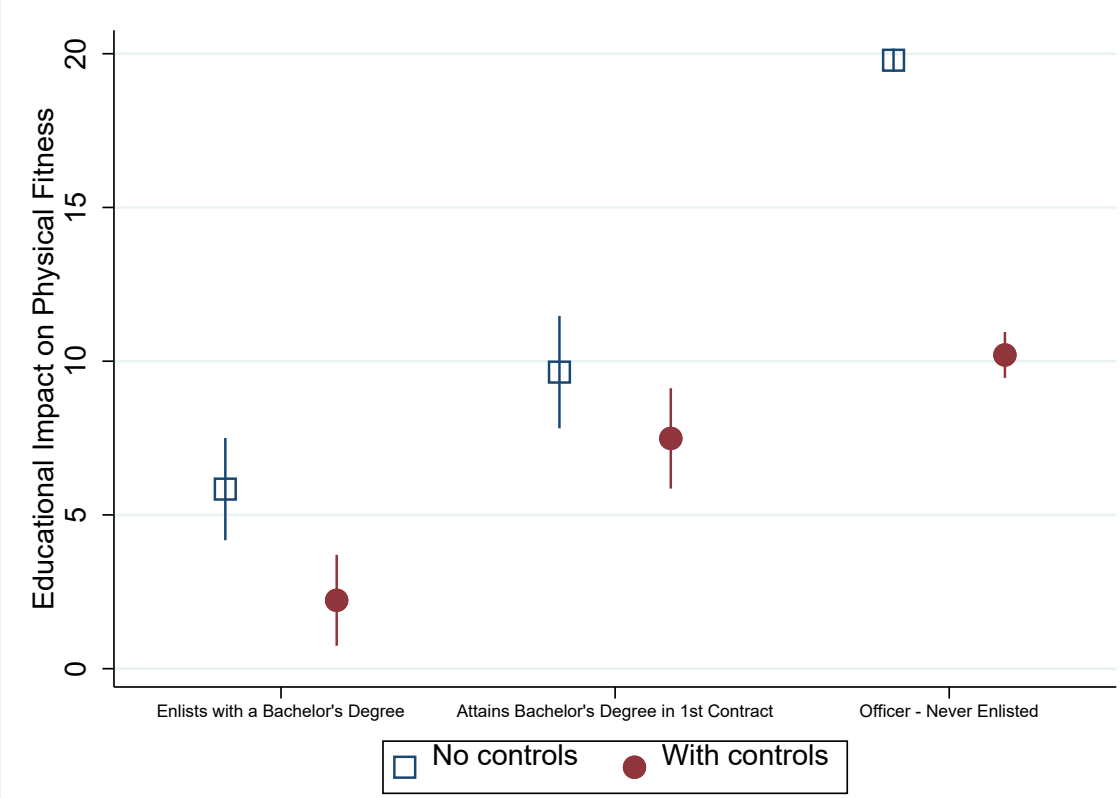


B. PHYSICAL FITNESS

Physical fitness is a sacred indicator of a "good" Marine in the Corps. Meritorious promotion boards are won often because of PFT scores, and good leadership is credited to physical fitness capabilities in many instances. Although physical fitness is not a direct indicator of leadership traits, moral judgement, critical thinking, or other qualities important to and impacting a total Marine's proficiency and conduct, it is hypothesized that educational level would impact a Marine's PFT score. Results of my analysis indicate that of the enlisted education groups, Marines who attained a bachelor's degree within their first contract have the highest average physical fitness test scores.

Regression results indicated that an enlisted Marine that joins the Marine Corps with a bachelor's degree will, on average, score 2.2 points higher on a PFT than the Marine who does not attain a bachelor's degree by the end of their first contract, even if they come in with the same AFQT and baseline PFT score (see Figure 4). Similarly, and perhaps more indicative of the benefits of educating our enlisted while in service, a Marine who attains their bachelor's degree in their first contract will score 7.5 points higher than the Marine without.

