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April 1973

A MULTIVARIATE COMPARISON OF DRUG USERS AND NON-USERS

Arthur C. F. Gilbert, Ph.D.
John F. Mazzuchi, Ph.D.

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Work Unit No.
(PF55.521.001.02.17)

Arthur C. F. Gilbert, Ph.D.
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WASHINGTON, D. C. 20374

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FOREWORD

This report is based on portions of a program presented by Arthur C. F. Gilbert, Ph.D. (Program Chairman), Arnold J. Gelfman and John F. Mazzuchi, Ph.D. at the National Convention of the American Personnel and Guidance Association, San Diego, California, February 1973.

The authors are indebted to Mr. Thomas E. Schering for his invaluable assistance and suggestions in the analysis of the data and to Mr. Bernard A. Rafacz for his critical reading of the manuscript.

SUBMITTED BY

PAUL P. FOLEY

Director, Personnel Measurement Research Division

APPROVED BY

E. M. RAMRAS

Acting Director, Psychological Research Department

ALVA L. BLANKS
Captain, U. S. Navy
Commanding Officer

EUGENE M. RAMRAS
Technical Director

SUMMARY

Problem

According to the findings of the National Commission on Marijuana and Drug Abuse, a greater percentage of 12 to 17 year olds use drugs than those 18 and older. The military, then, can expect to draw into service in the near future an increasing number of individuals who have used drugs for recreational purposes. Findings from a recent survey of drug use in the military indicate that the Navy has already begun to feel the rise in illicit drug use among young people. Although some demographic information concerning the drug user in the Navy has been uncovered, little is yet known about the pattern of drug use, the severity of the drug problem, or the possibility of predicting drug abuse on the basis of the serviceman's records. In order to learn more about these areas, all available information relating to the drug problem must be examined.

Approach

Subjects were selected from the enlisted personnel applying for amnesty under the Navy's Drug Exemption Program. Data were obtained on: all combinations of drug types reported; drug types reported by each pay grade; applicants declared drug dependent and requiring detoxification; and, Medical Officer's recommendation by drug type reported, by pay grade, and by month of application. An effort was also made to differentiate between drug users and non-users on the basis of cognitive variables by discriminant analysis, a technique which utilizes all variables under study for prediction of group membership and for determining the degree of predictive effectiveness of such a scheme. To implement this effort a random sample was selected from the Enlisted Loss File, 1,000 for those receiving an honorable discharge and 1,000 for those receiving a drug related discharge during a three year period just prior to the establishment of the Exemption Program. A cross-validation sample of 2,000 was selected in the same manner.

Findings

More than 86 percent of the Exemption applicants reported using a combination of drug types.

The two most frequently used combinations of drug types were Cannabis and Hallucinogens, and Cannabis, Amphetamines and Hallucinogens.

Almost 30 percent of the Exemption applicants reported using a combination of drug types that included the Opiates.

Only 5 1/2 percent of the Exemption applicants were evaluated as drug dependent.

Only 3 percent of the Exemption applicants were evaluated as requiring drug detoxification.

Almost 90 percent of those reporting the use of Cannabis reported using at least one other drug type.

The greatest percentage of applicants recommended for discharge by the Medical Officer reported using Hallucinogens.

As the Exemption Program developed over the first six months, more applicants were recommended for treatment and for discharge.

Drug users were younger, held the lower pay grades, had fewer years of military service and had a lower level of education than servicemen not reporting illicit drug use.

The results of the discriminant analysis indicated that five of the cognitive variables were of statistical significance in differentiating between those who received drug related discharges and those who received favorable discharges. However, the resulting classification scheme favored misclassification approximately one-third of the time. Further application of the discriminant analysis to this problem should focus on factors more directly related to drug involvement such as personality attributes and other psychosocial attributes.

Recommendations

From these findings there appears to be a marked tendency to recommend for discharge those individuals who become involved with hallucinogenic substances more than with other drug types. Investigation needs to be focused on those properties of hallucinogens which seem to have a deleterious effect on the performance of specific occupational fields within the military setting.

A study needs to be made of those who were actually discharged from the Navy after applying for Exemption. The purpose of this study would be to compare these applicants to those not discharged on type of drugs used, medical recommendations, pay grade, and other variables available on service personnel.

Since cognitive variables are not efficient predictors of drug involvement more relevant factors need to be explored; this work is currently in progress.

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TABLE OF CONTENTS

	Page
FOREWORD	ii
SUMMARY	iii
Use and Evaluation Form	--
LIST OF TABLES	viii
INTRODUCTION	1
Problem	1
Purpose	1
Background	2
METHOD	3
Selection of Subjects	3
Variables Studied	4
Statistical Analysis	5
RESULTS	6
Exemption Data	6
Comparison Data	17
DISUCSSION AND CONCLUSIONS	26
REFERENCES	30
DISTRIBUTION LIST	33

LIST OF TABLES

		Page
1	REPORTED DRUG TYPE COMBINATIONS.	8
2A	RELATIONSHIP BETWEEN DRUG TYPE REPORTED AND PAY GRADE.	11
2B	PERCENTAGE OF DRUG USE REPORTED AT EACH PAY GRADE IN SAMPLE COMPARED TO THE PERCENTAGE HOLDING EACH PAY GRADE IN TOTAL ENLISTED ACTIVE DUTY POPULATION . .	12
3	RELATIONSHIP BETWEEN DRUG TYPE REPORTED AND MONTH OF APPLICATION FOR EXEMPTION	13
4	RELATIONSHIP BETWEEN DRUG DEPENDENCY AND RECOMMENDED DRUG DETOXIFICATION	15
5	RELATIONSHIP BETWEEN MEDICAL OFFICER'S RECOMMENDATION AND DRUG TYPE REPORTED	16
6	RELATIONSHIP BETWEEN MEDICAL OFFICER'S RECOMMENDATION AND PAY GRADE	18
7	RELATIONSHIP BETWEEN MEDICAL OFFICER'S RECOMMENDATION AND MONTH OF APPLICATION FOR EXEMPTION.	19
8	MEANS AND STANDARD DEVIATIONS FOR THOSE RECEIVING DRUG RELATED DISCHARGES AND THOSE RECEIVING FAVORABLE DISCHARGES IN THE INITIAL VALIDATION GROUP AND IN THE CROSS-VALIDATION GROUP FOR THE FOURTEEN VARIABLES UNDER STUDY	20
9	SUMMARY TABLE.	22
10	DISCRIMINANT EQUATIONS FOR THE INITIAL VALIDATION SAMPLE AND THE CROSS-VALIDATION SAMPLE.	24
11	PREDICTION OF GROUP MEMBERSHIP BASED ON THE DIFFERENT COMBINATIONS OF VARIABLES AT EACH STEP . . .	25

INTRODUCTION

Problem

According to the findings of the National Commission on Marijuana and Drug Abuse, a greater percentage of 12 to 17 year olds use every major drug with the exception of marijuana than those 18 and older.[1] If these findings are accurate, the military can expect in the near future to draw into service an ever increasing number of people who have used drugs for recreational purposes. There is some evidence that the Navy has already begun to feel the effect of the rise in illicit drug use among adolescents. Findings of the Survey of Navy Drug Usage indicated that approximately 19 percent of the respondents reported using drugs illicitly and that more than 40 percent of those classified as frequent drug users reported using drugs while on duty. In addition to estimating the scope of the drug problem among enlisted Naval personnel, evidence from this survey indicated that the majority of drug users were found in the lower pay grades, were younger and tended to use a variety of drug types.[2] Although some demographic information concerning the drug user in the Navy has been provided by the Survey of Navy Drug Usage, many questions concerning both the characteristics of the drug user and the reaction of the Navy to drug abuse remain unanswered. In order to gain a more complete understanding of both the scope and the nature of the drug problem within the Navy, all available information relating to this area must be examined.

