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THESIS

PREDICTING DISHONORABLE DISCHARGE AMONG MILITARY RECRUITS

by

Oleksiy Kryvonos

March 2013

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PREDICTING DISHONORABLE DISCHARGE AMONG MILITARY RECRUITS

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ABSTRACT

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I.   INTRODUCTION

"Success is the result of perfection, hard work, learning from failure, loyalty, and persistence."

–Colin Powell

A.   BACKGROUND

In July 1, 1973, when the draft ended and the transition to the All-Volunteer Force began, a new era dawned for the U.S. Armed Forces. Since then a series of events has had a significant impact on the development of the U.S. military. These events include the end of the "Cold War" and the collapse of the Union of Soviet Socialist Republics (USSR), the terrorist attacks of September 11, 2001, the beginning of combat operations against al Qaeda and the Taliban in Iraq and Afghanistan, and the World Economic Crisis. Throughout this period, the U.S. military manpower has undergone several changes and challenges. In particular the U.S. military has suffered personnel quantity and quality problems. However, to credit of the U.S. military, they successfully overcame these manpower issues. Many government and private institutions have worked together to improve recruitment, which is where the inception of manpower issues lies.

B.   RECRUITMENT

The recruiting process was and is one of the most important stages in the formation and function of the U.S. Armed Forces. From the time when military service switched to an all-volunteer path, this process became more sophisticated and required vast resources to compete for high-quality recruits in the labor market. The traditional measures of enlisted personnel quality are a high school diploma graduate status and AFQT score (Hosek & Mattok, 2003).

However, there is little empirical evidence informing us of whether high-quality recruits indeed become high-quality servicemen.

The most common approach to measure military success is studying the motivations for current service personnel to reenlist and (or) their promotion speed. In contrast to retention studies many researchers have examined the reasons for attrition.

In numerous previous studies, authors have analyzed the recruits' characteristics that had the most influence on reenlistment rates and promotion speed, or that explained reasons for attrition. These were characteristics, such as: educational credentials, personal demographics and background information; which include AFQT score, high school diploma, college degree, gender, race, age, marital status, number of dependents, physical characteristics, prior military service, citizen status, residence, and criminal and drug-use history. As a result of these studies, researchers have provided recommendations for improving enlistment.

Detailed analyses of recruits' characteristics and the development of recommendations for improving the recruiting system are major weapons to fight the manpower shortage and personnel quality problems.

Our research examines which personal demographics and background characteristics can be descriptive of persons who were dishonorably discharged from the military services. Except for loss of life or severe injury, dishonorable discharge from the military is considered as one of the most negative outcomes of military service.

C.   DISHONORABLY DISCHARGED

Being dishonorably discharged from the armed forces is the rough equivalent of being convicted of a felony in civilian courts. But only by military court decision can a soldier be dishonorably discharged. Typically, in addition to obtaining "dishonorable discharge" status, a person has jail time or similar punishment. A serviceman (dischargee) who has been dishonorably discharged will also face a large variety of additional consequences in civilian life (Benjamin 2011).

As a result a dischargee forfeits his/her right to any benefits that a person might have had access to in civilian life. This can include the loss of medical insurance, education payment, and the right to the status of "veteran" in accordance with United

States Code, which defines a veteran as any member of the active armed forces who has not been given a dishonorable discharge. This status also prevents a dischargee from gaining any nonmilitary veterans' benefits, such as preferential consideration on university entrance applications and job applications. Any form of government aid is withheld from a service member who was dishonorably discharged. In addition to losing his or her veterans' benefits, a dischargee will be unable to apply for unemployment benefits upon entering civilian life. More than likely a dischargee will also lose the ability to apply for bank loans and will be barred from serving in any level of government service, especially those of the armed forces. If a service member was discharged because of a felony conviction, he or she also loses the right to vote and the ability to hold public office, and will be unable to sit on a jury for an extended period of time. A dischargee is also barred from purchasing or owning any sort of firearm under Title 18 of the United States Code (*Benjamin 2011*).

The following is a list of illegal actions that can be cause for Dishonorable Discharge:

- Murder and Manslaughter Discharge
- Sexual Assault Discharge
- Absent Without Leave Discharge
- Sedition Discharge
- Other Illegal Actions

The majority of other illegal actions, such as drug abuse or domestic violence, will likely not lead to a dishonorable discharge. They may, however, cause servicemen to be discharged as a bad conduct discharge or other than honorable discharge (Benjamin 2011).

Taking into consideration how important it is for the military's reputation, a person's life, and for society as a whole, we have to monitor this process constantly.

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II.   LITERATURE REVIEW

A.   PREVIOUS STUDIES OF PREDICTING MILITARY SUCCESS

The traditional measures of enlisted personnel quality are high school diploma graduate status and AFQT score (Hosek & Mattok, 2003). However, there is little empirical evidence informing us of whether high-quality recruits indeed become high-quality service members. Most researchers on military recruiting consider military success or promotion speed as motivating factors for reenlistment or recruitment.

