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THESIS

THE EFFECTS OF PRE-SERVICE CRIMINAL HISTORY ON RECRUIT PERFORMANCE IN THE U.S. NAVY

by

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March, 1997

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THE EFFECTS OF PRE-SERVICE CRIMINAL HISTORY ON RECRUIT PERFORMANCE IN THE U.S. NAVY

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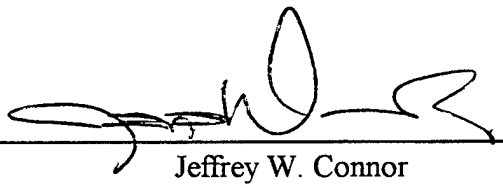
Author: 
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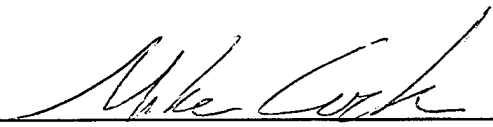
Approved by: 
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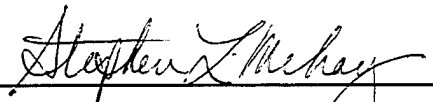
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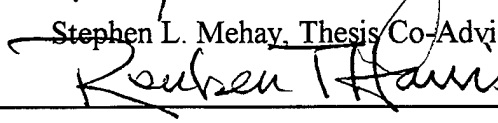
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I. INTRODUCTION

A. PROBLEM

Proper screening of recruits to identify individuals most likely to succeed in the military is imperative to maintain a high quality force. Cooke and Quester summarize the reasons screening is so important:

> First, the military has essentially no lateral entry, hiring only at the entry level. Thus, these accessions are the only significant source of career military personnel. If people with a high potential to succeed are missed at the entry level, they are forever missed. Second, the military provides considerable amounts of costly "front-end" training to new recruits at the same time that it is paying their wages. Selecting recruits who are likely to be successful means that up-front training dollars will not be wasted (Cooke and Quester, 1992).

The Armed Forces screen applicants on the basis of physical, mental, and moral characteristics. While physical condition and mental characteristics are easily measured, moral character is generally indexed on an individual's pre-service criminal behavior. Information concerning an individual's criminal behavior is not readily available and the accuracy of the information is often questionable.

Recent research into the effects of pre-service criminal history have focused almost exclusively on the relationship between this background and attrition[1] from the military. Understanding attrition behavior is important as it represents the forfeiture of human capital investments made by the Armed Forces, dollars which cannot be recouped from the productivity of the (now separated) individuals. There are other measures of performance which may be negatively influenced as well. These include promotability, reenlistment eligibility, and retention beyond the first term of enlistment. Understanding the effect of pre-service criminal behavior on performance is meaningful because it describes the

[1] Attrition is defined as separating from military service prior to the completion of the first term of enlistment.

quality of service provided by members who serve until their end-of-active-obligated-service (EAOS). Simply surviving to EAOS is an incomplete description of the quality of an individual's service. A marginal performer who survives to EAOS may not contribute to the organization's mission accomplishment and may actually prove to be a liability through lackadaisical work habits, disciplinary problems and/or periods of unexcused absences.

In the course of examining the effects of pre-service criminal behavior, this thesis deals with several issues: the number of recruits entering the Navy with criminal histories; the extent to which recruits disclose their criminal backgrounds; the potential gain from using information from state criminal history files as a screening device; and which type of criminal background information (juvenile versus adult records, felony versus misdemeanor offenses, convictions or arrests) is best to forecast behavior.

B. BACKGROUND

The military services screen applicants on the basis of moral character for several reasons. First, it is desirable to screen out individuals who may pose disciplinary problems during their period of service and divert resources from the performance of military duties. Research has shown that recruits with a history of criminal behavior are likely to become disciplinary problems and, in turn, separate from military service for reasons of unsuitability (Frabutt, 1996). Second, there is the concern that persons with criminal backgrounds, if permitted to enlist, may have "a corrupting influence on other recruits" (Flyer, 1995). Additionally, recruits and their parents need to be assured that they are not being "thrown into close association with (individuals) who are chronic offenders or who have committed serious offenses" (Department of Defense, 1966).

The military services rely on the moral waiver process to identify and screen individuals with histories of criminal behavior. In general, a moral waiver is required for enlistment if an individual has a criminal conviction or a history of drug use or alcohol dependency. One shortcoming of the current moral character screen is therefore by

definition: if an individual has engaged in criminal behavior but has not been caught, or, if caught but not convicted, a waiver is not required for enlistment and the criminal background may go undetected.

The method of criminal history disclosure is another problem with the moral waiver process. Prior to 1986, recruiters were required to complete local law enforcement agency checks on all potential recruits. These checks were hampered by the frequent failure of agencies to comply with recruiters' requests and the reluctance of recruiters to make requests that they considered to be an unproductive administrative detail. Subsequent to 1986, local agency checks are conducted "only for those applicants for enlistment who admitted to an arrest history, and who might require a moral waiver to enlist" (Flyer, 1995).

As a result of the discontinuation of local agency checks, recruiters must rely almost exclusively on self-disclosure by the potential recruit to uncover prior evidence criminal behavior. This reliance on self-disclosure is flawed in that the enlistee has no incentive to reveal information which potentially bars him or her from entering the military. Previous research has shown that less than half of all new recruits with juvenile or adult criminal histories are identified prior to enlistment via the moral waiver process (Flyer, 1995).

Given the large percentage of recruits entering the Armed Forces with hidden criminal backgrounds, research on the relationship between moral waivers and unsuitability attrition actually underestimates the effects of true criminal behavior[2] on unsuitability attrition. Thus, using actual criminal history records instead of self-reported history (upon which moral waivers are predominately based) should more closely reveal the "true" relationship between pre-service criminal behavior and active-duty performance.

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[2] Since an individual's criminal behavior can not be identified unless a record of it exists, "pre-service criminal behavior" is synonymous with "pre-service criminal background" for the purposes of this study.

Since the current policy requires a waiver for enlistment if an individual has a criminal conviction, research which emphasizes the effect of convictions[3] on performance measures is important when evaluating this policy. Inasmuch as previous research indicates that arrest history influences at least one performance measure, unsuitability attrition, it is also prudent to compare the effects of convictions to the effects of arrests on performance to determine any differences between in the predictive content of the two variables.

C. OBJECTIVES AND SCOPE

The objective of this thesis is to investigate the benefit of using information from state criminal history files to screen potential recruits at the enlistment point. In order to do this, two more fundamental questions must be answered. First, what is the level of pre-service criminal behavior in the recruit population and to what extent is it "hidden" from the Navy? Second, does pre-service criminal behavior affect first term performance, and if so, how large is the effect? The following successful outcomes are used as first-term performance measures: the likelihood of unsuitability attrition; the likelihood of being promoted to petty officer; the likelihood of being eligible for reenlistment; and the likelihood of remaining on active duty beyond the initial four year enlistment. I hypothesize that having a history of pre-service criminal behavior is associated with an increased likelihood of unsuitability attrition and is also negatively correlated with the other performance measures.

The sample studied is comprised of first-term, non-prior service active duty U.S. Navy recruits with four years of obligated service who were less than 25 years old at entry into the Navy. One sample consists of individuals who entered the Navy from Illinois between 1981 and 1987, the other of individuals who entered the Navy from Florida between 1984 and 1988.

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[3] Convictions are defined as "adverse adjudications" which include convictions as well as diversions, forfeiture of bail and processing through pre-trial intervention programs.

D. ORGANIZATION OF THE STUDY

Chapter II presents a review of literature concerning the effects of pre-service criminal behavior on unsuitability attrition and previous studies on measures of recruit success. Chapter III describes the data, defines the variables, and discusses the methodology used in the study. Chapter IV presents preliminary statistical analysis of the data. Chapter V contains the empirical results from the multivariate models. Chapter VI summarizes the findings, describes the implications of potential screening policies, and provides recommendations based on the study.

II. LITERATURE REVIEW

The fundamental purpose for screening potential enlistees during the accession process is to identify those individuals with the greatest likelihood of succeeding in the Armed Forces. A traditional, and frequently used, measure of recruit success is completion of initial obligated service. For example, Buddin (1984) studied the first-term attrition behavior of male recruits (in each of the military services) to "assess how background characteristics, prior work experience, and satisfaction with initial military job assignment influence attrition losses during the first six months of service (Buddin, 1984, p. 1)." Numerous other studies have also defined recruit success only in terms of attrition behavior. Cooke and Quester (1992) studied the relationship between recruit background characteristics and first-term success; however, they defined successful outcomes as completion of initial obligated service, promotion to paygrade E-4, and retention beyond EAOS.

Using Navy administrative data, Cooke and Quester analyzed the relationship between personal characteristics and success variables for males entering the Navy on four year enlistments, from fiscal years 1978 to 1982. Employing binary logit models to predict the probabilities of successful outcomes, they determined recruits with high school diplomas and higher AFQT scores, and those who participated in the Delayed Entry Program (DEP) had greater chances of first-term success (for each measure of success) than recruits who did not possess those characteristics. Additionally, Cooke and Questers' results suggested black and Hispanic recruits are more likely to be promoted to E-4 during their first term, and are more likely to remain on active duty beyond EAOS than non-black/non-Hispanic recruits.

Their finding that "bright" high school diploma graduates have a greater likelihood of reenlistment appears to contradict earlier retention studies which have shown individuals with the same characteristics have a lower likelihood of remaining in the Navy beyond EAOS. However, the different findings are easy to explain. Cooke and Quester

studied recruit characteristics at the *entry point* and higher quality recruits are more likely to survive to EAOS. Thus, they are disproportionately represented at the reenlistment point. From the *reenlistment point,* high-aptitude diploma graduates are less likely to remain after their initial enlistment. In providing empirical results for screening policy purposes, the relevant findings are those from the perspective of entry point characteristics: "since initial hires in the military are only at the entry level, it is the relationship between entry-level characteristics and subsequent behavior that is the more significant (Cooke and Quester, 1992, p. 249)."

Several studies on the effects of "moral character" on recruit performance have used moral waivers as a proxy for criminal background and attrition (both general and for reasons of unsuitability) as the measure of recruit success. Means (1983) found that recruits accessed by the military with moral waivers attrited at a rate only slightly higher than those without moral waivers (30 percent compared to 28 percent over three years service). Fitz and McDaniel (1988) and Etcho (1996) each determined recruits who require moral waivers are more likely to attrite for reasons of unsuitability than recruits without moral waivers. Fitz and McDaniel found that Navy recruits with any moral waiver are between 5.3 and 7.1 percentage points more likely to be discharged for unsuitability than Navy recruits without a moral waiver (Fitz and McDaniel, 1988, p. 34). Etcho found Navy recruits with moral waivers between 1.93 and 7.66 percentage points more likely to attrite for unsuitability than Navy recruits without moral waivers (Etcho, 1996, p. 46). Fitz and McDaniel also conclude that moral waivers have a larger effect on unsuitability discharges for lower mental categories than for upper mental categories (Fitz and McDaniel, 1988, p. 59).

Only recently have studies correlating actual criminal history to in-service performance been conducted. Flyer (1995), Frabutt (1996), and Griffis, Gregory, and Flyak (1996) each used information from state criminal history files to determine recruits' criminal background.

Flyer (1995) researched the relationship between pre-service arrests and first-term unsuitability attrition using state-provided criminal history files merged with enlisted information files. The criminal history files included juvenile records from Florida, adult records from Illinois and combined juvenile/adult records from California. Using descriptive statistical techniques Flyer concluded that: over 30 percent of all new recruits enlist with a juvenile or adult arrest history; less than half of these criminal histories are identified through moral waiver and Entrance National Agency Check procedures at enlistment; and recruits with a juvenile or adult arrest record in a state criminal history repository are about 65 percent more likely than other recruits to be discharged for unsuitability (Flyer, 1995, p. 1). On the basis of these and other findings, Flyer concluded unsuitability attrition rates would be reduced by a more effective moral waiver program.

An interesting point in Flyer's research is his assertion that there is little difference in the unsuitability discharge rate for individuals who have been arrested and convicted as compared to individuals who have only been arrested (Flyer, 1995, p. 62). This "lack of distinction between arrests and convictions" is potentially important as current moral waiver policy is based on convictions, not arrests.

Frabutt (1996) examined California arrest records merged with Navy enlisted cohort files to analyze the effect of pre-service criminal history on first-term unsuitability attrition in the Navy. He defined a "pre-service legal encounter" (PLE) variable which designated individuals as having a criminal background based on either an arrest history (identified from the state records) or a moral waiver. He found that 33 percent of the recruits entering the Navy from California from 1982 to 1989 had at least one PLE. For those recruits with a felony history, 98 percent did not obtain a felony moral waiver. He suggests that "the current moral waiver process, which relies on self-disclosure, may be ineffective in identifying recruits with a pre-service arrest history (Frabutt, 1996, p. 47)." This statement is slightly misleading however, as moral waivers are generally required only for convictions, not arrests.