Figure 4. Impact of education on physical fitness test scores



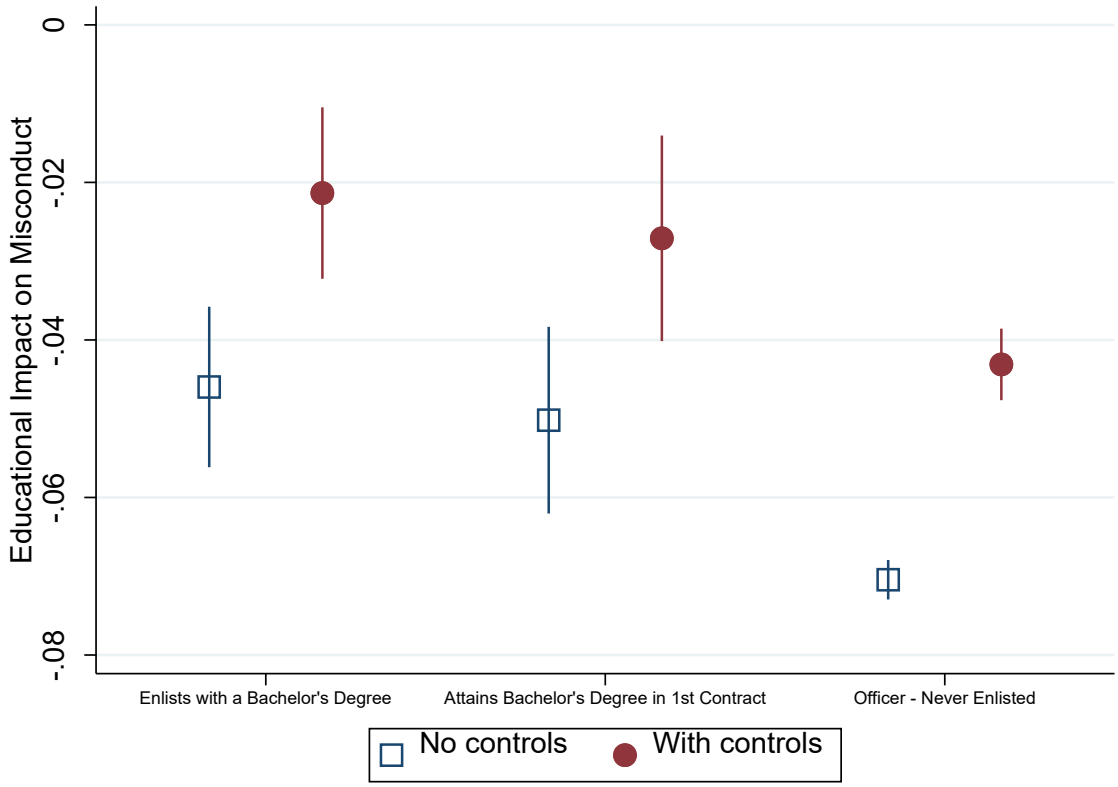
C. MISCONDUCT

Of the enlisted education groups, Marines who attained a bachelor's degree within their first contract are the least likely to be involved in misconduct.

The Marine Corps would benefit from seeing a decrease in misconduct incidents. The hypothesis that educational attainment would be related to a decrease in misconduct incidents is supported by the findings in the regression with and without control variables (see Figure 5). In comparison to Marines who do not attain a bachelor's degree by the end of their first contract, Marines who enlist with a bachelor's degree are 26.6% less likely to have a misconduct incident later in their careers (calculated as -0.021 divided by the enlisted without degree mean of .079. For those who attain a degree by the end of their first contract, the drop in likelihood is 34.2%. In other words, both enlisted education groups

were significantly less likely to be involved in misconduct during the period of observation than those who did not attain a bachelor's degree by the end of their first contract.

Figure 5. Impact of education on misconduct



D. RETENTION

Of the enlisted education groups, Marines who attained a bachelor's degree within their first contract are the most likely to re-enlist.

Retention and attrition are major focal points as the Commandant continues to support aging of the force and retention of talent (Berger, 2021b). Exploring the common belief that educated enlisted personnel will attrite in order to find higher paying jobs in industry, the results offer a nuanced picture. First, those who enlist with a bachelor's degree were not significantly more likely to leave the Marine Corps after their first contract, displaying a 3.4% (calculated as -0.018 divided by the enlisted without a degree mean of

0.528) higher chance of attrition than those who did not attain a bachelor's degree by the end of their first contract. For the same educational group, they have a lower likelihood of retention for their second and third re-enlistment opportunities at 10% and 38.9%, respectively (see Table 4). The first enlistment effect was not statistically (or practically significant), while the second and third enlistment effects were. In contrast, those who attained a bachelor's degree by the end of their first contract are 22.3% more likely to re-enlist than those who did not attain a bachelor's degree by the end of their first contract, 58.4% more likely to re-enlist a second time, and 28.8% more likely to re-enlist a third time. Each of these results was statistically significant. This data indicates that those who are invested in education attainment while in service tend to re-enlist more than any of their peer groups through at least three re-enlistment periods as shown in Table 4.

Table 4. Impact of education on retention

	Re-Enlists	Re-Enlists Twice	Re-Enlists Three Times
Enlisted w/o Bachelor's by 1st contract	0.000	0.000	0.000
	(.)	(.)	(.)
Enlisted with Bachelor's	-0.018	-0.027**	-0.089**
	(0.010)	(0.010)	(0.018)
Attained Bachelor's within 1st Contract	0.118**	0.157**	0.066**
	(0.014)	(0.016)	(0.023)
Officer - Never Enlisted	0.150**	0.134**	0.126**
	(0.008)	(0.011)	(0.017)
AFQT	0.004**	-0.001**	0.001**
	(0.000)	(0.000)	(0.000)
Persons of Color	-0.016**	-0.013**	-0.050**
	(0.002)	(0.003)	(0.004)
Female	0.012**	-0.004	-0.015*
	(0.004)	(0.004)	(0.007)
Entry PFT	0.001**	0.000**	0.000**
	(0.000)	(0.000)	(0.000)
Constant	0.053**	0.218**	0.159**
	(0.010)	(0.011)	(0.018)
Observations	236481	162295	46545
R-squared	0.029	0.004	0.006
HS only mean	0.528	0.269	0.229