In numerous previous studies, authors have analyzed the recruits' characteristics that had the greatest influence on reenlistment rates or promotion speed. These characteristics include: educational credentials, personal demographics, and background information, such as: gender, race, age, marital status, number of dependents, physical characteristics, prior military service, citizen status, and criminal and drug-use history. As a result of these studies, researchers have provided recommendations for improving enlistment.

At the same time most of the research was affected by problems in the recruiting screening process, different standards in procedures among the services and a lack of complete databases.

1.   Hosek and Mattok (2003)

The United States military struggles with its ability to recruit, train, and retain highly qualified enlisted service members. Therefore, the military branches apply multiple resources and tools in order to ensure recruiting efforts are not wasted and that the right service members are being hired. At present, the U.S. military uses metrics such as the AFQT results and high school diploma status to predict, with some accuracy, non-attrition and if the service member will successfully complete initial training. These metrics, although highly useful tools for recruiting purposes, provide no insight into how the enlisted members will do in their jobs and how successful those enlistees will be in their respective branch. To further expand on the quality of a service member, Hosek and Mattok apply a method developed by Ward and Tan (1985). The goal of the application is

to determine a measure of quality as it relates to performance and promotions. Quality, as defined by Hosek and Mattok, is not a measure of ability alone, but a measure of ability, taste for the military and, especially important, quality of the job matches to the service member.

Studies showed that AFQT results, prior to initial entry, were negatively related to reenlistment rates. Moreover, service members who scored higher on initial entry qualification tests were more likely to leave military service than those who scored lower. The aforementioned model also factored in promotion, especially through the ranks of E-1 through E-5. It found that those who were promoted to E-2 ahead of their peers were also promoted to E-3 and E-4 ahead of their peers as well.

Some service members of "high quality" will in fact leave the military for various reasons. The key reason rests on the link between the military and civilian sector as it pertains to specific job experience, training received while in the military, and leadership ability. However, because of the "taste for the military" factor, the branches do retain otherwise high-quality members.

The model, although quite successful, does have some limitations. Specifically, the model hinges on a large portion of the data set being promoted to the rank of E-5. As such, the model is limited due to the declining number of service members reaching the rank of E-5 during their first term in service (usually three to six years). The study found that the model should be extended to include members who reenlisted so as to use the reenlisted members' promotion history as a replacement for the aforementioned missing data.

2.   Kumazawa (2010)

The AFQT coupled with high school graduation status is the widespread form of metrics that are available to assist in determining high-quality recruits. Although these are great tools in predicting outcomes of the first term, they offer little insight into how a new service member will actually do on the job. Alternatively, Kumazawa (2010) introduces performance measures and speed of promotion, holding AFQT scores and

high school diploma status constant, in order to predict the retention of high-quality personnel.

Prior studies have been conducted, such as Hosek and Mattock (2003); however, those studies included all of the service branches except the Navy. According to Kumazawa, the exclusion of Navy data was due in large part to the Navy's "lumpy" promotion system. Additionally, Kumazawa cites the Navy's poor recognition of solid performance and what should be subsequent promotions. Previous studies including Hosek and Mattok (2003) and Ward and Tan (1985) relied heavily on relationships between quality measures and promotions to E-4 and E-5. Kumazawa explains that, given the promotion system of the Navy, the aforementioned approaches will continue to create biases. Conversely, Kumazawa uses a method that includes the differences in the quality of high school diploma status. She found that individuals with all high school credentials fared better than those without. Moreover, the study found that those with all credentials were promoted faster to all ranks in comparison to those holding a General Education Development (GED). Furthermore, those holding GEDs were more likely to have a higher attrition rate and higher rates of incompletion of their service commitment.

The Navy's approach to recruiting those with traditional high school diplomas may be counterintuitive in that they are not as likely to promote as fast as those holding GEDs or non-traditional high school credentials. However, the implication for changing the recruitment method to match the results of the study will increase the likelihood of oppositely impacting the attrition rates and completion rates of members' service obligations.

3.   Golan, Green and Perloff (2010)

Many factors determine the promotion and retention of a sailor, with many changes afoot given recent budget considerations and the downsizing of the military in general. Given the military's resemblance to many organizations, there are certain factors that can play a large part in retention and promotion. Golan, Green and Perloff in their study have carried out an in-depth analysis of the methodology used in the U.S. Navy's promotions and retention system. As the authors suggest, retention relies on many

factors, such as budgets; however, promotion to higher grades plays the largest role in determining retention. Much of the research associated with retention and promotion is separated into the two factors mentioned; however, Golan et al. tie the two together; specifically linking the two with other facets, such as race, gender, and ethnicity. Furthermore, given the high correlation of retention tied to promotion, analysis would have to be conducted to determine the differential in promotion between race, gender, and ethnicity also. At present, few recent studies exist in the civilian market regarding promotion and retention, with military studies being even rarer. Of those, few tie retention and promotion together.