Purpose

From the findings of the Survey of Navy Drug Usage, it is apparent that the Navy has felt the results of the increase in drug abuse among adolescents during the past decade. Data gathered from the Exemption programs and from the Enlisted Loss File[3] presented an opportunity to learn more about the drug abuser, the severity of his drug problem, and his preference of drug types. In addition, these data revealed

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[1]National Commission of Marijuana and Drug Abuse, Report For Release, May 10, 1972, Washington, D. C.

[2]Arnold Gelfman and Arthur C. F. Gilbert. Survey of Navy Drug Usage. Work Unit PF55.521.001.02.17. Naval Personnel Research and Development Laboratory, Washington, D. C.

[3]Information in the Enlisted Loss File is taken from the serviceman's Enlisted Master Magnetic Tape Record after separation from the Navy.

the opinion of Medical Officers on the desirability of recommending those seeking help with a drug problem to continued military service.

Data gathered on those discharged from the Navy for drug involvement prior to the Exemption program presented an opportunity to determine if known drug abusers could be differentiated from those receiving honorable discharges on the basis of cognitive and demographic variables. If a clear and meaningful pattern did emerge, then the Navy could minimize its drug problem by more careful screening methods.

It was the purpose, then, of this study to describe the pattern of drug types reported by enlisted personnel applying for Exemption and to present the types of disposition recommended by the Medical Officer during the first six full months of the program's operation. It was also the purpose of this study to determine if those individuals who became involved with drugs could be differentiated from those who did not on the basis of cognitive and certain demographic variables.

Background

In July, 1971, the Department of the Navy initiated the Drug Exemption Program, a procedure for the voluntary disclosure of drug abuse which the Navy hopes will prove to be an effective method of reducing and eventually eliminating drug abuse among Naval personnel. Exemption is defined as the withholding of disciplinary action under the Uniform Code of Military Justice and the withholding of separation from Naval service with a discharge under other than honorable conditions. Exemption does not include protection from modification of security clearance, duty assignment, flight status, or other personnel and/or administrative action including investigation of criminal activity.

Under the terms of the program, Naval personnel may qualify for Exemption only if they meet certain specified conditions. The program is applicable to those instances of drug use and possession for personal use revealed through a member's voluntary disclosure at the time of request for Exemption. The applicant, however, must make a serious attempt to eliminate his drug problem, and Exemption can be granted only once. Exemption may also be extended to one identified as a drug user through an approved testing program or through the Exemption disclosure of another provided that the person applies for Exemption within 24 hours after being notified that his name has been given.

Under the procedure for administration of the Exemption Program, each Commanding Officer must designate one or more Exemption representatives. This representative cannot be a chaplin, medical officer,

legal officer, discipline officer, a member of the Naval Investigative Service, or one whose primary duty is the detection and investigation of criminal offenses. The Exemption declaration is valid only if made to the Exemption representative who must advise the applicant of the program's scope and limits prior to his disclosure. At the time of disclosure, the representative will prepare a grant of Exemption to be signed by both the representative and the applicant.[4]

Specifications of the disclosure require the applicant to reveal every drug type used as well as the period of time of his drug use. Such disclosure is not considered privileged information and the Exemption grant does not protect the applicant from prosecution in other jurisdictions. Those given an Exemption grant must undergo a medical examination and treatment if it is required. Guidance and counseling, spiritual assistance, and those rehabilitation activities that are feasible are provided at the command level; additional care at a United States Naval Drug Rehabilitation Center is also available if needed. In the event of administrative processing for separation, the grant of Exemption and the disclosure preceeding the grant may be considered only for the purpose of deciding whether the applicant should be retained or separated from the Navy. The grant of Exemption may not be used as a basis for characterizing the type of service discharge.[5]

Several attempts have been made to describe drug users on the basis of certain demographic variables. Few studies, however, have sought to describe the drug user on the basis of both demographic and cognitive variables since information concerning drug involvement is usually collected through methods by which the anonymity of the respondent is assured, making it impossible to gather necessary information on the respondent's ability and aptitudes. Data gathered from the Exemption Program and from the Enlisted Loss File had no such limitation.

METHOD

Selection of Subjects

Information on all enlisted personnel applying for the Exemption Program during the first six full months of its operation (October 1971 through March 1972) was gathered from the Performance Evaluation Branch of the Enlisted Performance Division of the Bureau of Naval Personnel, Washington, D. C.

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[4]SECNAV INSTRUCTION 6710.2. Department of the Navy, Office of the Secretary, Washington, D. C. 9 July 1971.

[5]BUPERSNOTE 6710. Department of the Navy, Bureau of Naval Personnel, Washington, D. C. 10 August 1971.

Data were also obtained on 1,000 randomly selected Navy enlisted personnel who were discharged from the Navy because of drug involvement during the 1969, 1970, and 1971 fiscal years. These data were obtained for those individuals whose separation from the Navy was designated by a special code that indicated drug involvement for that period. In other words, data were obtained for those Navy enlisted personnel who received drug related discharges during the three fiscal years immediately prior to the initiation of the Drug Exemption Program.

The records of a randomly selected sample of 1,000 Navy enlisted personnel who received honorable discharges during the same fiscal years were obtained and who did not continue naval service. Excluded from this sample were the records of those personnel who received discharges from the Navy because of medical or administrative reasons. Also excluded from the sample were the records of those personnel who received honorable discharges but whose records carried a code that indicated that the primary reason for discharge was the inability to adapt to Navy life because of personality or other attributes. All of the initial statistical analyses were performed on the data obtained from the records of these 2,000 cases which will hereafter be referred to as the initial validation sample.

Another 1,000 cases were randomly selected from the records of those individuals who received drug related discharges during the same time period less the 1,000 cases in the initial validation sample. In a similar fashion another 1,000 cases were selected from the records of those who received favorable discharges again less the 1,000 cases comprising the initial validation sample from this group. This sample will be referred to as the cross-validation sample in subsequent sections of this report.

Variables Studied

Data from the Exemption application itself consisted of the following information for each applicant: name, service number, pay grade and self-reported drug type used. Supplementary documents sent to the Bureau with each Exemption application provided the following additional information: determination of the need for drug detoxification, declaration of degree of drug dependence, and, the Medical Officer's recommendations for treatment and disposition. During the first six full months of the program, 5,295 enlisted personnel applied for Exemption. Data concerning the drug types reported were available on the entire population; data yielding information on all of the variables to be studied were available on more than 92 percent of the population.