The table shows how different educational attainments influence a Marine's performance while controlling for variables that align those Marine's career starting points. Control variables are AFQT score at entry (AFQT), Persons of Color, if respondent is female (Female), initial PFT score (Entry PFT). Outcome variables are Marines who did not attain a Bachelor's degree by the end of their first contract (no Bachelor's 1st contract), enlisted who joined the Marine Corps with a minimum of a Bachelor's degree (enlisted with Bachelor's), Marines who attained their Bachelor's degree before the end of their first contract (attained Bachelor's in 1st contract), officers who were never enlisted (officer never enlisted). Robust Standard Errors are in parentheses. * indicates a confidence level of 5%. ** indicates a confidence level of 1% * $p < 0.05$, ** $p < 0.01$

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VI. DISCUSSION

A. SUMMARY OF KEY FINDINGS

This research breaks ground on understanding how education impacts the performance of enlisted servicemembers. Though specific to the Marine Corps, the findings support of a positive return on investment for education of our enlisted force. The results of this analysis indicate a positive correlation between education and overall performance and physical fitness. Additionally, they show that higher education is associated with less misconduct and greater retention of our enlisted servicemembers. Considering the overall picture, my data carry clear implications for recruitment and retention strategies, as well as manpower staffing. Furthermore, the results from this study can act as a starting place to guide senior leadership's decisions on funding when considering return on investment for programs that invest in short– and long-term enlisted capabilities.

My research demonstrates a positive link between enlisted education and both overall performance and physical fitness through a Marine's career. Evaluation of Marines' overall performance is necessary to understand how to advance our force and foster growth among our Marines. Given the importance of a physically fit and capable Marine Corps that is able to meet the missions of the service and nation, the results of this research also suggest that investment in education enhances the physical fitness ability of the individual Marine. Since physical readiness is necessary to carry out the demands of the organization, any investment into making Marines more fit will better prepare the Corps for the challenges of the modern operating environment.

Misconduct in the Corps not only jeopardizes the individuals and those around them, but also the image of the institution. Additionally, time and money spent on the legal process, administrative burden as well as the attrition of already trained Marines is unnecessary and avoidable. My research shows that enlisted Marines with higher education are involved in significantly fewer misconduct incidents. Knowing this, the Marine Corps'

investment in education could prevent loss of time and money as well as reduce attrition due to misconduct.

In the final area of my research, education had mixed outcomes in relation to retention. Enlisted Marines who enter the Corps with a bachelor's degree were not significantly less likely to re-enlist for a second contract, but were less likely to re-enlist through their second and third re-enlistment opportunities as compared to enlisted Marines who do not have a bachelor's degree by the end of their first contract. In contrast, those enlisted Marines who attained their bachelor's degree within their first contract were more likely to re-enlist through their first three re-enlistment opportunities through their 16-year mark of active duty service. The fact that Marines who attain a bachelor's in their first contract are more likely to re-enlist than individuals in either of the other two education groups supports a return on human capital investment

These findings are consistent with several other NPS studies showing that (graduate) education has significant effects on the retention of officers in the military. Pearson's (2007) thesis showed, through regression analysis, that graduate education has a significantly positive influence on retention and promotion of LAF officers. This report, and many more, display a positive correlation between education and retention. These data could be used to support increased education opportunities for enlisted servicemembers that would benefit the total force as we face an ever more complex operating environment.

B. INNOVATION

Even as a buzzword, innovation is still an important element of an ever-evolving force. Specifically, education plays a major role in innovation as it exposes us to areas of advanced capability (e.g., without experience in artificial intelligence, machine learning, mathematics, or engineering, one would likely not be able to innovate in those areas). To capitalize on the true innovative abilities of an organization, education must be at the forefront of investment in human capital.

Kardashian (2020) explains the profound effects that higher education has on innovation in his exploration of China's dark period, in which higher education was largely shut down within the country. Not only did it have immediate detrimental effects on

economic growth, but it took decades after the re-opening colleges for the country to recover and begin innovating again. If we look at China today, we can see the massive growth and recovery that has made it a threat in many areas of economic, defense and cyber domains. If a lesson can be learned here, it is that opening up more pathways to education can expand the capabilities of the nation and propel it forward on the world stage.

Innovation is often associated with some new technology, a gadget or tool, used to make processes faster, smarter and more efficient; but innovation can also be applied to a concept, system or cultural ideal just as easily. Nevertheless, from an organizational perspective, it is easier to accept a new product than it is a new idea that might change culture. Similarly, it can be easier to display a return on investment for a new weapon system, vehicle armament or maintenance tool that reduces overhead than trying to account for the value of an investment into education that reveals itself over the course of a servicemember's career. If the Marine Corps is only willing to risk investment on the tangible, the gap between human adaptability and technology depicted in Teller's graph (Figure 1, Chapter 1) will increase exponentially.