Of those analyses that do delve into promotion and retention, they conclude that promotions, and subsequent retention rates, vary by race and or gender. Studies, such as Butler (1976) and Gofin and Macllvaine (1995), suggest that promotions differ by aspects such as race. Despite tight measures within the Navy to monitor and control racial and gender bias, evidence clearly suggests that promotion and retention rates are affected by race and gender. Golan et al. conclude that probabilities of promotion throughout race, gender, and ethnicity exist for three reasons. First, those demographic groups within the branch could be treated differently causing the data to change from race to race and gender to gender. Second, the groups could have a myriad of different observations such as experience and education. Lastly, there is an unknown number of unobserved data throughout the demographic.

The slowed economy also plays a significant role in retention. Studies show that, as the economy gains momentum, military retention efforts must increase in order to stay in line with its needed numbers. Conversely, as the economy has slowed, Navy members typically stay in longer in order to avoid facing a weak economy outside of military service. Golan et al. suggest that the Navy should step up promotion and retention efforts in order to avoid facing a quality personnel shortage when the economy does rebound.

4.   Birchenall and Koch (2012)

The method of entry into the United States' military services plays a critical role in performance and/or the rates at which service members receive military decorations.

Currently, the United States military is an all-volunteer force that uses various recruiting methodologies to target, persuade, and process civilians for military service. There are varying degrees of persuasion needed based on the nature of the individual volunteering; some need a lot, others need little to none. Many college students, for instance, use the Reserve Officer Training Corps (ROTC) as a conduit and training tool for future military service as an officer. Research wise, WWII served as a significant time period from which to obtain data sets regarding personnel entry methods, awards received, length of service and performance. Further, it acted as a significant test bed in which the data could be examined and analyzed, specifically pertaining to the correlation between draftees, volunteers, decorations awarded, and mortality rates.

The observables and non-observables also played a significant factor in determining the hypothesis of favorable selection. Data such as time of entry, marital status, age, race, and gender were noteworthy facets for understanding the holistic view. Comprehensive data showed, as suggested by Birchenall and Koch, that members who volunteered during a parallel period of drafting, served with greater distinction and received awards at a greater rate. Specific valorous awards, such as the Medal of Honor, Silver Star and the Distinguished Service Cross, were awarded in greater numbers in volunteers versus draftees. Further examination by Birchenall and Koch focused on why volunteers performed at significantly greater levels. Although observables, as aforementioned, provide a piece of the answer, much of the answer rested solely on unobservable data. Weak evidence was also found that draftees were awarded at a slightly higher level during peacetime, just prior to the attack on the Pearl Harbor. Otherwise, during wartime, volunteers were awarded at greater levels as opposed to their draftee counterparts. Tying in the economic value to an all-volunteer force versus a force comprised of draftees, it was found that the value of life was on order of one million dollars, and the savings between draftees and an all-volunteer force was in the billion dollar range.

5.   **Rodriquez (2009)**

Each military service has an associated academy that strives to graduate the specific services' future officers. Millions of dollars are poured into these academies from various sources: federal funding, state funding, military services, and private donations. The United States Air Force boasts a military education system that drives the next generation of Air Force Officers. The United States Air Force Academy provides the finest of education, which is designed to assess and train future officers for service in the Air Force. Moreover, the Air Force Academy seeks to train its members to give them the highest chance possible at a successful career. Jacob Rodriquez's study, "Predicting the Military Career Success of the United States Air Force Academy Cadets," states that a successful career in the military hinges on two factors: twenty years of service and a rank of Lieutenant Colonel.

Previous studies regarding the military academies were based mainly on the curriculum, particularly what curriculum was needed and not needed in order to provide the best education and training for their future officers. However, no studies have been conducted by the Armed Forces and Society that compares the success rate, as defined supra, of military academy graduates. Successes during a student's tenure at the academy can be measured using metrics such as grades; however, little is done to measure the success past the point of graduation and deep into a career of the service member.

There are factors that hinder such a measurement as "success" in the Air Force. Most significant are the outlying factors of military reductions and the human capital that exist within a majority of the Air Force Academy graduates. For instance, many academy graduates are sought out by successful companies because of the graduates' degree of leadership and self-motivation. Based on a number of factors, the Air Force Academy could alter or influence the degree at which academy graduates complete a successful career in the Air Force. An additional variable was discovered in which Air Force cadets chose a career in aviation. This factor was significant in that the cadets who chose a career path in aviation were exposed to a longer service commitment versus a non-aviation career path. Models posed by Rodriquez suggest that an Air Force officer with a lengthy commitment post-graduation stood a better chance at serving twenty years, which

was a requirement within this study to be successful as an officer in the Air Force. Rodriquez also suggests that the Air Force could benefit from extending initial service commitments of non-rated (non-aviation) career fields. This finding could also have a positive effect on the number of women and African Americans who serve twenty years and reach the rank of Lieutenant Colonel.

Briefly analyzing the recent research, we decided to use an opposite approach to create new assumptions for predicting military success. In our study we analyze the recruits' characteristics that may have an effect on dishonorable discharge from the service.