Data were obtained for those who received drug related discharges and for those who received favorable discharges in both the initial validation sample and in the cross-validation sample on fourteen variables. The variables were age, length of service, years of education, pay grade, number of enlistments, Armed Forces Qualification Test Score, General Classification Test Score, Arithmetic Test Score, Mechanical Test Score, Clerical Aptitude Test Score, Shop Practices Test Score, Sonar Pitch Memory Test Score, Radio Code Aptitude Test Score, and Electronics Technician Test Score.

Statistical Analysis

To implement the purpose of the study, frequency and percentage distributions were tabulated for each of the following variables: all combinations of drug types reported; drug types reported by enlisted pay grade; drug types reported by month of application for Exemption; applicants declared drug dependent and recommended for drug detoxification; Medical Officer's recommendation by enlisted pay grade; and, Medical Officer's recommendation by month of application for Exemption.

Nine of the fourteen variables studied on the dischargees dealt with the cognitive life style of the individual. These are the last variables mentioned, in other words, the Armed Forces Qualification Test Score and the eight scores of the Basic Test Battery. Since a considerable number of the AFQT scores were missing, the comparison of the two groups will be made only on the basis of the Basic Test Battery scores. The comparison between the two groups was accomplished by discriminant analysis which provides a technique that utilizes all variables under study for prediction of groups membership and determines the degree of predictive effectiveness of such a scheme.

The discriminant analysis technique was originated by Fisher[1] in the form of the discriminant function. The technique is discussed at

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[1]R. A. Fisher. "The Use of Multiple Measurements in Taxonomic Problems." Annals of Eugenics, 1936, 7:179-188.

length by Wert, Neidt and Ahmann[2], Anderson[3], Rao[4,5], and Rulon, et al[6], Tatsuoka[7], among others. This technique was used for prediction of success in engineering at Princeton University by Gilbert[8,9] and for the problem of assignment of students to different levels of Chemistry courses, also at Princeton, by Rusten and Gilbert[10].

RESULTS

Exemption Data

In Table 1 the frequencies and percentages of all possible combinations of drug types reported by Exemption applicants are presented. Results of the analysis revealed that more than 86 percent of those applying for Exemption during the first six months of the program reported using a combination of drug types rather than one type only. Of the multiple drug users, 30 percent reported using drug types that included the Opiates. The most prevalent combinations of reported

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[2]J. E. Wert, et al. Statistical Methods in Education and Psychological Research. New York: Appleton-Century-Crafts, 1954.

[3]T. W. Anderson. An Introduction to Multivariate Statistical Analysis. New York: Wiley, 1958.

[4]C. R. Rao. Advanced Statistical Methods in Biometric Research. New York: Wiley, 1952.

[5]C. R. Rao. Linear Statistical Inference and Its Applications. New York: Wiley, 1965.

[6]P. J. Rulon, et al. Multivariate Statistics for Personnel Classification. New York: Wiley, 1967.

[7]M. M. Tatsuoka. Multivariate Analysis: Techniques for Educational and Psychological Research. New York: Wiley, 1971.

[8]A. C. F. Gilbert. The efficiency of certain variables in predicting survival in an engineering school. Psychological Newsletter, 1959, 10, 311-313.

[9]A. C. F. Gilbert. Predicting graduation from an engineering school. Journal of Psychological Studies, 1960, 11, 229-231.

[10]E. M. Rusten and A. C. F. Gilbert. The discriminant analysis technique in assigning freshmen to college chemistry courses. Journal of Psychological Studies, 1960, 11, 253-255.

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TABLE 1

REPORTED DRUG TYPE COMBINATIONS

Drug Type*	N	%	Drug Type*	N	%
A	517	9.76	C E	0	0.00
B	42	0.79	C F	1	0.02
C	11	0.21	D E	9	0.17
D	108	2.04	D F	1	0.02
E	26	0.49	E F	0	0.00
F	5	0.09	A B C	65	1.23
A B	144	2.72	A B D	944	17.83
A C	34	0.64	A B E	53	1.00
A D	1014	19.15	A B F	8	0.15
A E	67	1.27	A C D	110	2.08
A F	24	0.45	A C E	9	0.17
B C	4	0.08	A C F	3	0.06
B D	30	0.57	A D E	229	4.32
B E	8	0.15	A D F	61	1.15
B F	0	0.00	A E F	9	0.17
C D	8	0.15	B C D	6	0.11

*Drug types are: A = Cannabis
B = Amphetamines
C = Barbiturates
D = Hallucinogens
E = Opiates
F = Other (Glue, etc.)

TABLE 1 (cont)

REPORTED DRUG TYPE COMBINATIONS

Drug Type*	N	%	Drug Type*	N	%
B C E	2	0.04	A C D F	19	0.36
B C F	0	0.00	A C D E F	3	0.06
B D E	18	0.34	A D E F	15	0.28
B D F	1	0.02	B C D E	7	0.13
B E F	0	0.00	B C D F	2	0.04
C D E	1	0.02	B C E F	0	0.00
C D F	0	0.00	B D E F	1	0.02
C E F	0	0.00	C D E F	0	0.00
D E F	2	0.04	A B C D E	401	7.57
A B C D	377	7.12	A B C D F	47	0.89
A B C E	31	0.59	A B C E F	6	0.11
A B C F	12	0.23	A B D E F	77	1.45
A B D E	453	8.56	A C D E F	8	0.15
A B D F	81	1.53	B C D E F	3	0.06
A B E F	5	0.09	A B C D E F	99	1.87
A C D E	74	1.40			

*Drug types are: A = Cannabis
B = Amphetamines
C = Barbiturates
D = Hallucinogens
E = Opiates
F = Other (Glue, etc.)

drug use that included Opiates were: Cannabis, Amphitamines, and Hallucinogens, (more than 8.5 percent); Cannabis, Amphetamines, Barbiturates, and Hallucinogens (more than 7.5 percent); and, Cannabis and Hallucinogens (more than 4 percent). The most prevalent combinations of reported drug use that did not include Opiates were: Cannabis and Hallucinogens (more than 19 percent); Cannabis, Amphetamines, and Hallucinogens (almost 18 percent); and, Cannabis, Amphetamines, Barbiturates and Hallucinogens (more than 7 percent). It should also be noted that almost 10 percent of the population reported using Cannabis only.

While it is true that the results shown in Table 1 reflect only self-reported drug use, it should be remembered that, in order to qualify for Exemption, the member was obliged to report every drug type used; thus, there is a firmer basis for accepting the veracity of the findings of this study concerning the types of drugs used than there is for accepting the results of other surveys utilizing the questionnaire method where the researcher is forced to rely solely on the good will of the respondent to obtain accurate information. Errors that may have occurred were most likely due either to the applicant's ignorance of the proper drug classification or to the applicant's overscrupulousness to aviod losing eligibility for Exemption for failure to report every type of drug used.