My thesis takes a first step towards understanding the value that educational attainment might have for promoting critical thought, innovative change and OCB within the Marine Corps. The findings of my research show that Marines who attain their bachelor's degree within their first contract have better overall performance, higher physical fitness scores, are less likely to be involved in misconduct and are more likely to re-enlist. These findings, coupled with the simple fact that these Marines have received intellectual training, are evidence that those same Marines are better critical thinkers who, through trial and adaptability, can innovate around change and serve as better organizational citizens. These characteristics are what the Marine Corps is looking for in Marines, and this seems to be a piece of the instruction manual on developing them. Because we have not known these impacts previously, the Marine Corps may have been reluctant to increase or expand education opportunities to enlisted members as the return on investment is undetermined and vague at best. The findings in my research support structural changes that encourage and optimize enlisted capabilities through education. A more educated enlisted force, supported by innovative practices and experiments, could be

elevated to solving some of the more complex problems the Marine Corps faces. Since nearly 90% of the Marine Corps is enlisted and under 3% of enlistees possess a bachelor's degree , it is in the organization's best interest to invest in the skillsets that would allow the total force to produce innovative ideas at the speed of relevance.

Roger's Five Factors framework is a useful way to chart a research agenda that builds on the findings of my thesis and moves the Marine Corps closer to understanding the return on investment for education. Though generally related to a product and not an innovation based around human capital, Roger's Five Factors (see Table 5) is still a good way to determine diffusion rates and highlight the hurdles that ideas would face in our organizations. As Gourville (2021) states, "By increasing its perceived relative advantage, increasing its perceived compatibility relative to values and norms, decreasing its perceived complexity, increasing its trialability, and increasing its observability, a manager can proactively increase the likely rate of adoption for an innovative new product" (p. 6). Below, I apply Roger's Five Factors to the innovative proposal of expanding educational opportunities among enlisted service members.

Table 5. Roger's Five Factors defined and applied to this research. Adapted from Gourville (2021).

Roger's Factors	**General definition**	**Research question applied to expanding enlisted education**
Relative Advantage	The degree to which an innovation is perceived as being better than the idea it supersedes	How much better is having a more educated enlisted force than the status quo?
Compatibility	The degree to which an innovation fits with the existing values, past experiences, and needs of potential adopters	In what ways does having better education opportunities for enlisted personnel hold the Marine Corps to the values and standards it is positively known for?
Complexity	The degree to which an innovation is perceived as difficult to understand and use	How difficult is it to increase enlisted education opportunities or understand the value of doing so?

Trialability	The degree to which an innovation may be experimented with on a limited basis	How can we experiment with the concept of a more enlisted force and how can its impact be measured?
Observability	The degree to which the results of an innovation are visible to the adopters	What are the observable effects of a more educated enlisted force and how can these benefits be made visible to leadership?

Applying Roger's Five Factors, we can assume that there is, at least, a marginal benefit to the concept of investing in enlisted education. Magnitude of the investment is key; considering that the enlisted population is almost ten times the size of the officer population, one could ask if the top tier of enlisted servicemembers is worthy of the same educational investment as the bottom tier of officers selected for education programs. There is relative advantage to this consideration, and it seems to uphold the values of the Marine Corps' most important purpose: to fight and win the nation's battles. Future research can determine the feasibility of educating our enlisted force in terms of funding, trialability and results. The Marine Corps is in a unique and beneficial situation for assessing the impact of educational innovation within its workforce. It, in part, owns its applicants, students, curriculum, and employees before and after education, as well as their employers, allowing for a controlled testing environment.

Although credit is often given to the individual's innovative idea, more should be said about the role of organizations in fostering innovative environments that lead to these types of creations. Using DARPA as an example, Dew (2017) observes that innovative outputs require innovative talent within the organization and an environment that supports it: "Leveraging the best and brightest minds in a risk-tolerant environment that fostered creativity and innovation, DARPA had created an impressive legacy of game-changing technologies, such as the Internet, GPS (Global Positioning System), stealth capability, unmanned aerial vehicles, and micro-robotics" (p. 1). A culture of innovative risk acceptance and the decisions to experiment with new concepts while investing in their people is what rewards the organization with innovative output. The DOD would benefit

from the same concept: invest in your people, supporting the education of both officer and enlisted, so that you can capitalize on the talent of a total force rather than a pool of few.

C. LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

The largest limitation in my research relates to the quality of data at reception. Much of the data had to be dropped due to incompleteness, corruption, incorrect accountability of information on Marines, or missing information in general. There were tens of thousands of mistakes regarding educational attainment for both enlisted and officer Marines, as well as blank fields. Though the results of this research are consistent with other data that can be verified, a more robust analysis, with more usable data would assist in returning even more definitive findings.

Additionally, there is a limited ability to determine causality from this research alone. Further and expanded research should be conducted to test causal hypotheses. An important third variable to consider is *motivation.* Though my research sought to control for several variables that could serve as proxies for motivation (e.g., baseline intelligence and baseline physical fitness), it is difficult to determine if one educational group is composed of high performers, in general. Another hypothesis could be that educational attainment in the first term might cause a change in performance and set a Marine on a trajectory of higher capability, achievement and leadership visibility. Research with a broader data set would help account for motivational differences among Marines.

My study limited the education groups to their educational attainment by the end of their first contract. Expanding the sample size past the 15-year data I requested could enable a researcher to analyze the educational impact on performance at different points in a Marine's career. This research focused mostly on the performance of enlisted Marines' careers, where promotion was not analyzed due to the structure of the Marine Corps' promotion system. Given a more inclusive data set it could be determined if educational attainment has an impact on the selection process of enlisted Marines.