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III.   DATA

A.   DATA DESCRIPTION

We obtained the data for our study from the Defense Manpower Data Center (DMDC). The DMDC data contains two different data files: (1) a master file and (2) a transactions file. The two files provide information about the U.S. Military officers and enlistees who have been recruited and tracked between 2000 and 2012. These files were converted into a STATA file for the statistical analysis.

The first raw data file included 26,902,091 observations and 31 data elements. The data elements consisted of personal demographics and service background information, such as ID number, last, first and middle names, date of birth, sex, race, age, accession education designator, marital status, number of dependents, prior military service, AFQT score, weight, height, citizen status (origin), file date, accession date, accession service, and accession state.

Information for each individual was traced quarterly and following that one person is represented in many observations. In our study we use only one record per person. For that record we used select data elements, and we sorted persons by initial and accession file date. In this case, we dropped all duplicate records and obtained 925,597 singular observations.

The second raw data file has 1,050,342 observations and four data elements. The data elements consisted of personal information such as ID number, transaction effective date, interservice separation type, and character of service. As in the first data set we used only one (initial) record for each individual.

To perform the research, we merged these two data sets. The initial merged data file had 111,250 missing values of the number of dependents variable. Additionally, it had 28,750 missing AFQT scores. We dropped all duplicate observations and missing values. Also, some amendments have been made to the merged data. As a result, the merged data file for all services contains 785,597 sole observations with thirty-four data

elements, and each element includes different numbers of valid values. For this study we have also split the merged file into five different files by the four active-duties services: the Army (200,520), the Air Force (119,199), the Navy (156,413) and the Marine Corps (72,520), and one file (Reserves & Guards) includes the Army Reserve, the Air Force Reserve, the Marine Corps Reserve, and the Army Guard, the Air Guard (236,945).

It is important to note that we use for the merged file only initial and accession file date for each recruit. It gives us a chance to observe recruits under equal time conditions. On the other hand, each person who was dishonorably discharged had a different length in the service. Depending on how long a person was in the service, the personal demographics and background characteristics have been changed, but we do not consider them. We suspect that it could have biased he results.

B.   KEY VARIABLES

1.   Binary variables

Dishonorable: This variable was created by merging three valid values "dishonorable-dismissal" (F), "bad conduct" (D) and "other than honorable conditions" (E). The variable is coded as a "1" if dishonorable, and a "0" if otherwise.

Female: Shows gender of a person. The variable is coded as a "1" if female, and a "0" if otherwise.

Marital status: Indicates marital status of a person. The variable is coded as a "1" if married, and a "0" if otherwise.

Prior military service: Indicates whether a person has prior military service. The variable is coded as a "1" if a person had prior military service, and a "0" if otherwise.

Less than High school diploma: Includes information about a person's educational level. It was created by merging twelve valid values. The variable is coded as a "1" if a person has less than a high school diploma, and a "0" if otherwise.

High school diploma and some college: Includes information about a person's educational level. It was created by merging six valid values. The variable is coded as a "1" if a person has a high school diploma and/or some college, and a "0" if otherwise.

College degree and higher: Includes information about a person's educational level. It was created by merging six valid values. The variable is coded as a "1" if a person has a college diploma and/or higher degree, and a "0" if otherwise.

Original Citizenship Status: Shows the legal (statutory) origin by which a person acquired United States citizenship status. The variable is coded as a "1" if a person is native born, and a "0" if otherwise.

Variables *White Race*; *Asian Race*, *Black Race* and *Other & Unknown Race* indicate races of persons. The variables are accordingly coded as: a "1" if person is White, and a "0" if otherwise; a "1" if a person is Asian, and a "0" if otherwise; a "1" if a person is Black, and a "0" if otherwise; a "1" if a person is of another or unknown race, and a "0" if otherwise.

2.   Numerical variables

AFQT: Displays a person's percentile score on the Armed Forces Qualification Test.

Age: Shows the age of a person, measured in years. We consider age variable in a range: as minimum—16 years and as maximum—50 years; other observations were disregarded.

Number of dependents: Shows how many dependents a person has, measured per dependent.

Height: Indicates the height of a person, measured in inches. We ranged height from 54 to 80 inches only; other observations were disregarded.

Weight: Indicates the weight of a person, measured in pounds. We ranged weight from 80 to 400 pounds only; other observations were disregarded.

Summary statistics of the merged data file is provided in Table 1.