In Table 2A the relationship between the drug types reported used and enlisted pay grade is shown. Of the 5,295 enlisted personnel applying for Exemption, 92.2 percent held pay grade E-2, E-3, or E-4; there were no applicants during the first six months of the program from pay grades E-7, E-8, or E-9. It should also be noted from Table 2A that the greatest percentage of reported use of Cannabis only occurs at pay grades E-5 and E-6 from which approximately 28 percent of those applying for Exemption fell into this category compared to only 9 percent from pay grades E-1, E-2, E-3, and E-4 combined.

The significance of the results shown in Table 2A can be seen more clearly when the percentage of those reporting drug use at each enlisted pay grade is compared to the percentage of the total number of Active Duty Enlisted Naval Personnel at each pay grade for the same period of time (March, 1972).[1] The results of this comparison are shown in Table 2B. The greatest concentration of the disproportionate representation of reported drug abuse is found in pay grades E-2, E-3, E-5, and E-6. The information in Table 2B presents strong evidence that most of the drug abuse among enlisted Naval personnel is found in the lower pay grades, especially in grades E-2 and E-3. These results are strikingly similar

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[1]Bureau of Naval Personnel. Navy and Marine Corps Military Personnel Statistics (NAVPERS 15658). 31 December 1971 issue. Department of the Navy, Washington, D. C.

TABLE 2A

RELATIONSHIP BETWEEN DRUG TYPE
REPORTED AND PAY GRADE

Drug Type		Pay Grade E-1	E-2	E-3	E-4	E-5	E-6	Row Total Col %
Cannabis	N	8	125	178	151	49	6	517
	Col %	3.7	7.2	8.4	14.6	28.0	27.3	9.8
	Row %	1.5	24.2	34.4	29.2	9.5	1.2	
Amphetamines	N	2	10	19	9	2		42
	Col %	0.9	0.6	0.9	0.9	1.1		0.8
	Row %	4.8	23.8	45.2	21.4	4.8		
Barbiturates	N		7	3	1			11
	Col %		0.4	0.1	0.1			0.2
	Row %		63.6	27.3	9.1			
Hallucinogens	N	5	39	41	20	3		108
	Col %	2.3	2.3	1.9	1.9	1.7		2.0
	Row %	4.6	36.1	38.0	18.5	2.8		
Opiates	N	3	9	9	5			26
	Col %	1.4	0.5	0.4	0.5			0.5
	Row %	11.5	34.6	34.6	19.2			
Other	N		1	3		1		5
	Col %		0.1	0.1		0.6		0.1
	Row %		20.0	60.0		20.0		
Multiple, No Opiates	N	121	1005	1198	582	79	11	2996
	Col %	55.5	58.2	56.5	56.3	45.1	50.0	56.6
	Row %	4.0	33.5	40.0	19.4	2.6	0.4	
Multiple With Opiates	N	79	531	668	266	41	5	1590
	Col %	36.2	30.7	31.5	25.7	23.4	22.7	30.0
	Row %	5.0	33.4	42.0	16.7	2.6	0.3	
Col Total		218	1727	2119	175	22	5295	
Row %		4.1	32.6	40.1	19.5	3.3	0.4	100.0/100.0

to the results of the Survey of Navy Drug Usage where the greatest percentage of marijuana and drug use (both frequent use and infrequent use) was found in pay grades E-1, E-2, and E-3.

TABLE 2B

PERCENTAGE OF DRUG USE REPORTED AT EACH PAY GRADE IN SAMPLE COMPARED TO THE PERCENTAGE HOLDING EACH PAY GRADE IN TOTAL ENLISTED ACTIVE DUTY POPULATION

Pay Grade	Percent of all Personnel on Active Duty	Percent of Sample Reporting Drug Use
E9	.65	.00
E8	1.73	.00
E7	7.20	.00
E6	14.64	.42
E5	16.25	3.31
E4	21.87	19.50
E3	23.33	40.00
E2	11.16	32.60
E1	3.13	4.10

In Table 3 the relationship between the drug type reported used and the month of Exemption application is presented. From the analysis of the data, there appears to be no systematic pattern for the reporting of the five single drug type categories. Each has a wide fluctuation of reported use over the six month period, often varying from one extreme to another without apparent explanation. It should be remembered, however,

TABLE 3

RELATIONSHIP BETWEEN DRUG TYPE REPORTED AND MONTH OF APPLICATION FOR EXEMPTION

Drug Type		Month of Application: Oct	Nov	Dec	Jan	Feb	Mar	Row Total Col %
Cannabis	N	94	111	63	81	79	89	517
	Col %	8.9	12.0	8.2	10.6	9.3	9.4	9.8
	Row %	18.2	21.5	12.2	15.7	15.3	17.2	
Amphetamines	N	4	3	1	9	13	12	42
	Col %	0.4	0.3	0.1	1.2	1.5	1.3	0.8
	Row %	9.5	7.1	2.4	21.4	31.0	28.6	
Barbiturates	N	1	1	3		3	3	11
	Col %	0.1	0.1	0.4		0.4	0.3	0.2
	Row %	9.1	9.1	27.3		27.3	27.3	
Hallucinogens	N	29	13	27	13	16	10	108
	Col %	2.7	1.4	3.5	1.7	1.9	1.1	2.0
	Row %	26.9	12.0	25.0	12.0	14.8	9.3	
Opiates	N	2	3	4	6	3	8	26
	Col %	0.2	0.3	0.5	0.8	0.4	0.8	0.5
	Row %	7.7	11.5	15.4	23.1	11.5	30.8	
Other	N	2		1		1	1	5
	Col %	0.2		0.1		0.1	0.1	0.1
	Row %	40.0		20.0		20.0	20.0	
Multiple, No Opiates	N	591	523	438	434	483	527	2996
	Col %	56.0	56.7	57.3	56.9	57.2	55.8	56.6
	Row %	19.7	17.5	14.6	14.5	16.1	17.6	
Multiple, With Opiates	N	332	269	227	220	247	295	1590
	Col %	31.5	29.1	29.7	28.8	29.2	31.2	30.0
	Row %	20.9	16.9	14.3	13.8	15.5	18.6	
Col Total		1055	923	764	763	845	945	5295
Row %		19.9	17.4	14.4	14.4	16.0	17.9	100.0/100.0

that these categories account for less than 14 percent of the total population applying for Exemption from 1 October 1971 through 31 March 1972.

The pattern for the reporting of both of the multiple drug type combinations reveals far less fluctuation over the six month period. Frequencies of reported use were high for the first month, declined slightly for each of the following three months, and then rose again in each of the remaining two months, approaching the level of the first month. Since use of multiple drug types was reported by approximately 86 percent of the total population, the pattern for all drug types reported over the first six months of the Exemption program is similar to the pattern for multiple drug types. Of the 5,295 enlisted personnel who applied for Exemption during the period of time covered by this study, approximately 52 percent applied during the first three of the program's first six months of operation. The first month saw the largest number of Exemption applicants; the third and fourth month had the least number of applicants, and the last month yielded the second largest number of applicants. Thus, for the first six months, the number of Exemption applicants started out at a peak, gradually declined, and then rose almost to the original level.