With respect to traditional indicators of recruit quality, high school diploma status (HSDG) and AFQT category, Frabutt (1996) determined that recruits with a PLE attrited at a greater rate than recruits without a PLE, regardless of diploma status or AFQT category. In fact, he found that recruits in AFQT category IV without a PLE had a lower unsuitability discharge rate than recruits in AFQT category I with a PLE. This leads him to conclude that there "is little advantage in being more lenient in granting moral waivers to prospective recruits in the higher AFQT categories (Frabutt, 1996, p. 47)."

In addition to descriptive statistical techniques, Frabutt analyzed the California data with binary logit models which provide the effects of the explanatory variables (in this case PLE's) on the probability of unsuitability attrition. As a result, he found that California recruits with felony histories are 20 percentage points more likely to attrite for unsuitability as recruits without arrest histories and that recruits with misdemeanor histories are 10 percentage points more likely to receive an unsuitability discharge than those without arrest histories.

Griffis, Gregory, and Flyak (1996), analyzing fiscal years 1985 to 1989 Navy recruits from California, reached some of the same conclusions as Frabutt: 25 to 40 percent of recruits with criminal adverse adjudications (convictions) do not receive the appropriate moral waiver and recruits with arrest histories receive unsuitability discharges more frequently than those without arrest histories. Griffis, Gregory and Flyak (1996) found, when controlling for HSDG and AFQT category simultaneously, that high school graduates in the upper mental categories with arrest histories attrite at a lower rate than either non-HSDG's without arrest histories or HSDG's in the lower mental categories without arrest histories. This finding leads them to recommend not pursuing policies which screen HSDG's in the upper mental categories for pre-service arrest histories.

After reviewing the prior research, there is ample evidence that pre-service criminal history is positively correlated with the likelihood of unsuitability attrition and that a substantial number of recruits may not be disclosing their criminal backgrounds. This thesis seeks to expand previous research that used pre-service criminal histories by

identifying additional recruit success indicators and then examining the effects of various types of criminal history on those success measures. The ultimate goal of this research is to provide an empirical foundation upon which potential screening policies can be based.

III. DATA AND METHODOLOGY

A. DATA

Two sources of data were used in this study: enlisted personnel information files and state criminal history files from Illinois and Florida. Both sources were provided by the Defense Manpower Data Center (DMDC) in Monterey, California.

Personnel information was derived from Military Entrance Processing Command (MEPCOM) files for personnel entering the Navy from Illinois in the years 1981 to 1987 and entering the Navy from Florida in the years 1984 and 1988. The files contain data on the individuals at the time of accession and are updated annually by DMDC from the Department of Defense Active Duty Enlisted Master Inventory and Loss files, which contain the most recent active duty and loss information on the individuals. The MEPCOM files used in this study were last updated in September, 1995. Each individual accession is followed until the time of separation or the end of the data.

State criminal history files were provided to DMDC from Illinois and Florida for research purposes only. Each criminal history file was restricted by DMDC to include only those records with matching records in the associated MEPCOM file. The Florida file contained pre-service arrest and conviction data for juveniles only. The Illinois file contained adult criminal history data, convictions and arrests, for incidents occurring prior to entering the Navy, during the individual's military service and after separating from the Navy. For this thesis, the file was restricted to criminal incidents that occurred prior to military enlistment.

The merged criminal history-MEPCOM file was restricted to non-prior service, active duty enlistees who entered the Navy for four year enlistments and who were no older than 25 years old at the time of entry into the Navy. Restricting the data to non-prior service individuals ensured that the sample included first-term enlistees only. Previous research has demonstrated that attrition rates are different for different contract

lengths (Etcho, 1995). Restricting the data to only four year obligors avoided the effect of contract length on attrition rate. Sample size and demographic composition of the data files in presented in Table 1.

B. VARIABLE DESCRIPTION

Of primary importance to this study was determining the nature of an individual's pre-service criminal history (PCH) and comparing the PCH information with the demographic characteristics of the cohorts. The classification of offenses into felonies and non-felonies[4] was based on each state's classification criteria. Although the Navy has a set of offenses it considers felonies, the states' classifications were used in this study because "self-reporting" is the primary method by which a person's PCH is revealed. Thus, if the individual is going to report a pre-service conviction, he or she is most likely to report the offense classification used by the state which convicted him or her of the offense. The states' adjudication codes were likewise used to determine the adjudication status for each offense. If an individual was arrested for an offense but there was no adverse adjudication code associated with that offense, the PCH was counted as an arrest only. If the charge did have an associated adverse adjudication code, the PCH was counted as a conviction and an arrest.

If an individual had a felony PCH and a non-felony PCH, they were categorized as a felon only. This conforms to the assumption that a recruiter would pursue a waiver for the most serious offense reported by a potential enlistee. While not ignoring the lesser offense, the potential outcome of the moral waiver process would be a waiver for the felony; the less serious charge would become transparent. Table 2 presents the number and percentage of recruits with a PCH for each state.

[4] Non-felony offenses include misdemeanors, petty and other offenses not classified by the two states as felony offenses.

Table 1. Demographic Characteristics (in percentages) by State for Selected Cohorts

Characteristic	Illinois[a]	Florida[b]
Male	88.0 %	87.8 %
Female	12.0	12.2
White	78.4	73.5
Black	16.1	16.9
Hispanic	4.4	8.0
Other Minority[c]	1.1	1.6
High School Graduate	87.0	88.7
Non-High School Graduate	13.0	11.3
AFQT Category I & II	38.6	46.5
AFQT Category IIIA	20.7	23.0
AFQT Category IIIB	29.4	23.8
AFQT Category IV	11.4	6.8
Sample Size	17,792	17,797

[a] Based on entry cohorts for 1981 to 1987.

[b] Based on entry cohorts for 1984 to 1988.

[c]Other Minority includes American Indians, Alaskan Natives, Asian/Pacific Islander and all minority groups not included in the Black and Hispanic categories.

Source: Derived from data provided by the Defense Manpower Data Center.

This study only uses information from Illinois and Florida state criminal history files to determine an individual's PCH status. Other studies have used either moral waiver status or a state criminal history to characterize an individual's criminal background. This was done in an attempt to gather behavior information on individuals who may have a criminal history in states other than the state in which they enlisted. As there may be some unobserved attribute of people who voluntarily disclose their criminal history which makes them different from persons who do not disclose their criminal behavior, inclusion of moral waiver information may introduce self-reporting bias into the analysis. This bias could potentially influence measurement of the effect of PCH on performance.

Table 2. Percentage (and Number) of Recruits with Pre-Service Criminal Histories by Category and Sample

Sample	Felony Conviction	Non-felony Conviction	Felony Arrest	Non-felony Arrest
Florida [a]	1.87 % (336)	1.25 % (225)	5.20 % (935)	6.85 % (1232)
Illinois [b]	0.89 (159)	2.72 (484)	4.89 (870)	5.91 (1052)

[a] N = 17,977

[b] N = 17,792

Source: Derived from data provided by Defense Manpower Data Center.

In the interest of controlling self-reporting bias, this study does not use moral waiver status to define a recruit's PCH category.

Four binary performance variables to indicate recruit success were constructed from the cohort files. These performance measures are also used as dependent variables in the multivariate models discussed later in this chapter. The first measure of performance is a recruit's ability to complete his or her contracted term of enlistment. In the Florida sample, 28.2 percent of the recruits left the Navy prior to completing their first term, of which 71.7 percent separated for reasons of unsuitability. In the Illinois sample, 22.9

percent of the recruits separated from the Navy early for unsuitability, 79.4 percent of the total attrition. Unsuitability separations are indicative of a recruit's failure to meet minimum behavioral or performance criteria and are characterized by the interservice separation codes (ISCs) of 60 through 87 and 101 and 102 (ISCs are summarized in Appendix A). A binary variable UNSUIT identifies individuals who separated from the Navy prior to completing a minimum of 45 months of their 48 month enlistment for reasons of unsuitability[5].

A general measure of military success is promotion. To be eligible for continued service in the Navy beyond the first enlistment, a recruit must be promoted to at least paygrade E-4 prior to the reenlistment decision point (Cooke and Quester, 1992). The variable E_FOUR identifies individuals within the cohort who were promoted to the rank of E-4 (petty officer) or higher during their first term. The DMDC data did not permit precise capturing of the timing of the promotion to petty officer. Since continued service is a possibility only for individuals promoted to E-4 or higher, this research assumes that individuals who attained petty officer status did so within their first enlistment.

At the time of separation from the Navy, an individual's service is characterized as "honorable," "under honorable condition," "under other than honorable conditions," or "dishonorable." Character of service is the primary determinant of an individual's reenlistment eligibility (RE) code, recorded in the MEPCOM files (BUPERSINST 1900.8, 1993). In the data used for this study, reenlistment eligibility is not based directly on the recommendation of an enlisted person's supervisor (as one would find on a performance evaluation). However, the link between a recruit's reenlistment eligibility and his or her character of service indicates their "desirability" to the Navy, making it an indirect measure of performance. The variable ELIGIBLE was created to indicate an individual's reenlistment eligibility on the basis of their RE code. ELIGIBLE equals 1 if a recruit was eligible to reenlist; equals 0 if a recruit was ineligible to reenlist. ELIGIBLE was coded as

[5] We assume that 45 months is the completion point of a four year enlistment, which accounts for individuals who separate early for officer training or other special programs.

"missing" for observations without an RE code; these observations were not included in the analysis of reenlistment eligibility.

A recruit remaining on active duty beyond his or her first term of enlistment is indicative of a successful "job match" between the recruit and the Navy. Retention benefits the Navy as it represents a positive return on human capital investment and increases the pool of potential career sailors. The variable RETAINED was constructed to identify individuals who remained on active duty for more than 48 months, either by reenlisting or extending on active duty beyond their initial EAOS.

C. METHODOLOGY AND MODEL

This study uses two approaches to investigate the effect of PCH on recruit performance. Frequencies and cross-tabulations provide preliminary insight into the relationships between the performance measures and demographic, education, mental aptitude and PCH characteristics of the sample populations. Logistic (logit) multivariate models were also specified and estimated to isolate the effects of the PCH variables, holding the effects of the other independent variables constant. The following logit models are run separately on each of the four performance measures (UNSUIT, E_FOUR, ELIGIBLE, and RETAINED):

1. PERFORMANCE = f (FEMALE BLACK HISPANIC OTHRMIN ENTRYAGE NONHSDG CATIIIA CATIIIB CATIV FELON NONFELON)

2. PERFORMANCE = f (FEMALE BLACK HISPANIC OTHRMIN ENTRYAGE NONHSDG CATIIIA CATIIIB CATIV F_ARRST NF_ARRST)

A summary of the explanatory and dependent variables can be found in Table 3.

Following is a discussion of the independent variables in the models and their expected effects on the dependent performance variables:

1. Pre-service Criminal History Variables. There are four PCH variables, two representing convictions and two representing arrests. The same variable definitions are used for the juvenile criminal history data and the adult criminal history data. Previous research has shown that recruits entering military service under moral waivers are more likely to attrite for unsuitability than those without moral waivers (Fitz and McDaniel, 1988; Etcho, 1996). This finding is important to the investigation of the relationship between convictions and recruit performance as a moral waiver is an indicator that the individual has a conviction record. Research on pre-service arrest histories has demonstrated that recruits with arrest records are more likely to attrite for unsuitability than recruits without arrest records (Flyer, 1995; Frabutt, 1996; Griffis, Gregory, and Flyak, 1996). Given moral waivers and pre-service arrest records are associated with discharges for "failure to meet minimum behavioral or performance criteria," it is reasonable to hypothesize the same or similar traits will be negatively correlated with the other performance measures analyzed in this study. The expected effect of each PCH variable is positive on UNSUIT and negative on E_FOUR, ELIGIBLE, and RETAINED. The variables representing pre-service criminal history are:

FELON. A binary variable where the value of 1 indicates the recruit has a felony conviction record, 0 if the recruit does not have a felony conviction record.

NONFELON. A binary variable where a value of 1 represents a recruit with a non-felony conviction record. A value of 0 is assigned to NONFELON if the recruit does not have a non-felony conviction record or if the recruit has a felony conviction and a non-felony conviction record.

F_ARRST. A binary variable where a value of 1 represents a recruit with a felony arrest history, 0 if the recruit does not have a felony arrest history.

NF_ARRST. A binary variable where a value of 1 represents a recruit with a non-felony arrest record. As with the non-felony conviction variable, NF_ARRST has the value of 0 if the recruit does not have a non-felony arrest record or if the recruit has both a felony and a non-felony arrest record.

