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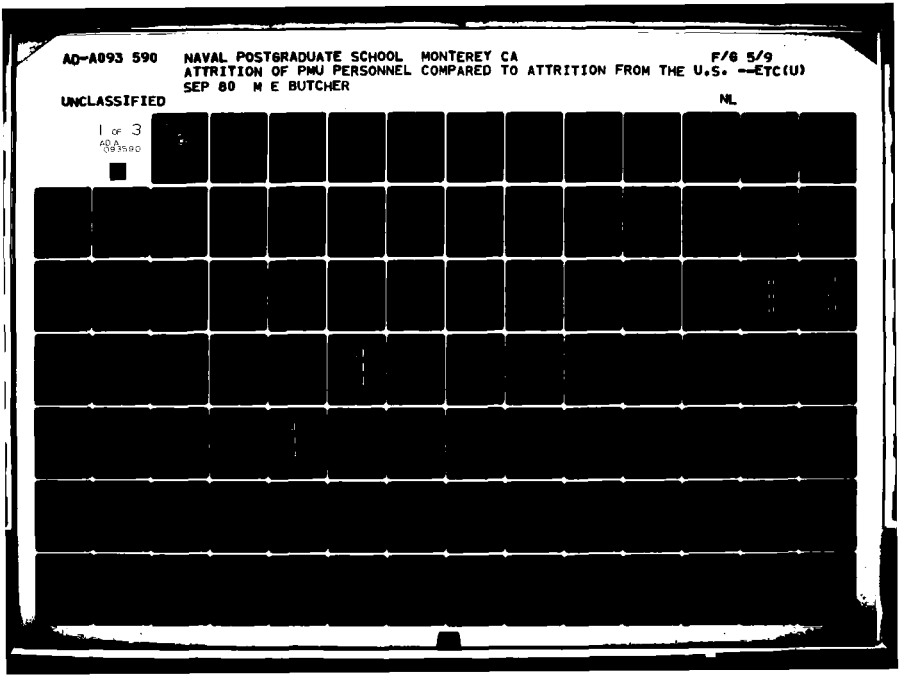

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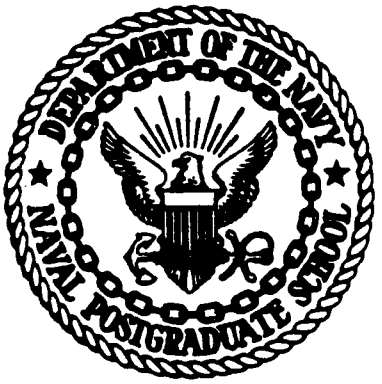

THESIS

ATTRITION OF PMU PERSONNEL COMPARED TO ATTRITION FROM THE U.S. NAVY MALE ENLISTED POPULATION.

by

Marvin E. Butcher, Jr.

September 1980

Thesis Advisor: R.S. Elster

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This thesis is a study of the difference in first-term personnel attrition between the Positive Motivation Unit (PMU), RTC Great Lakes, Ill. and a sample of the U.S. Navy male recruit population (control), for a period covering January 1977 through September 1979. Eleven cohorts, of 90 days each, for the PMU and control groups were tracked over the period (1977-1979) and their attrition rates were compared. Cross-tabulation,

(20. ABSTRACT Continued)

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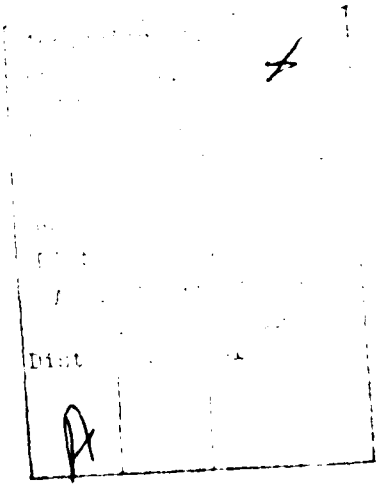

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Attrition of PMU Personnel Compared to Attrition from the U.S. Navy Male Enlisted Population

by

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Submitted in partial fulfillment of the requirements for the degree of

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ABSTRACT

This thesis is a study of the differences in first-term personnel attrition between the Positive Motivation Unit (PMU), RTC Great Lakes, Ill. and a sample of the U. S. Navy male recruit population (control), for a period covering January 1977 through September 1979. Eleven cohorts, of 90 days each, for the PMU and control groups were tracked over the period (1977-1979) and their attrition rates were compared. Cross-tabulation, discriminant, and multiple regression analyses were performed to examine PMU and control groupings and their observed attrition. The traditional biographic/demographic variables explained only a small portion of the variance in the dependent variable (survival), while the inclusion of certain situational variables, such as initial duty assignment, greatly increased the accuracy of the prediction of survival, for both the PMU and the control groups. The results of this study indicate that attrition has some determinants that are somewhat controllable by the Deputy Chief of Naval Operations (Manpower, Personnel, and Training). These determinants should aid Navy managers in preparing initiatives to combat attrition.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

Problem

Attrition...Attrition...Attrition, with the advent of the All-Volunteer Force in 1973 this word took on new meaning. No longer is attrition only the primary concern of the battlefield commander, with regard to losses of major pieces of battle equipment and battlefield casualties of personnel, but attrition of individuals who are lost to the military during their first three years of service prior to completing their initial enlistment is now also of concern (America's Volunteers, 1978). Since the end of the draft, first-term attrition in the U.S. Navy has grown from 28 percent in 1971 to 38 percent in 1977 (America's Volunteers, 1978). It was estimated in 1976 that the annual cost of Department of Defense first-term attrition was approximately one billion dollars (Defense Manpower Commission, 1976). A high level of attrition has been experienced in all the services. Attrition has become such a major problem that in 1977 the Secretary of Defense directed that efforts necessary to reduce first-term attrition be initiated (America's Volunteers, 1978).

The extent of the attrition problem is clearly shown in Table 1. Talbe 1 represents the total attrition of non-prior service males (NPS) in the U.S. Navy and the percentage of attrition assignable to the failure to meet behavioral and

	LENGTH OF SERVICE (MONTHS)							
	0-3	4-6	7-12	13-18	19-24	25-30	31-36	37-48
1973 total	7.41	9.52	15.62	21.37	26.88	30.91	34.06	36.99
ISC 6-8	4.70	6.27	11.20	16.38	20.69	23.93	26.42	28.46
1974 total	11.22	13.16	18.67	25.09	30.51	34.58	37.71	40.98
ISC 6-8	7.22	8.72	13.35	18.95	23.61	37.07	29.54	31.82
1975 total	9.99	12.41	17.65	23.64	28.93	32.76	35.25	37.73
ISC 6-8	6.76	9.21	13.61	18.78	23.26	26.33	28.18	29.77
1976 total	8.90	11.33	16.81	22.23	26.38	29.26	31.24	33.17
ISC 6-8	5.63	7.60	12.07	16.63	19.92	22.09	23.44	34.61
1977 total	12.37	14.20	17.77	21.14	24.09	25.66	26.05	-----
ISC 6-8	8.87	10.20	12.82	15.33	17.58	18.85	19.05	-----
1978 total	10.18	11.45	15.12	16.44	16.82	-----	-----	-----
ISC 6-8	9.14	10.11	11.60	12.88	13.18	-----	-----	-----
1979 total	8.80	9.36	9.88	-----	-----	-----	-----	-----
ISC 6-8	6.17	6.57	6.97	-----	-----	-----	-----	-----

TABLE 1

Navy Male NPS Cumulative Percent Attrition by Fiscal Year

Source: Defense Manpower Data Center Cohort File, Current as of Sept. 30, 1979.

Note: Total is total attrition for all reasons; ISC 6-8 stands for Interservice Separation codes representing losses due to failure to meet minimum acceptable behavioral or performance criteria. (HAWKINS, 1980)

performance criteria as indicated by the Interservice Separation Code (ISC) (Hawkins, 1980).[1]

Looking at the completion of 36 months active service from 1973 to 1977 in Table 1, it can be seen that the greatest increase in attrition has been in the 0-6 month service period, accounting for 28.5 percent of all attrition in 1973 and for 55 percent of all attrition in 1977. A closer look at Table 1 shows that most of the attrition in the 0-6 month service period takes place in the first three months of active duty. During the 0-3 month service period, 22 percent of all attrition in 1973 and 48 percent of all attrition in 1977 was experienced. During the five years 1973-1977, attrition appears to have declined slightly for the 0-36 month period; however, there is a slight increase in attrition in the 0-3 and 0-6 month service periods. The 0-3 month service period is the time generally used for recruit training and initial skill training. It would appear that a good place to attack the attrition problem would be during recruit training at the Recruit Training Centers (RTC) and during initial skills training.

Background

Since 1977, a number of initiatives have been launched with the intention of reducing attrition. For example, discharge standards were raised to make it harder to administratively discharge persons (America's Volunteers, 1978). Programs such as Behavioral Skills Training Program (BEST) have been established

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[1]See Appendix A for a listing of ISCs.

to reduce fleet attrition (Navy Times, 1980). However, the Special Training Division (STD) at each RTC was already in place prior to the Secretary of Defense's call for new initiatives. The STD is an organization composed of four major units (NAVCRUITRACOM, GLAKES 1510.7C, 1979):

1. Remedial Training Units

a. Academic Remedial Training Unit--teaches remedial reading skills to recruits with inadequate reading levels.

b. Military Indoctrination Unit--trains personnel who have performed inadequately in the military phase of training.

c. Physical Fitness Training Unit--trains personnel who have performed inadequately in RTC physical training requirements.

2. Reassignment Unit--a holding company for recruits who are being reassigned from one unit to another but whose ultimate transfer cannot be effected until normal working hours commence.

3. Recruit Convalescent Unit--receives recruits who have medical problems not requiring hospitalization but which precludes them from remaining in a regular recruit company.

4. Motivational Training Units

a. Positive Motivation Unit--trains and evaluates recruits who have developed motivational problems.

b. Motivational Training Unit--the most serious form of physical discipline which can be assigned at RTC and is basically a disciplinary unit.

c. Correctional Custody Unit--a preventive punishment unit designed to provide minor offenders with guidance and counseling.

Figure 1 provides a detailed organizational chart of a STD.

The STD's Positive Motivation Unit (PMU) is the primary unit designed to combat attrition at the RTC. During recruit training an individual undergoes eight weeks of intensive training designed to orient and acquaint him to the U.S. Navy's way of life. If, during this eight week period of instruction, an individual has demonstrated adjustment problems, insubordination, a lack of desire to remaining in the U.S. Navy, disciplinary infractions, or an overall negative attitude which is disruptive to the smooth functioning of his recruit company, as determined by his company commander and division officer, he will be transferred to the PMU (NAVCRUITRACOM, GLAKES 1510.7C, 1979). Personnel assigned to the PMU have been identified as being marginal performers, with respect to recruit training. Utilizing an active intervention policy to identify and correct deviant behavior instead of just removing the individual from the U.S. Navy, it is hoped that a potential attriter can be saved and become a productive member of the Navy.

The PMU's mission is to counsel, train, evaluate, and process recruits who are transferred from regular recruit training for the reasons listed above. The goals of the PMU are to:

1. effect a smooth transition from civilian to Navy life.
2. foster patriotic behavior.
3. affirm the dignity of the individual.

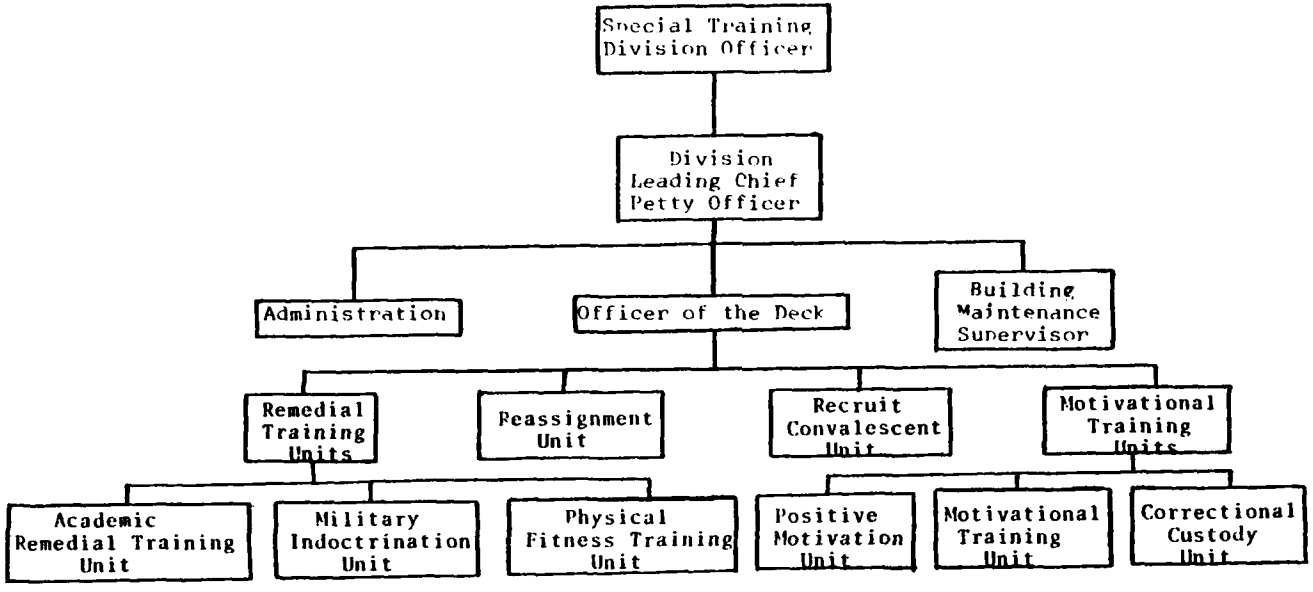

Figure 1: Special Training Division Organization Chart

4. encourage high standards of personal responsibility, conduct, manners, and morals.

5. provide the recruit with knowledge and skills which are basic to all Naval personnel.

6. develop pride in the unit and in the Navy and a desire to observe naval customs, ceremonies, and traditions (NAVCRUITRACOM GLAKES 1510.7C, 1979).

While recruits assigned to the PMU may be deserving of disciplinary action, the PMU is not a disciplinary unit. Using individual counseling, training, evaluation, and processing, the PMU is in reality the U.S. Navy's final effort to prevent a recruit from becoming an attrition statistic at the RTC.[2]

Purpose

This thesis is concerned with personnel attrition from the PMU at Recruit Training Center Great Lakes, Illinois. The Great Lakes PMU is intended to reduce attrition and to produce recruits who will be useful, productive members of the Navy. As with all PMU programs in the U.S. Navy, the emphasis is on the individual, and if successful should reduce not only RTC attrition but post-RTC attrition.

Traditionally, research aimed at prediction of attrition has focused upon individual characteristics such as age, years of education, and ability test scores (Mobley et al, 1977). This approach ignores the probability that dynamic factors such as

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[2]See Appendix B for Administrative Schedules, Counseling Sheets, Progress Reports, and Disposition Reports.

working conditions, organizational experiences, and supervisory practices may have more impact upon attrition than static personal or biographical characteristics (Lau, 1978). Attrition is a most complex phenomenon that can probably only be explained by simultaneously considering individual, situational, organizational, and other environmental variables (Smith and Kendall, 1980).

The first objective of this thesis is to compare the long term attrition rates of personnel who were assigned to the PMU with those of control personnel who were not assigned to the PMU. The second objective is to investigate the relationships of personal, organizational and situational variables with attrition rates of the PMU and control groups. The final objective is to identify the type of person who, having gone through the PMU, has the highest probability of success in the Navy.

METHOD

Design

The study of the attrition from the PMU was organized as follows:

1. All personnel who served in the PMU at Recruit Training Center, Great Lakes, Illinois from January 1, 1977 to September 30, 1979 were included in the experimental group for this thesis.

2. The control group was composed of a random sample of all personnel who commenced active duty between January 1, 1977 and September 30, 1979.

3. All data concerning personnel who participated in the PMU were obtained from Defense Manpower Data Center's (DMDC) cohort files and enlisted master record files.

4. All data concerning the control group were obtained from the Navy Personnel Research and Development Center's (NPRDC) survival tracking file number 2.

Experimental Group

The experimental group was obtained from records kept at the PMU office at RTC Great Lakes,[3] with an initial sample size of 3385 names and social security numbers. Passing the PMU social security numbers (SSN) against DMDC files,[4] it was

---

[3]LT Jerry Meyers, the officer in charge of the Special Training Division, provided names and social security numbers of all males having attended PMU during the period January 1, 1977 to September 30, 1979.

[4]See Appendix C for a list of the variables (and their descriptions) contained in the DMDC cohort file.

discovered that 192 SSN's were duplicates, and 68 SSN's could not be found; thus reducing the total number of personnel to 3125. Further analysis revealed that 103 females were included in the experimental group. Since there were no females at the RTC Great Lakes, these records were discarded. Another peculiarity was that 150 personnel in pay grades E-4 to E-9 were included in the experimental data. These were also excluded from the experimental group, so that the final count was 2863 personnel having participated in the PMU program.[5]

The experimental group was divided into eleven cohorts of 90 days each, i.e., January-March, April-June, and so on. Each cohort contained personnel who had an active duty service date commencing during the 90 day period. The 90 day time span was chosen because of the small number of personnel attending the PMU each month. Analyses would have been difficult and inconclusive if based on the small number of personnel in 30 or 60 day cohorts.

Control Group

The control group was obtained from the NPRDC survival tracking file number 2.[6] This file is a random sample[7] of all

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[5]It is this investigator's belief that the 159 personnel in paygrades E-4 to E-9 were part of the RTC staff. Since personnel assigned to the PMU as marginal performers were the ones who compiled the list of names and SSN's for this research, it appears that one or more of these workers either unwittingly copied the wrong list or perpetrated a small joke on this investigator.

[6]See Appendix D for a list of variables and descriptions contained in the NPRDC file.

[7]From personal communications with Dr. Jules Borack of NPRDC, the creator of Survival Tracking File Number 2.

personnel on active duty in 1977 with updates in 1978 and 1979. The tape uses a randomly chosen last digit of the service members' SSN to select personnel to be followed for attrition research. The tape contains 267,519 personnel with active duty service dates of 1950-1979. However, only personnel with active duty service dates of January 1977 to September 1979 were of interest for this thesis, which reduced the number of the control group to 24,105. Another reduction in the control group was made by removing 1847 female enlistees, so that the final number of personnel in the control group was 22,258.

The control group was divided into eleven cohorts of 90 days each, covering exactly the same months as the experimental group. This allowed the investigator to make direct comparisons between the male PMU personnel and a sample of the U.S. Navy male first-term enlisted population.

Procedures

Data collected for both the experimental group and the control group were arranged for processing by the Statistical Package for Social Sciences (SPSS, 1975). Frequency and discriminant analyses were used to determine whether the PMU population was representative of the general male U.S. Navy population of comparable length of enlisted series. Crosstabulation analyses were conducted utilizing the following demographic variables: Mental group (see table 2), age at enlistment, race, and years of education completed (see table 3).

Aggregate attrition data were developed utilizing number of personnel in a cohort who survived to a specified time. As

Table 2

Mental Groups for Crosstabulations

MG 12----------AFQT 65-100

MG 3U----------AFQT 49-64

MG 3L----------AFQT 11-48

AFQT: Armed Forces Qualification Test

MG3L as used here includes mental group IV.

Table 3

Variables Used to Describe Attrition in Crosstabulation Tables

MG 12----------mental group 1 and 2

MG 3U----------mental group 3 upper

MG 3L----------mental group 3 lower and 4

Age 17----------age 17 or less (at enlistment)

Age 18-19----------age 18 and 19 (at enlistment)

Age 20----------age 20 or greater (at enlistment)

White----------caucasian

Nwhite----------minority

H.S.G.----------high school graduates (at enlistment)

N.H.S.G.----------non-high school graduates (at enlistment)

mentioned earlier in this chapter, eleven cohorts were established, covering 90 days of active duty service commencement each. This was done to see if policy changes at the PMU could be identified by a marked change in attrition patterns.

Analyses were conducted to develop attrition and survival data for PMU personnel. Mental groups one and two were grouped due to the small number of PMU personnel in each group, while mental groups four and three lower were combined due to the small number of personnel in mental group four.

Additional analyses were conducted using multiple linear regression to predict survival rates. Two sets of equations were utilized. First, Lockman's model for attrition, using demographic and biographical variables, was used to develop an enlistment screening table (Lockman, 1977). The variables used included: race, mental group, age, number of dependents, and number of years education. Second, a modification of the equation developed by Smith and Kendall (1980) utilizing the traditional variables of Lockman and initial fleet assignments plus job status (see table 4) was utilized to predict survival rates. Initial duty assignments were determined by using the individual's unit identification code (UIC) to determine the type of activity to which he was assigned (DMDC file, 1979)[8]. The job assignment variables listed in Table 4 were created from the following methods utilizing Navy Enlisted Classification

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[8]See Appendix E for further details.

Table 4

Definition of Demographic and Situational Variables

Variable	Definition
MG 1	Mental Group 1 (ATQT 93-99)
MG 2	Mental Group 2 (AFQT 65-92)
MG 3U	Mental Group 3 upper (AFQT 49-64)
MG 3L	Mental Group 3 lower (AFQT 31-48)
MG 4	Mental Group 4 (AFQT 11-30)
Age 17	age 17 or below (at enlistment)
Age 18-19	age 18 and 19 (at enlistment)
Age 20	age 20 and above (at enlistment)
White	caucasian
NWhite	non-caucasian
LT 12ED	less than 12 years of education (at enlistment)
12 ED	12 years of education (at enlistment)
GT 12 ED	greater than 12 years of education (at enlistment)
PDEPS	primary dependents (at enlistment)
NDEPS	no primary dependents (at enlistment)
Initial Duty Assignment[A]	
Ship	assignment to a commissioned ship (but not CV or sub)
Sub	assignment to a commissioned submarine
Shore	assignment to Stateside or Overseas shore duty
CV	assignment to a commissioned aircraft carrier
AC	assignment to an aircraft squadron

Table 4 (continued)

Variable	Definition
Cea	sea duty other than ships, sub, AC, CV (e.g., Destroyer Squadron Staff)
Job Assignment[B]	
Tech	assignment to a technical job (e.g., sonar technician)
Spec	assignment to a specialist's job (e.g., acoustical analyst)
NSpec	not assigned to general detail (e.g., NEC = 0000)
Admin	assignment to an administrative job (e.g., yeoman)
Gen	assignemnt to general detail (e.g., seaman, fireman, or airman)

[A]Refer to Appendix E to see how initial duty assignment categories were assigned.

[B]Refer to Appendix E to see how job assignment categories were assigned.

Codes (NEC) or Defense Occupation Codes (DOC) and comparing them to NAVPERS 18068D and DoD 1312.1, the following variables were obtained:

1. if the NEC or DOC are identified as a specialist or analyst the variable assigned is SPEC.

2. if the NEC or DOC are identified as a 0000 or operator the variable assigned is NSPEC.

3. if the NEC or DOC are identified as a technician, welder, or machinist the variable assigned is TECH.

4. if the NEC or DOC are identified as a supply, administrative, or yoeman the variable assigned is ADMIN.

5. if the NEC is identified as blank or 9700 and the DOC is identified as 01 the variable assigned is GEN.

DESCRIPTIVE ANALYSIS

Personnel assigned to the PMU had been identified as marginal performers in recruit training. It is of interest to compare them with the recruit population of the U.S. Navy to determine whether the PMU personnel were different from recruits in general. These comparisons were made using demographic, job, and duty assignment data.

Frequency and discriminant analyses were used to compare the experimental group with the control group. First, frequency analysis was used to determine the distributions of the groups on the variables defined in table 4. Then a chi-squared test of independence was calculated for each variable. Second, discriminant analysis was used to attempt to distinguish statistically between the experimental and control groups using the variables in table 4. The discriminant analysis also provided a prediction model for classifying new recruits into PMU or recruit-in-general groups.

Comparison of Demographic Data

The frequency analysis was conducted in two parts.[9] First, the following variables were used, by calendar year of entry to the Navy, to compare the experimental and control groups:

--education at entry

--racial composition

---

[9]See Appendices F and G for formulae used in the analysis.

--mental groups

--age at entry

--number of dependents

Tables 5 through 7 provide demographic data for both the experimental and control groups for calendar years 1977, 1978 and 1979. Review of these tables indicates that the experimental and control groups differ significantly on education at entry, racial composition, mental group distribution, age at entry, and dependent status. These differences are discussed in the following paragraphs.

Education at Entry

Education at entry was determined by taking the highest grade of school the individual had completed and placing it into three dummy variables: less than twelve years of education, twelve years education, and greater than twelve years education.

1977 Education

In comparison to the control group, a significantly larger proportion of the experimental group had not completed twelve years of education (49.2 vs 35.7%; $z = 5.625$, $p < .001$).

1978 Education

In comparison to the control group, the experimental group had a significantly greater proportion of personnel with less than twelve years of education (49.6 vs 23.3%; $z = 11.5$, $p < .001$).

1979 Education

Compared to the control group, the experimental group had a significantly greater proportion of personnel with

Table 5

Comparison Between PMU and Control Groups

for Calendar Year 1977

	PMU Group		Control Group	
Variable	N	Percent	N	Percent
Education at Entry--χ^2(2df) = 154.44; p < .001*				
11 years or less	449	49.2	3131	35.7
12 years	453	49.7	4934	56.3
13 years or more	10	1.1	696	7.9
TOTAL	912	100.0	8761	99.9
Racial Composition--χ^2(1df) = 107.03; p < .001*				
White	652	71.5	7439	84.9
Non-White	260	28.5	1322	15.1
TOTAL	912	100.0	8761	100.0
Mental Group Category--χ^2(4df) = 1257.85; p < .001*				
Mental Group 1	15	1.6	569	6.5
Mental Group 2	87	9.5	2568	29.3
Mental Group 3U	222	24.3	2979	34.0
Mental Group 3L	258	28.3	2240	25.6
Mental Group 4	330	36.2	405	4.6
TOTAL	912	99.9	8761	100.0

Table 5 (continued)

Variable	PMU Group N	PMU Group Percent	Control Group N	Control Group Percent
Age at Entry--χ^2(2df) = 2966.53; p < .001*				
Age 17 or less	666	73.0	673	7.7
Age 18 or 19	196	21.5	5112	58.3
Age 20 or more	50	5.5	2976	34.0
TOTAL	912	100.0	8761	100.0
Number of Dependents--χ^2(1df) = 86.68; p < .001*				
No dependents	838	91.9	6919	79.0
one or more	74	8.1	1842	21.0
TOTAL	912	100.0	8761	100.0

*χ^2 test of independence is statistically significant, i.e., the PMU and control groups differ significantly on this variable.

Table 6

Comparison Between PMU and Control Groups

for Calendar Year 1978

	PMU Group		Control Group	
Variable	N	Percent	N	Percent
Education at Entry--χ^2(2df) = 324.08; p < .001*				
11 years or less	504	49.6	1804	23.3
12 years	503	49.5	5352	69.2
13 years or more	9	.9	575	7.4
TOTAL	1016	100.0	7731	99.9
Racial Composition--χ^2(1df) = 61.67; p < .001*				
White	745	73.3	6444	83.4
Non-White	271	26.7	1287	16.6
TOTAL	1016	100.0	7731	100.0
Mental Group Category--χ^2(4df) = 166.82; p < .001*				
Mental Group 1	20	2.0	447	5.8
Mental Group 2	164	16.1	2360	30.5
Mental Group 3U	429	42.2	2755	35.6
Mental Group 3L	295	29.0	1795	23.2
Mental Group 4	108	10.6	374	4.8
TOTAL	1016	99.9	7731	99.9

Table 6 (continued)

Variable	PMU Group N	PMU Group Percent	Control Group N	Control Group Percent
Age at Entry--χ^2(2df) = 1496.3; p < .001*				
Age 17 or less	488	48.0	527	6.8
Age 18 or 19	380	37.4	4582	59.3
Age 20 or more	148	14.6	2622	33.9
TOTAL	1016	100.0	7731	100.0
Number of Dependents--χ^2(1df) = 84.09; p < .001*				
no Dependents	969	95.4	6552	84.7
one or more	47	4.6	1179	15.3
TOTAL	1016	100.0	7731	100.0

* χ^2 test of independence is statistically significant, i.e., the PMU and Control Groups differ significantly on this variable.