Table 1. Summary statistics

Variables		All Services	Army (active)	Air Force (active)	Navy (active)	Marines (active)	Reserves & Guards*
Dishonorable	Mean	0.05	0.04	0.01	0.10	0.09	0.02
	Std. Dev.	(0.21)	(0.19)	(0.10)	(0.30)	(0.28)	(0.13)
Age	Mean	20.49	21.06	20.16	20.37	19.42	21.00
	Std. Dev.	(3.80)	(3.73)	(2.68)	(3.26)	(2.08)	(5.22)
Female	Mean	0.19	0.19	0.24	0.17	0.07	0.22
	Std. Dev.	(0.39)	(0.39)	(0.42)	(0.38)	(0.25)	(0.41)
Marital status	Mean	0.11	0.16	0.12	0.07	0.04	0.12
	Std. Dev.	(0.32)	(0.37)	(0.32)	(0.25)	(0.20)	(0.32)
Number of dependents	Mean	0.24	0.41	0.13	0.16	0.08	0.29
	Std. Dev.	(0.69)	(0.85)	(0.50)	(0.54)	(0.38)	(0.82)
Prior military service	Mean	0.06	0.09	0.04	0.06	0.02	0.10
	Std. Dev.	(0.24)	(0.29)	(0.19)	(0.21)	(0.13)	(0.30)
Less than High school diploma	Mean	0.21	0.17	0.01	0.11	0.05	0.44
	Std. Dev.	(0.41)	(0.37)	(0.11)	(0.31)	(0.23)	(0.50)
High school diploma and some college	Mean	0.76	0.79	0.96	0.87	0.94	0.52
	Std. Dev.	(0.42)	(0.41)	(0.20)	(0.33)	(0.24)	(0.50)
College degree and higher	Mean	0.02	0.04	0.03	0.01	0.01	0.04
	Std. Dev.	(0.15)	(0.20)	(0.17)	(0.12)	(0.08)	(0.18)
AFQT	Mean	59.60	58.71	63.52	58.51	58.80	59.31
	Std. Dev.	(17.99)	(17.95)	(15.89)	(18.10)	(17.67)	(18.73)
Height	Mean	68.21	68.27	68.18	68.30	68.74	68.04
	Std. Dev.	(3.34)	(3.33)	(3.49)	(3.33)	(2.97)	(3.39)
Weight	Mean	161.05	163.37	156.49	161.58	163.76	161.27
	Std. Dev.	(28.94)	(30.42)	(26.61)	(27.74)	(27.06)	(30.08)
Original Citizenship Status	Mean	0.94	0.94	0.94	0.94	0.94	0.95
	Std. Dev.	(0.23)	(0.24)	(0.23)	(0.24)	(0.23)	(0.22)
White Race	Mean	0.72	0.70	0.75	0.65	0.76	0.76
	Std. Dev.	(0.45)	(0.46)	(0.43)	(0.48)	(0.43)	(0.43)
Asian Race	Mean	0.00	0.01	0.00	0.00	0.00	0.00
	Std. Dev.	(0.06)	(0.07)	(0.05)	(0.06)	(0.03)	(0.07)
Black Race	Mean	0.18	0.21	0.17	0.21	0.11	0.16
	Std. Dev.	(0.39)	(0.40)	(0.37)	(0.41)	(0.31)	(0.37)
Other & Unknown Race	Mean	0.09	0.09	0.07	0.13	0.13	0.07
	Std. Dev.	(0.29)	(0.29)	(0.27)	(0.34)	(0.39)	(0.25)
Number of Observations		785597	200520	119199	156413	72520	236945

* Army, Air Force Reserve, Marine Corps Reserve, and Army, Air Guards.

Some of the results from Table 1 will obviously attract the attention of readers. For instance, dishonorable discharge from the military is considered as one of the most negative events that can take place during military service. Looking at the results, we can say that the percentage, across all services, of persons who were dishonorably discharged is relatively small at 5 percent. The Air Force, Army, and Reserves & Guards have 1 percent to 3 percent range. At the same time, the Navy and Marines have a much higher rate at 10 percent and 9 percent, respectively. Probably, we can try to find an explanation for the difference in specifics of service. We have to constantly monitor the dishonorable discharge process and take into consideration how important it is for the military's reputation, a person's life, and for society as a whole.

The average recruit's age is 20.5 years old. Also obvious are the small average percentages of variables as Female 18 percent and Married just 11 percent. We can add to these results the percentages of variables Female and Marital status in Marines of only 7 percent and 4 percent.

Individuals with high school diploma and some college make up 80 percent, but this figure is not so crucial in our case because the branches are seeking recruits with at least a high school diploma. The services' recruiting goal is to have above 90 percent high school graduates. At the same time, the variable College degree and higher shows that recruits of this educational status have only an average of 2 percent. The Marines result is negatively significant in this variable by just 0.6 percent.

Across all branches of the service, almost 94 percent of recruits are native born. We can say the same about the percentage for the variable White, which is 72 percent, but also note that Caucasians are still the majority.

Table 2 represents comparable summary statistics between Dishonorable and Honorable characteristics of discharges for all Services.