Table 3. Description of Logistic Model Variables

Variables	Description
Dependent Variables	
UNSUIT	=1 if attrited for unsuitability; =0 otherwise
E_FOUR	=1 if promoted to petty officer; =0 otherwise
ELIGIBLE	=1 if eligible for reenlistment; =0 otherwise
RETAINED	=1 if remained on active duty beyond EAOS; =0 otherwise
Independent Variables	
Gender	*Base case is male*
FEMALE	=1 if individual is female; =0 otherwise
Race/Ethnicity	*Base case is white*
BLACK	=1 if individual is African-American; =0 otherwise
HISPANIC	=1 if individual is Hispanic; =0 otherwise
OTHRMIN	=1 if individual is non-white and neither African-American nor Hispanic; =0 otherwise
ENTRYAGE	Age at entry into the Navy
Education	*Base case is high school diploma*
NONHSDG	=1 if individual does not have a high school diploma (includes GED); =0 otherwise
AFQT Category	*Base case is Category I/II*
CATIIIA	=1 if in AFQT category IIIA; =0 otherwise
CATIIIB	=1 if in AFQT category IIIB; =0 otherwise
CATIV	=1 if in AFQT category IV; =0 otherwise
Pre-service Criminal History	*Base case no PCH*
FELON	=1 if individual has a felony conviction; =0 otherwise
NONFELON	=1 if individual has a non-felony conviction only; =0 otherwise
F_ARRST	=1 if individual has a felony arrest; =0 otherwise
NF_ARRST	=1 if individual has a non-felony arrest only; =0 otherwise

2. FEMALE. A binary variable which equals 1 for females; equals 0 for males. Previous research has demonstrated that attrition rates are higher for men than women (Fitz and McDaniel, 1988; Frabutt, 1996) and that women are promoted more slowly than their male counterparts (Haase, 1995). Additionally, Hu (1995) demonstrated that women are less likely than men to remain on active duty beyond their first enlistment.

FEMALE is expected to have a negative effect on the variables UNSUIT, E_FOUR and RETAIN. Given that reenlistment eligibility is based on character of service in this study and that women are less likely to attrite for unsuitable behavior or substandard performance than men, the effect of FEMALE on the variable ELIGIBLE is hypothesized to be positive.

3. Race/Ethnicity is subdivided into four categories: white, black, Hispanic, and other minorities. Cooke and Quester (1992) found that black and Hispanic recruits were more likely than whites to complete their first enlistment, complete their first enlistment as a petty officer and remain in the Navy beyond EAOS. However, other research has shown that minorities promote more slowly than whites (Haase, 1995). Frabutt (1995) and Etcho (1995) both found that minorities other than blacks or Hispanics are less likely to attrite for unsuitability than whites. The race/ethnicity variables used in the LOGIT models are:

BLACK. Binary variable where 1 indicates the recruit is African-American and 0 indicates the recruit is not African-American. The effect of this variable is expected to be negative on UNSUIT and positive on RETAINED. The effect of BLACK on ELIGIBLE and E_FOUR is unclear; the effect may be positive or negative.

HISPANIC. A binary variable where 1 represents a Hispanic recruit and 0 represents a non-Hispanic recruit. This variable is expected to have a negative effect on UNSUIT and positive effect on RETAINED. The effect of HISPANIC on ELIGIBLE and E_FOUR is unclear; it may be positive or negative.

OTHRMIN. A binary variable where 1 indicates the recruit is either American Indian, Alaskan Native, Asian/Pacific Islander or a member of a minority group other than black or Hispanic. As with BLACK and HISPANIC, the effect of OTHRMIN on UNSUIT is expected to be negative and the effect on RETAINED is expected to be positive. The effect of OTHRMIN on ELIGIBLE and E_FOUR is unclear and may be positive or negative.

4. ENTRYAGE. A continuous variable representing the age of the recruit when he or she entered the Navy. Previous research has demonstrated that older recruits are less likely to attrite than younger recruits (Etcho, 1996; Frabutt, 1996) and are neither more or less likely to be promoted to E-4 sooner than younger recruits (Haase, 1995). The expected effect of ENTRYAGE on UNSUIT is negative. The effect of ENTRYAGE on the remaining performance measures is unclear and may be positive or negative.

5. NONHSDG. A binary variable describing the high school completion status of the recruit. A value of 1 identifies recruits who do not have a high school diploma, including those who have an equivalency certificate (GED). A value of 0 indicates the recruit does hold a high school diploma. Previous research has demonstrated that recruits who do not possess a high school diploma are more likely to attrite for unsuitability (Flyer, 1995; Etcho, 1996; Frabutt, 1996), less likely to complete enlistment as a petty officer (Cooke and Quester, 1992), and less likely to remain on active duty beyond EAOS (Cooke and Quester, 1992; Hu, 1995).The expected effect of NONHSDG on UNSUIT is positive; the expected effect is negative on E_FOUR, ELIGIBLE and RETAINED.

6. AFQT Category. Four variables were created to classify the recruits' AFQT category with the variable representing categories I and II as the base case. When compared to individuals in categories I and II, previous research has demonstrated that recruits in the lower mental categories are more likely to attrite for unsuitability (Flyer, 1995; Etcho, 1996; Frabutt, 1996) and less likely to remain on active duty beyond EAOS (Hu, 1995). When AFQT category was combined with high school graduation status in an interaction variable, Cooke and Quester (1992) found that AFQT categories IIIB and IV are associated with decreased likelihood of being promoted to petty officer. The AFQT category variables used in the models for this study are CATIIIA, CATIIIB and CATIV. Each is a binary variable where a value of 1 indicates the recruit is a member of that respective AFQT category and a value of 0 indicates that the recruit is not a member of

that category. The expected effects of CATIIIA, CATIIIB and CATIV on UNSUIT are positive. The expected effects on E_FOUR, ELIGIBLE and RETAINED are negative.

IV. PRELIMINARY DATA ANALYSIS

The focus of this study is to investigate the benefit of using information from state criminal history files to screen potential recruits at the enlistment point. In order to do this, two more fundamental questions must be answered. First, what is the level of pre-service criminal behavior in the recruit population and to what extent is it "hidden" from the Navy? Second, does pre-service criminal behavior affect first term performance, specifically, unsuitability attrition, promotion to petty officer, reenlistment eligibility, and retention? This chapter presents the initial step in answering these questions.

Using cross-tabulations, this chapter presents some descriptive statistics of the data. First, the occurrence of pre-service arrests and convictions are presented by demographic characteristic, AFQT category and education status for each of the combined cohorts, with comparisons drawn between juvenile and adult criminal behavior. Given the existence of pre-service criminal behavior, the frequency with which this behavior is not identified by the moral waiver process is investigated. This is followed by an examination of performance given the presence of a pre-service criminal history.

A. GENERAL OBSERVATIONS

In the previous chapter, Table 2 presented the distribution of the PCH categories within the juvenile and adult combined cohorts. Of the 17,977 recruits from Florida, 1.87 percent (336) had a juvenile felony conviction and 1.25 percent (225) had a non-felony conviction. Of the 17,792 recruits from Illinois, 0.89 percent (159) had an adult felony conviction while 2.72 percent (484) had a non-felony conviction. The reduced felony conviction rate between the juvenile and adult samples may be explained by the age at which an individual enters military service. The mean entry age of Illinois recruits was 19.31 years old. Given an individual is normally not charged with adult offenses until after the age of 18, recruits from the Illinois sample had, on average, only 1.31 years in which to commit adult offenses and to be arrested and convicted. However, when the non-felony conviction rates are compared between the samples the opposite effect is observed.

If recruits have more time to commit, be arrested for, and convicted of juvenile offenses than adult offenses, Florida recruits should have a higher non-felony conviction rate than Illinois recruits. In fact, the opposite is true in this data. This does not discount the previously mentioned theory, it merely implies further analysis is warranted.

B. INCIDENCE OF PRE-SERVICE CRIMINAL HISTORY

This section describes the cohorts in terms of PCH status by demographic characteristics in order to better understand any patterns of pre-service criminal behavior which may be targeted by potential screening policies. Table 4 presents the percentage of recruits from Florida with pre-service criminal histories by PCH status and demographic characteristic. Table 5 presents a similar breakdown in PCH status for recruits from Illinois with adult criminal records. In the remainder of this chapter, "juvenile" refers to the Florida combined cohort and "adult" refers to the Illinois combined cohort.

1. Gender. In both samples, men are more likely to have a history of criminal behavior in each PCH category when compared to women. In the case of juvenile PCH, men are eleven times more likely to have a felony conviction background than women (2.10 percent to 0.18 percent). Men are also 2.3 times more likely to have non-felony convictions (1.37 percent to 0.41 percent). The results are similar for adult PCH. Men are over four times more likely than women to have an adult felony conviction (0.99 percent to 0.19 percent) or a non-felony conviction background (3.01 percent to 0.56 percent). These findings are consistent with previous research into criminal behavior which has shown that men are up to fifty times more likely to commit crimes than females (Wilson and Herrnstein, 1985).

2. Race/Ethnicity. In these data, blacks are more likely than whites to have juvenile criminal histories in each PCH category, while Hispanics have rates of PCH occurrence greater than both blacks and whites. Hispanics are 67 percent more likely to have juvenile felony convictions than blacks (3.53 percent to 2.11 percent) and almost 110 percent more likely than whites (3.53 percent to 1.67 percent). Of the four race/ethnicity

Table 4. Percentage (and Number) of Recruits from Florida with PCH Background by Demographic Characteristics, 1984-1988 Cohorts (Combined)

Demographic Characteristic	Felony Convictions	Felony Arrests	Non-felony Convictions	Non-felony Arrests	Hidden PCH[a]
Gender					
Male	2.10 % (332)	5.81 % (916)	1.37 % (216)	7.39 % (1166)	2.59 % (408)
Female	0.18 (4)	0.86 (19)	0.41 (9)	3.00 (66)	0.05 (9)
Race/Ethnicity					
White	1.67 (221)	4.74 (626)	1.15 (152)	6.75 (892)	2.03 (268)
Black	2.11 (64)	6.40 (194)	1.32 (40)	7.25 (220)	2.67 (81)
Hispanic	3.53 (51)	7.54 (109)	2.15 (31)	7.61 (110)	4.71 (51)
Other Minority	0.00 (0)	2.15 (6)	0.72 (2)	3.58 (10)	0.00 (0)
High School Diploma Status					
Diploma Holder	1.32 (210)	4.03 (642)	0.97 (155)	6.17 (983)	1.63 (260)
Non-Diploma Holder	6.22 (126)	14.41 (292)	3.45 (70)	12.28 (249)	7.75 (157)
AFQT Category					
Category I/II	1.72 (144)	4.83 (403)	1.15 (96)	6.62 (553)	2.05 (171)
Category IIIA	2.40 (99)	6.10 (252)	1.69 (70)	6.87 (284)	3.05 (126)
Category IIIB	1.71 (73)	5.22 (223)	1.05 (45)	7.14 (305)	2.13 (91)
Category IV	1.64 (20)	4.51 (55)	1.15 (14)	7.30 (89)	2.38 (29)

[a]Hidden PCHs are those convictions, felony and non-felony, for which the appropriate moral waiver was not received.

Source: Derived from data provided by the Defense Manpower Data Center.

Table 5. Percentage (and Number) of Recruits from Illinois with Adult PCH Background by Demographic Characteristics, 1981-1987 Cohorts (Combined)

Demographic Characteristic	Felony Convictions	Felony Arrests	Non-felony Convictions	Non-felony Arrests	Hidden PCH[a]
Gender					
Male	0.99 % (155)	5.39 % (845)	3.01 % (472)	6.44 % (1009)	1.84 % (288)
Female	0.19 (4)	1.17 (25)	0.56 (12)	2.02 (43)	0.19 (4)
Race/Ethnicity					
White	0.72 (101)	4.08 (568)	3.11 (433)	6.34 (883)	1.59 (221)
Black	1.50 (43)	8.22 (236)	1.43 (41)	4.49 (129)	1.95 (56)
Hispanic	1.93 (15)	7.73 (60)	1.16 (9)	4.25 (33)	1.80 (14)
Other Minority	0.00 (0)	2.96 (6)	0.49 (1)	3.45 (7)	100.00 (1)
High School Diploma Status					
Diploma Holder	0.76 (117)	3.99 (618)	2.35 (363)	5.27 (816)	1.37 (212)
Non-Diploma Holder	1.81 (42)	10.87 (252)	5.22 (121)	10.18 (236)	3.45 (80)
AFQT Category					
Category I/II	0.67 (46)	3.98 (273)	2.83 (194)	6.01 (412)	1.50 (103)
Category IIIA	0.87 (32)	5.62 (207)	3.29 (121)	6.71 (247)	1.87 (69)
Category IIIB	1.03 (54)	5.11 (267)	2.47 (129)	5.72 (299)	1.63 (85)
Category IV	1.34 (27)	6.08 (123)	1.98 (40)	4.65 (94)	1.73 (35)

[a]Hidden PCHs are those convictions, felony and non-felony for which the appropriate moral waiver was not received.

Source: Derived from data provided by the Defense Manpower Data Center.

categories, "Other Minority" which consists primarily of Asians and Pacific Islanders, has the lowest percentage of juvenile criminal behavior in each PCH category. For adult PCH background, Hispanic recruits are more likely to have a history of felony convictions than any other race/ethnic categories although blacks, at 8.22 percent, had the greatest frequency of adult felony arrest history. Considering adult non-felony convictions, whites were two times more likely to have non-felony conviction records than blacks (3.11 percent to 1.43 percent) and 2.7 times more likely to have non-felony convictions than Hispanics (3.11 percent to 1.16 percent). As with the juvenile sample, recruits classified as other minority were the least likely to have any pre-service criminal records.