Table 7

Comparison Between PMU and Control Groups

for Calendar Year 1979

	PMU Group		Control Group	
Variable	N	Percent	N	Percent
Education at Entry--χ^2(2df) = 160.8; p < .001*				
11 years or less	366	39.1	1274	22.1
12 years	565	60.4	4126	71.6
13 years or more	4	.4	366	6.3
TOTAL	935	99.9	5766	100.0
Racial Composition--χ^2(1df) = 68.5; p < .001*				
White	637	68.1	4620	80.1
Non-White	298	31.9	1146	19.9
TOTAL	935	100.0	5766	100.0
Mental Group Category--χ^2(4df) = 94.8; p < .001*				
Mental Group 1	20	2.1	319	5.5
Mental Group 2	147	15.7	1589	27.6
Mental Group 3U	342	36.6	2046	35.5
Mental Group 3L	342	36.6	1459	25.3
Mental Group 4	84	9.0	353	6.1
TOTAL	935	100.0	5766	100.0

Table 7 (continued)

Variable	PMU Group N	PMU Group Percent	Control Group N	Control Group Percent
Age at Entry--χ^2(2df) = 609.3; p < .001*				
Age 17 or less	273	29.2	296	5.1
Age 18 or 19	462	49.4	3440	59.7
Age 20 or more	200	21.4	2030	35.2
TOTAL	935	100.0	5766	100.0
Number of Dependents--χ^2(1df) = 11.3; p < .001*				
no dependents	916	98.0	5515	96.0
one or more	19	2.0	251	4.0
TOTAL	935	100.0	5766	100.0

* χ^2 test of independence is statistically significant, i.e., the PMU and Control Groups differ significantly on this variable.

less than twelve years of education (39.1 vs 22.1%; $z = 6.54$, $p < .001$).

Figure 2 demonstrates graphically the large differences between the experimental and control groups on the education variable.

Racial Composition

In this thesis, race was defined as white or non-white. All personnel of the experimental and control groups were placed into one of those categories.

1977 Race

Comparison of the experimental group to the control group revealed a significantly smaller proportion of whites (71.5 vs 84.9%; $z = 8.9$, $p < .001$) in the experimental group.

1978 Race

Compared to the control population, the PMU group in 1978 also had a significantly smaller proportion of white personnel (73.3 vs 83.4%; $z = 6.73$, $p < .001$).

1979 Race

As before, when the experimental group is compared to the control group, the experimental group has a significantly smaller proportion of white personnel (68.1 vs 80.1%; $z = 7.06$, $p < .001$).

Figure 3 shows the large differences between the groups in racial composition.

Mental Group

These analyses were made using the mental groups defined in table 4. As with education level and racial composition, there

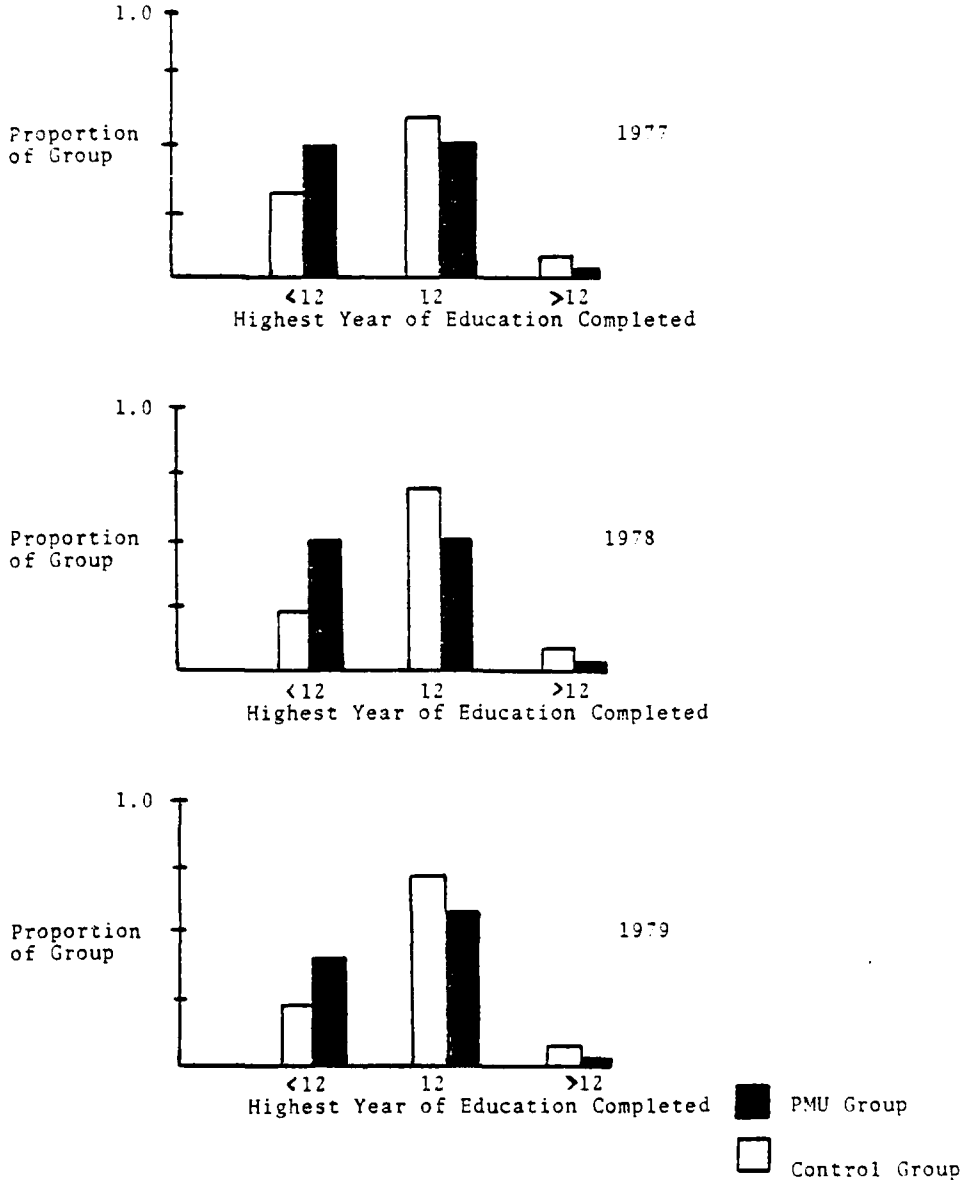

Figure 2: Educational Accomplishment of the PMU and Control Groups

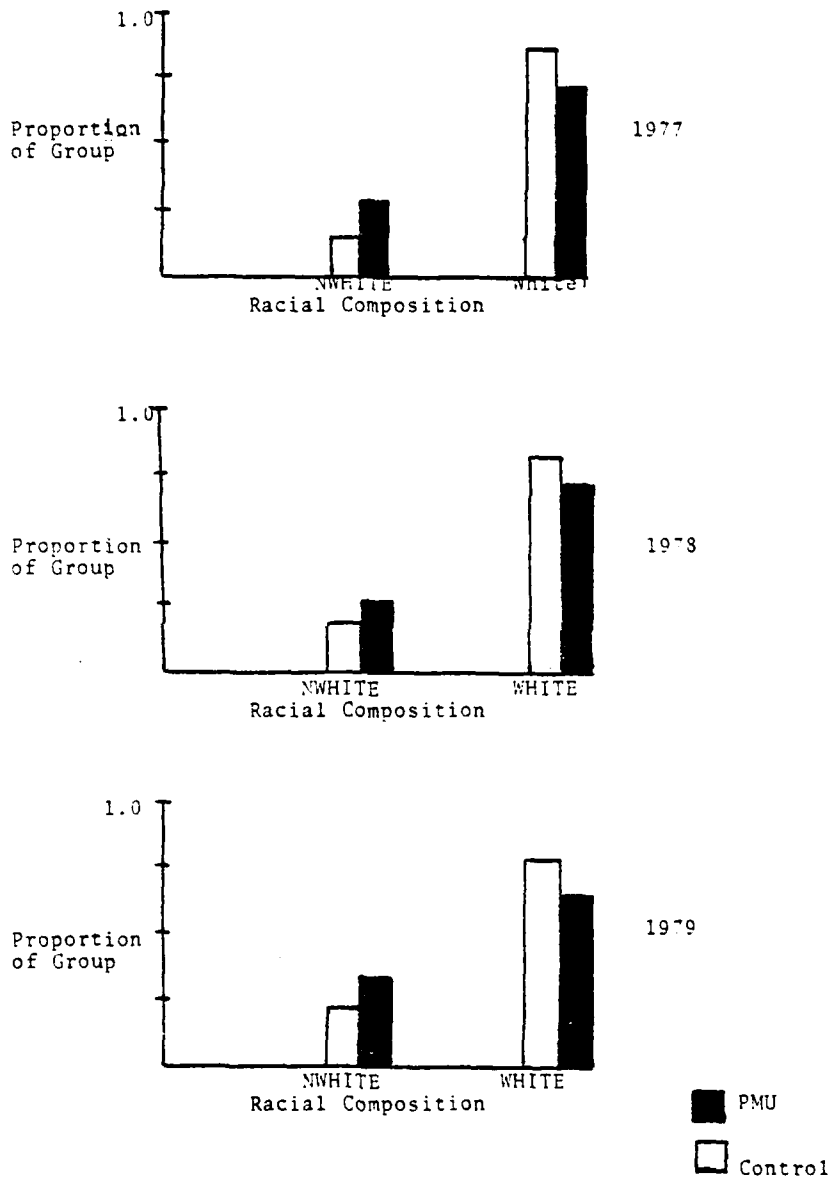

Figure 3: Racial Composition of PMU and Control Groups

are large differences between the PMU group and the control group. Refer to Figure 4 to see how large these differences are.

1977 Mental Categories

In contrast to the control group, the experimental group had a significantly greater proportion of mental group four personnel (36.2 vs 4.6%; $z = 31.6$, $p < .001$). While the experimental group had a greater proportion of mental category three lower personnel than did the control group, the difference was not statistically significant (28.3 vs 25.6%; $z = .93$, $p > .05$). The experimental group also had a significantly lower proportion of mental category three upper personnel than did the control group (24.3 vs 34.0%; $z = 2.94$; $p < .05$) and, significantly lower proportions of mental category one and two personnel (11.1 vs 35.8%; $z = 5.15$, $p < .001$).

1978 Mental Categories

Compared to the control group, the PMU group had a significantly larger proportion of personnel in mental categroy four (10.6 vs 4.8%; $z = 2.23$, $p < .05$), mental category three lower (29 vs 23.3%; $z = 2.15$, $p < .05$), and in mental category three upper (42.2 vs 35.6%; $z = 2.64$, $p < .01$). However, in mental categories one and two, the PMU group had a significantly smaller proportion of personnel than did the control group (18.1 vs 36.3%; $z = 5.01$, $p < .001$).

1979 Mental Categories

In comparison to the control group, the experimental group had a greater proportion of personnel in mental category

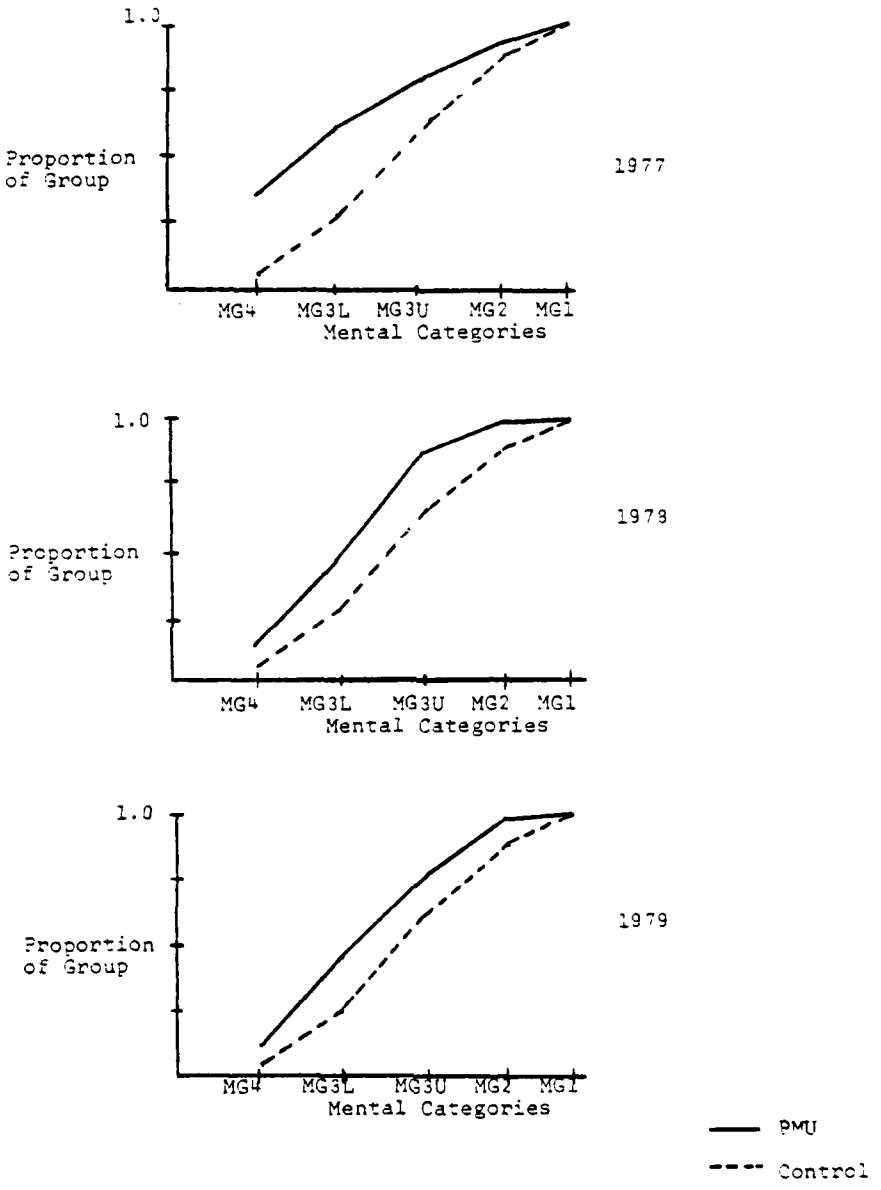

Figure 4: Cumulative Mental Groups: Scores for PMU and Control Group (Groups by cumulative proportion)

four, but the difference was not statistically significant (9.0 vs 6.1%; $z = .97$, $p > .05$). However, the experimental group had a significantly greater proportion of personnel in mental category three lower than did the control group (36.6 vs 25.1%; $z = 4.19$, $p < .001$); but in mental category three upper the groups' percentages were not significantly different. Finally, the control group had a significantly larger proportion of personnel in mental categories one and two than did the experimental group (2.1 vs 5.5%; $z = 4.16$, $p < .001$).

Age at Entry

Based on age at time of enlistment, all personnel were divided into three groups: 17 years old or younger, 18 or 19 years old, 20 years old and older. Personnel with ages less than 18 were placed in the 17 year or less group, while personnel with ages greater than 19 and less than 20 were placed in the 18-19 year group.

Figure 5 graphically demonstrates the differences between the PMU and the control groups, covering the three years of data used in this study.

1977 Age

Contrasted with the control group, the PMU group had a significantly higher proportion of personnel in the 17 year old or younger category (73.0 vs 7.7%; $z = 24.37$, $p < .001$). It follows then, that the PMU group had a significantly smaller proportion of personnel in the 18 to 19 year old category (21.5 vs 58.3%; $z = 10.22$, $p < .001$) and in the 20 year old or older

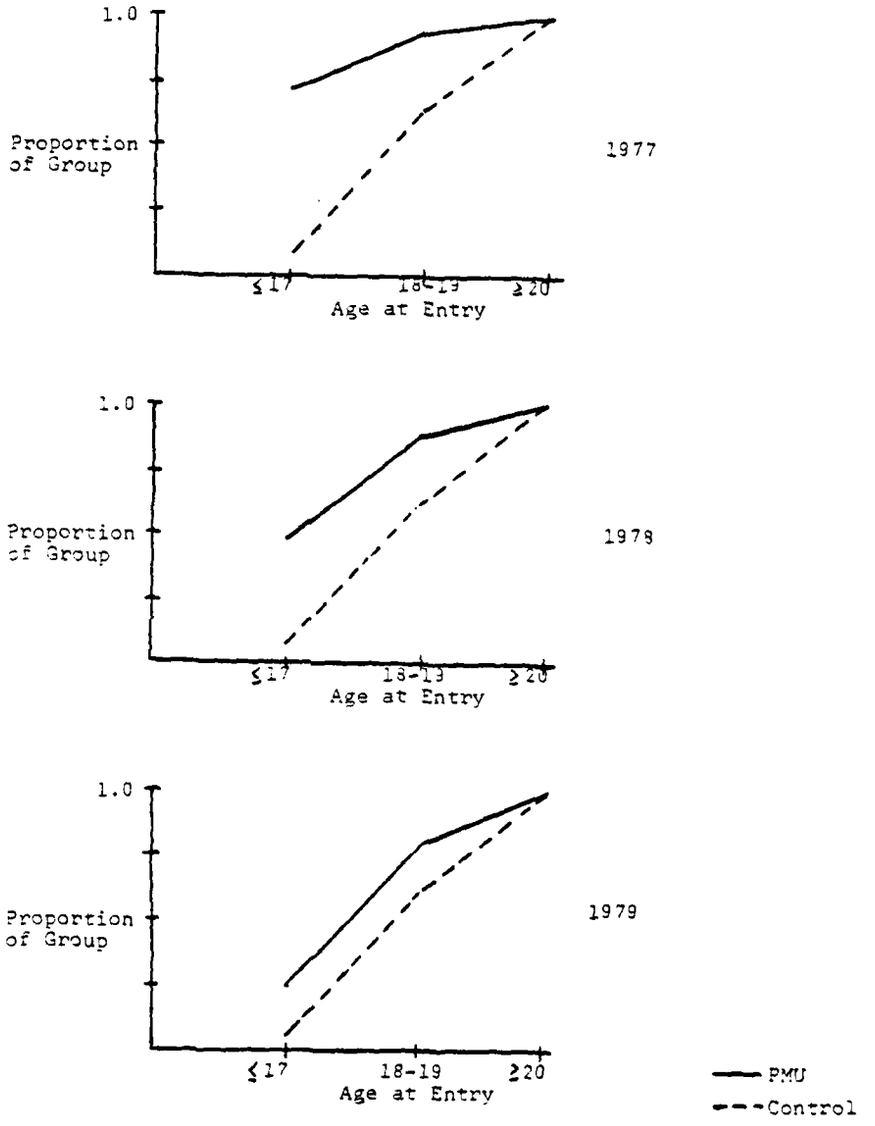

Figure 5: Cumulative Graph of Age at Entry (years by cumulative proportion)

category (5.5 vs 34.0%; $z = 4.25$, $p < .001$) than did the control group.

1978 Age

In comparison to the control group, the PMU group had a significantly higher proportion of personnel in the 17 year old or younger category (48.0 vs 6.8%; $z = 14.71$, $p < .001$). The PMU group consequently had a significantly lower proportion of personnel in the 18 to 19 year old category (37.4 vs 59.3%; $z = 8.42$, $p < .001$) and in the 20 year old or older category (14.6 vs 33.9%; $z = 4.83$, $p < .001$).

1979 Age

Compared to the control group, the PMU group had a significantly greater proportion of personnel in the 17 year old or younger category (29.2 vs 5.1%; $z = 7.77$, $p < .001$). As found for the previous years, the control group had a significantly larger proportion of personnel in the 18 to 19 year old category (41.5 vs 58.5; $z = 4.29$, $p < .001$) and in the 20 year old or older category (21.4 vs 35.2%; $z = 3.93$, $p < .001$).

Primary Dependents

All U.S. Navy personnel are classified as to primary dependent status prior to enlistment. The status is basically "yes or no" in nature. If an enlistee has a wife or children, he has one or more primary dependents; while the enlistee that has no children and is unmarried has no primary dependents. Figure 6 gives a graphical representation of the differences between the PMU groups and the control groups.

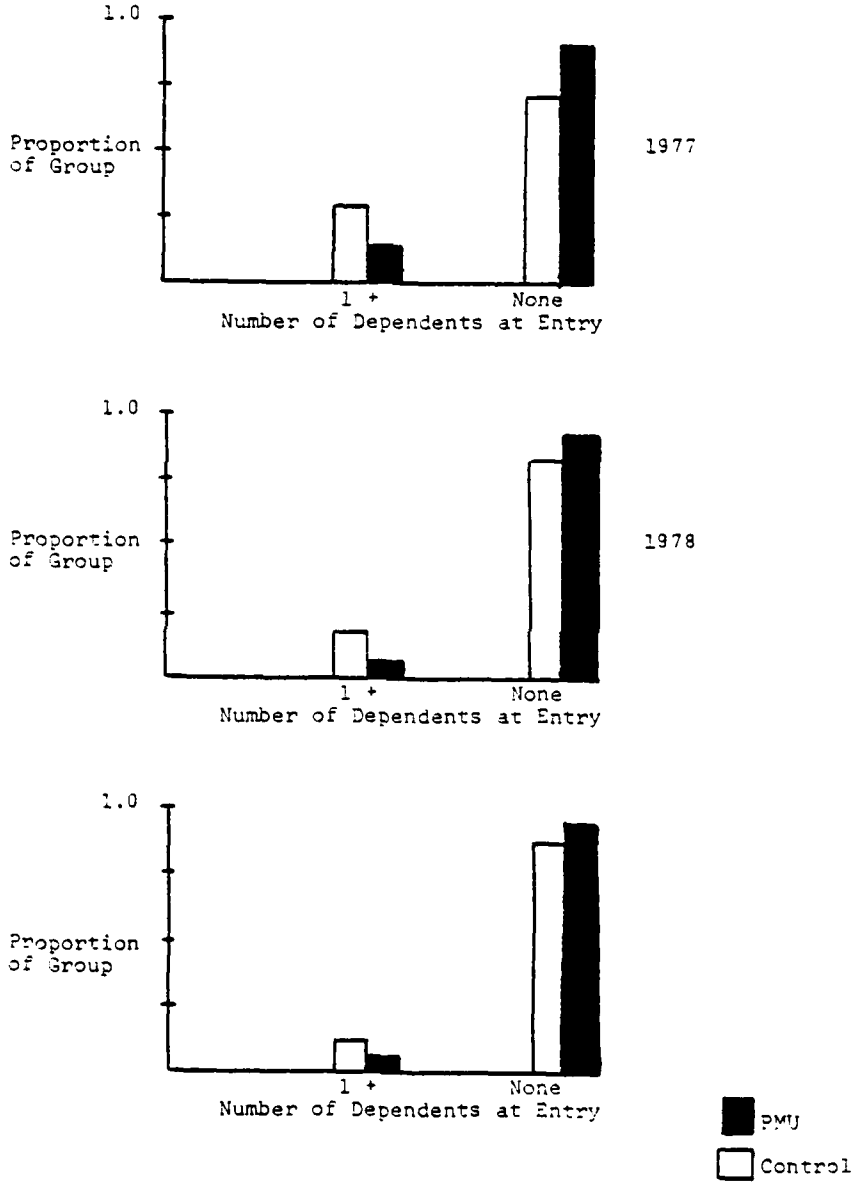

Figure 6: Number of Dependents at Entry for PMU and Control Groups (status by proportion)

1977 Dependents

Contrasted with the control group, the PMU group had a significantly smaller proportion of personnel with primary dependents (91.7 vs 79.0%; $z = 8.75$, $p < .001$).

1978 Dependents

The PMU group and the control group differed significantly in number of personnel having primary dependents. The PMU group had a significantly greater proportion of personnel without primary dependents (95.4 vs 84.7%; $z = 8.99$, $p < .001$).

1979 Dependents

The PMU group and the control group again differed significantly ($\chi^2 = 11.3$, $p < .001$) on number of personnel having dependents. As in the previous years, the PMU group had a longer proportion of personnel with no primary dependents than did the control group.

Summary of Findings Concerning Demographic Variables

Table 8 provides demographic data for the experimental and the control groups aggregated for the three year period covered by the study (1977-1979).

Aggregated Education at Entry

In comparison to the control groups, a significantly larger proportion of the experimental group had not completed twelve years of education (46.1 vs 27.9%; $z = 6.465$, $p < .001$), while a significantly smaller proportion of the experimental group had completed twelve years of education (53.1 vs 64.7%; $z = 4.47$, $p < .001$) and greater than twelve years of education (.8 vs 7.4%; $z = 22.99$, $p < .001$).

Table 8

Comparison Between PMU and Control Groups

for 1977 through 1979

	PMU Group		Control Group	
Variable	N	Percent	N	Percent
Education at Entry--χ^2(2df) = 2280.3; p < .001*				
11 years or less	1319	46.1	6209	27.9
12 years	1521	53.1	14412	64.7
13 years or more	23	.8	1637	7.4
TOTAL	2863	100.0	22258	100.0
Racial Composition--χ^2(1df) = 248; p < .001*				
White	2034	71.0	18503	83.1
Non-White	829	29.0	3758	16.9
TOTAL	2863	100.0	22258	100.0
Mental Group Category--χ^2(4df) = 1003.2; p < .001*				
Mental Group 1	55	1.9	1335	6.0
Mental Group 2	398	13.9	6517	29.3
Mental Group 3U	993	34.7	7780	40.0
Mental Group 3L	895	31.3	5494	24.7
Mental Group 4	522	18.2	1132	5.0
TOTAL	2863	100.0	22258	100.0

Table 8 (continued)

Variable	PMU Group N	PMU Group Percent	Control Group N	Control Group Percent
Age at Entry--χ^2(2df) = 4616.5; p < .001*				
Age 17 or less	1427	49.8	1496	6.7
Age 18 or 19	1038	36.3	13134	59.0
Age 20 or more	398	13.9	7628	34.3
TOTAL	2863	100.0	22258	100.0
Number of dependents--χ^2(1df) = 208; p < .001*				
No dependents	2723	95.1	18986	85.3
one or more	140	4.9	3272	14.7
TOTAL	2863	100.0	22258	100.0

*χ^2 test of independence is statistically significant, i.e., the PMU and Control groups differ significantly on this variable.

Aggregated Racial Composition

Compared to the control group, the experimental group had a significantly smaller proportion of whites (71.0 vs 83.1%; $z = 13.48$, $p < .001$).

Aggregated Mental Group Categories

Comparison of the experimental group to the control group revealed a significantly larger proportion of mental four personnel (18.2 vs 5.0%; $z = 8.72$, $p < .001$) and mental three lower personnel (31.3 vs 24.7%; $z = 4.17$, $p < .001$) in the experimental group. The control group had a significantly greater proportion of mental three-upper personnel (34.7 vs 40.0%; $z = 3.23$, $p < .001$) and mental group two personnel (13.9 vs 29.3%; $z = 6.64$, $p < .001$). While the control group had a larger proportion of mental one personnel, the difference was not statistically significant (1.9 vs 6.0%; $z = 1.25$, $p > .05$).

Aggregated Age at Entry

Contrasted with the control group, the PMU group had a significantly higher proportion of personnel in the 17 year or younger category (49.8 vs 6.7%; $z = 25.94$, $p < .001$). However, the PMU group had a significantly smaller proportion of personnel in the 18 to 19 year old category (36.3 vs 59.0%; $z = 14.22$, $p < .001$), and in the 20 year old or older category (13.9 vs 34.3%; $z = 8.44$, $p < .001$).

Aggregated Primary Dependents

The PMU group had a significantly greater proportion of personnel with no primary dependents (95.1 vs 85.3%; $z = 13.99$, $p < .001$).

After examining the various comparisons on the demographic variables one observation becomes apparent: the PMU groups and the control groups were very different. Since the control group was a random sample of U.S. Navy male enlistees with service lengths similar to those of the PMU group, it appears that PMU personnel were not randomly selected from the population of U.S. Navy recruits. The typical PMU individual was much younger, had a higher chance of being non-white, was less educated, and had a lower mental category than the average male U.S. Navy enlistee of similar length of service. The typical person found in the PMU, came from the lower success rate cells in the Screen Table.[10]

Certain trends appear when the PMU and control groups are compared using the data from the different years (1977-1979). First, the proportion of personnel with less than twelve years of education declined in 1979. Second, the proportion of mental four personnel in the PMU group declined rapidly over the three year period. Third, the proportion of PMU personnel aged 17 years or less declined over the period. Finally, the proportion of PMU personnel with primary dependents declined slightly over the three year period.

Comparison of the PMU and the Control Group on Situational Variables

Tables 9 through 11 present comparisons between the PMU and the control groups on selected situational variables. The

[10]Using Lockman's screening table (Lockman, 1977).

Table 9

Comparison Between PMU and Control Groups

on Situational Variables (1977)

	PMU Group		Control Group	
Variable	N	Percent	N	Percent
Assignment to Duty--χ^2(5df) = 360.5; p < .001*				
Ship	142	15.6	2898	33.1
Shore	659	72.1	3438	39.2
CV	50	5.5	934	10.7
AC	31	3.4	957	10.9
Other Sea	7	.8	163	1.9
Subs	7	.8	371	4.2
TOTAL[a]	896	98.2	8761	100.0

[a] Assignment-to-Duty missing observations = 19 (all from PMU).

* χ^2 test of independence is statistically significant, i.e., the PMU and control groups differe significantly on this variable.

Table 10

Comparison Between PMU and Control Groups

on Situational Variables (1978)

	PMU Group		Control Group	
Variable	N	Percent	N	Percent
Assignment to Duty--χ^2(5df) = 157.8; p < .001*				
Ship	182	17.9	1921	24.8
Shore	675	66.4	3872	50.1
CV	65	6.4	709	9.2
AC	51	5.0	643	8.3
Other Sea	13	1.3	346	4.5
Subs	8	.8	211	2.7
TOTAL[a]	994	97.8	7702	99.6

[a] Assignment-to-Duty missing observations = 50 (21 PMU + 29 control group).