In Table 4 the relationship between drug dependency and the Medical Officer's recommendation for drug detoxification is presented. Results of the analysis reveal that of the 271 Exemption applicants diagnosed as drug dependent, 108 (or 39.9 percent) were recommended for detoxification and 163 (or 60.1 percent) were not. A total of 41 (27.5 percent) applicants were recommended for detoxification who were not judged drug dependent. The most striking aspect of the data shown in Table 4, however, is the fact that, of the total number of enlisted personnel applying for Exemption during the first six months of the program's operation, only 5.5 percent were diagnosed as being dependent on drugs, and only 3 percent were recommended for drug detoxification. From this body of data, it appears that the great majority of those applying for Exemption over the first half year of the program's existence had no physical addiction to drugs.

TABLE 4

RELATIONSHIP BETWEEN DRUG DEPENDENCY
AND RECOMMENDED DRUG DETOXIFICATION

Drug Dependency		Detoxification Recommended		
		Yes	No	Row Totals Col %
Yes	N	108	163	271
	Col %	72.5	3.4	5.5
	Row %	39.9	60.1	
No	N	41	4623	4664
	Col %	27.5	96.6	94.5
	Row %	0.9	99.1	
	Col Totals	149	4786	4935
	Row %	3.0	97.0	100.0/100.0

In Table 5 the relationship between the Medical Officer's recommendation and the drug type reported is shown for each category of drug type. Those reporting the use of Opiates, the use of Amphetamines, or the use of multiple drug types were most often recommended for treatment, ranging from approximately 77 percent for reported Opiate use to 33 percent for reported Amphetamine use. Approximately one fourth of the Exemption applicants reporting use of the other drug types were recommended for treatment.

It is important to note that those categories of reported drug use which received the highest percentages of the Medical Officer's recommendation for treatment were not those which received the highest percentages of the Medical Officer's recommendation for discharge. While only 4.4 percent of all Exemption applicants received a recommendation for discharge during the first six months of the program, 8.3 percent of those reporting the use of Hallucinogenic drugs, and 5.1 percent of those reporting the use of multiple drug types that included Opiates were recommended for discharge. The recommendations for those reporting the use

TABLE 5

RELATIONSHIP BETWEEN MEDICAL OFFICER'S RECOMMENDATION AND DRUG TYPE REPORTED

Drug Type		Medical Officer's Recommendation: No Information	Treatment	No Treatment	Discharge	Row Total Col %
Cannabis	N	33	115	359	10	517
	Col %	10.3	5.6	13.4	4.3	9.8
	Row %	6.4	22.2	69.4	1.9	
Amphetamines	N	1	14	27		42
	Col %	0.3	0.7	1.0		0.8
	Row %	2.4	33.3	64.3		
Barbiturates	N	1	3	7		11
	Col %	0.3	0.1	0.3		0.2
	Row %	9.1	27.3	63.6		
Hallucinogens	N	5	25	69	9	108
	Col %	1.6	1.2	2.6	3.8	2.0
	Row %	4.6	23.1	63.9	8.3	
Opiates	N		20	5	1	26
	Col %		1.0	0.2	0.4	0.5
	Row %		76.9	19.2	3.8	
Other	N			5		5
	Col %			0.2		0.1
	Row %			100.0		
Multiple, No Opiates	N	175	1117	1571	133	2996
	Col %	54.9	54.4	58.4	56.8	56.6
	Row %	5.8	37.3	52.4	4.4	
Multiple, With Opiates	N	104	759	646	81	1590
	Col %	32.6	37.0	24.0	34.6	30.0
	Row %	6.6	47.7	40.6	5.1	
Col Total		319	2053	2689	234	5295
Row %		6.0	38.8	50.8	4.4	100.0/100.0

of the Hallucinogenic drugs are worthy of special attention. These Exemption applicants received the second lowest percentage of the Medical Officer's recommendation for treatment (second only to those reporting use of Cannabis only) and yet these same applicants received the highest percentage of the recommendations for discharge.

The Medical Officer's recommendation for the applicant by enlisted pay grade is presented in Table 6. It should be noted that, although those applying for Exemption from pay grades E-1 and E-2 received the lowest percentages of the recommendations for treatment (26.6 percent and 37.1 percent respectively compared to 38.8 percent for the total population), these same two groups of applicants received the highest percentage of the recommendations for discharge. No applicant from pay grade E-6 was recommended for discharge.

In Table 7 the Medical Officer's recommendation by month of Exemption application is shown. The recommendations for discharge for the six-month period are especially noteworthy. During the first three months of the program, an average of only .69 percent of the applicants were recommended for discharge; during the second three months of the program, 8.4 percent of the applicants were recommended for discharge.

There was a similar trend in the Medical Officer's recommendation for drug treatment. In the first month of the program 29.6 percent of the applicants were recommended for some form of treatment; the percentage rose steadily each month reaching a high of 49.4 percent during March, the sixth month of the program's operation. Thus, for the first six months of the Exemption program, both the percentage of recommendations for discharge and the percentage of recommendations for treatment increased from the first through the sixth month. This phenomenon may merely be the function of a new program.

Comparison Data

In Table 8 the means and standard deviations on each of the fourteen variables are presented for those who received drug related discharges and for those who received favorable discharges prior to the implementation of the Exemption Program in both the initial validation sample and in the cross-validation sample. In each of these two samples it is to be noted that those who received drug related discharges were somewhat younger than those who received favorable discharges. In both instances the mean age of those who received drug related discharges was 20.7 years as compared with 22.6 years for those who received favorable discharges in the initial validation sample and 22.7 years for those who received drug related discharges in the cross-validation sample. In both the initial validation sample and in the cross-validation sample the average length of service for those receiving drug related discharges and those receiving favorable

TABLE 6

RELATIONSHIP BETWEEN MEDICAL OFFICER'S RECOMMENDATION AND PAY GRADE

Pay Grade		Medical Officer's Recommendation: No Information	Treatment	No Treatment	Discharge	Row Total Col %
E-1	N	13	58	132	15	218
	Col %	4.1	2.8	4.9	6.4	4.1
	Row %	6.0	26.6	60.6	6.9	
E-2	N	84	641	906	96	1727
	Col %	26.3	31.2	33.7	41.0	32.6
	Row %	4.8	37.1	52.5	5.6	
E-3	N	118	874	1044	83	2119
	Col %	37.0	42.6	38.8	35.5	40.0
	Row %	5.6	41.2	49.3	3.9	
E-4	N	95	396	511	32	1034
	Col %	29.8	19.3	19.0	13.7	19.5
	Row %	9.2	38.3	49.4	3.1	
E-5	N	7	75	85	8	175
	Col %	2.2	3.7	3.2	3.4	3.3
	Row %	4.0	42.9	48.6	4.6	
E-6	N	2	9	11		22
	Col %	0.6	0.4	0.4		0.4
	Row %	9.1	40.9	50.0		
Col Total		319	2053	2689	234	5295
Row %		6.0	38.8	50.8	4.4	100.0/100.0