3. High School Diploma Status. Two of the most prominent indicators of recruit "quality" are high school diploma status and AFQT category. Frabutt (1996) and Flyer (1995) found a greater incidence of pre-service criminal history for recruits without a high school diploma than for recruits with a high school diploma. The results obtained by this study are consistent with these prior studies. In the case of juvenile background, non-diploma holders were nearly five times more likely to have felony conviction records (6.22 percent to 1.32 percent) and 3.5 times more likely to have non-felony conviction records (3.45 percent to 0.97 percent) than diploma graduates. For adult PCH, non-diploma holders were more than twice as likely to have felony and non-felony conviction records than diploma graduates. In both samples, non-diploma holders were more likely to have a record in each of the PCH categories when compared to high school diploma graduates.

4. AFQT Category. As mentioned previously, AFQT category is a prominent indicator of recruit "quality." Gottfredson and Hirschi (1990) report a moderate to weak connection between criminal involvement and low intelligence. Etcho (1996) reports of studies showing male repeat offenders having lower IQ's than non-repeat offenders and concludes that, in general, criminals tend to have lower intelligence scores than non-criminals. Applying this to the frequency of PCH by AFQT category, we expect to find an increased likelihood of PCH given a decrease in mental category (Category I/II to

Category IV). This is not always the case, however. From the juvenile sample, individuals in AFQT categories I and II have a greater likelihood of having a felony conviction record or a felony arrest record than individuals in Category IV. Individuals in Category IIIA have the greatest likelihood of PCH in each category except for non-felony arrests where Category IV individuals are most likely to have a PCH. In the adult sample, the incidence of felony conviction PCH does increase as mental category decreases but not in the other PCH categories. Category IIIA individuals are more likely than the other AFQT categories to have a higher incidence of PCH in all but felony convictions. There are two possible explanations for the difference between our findings and previous studies.. First, AFQT categories I and II are combined into a single category. The second reason may be due to the moral waiver process. If an individual in an upper mental category has a pre-service criminal background, a recruiter may pursue a moral waiver for that individual in order to enlist a higher quality recruit. In effect, the high AFQT category compensates for the PCH. The lower mental category individual with a PCH has no such "compensating characteristic" and either fails to disclose their criminal background to the recruiter, or is not accepted for enlistment into the Navy because recruiters are not willing to seek a moral waiver.

C. DISCLOSURE OF PRE-SERVICE CRIMINAL HISTORY

This section examines the extent to which pre-service criminal histories are not identified by the moral waiver process[6]. In this study, only felony and misdemeanor convictions were considered offenses requiring a waiver; minor traffic offenses, history of drug use/abuse, and history of alcohol use/abuse were not included. Using this restriction, the non-disclosure rate for individuals with PCH should be at or near zero if the moral waiver process was operating effectively. The actual non-disclosure rates are in fact much

[6] For the purposes of this study, failure to have a moral waiver which matches a recruit's actual criminal history is assumed to be a result of the recruit not disclosing his or her criminal background. This does not discount the possibility that recruiters may knowingly fail to pursue moral waivers for individuals whose actual criminal backgrounds may prevent them from entering the Navy.

greater than zero. In the juvenile sample, 40 percent of non-felony convictions and over 97 percent of the felony convictions were not disclosed. For the adult sample, 31 percent of the non-felony convictions and 91 percent of the felony convictions were not disclosed by recruits. Table 6 presents the percentage of recruits with pre-service criminal histories who fail to disclose their PCH.

Table 6. Of Recruits with PCH Background, Percentage of Those with Non-disclosed PCH[a] by Demographic Characteristic and Juvenile or Adult Criminal History.

Demographic Characteristic	Juvenile Criminal History (Florida)	Adult Criminal History (Illinois)
Gender		
Male	74.45	45.93
Female	69.23	25.00
Race/Ethnicity		
White	71.85	41.39
Black	77.88	66.67
Hispanic	62.20	58.33
Other Minority	0.00	100.00
High School Diploma Status		
Diploma Holder	71.23	44.17
Non-Diploma Holder	80.10	49.08
AFQT Category		
Category I/II	71.25	42.92
Category IIIA	74.56	45.10
Category IIIB	77.12	46.45
Category IV	85.29	52.24
Overall rate	74.33	45.41

[a]Includes felony and non-felony conviction histories.

Source: Derived from data provided by the Defense Manpower Data Center.

In both samples, men are more likely than women to hide their past criminal behavior and non-diploma holders and lower AFQT categories are more likely to hide their criminal backgrounds than diploma graduates and upper AFQT category individuals. Since the sample populations do not come from the same source (one is from Florida and the other from Illinois) direct comparisons between juvenile and adult rates cannot be made. We can, however, make the general observation that persons with juvenile criminal backgrounds appear to be less likely to disclose this information than individuals with adult criminal backgrounds.

D. RELATIONSHIP PCH BACKGROUND AND PERFORMANCE MEASURES

Having demonstrated that individuals with pre-service criminal histories have entered the Navy, many without disclosing this background, does the existence of this behavior influence first-term performance? That is, is there a significant difference in performance between those with criminal histories compared to those without such histories? Previous research has demonstrated the effects of demographic characteristics on performance, usually measured by rate of unsuitability attrition; the results from this study were consistent with previous results and are provided in Appendix B for the interested reader. This section emphasizes the relationship between PCH status and several measures of performance.

Table 7 contains the performance rates (in percent) for all accessions and for Florida recruits with juvenile pre-service criminal histories. The initial conclusion reached from the information in Table 7 is that existence of any PCH degrades performance on all of the indicators. The first-term unsuitability attrition rate for all recruits within the sample is 20.2 percent. For recruits with a non-felony arrest PCH the attrition rate is seven points higher (27.4 percent) and over 16 percentage points higher for recruits with felony conviction PCH (36.6 percent). In this sample, 64.1 percent of all recruits were promoted to at least paygrade E-4 during their first term. For recruits with non-felony arrest PCH

this rate was only 54.6 percent, and only 50.6 percent for recruits with a non-felony conviction PCH.

Table7. Performance Measures (in Percent) by Juvenile PCH Categories for Recruits from Florida, 1984-1988 Cohorts (Combined)

	All Accessions	Felony Conviction	Felony Arrest	Non-felony Conviction	Non-felony Arrest
First-term Unsuitability Attrition Rate (percent)	20.2 %	36.6 %	34.5 %	35.1 %	27.4 %
Promotion Rate to Petty Officer (percent)	64.1	51.8	50.6	47.6	54.6
Reenlistment Eligibility Rate (percent)	76.9	60.7	62.7	59.5	69.2
First-term Retention Rate (percent)	45.9	36.6	34.2	31.6	35.1

Source: Derived from data provided by the Defense Manpower Data Center.

Non-felony conviction PCH also had the most negative effect on recruit reenlistment eligibility rate, reducing it for all accessions (76.9 percent) by over 17 percentage points to 59.5 percent. Felony conviction PCH had the next largest effect on reenlistment eligibility, reducing it by 16.2 percentage points, from 76.9 percent to 60.7 percent. Recruits with non-felony conviction PCH also had the lowest first term retention rates, 31.6 percent, compared to 36.6 percent for recruits with felony conviction PCH and 45.9 percent for all accessions.

Table 8 contains the performance rates (in percent) for all Illinois accessions and for Illinois recruits with adult pre-service criminal histories. As with the juvenile sample, the performance measures are degraded by each of the PCH categories with felony conviction PCH having the greatest effect. Presence of a felony conviction PCH increased the unsuitability attrition rate nearly 21 percentage points, from 22.9 percent for all accessions to 43.4 percent for recruits with a felony conviction PCH. Felony conviction PCH reduced the promotion rate to petty officer by 19.3 points, from 61.8 percent for all

recruits to 41.5 percent for those with a felony conviction, and reduced reenlistment eligibility by 23.7 points, from 73.4 percent to 50.7 percent. Finally, felony conviction PCH changed the retention rate of Illinois recruits by 16.4 points: only 26.4 percent of the

Table 8. Performance Measures (in Percent) by Adult PCH Categories for Recruits from Illinois, 1981-1987 Cohorts (Combined)

	All Accessions	Felony Conviction	Felony Arrest	Non-felony Conviction	Non-felony Arrest
First-term Unsuitability Attrition Rate (percent)	22.9 %	43.4 %	41.5 %	33.5 %	33.8 %
Promotion Rate to Petty Officer (percent)	61.8	41.5	42.5	49.2	50.1
Reenlistment Eligibility Rate (percent)	73.4	50.7	52.4	61.8	61.3
First-term Retention Rate (percent)	42.8	26.4	28.3	32.9	34.2

Source: Derived from data provided by the Defense Manpower Data Center.

recruits with adult felony convictions were retained beyond their first term compared to the overall retention rate of 42.8 percent. Examination of this table yields another pattern as well. For each performance measure, felony conviction and arrest PCH categories have larger negative effects on performance than non-felony conviction and arrest PCH categories. This consistency implies that adult felony PCH categories may be stronger indicators of recruit performance than the adult non-felony PCH categories.

V. MULTIVARIATE ANALYSIS

This chapter contains the results of the estimated logit models for each of the four performance measures. While frequencies and cross-tabulations provide insight into the relationships among demographic characteristics, education, AFQT category, PCH status, and performance, accurate conclusions cannot be drawn from this information because the effects of the variables are not isolated from one another. Multivariate models correct for this limitation by estimating the effect each explanatory variable while holding all other variables constant. Thus, the independent effect of each PCH variable on performance can be isolated from the effect of the other explanatory variables.

Binary logistic (logit) models, which are estimated using maximum-likelihood techniques, are specified to determine the effect of the explanatory variables on the probability of unsuitability attrition, the probability of promotion to paygrade E-4, the probability of reenlistment eligibility, and the probability of retention beyond the first term. Predicted probabilities were generated from the models by varying each explanatory variable and comparing the resulting probability to a "base case" probability. The base case individual in this study is a white male, age 19.31 years, with a high school diploma, in AFQT category I/II and without any PCH background. The difference between the base case probability and predicted probability indicates the direction and magnitude of the effect of the explanatory variable on each of the four success measures.

It is important to note that promoting to E-4, achieving reenlistment eligibility and reenlisting can be viewed as being conditional on surviving the first term (i.e., not attriting). An individual who attrites cannot be promoted, is not (generally) eligible for reenlistment, and cannot remain in the Navy beyond his or her EAOS. This research does not estimate the conditional probabilities of success given the recruit does not attrite. Instead, it examines the probability of success from the entry point; that is, given the characteristics of recruits at the time of entering the Navy, what are their chances of success? Since all "hires" in the Navy occur at the entry level (Cooke and Quester, 1992), this methodology essentially adapts the recruiting viewpoint. The decision to access or

not access an individual is based on the individual's physical status, mental aptitude and moral character at the time of enlistment, not at some later career stage. Other models with different specifications are required to estimate the likelihood of success conditional on surviving the first term. Such modeling is beyond the scope and intent of this research.

This chapter is organized into four sections. The first section presents the overall results of the logit models and summarizes the effects of demographic characteristics on the performance measures. The second section discusses the effects of the PCH variables on each performance measure, comparing the differences between the effect of juvenile versus adult criminal background, felony versus non-felony offenses, and arrests versus convictions. The third section presents the effects of high school diploma status combined with AFQT category and PCH background on each performance measure individually and the final section discusses potential cohort effects on the results.

A. RELATIONSHIP BETWEEN DEMOGRAPHICS, EDUCATION, AFQT, AND PERFORMANCE MEASURES

The results of the logit models, in terms of marginal probabilities, are presented in the tables in Appendix C. The reliability of the estimated relationship between an explanatory variable and the dependent variable is measured by the statistical significance of the estimated coefficient. Significance levels of 1 percent and 5 percent were both used in this study. If a variable is identified as significant at the 1 percent level, only one time out of a one hundred is the calculated relationship between that variable and the dependent variable due to chance. Significance at the 5 percent level indicates that only five times out of one hundred is the relationship due to chance.

1. Gender. When compared to men, women are less likely to attrite for unsuitability, less likely to promote to E-4 in their first term and less likely to remain in the Navy beyond their first enlistment. However, women are more likely than men to be eligible for reenlistment. These results are consistent between the conviction and arrest models and both juvenile and adult PCH samples.