* χ^2 test of independence is statistically significant, i.e., the PMU and control groups differ significantly on this variable.

Table 11

Comparison Between PMU and Control Groups

on Situational Variables (1979)

	PMU Group		Control Group	
Variable	N	Percent	N	Percent
Assignment to Duty--χ^2(5df) = 16.2; p < .01				
Ship	100	10.7	462	8.0
Shore	761	81.4	4927	85.4
CV	35	3.7	141	2.4
AC	16	1.7	109	1.9
Other Sea	4	.4	18	.3
Subs	6	.6	87	1.5
TOTAL[a]	922	98.5	5744	99.5

[a] Assignment-to-Duty missing observations = 35 (13 PMU + 22 control group).

* χ^2 test of independence is statistically significant, i.e., the PMU and control groups differ significantly on this variable.

situational variables available for this study were:

1. occupational assignments,
2. duty assignments.

Significant differences occurred between the two groups on both occupational and duty assignment variables. These differences, which are shown in Tables 9 through 11, are discussed in the following paragraphs.

Occupations Assigned

Of interest to this thesis is the initial job assignment of PMU personnel. While initial job assignment variables were available for the PMU group, they were not available for all of the control group. The NPRDC survival tracking file number 2 is updated quarterly, thus replacing initial job assignment information for individuals in the control group if they had moved from these initial job assignments. Since many individuals in the file have served for over two years, changes could have been made to the occupation codes of the control group, thereby making comparisons for occupation variables inappropriate.

Five types of occupational assignments were identified: specialist, non-specialist, administrative, technical, and general detail. Each person was assigned into an occupation by using his Navy Enlisted Classification (NEC) or Defense Occupation Codes (DOC) (as discussed in Appendix E).

Figure 7 presents the flow of personnel during a one year period. Initially, 70% of the recruits go to A-schools and are then assigned to non-general detail jobs in the fleet, while 30% of the recruits go to apprenticeship training and are

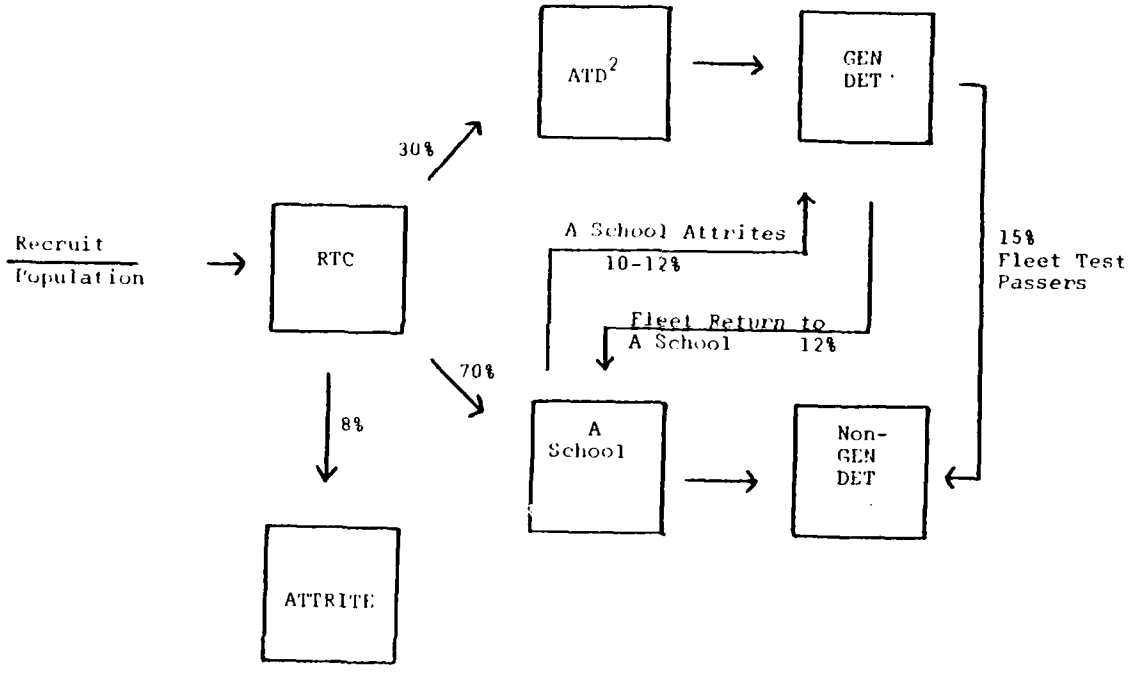

Figure 7: Flow of a cohort of Personnel entering the U.S. Navy.[1]

[1] Data provided by Navy Military Personnel Command code 482 and Recruit Command code 333.

[2] Apprenticeship Training.

designated general detail. During the period in which the personnel are assigned to the fleet, 15% of general detail are assigned to non-general detail personnel category by fleet units through fleet test passing, while 12% of general detail personnel are returned to A-school from the fleet. Further, 10 to 12% of personnel assigned to A-school are attrited and assigned to general detail billets. These changes could radically alter the initial job assignment categories. The occupation codes available for the control group were as of the date the individual attrited, or as of September 1979. Since six percent of personnel in the 1977 control group, 13% of the 1978 control group, and 31% of the 1979 control group were designated as general detail, it appears that the flow presented in Figure 7 affected the distribution of the control group's job assignments such that it no longer represented the distribution of initial assignments.

PMU Occupations

Table 12 presents the initial occupations assigned the PMU personnel. Over 81% of the PMU personnel were initially assigned to general detail, compared to an average of 30% assigned from the general recruit population (based on personal communications with NMPC-482).

Assignment to Duty

Six duty assignments were identified: ship, shore, aircraft carriers, aircraft squadrons, other sea, and submarines (subs). Personnel were tracked to their initial duty stations

Table 12

Aggregated Occupation Codes of the PMU Personnel for 1977-1979

Occupation	N	Percent
SPECIALIST	123	4.3
NON-SPECIALIST	70	2.4
ADMINISTRATIVE	68	2.4
TECHNICAL	238	8.3
GENERAL DETAIL	2345	81.9
TOTAL[a]	2844	99.3

[a] Missing observations = 19.

by using Unit Identification Codes (UIC's). Figure 8 demonstrates the differences which occurred between the PMU group and the control group for years 1977, 1978, and 1979.

1977 Assignments

Compared to the control group, the PMU group had a significantly larger proportion of personnel assigned to shore duty (72.1 vs 39.2%; $z = 15.57$, $p < .001$) and a significantly smaller proportion of personnel assigned to ship duty (15.6 vs 33.1%; $z = 4.35$, $p < .001$). The control group had a larger proportion of personnel assigned to aircraft squadrons and to aircraft carriers than did the PMU, but the differences were not significant. The groups other sea duty and subs contained too few personnel to justify statistical tests.

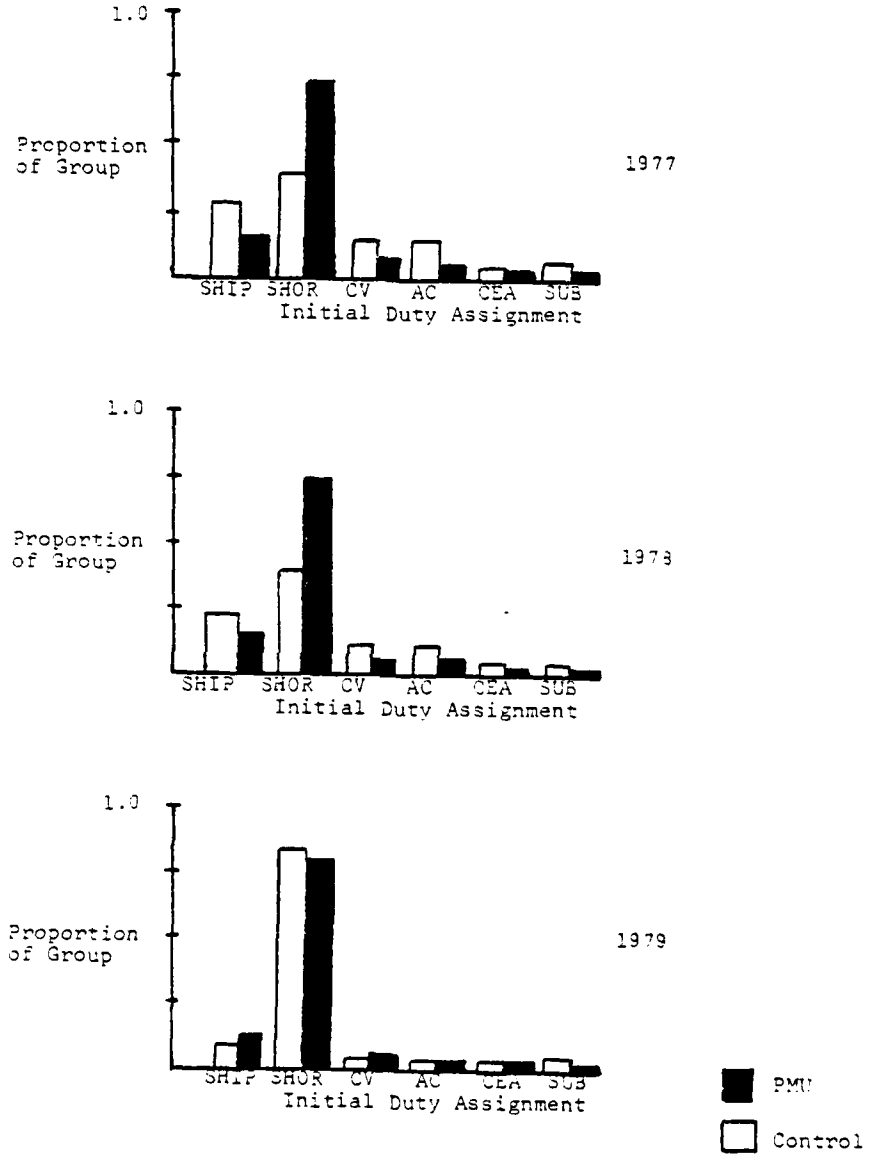

Figure 8: Initial Duty Assignment for PMU and Control Groups

1978 Assignments

The 1978 assignment data are very similar to those from 1977. The PMU group had a significantly greater proportion of personnel assigned to shore duty (66.4 vs 50.1%; $z = 7.83$, $p < .001$) and a significantly smaller proportion of personnel assigned to shipboard duty (17.9 vs 24.8%; $z = 2.08$, $p < .05$) than did the control group. The control group had proportionately more personnel assigned to aircraft squadrons and aircraft carriers than did the PMU group, but the differences are not significant. The groups labeled other sea duty and subs once again had very few personnel in them.

1979 Assignments

The PMU group, when compared to the control group, had proportionately more personnel assigned to shipboard duty and aircraft carrier duty than did the control group. However, none of the differences was significant. The control group had a significantly larger proportion of personnel assigned to shore duty than did the PMU group (81.4 vs 85.4%; $z = 2.89$; $p < .01$).

Summary of Comparisons Between the PMU and Control Groups on the Situational Variables

Table 13 presents comparisons between the PMU and control groups for assignment to duty categories aggregated over the three year period. The PMU group had a significantly larger proportion of personnel assigned to shore duty (73.2 vs 55.0%; $z = 1.559$, $p < .001$) than did the control group. While the control group had a significantly larger proportion of personnel

Table 13

Comparison Between PMU and Control Groups

on Situational Variables (1977-1979)

	PMU Group		Control Group	
Variable	N	Percent	N	Percent
Assignment to Duty--χ^2(5df) = 414.9; p < .001*				
SHIP	424	14.8	5281	23.7
SHORE	2095	73.2	12237	55.0
CV	150	5.2	1784	8.0
AC	98	3.4	1709	7.7
other Sea	24	8.4	527	2.4
SUBS	21	7.6	669	3.0
TOTAL[a]	2812	98.27	22207	99.8

[a] Assignment-to-Duty missing observations = 104 (53 PMU + 51 Control Group).

* χ^2 test of independence is statistically significant, i.e., the PMU and Control Groups differ significantly on this variable.

assigned to ship duty (14.8 vs 23.7%; z = 4.19, p < .001) than did the PMU group. The control, when compared to the PMU group, had proportionately more personnel assigned to aircraft carrier duty, aircraft squadron duty, submarine duty, and other sea duty, but the differences were not significant.

Looking at situational variables, in light of the type of demographic data available, it is not surprising that the PMU personnel have a greater chance of being general detail than do the control group personnel. It appears to follow from Navy personnel policies that someone with less education and lower test scores would be less likely to qualify for A-school training (Mobley et al, 1978).

Table 12 demonstrates the large difference between the PMU and the control groups in the locations personnel are assigned for their initial duty tour. The PMU personnel had a much greater chance of being assigned to shore duty than did their counterparts in the control group.

Discriminant Analyses

Discriminant analyses were run to see if there were multivariate differences between the PMU and Control groups. Two discriminant analyses were run on the PMU and control groups. First, using demographic variables only, a discriminant analysis was used to compare the PMU and control groups for 1977, 1978, and 1979. The following variables were used in the first phase of the discriminant analysis: STAY (0 = no longer on active duty, 1 = on active duty, from January 1977 to September 1979); MG1; MG2; MG3L; MG4; Age 17; Age 20; NWHITE; Time; LT12ED; NDEPS; and GT12ED (previously defined in Table 4). The constant contained MG3U, Age 18, WHITE, ED12, and PDEPS. The second discriminant analysis added situational variables (duty assignement variables) to the demographic variables. The following variables were used in the second phase of discriminant

analysis: STAY; MG1; MG2; MG3L; MG4; AGE 17; AGE 20; NWHITE; TIME: LT12ED: GT12ED; NDPES; Ship, CEA; CV; AC; and SUB (all previously defined in Table 4). The constant contained MG3U, AGE 18, WHITE, ED12, PDEPS and SHOR.

1977 Discriminant Analysis (Phase I)

The results of this discriminant analysis are shown in Table 14 and Figure 9. The derived discriminant function was significant, as demonstrated by the chi-square value of 8361.2. All variables in the analysis were significant discriminators when analyzed one at a time, except MG3L, as shown in the univariate F-ratio section of Table 14. When placed in the discriminant function, the variables: STAY, MG2, MG3L, MG4, Age 17, Age 20, NWHITE, LT12ED, and Time were significant at the .01 level, while GT12ED was significant at the .05 level. The coefficient for MG1 was insignificant and MG1 was not included in the function. All variables appearing in the discriminant function in Table 11 were significant at the .01 level. The discriminating power was good, as the discriminant function accurately classified 97.8% of the control group and 83.4% of the PMU group. This classification accuracy should be compared against the classification accuracy that could be attained by using base rate data. For these data, a classification accuracy of 90.6% could have been obtained by labeling all individuals as non-PMU personnel (8761 $\div$ (912 + 8761) = .906). Using the discriminant function, 96.47% of the individuals were accurately classified.

FUNCTION	EIGENVALUE	PERCENT OF VARIANCE	CUMULATIVE PERCENT	CANONICAL CORRELATION
1*	1.37508	100.00	100.00	0.7608890

AFTER FUNCTION	WILKS' LAMBDA	CHI-SQUARED	C.F.	SIGNIFICANCE
0	0.4210479	8379.2	10	0.0

WILKS' LAMBDA (C-STATISTIC) AND UNIVARIATE F-RATIO
WITH 1 AND 9671 DEGREES OF FREEDOM

VARIABLE	WILKS' LAMBDA	F	SIGNIFICANCE
STAY	0.90042	1070.	0.0000
MG1	0.99646	34.26	0.0000
MG2	0.98324	164.9	0.0000
MG3L	0.99967	3.194	0.0740
MG4	0.87885	1333.	0.0
AGE17	0.69427	4259.	0.0000
AGE20	0.96777	322.1	0.0000
NWHITE	0.98876	109.9	0.0
LT12BD	0.98333	64.94	0.0
GT12BD	0.99408	57.58	0.0000
TIME	0.63152	5643.	0.0000
NDEPS	0.99104	87.45	0.0

ACTUAL GROUP		NO. OF CASES	PRELICTED GROUP MEMBERSHIP 0	1
GROUP	0 (Control)	8761	8571	190
			97.8%	2.2%
GROUP	1 (PMU)	912	151	761
			16.6%	83.4%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 96.47%

Table 14

Discriminant Analysis Results for

1977 PMU vs Control Groups (Phase 1)

Table 14 (continued)

Discriminant Function Coefficients

Variable	F-ratios[a]	Coefficient
STAY	195.56	.19017**
MG2	2.45	.02320**
MG3L	15.72	-.05977**
MG4	312.90	-.23638**
Age 17	2061.60	-.59584**
Age 20	217.26	.22183**
NWHITE	70.06	-.11484**
LT12ED	151.62	.17957**
GT12ED	1.92	.01774*
TIME	4422.80	-.75320**
NDEPS	18.44	-.05845**

* Significant at .05 level.

** Signficant at .01 level.

[a] Degrees of freedom 11 by 9661.

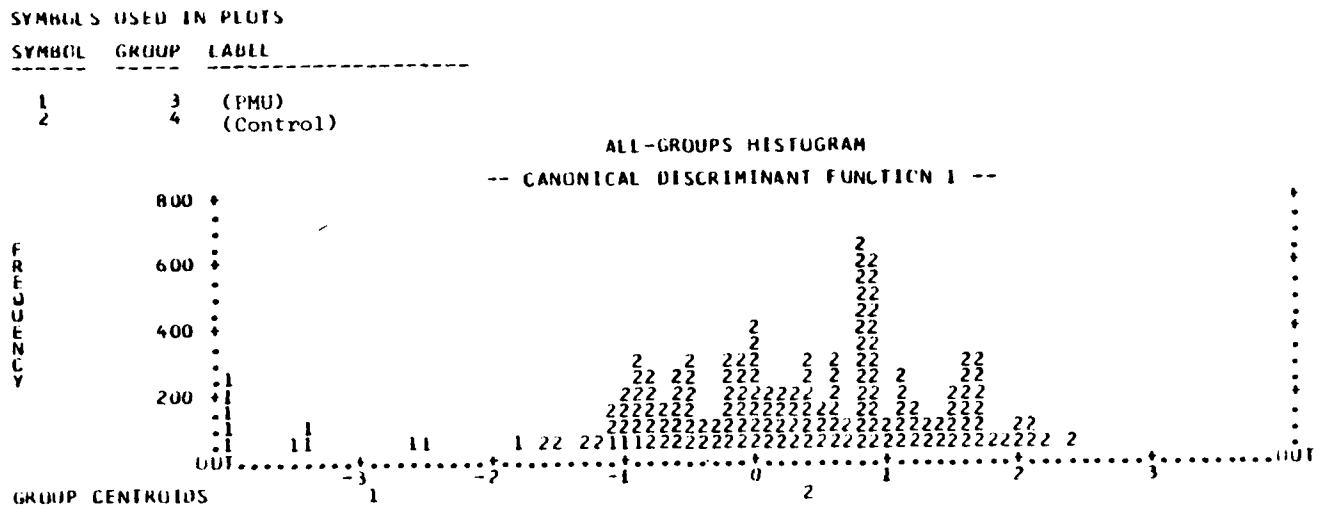

Figure 9: Discriminant Analysis for 1977 PMU vs Control Groups (Phase 1)

1978 Discriminant Analysis (Phase I)

Table 15 and Figure 10 reveal the results of the discriminant analysis for the 1978 PMU and control groups. The discriminant function is significant with a chi-square value of 6802.7. All of the variables included in the discriminant function had a significant impact on group discrimination when used separately, as can be seen by examining the univariate F-ratios in Table 15. In the initial discriminant analysis, the variable GT12ED and MG1 were not significant and not included in the function developed by a stepwise procedure. The variables STAY, MG2, MG3L, MG4, Age 17, Age 20, NWHITE, LT12ED, and time were significant at the .01 level. The discriminant analysis was repeated without variables MG1 and GT12ED which had non-significant coefficients. The resulting function had a chi-square value of 6857.7. All variables in the function were significant at the .01 level. Table 12 shows the discriminant function coefficients. The function accurately predicted 86.2% of the PMU group and 97.3% of the control group. The classification accuracy of the discriminant function should be compared against base rate data. For these data, a classification accuracy of 88.4% could have been obtained by labeling all individuals as non-PMU personnel (7731 ÷ (1016 + 7731) = .884). Using the discriminant function, 96.04% of the individuals were accurately classified.

1979 Discriminant Analysis (Phase I)

Once again, the variables were significant when viewed individually, as can be seen by examining the univariate F-ratios

FUNCTION	EIGENVALUE	PERCENT OF VARIANCE	CUMULATIVE PERCENT	CANONICAL CORRELATION
1*	1.17786	100.00	100.00	0.7354138

AFTER FUNCTION	WILKS' LAMBDA	CHI-SQUARE	D.F.	SIGNIFICANCE
0	0.4591666	6852.7	10	0.0

WILKS' LAMBDA (C-STATISTIC) AND UNIVARIATE F-RATIO
WITH 1 AND 8745 DEGREES OF FREEDOM

VARIABLE	WILKS' LAMBDA	F	SIGNIFICANCE
STAY	0.93546	803.4	0.0000
MG1	0.99705	25.91	0.0000
MG2	0.98965	91.44	0.0000
MG3L	0.99809	16.74	0.0000
MG4	0.99338	58.23	0.0
AGE17	0.82999	1791.	0.0000
AGE20	0.98224	158.1	0.0000
NWHITE	0.99295	62.08	0.0000
LT12ED	0.96352	331.1	0.0
GT12ED	0.99293	62.29	0.0000
TIME	0.95602	6983.	0.0000
NDEPS	0.99038	84.90	0.0000

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP 0	1
GROUP 0 (PMU)	1016	876	140
		86.2%	13.8%
GROUP 1 (Control)	7731	206	7525
		2.7%	97.3%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 96.04%

Table 15

Discriminant Analysis Results for 1978

PMU vs Control Groups (Phase 1)

Table 15 (continued)

Discriminant Function Coefficients

Variable	F-ratios[a]	Coefficients
STAY	142.57	.17573**
MG2	5.07	.03569**
MG3L	8.89	-.04650**
MG4	6.51	-.03837**
Age 17	907.83	-.44807**
Age 20	155.96	.18380**
NWHITE	81.18	-.13677**
LT12ED	13.22	.05978**
TIME	6125.30	-.89112**
NDEPS	51.11	-.10481**

** Significant at .01 level.

[a] Degrees of Freedom 10 by 8736.

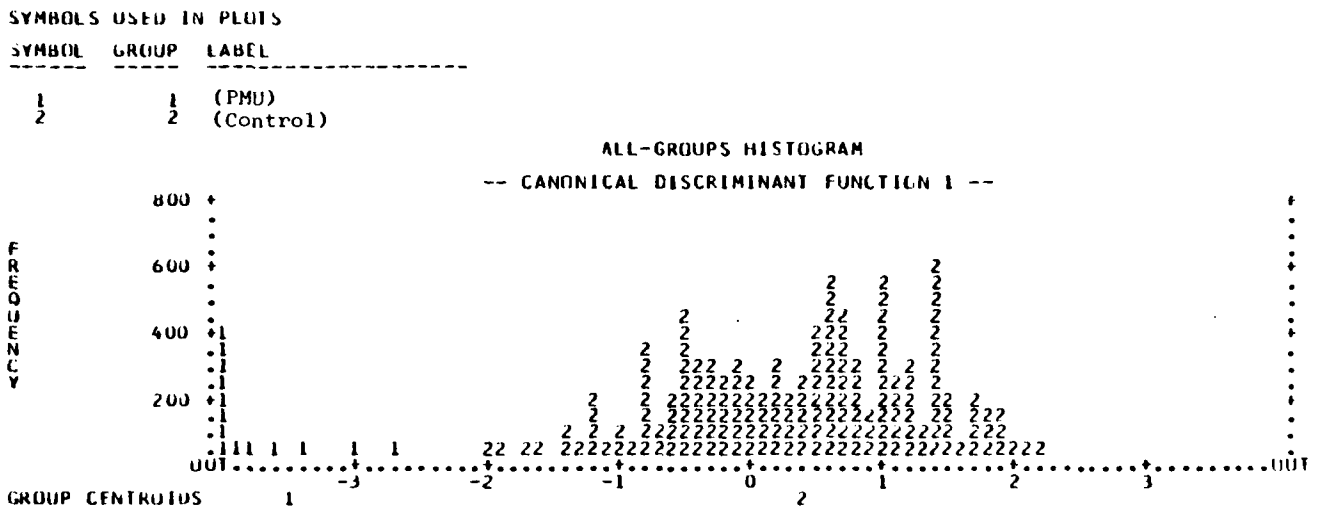

Figure 10: Discriminant Analysis Histogram for 1978 PMU vs Control Groups (Phase 1)

in Table 12. Table 16 and Figure 11 show the discriminant analysis results. When the initial discriminant function was run MG1 and MG2 were not included as discriminating variables by the stepwise analysis. The function was significant with a chi-square value of 6219.4. The variables STAY, MG3L, MG4, Age 17, Age 20, NWHITE, LT12ED, GT12ED, and Time were significant variables at the .01 level. The discriminant analysis was then repeated without variables MG1 and MG2. The function was highly significant with a chi-square value of 6884.4, and all coefficients were significant at or beyond the .01 level. Table 16 contains the discriminant function coefficient for each significant variable. The discriminant function for this year (1979) yielded a classification accuracy of 92.9% for the PMU and 97.2% for the control group. Again, the classification accuracy should be compared against base rate data. For these data, a classification accuracy of 86% could have been obtained by labeling all individuals as non-PMU personnel (5766 ÷ (935 + 5766) = .86). Using the discriminant function, 96.64% of the individuals were accurately classified.

Summary of Discriminant Analysis (Phase I)

For all three years (1977, 1978 and 1979), the discriminant analysis was used to compare the PMU and control groups. Certain variables which were significant when used separately were not included by the stepwise analysis in the discriminant function.[11]

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[11]See Appendix H for Discriminant functions not containing STAY. Those functions may be useful for RTC administrators.

FUNCTION	EIGENVALUE	PERCENT OF VARIANCE	CUMULATIVE PERCENT	CANONICAL CORRELATION
1*	1.53206	100.0	100.0	0.7778587

AFTER FUNCTION	WILKS' LAMBDA	CHI-SQUARED	D.F.	SIGNIFICANCE
0	0.3949358	6284.4	9	0.0

WILKS' LAMBDA (C-STATISTIC) AND UNIVARIATE F-RATIO
WITH 1 AND 6899 DEGREES OF FREEDOM

VARIABLE	WILKS' LAMBDA	F	SIGNFICANCE
STAY	0.88208	895.5	0.0000
MG1	0.99712	19.34	0.0000
MG2	0.99124	59.22	0.0000
MG3L	0.99224	52.42	0.0000
MG4	0.99839	10.82	0.0000
AGE17	0.91052	658.3	0.0000
AGE20	0.98968	69.86	0.0000
NWHITE	0.98978	69.18	0.0
LT12ED	0.98112	128.9	0.0000
GT12ED	0.99193	54.47	0.0000
TIME	0.45547	8009.	0.0
NDEPS	0.98246	119.6	0.0

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP 0	1
GROUP 0 (PMU)	935	869 92.9%	66 7.1%
GROUP 1 (Control)	5766	159 2.8%	5607 97.2%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 96.64%

Table 16

Discriminant Analysis Results for 1979

PMU vs Control Groups (Phase I)

Table 16 (continued)

Discriminant Function Coefficients

Variable	F-ratios[a]	Coefficients
STAY	139.83	.18625**
MG3L	52.18	-.11967**
MG4	3.83	-.03218**
Age 17	390.53	-.32545**
Age 20	186.19	.23292**
NWHITE	50.09	-.11758**
LT12ED	46.44	.11680**
GT12ED	8.52	.04841**
TIME	6572.50	-.93742**
NDEPS	66.17	.12704**

** Significant at .01 level.

[a] Degrees of Freedom 10 by 6690.