Table 2.   Comparable summary statistics for all Services

Variables	Dishonorable discharge for all Services	Honorable or General- under honorable conditions discharge for all Services
Age	19.95 (2.79)	20.52 (3.84)
Female	0.07 (0.26)	0.20 (0.40)
Marital status	0.08 (0.27)	0.11 (0.32)
Number of dependents	0.17 (0.57)	0.24 (0.70)
Prior military service	0.02 (0.16)	0.06 (0.24)
AFQT	56.06 (17.07)	59.77 (18.01)
Less than High school diploma	0.20 (0.40)	0.21 (0.41)
High school diploma and some college	0.79 (0.41)	0.76 (0.43)
College degree and higher	0.01 (0.08)	0.02 (0.15)
Height	68.76 (2.96)	68.19 (3.36)
Weight	162.13 (27.08)	161.00 (29.02)
Original Citizenship Status	0.96 (0.20)	0.94 (0.24)
White race	0.66 (0.47)	0.72 (0.45)
Asian race	0.00 (0.04)	0.00 (0.06)
Black race	0.23 (0.42)	0.18 (0.38)
Other & Unknown Race	0.11 (0.31)	0.09 (0.29)
Number of Observations	35884	749713

In Table 2 we have 35,884 observations from all service branches which are represented under the variable *Dishonorable*. We can see that the variables for both groups are relatively same with only one exception; the proportion of the variable Female in the Dishonorable group is lower than in the Honorable group.

IV. ESTIMATION AND MODEL

To examine which personal demographics and background characteristics can be descriptive for persons who were dishonorably discharged we use the Linear Probability Model.

$$D_i = \beta_0 + \beta_1 Age_i + \beta_2 Female_i + \beta_3 Married_i + \beta_4 Number\_depend_i + \beta_5 Prior\_service_i +$$
$$\beta_6 HSDG_i + \beta_7 College_i + \beta_8 AFQT_i + \beta_9 Height_i + \beta_{10} Weight_i + \beta_{11} Citizen_i + \beta_{12} Asian_i + \beta_{13} Black +$$
$$\beta_{14} Other\_Race_i + \beta_{15} Access\_file_i + \beta_{16} Access\_state_i + u_i$$

where D_i is a dependent variable equal to "1" if a person was dishonorably discharged, i is a name of a person. *Age* shows individual age effect. *Female* displays gender effect equal to "1" if a person is female; *Married* indicates effect of marital status, equal to "1" if a person is married. *Number_depend* displays effect of the number of dependents. *Prior_service* indicates effect of prior military service, equal to "1" if a person has prior military service. *HSDG* shows effect of possession of a high school diploma, equal to "1" if person has a high school diploma. *College* reflects effect of possession of a college diploma, equal to "1" if person has college diploma. *AFQT* indicates effect of the AFQT score; *Height* displays effect of height; *Weight* shows effect of a person's weight; *Citizen* indicates effect of citizenship status, and *Asian, Black and Other _race* reflects effect of a person's race. *Access_file* and *Access_state* are used as a control group, which includes information of accession year and state.

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V. RESULTS

Table 3 indicates that variables included in the empirical model for all services are statistically significant at a one percent confidence level. Significance, however, varies when analyzing discharge separately by services. The output from the empirical model run for all services shows that females have lower chances of being dishonorably discharged than men by four percent. This finding was expected, as usually women have lower attrition rates and higher performance than men. Although the magnitude of this effect on discharge varies across services, it has the same statistically significant direction for all services. The results show that the chances of the Navy females being dishonorably discharged is 7.43 percent lower than those of the Navy males, while in the Air Force this difference is less than 1 percent.

Interestingly, being older at the time of the enlistment is associated with a significantly lower probability of being dishonorably discharged across all services. Ten years of age difference at the moment of enlisting reduces someone's probability of dishonorable discharge by 0.68 percent overall. The magnitude of age effect is highest for personnel in the Marine Corps, and consists of 1.24 percent for ten years of age difference.

Consistent with previous research is the direction of effect of marital status, even though the effect is not statistically significant for each of the services. The effect is statistically significant for the model which uses the data of all services. Although the magnitude of the effect is slightly less than one percent, its direction is negative, meaning that married persons are less likely to be dishonorably discharged. Again, the effect is greater for the Navy personnel, reducing the probability of being dishonorably discharged by 2.77 percent.

Number of dependents is associated with higher probabilities of being dishonorably discharged. The effect is statistically significant for the Navy and the Army, and the magnitude is higher for the Navy. This result may be underestimated, as the recruitment process screens those who have dependents, often requiring a waiver for

these recruits to enter some services. Because of the waiver process, the sample may include very few new recruits who enter with dependents.

As expected, prior military service reduces significantly the probability of being dishonorably discharged. Personnel with prior military service hold the knowledge about the requirements and conditions of military service. They are most often more motivated toward success and have higher credibility due to their past experience. Comparing the different services, prior military service has the highest effects on the Navy and the Marine Corps enlisted personnel, 5.28 and 3.22 percent respectively. The effect for the Army and the Air Force is 0.7 and 0.73 percent, respectively.

The effect of AFQT scores on the probability of being dishonorably discharged is statistically significant for all services. Again, the magnitude of effect is slightly higher for the Navy and the Marine Corps enlisted personnel. Navy and the Marine Corps personnel with AFQT score of 10 points above the mean lower their discharge probability by 0.85 and 0.87 percent respectively. Consistent with this finding is the effect of the education level for Navy and Marine Corps personnel. The higher the education, the lower the probability is of being dishonorably discharged. However, for the Reserves & Guards the effect appears to be in the opposite direction.