It is recommended that further research be done on the impact of education on enlisted Marines' physical fitness capabilities. The limitation of using the Combat Fitness Test (CFT) as our measure of physical fitness is it being incorporated after a point where

the Marines would have enough time left on contract for full analytical evaluation. Additionally, the PFT is currently changing its testing requirements, which could change the outcome of this study. In future studies, researchers could sample a more recent data set to ensure they capture useful data regarding CFT performance.

Future research could also explore the impact of educational attainment on the RO marks of an enlisted Marine's fitness report. The reporting of this area is key to the promotion briefing of an individual Marine, and this research could test the impacts of educational attainment to further support hypotheses about overall performance.

Awards were omitted from this research as there was not a quantifiable method of analyzing the receipt or circumstance of the awards. It is unknown if educational attainment has an impact on a Marine's performance in relation to the acknowledgement that leads to the reception of an award.

Given the small sample sizes of ethnic demographic groups, my research only broke down the data on ethnicity into two categories: persons of color (POC) and white. It is recommended that the total sample size be expanded over a longer timeframe to help determine how results might change when accounting for a more specified breakdown of ethnic diversity. This research could help the Marine Corps better understand motivations of enlistment and recruitment strategies that could improve diversity and inclusion. Moreover, with a larger sample size, a subgroup analysis could be used to see if obtaining an education in the military had bigger or smaller benefits to POC vs. non-POC Marines.

Similar to the sample size limitations on ethnicity, there was not enough data to create a subgroup for MOS. Recognizing the impact that education has on different performance outcomes under MOS subgroups would increase the Corps' ability to strengthen the total force and possibly adopt a similar structure of job selection that officers succumb to so that talent is distributed across the enlisted force more evenly. It is recommended that further research be conducted using a wider and larger sample size to determine the effects of educational attainment on performance with respect to MOS.

Lastly, PME was not considered in the research due to the pass or fail nature of PME evaluation. It seemed difficult to quantify the impact that educational attainment would have on enlisted PME attainment without a more sensitive evaluation scale.

VII. CONCLUSION

My research indicates that education is associated with improvements in enlisted Marines' overall performance, physical fitness ability, probability to re-enlist, as well as reductions in the probability of misconduct, even after accounting for baseline intelligence, physical abilities and limited demographics.

A. RECOMMENDATIONS FOR USMC POLICY

Enlisted personnel are required to be specialists in their fields, which requires specialized education to evolve with the advancements of technology, systems, strategy and operational concepts of the future operating environment. If we continue to neglect the education of our enlisted people, investing only in the advancement of our corps of officers, it could lead to officers being responsible for the brunt of the workload for future military missions, especially those requiring higher education and technological expertise. In contrast, if we promote through required educational milestones in the enlisted pipeline, we can raise the capabilities and efficiencies of the total force rather than increasing the existing divide between officer and enlisted. As advisors, enlisted servicemembers must be able to contribute value to their officer counterparts. This contribution falls flat without officers' confidence that it comes from a place of experience and education simultaneously.

1. Recruitment

This research showed that educated enlisted Marines perform at higher levels in most categories of evaluations, misconduct and retention. Knowing this should create opportunity for recruitment strategies that are focused before the recruiting office is ever involved.

A reorganization of the JROTC program could help identify, develop and recruit potential enlistees in gapped areas of technology and skills that the Marine Corps needs. Currently, JROTC is considered a "Leadership Education Program meant solely to develop character and citizenship" (United States Marine Corps, n.d.). Though commendable, there is room for progress in the identification and development of young students who could

potentially serve in the USMC. The JROTC program should be used to identify students who have an interest and desire in furthering their education; then it can invest in a system that would help candidates succeed in their studies as well as create an interest in critical and advanced military occupational specialties. In addition to the identification of candidates, JROTC should create a program that supports higher learning, tutoring, and encourages STEM related fields of study to support the Marine Corps' need for an evolving and complex mission requiring critical thinkers and innovators at the earliest stages of enlistment.

Marine Corps Recruiting Command should utilize marketing strategies that appeal to a wider and more diverse audience of potential enlistees. Much of the Marine Corps' current marketing strategy seems to revolve around physical abilities (e.g., climbing a mountain to fight a dragon at the top with the Noncommissioned Officer sword). Though it is still important to recruit the physically fit and nationalistic minds of the country, there is room for growth in other areas of recruitment strategy that could be aimed at intellectual capabilities and aptitudes. A STEM focused recruitment strategy with incentives around tuition assistance and education opportunities could entice an audience of intellectuals into the Marine Corps that may not have been otherwise interested. Additionally, those young Americans who do not have the opportunities or means to attend college, but have the aptitude and potential to do well, may find themselves interested in enlisting so they can take advantage of the opportunities granted by the organization. During a press conference, the former Director of the Joint Artificial Intelligence Center (JAIC) asked "How do I incentivize somebody to come in [to the military] at 50 to 75 salary cut and work in a government where our rules and regulations are a little different than they are in commercial industry?"(United States Department of Defense, 2019). This reorganization of JROTC could help solve this problem.