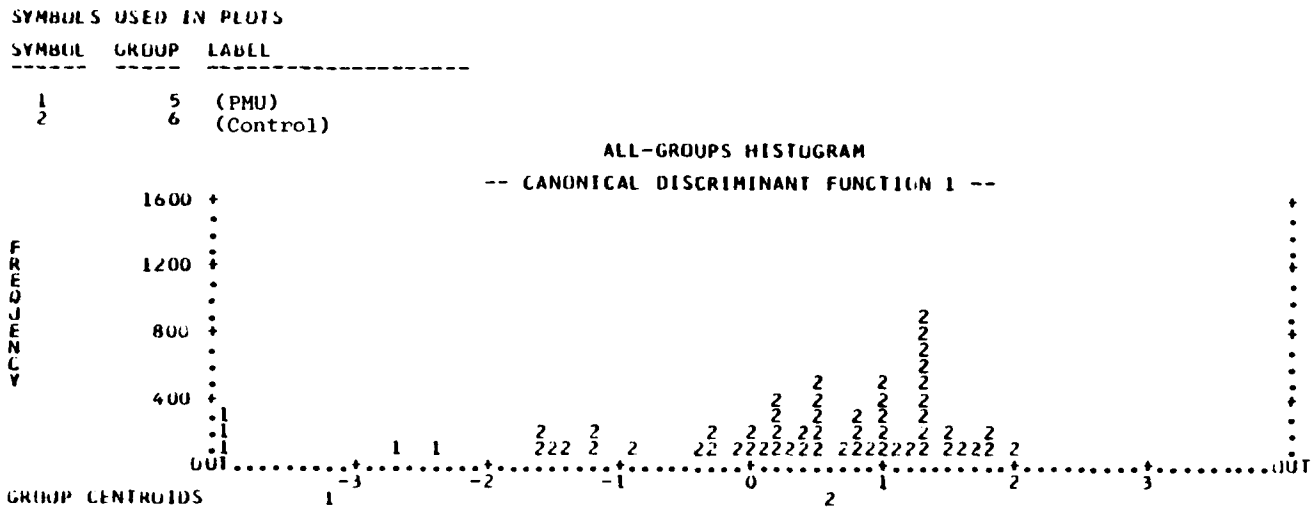

Figure 11: Discriminant Analysis Histogram for 1979 PMU vs Control Groups (Phase 1)

It is this investigator's belief that these variables accounted for variance included in other variables. However, when these variables, which were not included in the discriminant function, were removed from analysis the chi-square value of each function was increased. These differences did not lessen the main impact of the discriminant analysis, which is the finding that the PMU and control groups for all years are heterogeneous groups. What was concluded from the univariate analysis appears to be confirmed by the discriminant analysis: the PMU group is not representative of the U.S. Navy male recruit population.

Aggregated Discriminant Analysis (Phase II)

Phase I of the discriminant analyses was concerned with using traditional variables to dsicriminate the PMU group from the control group for each year. Phase II of the discriminant analyses was concerned with using traditional variables plus initial duty assignment variables to discriminate the PMU group from the control group for aggregated time period of 1977-1979.

The results of this discriminant analysis are shown in Table 17 and Figure 12. The individual variables were significant at the .01 level (the univariate F-ratios are given in Table 17). When the variables were placed into the discriminant analysis, all were significant at the .01 level, except MG2 which was significant at the .05 level. The resultant function was significant with a chi-square value of 8425.6. Table 17 presents the discriminant function coefficients. The function was able to classify correctly 61.0% of the PMU

FUNCTION	EIGENVALUE	PERCENT OF VARIANCE	CUMULATIVE PERCENT	CANONICAL CORRELATION
1*	0.39870	100.00	100.00	0.5338995

AFTER FUNCTION	WILKS' LAMBDA	CHI-SQUARED	D.F.	SIGNIFICANCE
0	0.7149513	8425.6	17	0.0

WILKS' LAMBDA (C-STATISTIC) AND UNIVARIATE F-RATIO
WITH 1 AND 25119 DEGREES OF FREEDOM

VARIABLE	WILKS' LAMBDA	F	SIGNIFICANCE
STAY	0.91699	2274.	0.0
MG1	0.99679	80.91	0.0000
MG2	0.98803	304.3	0.0000
MG3L	0.99770	58.00	0.0
MG4	0.97162	733.6	0.0000
AGE17	0.81738	5612.	0.0000
AGE20	0.98073	493.6	0.0
NWHITE	0.99011	250.8	0.0
LT12ED	0.98411	405.7	0.0
GT12ED	0.99298	177.7	0.0
TIME	0.95100	1294.	0.0000
SHIP	0.99554	112.6	0.0000
SUB	0.99805	49.12	0.0000
CEA	0.99890	27.69	0.0000
CV	0.99891	27.53	0.0000
AC	0.99726	68.99	0.0000
NDEPS	0.95527	1176.	

ACTUAL GROUP		NO. OF CASES	PREDICTED GROUP MEMBERSHIP 0	1
GROUP	0	22258	19785 88.9%	2473 11.1%
GROUP	1	2863	1116 39.0%	1747 61.0%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 85.71%

Table 17

Discriminant Analysis Results for Aggregated

PMU vs Control Groups (Phase II)

Table 17 (continued)

Discriminant Function Coefficient		
Variable	F-Ratios[a]	Coefficients
STAY	329.69	-.23938**
MG1	4.30	-.02648*
MG2	25.11	-.06879**
MG3L	51.90	.09826**
MG4	256.09	.20184**
AGE 17	3390.90	.69641**
AGE 20	41.83	-.08438**
NWHITE	245.83	.19381**
LT12ED	70.52	-.10956**
GT12ED	40.19	-.08124**
TIME	413.36	.28553**
SHIP	281.37	-.23110**
SUB	52.94	-.08863**
CEA	47.26	-.08316**
DV	138.93	-.15050**
AC	169.28	-.16593**
NDEPS	391.05	.26428**

* Significant at .05 level.

** Significant at .01 level

[a] Degrees of Freedom 17 by 25103.

SYMBOLS USED IN PLOTS

SYMBOL	GROUP	LABEL
1	0	(Control)
2	1	(PMU)

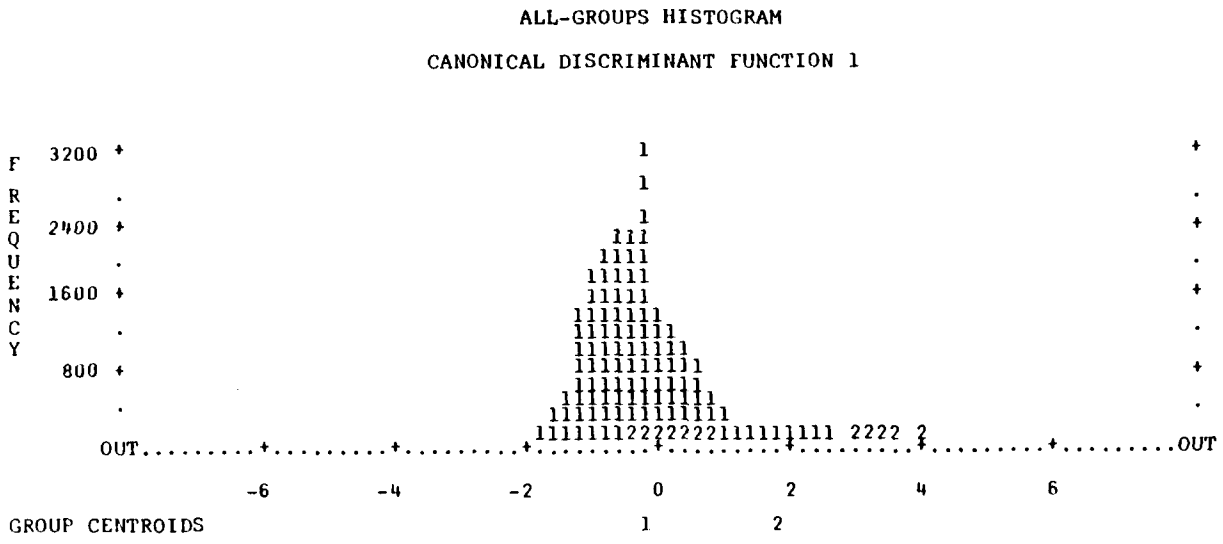

Figure 12: Discriminant Analysis Historgram for Aggregated PMU vs Control Groups (Phase II)

group and 88,9% of the control group. For these data, a classification accuracy of 88.6% could have been obtained by labeling all individuals as non-PMU personnel (22258 ÷ (2863 + 22258) = .886). Using the discriminant function, only 85.7% of the individuals were accurately classified.

The discriminant analysis was run with not only demographic variables but with situational variables, dealing with initial duty assignments for the three year period. When the discriminant analyses were done for separate years, the PMU and control groups were significantly different, and classifications were quite accurate (refer to Tables 13 through 16). The aggregated phase II discriminant analysis, however, yielded no improvement in the ability to accurately classify the PMU and control groups; in fact, the classification accuracy declined. It would seem that the PMU and control groups have changed over the three years under study.

The primary reason for this analysis was the question, are the two groups, PMU and Control, homoegeneous? The answer based on the analysis of individual variables is NO! Phase I of the discriminant analyses tends to corroborate the univariate analysis, revealing that the PMU and Control groups are different from one another. However, when utilizing the phase II discriminant function over the aggregated time period, the discriminant function was not as accurate as if all personnel had been classified in the non-PMU group. The reader should keep in mind this fact while reading the rest of this text.

The next chapter of this thesis deals with the description and prediction of attrition from the PMU and Control groups.

ATTRITION ANALYSES

In this chapter, the relationship of certain demographic and situational variables to PMU attrition is examined. Initially, attrition over time from the PMU and control groups is compared. Summary tables are provided in the text for attrition over time; however, for more detailed information the reader should refer to Appendix I. Appendix I contains the statistical summary of attrition from each control and PMU cohort. Screening tables for personnel assigned to the PMU are developed in section two of this chapter. In addition to screening tables, results of correlational analyses are reviewed. The final section of this chapter deals with regression analysis. Several different multiple regression equations are used, and their usefulness in predicting attrition examined.

OVERALL ATTRITION

Prior to ascertaining the correlates of attrition in the PMU group, it is paramount that the seriousness of the attrition problem be understood.

Table 18 presnts the cumulative attrition of personnel assigned to the PMU and the control groups. It should be noted when comparing the PMU and Control groups that the Control group is a random sample of the U.S. Navy male recruit population for the years 1977, 1978, and 1979. The data in Table 18 reveal there is a large disparity in attrition between

Table 18

Summary of Cumulative Attrition Data

	PMU[a]		Control[a]	
Cohort[b]	First Quarter	Last Quarter[c]	First Quarter[e]	Last Quarter[c]
1	41.1%	82.0% (11)[d]	.1%	11.1% (11)
2	40.9%	78.0% (10)	.1%	19.8% (10)
3	41.6%	66.9% (9)	4.8%	22.1% (9)
4	31.0%	61.9% (8)	7.4%	27.2% (8)
5	32.3%	61.7% (7)	10.9%	24.2% (7)
6	32.7%	52.2% (6)	10.3%	21.9% (6)
7	37.8%	53.1% (5)	10.9%	19.4% (5)
8	46.7%	57.1% (4)	13.2%	19.4% (4)
9	32.9%	44.5% (3)	12.7%	16.9% (3)
10	38.0%	42.1% (2)	11.8%	12.1% (2)
11	18.3%	18.3% (1)	5.3%	5.3% (1)

a. for calendar quarters.

b. Entry Date of Cohort:

1	February 1977
2	May 1977
3	August 1977
4	November 1977
5	February 1978
6	May 1978
7	August 1978
8	November 1978
9	February 1979
10	May 1979
11	August 1979

c. End of data updates for all cohorts is 30 September 1979.

d. Numbers in parentheses are the total number of calendar quarters served by the cohort as of 30 September 1979.

e. Cohort 1 and 2 of the control group appear to be outliers; however, no reasonable explanation is available to explain the low attrition rates.

the PMU and Control groups. The first PMU cohort had 82% attrition by the end of its eleventh quarter of service while the comparable Control cohort had only 11.1% attrition by the end of its eleventh quarter. Further, all PMU cohorts, with the exception of cohort 11, had first quarter attrition rates between 32-46%, while the Control groups had attrition rates of 1-13%. One reason for the varying attrition rates in the PMU and Control cohorts is the grouping process which gave all personnel in a cohort the same date of entry. If most personnel in a cohort entered the Navy in the last few weeks of a 90 day period, then attrition rates would be much lower than for a cohort in which most people entered the Navy in the first several days of the period.

To illustrate PMU group attrition, survival rates for both PMU and Control groups can be calculated: survival = 1.00 - Table 18 values, e.g., survival for first quarter of cohort 11, survival = 1.00 - .411 = .589. First quarter survival for the PMU group tends to remain in the mid 50% to high 60% range for all cohorts, except cohort number 11. The Control group has a first quarter survival rate in the upper 80-90% range for all cohorts.

It was hoped that this analysis would allow the investigator to judge if the PMU policies were changed during the three years for which this study was conducted. It does appear that the Secretary of Defense's order in 1977 (America's Volunteer, 1978) telling services to reduce attrition might have had some effect on the PMU starting in the fourth quarter of 1977 (cohort 4).

Other reasons for this decline may have been that the types of personnel assigned to the PMU changed, especially in age, or that the treatment of these individuals changed over the time periods under consideration.

Prediction of Survival

A most important consideration for the U.S. Navy is how to predict whether a potential recruit will survive in the Navy. Lockman (1977) developed recruit screening tables based on demographic variables which are related to attrition. A useful piece of information for a RTC commander could be the expected success in the Navy of members assigned to the PMU during recruit training.

Taking a different approach to the creation of survival screening tables than did Lockman (1977), this investigator used a counting method to examine survival in the Navy of persons assigned to the PMU. The approach here is strictly actuarial, while Lockman used multiple regression techniques to produce estimates of survival rates (Lockman, 1976). Every person in this study was tracked to see if he was a loss or a survivor, and if a loss, at what time in his enlistment the loss occurred. The emphasis was placed on developing six month, 12 month, and 18 month screening tables for personnel who had attended the PMU. For comparison purposes, the data from the control group were analyzed in the same way.

All personnel were classified using the following variables: MG12, MG3U, MG3L, Age 17, Age 18, Age 20, WHITE, NWHITE, HSG,

(all as defined in Table 3). For a complete description of the creation of these screening tables, please see Appendix J. Appendix J contains ancillary information plus statistical formulae used to develop the screening tables.

The variables used in the analysis were placed together to form 36 different groups of personnel, formed by 3 mental groups x 2 education levels x 3 age groups x 2 race groups (as defined by the demographic variables). Several caveats must be made prior to presenting this analysis. First, the personnel all were screened by Lockman's table prior to their enlistment. Second, the small sample size available for certain cells could seriously degrade the stability of the results shown in the tables, particularly for MG12. Third, since there were very few personnel in the PMU with primary dependents, this variable was excluded from the analysis. Fourth, due to the low numbers of personnel in mental categories one and two, they were combined, as were mental categories three lower and four. Fifth, the personnel with greater than 12 years education were combined with high school graduates.[12]

Table 19 presents the PMU screening table for predicting attrition by the end of six months of active duty. The data in Table 19 show that the number of PMU personnel who survive six months is very low. Table 20 gives the six month survival data for the Control group. Several trends are observable in

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[12]These decisions yielded 36 combinations: 3 mental groups (MG12,MG3U,MG3L) x 3 age groups (age 17,age 18,age 20) x 2 race groups (WHITE,NON-WHITE), x 2 education levels (HSG,NHSG).

Table 19

Proportion of PMU Personnel Surviving 6 months in the Navy by Race, Education, Mental Group, and Age[a]

		White				Non-White			
		H.S.		NHS		H.S.		NHS	
Mental Group	1-2								
ages	17	(15)	.93[b]	(65)	.57	(1)	1.00	(9)	.56
ages	18-19	(59)	.58	(53)	.68	(8)	.75	(5)	.60
ages	20	(56)	.49	(13)	.46	(10)	.64	(3)	.67
Mental Group	3U								
ages	17	(19)	.63	(191)	.53	(7)	.57	(35)	.51
ages	18-19	(102)	.58	(116)	.54	(27)	.88	(40)	.40
ages	20	(45)	.36	(23)	.39	(35)	.57	(12)	.42
Mental Group	3L								
ages	17	(23)	.52	(91)	.44	(19)	.58	(23)	.48
ages	18-19	(137)	.48	(123)	.41	(92)	.52	(46)	.61
ages	20	(40)	.33	(7)	.29	(61)	.56	(6)	.50

(n) - number entering Navy in each group

a. Table contains cohorts 1, 2, 3, 4, 5, 6, 7, 8, 9.

b. The decimal numbers in each group are the proportion of PMU personnel survivig six months in the Navy.

Table 20

Proportion of Control Personnel Surviving 6 months in the Navy by Race, Education, Mental Groups and Age[a]

		White			Non-White			
		H.S.		NHS	H.S.		NHS	
Mental Group	1-2							
ages	17		.93[b]	.84	(10)	1.00*	(18)	.44*
ages	18-19		.94	.92		.94		.86
ages	20		.93	.85		.95		.81
Mental Group	2U							
ages	17	(12)	.94*	.76	(16)	.60*		.92
ages	18-19		.93	.86		.92		.80
ages	20		.89	.83		.93		.85
Mental Group	3L							
ages	17		.76	.71	(14)	1.00*		.74
ages	18-19		.88	.84		.92		.88
ages	20		.87	.82		.90		.86

* - n less than 100

(n) - number entering the Navy in group

a. Table contains cohorts 1, 2, 3, 4, 5, 6, 7, 8, 9

b. The decimal numbers in each group are the probability of a Control person surviving six months in the Navy.

Table 19. First, the higher the mental group, other things being equal, the greater the chance for the individual's survival. Second, a person who is non-white has a greater chance of survival than does a white person, other things being equal. Third, the greater a persons age the lesser his chance of survival, ceteris paribus. Table 20 shows higher numbers of control group personnel survive than do PMU personnel (see Table 19). The trend of greater survivability of higher mental groups, other things being equal, appears to hold for the control group as well as for the PMU group. Further, instead of decreasing survival rates with increasing age as in the PMU group, in the control group the survival rates for 18-19 year olds are often higher than for those of ages 17.

Table 21 presents the PMU 12 month screening table. A comparison of Tables 19 and 20 shows that attrition continued beyond the six month point.

Finally, 18-month screening tables were developed for the PMU and Control groups. Tables 23 and 24 present the two screening tables. Table 23 shows the PMU screening table.

The primary reason, for preparing these tables, is to allow them to be used as management tools. For instance, the information presented in Tables 19, 21, and 23 could help a RTC commander to decide whether or not to allocate resources to attempt to salvage an individual assigned to the PMU.

Correlational Analysis

The basic objective of bivariate correlational analysis is to assess the degree of association that exists between pairs

Table 21

Proportion of PMU Personnel Surviving 12 months in the Navy by Race, Education, Mental Group, and Age[a]

		White				Non-White			
		H.S.		NHS		H.S.		NHS	
Mental Groups	1-2								
ages	17	(13)	.54[b]	(37)	.29	(1)	1.00	(8)	.50
ages	18-19	(52)	.51	(35)	.40	(6)	.50	(5)	.40
ages	20	(49)	.42	(9)	.25	(9	.67	(1)	0
Mental Groups	3U								
ages	17	(17)	.40	(135)	.40	(7)	.29	(29)	.35
ages	18-19	(87)	.55	(95)	.46	(20)	.70	(30)	.30
ages	20	(37)	.31	(16)	.20	(28)	.43	(9)	.22
Mental Groups	3L								
ages	17	(22)	.50	(71)	.27	(19)	.47	(21)	.29
ages	18-19	(102)	.48	(107)	.33	(78)	.53	(35)	.43
ages	20	(31)	.23	(5)	.20	(47)	.40	(6)	.33

(n) - number entering Navy in each group

a. Table contains cohorts 1, 2, 3, 4, 5, 6, 7.

b. The decimal numbers in each group are the probability of a PMU person surviving 12 months in the Navy.

Table 22

Proportion of Control Personnel Surviving 12 months in the Navy by Race, Education, Mental Group, and Age[a]

		White			Non-White			
		H.S.		NHS	H.S.		NHS	
Mental Group	1-2							
ages	17		.82[b]	.75	(10)	1.00*	(26)	.36*
ages	18-19		.92	.85		.88		.82
ages	20		.89	.77		.91		.87
Mental Group	3U							
ages	17	(31)	.91*	.76	(21)	.43*		.76
ages	18-19		.90	.81		.89		.77
ages	20		.86	.74		.88		.78
Mental Group	3L							
ages	17		.69	.73	(14)	1.00*		.62
ages	18-19		.86	.80		.88		.82
ages	20		.83	.75		.89		.78

* - n less than 100

(n) - number entering Navy in each group

a. Table contains cohort 1, 2, 3, 4, 5, 6, 7.

b. The decimal number in each group are the probability of a Control person surviving 12 months in the Navy.

Table 23

Proportion of PMU Personnel Surviving 18 months in the Navy by Race, Education, Mental Group, and Age[a]

		White				Non-White			
		H.S.		NHS		H.S.		NHS	
Mental Group	1-2								
ages	17	(10)	.40[b]	(29)	.24	(0)	--*	(5)	.20
ages	18-19	(35)	.49	(17)	.24	(5)	.61	(3)	.67
ages	20	(28)	.31	(7)	.14	(5)	.60	(0)	--*
Mental Group	3U								
ages	17	(6)	.50	(84)	.40	(5)	.20	(21)	.40
ages	18-19	(54)	.54	(58)	.43	(12)	.58	(19)	.26
ages	20	(20)	.25	(11)	.18	(15)	.33	(7)	.14
Mental Group	3L								
ages	17	(18)	.50	(51)	.28	(13)	.38	(17)	.29
ages	18-19	(73)	.38	(86)	.30	(54)	.50	(26)	.35
ages	20	(25)	.20	(4)	.25	(27)	.37	(5)	.40

(n) - number entering Navy in each group

a. Table contains cohorts 1, 2, 3, 4, 5.

b. The decimal number in each group are the probability of a PMU person surviving 18 months in the Navy.

Table 24

Proportion of Control Personnel Surviving 18 months in the Navy by Race, Education, Mental Group, and Age[a]

		White			Non-White		
			H.S.	NHS		H.S.	NHS
Mental Group	1-2						
ages	17		.87[b]	.71	(16)	1.00*	.30
ages	18-19		.90	.80		.90	.91
ages	20		.87	.76		.87	.79
Mental Group	3U						
ages	17	(60)	.67*	.71	(30)	.33*	.71
ages	18-19		.89	.79		.92	.77
ages	20		.84	.72		.85	.72
Mental Group	3L						
ages	17		.58	.68	(20)	1.00*	.64
ages	18-19		.84	.76		.88	.77
ages	20		.81	.70		.89	.75

* - n less than 100

(n) - number entering Navy in each group.

a. Table contains cohorts 1, 2, 3, 4, 5.

b. The decimal numbers in each group are the approximate probability of a Control person surviving 18 months in the Navy.

of variables. An analysis of the correlation among pairs of variables is a first step prior to running multiple regression analysis. In this analysis, the variable "stay" (for survival) will be the most important variable. Table 28 provides the definitions for all the variables.

PMU Correlation Analysis

The variables used in the analysis are defined in Tables 4 and 28. The traditional variables used to predict attrition (mental group, age, race, and education), are included in this analysis along with job assignment variables (SPEC, NSPEC, ADMIN, GEN, and TECH) and initial duty assignment variables (SHIP, SUB, CEA, SHOR, CV and AC). Referring to Table 25, the most striking correlations are between the initial duty assignment variables and stay. Ship has a $r = .356$ ($p < .01$) with STAY while, CV has a $r = .224$ ($p < .01$) with stay. The other four duty assignment variables have the following associations with STAY: SUB ($r = .091$, $p < .01$), CEA ($r = .098$, $p < .01$), AC ($r = .163$, $p < .01$), and SHOR ($r = -.484$, $p < .01$). The association between initial duty assignment and survival probability indicates that there is a relationship between a controllable variable, assignment, and attrition. Of interest is the fact that LT12ED ($r = -.057$, $p < .01$) and GT12ED ($r = -.023$, $p < .05$) are both negatively correlated to survival. One would generally expect probability of survival to increase with increases in education, so the negative correlation between GT12ED and survival is surprising. Antoher correlation of interest is

	STAY	MG1	MG2	MG2U	MG3L	MG4	AGE17	AGE18	AGE20
STAY	1.0000	0.0020	0.0962	0.0723	0.0499	-0.2359	-.3212	0.2751	0.0819
MG1	0.0020	1.0000	-0.0562	-0.1020	-0.0944	-0.0661	-0.0326	-0.0050	0.0541
MG2	0.0962	-0.0562	1.0000	-0.2938	-0.2710	-0.1897	-0.0452	0.0099	-.0516
MG3U	0.0723	-0.1020	-0.2928	1.0000	-0.4914	-0.3441	0.0353	-0.0138	-0.0319
MG3L	0.0499	-0.0944	-0.2710	-0.4914	1.0000	-0.3184	-0.1795	0.1669	0.0274
MG4	-0.2359	-0.0661	-0.1897	-0.3441	-0.3184	1.0000	0.2240	-0.1905	-0.0590
AGE17	-0.3212	-0.0326	-0.0452	0.0353	-0.1795	0.2240	1.0000	-0.7518	-0.4006
AGE18	0.2751	-0.0050	0.0099	-0.0138	0.1669	-0.1905	-0.7518	1.0000	-0.3030
AGE20	0.0819	0.0541	0.0516	-0.0319	0.0274	-0.0590	-0.4006	-0.3030	1.0000
WHITE	-0.0235	0.0837	0.1296	0.0704	-0.1260	-0.0815	0.1235	-0.0199	-0.1508
NWHITE	0.0235	-0.0837	-0.1296	-0.0704	0.1260	0.0815	-0.1235	0.0199	0.1508
LT12ED	-0.0569	-0.0579	-0.0311	0.1774	-0.0972	-0.0535	0.3091	-0.1490	-0.2397
ED12	0.0609	0.0499	0.0214	-0.1758	0.1065	0.0520	-0.3053	0.1610	0.2176
GT12ED	-0.0227	0.0444	0.0543	-0.0080	-0.0522	0.0082	-0.0193	-0.0679	0.1222
TIME	-0.2095	-0.0247	-0.0758	-0.0996	-0.0846	0.3010	0.3787	-0.2686	-0.1740
SPEC	0.1503	-0.0297	-0.0055	0.0302	0.0243	-0.0510	-0.0975	0.0946	0.0095
NSPEC	0.1657	0.0268	0.1112	0.0395	-0.0736	-0.0695	-0.0152	0.0059	0.0138

Table 25

Correlation Matrix for the PMU Group's Data

	STAY	MG1	MG2	MG3U	MG3L	MG4	AGE17	AGE18	AGE20
GEN	-0.3678	-0.0334	-0.1101	-0.0807	0.0429	0.1585	0.1745	-0.1230	-0.0813
ADMIN	0.1011	-0.0051	0.0103	0.0502	-0.0211	-0.0440	-0.0362	0.0207	0.0235
TECH	0.2322	0.0500	0.0911	0.0251	-0.0175	-0.1094	-0.1332	0.0756	0.0875
SHIP	0.3556	-0.0082	0.0201	0.0350	0.0243	-0.0874	-0.1619	0.1335	0.0485
SUB	0.0908	0.0178	0.0128	0.0492	-0.0403	-0.0300	-0.0284	0.0373	-0.0109
CEA	0.0983	-0.0129	0.0295	0.0135	-0.0124	-0.0236	-0.0304	0.0343	-0.0037
CV	0.2236	-0.0215	-0.0039	0.0427	0.0105	-0.0542	-0.0714	0.0640	0.0143
AC	0.1627	-0.0124	0.0354	-0.0040	0.0264	-0.0541	-0.0532	0.0378	0.0243
SHOR	-0.4838	0.0274	-0.0367	-0.0750	-0.0146	0.1331	0.2069	-0.1757	-0.0549
PDEPS	0.1077	0.0391	0.0072	0.0185	-0.0236	-0.0148	-0.1029	0.0109	0.1336
NDEPS	-0.1077	-0.0391	-0.0072	-0.0185	0.0236	0.0148	0.1029	-0.0109	-0.1336

Table 25 (continued)

	NWHITE	LT12ED	ED12	GT12ED	TIME	SPEC	NSPEC	GEN	ADMIN
STAY	0.0235	-0.0569	0.0609	-0.0227	-0.2095	0.1503	0.1657	-0.3678	0.1011
MG1	-0.0837	-0.0579	0.0499	0.0444	-0.0247	-0.0297	0.0268	-0.0334	-0.0051
MG2	-0.1296	-0.0311	0.0214	0.0543	-0.0758	-0.005	0.1112	-0.1101	0.0103
MG3U	-0.0704	0.1774	-0.1758	-0.0080	-0.0996	0.030[illegible]	0.0395	-0.0807	0.0502
MG3L	0.1260	-0.0972	0.1065	-0.0522	-0.0846	0.0243	-0.0736	0.0429	-0.0211
MG4	0.0815	-0.0535	0.0520	0.0082	0.3010	-0.0510	-0.0695	0.1585	-0.0440
AGE17	-0.1235	0.3091	-0.3053	-0.0193	0.3787	-0.0975	-0.0152	0.1745	-0.0362
AGE18	0.0199	-0.1490	0.1610	-0.0679	-0.2686	0.0946	0.0059	-0.1230	0.0207
AGE20	0.1508	-0.2397	0.2176	0.1222	-0.1740	0.0095	0.0138	-0.0813	0.0235
WHITE	-1.0000	0.1405	-0.1336	-0.0374	0.0348	0.0213	0.0077	-0.0100	-0.0623
NWHITE	1.0000	-0.1405	0.1336	0.0374	-0.0348	-0.0213	-0.0077	0.0100	0.0623
LT12ED	-0.1405	1.0000	-0.9840	-0.0832	0.0817	-0.0300	-0.0032	0.0722	-0.0061
ED12	0.1336	-0.9840	1.0000	-0.0958	-0.0875	0.0333	0.0013	-0.0687	-0.0006
GT12ED	0.0374	-0.0832	-0.0958	1.0000	0.0332	-0.0191	0.0108	-0.0187	0.0374
TIME	-0.0348	0.0817	-0.0875	0.0332	1.0000	0.0593	0.0448	-0.1046	0.0458
SPEC	-0.0213	-0.0300	0.0333	-0.0191	0.0593	1.0000	-0.0338	-0.4508	-0.0330
NSPEC	-0.0077	-0.0032	0.0013	0.0108	0.0448	-0.0338	1.0000	-0.3393	-0.0249