Height and weight also affect the examined dependent variable. Interestingly, according to historical data, taller persons have higher dishonorable discharge rates for the Army, the Navy, and the Marine Corps. The weight has an opposite effect: the higher the weight, the lower the probability. This effect may be underestimated due to the fact that personnel with higher weight than the standard are released from the services for reasons other than dishonorable discharge.

Looking at race, blacks have higher dishonorable discharge probabilities than whites in all services, except for the Reserves & Guards. Asians have lower probabilities for the Navy and the Reserves & Guards.

I also include accession state and year of accessing the service to control for regional and time related differences between different cohorts.

Table 3.   Results

VARIABLES	(1) All Services dishonorable	(2) Army (active) dishonorable	(3) Air Force (active) dishonorable	(4) Navy (active) dishonorable	(5) Marine Corps (active) dishonorable	(6) Reserves & Guards dishonorable
Age	-0.000682***	-0.000597***	-0.000406***	-0.000850***	-0.00124**	-0.000936***
	(8.29e-05)	(0.000143)	(0.000154)	(0.000295)	(0.000536)	(9.14e-05)
Female	-0.0399***	-0.0208***	-0.00967***	-0.0743***	-0.0494***	-0.0201***
	(0.000760)	(0.00139)	(0.000964)	(0.00252)	(0.00463)	(0.000880)
Marital status	-0.00973***	-0.00148	-0.000328	-0.0277***	-0.00398	-0.00250*
	(0.00116)	(0.00182)	(0.00132)	(0.00512)	(0.00752)	(0.00148)
Number of dependents	0.00248***	0.00282***	0.000145	0.00834***	0.00459	-0.000171
	(0.000559)	(0.000854)	(0.000910)	(0.00256)	(0.00460)	(0.000612)
Prior military service	-0.0198***	-0.00704***	-0.00733***	-0.0528***	-0.0322***	-0.0113***
	(0.00115)	(0.00152)	(0.00246)	(0.00492)	(0.00925)	(0.00138)
AFQT	-0.000439***	-0.000225***	-0.000120***	-0.000853***	-0.000873***	-0.000132***
	(1.37e-05)	(2.52e-05)	(2.03e-05)	(4.52e-05)	(5.96e-05)	(1.60e-05)
High school diploma some college	0.00518***	-0.0285***	-0.00388	-0.0693***	-0.0569***	0.0165***
	(0.000595)	(0.00112)	(0.00293)	(0.00246)	(0.00475)	(0.000629)
College degree and higher	-0.00951***	-0.0372***	-0.00710*	-0.0962***	-0.0775***	0.00675***
	(0.00172)	(0.00253)	(0.00420)	(0.00748)	(0.0140)	(0.00185)
Height	0.000701***	0.000961***	8.66e-05	0.00188***	0.00101**	-0.000137
	(0.000102)	(0.000183)	(0.000138)	(0.000330)	(0.000449)	(0.000123)
Weight	-0.000158***	-0.000151***	-3.45e-05**	-0.000380***	-0.000343***	-1.60e-05
	(1.05e-05)	(1.78e-05)	(1.62e-05)	(3.43e-05)	(4.73e-05)	(1.24e-05)
Original Citizenship Status	0.0177***	0.00969***	0.000833	0.0436***	0.0281***	0.00669***
	(0.00104)	(0.00182)	(0.00137)	(0.00342)	(0.00469)	(0.00131)
Asian race	-0.0128***	0.00188	-0.00849	-0.0273**	-0.000289	-0.0116***
	(0.00426)	(0.00935)	(0.00577)	(0.0138)	(0.0275)	(0.00425)
Black race	0.0152***	0.00663***	0.00470***	0.0307***	0.0522***	0.000105
	(0.000658)	(0.00117)	(0.000886)	(0.00211)	(0.00363)	(0.000827)
Other & Unknown race	0.00963***	-0.000272	8.59e-05	-0.000733	-0.000545	0.0177***
	(0.000911)	(0.00170)	(0.00136)	(0.00264)	(0.00344)	(0.00129)
Accession File Date	yes	yes	yes	yes	yes	yes
Accession State	yes	yes	yes	yes	yes	yes
Constant	0.0322***	0.0351**	0.0315***	0.117***	0.121***	0.0320***
	(0.00691)	(0.0139)	(0.0106)	(0.0261)	(0.0371)	(0.00938)
Observations	785,597	200,520	119,199	156,413	72,520	236,945
R-squared	0.014	0.009	0.003	0.026	0.017	0.015

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In addition, we ran the regressions for each of the categories included in the variable *Dishonorable* separately on observations of all services. To review, the

dependent variable was created by combining all persons who were dismissed dishonorably (F), for bad conduct (D), or for other than honorable conditions (E).

Table 4 shows the outcomes of the regressions run separately for each of the mentioned categories on observations of all services.