TABLE 7

RELATIONSHIP BETWEEN MEDICAL OFFICER'S RECOMMENDATION AND MONTH OF APPLICATION FOR EXEMPTION

Month		Medical Officer's Recommendation: No Information	Treatment	No Treatment	Discharge	Row Total Col %
October	N	103	312	626	14	1055
	Col %	32.2	15.2	23.3	6.0	19.9
	Row %	9.8	29.6	59.3	1.3	
November	N	59	306	556	2	923
	Col %	18.5	14.9	20.7	0.9	17.4
	Row %	6.4	33.2	60.2	0.2	
December	N	41	290	430	3	764
	Col %	12.9	14.1	16.0	1.3	14.4
	Row %	5.4	38.0	56.3	0.4	
January	N	51	303	355	54	763
	Col %	16.0	14.8	13.2	23.1	14.4
	Row %	6.7	39.7	46.5	7.1	
February	N	26	375	352	92	845
	Col %	8.1	18.3	13.1	39.3	16.0
	Row %	3.1	44.4	41.7	10.9	
March	N	39	467	370	69	945
	Col %	12.2	22.7	13.8	29.5	17.8
	Row %	4.1	49.4	39.2	7.3	
Col Total		319	2053	2689	234	5295
Row %		6.0	38.8	50.8	4.4	100.0/100.0

TABLE 8

Means and Standard Deviations for Those Receiving Drug Related Discharges and Those Receiving Favorable Discharge in the Initial Validation Group and in the Cross-Validation Group for the Thirteen Variables under Study

	Initial Validation Sample						Cross Validation Sample					
	Drug Related Discharges		Favorable Discharges		Total		Drug Related Discharges		Favorable Discharges		Total	
	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	σ
Age	20.7	1.50	22.6	1.52	21.7	1.80	20.7	1.44	22.7	1.63	21.7	1.82
Length of service	1.8	1.00	3.4	0.92	2.6	1.26	1.8	0.98	3.4	0.97	2.6	1.25
Education (years)	11.5	1.24	11.7	1.23	11.6	1.24	11.6	1.13	11.8	1.30	11.7	1.23
Pay Grade	2.5	0.96	3.9	0.93	3.2	1.16	2.5	0.97	3.8	0.94	3.2	1.16
Number of Enlistments	1.0	0.14	1.0	0.09	1.0	0.12	1.0	0.12	1.0	0.08	1.0	0.10
General Classification Test Score	56.2	8.91	52.8	10.10	54.5	9.67	56.3	8.96	52.9	10.42	54.6	9.86
Arithmetic Test Score	53.7	8.10	53.1	8.7	53.4	8.41	53.7	8.16	52.8	8.80	53.3	8.50
Mechanical Test Score	50.7	7.95	50.1	8.21	50.4	8.09	50.9	7.80	50.5	8.20	50.7	8.00
Clerical Aptitude Test Score	49.9	8.80	48.9	8.04	49.4	8.44	50.3	8.95	49.4	8.29	49.9	8.64
Shop Practices Test Score	52.2	7.81	51.5	8.07	51.8	7.94	51.9	7.99	51.8	8.03	51.9	8.00
Sonar Pitch Memory Test Score	55.3	9.90	51.6	9.53	53.4	9.89	55.7	9.84	51.4	9.59	53.5	9.95
Radio Code Aptitude Score	56.7	9.33	55.1	9.23	55.9	9.31	56.7	8.94	55.5	9.19	56.1	9.08
Electronics Technician Test Score	56.5	8.44	56.3	8.44	56.4	8.44	56.8	8.10	56.8	7.97	56.8	8.03

discharges was 1.8 years and 3.4 years respectively. Those who received drug related discharges had on the average about .2 years less education than those who received favorable discharges (11.5 years compared with 11.7 years) in the initial validation sample and in the cross-validation sample the average educational level of those who received favorable discharges was 11.6 years as compared to 11.8 years for those who received drug related discharges. The average pay grade was approximately the same for those who received drug related discharges and for those who received favorable discharges in both the initial validation sample and in the cross-validation sample. For those who received drug related discharges and for those who received favorable discharges the number of enlistments in the Armed Forces were approximately the same in both the initial validation sample and in the cross-validation samples. It should be stressed at this point that these data were obtained from the Navy's loss records and consequently the obtained data on those who received favorable discharges were on those who received favorable discharges and did not continue in an enlisted career in the Navy. Not reflected in the table is the fact that those in the drug related discharge group in the initial validation group had a maximum of two enlistments while those in the favorable discharge group had a maximum of three enlistments. In the cross-validation sample the maximum number of enlistments for those in the drug related discharge group and for those in the favorable discharge group was two.

As far as comparison of the two groups on these six variables is concerned, it can be said that those individuals who received drug related discharges were younger, had a slightly lower educational level, were in a lower pay grade and had a shorter length of service at time of discharge than those who received favorable discharges. Those receiving drug related discharges and those who received favorable discharges were by and large in their first enlistment.

In the initial validation sample it should be noted from Table 8 that the group who received drug related discharges had higher mean scores on the eight tests of the Basic Test Battery.

In Table 9 the results of the discriminant analysis approach are shown for the eight variables (i.e., the eight scores on the Basic Test Battery). In this summary table are shown the sequence in which each of the variables have been selected in terms of discriminating power between the two groups for both the initial validation sample and for the cross-validation samples. In the column headed λ-Statistic the value of Wilks' Lambda criterion[2] at each step is shown. It should be noted that the first five variables entered account for the differences between the two groups in the initial validation sample. These variables yielded a λ-value of .9217 which yields an approximate F-ratio of 33.86 which is significant at the .01 level. These five variables were the Sonar Pitch Memory Test, General Classification Test score, Electronics Technician Test score, Arithmetic Test score, and Shop Practices Test score in the order in which they were entered into the analysis. The variables that did not appreciably increase the prediction of group membership for the two groups were the Clerical Aptitude Test score, the Mechanical Test score, and the Radio Code Aptitude Test score again listed in the order in which they were entered in the analysis. When all eight variables were used, the resulting λ-value decreased only to .9210 which yielded an approximate F-ratio of 21.34. However, in evaluating the decrease in the F-ratio we have to consider that this F-ratio is to be evaluated with 8 and 1991 degrees of freedom instead of the 5 and 1994 used to evaluate the previous F-ratio of 33.86.

In the cross-validation sample it should also be noted from Table 8 that the group who received drug related discharges had higher mean scores on all of the eight tests of the Basic Test Battery. In Table 9 the results of the discriminant analysis technique are shown for the eight variables (i.e., the eight tests of the Basic Test Battery). The sequence in which the variables have been selected is shown as well as the corresponding value of Wilks λ-criterion at each step. Again it was found that the first five variables entered were significant in terms of mean differences between the groups. These variables were Sonar Pitch Memory Test score, General Classification Test score, Electronics Technician Selection Test, Shop Practices Test score, and Arithmetic Test score in the order of selection into the analysis. These variables yield a λ-value of 0.91441 which yields an approximate F-ratio of 37.33 which is significant at the .01 level when evaluated with 5 and 1994 degrees of freedom. The variables that did not appreciably differentiate between the groups were scores on the Radio Test, scores on the Clerical Aptitude Test, and scores on the Mechanical Test listed in the order of selection. In the cross-validation sample when all the eight variables were used the resulting λ-value decreased only to 0.9131 which corresponds to an approximation of the F-statistic of 27.06 which is significant at the .01 level when evaluated with 7 and 1992 degrees of freedom.