2. Investment

a. Entry-Level Education

In support of the enhanced performance observed in the educational group that attained a bachelor's degree within their first contract, it is recommended that the Marine

Corps invest into entry-level Marines' education. This can be attained through an *academic holding platoon* for top graduates from MOS schools. Creation of entry-level education programs can provide top graduates from MOS schools while furthering their education at local colleges and universities as resident students and extending their service contracts. This not only advances the force through educating its enlisted Marines, but also ages the force which is an area the Commandant expressly states as a necessity to the Corps' evolution.

b. Career-Level Education

Similar to the advantages of higher education for Marine Corps officers, it is beneficial to have enlisted Staff Noncommissioned Officers (SNCO) with higher education in order to support the officers they advise. Sending them to graduate education programs at military colleges would enhance the Corps' ability to accomplish missions and work cohesively across complex and joint operations. This program can mirror the Career Professional Intermediate-Level Education Board (CPIB) and the Commandant's Career-Level Education Board (CCLEB) found in Marine Corps Order 1524.1 – Marine Corps Graduate Education Program (MCGEP). Similar titles, Staff Professional Intermediate-Level Education Board (SPIB) and Staff Career-Level Education Board (SLEB) would be applied to represent a pull mechanism that screens enlisted SNCOs for prerequisites that would support resident graduate education programs.

3. Retention

Research in industry shows that attrition decreases among those using tuition reimbursement, but increases upon degree completion (Hui et al., 2000). This pattern reverses again if promotion is tied to degree completion. In the Marine Corps, my research shows that enlisted Marines who attain their bachelor's in their first contract are more likely to re-enlist through 15 years of service than their peers who do not attain a bachelor's degree or come into the Marine Corps with a bachelor's degree . This shows that early level investment into education is a major contributing factor to retention, and therefore should be an area of investment for the Marine Corps to ensure we are retaining the most capable and highest aptitudes of our force.

"*If you don't like change, you're going to dislike irrelevance even more.*"

— General Eric Shinseki

APPENDIX: TABLES AND CHARTS

Table 6 shows that all three educated target groups outperform the enlisted who do not get a bachelor's degree (constant) by the end of their first contract. For relative value, a Marine who enters the Marine Corps with a bachelor's degree will score, on average, 1.23 points higher on their fitness report than will the constant. Additionally, the Marine who attains their bachelor's degree within their first contract will score an average of 1.874 points higher on their fitness report than will the constant. This is a 6.15% and 9.37% increase overall.

Table 6. Mean performance impacts from education without controls

	Relative Value	Cumulative Relative Value	PFT	Misconduct
Enlisted w/o a Bachelor's Degree	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Enlists with a Bachelor's Degree	1.230**	1.305**	5.841**	-0.046**
	(0.134)	(0.128)	(0.848)	(0.005)
Attains Bachelor's Degree in 1st Contract	1.874**	1.792**	9.645**	-0.050**
	(0.155)	(0.147)	(0.933)	(0.006)
Officer - Never Enlisted	1.143**	0.717**	19.789**	-0.070**
	(0.040)	(0.039)	(0.194)	(0.001)
Constant	90.258**	90.048**	252.145**	0.079**
	(0.016)	(0.016)	(0.105)	(0.001)
Observations	91493	91494	83872	91493
R-squared	0.010	0.006	0.067	0.010
HS only mean	90.258	90.048	252.145	0.079

Note: The table shows how different educational attainments influence a Marine's performance while controlling for variables that align those Marine's career starting points. Outcome variables are Marines who did not attain a Bachelor's degree by the end of their first contract (no Bachelor's 1st contract), enlisted who joined the Marine Corps with a minimum of a Bachelor's degree (enlisted with Bachelor's), Marines who attained their Bachelor's degree before the end of their first contract (attained Bachelor's in 1st contract), officers who were never enlisted (officer never enlisted). Robust Standard Errors are in parentheses. * indicates a confidence level of 5%. ** indicates a confidence level of 1% * $p < 0.05$, ** $p < 0.01$

Using control variables to account for underlying differences between those who do and do not pursue education, Table 7 shows similar trends:

Table 7. Mean performance impacts from education with controls

	Relative Value	Cumulative Relative Value	PFT	Misconduct
Enlisted w/o Bachelor's by 1st contract	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Enlisted with Bachelor's	0.631**	0.714**	2.224**	-0.021**
	(0.139)	(0.133)	(0.755)	(0.006)
Attained Bachelor's within 1st Contract	1.446**	1.348**	7.489**	-0.027**
	(0.158)	(0.151)	(0.832)	(0.007)
Officer - Never Enlisted	0.426**	0.269**	10.202**	-0.043**
	(0.096)	(0.094)	(0.382)	(0.002)
AFQT	0.021**	0.021**	-0.015**	-0.001**
	(0.001)	(0.001)	(0.005)	(0.000)
Persons of Color	-0.600**	-0.539**	0.815**	0.014**
	(0.037)	(0.036)	(0.204)	(0.002)
Female	0.810**	0.797**	-3.211**	-0.036**
	(0.057)	(0.055)	(0.372)	(0.003)
Entry PFT	0.015**	0.016**	0.468**	-0.000**
	(0.001)	(0.001)	(0.004)	(0.000)
Constant	85.208**	84.707**	131.727**	0.185**
	(0.165)	(0.159)	(1.040)	(0.010)
Observations	76161	76161	69972	76161
R-squared	0.026	0.028	0.224	0.010
HS only mean	90.305	90.115	251.890	0.079