2. Race/Ethnicity. In general, the results for the race/ethnicity variables are inconsistent and not statistically significant. For unsuitability attrition, the results for BLACK and HISPANIC are mixed. In the juvenile crime data, blacks and Hispanics are less likely than whites to attrite while in the adult crime data, blacks and Hispanics are more likely than whites to attrite. In both samples, other minorities are less likely to attrite than whites and HISPANIC is never statistically significant. The results for promotion to E-4 are consistent for HISPANIC and OTHRMIN but mixed for BLACK. In both samples, Hispanics are less likely to promote than whites and other minorities are more likely to promote than whites. Only OTHRMIN is significant in the juvenile data; neither variable is significant in the adult data. BLACKS are more likely than whites to promote to E-4 in the juvenile data and less likely to promote in the adult data; the results are statistically significant only for the juvenile data. In terms of reenlistment eligibility, the results are consistent for BLACK and OTHRMIN: in both samples, blacks are less likely than whites to be eligible for reenlistment and other minorities are more likely to be eligible for reenlistment than whites. Both variables are significant only in the juvenile crime data. Hispanics are more likely to be reenlistment eligible than whites in the juvenile crime data but less likely to be reenlistment eligible in the adult crime data; however, the results are not statistically significant. Finally, with respect to retention beyond EAOS, blacks and other minorities are more likely than whites to remain in the Navy beyond their first term in both samples. The results for Hispanics are inconsistent. In the juvenile crime data, Hispanics are less likely than whites to remain past their first term but in the adult crime data, they are more likely than whites to remain past their first term. The results for each race/ethnic variable are statistically significant in the adult crime data; only BLACK is consistently significant in the juvenile crime data in regard to retention.

3. Age at Entry. The variable representing age at entry into the Navy is significant in nearly every model except reenlistment eligibility for the juvenile crime data. The effect of entry age is less than one percentage point on every measure of performance. An increase of one year in age at entry decreases the likelihood of

unsuitability attrition and increases the likelihood of promotion to E-4, reenlistment eligibility and retention beyond EAOS for the adult crime data. For the juvenile crime data, an increase of one year in age at entry decreases the likelihood of unsuitability attrition in the conviction PCH model (model 1), but increases the likelihood of attrition when considering arrest PCH's (model 2).

4. Education. Of all the explanatory variables, high school diploma status has the largest effect on each performance measure. For both the juvenile and adult crime samples, not having a high school diploma increases the likelihood of unsuitability attrition and decreases the likelihood of promotion to E-4, reenlistment eligibility, and retention beyond the first term. The magnitude of the effect is greater than 20 percentage points for every performance measure for both PCH backgrounds.

5. AFQT Category. AFQT category has the second largest effect on performance after high school education. Compared to AFQT category I/II, performance is degraded for the lower in mental categories. Additionally, the magnitude of the effect grows as mental aptitude decreases. These results are the same for juvenile and the adult crime data. For both crime samples, lower mental categories are associated with increased likelihood of unsuitability attrition and decreased likelihood of promotion to E-4, reenlistment eligibility, and retention beyond the first term.

B. RELATIONSHIP BETWEEN PCH CATEGORIES AND PERFORMANCE MEASURES

Table 9 presents the percentage point differences in performance probabilities by PCH category for juvenile crime data and Table 10 presents the percentage point differences in performance probabilities by PCH category for adult crime data.

For the juvenile crime data, each performance measure is degraded by the presence of a PCH: the likelihood of unsuitability attrition increases while the likelihood of promotion to E-4, reenlistment eligibility, and retention beyond first term all decrease. For unsuitability attrition, the presence of a PCH has nearly the same effect regardless of PCH

Table 9. Percentage Point Difference in Recruit Performance by PCH Category for Florida Juvenile Criminal Data, 1984-1988

PCH Category	Performance Measures			
	First-term Unsuitability Attrition	Promotion to Petty Officer in First-term	Reenlistment Eligibility	Retention Beyond EAOS
Felonies				
Arrests	7.8 **	- 8.0 **	- 8.7 **	- 9.3 **
Convictions	7.2 **	- 4.5 *	- 8.1 **	- 4.0
Non-felonies				
Arrests	4.4 **	- 7.0 **	- 5.3	- 9.7 **
Convictions	7.8 **	- 10.2 **	- 10.8 **	- 11.3 **

Base case: Male, white, 19.31 years, high school diploma, AFQT I/II
* Significant at .05 level
** Significant at .01 level

category. Attrition increases by more than 7 percentage points for all categories of criminal background except non-felony arrests. Non-felony convictions have the largest effect of all the other PCH categories on promotion, reenlistment eligibility and retention, reducing the likelihood of each measure by at least 10 percentage points.

In Table 10, presence of an adult PCH also degrades each measure of performance. Comparing felony PCH's to non-felony PCH's, felonies have a larger effect on each performance measure. The difference is minimal when looking at the likelihood of promotion to E-4. In this case, there is less than a 3 percentage point difference between the effect of a felony conviction PCH and a non-felony arrest PCH. Between the two felony PCH categories, convictions have a larger impact on recruit success than arrests though the difference is negligible.

To summarize these findings, each PCH category has a negative effect on each measure of recruit success in both samples. Convictions appear to have the largest negative effects among the PCH categories (non-felonies in the juvenile data; felonies in the adult data) although arrest histories are also significant. In fact, in the juvenile data

Table 10. Percentage Point Difference in Recruit Performance by PCH Category for Illinois Adult Criminal Data, 1981-1987

PCH Category	Performance Measures			
	First-term Unsuitability Attrition	Promotion to Petty Officer in First-term	Reenlistment Eligibility	Retention Beyond EAOS
Felonies				
Arrests	11.9[a]	- 13.2	- 14.0	- 14.6
Convictions	12.4	- 12.9	- 14.7	- 15.5
Non-felonies				
Arrests	8.4	- 10.2	- 4.5	- 9.7
Convictions	6.5	- 9.7	- 7.8	- 9.8

Base case: Male, white, 19.31 years, high school diploma, AFQT I/II
[a]Each result in the table is significant at .01 level

felony arrests are associated with greater likelihood of decreased performance than felony convictions. Finally, the results indicate that adult criminal history may have a greater impact on recruit performance than juvenile criminal history; however, juvenile criminal history is still associated with significant, negative effects on performance.

C. RELATIONSHIP BETWEEN PCH AND HIGH SCHOOL EDUCATION/AFQT CATEGORY ON PERFORMANCE

In the previous sections we demonstrated that high school diploma status (HSDG) and AFQT category have the largest effects on performance and that the presence of a PCH degrades performance in each measure. When comparing the effects of juvenile PCH to adult PCH, larger effects are found for adult PCH categories, suggesting the adult crime data may be a better indicator of first-term recruit success. In this section we examine performance probabilities generated by the models when HSDG, AFQT category and PCH category are varied simultaneously. There is a practical reason for investigating these relationships. Navy recruiters classify applicants into "cells" based on their high school education status and AFQT category, and develop recruiting goals separately for each cell, based in part on Navy requirements for educational background and aptitude.

Thus, analyzing the results from these cells may provide empirical foundations for screening policies. "A-cell" individuals are diploma holders who fall into AFQT categories I, II, or IIIA; "B-cell" individuals are non-diploma holders in AFQT categories I, II, or IIIA; and "C-cell" individuals are high school diploma holders who are in AFQT category IIIB. There is a D-cell classification (non-diploma, AFQT category IIIB) but since these individuals are no longer recruited, they were not considered in the analysis of the empirical results (Griffis, Gregory, and Flyak, 1996). For recruits in the juvenile crime sample, the distribution of individuals by cell is 58.7 percent in A-cell, 10.7 percent in B-cell, and 23.1 percent in C-cell. For recruits in the adult crime sample, the distribution of individuals by cell is 49.9 percent in A-cell, 9.4 percent in B-cell and 25.8 percent in C-cell.

From Tables 4 and 5 in the previous chapter, non-HSDGs are more likely to have preservice criminal histories than HSDGs and lower mental category recruits are generally more likely to have criminal histories than upper mental category recruits. This implies that B- and C-cell recruits are more likely to have criminal backgrounds than A-cell recruits. This is in fact what we find when classifying HSDG and AFQT status into cells. For example, B-cells from Illinois are nearly twice as likely to have an adult criminal background, of any type, than A-cells from Illinois; C-cells from Illinois are more likely to felony histories (but are slightly less likely to have non-felony histories) than A-cells from Illinois. The remainder of this section examines the results of the analysis of each alternative performance measure.

1. Unsuitability Attrition. Table 11 presents the predicted unsuitability attrition probabilities by PCH category and high school diploma status with AFQT category for juvenile and adult PCH backgrounds. For the juvenile sample, the probability of attriting for unsuitability increases nearly 30 percentage points between AFQT I/II diploma graduates and AFQT IIIA non-diploma graduates (15.0 percent to 44.3 percent), even without taking PCH status into account. For the adult crime data this difference is nearly identical. These results are consistent with our earlier findings when

Table 11. Unsuitability Attrition Probabilities (in Percent) by PCH Category and High School Diploma Status with AFQT Category for Juvenile and Adult Criminal Backgrounds

	High School Diploma Status and AFQT Category				
	A-Cell		C-Cell	B-Cell	
	Diploma AFQT I/II	Diploma AFQT IIIA	Diploma AFQT IIIB	No Diploma AFQT I/II	No Diploma AFQT IIIA
Juvenile Data					
Without PCH[a]	15.0 %	17.2 %	22.1 %	40.3 %	44.3 %
Felony PCH					
Arrests	22.2	25.2	31.3	51.3	55.5
Convictions	22.2	25.1	31.4	52.2	56.2
Non-felony PCH					
Arrests	19.0	21.7	27.3	46.5	50.7
Convictions	22.8	25.7	32.2	53.0	57.0
Adult Data					
Without PCH[a]	15.5 %	18.3 %	20.8 %	40.2 %	45.1 %
Felony PCH					
Arrests	26.7	30.6	34.1	55.9	60.1
Convictions	27.9	32.2	35.7	58.7	63.5
Non-felony PCH					
Arrests	23.3	26.9	30.1	51.4	56.2
Convictions	22.0	25.7	28.8	50.9	55.9

Notes: Conviction PCH probabilities calculated from LOGIT model 1; Arrest PCH probabilities calculated from LOGIT model 2. [a]Baseline probabilities calculated from LOGIT model 1.

considering AFQT and high school diploma status separately; that is, the likelihood of success decreases for non-HSDG's and lower mental categories.

When criminal history is introduced, the likelihood of attriting for unsuitability increases. For the juvenile crime data, non-felony convictions result in the greatest likelihood of unsuitability attrition in each cell, from 22.8 percent for "upper" A-cell to 57.0 percent for the "lower" portion of the B-cell[7]. The largest effect occurs in both

[7] "Upper" A-cell or B-cell refers to AFQT category I/II within those cells. "Lower" A-cell or B-cell refers to AFQT category IIIA within those cells.

categories of B-cell. Recruits with a juvenile non-felony conviction in either upper or lower B-cell are 12.7 percentage points more likely to attrite than recruits in the same category without any criminal history (53.0 percent to 40.3 percent, upper B-cell; 57.0 percent to 44.3 percent, lower B-cell). Comparing PCH categories for the adult crime data, felony convictions result in the greatest likelihood of unsuitability attrition. The difference in the probability of attrition between a recruit with an adult felony conviction compared to a recruit without a history of criminal behavior increases consistently from 12.4 percentage points for upper A-cell to 18.4 percentage points for lower B-cell. These findings are consistent with the results presented in Table 9 and Table 10.

Using California adult arrest history data, Griffis, Gregory, and Flyak (1996) found that A-cell recruits, with or without arrest histories, left the Navy at lower rates than B- or C-cell recruits without arrest histories. We do not find the same results in either the Illinois or Florida data. For the adult crime data, C-cell recruits without criminal backgrounds attrite from the Navy at a lower rate (20.8 percent) than A-cells, upper or lower, with any PCH category (ranging from 22.0 percent for upper A-cell with a non-felony conviction PCH to 32.2 percent for a lower A-cell with a felony conviction PCH). For the juvenile crime data, only upper A-cell recruits with non-felony arrest PCH leave the Navy at a lower rate than C-cell recruits with no PCH. In both samples, A-cell and C-cell recruits with or without criminal histories attrite less frequently than B-cell recruits without criminal histories. These findings are important for two reasons. First, they emphasize the strength of the relationship between high school diploma status and recruit success. Second, and perhaps more importantly, they suggest that higher AFQT scores may <u>not</u> compensate for an individual's criminal background. Thus, the presence of a criminal background could potentially influence the way the Navy views compensating characteristics when screening prospective recruits.

The results also imply that the likelihood of recruit success, as measured by first-term unsuitability attrition, may be improved by identifying and denying enlistment to individuals based on their criminal background. The first-term attrition rate could be

reduced by checking the criminal histories of all recruits; however, a large portion of the gains should occur from screening only B and C-cell recruits as the magnitude of the effects are larger for these two categories.

2. Promotion to Paygrade E-4. Table 12 presents the predicted probabilities of promotion to E-4 by PCH category and high school diploma status with AFQT category for juvenile and adult crime data. Among other things, promotion to E-4 is conditional on whether an individual has attrited from the Navy prior to the promotion point. Obviously, a recruit who has attrited, be it for unsuitability or any other reason, cannot be promoted. Since this study looks at the probability of recruit success from the entry point (enlistment), a portion of the likelihood of promotion can be attributed to attrition.