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[2]S. S. Wilks. Certain generalizations in the analysis of variance. Biometrika, 1932, 24, 471-494.

TABLE 9

SUMMARY TABLE

	Initial Validation Sample				Cross Validation Sample			
Step Number	Variable Entered	F Value To Enter	Number of Variables Included	λ-Statistic	Variable Entered	F Value To Enter	Number of Variables Included	λ-Statistic
1	Sonar Pitch Memory Test Score	73.0031	1	0.9647	Sonar Pitch Memory Test Score	98.1745	1	0.9532
2	General Classification Test Score	31.2861	2	0.9499	General Classification Test Score	23.1413	2	0.9422
3	Electronics Technician Test Score	33.4682	3	0.9342	Electronics Technician Test Score	40.6906	3	0.9234
4	Arithmetic Test Score	19.4732	4	0.9252	Shop Practices Test Score	12.1135	4	0.9178
5	Shop Practices Test Score	7.4060	5	0.9217	Arithmetic Test Score	7.5001	5	0.9144
6	Clerical Aptitude Test Score	1.4889	6	0.9211	Radio Code Aptitude Test	2.1123	6	0.9134
7	Mechanical Test Score	0.0542	7	0.9210	Clerical Aptitude Test Score	0.5905	7	0.9132
8	Radio Code Aptitude Test	0.0148	8	0.9210	Mechanical Test Score	0.0207	8	0.9132

In Table 10 the discriminant function for those who received drug related discharges and for those who received favorable discharges is shown for both the initial classification sample and for the cross-validation sample. It should be noted that the weighting of the variables in the discriminant equation in both instances are proportional.

TABLE 10

DISCRIMINANT EQUATIONS FOR THE INITIAL VALIDATION SAMPLE AND THE CROSS-VALIDATION SAMPLE

	Initial Validation Sample		Cross-Validation Sample	
Variable	Drug Related	Favorable	Drug Related	Favorable
General Classification	-0.29904	-0.37151	-0.28618	-0.35183
Arithmetic	0.24437	0.28192	0.24418	0.26695
Mechanical	0.19155	0.19348	0.21207	0.21329
Clerical Aptitude	0.51093	0.50357	0.44539	0.44082
Shop Practices	0.38946	0.40659	0.41321	0.43696
Sonar Pitch Memory	0.31300	0.27946	0.28165	0.23720
Radio Code Aptitude	0.25480	0.25553	0.29110	0.30051
Electronics Technician Selection	0.37357	0.40202	0.39667	0.43140
Constant	-53.08861	-51.61650	-53.94453	-52.75851

In Table 11 the predictive power of the variables at each step is shown for the initial validation sample and for the cross-validation sample. The heading across each four cell table indicates those individuals who were classified as belonging to the drug related discharge group or to the favorable discharge group on the basis of the variables used at each of the eight steps while the vertical captions reveal those who were actually in each of these groups. For example, in the first four cell table for the first step of the discriminant analysis for the initial validation sample, there were 1,000 individuals who received drug related discharges and 1,000

TABLE 11

PREDICTION OF GROUP MEMBERSHIP BASED ON THE DIFFERENT COMBINATIONS OF VARIABLES AT EACH STEP

Initial Validation Sample					Cross-Validation Sample				
		Classified as					Classified as		
Variables Used	Actually In	Drug Related	Favorable	Possibility of Misclassification	Variables Used	Actually In	Drug Related	Favorable	Possiblity of Misclassification
SONAR	Drug Related	554	446	%	SONAR	Drug Related	607	393	%
	Favorable	360	640	40.30		Favorable	354	646	37.35
SONAR, GCT	Drug Related	585	415	%	SONAR, GCT	Drug Related	610	390	%
	Favorable	412	588	41.35		Favorable	397	603	39.35
SONAR, GCT ETST	Drug Related	628	372	%	SONAR, GCT, ETST	Drug Related	641	359	%
	Favorable	425	575	39.85		Favorable	391	609	37.50
SONAR, GCT, ETST, ARI	Drug Related	632	368	%	SONAR, GCT, ETST, SHOP	Drug Related	636	364	%
	Favorable	400	600	38.40		Favorable	383	617	37.35
SONAR, GCT ETST, ARI, SHOP	Drug Related	634	366	%	SONAR, GCT, ETST, ARI, SHOP	Drug Related	633	367	%
	Favorable	391	609	37.85		Favorable	374	626	37.05
SONAR, GCT ETST, ARI, SHOP, CLER	Drug Related	629	371	%	SONAR, GCT, ETST, ARI SHOP, CLER	Drug Related	634	366	%
	Favorable	395	605	38.30		Favorable	375	625	37.05
SONAR, GCT, ETST, ARI, SHOP, CLER MECH	Drug Related	629	371	%	SONAR, GCT, ETST, ARI, SHOP, CLER RADIO	Drug Related	633	367	%
	Favorable	400	600	38.55		Favorable	372	628	36.95
SONAR, GCT, ETST, ARI, SHOP, CLER, MECH, RADIO	Drug Related	629	371	%	SONAR, GCT, ETST, ARI, SHOP, CLER MECH, RADIO	Drug Related	632	368	%
	Favorable	399	601	38.50		Favorable	371	629	36.95

individuals who received favorable discharges. (The sum of 607 and 393 and the sum of 354 and 646 each total 1,000.) In other words, if each pair of cells are summed horizontally in each of the tables the number of those who received drug related discharges and those who received favorable discharges is found. On the other hand if we sum each pair of cells vertically (i.e., 607 and 354), the number of individuals or 1,961 who were classified as being drug related discharges on the basis of the square of the Mahalanobis distance from the mean of each group is found.[3] In a similar fashion if one sums the two cells under the heading "Favorable Discharges" (i.e., 393 and 646), he finds the number of individuals or 1,039 classified as favorable discharges. Summation of the diagonal entries in each table gives the agreement between the actual status of the individuals as far as discharge status is concerned and prediction of discharge status on the basis of Mahalanobis D^2. In the off-diagonal entries the number of misclassifications is given. For example, in the first four cell table the sum of 360 and 446 equals 806 which constitutes the number of individuals misclassified on the basis of D^2. When this number is divided by 2,000 we find the percent of misclassification which is 40.30 percent and this number is entered at each step under the column "Probability of Misclassification". In the initial validation sample the probability of misclassification was at a minimum or 37.85 percent when the five variables were used (i.e., Sonar Pitch Memory, General Classification Test, Electronics Technician Selection Test, Arithmetic Test and the Shop Practices Test).

In the cross-validation sample one again finds the probability of misclassification minimized by use of these five variables at 37.05 percent.

DISCUSSION AND CONCLUSIONS

An examination of the data from the Exemption program from 1 October 1971 through 31 March 1972 revealed that more than 86 percent of the applicants reported using a combination of drug types rather than a single drug type. The combination that occurred most frequently was Cannabis and Hallucinogens and Cannabis, Amphetamines and Hallucinogens. About 30 percent of the population reported using a combination of drug types that included the Opiates. The majority of applicants, however, were found neither to be drug dependent nor to require drug detoxification.