Table 4.   Outcomes of the regressions

VARIABLES	(1) Dishonorable	(2) Bad Conduct	(3) Other than Honorable Conduct
Age	-1.42e-05*	-0.000257***	-0.000411***
	(7.69e-06)	(2.88e-05)	(7.79e-05)
Female	-0.000408***	-0.00448***	-0.0350***
	(7.05e-05)	(0.000264)	(0.000714)
Marital status	-0.000207*	-0.000186	-0.00934***
	(0.000108)	(0.000405)	(0.00109)
Number of dependents	0.000153***	6.34e-05	0.00227***
	(5.19e-05)	(0.000194)	(0.000525)
Prior military service	7.09e-05	0.00313***	-0.0230***
	(0.000106)	(0.000398)	(0.00108)
AFQT	-3.27e-06**	-5.05e-05***	-0.000385***
	(1.28e-06)	(4.78e-06)	(1.29e-05)
High school diploma some College	7.68e-05	0.00256***	0.00254***
	(5.52e-05)	(0.000207)	(0.000559)
College degree and higher	0.000120	0.00253***	-0.0122***
	(0.000160)	(0.000598)	(0.00162)
Height	5.87e-07	1.13e-05	0.000690***
	(9.47e-06)	(3.55e-05)	(9.59e-05)
Weight	-1.45e-06	-1.38e-05***	-0.000142***
	(9.74e-07)	(3.65e-06)	(9.86e-06)
Original Citizenship Status	2.02e-05	0.000626*	0.0171***
	(9.68e-05)	(0.000362)	(0.000980)
Asian race	-0.000288	-0.00411***	-0.00840**
	(0.000396)	(0.00148)	(0.00401)
Black race	0.000221***	0.00158***	0.0134***
	(6.11e-05)	(0.000229)	(0.000619)
Other & Unknown Race	1.92e-05	0.00138***	0.00823***
	(8.45e-05)	(0.000316)	(0.000856)
Accession File Date	yes	yes	yes
Accession State	yes	yes	yes
Constant	0.00120*	0.0112***	0.0198***
	(0.000641)	(0.00240)	(0.00649)
Observations	785,597	785,597	785,597
R-squared	0.000	0.002	0.014

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

To perform robustness checks of the different outcomes we ran the Hausman test. The test was performed on the following combinations:

Dishonorable (containing F, D, and E) versus dishonorably-dismissed (F);

Dishonorable (containing F, D, and E) versus bad conduct (D);

Dishonorable (containing F, D, and E) versus other than honorable conditions (E);

Dishonorably-dismissed (F) versus bad conduct (D);

Dishonorably-dismissed (F) versus other than honorable conditions (E);

Bad conduct (D) versus other than honorable conditions (E).

The Hausman test results show that there are systematic differences in coefficients of all combinations of the four mentioned outcomes (chi-squared tests are greater than 1,100 with p-values much smaller than 0.01).

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VI. CONCLUSION

In this research we estimated which personal demographics and background characteristics can be descriptive for persons who were dishonorably discharged from the military services. We used the data files from the Defense Manpower Data Center. These files were converted into the STATA file for the statistical analysis.

Dishonorable is regressed on age, gender, race, education designator, marital status, number of dependents, prior military service, AFQT score, weight, height, citizenship status, and accession file date and accession state as control group.

The variable *Dishonorable* was created by combining all persons who were dismissed dishonorably, for bad conduct, or for other than honorable conditions.

The results of empirical model show that variables *female, age, number of dependents, prior military service, AFQT score, and black race* are significant determinants for persons who were dishonorably discharged from the military service.

As the results show, females have lower chances of being dishonorably discharged than men. Older persons at the time of their enlistment are associated with a significantly lower probability. Blacks have a higher probability than whites of being dishonorably discharged across all services.

Controversially, number of dependents is associated with higher probabilities of being dishonorably discharged. In common thought, a person with a higher number of dependents is associated with being a more responsible person.

Personnel with prior military service has significantly lower probability of being dishonorably discharged. In our research, as in previous studies, the effect of AFQT scores is shown to play a significant role. As well we can note that higher levels of education reduce the probability of being dishonorably discharged.

We performed robustness checks of the different outcomes of the regressions separately for each of the mentioned categories on observations of all services. We ran

the Hausman test. The results of the test showed that the different outcomes have systematic differences.

We suspect that the estimate obtained in the research may not represent the true effect of examined variables on the probability of being dishonorably discharged. One of the reasons could be the fact that we based our dataset of these recruits only on their accession file date. However, we consider the direction of the effect and significance of the independent variables to be correct. Therefore, we suggest further research in this area.

In summary, we can consider the research as a part of more comprehensive endeavors to measure military success and improvement in the manpower issues-in our case through study of negative events. Besides the low percentage of dishonorably discharged persons and the absence of strong evidence to predict persons dishonorably discharged by personal demographics and background characteristics, we have to constantly monitor that process taking into consideration how important it is for the military's reputation and society as a whole. To improve the enlistment process and attract recruits with the highest probability of future career success, based on our research we can recommend the following:

- Consider increasing the quota of females in the armed forces.

- Continue looking for potential recruits with higher AFQT scores, a higher educational level, and prior military experience.

- Reduce the number of waivers given to persons who have a greater number of dependents.

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