As with attrition probability, promotion probabilities decrease for non-HSDG's and lower AFQT categories, with or without a PCH background. In the juvenile sample, an upper A-cell recruit's promotion probability, without a PCH, is 37.5 percentage points higher than the promotion probability of a lower B-cell recruit without a PCH (75.3 percent to 37.8 percent). The difference between the same categories in the adult sample is 43.3 percentage points (76.9 percent to 33.6 percent). Introduction of a PCH does not significantly change the difference in probabilities between upper A-cells and lower B-cells; the marginal probability of promotion generally remains constant from one PCH category to the next. For example, in the adult crime data the performance difference between upper A-cell recruits and lower B-cell recruits with felony conviction histories is 42.7 percentage points; for recruits in the same cells with non-felony arrest histories the difference is 42.5 percentage points.

Presence of a PCH does reduce the likelihood of promotion within the cells for both samples. For the juvenile crime data, the largest decrease in promotion probability is associated with non-felony convictions. A C-cell recruit with a non-felony conviction is 12.2 percentage points less likely to promote to E-4 than a C-cell recruit without a criminal history (46.6 percent to 58.8 percent). For the adult crime data the largest

Table 12. E-4 Promotion Probabilities (in Percent) by PCH Category and High School Diploma Status with AFQT Category for Juvenile and Adult Criminal Backgrounds

	High School Diploma Status and AFQT Category				
	A-Cell		C-Cell	B-Cell	
	Diploma AFQT I/II	Diploma AFQT IIIA	Diploma AFQT IIIB	No Diploma AFQT I/II	No Diploma AFQT IIIA
Juvenile Data					
Without PCH[a]	75.3 %	68.1 %	58.8 %	46.4 %	37.8 %
Felony PCH					
Arrests	67.9	59.7	49.9	38.4	30.3
Convictions	70.8	63.0	53.2	40.8	32.6
Non-felony PCH					
Arrests	68.9	60.7	51.0	39.5	31.3
Convictions	65.0	56.7	46.6	34.6	27.1
Adult Data					
Without PCH[a]	76.9 %	67.5 %	62.3 %	44.9 %	33.6 %
Felony PCH					
Arrests	64.3	53.1	47.3	31.5	22.4
Convictions	64.0	52.6	46.9	30.3	21.3
Non-felony PCH					
Arrests	67.4	56.5	50.7	34.5	24.9
Convictions	67.2	56.0	50.4	33.3	23.8

Notes: Conviction PCH probabilities calculated from LOGIT model 1; Arrest PCH probabilities calculated from LOGIT model 2. [a]Baseline probabilities calculated from LOGIT model 1.

decrease in promotion probability is associated with felony convictions. A C-cell recruit with an adult felony conviction is 15.4 percentage points less likely to promote than a C-cell recruit without an adult criminal history (46.9 percent to 62.3 percent). In the juvenile and adult samples, PCH's have the largest effects on C-cell recruits, regardless of the category of the PCH. This implies that criminal history, when considered with AFQT, has a larger impact on promotion probability than criminal history together with HSDG.

Table 12 provides additional evidence that upper AFQT categories alone, ignoring criminal history, may not always be associated with a greater likelihood of recruit success.

C-cell recruits in the juvenile crime data who do not actually have a criminal history promote at a higher rate (58.8 percent) than lower A-cell recruits with a non-felony conviction (56.7 percent). C-cell recruits from the same sample with non-felony conviction PCH's are still more likely to promote to E-4 as any B-cell recruit. A similar pattern is found for recruits with the adult crime data. C-cell recruits who do not actually have a criminal history promote at a greater rate (62.3 percent) than lower A-cell recruits with any form of adult PCH (highest promotion rate is 56.5 percent for those with non-felony convictions). C-cell recruits with any type of adult PCH also promote at a greater rate than upper and lower B-cell recruits without criminal histories. It appears that an individual's criminal background may reduce or eliminate the likelihood of success normally attributed to increased mental ability (as measured by AFQT category).

3. Reenlistment Eligibility. Table 13 presents the predicted probabilities of reenlistment eligibility by PCH category and high school diploma status with AFQT category for recruits with juvenile criminal backgrounds and recruits with adult criminal backgrounds. Reenlistment eligibility is conditional on attrition; therefore, a portion of the likelihood of being eligible for reenlistment can be attributed to the likelihood of attriting.

For the juvenile crime data, the lowest eligibility rates are associated with non-felony conviction PCH's regardless of diploma status or AFQT category. Upper A-cell recruits with non-felony convictions are 9.8 percentage points less likely to be eligible to reenlist than A-cell recruits without any PCH (73.9 percent to 82.1 percent). Lower B-cell recruits with non-felony PCH from this sample have the lowest reenlistment eligibility rate of 40.3 percent.

In the adult crime data, the lowest eligibility rates occur for recruits with felony convictions. A felony conviction reduces an upper A-cell recruit's probability of reenlistment eligibility by 14.7 points, from 81.6 percent to 66.9 percent. The difference is larger for lower B-cell recruits. A recruit in this category with a felony conviction is 18.6 points less likely to be eligible than a recruit in this category with no criminal history (31.2 percent to 49.8 percent).

Table 13. Reenlistment Eligibility Probabilities (in Percent) by PCH Category and High School Diploma Status with AFQT Category for Juvenile and Adult Criminal Backgrounds

	High School Diploma Status and AFQT Category				
	A-Cell		C-Cell	B-Cell	
	Diploma AFQT I/II	Diploma AFQT IIIA	Diploma AFQT IIIB	No Diploma AFQT I/II	No Diploma AFQT IIIA
Juvenile Data					
Without PCH[a]	82.1 %	80.1 %	74.7 %	58.5 %	55.4 %
Felony PCH					
Arrests	74.1	71.4	64.9	47.6	44.3
Convictions	73.9	71.4	64.7	46.6	43.5
Non-felony PCH					
Arrests	77.2	74.8	68.7	51.8	48.15
Convictions	71.3	68.7	61.6	43.4	40.3
Adult Data					
Without PCH[a]	81.6 %	78.3 %	75.9 %	55.1 %	49.8 %
Felony PCH					
Arrests	68.3	63.9	60.6	38.6	34.0
Convictions	66.9	62.1	58.9	35.8	31.2
Non-felony PCH					
Arrests	72.3	68.2	65.0	43.2	38.4
Convictions	73.8	69.6	66.6	43.7	38.6

Notes: Conviction PCH probabilities calculated from LOGIT model 1; Arrest PCH probabilities calculated from LOGIT model 2. [a]Baseline probabilities calculated from LOGIT model 1.

In both samples, the strength of the relationship between HSDG and success is highlighted in that C-cell recruits with any PCH are eligible for reenlistment at higher rates than any B-cell recruits (regardless of their PCH status). In the adult crime data, C-cell recruits with adult felony convictions have a likelihood of reenlistment eligibility nearly four points higher than upper B-cell recruits with no criminal history (58.9 percent compared to 55.1 percent). Additionally, C-cell recruits without adult criminal backgrounds are more likely to be eligible for reenlistment than A-cell recruits, upper or lower, with any adult criminal history. These results demonstrate the deleterious effect

pre-service criminal history has on success which may not always be compensated for by higher AFQT categories.

4. Retention beyond EAOS (Reenlistment). Table 14 presents the predicted probabilities of retention beyond the first term by PCH category and high school diploma status with AFQT category for juvenile and adult crime data. Like the probabilities of promotion and reenlistment eligibility, the likelihood of remaining in the Navy beyond EAOS is conditional on attrition. A recruit who has left the Navy prior to EAOS can not, by definition, serve past his or her EAOS.

The effects of criminal behavior on retention are similar to those seen in the other success measures: the likelihood of retention decreases for non-HSDG's and lower mental categories; non-felony convictions have the largest effect on retention probability in the juvenile crime data; and felony convictions have the largest effect on retention probability in the adult crime data. What is different is the effect of AFQT category and HSDG on success given the presence of a PCH.

Previously we found that C-cell recruits with any category of PCH had a greater likelihood of success than any B-cell recruit regardless of the B-cell recruit's criminal history. This is not the case with regard to the probability of retention. In the juvenile data, B-cell recruits without juvenile criminal histories are generally more likely to remain in the Navy beyond their EAOS as C-cell recruits with any type of PCH. Also, A-cell recruits with any juvenile PCH, other than non-felony convictions, have a higher probability of retention than C-cell recruits without juvenile criminal histories. This suggests that upper AFQT categories may compensate for juvenile criminal history when examining the probability of reenlistment.

This reversal of the previous findings is not completely duplicated in the adult crime data. As with the juvenile data, B-cell recruits without adult criminal histories have a greater likelihood of retention than C-cell recruits with any adult PCH. But unlike the juvenile data, C-cell recruits without adult criminal histories are more likely to remain in the Navy than lower A-cell recruits with any type of adult PCH. A possible explanation

Table 14. Retention Probabilities (in Percent) by PCH Category and High School Diploma Status with AFQT Category for Juvenile and Adult Criminal Backgrounds

	High School Diploma Status and AFQT Category				
	A-Cell		C-Cell	B-Cell	
	Diploma AFQT I/II	Diploma AFQT IIIA	Diploma AFQT IIIB	No Diploma AFQT I/II	No Diploma AFQT IIIA
Juvenile Data					
Without PCH[a]	55.6 %	47.0 %	37.1 %	33.4 %	26.2 %
Felony PCH					
Arrests	47.1	38.5	29.6	27.0	20.7
Convictions	51.5	43.0	33.4	29.9	23.2
Non-felony PCH					
Arrests	46.7	38.2	29.3	26.7	20.4
Convictions	44.3	36.0	27.2	24.1	18.4
Adult Data					
Without PCH[a]	56.5 %	43.3 %	36.6 %	34.1 %	23.4 %
Felony PCH					
Arrests	42.6	30.6	24.8	23.5	15.4
Convictions	41.0	29.0	23.5	21.7	14.0
Non-felony PCH					
Arrests	47.5	34.9	28.7	27.2	18.2
Convictions	46.7	34.1	28.0	25.9	17.1

Note: Conviction PCH probabilities calculated from LOGIT model 1; Arrest PCH probabilities calculated from LOGIT model 2. [a]Baseline probabilities calculated from LOGIT model 1.

for these "mixed effects" may be the conditional relationship between the probability of retention and the probability of attrition. In this study the effect of criminal history on retention may actually be attributed in large part to the effect of criminal history on attrition. In any case, the results indicate the likelihood of success, as measured by retention, is degraded by pre-service criminal history.

D. POTENTIAL COHORT EFFECTS

The juvenile crime data contains recruits who entered the Navy from fiscal years 1984 to 1988. The adult crime data contains recruits who entered the Navy from fiscal years 1981 to 1987. With several entry cohorts pooled into the two samples, it is possible that recruit success may be in some part attributed to specific entry cohorts. In other words, does the likelihood of success change depending on the year a recruit entered the Navy?

To examine this possibility, logit models to estimate the probability of first-term unsuitability attrition were specified which added dummy variables to identify an individual's entry cohort (in addition to the other explanatory variables). An individual cohort dummy equals one if the recruit entered the Navy in that fiscal year; zero otherwise. In the juvenile data, fiscal year 1988 is used as the base case and excluded from the model; the base case for the adult crime data is fiscal year 1987. These were the last years for the respective samples. The logit model results are included in Appendix D.

Examination of the results reveals that the coefficients estimated for the PCH variables remain basically unchanged when the cohort dummy variables are included in the models. In general, entry cohort appears to have little effect on first-term recruit success: pre-service criminal history increases the likelihood of unsuitability attrition even when cohort effects are considered. In both the juvenile and adult crime data, the estimated coefficients for fiscal year 1984 and 1985 are negative (as are the coefficients for fiscal years 1981 through 1983 in the adult data). This indicates that recruits entering the Navy in those fiscal years are less likely to attrite for unsuitability as recruits in the base case entry cohorts. However, in the juvenile crime data, none of the estimated coefficients are statistically significant at conventional levels; in the adult crime data, three of the six cohort coefficients are not statistically significant.

VI. CONCLUSIONS, POLICY IMPLICATIONS AND RECOMMENDATIONS

A. CONCLUSIONS

For recruits entering the Navy from Florida from 1984 to 1988, 2,167 (12.1 percent) had some form of pre-service, juvenile criminal history; Of these, 336 (1.9 percent of the sample) were convicted felons. Of the recruits entering the Navy from Illinois from 1981 to 1987, 1,922 (10.8 percent) had pre-service histories of adult criminal activity; 159 (0.9 percent) possessed an adult felony conviction. Given chronic adult offenders were likely to have been chronic juvenile offenders (Etcho, 1996) and assuming the Florida and Illinois samples were representative of Navy recruits as a whole, this implies that between 1 and 3 percent of all recruits entering the Navy were convicted felons. Further, 935 (5.20 percent) of the recruits from Florida entered the Navy with juvenile felony arrest histories and 870 (4.89 percent) of the recruits from Illinois entered the Navy with adult felony arrest histories.

The moral waiver process does not appear to be an effective method of determining a recruit's true criminal background. For recruits from Florida with juvenile felony convictions, only 2.7 percent received the appropriate moral waiver, indicating 97.3 percent of the convicted juvenile felons were not identified by the moral waiver process. Illinois recruits with adult felony convictions received the appropriate moral waiver 8.8 percent of the time. This is a marginal improvement over the Florida sample; however, it indicates more than 91 percent of the adult, convicted felons were allowed into the Navy without a moral waiver for their criminal background. It cannot be determined from the data whether the failure to identify these recruits was due to lack of self-disclosure or a failure of the recruiters to request a waiver. In either case the outcome is the same: almost 100 percent of the convicted felons actually entering the Navy did so without the appropriate moral waiver.