Table 25 (continued)

AD-A093 590 NAVAL POSTGRADUATE SCHOOL MONTEREY CA F/G 5/9
ATTRITION OF PMU PERSONNEL COMPARED TO ATTRITION FROM THE U.S. --ETC(U)
SEP 80 M E BUTCHER

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2 OF 3
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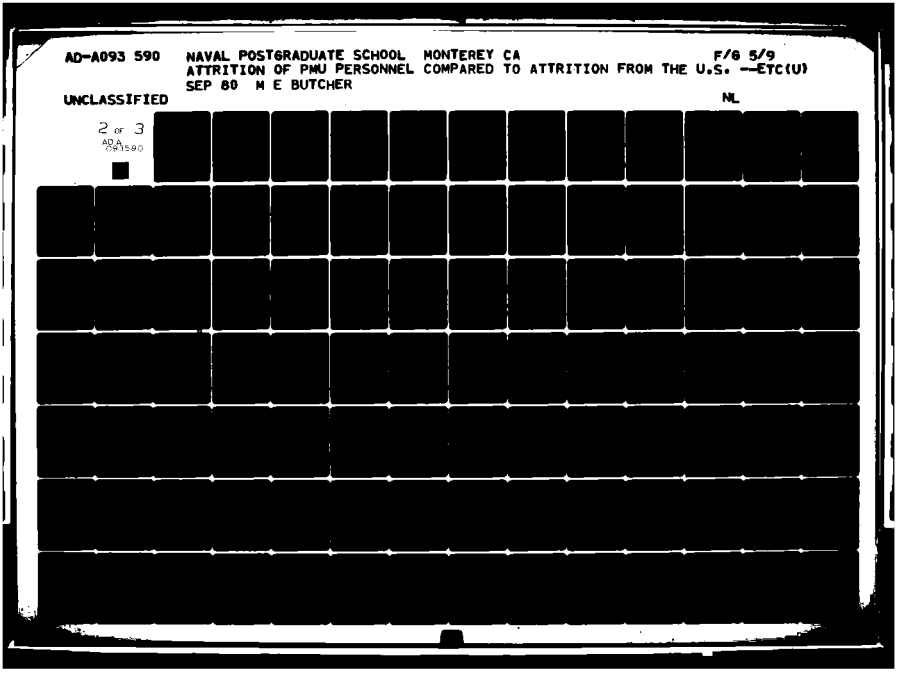

	NWHITE	LT12ED	ED12	GT12ED	TIME	SPEC	NSPEC	GEN	ADMIN
GEN	0.0100	0.0722	-0.0687	-0.0187	-0.1046	-0.4508	-0.3393	1.0000	-0.3319
ADMIN	0.0623	-0.0061	-0.0006	0.0374	0.0458	-0.0330	-0.0249	-0.3319	1.0000
TECH	-0.0193	-0.0626	0.0597	0.0154	0.0536	-0.0638	-0.0480	-0.6407	-0.0470
SHIP	0.0417	-0.0401	0.0429	-0.0155	0.0663	0.0717	0.1422	-0.2051	0.0770
SUB	-0.0368	-0.0220	0.0233	-0.0077	0.0125	0.0222	-0.0137	-0.0553	-0.0134
CEA	-0.0165	-0.0158	0.0173	-0.0083	0.0141	0.1506	0.0100	-0.1359	0.0108
CV	0.0158	0.0028	-0.0053	0.0140	0.0449	0.0275	0.0633	-0.0768	0.0560
AC	0.0281	0.0418	-0.0387	-0.0169	0.0273	0.0075	-0.0300	-0.1311	0.1346
SHOR	-0.0457	0.0210	-0.0244	0.0192	-0.0979	-0.1048	-0.1365	0.2904	-0.1384
PDEPS	0.0266	-0.0406	0.0377	0.0159	0.1107	0.0238	-0.0049	-0.0954	0.0391
NDEPS	-0.0266	0.0406	-0.0377	-0.0159	-0.1107	-0.0238	0.0049	0.0954	-0.0391

Table 25 (continued)

	SHIP	SUB	CEA	CV	AC	SHOR	PDEPS	NDEPS
CEA	-0.0383	-0.0079	1.0000	-0.0216	-0.0173	-0.1517	0.0324	-0.0324
CV	-0.0980	-0.0202	-0.0216	1.0000	-0.0443	-0.3880	0.0048	-0.0048
AC	-0.0785	-0.0162	-0.0173	-0.0443	1.0000	-0.3107	0.0464	-0.0464
SHOR	-0.6880	-0.1418	-0.1517	-0.3880	-0.3107	1.0000	-0.1001	0.1001
PDEPS	0.0787	0.0375	0.0324	0.0048	0.0464	-0.1001	1.0000	-1.0000
NDEPS	-0.0787	-0.0375	-0.0324	-0.0048	-0.0464	0.1001	-1.0000	1.000
TECH	0.0989	0.0483	0.0695	0.0144	0.1242	-0.1601	0.1019	-0.1019
SHIP	1.0000	-0.0358	-0.0383	-0.0980	-0.0785	-0.6880	0.0787	-0.0787
SUB	-0.0358	1.0000	-0.0079	-0.0202	-0.0162	-0.1418	0.0375	-0.0375

Table 25 (continued)

between NDEPS and Survival ($r = -.11$, $p < .01$ (which is also the opposite of expectation. Another variable having an important correlation with survival is time ($r = -.21$, $p < .01$).

Control Group Correlation Analysis

Table 26 provides the intercorrelation matrix for the control group. LT12ED has the highest negative correlation with survival ($r = -.175$, $p < .01$). The variable having the highest positive correlation with survival is ship ($r = .168$, $p < .01$). The other initial assignment variables also are positively related to survival, with SUB ($r = .075$, $p < .01$), CEA ($r = .061$, $p < .01$), CV ($r = .086$, $p < .01$), and AC ($r = .108$, $p < .01$) and SHOR ($r = -.292$, $p < .01$). The traditional variables, e.g., mental group, have correlations of the expected algebraic sign with survival. The taditional variables, while statistically significant, do not have as strong a relationship with survival that the initial duty assignment variables have.

Combined Groups Correlation Analysis

The PMU and control group were combined and a variable called PMU used to identify members of the PMU group. Table 27 presents the results of the correlation analysis. Of particular interest is the relationship of variable PMU with survival ($r = -.288$, $p < .01$). The traditional variables have about the correlations one would expect with survival. It is the initial duty assignment variables that have the most striking correlations with survival: ship ($r = .199$, $p < .01$), SUB ($r = .084$, $p < .01$), CEA ($r = .07$, $p < .01$), CV ($r = .106$, $p < .01$), AC ($r = .122$, $p < .01$), and SHOR ($r = -.33$, $p < .01$).

	STAY	MG1	MG2	MG3U	MG3L	MG4	AGE17	AGE18	AGE20
STAY	1.0000	0.0369	0.0493	-0.0326	-0.0227	-0.0267	-0.0705	0.0433	-0.0077
MG1	0.0369	1.0000	-0.1625	-0.1852	-0.1446	-0.0585	-0.0466	-0.0630	0.0899
MG2	0.0493	-0.1625	1.0000	-0.4717	-0.3684	-0.1489	-0.0304	-0.0128	0.0292
MG3U	-0.0326	-0.1852	-0.4717	1.0000	-0.4197	-0.1697	0.1062	0.0244	-0.0813
MG3L	-0.0227	-0.1446	-0.3684	-0.4197	1.0000	-0.1325	-0.0380	0.0492	-0.0309
MG4	-0.0267	-0.0585	-0.1489	-0.1697	-0.1325	1.0000	-0.0425	-0.0549	0.0793
AGE17	-0.0705	-0.0466	-0.0304	0.1062	-0.0380	-0.0425	1.0000	-0.3221	-0.1938
AGE18	0.0433	-010630	-0.0128	0.0244	0.0492	-0.0549	-0.3221	1.0000	-0.8663
AGE20	-0.0077	0.0899	0.0292	-0.0813	-0.0309	0.0793	-0.1938	-0.8663	1.0000
WHITE	-0.0213	0.0936	0.1707	0.0293	-0.1984	-0.1289	0.0510	0.0790	-0.1087
NWHITE	0.0213	-0.0936	-0.1707	-0.0293	0.1984	0.1289	-0.0510	-0.0790	0.1087
NDEPS	-0.0727	-0.0053	0.0166	0.0194	-0.0099	-0.0514	0.0443	0.0659	-0.0916
LT12ED	-0.1752	-0.0976	-0.0894	0.1571	0.0092	-0.0683	0.3275	0.0383	-0.2125
ED12	0.1469	-0.0014	0.0443	-0.1021	0.0416	0.0497	-0.2673	0.1237	0.0129
GT12ED	0.0322	0.1702	0.0725	-010831	-0.0918	0.0264	-0.0736	-0.2922	0.3416
TIME	-0.1185	0.0197	0.0177	-0.0157	-0.0010	-0.0218	-0.0063	-0.0497	0.0548

Table 26

Correlation Matrix for the Control Group's Data

	STAY	MG1	MG2	MG3D	MG3L	MG4	AGE17	AGE18	AGE20
SHIP	0.1677	-0.0312	-0.0507	0.0262	0.0345	0.0144	0.0143	-0.0010	-0.0065
SUB	0.0753	0.0453	0.0700	-0.0231	-0.0611	-0.0240	-0.0063	0.0039	-0.0007
CEA	0.0614	-0.0169	-0.0021	0.0147	0.0047	-0.0186	-0.0111	010012	0.0046
CV	0.0858	-0.0300	-0.0438	0.0144	0.0440	0.0055	0.0100	0.0051	-0.0106
AC	0.1077	-0.0231	-0.0239	0.0016	0.0353	0.0016	-0.0147	0.0108	-0.0034
SHOR	-0.2915	0.0464	0.0584	-0.0277	-0.0552	-0.0026	-0.0045	-0.0108	0.0136
PDEPS	0.0727	0.0053	-0.0166	-0.0194	0.0099	0.0514	-0.0443	-0.0659	0.0916

Table 26 (continued)

	NWHITE	LT12ED	ED12	GT12ED	TIME	SHIP	SUB	CEA	CV
STAY	0.0213	-0.1752	0.1469	0.0322	-0.1185	0.1677	0.0753	0.0614	0.0858
MG1	-0.0936	-0.0976	-0.0014	0.1702	0.0197	-0.0312	0.0453	-0.0169	-0.0300
MG2	-0.1707	-0.0894	0.0443	0.0725	0.0177	-0.0507	0.0700	-0.0021	-0.0438
MG3U	-0.0293	0.1571	-0.1021	-0.0831	-0.0157	0.0262	-0.0231	0.0147	0.0144
MG3L	0.1984	0.0092	0.0416	-0.0918	-0.0010	0.0345	-0.0611	0.0047	0.0440
MG4	0.1289	-0.0683	0.0497	0.0264	-0.0218	0.0144	-0.0240	-0.0186	0.0055
AGE17	-0.0510	0.3275	-0.2673	-0.0736	-0.0063	0.0143	-0.0063	-0.0111	0.0100
AGE18	-0.0790	0.0383	0.1237	-0.2922	-0.0497	-0.0010	0.0039	0.0012	0.0051
AGE20	0.1087	-0.2125	0.0129	0.3416	0.0548	-0.0065	-0.0007	0.0046	-0.0106
WHITE	-1.0000	0.0665	-0.0275	-0.0638	0.0534	-0.0141	0.0343	0.0094	-0.0115
NWHITE	1.0000	-0.0665	0.0275	0.0638	-0.-534	0.0141	-0.0343	-0.0094	0.0115
NDEPS	-0.0549	0.0802	-0.0570	-0.0335	0.4756	0.1861	0.0298	0.0579	0.1121
LT12ED	-0.0665	1.0000	-0.8430	-0.1752	0.1324	0.0539	-0.0186	-0.0231	0.0385
ED12	0.0275	-0.8430	1.0000	-0.3819	-0.1459	-0.0353	0.0076	0.0203	-0.0302
GT12ED	0.0638	-0.1752	-0.3819	1.0000	0.0395	-0.0281	0.0179	0.0025	-0.0109
TIME	-0.0534	0.1324	-0.1459	0.0395	1.0000	0.2400	0.0673	0.0266	0.1180

Table 26 (continued)

	NWHITE	LT12ED	ED12	GT12ED	TIME	SHIP	SUB	CEA	CV
SHIP	0.0141	0.0539	-0.0353	-0.0281	0.2400	1.0000	-0.0923	-0.0866	-0.1641
SUB	-0.0343	-0.0186	0.0076	0.0179	0.0673	-0.0923	1.0000	-0.0274	-0.0520
CEA	-0.0094	-0.0231	0.0203	0.0025	0.0266	-0.0866	-0.0274	1.0000	-0.0460
CV	0.0115	0.0385	-0.0302	-0.0109	0.1180	-0.1641	-0.0520	-0.0460	1.0000
AC	0.0237	0.0012	-0.0002	-0.0017	0.1334	-0.1603	-0.0508	-0.0449	-0.0851
SHOR	-0.0182	-0.0555	0.0385	0.0249	-0.3711	-0.6142	-0.1945	-0.1721	-0.3262
PDEPS	0.0549	-0.0802	0.0570	0.0335	-0.4756	-0.1861	-0.0298	-0.0579	-0.1121

Table 26 (continued)

	SHOR	PDEPS	NDEPS	WHITE	AC
STAY	-0.2915	0.0727	-0.0727	-0.0213	0.1077
MG1	0.0464	0.0053	-0.0053	0.0936	-0.0231
MG2	0.0584	-0.0166	0.0166	0.1707	-0.0239
MG3U	-0.0277	-0.0194	0.0194	0.0293	0.0016
MG3L	-0.0552	0.0099	-0.0099	-0.1984	0.0353
MG4	-0.0026	0.0514	-0.0514	-0.1289	0.0016
AGE17	-0.0045	-0.0443	0.0443	0.0510	-0.0147
AGE18	-0.0108	-0.0659	0.0659	0.0790	0.0108
AGE20	0.0136	0.0916	-0.0916	-0.1087	-0.0034
WHITE	0.0182	-0.0549	0.0549	1.0000	-0.0237
NWHITE	-0.0182	0.0549	-0.0549	-1.0000	0.0237
NDEPS	-0.2978	-1.0000	1.0000	0.0912	0.0549
LT12ED	-0.0555	-0.0802	0.0802	0.0665	0.0012
ED12	0.0385	0.0570	-0.0570	-0.0275	-0.0002
GT12ED	0.0249	0.0335	-0.0335	-0.0638	-0.0017
TIME	-0.3711	0.4756	0.4756	0.0534	0.1334

Table 26 (continued)

	SHOR	PDEPS	NDEPS	WHITE	AC
SHIP	-0.6142	-0.1861	0.1861	-0.0141	-0.1603
SUB	-0.1945	-0.0298	0.0298	0.0343	-0.0508
CEA	-0.1721	-0.0579	0.0579	0.0094	-0.0449
CV	-0.3262	-0.1121	0.1121	-0.0115	-0.0851
AC	-0.3187	-0.0912	0.0912	-0.0237	1.0000
SHOR	1.0000	0.2978	-0.2978	0.0182	-0.3187
PDEPS	0.2978	1.0000	-1.0000	-0.0549	-0.0912

Table 26 (continued)

	STAY	MG1	MG2	MG3U.	MG3L	MG4	AGE17	AGE18	AGE20
STAY	1.0000	0.0479	0.0827	-0.0166	-0.0252	-0.1170	-0.2352	0.1129	0.0417
MG1	0.0479	1.y000	-0.1492	-0.1773	-0.1413	-0.0643	-0.0612	-0.0496	0.0948
MG2	0.0827	-0.1492	1.0000	-0.4515	-0.3599	-0.1636	-0.0744	0.0054	0.0454
MG3U	-0.0166	-0.1773	-0.4515	1.0000	-0.4278	-0.1945	0.0790	0.0202	-0.0757
MG3L	-0.0252	-0.1413	-0.3599	-0.4278	1.0000	-0.0550	-0.0395	0.0554	-0.0318
MG4	-0.1170	-0.0643	-0.1636	-0.1945	-0.1550	1.00-0	0.1079	-0.1001	0.0322
AGE17	-0.2352	-0.0612	-0.0744	0.0790	-0.0395	0.1079	1.0000	-0.4128	-0.2486
AGE18	0.1129	-0.0496	0.0054	0.0202	0.0554	-0.1001	-0.4128	1.0000	-0.7795
AGE20	0.0417	0.0948	0.0454	-0.0757	-0.0318	0.0322	-0.2486	-0.7795	1.0000
WHITE	0.0080	0.0959	0.1737	0.0348	-0.1915	-0.1318	0.0175	0.0792	-0.0962
NWHITE	-0.0080	-0.0959	-0.1737	-0.0348	0.1915	0.1318	-0.0175	-0.0792	0.0962
NDEPS	-0.1287	-0.0182	-0.0081	0.0163	0.0026	-0.0045	0.1302	0.0279	-0.1193
PMU	-0.2881	-0.0567	-0.1094	-0.0018	0.0480	0.1685	0.4273	-0.1458	-0.1388
LT12ED	-0.1854	-0.0994	-0.0958	0.1580	0.0011	-0.0416	0.3355	-0.0033	-0.2272
ED12	0.1502	0.0066	0.0500	-0.1103	0.0459	0.0353	-0.2724	0.1374	0.0412
GT12ED	0.0508	0.1704	0.0797	-0.0776	-0.0910	0.0082	-0.0905	-0.2603	0.3391
TIME	-0.1859	0.0034	-0.0152	-0.0250	-0.0002	0.0726	0.1558	-0.1037	0.0032

Table 27

Correlation Matrix for Combined Group's Data

	STAY	MG1	MG2	MG3U	MG3L	MG4	AGE17	AGE18	AGE20
SHIP	0.1993	-0.0259	-0.0377	0.0270	0.0300	-0.0130	-0.0429	0.0214	0.0068
SUB	0.0836	0.0467	0.0715	-0.0184	-0.0607	-0.0299	-0.0260	0.0122	0.0050
CEA	0.0700	-0.0148	0.0032	0.0146	0.0018	-0.0233	-0.0255	0.0083	0.0087
CV	0.1062	-0.0274	-0.0369	0.0171	0.0388	-0.0092	-0.0177	0.0153	-0.0041
AC	0.1215	-0.0195	-0.0143	0.0013	0.0316	-0.0143	-0.0395	0.0204	0.0055
SHOR	-0.3319	0.0380	0.0373	-0.0325	-0.0446	0.0387	0.0796	-0.0439	-0.0080
PDEPS	0.1287	0.0182	0.0081	-0.0163	-0.0026	0.0045	-0.1302	-0.0279	0.1193

Table 27 (continued)

	NWHITE	LT12ED	ED12	GT12ED	TIME	SHIP	SUB	CEA	CV
STAY	-0.0080	-0.1854	0.1502	0.0508	-0.1859	0.1993	0.0836	0.0700	0.1062
MG1	-0.0959	-0.0994	0.0066	0.1704	0.0034	-0.0259	0.0467	-0.0148	-0.0274
MG2	-0.1737	-0.0958	0.0500	0.0797	-0.0152	-0.0377	0.0715	0.0032	-0.0369
MG3U	-0.0348	0.1580	-0.1103	-0.0776	-0.0250	0.0270	-0.0184	0.0146	0.0171
MG3L	0.1915	0.0011	0.0459	-0.0910	-0.0002	0.0300	-0.0607	0.0018	0.0388
MG4	0.1318	-0.0416	0.0353	0.0082	0.0726	-0.0130	-0.0299	-0.0233	-0.0092
AGE17	-0.0175	0.3355	-0.2724	-0.0905	0.1558	-0.0429	-0.0260	-0.0255	-0.0177
AGE18	-0.0792	-0.0033	0.1374	-0.2603	-0.1037	0.0214	0.0122	0.0083	0.0153
AGE20	0.0962	-0.2272	0.0412	0.3391	0.0032	0.0068	0.0050	0.0087	-0.0041
WHITE	-1.0000	0.0638	-0.0344	-0.0511	0.0273	-0.0104	0.0378	0.0130	-0.0085
NWHITE	1.0000	-0.0638	0.0344	0.0511	-0.0273	0.0104	-0.0378	-0.0130	0.0085
NDEPS	-0.0289	0.1003	-0.0696	-0.0500	0.4626	0.1540	0.0179	0.0465	0.0965
PMU	0.0994	0.1261	-0.0767	-0.0838	0.2214	-0.0668	-0.0442	-0.0332	0.0331
LT12ED	-0.0638	1.0000	-0.8614	-0.1740	0.1497	0.0349	-0.0238	-0.0262	0.0301
ED12	0.0344	-0.8614	1.0000	-0.3503	-0.1521	-0.0221	0.0118	0.0223	-0.0250
GT12ED	0.0511	0-.1740	-0.3503	1.0000	0.0187	-0.0215	0.0210	0.0050	-0.0071
TIME	-0.0273	0.1497	-0.0521	0.0187	1.0000	0.2020	0.0517	0.0175	0.1007

Table 27 (continued)

	NWHITE	LT12ED	ED12	GT12ED	TIME	SHIP	SUB	CEA	CV
SHIP	0.0104	0.0349	-0.0221	-0.0215	0.2020	1.0000	-0.0856	-0.0809	-0.1561
SUB	-0.0378	-0.0238	0.0118	0.0210	0.0517	-0.0856	1.0000	-0.0252	-0.0485
CEA	-0.0130	-0.0262	0.0223	0.0050	0.0175	-0.0809	-0.0252	1.0000	-0.0432
CV	0.0085	0.0301	-0.0250	-0.0071	0.1007	-0.1561	-0.0485	-0.0432	1.0000
AC	0.0185	-0.0019	0.0006	0.0022	0.1094	-0.1504	-0.0468	-0.0417	-0.0804
SHOR	-0.0096	-0.0313	0.0225	0.0142	-0.3063	-0.6227	-0.1937	-0.1726	-0.3328
PDEPS	0.0289	-0.1003	0.0696	0.0500	-0.4626	-0.1540	-0.0179	-0.0465	-0.0965

Table 27 (continued)

	SHOR	PDEPS	NDEPS	PMU	WHITE	AC
STAY	-0.3319	0.1287	-0.1287	-0.2881	0.0080	0.1215
MG1	0.0380	0.0182	-0.0182	-0.0567	0.0959	-0.0195
MG2	0.0373	0.0081	-0.0081	-0.1094	0.1737	-0.0143
MG3U	-0.0325	-0.0163	0.0163	-0.0018	0.0348	0.0013
MG3L	-0.0446	-0.0026	0.0026	0.0480	-0.1915	0.0316
MG4	0.0387	0.0045	-0.0045	0.1685	-0.1318	-0.0143
AGE17	0.0796	-0.1302	0.1302	0.4273	0.0175	-0.0395
AGE18	-0.0439	-0.0279	0.0279	-0.1458	0.0792	0.0204
AGE20	-0.0080	0.1193	-0.1193	-0.1388	-0.0962	0.0055
WHITE	0.0096	-0.0289	0.0289	-0.0994	1.0000	-0.0185
NWHITE	-0.0096	0.0289	-0.0289	0.0994	-1.0000	0.0185
NDEPS	-0.2425	-1.0000	1.0000	0.2115	0.0289	0.0725
PMU	0.1166	-0.2115	0.2115	1.0000	-0.0994	-0.0523
LT12ED	-0.0313	-0.1003	0.1003	0.1261	0.0638	-0.0019
ED12	0.0225	0.0696	-0.0696	-0.0767	-0.0344	0.0006
GT12ED	0.0142	0.0500	-0.0500	-0.0838	-0.0511	0.0022
TIME	-0.3063	-0.4626	0.4626	0.2214	0.0273	0.1094

Table 27 (continued)

	SHOR	PDEPS	NDPES	PMU	WHITE	AC
SHIP	-0.6227	-0.1540	0.1540	-0.0668	-0.0104	-0.1504
SUB	-0.1937	-0.0179	0.0179	-0.0442	0.0378	-0.0468
CEA	-0.1726	-0.0465	0.0465	-0.0332	0.0130	-0.0417
CV	-0.3328	-0.0965	0.0965	-0.0331	-0.0085	-0.0804
AC	-0.3208	-0.0725	0.0725	-0.0523	-0.0185	1.0000
SHOR	1.0000	0.2425	-0.2425	0.1166	0.0096	-0.3208
PDEPS	0.2425	1.0000	-1.0000	-0.2115	-0.0289	-0.0725

Table 27 (continued)

Table 28

Definitions of Variables Included in Regression Analysis

Variable	Definition
STAY	0-individual attrited from service from January 1977 to September 1979 1-individual remained in service from January 1977 to September 1979
MG1[1]	0-individual not in Mental Group 1
	1-individual in Mental Group 1
MG2[1]	0-individual not in Mental Group 2
	1-individual in Mental Group 2
*MG3U[1]	0-individual not in Mental Group 3U
	1-individual in Mental Group 3U
MG3L[1]	0-individual not in Mental Group 3L
	1-individual in Mental Group 3L
MG4[1]	0-individual not in Mental Group 4
	1-individual in Mental Group 4
Age 17[2]	0-individual not 17 years or less
	1-individual 17 years or less
*Age 18[2]	0-individual not 18-19 years old
	1-individual 18-19 years old
Age 20[2]	0-individual not 20 years or more
	1-individual 20 years or more
*White[2]	0-individual not white
	1-individual white
NWhite[2]	0-individual not non-white
	1-individual non-white
LT13ED[2]	0-individual not less than 12 years ed.
	1-individual with less than 12 years ed.

Table 28 (continued)

Variable	Definition
*ED12	0-individual not with 12 years ed.
	1-individual with 12 years ed.
GT12ED[2]	0-not greater than 12 years education
	1-greater than 12 years education
NDEPS[2]	0-dependents
	1-no dependents
PDEPS[2]	0-no dependents
	1-dependents
Time[3]	variable created to give number of days served (11 values)
Spec[2]	0-some other job designator
	1-specialist
NSpec[2]	0-some other job designator
	1-non-specialist
Admin[2]	0-some other job designator
	1-administration worker
Tech[2]	0-some other job designator
	1-technician
*GENDET[2]	0-some other job designator
	1-general detail
Ship[2]	0-some other assignment
	1-shipboard duty
*Shore[2]	0-some other assignment
	1-shore assignment

Table 28 (continued)

Variable	Definition
Sub[2]	0-some other assignment
	1-submarine duty
Cea[2]	0-some other assignment
	1-other sea duty
CV[2]	0-some other assignment
	1-aircraft carrier duty
AC[2]	0-some other assignment
	1-aircraft squadron duty

[1]Further definition contained in Table 3.

[2]Further definition contained in Table 4.

[3]Time is a variable computed as an estimation of days served on Active Duty:

cohort 1---945 days served
cohort 2---855 days served
cohort 3---765 days served
cohort 4---675 days served
cohort 5---585 days served
cohort 6---485 days served
cohort 7---405 days served
cohort 8---315 days served
cohort 9---225 days served
cohort 10--135 days served
cohort 11--45 days served

*variable subsumed in regression constant.

run using the time in service given by the above equation, in order to account for time-in-service differences among the cohorts.

Regression Analysis using Traditional Variables

Table 29 presents the regression results utilizing traditional variables considered significant in predicting survival. The time variable is also included as a predictor in Table 30. Of special note is the fact that all variables are significant for the control group, but they only account for 4.7% of the variance in the survival. MG1, LT12ED, GT12ED, and NWHITE are not significant, and are not included in the regression equation of the PMU, yet the PMU equation explains 15.7% of the total variance. Prior to interpreting these results, it should be noted that the R^2's are a great deal smaller than those presented by Lockman (1976). The sample size in this study is 25,121 while Lockman had a sample size of 148 averages. This is due to the fact that Lockman sorted approximately 66,000 recruit personnel into 148 different groups. So his equation was really predicting the survival of group averages, not the survival rates of individual's. The prediction of a relatively small number of group averages tends to yield R^2's much greater than obtained when predicting the survival of a large number of individuals.

Traditional variables presented in Tables 29 and 30 are significant in predicting survival or attrition. Plag et al, (1970) found that lower education, and age were predictors of attrition in Marines. Later, Lockman (1976) found that low

Table 29

Regression Results for Traditional Attrition Variables

	Survival[a]	
	PMU	Control
CONSTANT	.955	.878
MG1	-.185**	.046**
MG2	---	.029**
MG3L	-.064**	-.014*
MG4	-.226**	-.062**
Age 17	-.291**	-.042**
Age 20	-.100**	-.037**
NWHITE	---	.026**
LT12ED	---	-.137**
GT13ED	---	.022**
NDEPS	-.209**	.042**
TIME	-.001**	-.0001**
R^2 Adj.	.157	0.047
F statistic	54.5100**	100.6833**
N[b]	2005	22,258

* Significant at .05 level

** Significant at .01 level

--- Variables not in equation

a. The dependent variable was STAY. All variables are defined in Table 28. Appendix K contains means and standard deviations for the PMU and control groups.

b. N includes a 70% random sample of the PMU group and 100% of the control group.