The table shows how different educational attainments influence a Marine's performance while controlling for variables that align those Marine's career starting points. Control variables are AFQT score at entrY(AFQT), Persons of Color, if respondent is female (Female), initial PFT score (Entry PFT). Outcome variables are Marines who did not attain a Bachelor's degree by the end of their first contract (no Bachelor's 1st contract), enlisted who joined the Marine Corps with a minimum of a Bachelor's degree (enlisted with Bachelor's), Marines who attained their Bachelor's degree before the end of their first contract (attained Bachelor's in 1st contract), officers who were never enlisted (officer never enlisted). Robust Standard Errors are in parentheses. * indicates a confidence level of 5%. ** indicates a confidence level of 1% * $p < 0.05$, ** $p < 0.01$

Even after accounting for four control variables to decrease the bias of the model, the coefficients resulted in a confidence level of 5% for all outcome variables and similar trends were displayed between both tables.

LIST OF REFERENCES

Albrecht, M. J. (1976). *A Discussion of some applications of human capital theory to military manpower issues* (No. ADA040888; p. 22). Rand Corps. https://apps.dtic.mil/sti/pdfs/ADA040888.pdf

Almendarez, L. (2011, October 11). *Human capital theory: Implications for educational development*. Second Conference. https://www.open.uwi.edu/sites/default/files/bnccde/belize/conference/papers2010/almendarez.html

Bacolod, M., & Chaudhary, L. (2018). Distance to promotion: Evidence from military graduate education. *Contemporary Economic Policy*, *36*(4), 667–677. https://doi.org/10.1111/coep.12275

Benson, G. S., Finegold, D., & Mohrman, S. A. (2004). You paid for the skills, now keep them: Tuition reimbursement and voluntary turnover. *Academy of Management Journal*, *47*(3), 315–331. https://doi.org/10.5465/20159584

Berger, D. (2019). *Commandant's planning guidance (CPG)*. United States Marine Corps. https://www.hqmc.marines.mil/Portals/142/Docs/%2038th%20Commandant%27s%20Planning%20Guidance_2019.pdf?ver=2019-07-16-200152-700

Berger, D. (2020). *Force design 2030 report phase I and II*. United States Marine Corps. https://www.hqmc.marines.mil/Portals/142/Docs/CMC38%20Force%20Design%202030%20Report%20Phase%20I%20and%20II.pdf?ver=2020-03-26-121328-460

Berger, D. (2021a). *2021 Force design annual update*. United States Marine Corps. https://www.marines.mil/Portals/1/Docs/2021%20Force%20Design%20Annual%20Update.pdf?ver=D8ZSD8j66Pci2kEsR4BYDw%3D%3D&timestamp=1619455504887

Berger, D. (2021b). *Talent Management 2030*. United States Marine Corps. https://www.hqmc.marines.mil/Portals/142/Users/183/35/4535/Talent%20Management%202030_November%202021.pdf?ver=E88HXGUdUQoiB-edNPKOaA%3D%3D

Blanco, R. L. (1966). Education reforms for the enlisted man in the army of Victorian England. *History of Education Quarterly*, *6*(2), 61. https://doi.org/10.2307/367419

Bowman, W. R., & Mehay, S. L. (1999). Graduate education and employee performance: Evidence from military personnel. *Economics of Education Review*, *18*(4), 453–463. https://doi.org/10.1016/S0272-7757(99)00014-X

Branigan, G. A. (2001). *The effect of graduate education on the retention and promotion of Marine Corps officers* [Master's Thesis, Naval Postgraduate School]. Calhoun. https:// https://calhoun.nps.edu/handle/10945/4298

Bureau, U. C. (2020). *Education*. Census.Gov. https://www.census.gov/topics/education.html

Carter, S., & Simmons, K. (2015). Intelligence professionals. *Marine Corps Gazette*, *99*(8), 50–52.

Cavanaugh, M. (2014, January 5). The decay of the profession of arms [Modern War Institute at Westpoint]. *Modern War Institute*. https://mwi.usma.edu/201415the-decay-of-the-profession-of-arms/

Dew, N. (2017). *The "As" in DARPA: Advanced or Applied?* [case study for DA3302: Navagating Innovation Ecosystems]. Defense Analysis department, Naval Postgraduate School.

Dixon, N. (2016). On the psychology of military incompetence. Basic Books.

Friedman, T. (2016). *Thank you for being late: An optimist's guide to thriving in the age of accelerations*. https://books.google.com/books?hl=en&lr=&id=r-U2DwAAQBAJ&oi=fnd&pg=PA3&dq=thank+you+for+being+late&ots=LkRYh3SaYQ&sig=l1ZvkBPrIJ1hs4xFDYTDn0ZmzdQ#v=onepage&q=thank%20you%20for%20being%20late&f=false

Gerding, S. C. (2007). An analysis of the relationship between higher education and police misconduct in the New Jersey State Police [Dissertation, Seton Hall University]. ProQuest.