The results from this study suggest that all categories of pre-service criminal history are correlated with lower success of first-term recruits. Specifically, a PCH

background increases the probability of an early discharge for reasons of unsuitability, reduces the likelihood of promotion to paygrade E-4, reduces the likelihood of reenlistment eligibility, and reduces the likelihood of a recruit staying in the Navy beyond their initial EAOS. Both juvenile and adult criminal offenses degrade recruit performance. For recruits with juvenile PCH backgrounds, those with non-felony convictions were the least likely to succeed in all performance measures. For recruits with adult PCH backgrounds, those with felony convictions were least likely to succeed, though there was little difference in effects between adult felony convictions and adult felony arrests.

Not surprisingly, recruits without high school diplomas were less likely to succeed than recruits with high school diplomas and recruits in the lower mental categories were less successful than those in the upper mental categories. These results are well-documented in the literature (Buddin, 1984; Cooke and Quester, 1992; Etcho, 1996; and Frabutt, 1996). Taking PCH background into consideration does not significantly change these results. It does, however, provide useful information which may be applied to screening potential recruits. In general, C-cell recruits without PCH backgrounds (juvenile or adult) perform better than A-cell recruits with any form of criminal history. Additionally, criminal background negatively affects the performance of B-cell and C-cell recruits more than it does A-cell recruits. This implies that aggregate recruit performance rates could be improved by screening all recruits and excluding those who meet specific criminal criteria; and, the Navy may achieve nearly the same performance rate increases by screening only B-cell and C-cell recruits.

If the Navy is to use information from state criminal files as part of the recruit selection process, what type of information would be best to use? This study demonstrates that both adult and juvenile criminal history reduce the likelihood of recruit success. There is evidence which may make adult criminal history the better choice. First, adult information is relatively easier to obtain than juvenile information. Currently, only three states have been willing to release juvenile criminal information to Navy recruiters (Commander Navy Recruiting Command, 1996). Second, non-felony conviction PCH is

the juvenile crime category which had the largest negative effect on recruit success. In this study, non-felonies are basically misdemeanor offenses. It seems unlikely that a policy excluding an otherwise qualified applicant based on one juvenile misdemeanor conviction would be accepted as sound judgment. Third, the adult criminal history variables are associated with systematically larger negative effects than the juvenile criminal history variables. This implies that adult criminal history may make more effective criteria for predicting first-term recruit success.

B. POLICY IMPLICATIONS

Given the empirical results from the analyses, the Illinois data were chosen to test the outcomes of potential screening policies based on pre-service criminal history from state repositories. In order to make the sensitivity analysis as applicable to current recruiting conditions as possible, the data are restricted to A, B, and C-cell recruits only. This restriction eliminates those individuals who are no longer actively recruited by the Navy (Griffs, Gregory, and Flyak, 1996). As a result, the sample contains 15,126 observations: 8,876 A-cells (58.9 percent), 1,665 B-cells (11.0 percent), and 4,585 C-cells (30.1 percent).

Before discussing potential policies and their outcomes, two assumptions must be made. One is that recruits in the Illinois data are representative of Navy recruits nationwide; the second is that recruit behavior from 1981 to 1987 is identical to current recruit behavior. Given these assumptions, the following policies are examined:

1. Screen all recruits and exclude those with adult felony convictions only;

2. Screen only B-cell and C-cell recruits and exclude those with adult felony convictions; and

3. Screen only B-cell and C-cell recruits and exclude those with either an adult felony arrest or conviction.

From Table 15, each policy alternative results in improved first-term success rates. For the first alternative, all 15,126 recruits are screened for adult felony convictions and 176 (in Illinois only, not nationwide) are identified as convicted felons. If those

Table 15. Number of Records Screened, Individuals Identified and Difference in Success Rates by Policy Option

	Current Policy	Screen all Recruits for Adult Felony Convictions	Screen only B-cell and C-cell Recruits for Adult Felony Convictions	Screen only B-cell and C-cell Recruits for Adult Felony Convictions and Arrests
Records Screened	--	15,126	6,250	6,250
Individuals Identified	--	123	76	391
Success Rates[a]				
Unsuitability Attrition	20.9	20.7 (-0.2)	20.8 (-0.1)	20.3 (-0.6)
Promotion to E-4	64.7	64.8 (0.1)	64.8 (0.1)	65.4 (0.7)
Reenlistment Eligibility	75.8	76.0 (0.2)	75.9 (0.1)	76.4 (0.6)
Retention	44.8	45.0 (0.2)	45.0 (0.2)	45.4 (0.6)

[a]Given identified individuals are excluded from the sample. Percentage point difference between the overall success rates and success rates resulting from the prospective policies are given in parentheses.

individuals are excluded, that is, not accessed into the Navy, the overall unsuitability attrition rate decreases by 0.2 percentage points, the promotion rate to E-4 increases by 0.1 percentage points and both reenlistment eligibility and retention increase by 0.2 percentage points.

The second policy alternative screens only B-cell and C-cell recruits, 6,250 individuals. Of these, 76 are identified as adult convicted felons. When the identified convicted felons are excluded, first-term recruit success also improves in all measures. In fact, the retention rate increases by the same amount for the second alternative as for the first alternative. By reducing the size of the screening group by nearly 60 percent (15,126

individuals to 6,250), we realize no more than a 50 percent decrease in improved performance.

The third policy alternative differs from the second by modifying the selection criteria: individuals with adult felony convictions and arrests are identified and excluded. From the 6,250 B-cell and C-cell recruits, 391 are identified from Illinois criminal history files as having either a felony conviction or felony arrest. When these individuals are excluded, the performance "gain" is at least three times greater than the gains from the first policy. Thus, by changing the selection criteria, we can realize three times the performance gain by screening far fewer applicants (less than half as many). If the Navy recruited about 75,000 new enlistees nationwide and the unsuitability attrition rate was 25 percent without the screening, the third policy option would thus eliminate about 750 attrites.

The primary benefit to implementing a policy of screening state criminal history files to determine enlistees' criminal histories is one of cost. In reducing unsuitability attrition, the Navy reduces the lost human capital investment represented by recruits leaving the Navy prior to their EAOS. Exclusion of these recruits also improves the likelihood of sailors joining the career force, some of which may be due to the conditional relationship between attrition and the other success measures. Basically, performance is increased as attrition is decreased. Increased performance may be, in turn, positively related to increased production. Additionally, improved unit effectiveness may result as the potentially negative influence of convicted felons is removed from the military environment. Further study is required to determine the true relationship between increased success rates and productivity.

The benefits are not without costs. First among potential costs are the time, money, and effort required to recruit replacements for those excluded by the selection policy. Additionally, there is the cost of the record check itself. This may vary from state

to state as each maintains its own recordkeeping system with different abilities to retrieve information and different levels of cooperation exist between state agencies and recruiters (Flyer, 1995).

C. RECOMMENDATIONS

This thesis provides a foundation of empirical results which suggest first-term recruit success can be improved by using information from state criminal history files to determine an enlistee's criminal background. Specifically, it appears that adult felony criminal background is an effective predictor of recruit success. Before implementing any screening policy changes, detailed and accurate analyses of benefits and costs of such policies must be conducted to determine the net benefit to the Navy of such policies.

There is a position that criminal background alone is not a substantial basis for denying enlistment to otherwise qualified individuals, that "screening" implies there are "holes" in the selection process allow candidates to pass through and into the Navy. Generally, this argument is defensible by empirical results. For example, while approximately 43 percent of the Illinois recruits with adult felony convictions attrite for unsuitability, 57 percent do not. But attrition alone does not capture the quality of service recruits with criminal backgrounds provide. The same recruits are less likely to be promoted to E-4, less likely to be reenlistment eligible, and less likely to remain in the Navy beyond their first term. How does the presence of these recruits, who have been shown to be more likely to have disciplinary problems while on active duty (Flyer, 1995), affect unit-level performance?

As the Navy continues to reduce end strength and rely on fewer sailors to accomplish more tasks, wise investment of human capital resources is imperative to maintain a quality force. In this environment, the Navy may no longer have the luxury of accessing individuals with characteristics which have been demonstrated to reduce their chances of success on the hope they will be the ones who succeed. Perhaps now more than ever it is time to shrink the holes in the selection process "screen."

APPENDIX A. UNSUITABILITY ATTRITION INTER-SERVICE SEPARATION CODES

FAILURE TO MEET MINIMUM BEHAVIORAL OR PERFORMANCE CRITERIA

ISC	Description
60	Character of Behavior Disorder
61	Motivational Problems (Apathy)
62	Enuresis
63	Inaptitude
64	Alcoholism
65	Discreditable Incidents - Civilian or Military
66	Shirking
67	Drugs
68	Financial Irresponsibility
69	Lack of Dependent Support
70	Unsanitary Habits
71	Civil Court Conviction
72	Security
73	Court Martial
74	Fraudulent Entry
75	AWOL, Desertion
76	Homosexuality
77	Sexual Perversion
78	Good of the Service (in lieu of Court-Martial)
79	Juvenile Offender
80	Misconduct
81	Unfitness
82	Unsuitability
83	Pattern of Minor Disciplinary Infractions
84	Commission of a Serious Offense
85	Failure to Meet Minimum Qualifications for Retention
86	Expeditious Discharge
87	Trainee Discharge
101	Dropped from Strength for Desertion
102	Dropped from Strength for Imprisonment

APPENDIX B. RECRUIT PERFORMANCE RATES BY DEMOGRAPHIC CHARACTERISTIC.

First-term Performance Rates by Demographic Characteristics for Recruits from Florida, 1984-1988 Cohorts (Combined)

Demographic Characteristic	Unsuitability Attrition	Promotion to Petty Officer	Reenlistment Eligibility	Retention
Gender				
Male	21.31 %	64.35 %	75.82 %	45.96 %
Female	12.37	62.26	84.82	45.25
Race/Ethnicity				
White	20.06	65.42	77.52	46.32
Black	20.15	60.44	75.23	47.51
Hispanic	22.49	58.55	74.36	37.09
Other Minority	16.49	69.53	81.41	52.33
High School Diploma Status				
Diploma Holder	17.28	67.12	79.49	48.10
Non-Diploma Holder	43.27	40.15	55.63	28.37
AFQT Category				
Category I/II	17.46	71.25	79.85	52.74
Category IIIA	22.71	59.77	75.24	41.93
Category IIIB	21.57	57.12	74.73	38.06
Category IV	25.82	54.26	70.34	39.51

Source: Derived from data provided by the Defense Manpower Data Center.

First-term Performance Rates by Demographic Characteristics for Recruits from Illinois, 1981-1987 Cohorts (Combined)

Demographic Characteristic	Unsuitability Attrition	Promotion to Petty Officer	Reenlistment Eligibility	Retention
Gender				
Male	24.11 %	61.69 %	71.96 %	42.53 %
Female	13.86	62.66	84.00	44.95
Race/Ethnicity				
White	21.77	63.91	75.15	43.38
Black	28.40	52.75	65.51	40.45
Hispanic	25.13	54.64	69.34	40.85
Other Minority	13.30	72.41	83.16	45.32
High School Diploma Status				
Diploma Holder	19.40	65.88	76.92	45.39
Non-Diploma Holder	46.16	34.60	48.64	25.67
AFQT Category				
Category I/II	18.44	72.04	78.67	53.72
Category IIIA	24.59	58.08	71.73	38.85
Category IIIB	24.90	55.65	71.26	34.80
Category IV	29.72	49.75	64.07	33.78

Source: Derived from data provided by the Defense Manpower Data Center.

APPENDIX C. LOGIT MODEL MARGINAL PROBABILITIES

Effects of Logit Model Explanatory Variables on Performance Measure Probabilities for Logit Model 1 with Juvenile History[a]

Explanatory Variables	Performance Measures			
	First-term Unsuitability Attrition	Promotion to Petty Officer in First-term	Reenlistment Eligibility	Retention Beyond EAOS
FEMALE	-0.0447**	-0.0581**	0.0504**	-0.0456**
BLACK	-0.0695**	0.0099	-0.0040	0.0809**
HISPANIC	-0.0152	-0.0043	0.0082	-0.0422**
OTHRMIN	-0.0220	0.0351	0.0276	0.0653*
ENTRYAGE	-0.0006	0.0047**	-0.0008	0.100**
NONHSDG	0.2529**	-0.2885**	-0.2357**	-0.2220**
CATIIIA	0.0218**	-0.0713**	-0.0194**	-0.0858**
CATIIIB	0.0710**	-0.1647**	-0.0738**	-0.1848**
CATIV	0.1179**	-0.2137**	-0.1129**	-0.1999**
FELON	0.0718**	-0.0448*	-0.0811**	-0.0402
NONFELON	0.0775**	-0.1022**	-0.1074**	-0.1129**

[a]Base case: Male, white, 19.31 years old, high school diploma graduate in AFQT category I/II.