Table 30

Regression Results for Traditional Attrition Variables, PMU and Control Groups Combined

	Survival[a]
CONSTANT	.906
MG1	.039**
MG2	.029**
MG3L	-.020**
MG4	-.117**
Age 17	-.124**
Age 20	-.038**
NWHITE	.026**
LT12ED	-.108**
GT12ED	.024**
NDEPS	.025**
PMU	-.269**
TIME	-.0004**
R^2 Adj.	.132
F Statistic	317.9668**
N	25121

* Significant at .05 level.

** Significant at .01 level.

a. The dependent variable was STAY. All variables are defined in Table 28.

education, lower age, and minority status had significant relationships with attrition. Lockman (1977) demonstrated that non-whites have lower first year attrition rates from the Navy than do whites.

The variables MG3U, Age 18, ED12, PDEPS, and WHITE are used to define the average person to whom all others can be compared in the regression analysis i.e., they are in the constant. The findings in Table 30 support the findings from other researchers; other things being equal:

1. Persons who have completed a greater number of years in school will have higher survival rates (Plag et al, 1970).

2. Persons with higher mental categories have higher survival rates (Lockman, 1977).

3. Persons with no primary dependents have a higher survival rate than persons with primary dependents (Lockman, 1977).

4. Non-White personnel have higher survival rates than do white personnel (Lockman, 1977).

The regression results presented in Table 29 for the traditional independent variables show a relatively low adjusted R^2 of .157 ($p < .01$) for the PMU group and .047 ($p < .01$) for the control group. Table 30, which presents the results obtained using the variable PMU, is based on a combination of PMU and Control groups. The adjusted R^2 for the equation from the combined group was .132 ($p < .01$). The coefficient for PMU means the PMU alone, after controlling for all other variables, contributed to a survival differential of negative 26.9%. That is, if the PMU and control groups had been identical in all other variables

in the equation, the PMU would be expected to have had an attrition rate equal to the control group's attrition rate plus 26.9%.

Several other findings are notable in Table 29. The variable with the highest regression coefficient for the PMU group was AGE 17 (-29.7%). The variable with the greatest coefficient for the control group was LT12ED (-31.7%). The regression results for the control group tend to agree with Lockman (1976): variables exerting a negative impact on survival are LT12ED, MG3L, MG4, Age 17 and Age 20; while NDEPS, MG1, MG2, NWHITE, and GT12ED have a positive relationship with survival. Meanwhile, regression results for the PMU indicate that variables Age 17, Age 20, MG1, MG3L, MG4, and NDEPS have a negative impact on survival (compared to the variables subsumed in the constant). Coefficients for LT12ED, GT12ED, MG2, and NWHITE are not significant in the equation.

In Table 30, it can be seen that when both groups are combined, the variables MG1, MG2, NDEPS, and GT12ED have the expected positive impact on survival, while variables MG3L, MG4, Age 17, Age 20, LT12ED and PMU have the expected negative coefficients. NWHITE had a positive effect on survival, which is in keeping with Lockman's finding (1977).

Table 31 gives the first year screen table developed by Lockman (1976). Assume an individual was a MG2, had 12 years education, was non-white, 18 years old, and had primary dependents. Using the Lockman table, he would have a .90 predicted

Table 31

First Year Screen
Linear Model

		CAUCASIAN						NON-CAUCASIAN					
		>12	12	>12	12	<12		>12	12	>12	12	<12	
		NO DEPS		DEPENDENTS		NO DEPS	DEPS	NO DEPS		DEPENDENTS		NO DEPS	DEPS
I	18-19	99	96	95	92	85	81	99	99	98	95	88	84
	17	97	94	93	90	83	79	99	98	97	94	87	83
	20+	96	92	92	89	81	78	99	96	95	92	85	83
II	18-19	94	91	90	87	80	76	97	94	93	90	83	79
	17	92	89	89	85	78	74	96	94	92	90	82	78
	20+	91	88	87	84	76	73	94	91	90	87	80	76
IIIU	18-19	91	88	87	84	77	73	95	92	91	88	80	77
	17	90	87	86	83	76	72	93	90	89	86	79	75
	20+	88	85	84	81	74	70	91	88	88	85	77	73
IIIL	18-19	86	83	82	79	72	68	89	86	86	83	75	71
	17	85	81	81	78	70	67	88	85	84	81	74	70
	20+	83	80	79	76	69	65	86	83	82	79	72	68
IV	18-19	81	78	77	74	67	63	85	82	81	78	70	67
	17	80	77	76	73	66	62	83	80	79	76	69	65
	20+	78	75	74	71	64	60	81	78	78	75	67	63

Source: Lockman, 1977

chance of surviving one year in the Navy. Using Table 30, the same man would have a .815 predicted chance of surviving (computed by the following equation:

$$P\ (\text{survive}) = .906 + .029\ MG2 + .026\ NWHITE - (365 \times .0004) = .815).$$ [15]

Crossvalidation of the Regression Equations

The control group's regression equation was tested by taking the equation developed for 100 percent of the control group and using it to predict survival in the PMU group. The results were less than satisfactory. Table 32 shows the crossvalidation results. When the control group's equation predicted a person would attrite, it was accurate 94.6% of the time; however, when it predicted a person would stay, it was only accurate 45.8% of the time. Overall, it was only accurate 49.3% of the time. The equation had a crossvalidation R = .210. A crossvalidation was also run with the PMU group's equation. The PMU group's regression equation was developed on a random sample of 70 percent and crossvalidated on the remaining 30% of the PMU. Table 33 summarizes the results of this crossvalidation. The equation was accurate in its predictions 64.1% of the time. When the equation predicted an individual would attrite, it was accurate 70.2 percent of the time. When the equation predicted an individual would survive, it was accurate 56.7 percent of the time.

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[15] Time is an estimation of days served on active duty, so the multiplication of number of days, for estimated survival, times the coefficient for Time is necessary to predict an individual's chances of survival.

Table 32

Prediction of Survival of PMU Personnel Using the Control Group's Survival Equation Using only Traditional Predicters

	Attrited[a]	Survived	Total
Predicted Attrite	194	11	205
Predicted Survive	1440	1218	2658
Total	1634	1229	2863

R = .210

a. If predicted value $\geq$ .5 then the person is predicted to survive.

Table 33

Prediction of Survival of PMU Personnel Using a Survival Equation Developed on 70% of the PMU Population Using Only Tradition Predictors[a]

	Attrited[b]	Survived	Total
Predicted Attrite	328	139	467
Predicted Survive	169	222	391
Total	497	361	858

R = .273

a. The equation was developed on a randomly selected group of PMU personnel and crossvalidated on the remainder of the PMU personnel. The validation group was 70% of the PMU population; the remaining 30% were in the hold-out sample used for crossvalidation.

b. If predicted value $\geq$ .5 then the person is predicted to survive. This value could be adjusted if costs and benefits were assigned to the four cells of Tables 32 and 33, e.g., if the costs of incorrectly predicting attrition are high, one could guard against that error by using a predicted value of $<$ .5.

Regression Analysis using Traditional plus Situational Variables

Smith and Kendall (1980) developed some models for predicting attrition using information about the type of initial duty assignment an individual receives. It was their contention that there existed a relationship between duty assignment and attrition.

Duty Assignment Variables

To see the effect of duty assignment on survival rates, the following variables were added to the previous equation: SHIP, SUB, CEA, CV, and AC (all previously defined in Tables 4 and 28). The regression results are shown in Table 34. The type of individual now subsumed in the constant is MG3U, WHITE, AGE 18, ED12, PDEPS, GENDET, and assigned to shore duty.

PMU Group

Referring to Table 34, it is readily apparent that the assignment variables have a relationship with survival rates. For the PMU group R^2 = .384 which is a 150 percent increase over the amount of variance which can be explained by the equation in Table 29. For the control group, the R^2 = .187 which is a 298% increase over the variance which can be explained by the equation in Table 29. Caution should be used in comparison of adjusted R^2 values when using forward stepwise regression techniques (McNemar, 1970), so this comparison should be treated with caution. The PMU equation has the same pattern of coefficients seen in the earlier regression analyses. The variables MG4, AGE 17, AGE 20, TIME, and NDEPS have negative

Table 34

Regression Results for Traditional Plus Initial Duty Assignment as Predictors of Survival

	Survival[a]	
	PMU	Control
CONSTANT	.765	.894
MG1	----	.081**
MG2	----	.051**
MG3L	----	-.022**
MG4	-.091**	-.068**
Age 17	-.159**	-.039**
Age 20	-.090**	-.040**
NWHITE	----	.161**
LT12ED	----	-.133**
GT12ED	----	.031**
NDEPS	-.091**	.071**
TIME	-.0003**	-.0003**
SHIP	.563**	.318**
SUB	.603**	.318**
CEA	.701**	.317**
CV	.611**	.318**
AC	.553**	.343**
R^2 Adj.	.384	.187
F Statistic	114.7533**	320.7880**
N[1]	2005	22,258

* Significant at .05 level, ** Significant at .01 level

---- Variable not in equation

1 N includes 70% of the PMU and 100% of the control groups.

a The dependent variable is STAY. All variables are defined

Table 34 (continued)

in Table 28. Appendix K contains means and standard deviations for the variables.

regression coefficients significant at the .01 level. The coefficients for the variables MG1, MG2, MG3L, LT12ED, GT12ED, and NWHITE were not significant, so those variables did not enter in the equation. Highly notable in Table 34 are the regression coefficients for the initial duty assignment variables. The variable SHIP has a positive coefficient of .563.

The other new variables e.g., SHIP, CV, etc., all have positive relationships with survival. Assignment to CV has a regression coefficient of .611, while assignment to AC has a regression coefficient of .553 in the survival prediction equation for the PMU (shore duty is in the constant).

Control Group

For the control group, "SHIP" had a regression coefficient of .318. The coefficients for the variables AC, CV, SUB, and CEA showed these assignments to have higher survival percentages than shore duty, with percentage increases over shore duty of 34.3, 31.8, 31.8, and 31.7, respectively. What appears to be very clear in both sets (PMU and Control) of data is that assignment is related to survival, and that assignment explains a great deal of variance in attrition.

PMU and Control Group

Utilizing the traditional and initial duty assignment variables with the combined PMU and control groups yielded an R^2 of .272. This is a 106% increase over the amount of variance explainable by using only traditional variables. As shown in Table 35, the assignment with the largest positive relationship

Table 35

Regression Results for Traditional plus Initial Duty Assignment as Predictors of Survival (PMU and Control Groups Combined)

	Survival[a]
CONSTANT	.897**
MG1	.076**
MG2	.051**
MG3L	-.024**
MG4	-.097**
Age 17	-.086**
Age 20	-.041**
NWHITE	.014**
LT12Ed	-.110**
GT12ED	.035**
NDEPS	.078**
TIME	.0003**
PMU	-.152**
SHIP	.345**
SUB	.339**
CEA	.342**
CV	.350**
AC	.366**
R^2 Adj.	.272
F Statistic	586.5574**
N	25121

* Significant at .05 level ** Significant at .01 Level

a. The dependent variable is STAY. All variables are defined in Table 28. MG3U, AGe 18, WHITE, ED12, NON-PMU, and SHOR are subsumed in the constant.

with survival was AC, which had a regression coefficient of .354. The next two variables with large positive relationships with chances of survival are CV and SHIP, both of which increase an individual's predicted chance of surviving by 34% over those of personnel in the constant. The final two variables, SUB and CEA, increase an individual's chances of survival 31.8 and 32.5 percent respectively above those of personnel subsumed in the constant.

Keeping in mind McNemar's (1970) warning concerning comparisons of adjusted R^2's, the large increase in R^2 over the equations presented in Table 30 is noteworthy.

An example can explain what all these variables mean when predicting survival rates. Consider an individual who is in the following group: MG4, LT12ED, Age 17, NDEPS, NWHITE, PMU, and SHIP. Using the results in Table 35, compare him to five identical individuals, assigned to SHORE, SUB, CEA, CV, and AC, respectively. The following survival probabilities of individuals are predicted: for the man assigned to a SHIP, .859; the man assigned to SUB, .853; the man assigned to CEA, .856; theman assigned to CV, .864; the man assigned to AC, .880; and, last for the man assigned to shore, .514, demonstrating the influence assignment has on a person'a survival. Incidentally, according to Table 31 (the screen table) all individuals would have a predicted survival probability of .69.

Crossvalidation

The crossvalidations of the equations from the PMU and control groups were conducted as outlined in a previous section.

The control group's equation was used with data from the PMU group to predict PMU attrition rates. The equation developed from 70 percent of the PMU population was run using data from 30% of the PMU population to predict their survival rates. Tables 36 and 37 give the cross-validation results.

When the control groups predicted a person would attrite, it was accurate 86.1% of the time; however, when it predicted a person would stay, it was only accurate 57.2% of the time. The equation had a R = .412 and an overall accuracy of 66.8%.

The PMU equation was accurate in its predictions 68.6% of the time. When the equation predicted an individual would attrite it was accurate 81.7% of the time. When the equation predicted an individual would survive it was accurate 59.2% of the time. The equation had an R = .412.

Regression Analysis with Traditional plus Assignment plus Job Variables

In an attempt to increase the amount of variance which could be explained by the regression equations, several variables were added. The variables included with the traditional variables were the job assignments of SPEC, NSPEC, ADMIN, and TECH, as defined in Tables 4 and 28. The variable GEN, for general detail, was subsumed in the constant. It was hoped that the type of job a person performed might account for a part of the variance in the survival analysis.

As previously reported, initial job assignments were not determinable, due to updates of the data base used. However, it was felt that prediction of survival of the control group

Table 36

Prediction of PMU Survival Using the Control Group's Survival Equation for Traditional Plus Initial Duty Assignment Predictors

	Attrited[b]	Survived	Total
Predicted Attrite	814	131	945
Predicted Survive	820	1098	1918
TOTAL	1634	1229	2863

R = .412

[b] If predicted value $\geq$ .5 then the person was predicted to survive.

Table 37

Prediction of Survival of PMU Personnel Survival Using the Equation Developed on 70% of PMU Population and Crossvalidated on 30% of the PMU Population for Traditional Plus Initial Duty Assignment Predictors[a]

	Attrited[b]	Survived	Total
Predicted Attrite	294	66	360
Predicted Survive	203	295	498
TOTAL	497	361	858

R = .412

[a] The equation was developed on a randomly selected group of PMU personnel and crossvalidated on the remainder of the PMU personnel. The validation group was 70% of the PMU population; the remaining 30% were in the hold-out sample used for crossvalidations.

[b] If predicted value $\geq$ .5 then the person was predicted to survive. This value could be adjusted if costs and benefits were assigned to the four cells of Tables 36 and 37, e.g., if the costs of incorrectly predicting attrition are high, one could guard against that error by using a predicted value < .5.

would be enhanced by the inclusion of job assignment variables.

Smith and Kendall (1980) used job assignment variables in their study of Gendet/non-gendet to describe the job assignment an individual received. These variables were significant in predicting attrition from their sample. Hoping to explain even more of the survival variance than did Smith and Kendall, the decision was made to classify all personnel into five distinct job categories: SPEC, NSPEC, ADMIN, TECH, and GEN.

Two regression equations were developed. One on 70 percent of the PMU group only, and another on the control group only. No equation was run on the combined group, due to probems in identifying initial job assignments for the control group. Table 38 presents the results of the regression analyses. Once again McNemar (1970) warning concerning comparison of adjusted R^2 must be taken into account. As can be seen, the R^2 for the PMU group was .434 ($p < .01$), and the R^2 for the control group was .229 ($p < .01$). These R^2s represent an increase for the PMU group, and for the control group, when compared to the correlation obtained when job variables were not included as predictors (see Table 34).

Control Group

As shown in Table 38 for the control group, the variables MG1, MG2, NWHITE, GT12ED, and NDEPS had positive regression coefficients which were significant at the .01 level. The variables MG4, AGE 17, AGE 20, and LT12ED had negative coefficients which were significant at the .01 level. The variable MG3L was

Table 38

Regression Results for Traditional Plus Job and Situational Variables as Predictors of Survival[a]

	PMU	Control
CONSTANT	.733	.784
MG1	-.092**	.076**
MG2	----	.046**
MG3L	----	----
MG4	-.058**	.034**
Age 17	-.121**	-.026**
Age 20	-.093**	-.038**
NWHITE	----	.021**
LT12ED	----	-.110**
GT12ED	----	.021**
NDEPS	-.120**	.091**
TIME	-.004**	-.0004**
SPEC	.277**	.100**
NSPEC	.429**	.245**
ADMIN	.163**	.069**
TECH	.328**	.157**
SHIP	.510**	.307**
SUB	.570**	.313**
CEA	.507**	.270**
CV	.580**	.302**
AC	.484**	.319**

Table 38 (continued)

	PMU	Control
R^2 Adj.	.434	.229
F Statistic	103.3877**	367.9374**
N[1]	2005	22,258

* Significant at .05 level

** Significant at .01 level

-- Variables not in Equation

[1]N contains approximately 70% of PMU and 100% of control personnel.

[a]The dependent variable is STAY. All variables are defined in Table 28. The variables subsumed in constant are MG3U, Age 18, WHITE, ED12, PDEPS, GEN, and SHOR. Appendix K contains means and standard deviation.

not significant and therefore not included in the equation. The four variables of primary interest in this equation, namely the job variables, make only a slight change to the overall equation. For instance, the variable SPEC has a positive coefficient of +10%, while NSPEC has a coefficient of +24.5%. The variable ADMIN has a coefficient of +6.9% and the variable TECH has a coefficient of +15.7%. Further, the coefficient for SPEC, NSPEC, TECH, and ADMIN are significant in the equation (general detail is in the constant). However, looking solely at the control group, one would have to say that adding the job variables to the prediction of survival accomplishes very little in increasing the accuracy of prediction of survival.

PMU Group

As shown in Table 38 for the PMU group, the traditional variable equation, MG1, MG4, AGE 17, AGE 20, TIME, and NDEPS have negative regression coefficients which are significant at the .01 level. The job variables included in the PMU equation are highly significant. NSPEC had a positive relationship with survival (a regression coefficient of 42.9%), while the variable SPEC had a positive coefficient of 27.7% in the equation. The variable ADMIN had a positive regression coefficient of 16.3% while Tech also had a positive coefficient relationship (32.8%). For some reason the job variables are very important as predictors of the survival of PMU personnel. The previously explained difficulties (see Chapter III and Figure 7) in identifying

initial job assignments for the control group may have reduced the values of the job variables as predictors of survival.

Unless one is interested in the PMU group exclusively, the survival equation is not enhanced greatly by the job avriables. However, since this thesis is primarily concerned with what affects the survival of PMU personnel, the job variables are viewed here as important. To more readily understand what the equations in Table 38 offer us, consider for example a non-white, 25 years old, with no dependents, scoring in mental group three lower, who has greater than 12 years education, was assigned to the PMU, then to a job in the general detail group, and to shore duty. According to the Lockman screen, Table 31, this individual would have an 86% chance of surviving one year. According to the PMU equation in Table 38, the individual would have a 37.4% chance of surviving a year,[16] whereas using the control group equation in Table 38, he would have a 50.9% chance to survive one year.[17] Certain objections could be raised, such as claiming person cannot be screened for being in the PMU prior to his enlisting. Of course this is correct. However, perhaps a screening table can be created to help policymakers ascertain whether they will expend limited resources to salvage an individual, by providing the best

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[16]Created by taking P(Survive) = .733 - .093 Age 20 - .120 NDEPS - (365 x .004 TIME) (e.g., for PMU in Table 38).

[17]Created by taking P(Survive) = .784 - .038 Age 20 - .091 NDEPS - (365 x .0004 TIME) (e.g., for Control in Table 38).

estimate of an individual's success (survival in the Navy). Another reason for developing these tables is to identify what seems to drive attrition.

Crossvalidation of Regression Analysis

Crossvalidation of the traditional variables plus job variables was conducted. The crossvalidation involved running the PMU equation developed on 70% of the PMU against the remaining 30% of the PMU to see if it correctly identified survivors and attriters. Table 39 provides the crossvalidation results. The PMU equation predicted accurately 75.6% of the attriters while at the same time predicted accurately 78.6% of all survivors. The overall accuracy rate was 76.7% with $R = .515$

Explanation of Regression Analyses

This explanation section is an attempt by the investigator to explain certain phenomena which occurred during the regression analyses. The easiest way to offer these explanations is by variable or group of variables which are similar. This is the reason the following section is subdivided by variable types. Table 40 summarizes the regression results.

Mental Groups

Using only the traditional variables, there were no surprises in the results obtained with the control group. MG1 had a higher positive regression coefficient with survival than did MG2, which was also significantly positive, while MG3L had a less negative regression coefficient than did MG4. This is exactly what is

Table 39

Prediction of 30% PMU Personnel's Survival Using The Regression Equation Developed on 70% of PMU Population[a]

	Attrited[b]	Survived	Total
Predicted Attrite	437	141	578
Predicted Survive	60	220	280
TOTAL	497	361	858

R = .515

[a]The equation was developed on a randomly selected group of PMU personnel and crossvalidated on the remainder of the PMU personnel. The validation group was 70% of the PMU population; the remaining 30% were in the holdout sample used for crossvalidation.

[b]If predicted value $\geq$ .5 then the person was predicted to survive. This value could be adjusted if costs and benefits were assigned to the four cells of Table 39; e.g., if the costs of incorrectly predicting attrition are high, one could guard against that error by using a predicted value $<$ .5.

Table 40

Summary of the Regression Analyses Predicting Survival in the Navy
(Values are Partial Regression Coefficients)

	Equation with Traditional only		Equation with Traditional + duty assignment		Equation with traditional + job + duty assignment	
Predictors	PMU	Control	PMU	Control	PMU	Control
CONSTANT	.955	.878	.765	.894	.733	.784
MG1	-.185**	.046**	----	.081**	-.093**	.076**
MG2	---	.029**	----	.051**	----	.046**
MG3L	-.064**	-.014*	----	-.022**	----	----
MG4	-.226**	-.062**	-.091**	-.068**	-.058**	.034**
AGE 17	-.291**	-.042**	-.159**	-.039**	-.121**	-.026**
AGE 20	-.100**	-.037**	-.090**	-.040**	-.093**	-.038**
NWHITE	---	.026**	----	.161**	----	.021**
LT12ED	---	-.137**	----	-.133**	----	-.110**
GT12ED	---	.022**	----	.031**	----	.021**
NDEPS	-.209**	.042**	-.091**	.071**	-.120**	-.091**
TIME	-.0001**	-.001**	-.0003**	-.0003**	-.004**	-.0004**
SHIP	a	a	.563**	.318**	.510**	.307**
SUB	a	a	.603**	.318**	.570**	.313**

Table 40

Predictors	PMU	Control	PMU	Control	PMU	Control
CEA	a	a	.701**	.317**	.507**	.270**
CV	a	a	.611**	.318**	.580**	.302**
AC	a	a	.553**	.318**	.484**	.319**
SPEC	a	a	a	a	.277**	.100**b
NSPEC	a	a	a	a	.429**	.245**b
ADMIN	a	a	a	a	.163**	.069**b
TECH	a	a	a	a	.328**	.157**b
R^2 Adj.	.157	.047	.384	.187	.434	.229
F Statistic	54.5100**	100.6833**	114.7533**	320.7880**	103.3877**	367.9374**
N	2005	22,258	2005	22,258	2005	22,258

a. not used in this analysis

b. not comparable with PMU because initial duty assignment information for control group was unavailable.

* significant at the .05 level.

** significant at the .01 level.

-- not significant; therefore not used in the final equation.

expected from Lockman's findings (1977). The addition of the initial duty variables, while changing the coefficients slightly, did not alter the order of the relationships of the mental variables with survival. With the addition of the job variables all the mental category variables were significant, except MG3L, and although a slight change occurred in their coefficients, their relationships to one another stayed the same. Basically, the control group reinforces the belief that the higher the mental group of a person the more likely his survival.

Looking at the regression results from the PMU group, several surprises are found. Using only traditional variables, MG1, had a significant negative regression coefficient with survival, while MG3L had less negative relationship with survival than did MG4. With the addition of the assignment variables, MG1, MG2 and MG3L drop out of the equation. Only MG4 maintains the relationship expected from the Screen table: significantly negative with respect to survival. With the addition of the job variables, MG1 had a significantly negative regression coefficient with survival, while the other mental category variables remain in the same relative position as in the earlier equation.

Age at Entry

Lockman (1976) found that the youngest recruits (17 years old) had the highest attrition rates, the 18-19 year old group had the lowest attrition rate, while the 20 year old and older group had an attrition rate between those of the other two age

groups. These are precisely the results shown in Tables 29-30, and 34-38. For the three different types of equations (traditional variables, traditional plus job variables, and traditional, plus job plus assignment variables) applied to the three different groups (PMU, control, and combined), the age 17 groups had the largest negative regression coefficient with respect to survival, while the age 20 groups had the smallest negative regression coefficient with respect to survival, and the age 18 groups had higher survival rates than did the other two age groups.

Racial Composition

Lockman (1976) stated that minority personnel had a higher attrition rate than did majority personnel. However, using 1977 data he found minorities to have a better survival rate than whites. The regression results presented here echo Lockman's findings. Non-white personnel, in two groups (control, and combined), had a higher survival rate than did whites. However, in the PMU group the variable NWHITE was not significant.

Education at Entry

Lockman (1976) found years of education completed to be negatively correlated with attrition rate. Smith and Kendall (1980) also found years of education to be negatively correlated with attrition. In the control and combined groups, similar results were found to occur, as the regression coefficient for LT12ED was significant and negative, while the coefficient for GT12ED was significant and positive with respect to survival. However, in the PMU group the variables LT12ED and GT12ED were

not significant, and therefore, not included in the regression equation.

Dependents

For the control group and the combined group, NDEPS has a significant positive relationship with survival. All three equations had regression coefficients showing NDEPS positively affect survival, i.e., individual's with no dependents are more likely to survive in the Navy. The possible reasons for this are many and have been enumerated by several researchers, among them Smith and Kendall (1980). However, the equations from the PMU group show that the regression coefficient for NDEPS had a significant negative relationship with survival.

Time

As expected, time in the Navy has a significant negative regression coefficient when predicting survival. This relationship holds in all equations presented in Tables 29 and 30, and 34 through 38, and for all groups studied. The way to use the tie variable in the prediction equations is to multiply the number of days that a prediction of survival is needed for by the regression coefficient for Time.

Job Variables

Job variables were introduced with the expectation that attrition rates would generally be highest for general detail personnel. Looking at the PMU group, as expected those personnel in any job identified as SPEC, NSPEC, ADMIN, or TECH had a substantially higher survival rate than did general detail personnel.

For the control group, only the job assignment of NSPEC, TECH, ADMIN, and SPEC had survival rates significantly higher than that of general detail personnel.

While analysis of job assignment for the control group is not as meaningful as for the PMU group, due to the inability to obtain all initial duty assignments, it is felt that inclusion of these variables enhances somewhat the ability to predict survival. Even though in many cases personnel converting from general detail to another job category may have increased the positive regression coefficients of the other categories, the fact that general detail has lower survival rates than those of other job categories is consistent with other research (Smith and Kendall, 1980).

Initial Duty Assignment

As shown in Tables 34 and 35, any kind of duty associated with "sea duty" has a significantly higher survival rate than does shore duty. This is apparent for the PMU group, control group and the combined group. Kendall and Smith (1980) noted this phenomenon and thought that it was primarily due to the Navy's "Adventure" advertising program. Since an individual joined the Navy to see the world then disillusionment would result in higher attrition rates, if those expectations were not met. While that is certainly a plausible explanation, other reasons are possible, e.g.,

1. people on shore duty find it easier to attrite than do people on sea duty.

2. people on shore duty compare their jobs, working conditions, pay, etc., with civilians more than do people on sea duty.
3. there is a greater sense of espirit on sea duty than on shore duty.

In any case, further research should certainly be done to explicate why attrition rates are higher for people assigned initially to shore duty than for those assigned initially to sea duty.

CONCLUSIONS AND RECOMMENDATIONS

Introduction

The purposes of this thesis were: First, to compare long term attrition rates of personnel assigned to the PMU with the attrition of individuals in the control group. Second, to identify situational variables which affect the attrition of individuals from the PMU and the control groups. Finally, to identify the variables associated with probability of survival of individuals who have attended the PMU.

Conclusions/Recommendations

The PMU personnel were compared to the control group using univariate and discriminant analyses. The analysis of traditional variables demonstrated conclusively that the PMU group was not representative of the population of U.S. Navy male recruits. The PMU group was younger, less educated, more likely to be non-white, and from lower mental groups than the average U.S. Navy recruit. The analysis of the situational variables, i.e., job assignment and initial duty assignment, showed that PMU personnel were, for the most part, assigned to general detail ashore. Further, the discriminant analysis demonstrated the PMU and control groups were significantly different from one another when compared on a yearly basis (1977, 1978 and 1979). However, when both groups were aggregated for the entire period and a discriminant analysis was conducted, the results tended to imply that the PMU group

personnel have varied over the years in terms of age, mental group categories, and dependency status.