Gourville, J. T. (2021). Note on innovation diffusion: Rogers' Five Factors. Harvard Business School Background Note 505-075. Harvard Business School.

Hui, C., Lam, S. S. K., & Law, K. K. S. (2000). Instrumental values of organizational citizenship behavior for promotion: A field quasi-experiment. *Journal of Applied Psychology*, *85*(5), 822–828. http://dx.doi.org.libproxy.nps.edu/10.1037/0021-9010.85.5.822

Johnson-Freese, J. (2012). The Reform of military education: Twenty-five years later. *Orbis*, *56*(1), 135–153. https://doi.org/10.1016/j.orbis.2011.10.007

Joyner, J. (2020). Soldier-Scholar (pick one): Anti-Intellectualism in the American Military. *War on the Rocks*. http://warontherocks.com/2020/08/soldier-scholar-pick-one-anti-intellectualism-in-the-american-military/

Kardashian, K. (2020, September 14). *Higher education has profound effects on innovation* [News Page]. Dartmouth, Tuck School of Business. https://www.tuck.dartmouth.edu//news/articles/higher-education-has-profound-effects-on-innovation

Mattis, J. (2018). *Summary of the 2018 National Defense Strategy: Sharpening the American Military's Competitive Edge*. https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf

Mincer, J. (1984). Human capital and economic growth. *Economics of Education Review*, *3*(3), 195–205. https://doi.org/10.1016/0272-7757(84)90032-3

Ng, T. W. H., & Feldman, D. C. (2009). How broadly does education contribute to job performance? *Personnel Psychology*, *62*(1), 89–134. https://doi.org/10.1111/j.1744-6570.2008.01130.x

Perper, R. (2018, November 8). *China is said to be recruiting an elite group of "patriotic" kids to help develop AI weapons*. Business Insider. https://www.businessinsider.com/china-recruited-an-elite-group-of-kids-to-develop-ai-weapons-2018-11

Rosenbloom, T., & Perlman, A. (2016). Personal resilience, discipline and safety of military drivers. *Transportation Research Part F: Traffic Psychology and Behaviour*, *41*, 66–73. https://doi.org/10.1016/j.trf.2016.04.003

Schultz, T. W. (1960). Capital formation by education. *Journal of Political Economy*, *68*(6), 571–583. https://doi.org/10.1086/258393

Senate and House of Representatives of the United States of America. (1986). *Goldwater-Nichols DOD Reorganization Act of 1986*. https://history.defense.gov/Portals/70/Documents/dod_reforms/Goldwater-NicholsDoDReordAct1986.pdf

Truxillo, D. M., Bennett, S. R., & Collins, M. L. (1998). College education and police job performance: A ten-year study. *Public Personnel Management*, *27*(2), 269–280. https://doi.org/10.1177/009102609802700211

Ugurbas, U., & Korkmaz, M. (2015). Determinants of first-term attrition for enlisted and officer selected Marine Corps reservists [Master's Thesis, Naval Postgraduate School]. NPS Archive Calhoun. https://calhoun.nps.edu/handle/10945/45267

United States Department of Defense. (2019). *Lt. Gen. Jack Shanahan Media Briefing on A.I.-Related Initiatives within the Department of* [Transcript]. https://www.defense.gov/Newsroom/Transcripts/Transcript/Article/1949362/lt-gen-jack-shanahan-media-briefing-on-ai-related-initiatives-within-the-depart/

United States Marine Corps. (n.d.). *About—Marine Corps Junior ROTC*. MCJROTC. Retrieved March 4, 2022, from https://www.mcjrotc.marines.mil/About/

United States Marine Corps. (2018). *Performance Evaluation System MCO 1610.7A*. https://www.marines.mil/portals/1/Publications/MCO%201610.7A.pdf?ver=2018-05-07-074813-187

United States Marine Corps. (2019a). *MCO 1524.1 Marine Corps Graduate Education Program (MCGEP)*. https://www.marines.mil/Portals/1/Publications/MCO%201524.1.pdf?ver=2019-06-03-083458-743

United States Marine Corps. (2019b). MCO 6100.13A CH-2 Marine Corps physical fitness and combat fitness tests (PFT/CFT). United States Marine Corps.

United States Marine Corps. (2020). *Marine Corps Doctrinal Publication 7: Learning*. https://www.marines.mil/News/Publications/MCPEL/Electronic-Library-Display/Article/2129863/mcdp-7/

Verlinden, N. (2020, August 20). *Organizational Citizenship Behavior: Benefits and 3 best practices*. *AIHR*. https://www.aihr.com/blog/organizational-citizenship-behavior/

Wielsma, R. J. (1996). An analysis of factors affecting promotion, retention, and performance for USMC officers: A graduate education perspective [Master's Thesis, Naval Postgraduate School]. NPS Archive Calhoun. https://calhoun.nps.edu/handle/10945/32209

Zamarripa, L. R., & Lianez, R. (2003). The effects of U.S. Marine Corps officer graduate education programs on officer performance: A comparative analysis of professional military education and graduate education [Master's Thesis, Naval Postgraduate School]. NPS Archive Calhoun. https://calhoun.nps.edu/handle/10945/1092

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