* Significant at .05 level

** Significant at .01 level

Effects of Logit Model Explanatory Variables on Performance Measure Probabilities for Logit Model 2 with Juvenile History[a]

Explanatory Variables	Performance Measures			
	First-term Unsuitability Attrition	Promotion to Petty Officer in First-term	Reenlistment Eligibility	Retention Beyond EAOS
FEMALE	-0.0416**	-0.0615**	0.0471**	-0.0505**
BLACK	-0.0126	0.0113	-0.0027	0.0825**
HISPANIC	-0.0146	-0.0041	0.0075	-0.0418**
OTHRMIN	-0.0204	0.0324	0.0260	0.0617*
ENTRYAGE	0.0003	0.0035*	-0.0017	0.0084**
NONHSDG	0.2414**	-0.2780**	-0.2252**	-0.2145**
CATIIIA	0.0222**	-0.0716**	-0.0200**	-0.0872**
CATIIIB	0.0689**	-0.1623**	-0.0719**	-0.1847**
CATIV	0.1161**	-0.2122**	-0.1115	-0.2008**
F_ARRST	0.0757**	-0.0796**	-0.0846**	-0.0934**
NF_ARRST	0.0443**	-0.0699**	-0.0532	-0.0973**

[a]Base case: Male, white, 19.31 years old, high school diploma graduate in AFQT category I/II.

* Significant at .05 level

** Significant at .01 level

Effects of Logit Model Explanatory Variables on Performance Measure Probabilities for Logit Model 1 with Adult History[a]

Explanatory Variables	Performance Measures			
	First-term Unsuitability Attrition	Promotion to Petty Officer in First-term	Reenlistment Eligibility	Retention Beyond EAOS
FEMALE	-0.0538**	-0.0259**	0.0696**	-0.0066
BLACK	0.0466**	-0.0510**	-0.0733**	0.0309**
HISPANIC	0.0031	-0.0231	-0.0206	0.0353
OTHRMIN	-0.0635**	0.0716**	0.0610*	0.0414
ENTRYAGE	-0.0031*	0.0022	0.0034*	0.0052**
NONHSDG	0.2471**	-0.3204**	-0.2656**	-0.2240**
CATIIIA	0.0284**	-0.0944**	-0.0336**	-0.1316**
CATIIIB	0.0528**	-0.1462**	-0.0576**	-0.1994**
CATIV	0.1176**	-0.2400**	-0.1377**	-0.2365**
FELON	0.1244**	-0.1287**	-0.1469**	-0.1554**
NONFELON	0.0652**	-0.0973**	-0.0782**	-0.0977**

[a]Base case: Male, white, 19.31 years old, high school diploma graduate in AFQT category I/II.

* Significant at .05 level

** Significant at .01 level

Effects of Logit Model Explanatory Variables on Performance Measure Probabilities for Logit Model 2 with Adult History[a]

Explanatory Variables	Performance Measures			
	First-term Unsuitability Attrition	Promotion to Petty Officer in First-term	Reenlistment Eligibility	Retention Beyond EAOS
FEMALE	-0.0476**	-0.0326**	0.0627**	-0.0136
BLACK	0.0419**	-0.0464**	-0.0677**	0.0350**
HISPANIC	0.0018	-0.0206	-0.0181	0.0377*
OTHRMIN	-0.0600**	0.0690**	0.0587*	0.0396
ENTRYAGE	-0.0050**	0.0042**	0.0056**	0.0074**
NONHSDG	0.2295**	-0.3071**	-0.2479**	-0.2160**
CATIIIA	0.0258**	-0.0910**	-0.0307**	-0.1300**
CATIIIB	0.0500**	-0.1431**	-0.0549**	-0.1990**
CATIV	0.1138**	-0.2371**	-0.1338**	-0.2367**
F_ARRST	0.1185**	-0.1326**	-0.1397**	-0.1455**
NF_ARRST	0.0844**	-0.1019**	-0.1002**	-0.0963**

[a]Base case: Male, white, 19.31 years old, high school diploma graduate in AFQT category I/II.

* Significant at .05 level

** Significant at .01 level

APPENDIX D. LOGIT MODEL RESULTS ON UNSUITABILITY ATTRITION FOR SPECIFICATIONS INCLUDING ENTRY COHORT DUMMY VARIABLES

CONVICTION LOGIT MODEL ON UNSUITABILITY ATTRITION: JUVENILE CRIME DATA

Criteria for Assessing Model Fit

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	18082.215	17246.177	.
SC	18090.011	17370.913	.
-2 LOG L	18080.215	17214.177	866.038 with 15 DF (p=0.0001)
Score	.	.	967.790 with 15 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standardized Estimate	Odds Ratio
INTERCPT	1	-1.6408	0.2090	61.6162	0.0001	.	0.194
FEMALE	1	-0.4088	0.0696	34.4892	0.0001	-0.073871	0.664
BLACK	1	-0.0993	0.0561	3.1356	0.0766	-0.020506	0.905
HISPANIC	1	-0.1221	0.0704	3.0107	0.0827	-0.018308	0.885
OTHRMIN	1	-0.1844	0.1660	1.2338	0.2667	-0.012569	0.832
ENTRYAGE	1	-0.00380	0.0105	0.1312	0.7172	-0.003936	0.996
NONHSDG	1	1.3246	0.0544	592.1466	0.0001	0.231019	3.761
CATIIIA	1	0.1611	0.0501	10.3254	0.0013	0.037367	1.175
CATIIIB	1	0.4697	0.0507	85.6937	0.0001	0.110198	1.599
CATIV	1	0.7217	0.0779	85.8208	0.0001	0.100112	2.058
FELON	1	0.4847	0.1211	16.0217	0.0001	0.036205	1.624
NONFELON	1	0.5094	0.1478	11.8795	0.0006	0.031239	1.664
FY84	1	-0.1269	0.0645	3.8675	0.0492	-0.025623	0.881
FY85	1	-0.00061	0.0615	0.0001	0.9921	-0.000125	0.999
FY86	1	0.0716	0.0558	1.6444	0.1997	0.016472	1.074
FY87	1	-0.0470	0.0572	0.6741	0.4116	-0.010764	0.954

Association of Predicted Probabilities and Observed Responses

Concordant = 63.3%	Somers' D = 0.288
Discordant = 34.5%	Gamma = 0.294
Tied = 2.2%	Tau-a = 0.093
(52025160 pairs)	c = 0.644

ARREST LOGIT MODEL ON UNSUITABILITY ATTRITION: JUVENILE CRIME DATA

Criteria for Assessing Model Fit

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	18082.215	17213.732	.
SC	18090.011	17338.468	.
-2 LOG L	18080.215	17181.732	898.483 with 15 DF (p=0.0001)
Score	.	.	1002.230 with 15 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standardized Estimate	Odds Ratio
INTERCPT	1	-1.8072	0.2114	73.0767	0.0001	.	0.164
FEMALE	1	-0.3874	0.0697	30.8472	0.0001	-0.069993	0.679
BLACK	1	-0.1104	0.0562	3.8561	0.0496	-0.022795	0.895
HISPANIC	1	-0.1212	0.0704	2.9603	0.0853	-0.018163	0.886
OTHRMIN	1	-0.1745	0.1663	1.1014	0.2940	-0.011897	0.840
ENTRYAGE	1	0.00319	0.0106	0.0910	0.7629	0.003303	1.003
NONHSDG	1	1.2922	0.0548	557.0190	0.0001	0.225379	3.641
CATIIIA	1	0.1673	0.0502	11.1075	0.0009	0.038802	1.182
CATIIIB	1	0.4660	0.0508	84.1528	0.0001	0.109344	1.594
CATIV	1	0.7244	0.0780	86.2111	0.0001	0.100488	2.063
F_ARRST	1	0.5149	0.0763	45.5579	0.0001	0.062970	1.674
NF_ARRST	1	0.3206	0.0699	21.0128	0.0001	0.044666	1.378
FY84	1	-0.1309	0.0646	4.1098	0.0426	-0.026436	0.877
FY85	1	-0.0148	0.0616	0.0577	0.8102	-0.003041	0.985
FY86	1	0.0737	0.0559	1.7395	0.1872	0.016954	1.076
FY87	1	-0.0478	0.0573	0.6962	0.4040	-0.010948	0.953

Association of Predicted Probabilities and Observed Responses

Concordant = 64.0%	Somers' D = 0.297
Discordant = 34.3%	Gamma = 0.303
Tied = 1.7%	Tau-a = 0.096
(52025160 pairs)	c = 0.649

CONVICTION LOGIT MODEL ON UNSUITABILITY ATTRITION: ADULT CRIME DATA

Criteria for Assessing Model Fit

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	19133.573	18056.699	.
SC	19141.359	18196.843	.
-2 LOG L	19131.573	18020.699	1110.874 with 17 DF (p=0.0001)
Score	.	.	1189.692 with 17 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standardized Estimate	Odds Ratio
INTERCPT	1	-1.1671	0.2065	31.9380	0.0001	.	0.311
FEMALE	1	-0.4738	0.0679	48.7588	0.0001	-0.084799	0.623
BLACK	1	0.2902	0.0514	31.8591	0.0001	0.058853	1.337
HISPANIC	1	-0.0134	0.0912	0.0217	0.8828	-0.001515	0.987
OTHRMIN	1	-0.6142	0.2115	8.4368	0.0037	-0.035979	0.541
ENTRYAGE	1	-0.0224	0.0103	4.6731	0.0306	-0.023054	0.978
NONHSDG	1	1.2999	0.0497	685.0388	0.0001	0.241281	3.669
CATIIIA	1	0.1930	0.0521	13.7053	0.0002	0.043100	1.213
CATIIIB	1	0.3618	0.0474	58.1875	0.0001	0.090875	1.436
CATIV	1	0.7366	0.0626	138.6508	0.0001	0.128803	2.089
FELON	1	0.7434	0.1689	19.3789	0.0001	0.038586	2.103
NONFELON	1	0.4319	0.1032	17.5075	0.0001	0.038754	1.540
FY81	1	-0.0891	0.0669	1.7728	0.1830	-0.017627	0.915
FY82	1	-0.2293	0.0745	9.4774	0.0021	-0.038647	0.795
FY83	1	-0.3013	0.0726	17.2103	0.0001	-0.054887	0.740
FY84	1	-0.1520	0.0663	5.2536	0.0219	-0.030092	0.859
FY85	1	-0.0495	0.0661	0.5609	0.4539	-0.009648	0.952
FY86	1	0.0448	0.0633	0.5018	0.4787	0.009052	1.046

Association of Predicted Probabilities and Observed Responses

Concordant = 65.7%	Somers' D = 0.322
Discordant = 33.4%	Gamma = 0.325
Tied = 0.9%	Tau-a = 0.114
(55805268 pairs)	c = 0.661

ARREST LOGIT MODEL ON UNSUITABILITY ATTRITION: ADULT CRIME DATA

Criteria for Assessing Model Fit

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	19133.573	17956.883	.
SC	19141.359	18097.027	.
-2 LOG L	19131.573	17920.883	1210.691 with 17 DF (p=0.0001)
Score	.	.	1296.544 with 17 DF (p=0.0001)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standardized Estimate	Odds Ratio
INTERCPT	1	-0.8962	0.2097	18.2610	0.0001	.	0.408
FEMALE	1	-0.4259	0.0681	39.1240	0.0001	-0.076225	0.653
BLACK	1	0.2660	0.0518	26.4145	0.0001	0.053952	1.305
HISPANIC	1	-0.0179	0.0914	0.0383	0.8448	-0.002016	0.982
OTHRMIN	1	-0.6064	0.2123	8.1569	0.0043	-0.035521	0.545
ENTRYAGE	1	-0.0388	0.0106	13.4727	0.0002	-0.039967	0.962
NONHSDG	1	1.2493	0.0501	622.5726	0.0001	0.231887	3.488
CATIIIA	1	0.1807	0.0523	11.9436	0.0005	0.040368	1.198
CATIIIB	1	0.3545	0.0476	55.5234	0.0001	0.089035	1.425
CATIV	1	0.7350	0.0628	137.1123	0.0001	0.128514	2.085
F_ARRST	1	0.7372	0.0766	92.7146	0.0001	0.087683	2.090
NF_ARRST	1	0.5565	0.0717	60.1504	0.0001	0.072387	1.744
FY81	1	-0.1055	0.0673	2.4583	0.1169	-0.020859	0.900
FY82	1	-0.2251	0.0747	9.0757	0.0026	-0.037940	0.798
FY83	1	-0.3077	0.0729	17.8130	0.0001	-0.056055	0.735
FY84	1	-0.1522	0.0665	5.2362	0.0221	-0.030138	0.859
FY85	1	-0.0443	0.0663	0.4467	0.5039	-0.008636	0.957
FY86	1	0.0453	0.0635	0.5086	0.4757	0.009147	1.046

Association of Predicted Probabilities and Observed Responses

Concordant = 66.5%	Somers' D = 0.339
Discordant = 32.6%	Gamma = 0.342
Tied = 0.9%	Tau-a = 0.120
(55805268 pairs)	c = 0.669

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