When compared to the control group on overall attrition rates by cohort, the PMU group had significantly greater attrition than did the control group. Further, the PMU group demonstrated a marked change in its attrition rates in 1977, possibly in response to the Secretary of Defense's order to reduce attrition. The control group showed no such change but the attrition rates for this group are very low when compared to previous years presented in Table 1, so perhaps the effects of the order took place in the first quarter of 1977 for this group.

The PMU and control personnel were divided into 36 different groups by using certain traditional variables (2x race, 3x mental group, 3x age and 2x education). When screening tables were developed to predict survival rates for six-months, 12-months, and 18-months, large differences were found between the control and the PMU groups. The control group had substantially higher survival rates than the PMU group in all tables. A trend was found in the PMU group's data in the six-month and 12-month screen tables which was counter to the trend in the control groups data: for the PMU personnel, age was often inversely related to attrition. In the control groups, ages 18-19 tended to have the highest survival rate, and age 17 the highest attrition rates. Non-white and whites attrition rates were about equal overall. In the 18-month screen tables, the PMU group had substantially lower survival rates than did the control group.

Correlational analyses were conducted for the PMU, control, and combined (PMU and control) groups. The analyses were conducted to ascertain which variables had a significant association with the dependent variable, survival. The most impressive finding from this analysis was the strength of the relationship of the initial duty assignment variables with survival for the PMU, control, and combined groups. For the control and combined groups, the traditional variables have a significant relationship with survival. However, for the PMU group the traditional variables are not what one would expect, as higher years of education, and no dependents, both have a negative effect on survival. The main point, however, is that initial duty assignment variables were highly correlated with survival for all groups.

Regression analyses utilizing the traditional variables plus job assignment and initial duty assignment variables were run using the data from the PMU group. It appears that survival is increased significantly when the PMU individual is assigned to any occupation group, except general detail. Perhaps a regression developed screen should be made available to RTC's to enable administrators to predict the survivability of recruits recommended for assignment to the PMU. In any event, for the PMU group it should be noted that variables such as age and duty assignment affect a person's survival in the Navy, while in the control group the more traditional plus duty assignment variables affect a person's survival. Job assignments were also related to survival for the PMU personnel.

Further study needs to be done on the recruit population of the U.S. Navy to see if initial duty assignment is as large a factor in a person's survival as the correlation analysis and multiple regression analysis in this thesis indicate. The creation of a set of screen tables, including the job variables and initial duty assignment, for personnel assignment officers or policy makers should be made to allow the full implications of survival and attrition on what is a somewhat controllable set of variables. This would enable policy makers to understand the implications of certain policy decisions and how they might affect attrition.

Another recommendation concerns the PMU. Prior to assigning an individual to the PMU, the survival prediction equation developed in this thesis should be used to determine the individuals' estimated survival probability. Unless the PMU (or the rest of the Navy) changes, resources are being expended on some individuals with very low survival probabilities.

Another recommendation concerns the different data bases, e.g., the DMDC cohort files, and NPRDC's survival tracking file number 2. It would appear that there are many different data sets and codes for the same information within the Navy. The different data bases should be standardized in their coding.

The analysis in this thesis has primarily pointed to the fact that survival in the Navy is highly related to an individual's initial duty assignment and to the type of initial job the individual receives--survival in the Navy depends upon the organization and the job, as well as upon the man.

This tends to corroborate the Smith and Kendall (1980) findings. The time devoted to conducting this thesis would be well spent if this thesis arouses people to the fact that attrition has some determinants which can be controlled by the Deputy Chief of Naval Operations (Manpower, Personnel, and Training).

APPENDIX A

INTERSERVICE SEPARATION LISTING FOR CODES 6-8

6----Failure to Meet Minimum Behavioral and Performance Criteria

61----Substandard performance of duty

63----Failure on course of instruction

64----Alcoholism

67----Drugs

68----Financial irresponsibility

72----Security

73----Court Martial

75----AWOL, Desertion

76----Homosexuality

78----Good of the Service

79----Failure of the selection for promotion

80----Unsuitability (other)

81----Unfitness or Unacceptible Conduct (other)

85----Failure to meet minimum retention requirements

(HAWKINS, 1980)

APPENDIX B

Procedures for PMU

(1) Division Check-in and Initial Interview

(a) Upon his initial check-in to the division he is interviewed by the Division Officer or LCPO. During this interview an attempt is made to define what types of problems the recruit is experiencing (i.e., adjustment problems, immaturity, demotivation, disciplinary, personal problems, personality conflict, etc.). The objective is then to determine the reason for this problem. It is explained to the recruit during this interview, that the purpose of PMU is to help him develop the proper attitude and level of performance so that he will qualify for a return to training in the shortest possible time.

(2) Unit Indoctrination and Evaluation Contents

(a) Shortly after checking into the unit he will be personally interviewed by one of the unit counselors. This interview will again try to identify the man's problem and the basis for it. At this time the unit schedule will be explained (TAB A) and (TAB B) will be completed to provide pertinent background data which may be utilized in the problem solving process, and to improve communication between the various staff counselors.

(b) During the course of this interview the recruits responsibilities and evaluation will be explained to him in detail. They are as follows:

1. He must have memorized the general orders of a sentry, chain or command, and rate/rank recognition satisfactorily for his day of training (if he has reached his 3-1 D.O.T. these items must be 4.0).

2. A satisfactory level of proficiency must be demonstrated on bunk, locker and personnel inspections (again, if he is on his 3-1 D.O.T. or beyond these areas must be 4.0).

3. Any outstnading Intensive Training, and/or Motivational Training must be satisfied prior to returning to training. (This is a requirement to aid in evaluating the sincerity and capability of the recruit and allows him to return to training with a clean record.) Exceptions to this rule may be made if there is a medical restriction which precludes this form of exercise.

4. Particular emphasis is placed on his responsiveness to counseling and satisfactory demonstration of proper military bearing; subordination, initiative toward his responsibilities, ability to work constructively with others and motivation to become a successful Navy man.

(c) To add basis to this requirement, Article 1210 of the U.S. Navy Regulations may be used as a counseling guide. (This is posted in the compartment as a reminder that it is a basic prerequisite for all military personnel. It reads as follows:

U. S. NAVY REGULATIONS
ART. 1210

Conduct of Persons in the Naval Service.

All persons in the naval service shall show in themselves a good example of subordination, courage, zeal, sobriety, neatness, and attention to duty. They shall aid to the utmost of their ability, and to the extent of their authority, in maintaining good order and discipline, and in all that concerns the efficiency of the command.

(3) Methods of Evaluation and Return

(a) The following methods are employed within the PMU curriculum to accomplish its stated purpose:

(1) Individual counseling sessions are conducted, ideally, on a daily basis by each of the unit counselors. These sessions should normally be private, relaxed and positive in nature. It is during these sessions that communication and understanding should be achieved and direct, constructive criticism should be given when necessary. The impressions or information gained by the counselor will be recorded on TAB C.

(2) Group counseling sessions should be conducted frequently on both a formal and informal basis. This allows recruits to interact and both observe and evaluate each other, as well as, themselves.

(3) Human Resource Management personnel are scheduled to present group counseling sessions on subjects such as "Cultural Adjustment" and "Feelings." These sessions

are for the most part informal and allow for recruits to relate with each other and staff personnel at a different level.

(4) Movies of both an informative and motivational nature are shown to increase understanding of responsibilities, and to make the fleet Navy with its travel, adventure, education, and friendship seem more real.

(5) Performance Criteria such as memory items and inspections are emphasized for the purpose of evaluating both willingness and ability to perform these functions, as well as, to prepare them for a better chance of success upon their return to regular training.

(4) Disposition of Recruits

(a) Determination of the required processing of recruits will be on an individual basis. An important consideration for disposition is proper timing.

(1) Once a recruit has satisfied all return to training criteria, it is important to get him back to regular training as soon as possible while his motivation level is high. (The knowledge of this fact by the recruit is one of his biggest incentives to perform.)

(2) When a recruit is being recommended for a return to training (TAB D), will be initiated and the recruit will then be referred to the STD LCPO and/or the STD Division Officer for final approval and evaluation comments.

(3) If it is determined that a recruit is not suitable for continued naval service, he should be recommended

for discharge in a timely manner so that his attitude and behavior will not exert undue negative influence on other recruits who are willing and capable of reform. This discharge recommendation will be initiated on the standard recruit evaluation form and referred to the STD Division Officer, or acting Division Officer, for final adjudication. This decision will be made only after a thorough review is conducted of all evaluation criteria and performance records in conjunction with a personal interview of the recruit.

7. Additional Comments and Considerations. These items are mentioned to help insure the purpose and objectives of PMU can be accomplished.

a. A review of this instruction should be made by all staff personnel who have any dealings with PMU, or the people it processes, so that proper understanding and credibility can be given to its purpose and to the decisions and recommendations which it generates.

b. Careful consideration should be made that those who are being referred to PMU require that form of remediation and that all other methods have been attempted or considered. (Transfer of recruits to PMU who did not require that form of action causes demotivation, pipeline delays and possibly increased recruit attrition.)

c. When a recruit returns to regular training from PMU he should be given an equal opportunity to demonstrate his worth. (He would not be going back to training if he had not

performed up to standards and demonstrated a potential to succeed.)

d. After a recruit has been through PMU he should not be referred back if his performance again becomes unsatisfactory in training. He has already been exposed to the PMU curriculum and some other form of remediation or processing should then be utilized.

POSITIVE MOTIVATION UNIT
Daily Routine
(Monday-Friday)

0500 REVEILLE--make up bunk/personal hygiene

0530 Depart for morning meal

0630 Return from morning meanl/muster by Unit Commander

0730 Personnel Inspection

0830 Dynamic Bunk Inspection and debrief

0910 Dynamic Locker Inspection/group counseling i.e., movies, slides, IG's etc.

1030 Depart for noon meal

1200 Return from noon meal/free period

1210 Study period

1245 Individual counseling/Bunk/Locker Dynamic Inspections

1400 Physical training--group counseling i.e., movies, slides, IG's etc.

1500 Individual counseling/Bunk/Locker Dynamic Inspections

1630 Depart for evening meal

1745 Return from evening meal/free period

1745 Exchange/phone calls, as authorized by Unit Commander

1800 Commence night routine, as set by Unit Commander

1900 Field day

2000 Set Fwd. Compt. Watch/secure field day/personal hygiene and free period

2100 TAPS

* Individual counseling sessions and processing will be conducted throughout the day and will take priority over scheduled daily routine. Tuesday/Thursday, Human Resource Management Team conducts counseling sessions.

POSITIVE MOTIVATION UNIT
Daily Routine
(Saturday)

0500 REVEILLE--make up bunk/personal hygiene/get in uniform of the day

0515 Muster by OOD

0530 Depart for morning meal

0630 Return from morning meal/free period

0700 Field day compt. B-1, including, Head and shower area

1030 Secure from field day/free period

1100 Depart for noon meal

1200 Return from noon meal/free period

1230 Commence compartment field day

1530 Free period

1600 Depart for evening meal

1700 Return from evening meal/free period

1730 Work detail as prescribed by the OOD

1830 Free period

1900 Hold on station muster/commence field day

2000 Secure from field day/free period/set Fwd. Compt. Watch

2100 TAPS

POSITIVE MOTIVATION UNIT
Daily Routine
(Sunday)

0600 REVEILLE--make up bunk/personnel hygiene/get in uniform of the day

0615 Muster by OOD

0645 Depart for morning meal

0745 Return from morning meal/free period

0830 Free period

0900 Church Call

1100 Depart for noon meal

1200 Return from noon meal/free period

1230 Sweep down

1300 Commence field day of compartment. A-1, it's Head and shower

1530 Secure from field day/free period

1600 Depart for evening meal

1700 Return from evening meal/free period

1730 Work detail as prescribed by the OOD

1830 Free period

1900 Sweep down/hold on station muster

2000 Free time/set Fwd. Compt. Watch

2100 TAPS

_____
(DATE)

COUNSELING SHEET

_____
(LAST NAME) (FIRST) (MIDDLE INITIAL) (SSN) (PREVIOUS UNIT/DIV./ D.O.T.)

_____
(AGE) (FATHER LIVING) (MOTHER LIVING) (NO. BROS. & SISTERS)

_____
(DIVORCED/SEPARATED)

_____
(HOME ADDRESS) (CITY, STATE & ZIP CODE)

_____
(RELIGIOUS PREFERENCE) (ATTEND CHURCH) (SPORTS) (MO. YR SCHOOLING)

_____
(PRIOR MILITARY SERVICE) (RANK/RATE) (YEARS) (TYPE OF DISCHARGE)

_____
(PRIOR EMPLOYMENT) (TYPE WORK) (LENGTH EMPLOYED) (WK)

1. WHY DID YOU JOIN THE NAVY?

2. HIGHEST YEAR IN SCHOOL _____

   a. REASON FOR NON-COMPLETION _____

3. SOCIAL PROBLEMS--ARRESTS _____, RUNAWAY _____

4. UNIT RELATIONS

   a. REASON CAME TO _____ .
   (UNIT NO.)

   ATTITUDE TOWARDS THE NAVY _____

   MILITARY BEARING _____

   IMMATURITY _____

   LACK OF INITIATIVE _____

   DISCIPLINARY INFRACTIONS _____

   INABILITY TO GET ALONG _____

   PERSONALITY CONFLICT _____

5. INITIAL EVALUATION COMMENTS: _____

PMU/MIU INDIVIDUAL RECRUIT PROGRESS REPORT

POSITIVE OBSERVATIONS	IN	OUT	NEGATIVE OBSERVATIONS	IN	OUT
INTEREST IN THE NAVY?			1. DIRECTLY DISOBEDIENT?		
ATTENTIVE DURING DRILLS?			2. HOMESICK/FAMILY PROBLEMS?		
CLEAN IN PERSONAL HABITS?			3. TROUBLE MAKER?		
GOOD MIXER?			4. FOLLOWER?		
OBEYS WITHOUT SUPERVISION?			5. WISEGUY?		
MAKES GOOD USE OF SPARE TIME?			6. IMMATURE?		
MENTALLY CAPABLE?			7. BELLIGERENT?		
PHYSICALLY CAPABLE?			8. DEPRESSED/SAD?		
PROGRESS GOOD?					
IMPROVING?					

RECOMMEND FULL DUTY THIS DATE _____

DATE	REMARKS	INITIALS

DATE _____

FROM: UNIT COMMANDER 605K/606K

TO: COMPANY COMMANDER

VIA: 1. SPECIAL TRAINING DIVISION LCPO
2. SPECIAL TRAINING DIVISION OFFICER

SUBJ: MOTIVATIONAL TRAINING DIVISION: COMPLETION OF

1. SR _____ HAS SATISFACTORILY COMPLETED TRAINING IN UNIT _____. HE HAS BEEN ASSIGNED TO THIS UNIT FOR ____ DAYS, AND IS RECOMMENDED TO CONTINUE TRAINING IN A COMPANY ON ITS _____ DAY OF TRAINING. HIS PREVIOUS COMPANY WAS _____ ON ITS ____ DAY OF TRAINING.

2. THIS UNIT HAS ATTEMPTED TO CHANGE HIS ATTITUDE WHERE HE WILL HAVE A POSITIVE ATTITUDE AND APPROACH TOWARDS ACCOMPLISHING THE GOALS OF THE NAVY. AN UNOFFICIAL RECORD ON THIS MAN IS MAINTAINED BY THE SPECIAL TRAINING DIVISION AND WILL BE MADE AVAILABLE TO YOU UPON REQUEST.

REAMRKS: _____

_____

FIRST ENDORSEMENT: SIGNATURE _____

FROM: SPECIAL TRAINING LCPO

TO: SPECIAL TRAINING DIVISION OFFICER

REMARKS: _____

_____

SECOND ENDORSEMENT: SIGNATURE _____

FROM: SPECIAL TRAINING DIVISION OFFICER
TO: MILITARY TRAINING OFFICER

REMARKS: _____

_____

THIRD ENDORSEMENT: SIGNATURE _____

APPENDIX C

Variables Contained in DMDC Cohort Files

Variables

Social Security Number

Census Region

Zip Code

Home of Record County

Date of Birth

Age at Entry

Highest year of education completed

sex

race

ethnic group

Marital status/Dependents

AFQT test form

AFQT percentile

AFQT category

Aptitude scores

Date of entry

Term of enlistment

entry paygrade

height

wdight

total active federal military service

DOD primary occupation code

Variables

DOD secondary occupation code

separation code Navy

inter-service separation code

base active duty date

pay entry base date

character of service

reenlistment eligibility

unit identification code

APPENDIX D

Variables Contained in NPRDC Survival Tracking File 2

Variables

social security numbers

sex

race

ethnic group

date of birth

AFQT

education years/certification

A-school indicator

dependents

term of enlistment

type of enlistment

present pay grade

primary Navy enlisted classification

secondary Navy enlisted classification

active duty service date

pay entry base date

unit identification code

inter-service separation code

separation code Navy

loss date

reenlistment code

APPENDIX E

Identification of Job and Duty Assignment Variables

Job Assignment

1. Take PNEC (Primary Navy Enlisted Classification) and compare with NAVPERS 18068D.[a]

   a) if Navpers identifies as a specialist or analyst ---designate as SPEC
   b) if Navpers identifies as a 0000 or operator ---designate as NSPEC
   c) if Navpers identifies as a technician or welder or machinist---designate as Tech
   d) if Navpers identifies as blank or 9700 ---designate as Gen
   e) if Navpers idneifies as supply or yoeman or administrative---designate as Admin

2. Take DOC (Defense Occupation Code) compare with DOD 1312.1.[a]

   a) utilize same criteria as above.

Initial Duty Assignment

1. Take UIC and compare with NMPC (Navy Military Personnel Command) file.

   a) Activity is identified and assigned one of the following variables:

      1) ship
      2) shore
      3) aircraft squadron
      4) aircraft carrier
      5) other sea duty
      6) submarines

[a]NAVPERS 18068D gives Navy Enlisted Manpower and Personnel Classifications and Occupation Codes.
DOD 1312.1 is Occupation Conversion Manual for DOD.

APPENDIX F

1. Chi-square analysis-test of independence

a) expectancy table

f_t = the expected frequency for a cell

$\sum Row_i$ = total of the frequencies in the ith row

$\sum Column_j$ = total of the frequencies in the jth row

Grand Total = total of all frequencies in the table

$$(f_t)_{ij} = \frac{(\sum Row_i)(\sum Column_j)}{\text{Grand Total}}$$

(HAMBURG, 1970)

b) Chi-square-formula

χ^2 = chi-squre statistic

f_{oi} = observed frequency in the ith cell

f_{ti} = the expected frequency in the ith cell

$$\chi^2 = \sum_{i=1}^{I} \frac{(f_{oi} - f_{ti})^2}{f_{ti}}$$

(HOEL and JASSEN, 1977)

APPENDIX G

Formula for Testing Proportions

P_1 - sample proportion obtained from large samples

P_2 - sample proportion obtained from large samples (i.e., 30 or more)

N_1 - sample size

N_2 - sample size

$\overline{P}$ - estimate of population proportion p

$$\overline{P} = \frac{N_1P_1 + N_2P_2}{N_1 + N_2}$$

$$\sigma_{p_1-p_2} = \sqrt{\overline{p}(1-\overline{p})\left[\frac{1}{n_1} + \frac{1}{n_2}\right]}$$

z = a variable with unit normal distribution

$$z = \frac{p_1 - p_2}{\sigma_{p_1-p_2}}$$

(Spiegel, 1975)

APPENDIX H

Discriminant Analysis Results Between the PMU and Control Groups with the Variable STAY removed

FUNCTION	EIGENVALUE	PERCENT OF VARIANCE	CUMULATIVE PERCENT	CANONICAL CORRELATION
1*	1.33235	100.00	100.00	0.7558093

AFTER FUNCTION	WILKS' LAMBDA	CHI-SQUARED	D.F.	SIGNIFICANCE
0	0.4287523	8185.9	10	0.0

WILKS' LAMBDA (U-STATISTIC) AND UNIVARIATE F-RATIO
WITH 1 AND 9671 DEGREES OF FREEDOM

VARIABLE	WILKS' LAMBDA	F	SIGNIFICANCE
STAY	0.90042	1070.	0.0000
MG1	0.99646	34.36	0.0000
MG2	0.98324	164.9	0.0000
MG3L	0.99967	3.194	0.0740
MG3	0.87885	1333.	0.0
AGE17	0.69427	4259.	0.0000
AGE20	0.96777	322.1	0.0000
NWHITE	0.98876	109.9	0.0
LT12ED	0.99333	64.94	0.0
GT12ED	0.99408	57.58	0.0000
TIME	0.63152	5643.	0.0000
NDEPS	0.99104	87.45	0.0

ACTUAL GROUP		NO. OF CASES	PREDICTED GROUP MEMBERSHIP 1	2
GROUP	1	912	761 83.4%	151 16.6%
GROUP	2	8761	189 2.2%	8572 97.8%

PERCENT OF "GROUPED" CASES CORRECLTY CLASSIFIED: 96.49%

Table H-1

Discriminant Analysis Results for 1977 PMU vs Control Groups (without STAY variable in the discriminant function)

Table H-1 (continued)

Discriminant Function Coefficients

Variable	F-ratios[1]	Coefficients
MG2	2.96	.02572*
MG3L	17.73	-.06395**
MG4	368.96	-.26788**
Age 17	2424.50	-.63479**
Age 20	200.52	.21457**
NWHITE	68.19	-.11413**
LT12ED	119.75	.16006**
GT12ED	2.03	.02077*
TIME	4503.07	-.76338**
NDEPS	22.10	-.06442**

* Significant at .05 level.

** Significant at .01 level.

1 Degrees of Freedom: 10, 9662.

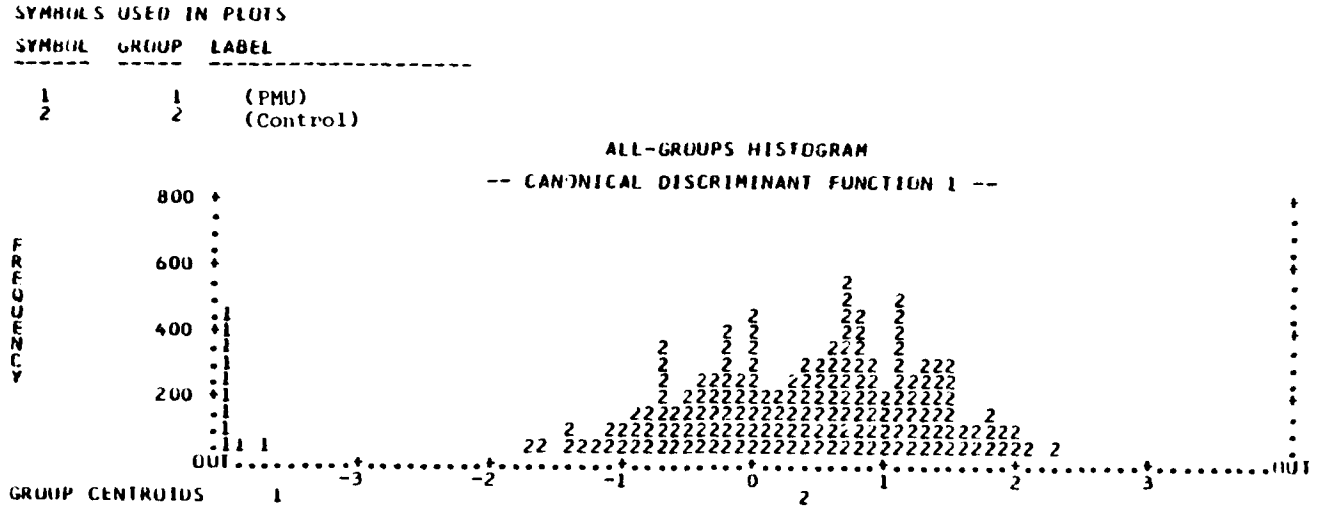

Figure H-1. Discriminant Analysis for 1977 PMU vs Control Groups (without STAY variable).

FUNCTION	EIGENVALUE	PERCENT OF VARIANCE	CUMULATIVE PERCENT	CANONICAL CORRELATION
1*	1.15553	100.00	100.00	0.7321732

AFTER FUNCTION	WILKS' LAMBDA	CHI-SQUARED	D.F.	SIGNIFICANCE
0	0.4639224	6712.7	10	0.0

WILKS' LAMBDA (U-STATISTIC) AND UNIVARIATE F-RATIO
WITH 1 AND 8745 DEGREES OF FREEDOM

VARIABLE	WILKS' LAMBDA	F	SIGNIFICANCE
STAY	0.93546	603.4	0.0000
MG1	0.99705	25.91	0.0000
MG2	0.98965	91.44	0.0000
MG3L	0.99809	16.74	0.0000
MG4	0.99338	58.23	0.0
AGE17	0.82999	1791.	0.0000
AGE20	0.98224	1581.	0.0000
NWHITE	0.99295	62.08	0.0000
LT12ED	0.96352	331.1	0.0
GT12ED	0.99293	62.29	0.0000
TIME	0.55602	6983.	0.0000
NDEPS	0.99038	84.90	0.0000

ACTUAL GROUP		NO. OF CASES	PREDICTED GROUP MEMBERSHIP 3	4
GROUP	3	1016	865 85.1%	151 14.9%
GROUP	4	7731	176 2.3%	7555 97.7%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 96.26%

Table H-2

Discriminant Analysis Results for 1978 PMU vs Control Groups (without STAY variable in the discriminant function)

Table H-2 (continued)

Discriminant Function Coefficients

Variable	F-ratios[1]	Coefficients
MG2	6.75	.04225**
MG3L	10.92	-.05383**
MG4	9.63	-.04748**
Age 17	980.20	-.46567**
Age 20	123.06	.17961**
NWHITE	77.87	-.13396**
LT12ED	4.10	.03197**
GT12ED	3.57	.02954*
TIME	6424.10	-.90968**
NDEPS	38.49	-.09190**

** Significant at .01 level.

1 Degrees of Freedom: 10, 8736.

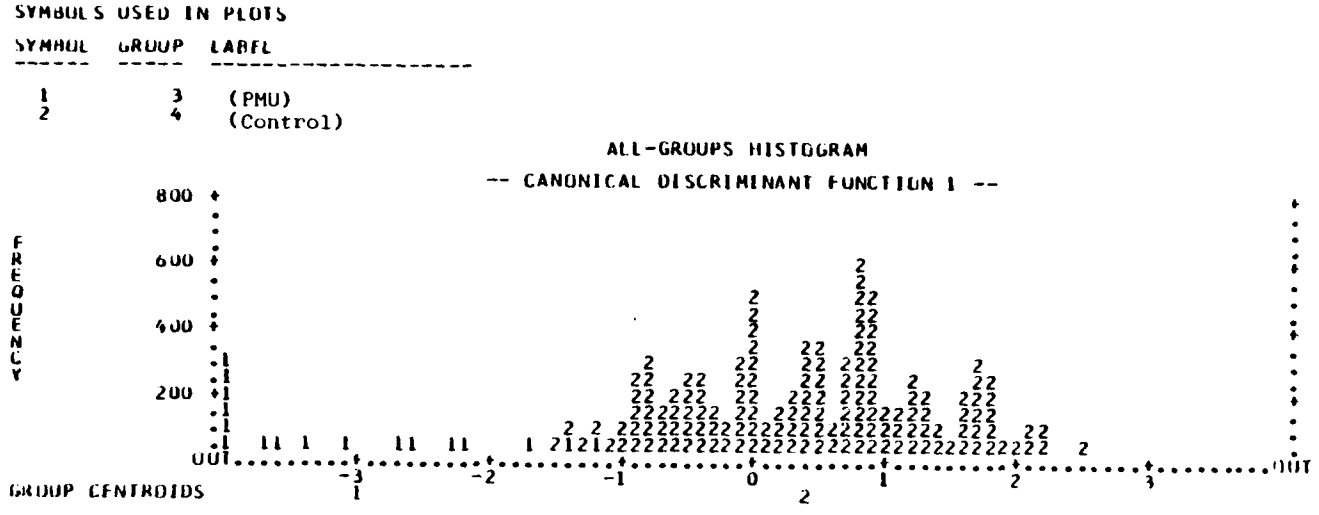

Figure H-2. Discriminant Analysis for 1978 PMU vs Control Groups (without STAY variable).

FUNCTION	EIGENVALUE	PERCENT OF VARIANCE	CUMULATIVE PERCENT	CANONICAL CORRELATION
1*	1.50475	100.00	100.00	0.7750859

AFTER FUNCTION	WILKS' LAMBDA	CHI-SQUARED	D.F.	SIGNIFICANCE
0	0.3992418	6146.8	9	0.0

WILKS' LAMBDA (U-STATISTIC) AND UNIVARIATE F-RATIO
WITH 1 AND 6699 DEGREES OF FREEDOM

VARIABLE	WILKS' LAMBDA	F	SIGNIFICANCE
STAY	0.88208	895.5	0.0000
MG1	0.99712	19.34	0.0000
MG2	0.99124	59.22	0.0000
MG3L	0.99224	52.42	0.0000
MG4	0.99839	10.82	0.0010
AGE17	0.91052	658.3	0.0000
AGE20	0.98968	69.86	0.0000
NWHITE	0.98978	69.18	0.0
LT12ED	0.98112	128.9	0.0000
GT12ED	0.99193	54.47	0.0000
TIME	0.45547	8009.	0.0
NDEPS	0.98246	119.6	0.0

ACTUAL GROUP		NO. OF CASES	PREDICTED GROUP MEMBERSHIP 5	6
GROUP	5	935	857 91.7%	78 8.3%
GROUP	6	5766	78 1.4%	5688 98.6%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 97.67%

Table H-3

Discriminant Analysis Results for 1979 PMU vs Control Groups (without STAY variable in the discriminant function)

Table H-3 (continued)

Discriminant Function Coefficients

Variable	F-ratios[1]	Coefficients
MG3L	62.36	-.13144**
MG4	7.47	-.04513**
Age 17	393.58	-.32882**
Age 20	181.14	.23127**
NWHITE	45.98	-.11339**
LT12ED	34.10	.10092**
GT12ED	9.59	.05168**
TIME	7777.80	-.97621**
NDEPS	65.24	.12698**

* Significant at .01 level.

1 Degrees of Freedom: 9, 6691.

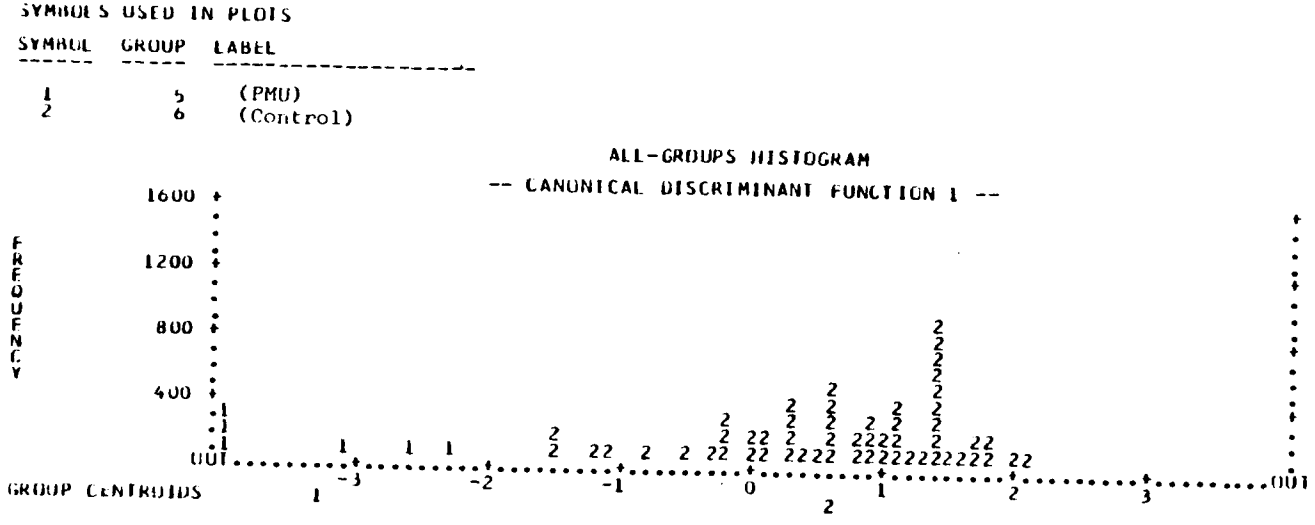

Figure H-3. Discriminant Analysis for 1979 PMU vs Control Groups (without STAY variable).

APPENDIX I

Statistical Formulae and Data used in Cohort Analyses

The eleven cohorts were formed by dividing the personnel into three-month groups. The group in which an individual was placed was dependent upon his base active duty service date, for example every person entering active duty between January 1977 and March 1977 was placed in cohort number 1. This was done for the base recruit population as well as the Positive Motivation Unit personnel.

A statistical analysis was performed on each cohort to determine the probability of attrition at quarterly intervals, the probability of survival at quarterly intervals, the conditional probability of attriting given length of service X, and the standard errors of those probabilities.

Variables

Let, X_i = the ith quarter of service

L_i = the number of personnel who attrite during the interval (X_i, X_{i+1})

Z_o = the number of personnel who enter service in the cohorts' initial quarter

Z_i = the number of personnel remaining in the cohort at the start of the ith quarter

C_i = $(X_{i+1} - X_i)$ (Bartholomew and Forbes, 1979)

Probability an entrant attrites during a unit interval (X_o, X_{i+1})

Let f_i = Pr(entrant attrites during an interval (X_i, X_{i+1})

$(i = 0,1,2,\ldots,K)$

Then

$$\hat{f}_i = L_i / C_i Z_o \quad (i = 0,1,2,\ldots,K)$$

if the group is homogeneous and behaves independently L_i is a binomial variable. Thus L_i has variance $Z_o \times f_i \times C_i \times (1 - f_i C_i)$ and hence

$$\text{var } (\hat{f}_i) = f_i (1 - c_i f_i) / c_i Z_o$$

the standard error of the estimator may thus be given by replacing f_i by $\hat{f}_i$ giving

$$\hat{se} (\hat{f}) = (L_i (1 - L_i / Z_o))^{1/2} \quad (i = 0,1,2,\ldots,k)$$

(Bartholomew and Forbes, 1979)

Survivability Function

Let, G_i = Pr(entrant survives to X_i)

Then

$$\hat{G}_i = Z_i / Z_o \quad (i = 1,2,\ldots,k)$$

and since Z_i is binomial the variance of G_i will be

$$\text{var } (\hat{G}_i) = Z_o \, G_i (1 - G_i) / Z_o$$

the standard error of the estimator may then be given by replacing the G_i with the $\hat{G}_i$ thus

$$\hat{se} (\hat{G}_i) = (\hat{G}_i (1 - \hat{G}_i) / Z_o)^{1/2} \quad (i = 1,2,3,\ldots,k)$$

(Bartholomew and Forbes, 1979)

Conditional Probability of leaving at Length of Service X

Let

$$q_i = \Pr(\text{entrant with length of service } X_i \text{ attrites before } X_i = 1)$$

Then

$$\hat{q}_i = L_i / C_i Z_i \quad (i = 1,2,3,\ldots,k)$$

since L_i and Z_i are both random variables the calculation of the standard error is difficult, but it seems more relevant to treat Z_i as given since the probability is only of real interest when the point X_i is reached and Z_i is known, under these conditions the binomial argument applies and

$$\hat{se}\ (\hat{q}_i) = (C_i\ \hat{q}_i\ (1 - C_i\ \hat{q}_i)/Z_i)^{1/2}/C_i$$

$$(i = 0,1,2,\ldots,k)$$

(Bartholomew and Forbes, 1979)

Table I-1

Wastage Analysis of PMU Cohort 1

Qtr	L_i	Z_i	f_i $L_i/c_i\ Z_o$	se(f_i)	G_i Z_i/Z_o	se(G_i)	q_i	se(q_i)
0	39	95	.411	.050	1.0000	0	.411	.050
1	13	56	.137	.035	.589	.050	.232	.056
2	6	43	.063	.025	.453	.051	.140	.053
3	4	37	.042	.021	.389	.050	.108	.002
4	4	33	.042	.021	.347	.049	.121	.057
5	2	29	.021	.015	.305	.047	.069	.047
6	3	27	.032	.018	.284	.046	.111	.060
7	2	24	.021	.015	.253	.045	.083	.056
8	4	22	.042	.021	.232	.043	.182	.082
9	1	18	.011	.010	.189	.040	.056	.037
10	0	17	----	----	.180	.039	----	----

Table I-2

Wastage Analysis of PMU Cohort 2

Qtr	L_i	Z_i	f_i	$se(f_i)$	G_i	$se(G_i)$	q_i	$se(q_i)$
0	52	127	.409	.005	1.0000	0	.409	.044
1	16	75	.126	.003	.591	.044	.213	.047
2	5	59	.039	.002	.465	.044	.084	.036
3	5	54	.039	.002	.425	.043	.093	.040
4	5	49	.039	.002	.386	.043	.102	.043
5	9	44	.071	.002	.346	.042	.205	.061
6	1	35	.008	.001	.276	.040	.028	.028
7	2	34	.016	.001	.268	.039	.059	.040
8	3	32	.024	.001	.252	.039	.034	.051
9	1	29	.008	.001	.228	.037	----	.034
10	--	28	----	----	.220	.037		----

Table I-3

Wastage Analysis of PMU Cohort 3

Qtr	L_i	Z_i	f_i	$se(f_i)$	G_i	$se(G_i)$	q_i	$se(q_i)$
0	123	296	.416	.028	1.000	0	.416	.029
1	30	173	.101	.017	.584	.028	.173	.029
2	3	143	.010	.006	.483	.029	.020	.012
3	7	140	.027	.009	.472	.029	.050	.018
4	10	133	.034	.011	.449	.029	.075	.023
5	12	123	.041	.011	.415	.028	.097	.027
6	8	111	.027	.009	.375	.028	.072	.025
7	4	103	.014	.007	.347	.027	.039	.019
8	1	99	.003	.003	.334	.027	.010	.010
9	---	98	----	----	.331	.027	----	----

Table I-4

Wastage Analysis of PMU Cohort 4

QTR	L_i	Z_i	f_i	$se(f_i)$	G_i	$se(G_i)$	q_i	$se(q_i)$
0	65	210	.310	.032	1.000	0	.310	.032
1	22	145	.105	.021	.690	.032	.152	.025
2	8	123	.038	.013	.585	.034	.065	.017
3	11	115	.052	.015	.547	.034	.096	.020
4	6	104	.029	.011	.495	.035	.058	.016
5	7	98	.033	.012	.466	.034	.071	.018
6	6	91	.029	.011	.433	.034	.066	.017
7	5	85	.024	.010	.404	.034	.059	.016
8	--	80	----	----	.381	.033	----	----

Table I-5

Wastage Analysis of PMU Cohort 5

QTR	L_i	Z_i	f_i	$se(f_i)$	G_i	$se(G_i)$	q_i	$se(q_i)$
0	43	133	.323	.041	1.0000	0	.323	.041
1	15	90	.113	.027	.677	.041	.167	.039
2	4	75	.030	.015	.564	.043	.053	.026
3	4	71	.030	.015	.534	.043	.056	.027
4	6	67	.045	.018	.504	.043	.089	.035
5	5	61	.038	.016	.458	.043	.082	.035
6	5	56	.038	.016	.421	.043	.089	.038
7	--	51	----	----	.383	.042	----	----

Table I-6

Wastage Analysis of PMU Cohort 6

0	52	159	.327	.037	1.0000	0	.327	.037
1	11	107	.069	.020	.673	.037	.103	.029
2	6	96	.038	.015	.604	.038	.063	.025
3	5	90	.031	.014	.566	.039	.055	.024
4	7	85	.044	.016	.535	.040	.082	.030
5	2	78	.013	.008	.490	.040	.026	.018
6	--	76	----	----	.478	.040	----	----

Table I-7

Wastage Analysis of PMU Cohort 7

QTR	L_i	Z_i	f_i	$se(f_i)$	G_i	$se(G_i)$	q_i	$se(q_i)$
0	99	262	.378	.030	1.0000	0	.378	.030
1	21	163	.080	.017	.622	.038	.129	.026
2	5	142	.019	.008	.542	.042	.035	.015
3	7	137	.027	.010	.523	.043	.051	.019
4	7	130	.027	.010	.496	.044	.054	.020
5	--	123	----	----	.469	.045	----	----

Table I-8

Wastage Analysis of PMU Cohort 8

0	85	182	.467	.037	1.0000	0	.467	.037
1	7	97	.038	.014	.533	.037	.072	.026
2	9	90	.049	.016	.495	.037	.100	.032
3	3	81	.016	.009	.445	.037	.037	.021
4	--	78	----	----	.429	.036	----	----

Table I-9

Wastage Analysis of PMU Cohort 9

0	51	155	.329	.038	1.0000	0	.329	.038
1	18	104	.116	.026	.671	.038	.173	.037
2	0	86	0	0	.555	.040	0	0
3	--	86	----	----	.555	.040	----	----

Table I-10

Wastage Analysis of PMU Cohort 10

QTR	L_i	Z_i	f_i	$se(f_i)$	G_i	$se(G_i)$	q_i	$se(q_i)$
0	55	145	.379	.040	1.0000	0	.379	.040
1	6	90	.041	.017	.620	.040	.067	.026
2	--	84	----	----	.579	.041	----	----

Table I-11

Wastage Analysis of PMU Cohort 11

0	48	262	.183	.024	1.0000	0	.183	.024
1	--	214	----	----	.817	.024	----	----

Table I-12

Wastage Analysis of Control Cohort 1

0	1	1862	.001	.001	1.000	0	.001	.001
1	5	1861	.003	.001	.999	.001	.003	.001
2	44	1856	.024	.004	.997	.001	.024	.004
3	58	1812	.031	.004	.973	.004	.032	.004
4	66	1754	.035	.004	.941	.005	.038	.005
5	52	1688	.028	.004	.900	.007	.031	.004
6	39	1636	.021	.003	.878	.008	.024	.004
7	55	1597	.029	.004	.857	.008	.034	.005
8	33	1542	.018	.003	.828	.009	.021	.004
9	32	1509	.017	.003	.810	.009	.021	.004
10	7	1477	.004	.002	.793	.009	.005	.002
11	--	1470	----	----	.789	.009	----	----

Table I-13

Wastage Analysis of Control Cohort 2

Qtr	L_i	Z_i	f_i	se(f_i)	G_i	se(G_i)	q_i	se(q_i)
0	1	1721	.001	.001	1.000	0	.001	.001
1	32	1720	.019	.003	.999	.001	.019	.003
2	34	1688	.020	.003	.981	.003	.020	.010
3	68	1654	.040	.005	.961	.005	.041	.005
4	41	1596	.024	.004	.922	.006	.026	.004
5	50	1545	.029	.004	.897	.007	.032	.004
6	27	1495	.016	.003	.868	.008	.018	.003
7	45	1468	.026	.004	.853	.009	.031	.005
8	36	1423	.021	.003	.827	.009	.025	.004
9	6	1387	.003	.001	.806	.010	.004	.002
10	--	1381	----	----	.802	.010	----	----

Table I-14

Wastage Analysis of Control Cohort 3

0	155	3209	.048	.004	1.000	0	.048	.004
1	72	3054	.022	.002	.952	.004	.024	.003
2	87	2982	.027	.003	.929	.005	.029	.003
3	94	2895	.028	.003	.902	.005	.032	.003
4	81	2801	.025	.003	.873	.006	.029	.003
5	66	2721	.021	.003	.847	.006	.024	.003
6	75	2654	.023	.003	.827	.007	.028	.003
7	64	2579	.020	.002	.804	.007	.025	.003
8	12	2515	.004	.001	.784	.007	.005	.001
9	---	2503	----	----	.779	.007	----	----

Table I-15

Wastage Analysis of Control Cohort 4

Qtr	L_i	Z_i	f_i	$se(f_i)$	G_i	$se(G_i)$	q_i	$se(q_i)$
0	140	1920	.073	.006	1.000	0	.073	.006
1	61	1780	.032	.004	.927	.006	.034	.004
2	68	1719	.035	.004	.895	.007	.040	.005
3	54	1651	.028	.004	.860	.008	.033	.004
4	47	1597	.024	.004	.832	.009	.029	.004
5	57	1550	.030	.003	.807	.009	.037	.005
6	86	1493	.045	.005	.778	.009	.058	.006
7	9	1407	.005	.002	.733	.010	.006	.002
8	---	1398	----	----	.728	.010	----	----

Table I-16

Wastage Analysis of Control Cohort 5

0	182	1666	.109	.008	1.000	0	.109	.008
1	50	1484	.030	.004	.891	.008	.034	.005
2	44	1434	.026	.004	.861	.008	.031	.005
3	35	1390	.021	.004	.834	.009	.025	.004
4	39	1355	.023	.004	.813	.010	.029	.005
5	43	1361	.026	.004	.789	.010	.033	.005
6	10	1273	.006	.002	.764	.010	.008	.002
7	---	1263	----	----	.758	.010	----	----

Table I-17

Wastage Analysis of Control Cohort 6

Qtr	L_i	Z_i	f_i	se(f_i)	G_i	se(G_i)	q_i	se(q_i)
0	179	1731	.103	.007	1.000	0	.103	.007
1	41	1552	.024	.004	.897	.007	.026	.004
2	50	1511	.029	.004	.873	.008	.033	.005
3	51	1461	.029	.004	.844	.009	.035	.005
4	49	1410	.028	.004	.815	.009	.035	.005
5	9	1361	.005	.002	.786	.010	.007	.002
6	---	1352	----	----	.781	.010	----	---

Table I-18

Wastage Analysis of Control Cohort 7

0	297	2723	.109	.006	1.000	0	.109	.006
1	59	2426	.022	.003	.891	.006	.024	.003
2	79	2367	.029	.003	.869	.006	.033	.004
3	81	2288	.030	.840	.007	.035	.004	
4	12	2207	.004	.001	.810	.008	.005	.002
5	---	2195	----	----	.806	.008	----	----

Table I-19

Wastage Analysis of Control Cohort 8

0	213	1611	.132	.008	1.000	0	.132	.008
1	52	1398	.032	.004	.868	.008	.037	.005
2	38	1346	.024	.004	.836	.009	.028	.004
3	10	1308	.006	.002	.812	.010	.008	.002
4	---	1298	----	----	.806	.010	----	----

Table I-20

Wastage Analysis of Control Cohort 9

Qtr	L_i	Z_i	f_i	se(f_i)	G_i	se(G_i)	q_i	se(q_i)
0	211	1655	.127	.008	1.000	0	.127	.008
1	52	1444	.031	.004	.873	.008	.036	.005
2	16	1392	.010	.002	.841	.09	.011	.003
3	---	1376	----	----	.831	.009	----	----

Table I-21

Wastage Analysis of Control Cohort 10

0	181	1529	.118	.008	1.000	0	.118	.008
1	3	1348	.002	.001	.882	.008	.002	.001
2	---	1345	----	----	.879	.008	----	----

Table I-22

Wastage Analysis of Control Cohort 11

0	124	2359	.053	.005	1.000	0	.053	.005
1	---	2235	----	----	.947	.005	----	----

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APPENDIX J

Creation of Screening Tables

Variables

N_i = number of personnel for a category surviving to the end of the ith period. (i = 6, 12, 18 months)

X_i = total number of personnel for a category commencing at period 0 who would have been eligible to have survived to the of the period i (= 6, 12, 18 months)

Z_i = the survival rate for a category at the end of period i. (i = 6, 12, 18, months)

MG 1-2----------those persons having an AFQT above 64.

MG 3U----------those persons having an AFQT between 49-65.

MG 3L----------those persons having an AFQT below 49.

age 17----------those persons having ages below 18 years at entry.

age 18-19----------those persons having ages 18 or 19 at entry.

age 20----------those persons having ages above 19 years at entry.

majority----------caucasians

minority----------non-caucasians

High school graduates-------all diploma graduates of high school

non-high school graduates---all persons, including GED, not possessing a high school diploma

categories of personnel

MG 1-2 / majority / NHS / ≤ 17

MG 1-2 / majority / NHS / 18-19

MG 1-2 / majority / NHS / ≥ 20

MG 1-2 / minority / NHS / ≤ 17

MG 1-2 / minority / NHS / 18-19

MG 1-2 / minority / NHS / ≥ 20

MG 1-2 / majority / HS / ≤ 17

MG 1-2 / majority / HG / 18-19

MH 1-2 / majority / HS / ≥ 20

MG 1-2 / minority / HS / ≤ 17

MH 1-2 / minority / HS / 18-19

MG 1-2 / minority / HS / ≥ 20

MG 3U / majority / NHS / ≤ 17

MG 3U / majority / NHS / 18-19

MG 3U / majority / NHS / ≥ 20

MG 3J / minority / NHS / ≤ 17

MG 3U / minority / NHS / 18-19

MG 3U / minority / NHS / ≥ 20

MG 3U / majority / HS / ≤ 17

MG 3U / majority / HS / 18-19

MG 3U / majority / HS / ≥ 20

MG 3U / minority / HS / ≤ 17

MG 3U / minority / HS / 18-19

MG 3U / minority / HS / ≥ 20

categories of personnel

MG 3L / majority / NHS / $\leq$ 17

MG 3L / majority / NGS / 18-19

MG 3L / majority / NHS / $\geq$ 20

MG 3L / minority / NHS / $\leq$ 17

MG 3L / minority / NHS / 18-19

MG 3L / minority / NHS / $\geq$ 20

MG 3L / majority / HS / $\leq$ 17

MG 3L / majority / HS / 18-19

MH 3L / majority / HS / $\geq$ 20

MG 3L / minority / HS / $\leq$ 17

MG 3L / minority / HS / 18-19

MG 3L / minority / HS / $\geq$ 20

Survival Rate for a Category

$$Z_i = N_i/X_i$$

APPENDIX K

Means and Standard Deviations Obtained from Regression Equations

Standard Demographic Variables in Table 29

	PMU (70%)		Control (100%)	
	Means	Standard Deviations	Means	Standard Deviations
Stay	.4329	.4956	.8118	.3908
MG1	.0200	.1399	.0600	.2375
MG2	.1312	.3377	.2923	.4551
MG3L	.3117	.4633	.2468	.4312
MG4	.1890	.3916	.0509	.2197
Age 17	.4988	.5001	.0672	.2504
Age 20	.1411	.3483	.3427	.4746
NWhite	.2948	.4560	.1687	.3745
LT12ED	.4643	.4989	.2790	.4485
GT12ED	.0100	.0994	.0735	.2610
Time (days)	707.2743	288.9542	500.8246	287.3522
NDeps	.9531	.2114	.8643	.3425

Appendix K (continued)

Demographic with Initial Duty Variables in Table 34

	PMU (70%)		Control (100%)	
	Means	Standard Deviations	Means	Standard Deviations
Stay	.4329	.4956	.8118	.3908
MG1	.0200	.1399	.0600	.2375
MG2	.1312	.3377	.2928	.4551
MG3L	.3117	.4633	.2468	.4312
MG4	.1890	.3916	.0509	.2197
Age 17	.4988	.5001	.0672	.2504
Age 20	.1411	.3483	.3427	.4746
NWhite	.2946	.4560	.1687	.3745
LT12ED	.4643	.4989	.2790	.4485
GT12ED	.0100	.0994	.0735	.2610
Time (days)	707.2743	288.9542	500.8246	287.3522
NDeps	.9531	.2114	.8643	.3425
SHIP	.1476	.3548	.2360	.4246
SUB	.0085	.0917	.0301	.1707
CEA	.0085	.0917	.0237	.1520
CV	.0524	.2228	.0802	.2715
AC	.0339	.1811	.0768	.2663

Appendix K (continued)

Standard Demographic and Situational Variables in Table 39

	PMU(70%)		Control (100%)	
	Means	Standard Deviations	Means	Standard Deviations
Stay	.4329	.4956	.8118	.3908
MG1	.0200	.1399	.0600	.2375
MG2	.1312	.3377	.2928	.4551
MG3L	.3117	.4633	.2468	.4312
MG4	.1890	.3916	.0509	.2197
Age 17	.4988	.5001	.0672	.2504
Age 20	.1411	.3483	.3427	.4746
NWhite	.2948	.4560	.1687	.3745
LT12ED	.4643	.4989	.2790	.4485
GT12ED	.0100	.0994	.0735	.2610
Time (days)	707.2743	288.9542	500.8246	287.3522
NDeps	.9531	.2114	.8643	.3425
Spec	.0444	.2060	.0947	.2928
NSpec	.0219	.1465	.4647	.4988
Admin	.0249	.1560	.0509	.2199
Tech	.0838	.2771	.2338	.4233
Ship	.1476	.3548	.2360	.4246
Sub	.0085	.0917	.0301	.1707
Cea	.0085	.0917	.0237	.1520
Cv	.0524	.2228	.0802	.2715
Ac	.0339	.1811	.0768	.2663

REFERENCES

America's Volunteers: A Report on the All-Volunteer Armed Forces, Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics). Washington, D.C.: December, 1978.

Bartholomew, D.J., and Forbes, A.F. Statistical Techniques for Manpower Planning. Norwich, V.K.: Page Bros LTD, 1979.

Bellante, D., and Jackson, M. Labor Economics, Choice in Labor Markets. New York, N.Y.: McGraw-Hill, Inc., 1979.

Bent, D.H., and Hull, C.H., and Jenkins, J.G., and Nie, N.H., Steinbrenner, K. Statistical Package for the Social Sciences 2nd ed. New York, N.Y.: McGraw-Hill, 1975.

Defense Manpower Commission, Defense Manpower: The Keystone of National Security. Washington, D.C.: Government Printing Office, 1976.

Grinold, R.C., and Marshall, K.T. Manpower Planning Models. New York, N.Y.: Elsevier North-Holland, 1977.

Hamburg, M. Statistical Analysis for Decision Making. New York, N.Y.: Harcourt, Brace, and World, Inc., 1970.

Hand, R.H., and Griffeth, R.W., and Mobley, W.H. Military Enlistment, Reenlistment and Withdrawal Research: A Critical Review of the Literature. Center of Management and Organizational Research, University of South Carolina. Columbia, S.C.: December, 1977.

Hawkins, S.G. RTC Credo, Initial Assessment. (M.S. Thesis) Monterey, Ca.: Naval Postgraduate School, June 1980.

Hoel, P.G., and Jessen, R.J. Basic Statistics for Business and Economics, 2nd ed. New York, N.Y.: John Wiley and Sons, 1977.

Lau, A.W. Personnel and Organizational Determinants of Enlisted Attrition. (NPRDC Tech Rep. 79-11) San Diego, Ca.: Navy Personnel Research and Development Cetner, March, 1979.

Lockman, R.F. "A Model for Estimating Premature Losses." In R.V.L. Cooper (Ed), Defense Manpower Policy: Presentations from the 1976 Rand Conference on Defense Manpower. Santa Monica: Rand, 1969.

Lockman, R.F. Success Chances of Recruits Entering the Navy (Screen). (CNS 1086). Arlington, VS.: Center for Naval Analyses, February, 1977.

Navy Enlisted Manpower and Personnel Classifications and Occupation Standards. (NAVPERS 18068D) Chief of Naval Personnel. Washington, D.C.: September, 1975.

Occupation Conversion Manual, enlisted/officer/civilian. Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics). Washington, D.C.: December, 1977.

Plag, J.A., and Goffman, J.M., and Phelan, J.D. Predicting the Effectiveness of New Mental Standards Enlistees in the U.S. Marine Corps. TR 71-42, San Diego, CA.: Navy Neuropsychiatric Research Unit. December, 1970.

Smith, J.V., and Kendall, W.A. Personal, Situational, and Organizational Determinants of Navy Enlisted Attrition. (M.S. Thesis) Monterey, CA.: Naval Postgradute School, June 1980.

Special Training Division Instructions (RTC GLAKES 1510.7C). Commanding Officer Recruit Training Center, Great Lakes, Illinois. Chicago, Ill: 1977.

Spiegel, M.R. Probability and Statistics. New York, N.Y.: McGraw-Hill, 1975.

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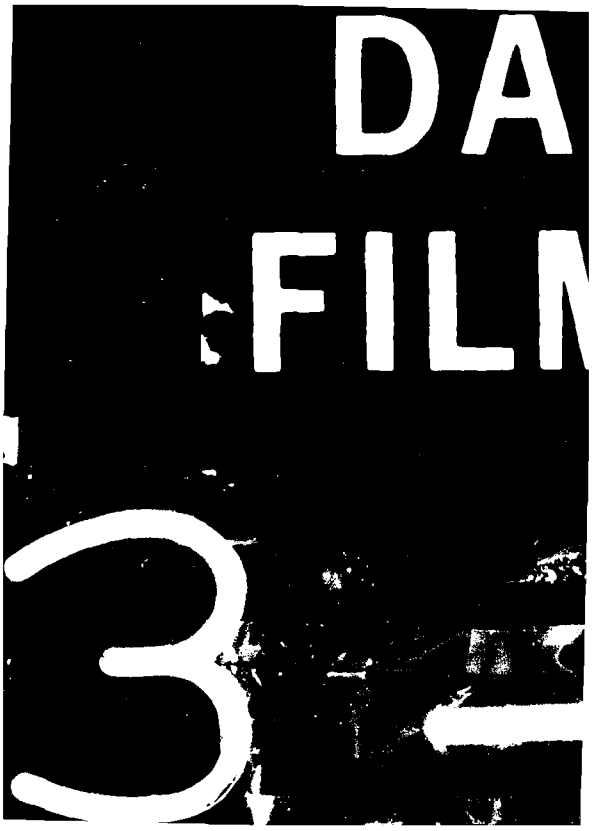
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