The results concerning the use of Cannabis deserve special attention. Of the 5,295 enlisted personnel applying for Exemption, 4,995 or 94.3

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[3] P. C. Mahalanobis. On the generalized distance in statistics. Proceedings of the National Institute of Sciences, India, 1936, 12, 49-55.

percent reported use of Cannabis. Almost 90 percent of those reporting the use of Cannabis used this drug type with at least one other drug type. Only 10.3 percent of reported Cannabis users claimed to have used this drug type alone. These findings, especially when related to the results of the Survey of Navy Drug Usage which found that more than 55 percent of the drug users (both frequent users and infrequent users) reported that marijuana was the first drug used, present evidence that those who use Cannabis tend to experiment with other drug types as well.

Exemption applicants were found to hold the lower pay grades, especially grades E-2 and E-3. These findings are consistent with the results of the Survey of Navy Drug Usage which found that the largest number of reported drug abusers come from grades E-1 through E-3. No one holding pay grades E-7, E-8, or E-9 applied for Exemption during the program's first six months of operation.

The greatest percentage of applicants who were recommended for discharge reported using Hallucinogenic drugs only, Opiates only, or a combination of drug types. They also tended to come from the lower pay grades. The smallest percentage of applicants recommended for treatment were found in the lowest two pay grades. The Medical Officer's recommendation for the applicant reporting the use of Hallucinogenic drugs only is particularly noteworthy. This type of drug use was not only the most likely to receive a recommendation for discharge, it was also the second least likely to be recommended for treatment. Apparently, the Medical Officers considered the use of the Hallucinogenic drug type to be the most injurious to Navy life. This belief is apparently not shared by the reported drug users since, in the Survey of Navy Drug Usage, a large majority expressed the belief that the use of drugs did not have an adverse effect on their job performance. The Medical Officers' attitudes, however, are likely due to the phenomenon of flashbacks which has been associated with the use of Hallucinogenic drugs, especially with the use of LSD.

The number of applications for Exemption during the six-month period of this study hit a peak in the first month, declined gradually, and then rose again almost to the original level recorded during October. During the first three months of the program's operation, Medical Officers tended to recommend few for discharge, some for treatment and most for no treatment. This trend was almost reversed during the second three-month period of the program even though the pattern of drug types reported by Exemption applicants remained basically the same. Apparently, as the program developed in time, more Medical Officers became convinced that the use of certain drug types either required special treatment or was incompatible with Navy life.

From the findings of both this study and the Survey of Navy Drug Usage, it is evident that the Navy has felt the effect of the rise in drug abuse. Those applying for Exemption account for a little more than

1 percent of the average strength of enlisted personnel on active duty in the Navy from 1 October 1971 through 31 March 1972. Those reporting drug and/or marijuana use in the Survey of Navy Drug Usage account for 18.7 percent of the average strength of enlisted personnel from 1 September 1971 through 30 November 1971. Even though the percentage of those applying for Exemption is far below that of reported drug and/or marijuana users, the number is sufficiently large to cause concern.

The results of the investigation of dischargees indicated that those who received discharges from the Navy because of drug involvement were younger, had less years of military service, were in a lower pay grade, and had a lower educational level than those who received favorable discharges. These findings are in agreement with those of other studies that have been previously cited with the exception of length of military service. However, it should be pointed out that it has already been established that those who were involved with drugs were in a lower pay grade and since the correlation between pay grade and length of service obtained in this study was .701 in the initial validation sample and .685 in the cross-validation sample, these findings tend to be substantiated.

The discriminant analysis approach yields significant λ-ratios for both the initial validation sample and for the cross-validation sample. Five variables accounted for the separation between the two groups in that other variables added did not decrease the value of the λ-ratio substantially in either of the samples involved. Those variables that contributed were scores on the Sonar Pitch Memory Test, General Classification Test, Electronics Technician Selection Test, Shop Practices Test and the Arithmetic Test.

Again it must be noted that even though the means of the groups differ significantly on five variables the lowest probability of misclassification obtained was 37.05 percent which was obtained in the cross-validation sample as indicated in Table 11. This finding may be reformulated by stating that the probability of correct classification was 62.95 percent or in other words 12.95 percent above chance expectancy. It should be noted from this table that the probability of classifying an individual correctly as a drug involved dischargee was 63.3 percent but that the the probability of classifying an individual as a favorable dischargee when in fact he received a drug related discharge was 36.7 percent. On the other hand the probability of correctly classifying an individual as having received a favorable discharge was 62.6 percent but again the probability of misclassifying an individual as having received a drug related discharge when in fact he received a favorable discharge was 37.4 percent. Thus, the probability of misclassification was almost split evenly. In summary, approximately two-thirds of the time the classification system worked and one third of the time it did not work, yielding an equal number of false positives and fales negatives.

It is difficult to determine why these five variables were the most effective predictors. It might be argued that the apparent efficiency of the Sonar Pitch Memory Test was spurious in nature as a result of the samples that were drawn for this study. Somewhat contradictory findings are indicated by the fact that those who were given drug related discharges did better on those test scores that indicated mathematical, verbal and abstract reasoning than did those who received favorable discharges even though their educational level was somewhat lower. It should be pointed out, however, that even though the differences on these variables were significant, the magnitude of these differences may not be large enough to warrant practical consideration. Furthermore, the difficulty enountered in postulating a logical framework to account for these results renders the approach of predicting drug abuse in the Navy on the basis of cognitive variables useless by the argument of reductio ad absurdum.

The results of this investigation proved fruitful in providing a negative answer to the question of the practical value of attempting to differentiate drug users from non-users on the basis of cognitive variables. Such a negative finding has definitive value in that it moves the research effort toward personality and motivational variables as a solution to the problem of differentation. In a recent article summarizing major efforts in the area of drug abuse among young people, the authors concluded that there is a need for psychological explanation of adolescent drug use and that comprehensive identification of socio-cultural and personality determinants of various forms of drug use is fundamental to the development of primary prevention and treatment efforts in this area.[1] The authors of this report could not agree more.

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[1] G. Nicholas Braucht, et al. Deviant Drug Use in Adolescence: A Review of Psychosocial Correlates. Psychological Bulletin, Vol 79, No. 2, 1973.

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13. ABSTRACT

The purpose of this study was to determine the pattern of drug types reported by enlisted personnel applying for amnesty under the Navy's Drug Exemption Program as well as to attempt to differentiate on the basis of certain demographic and cognitive variables between a random sample of individuals receiving drug related discharges and those receiving honorable discharges during the three year period prior to the implementation of the Exemption Program.

More than 86 percent of the Exemption applicants reported using a combination of drug types; about 30 percent reported Opiate use, and about 5 percent were drug dependent. Drug users were younger, held lower pay grades, and had a lower educational level than those not reporting illicit drug use. The results of the discriminant analysis yielded a significant difference between the two groups on five of the cognitive variables but the resulting classification scheme left much to be desired in that one third of the time it favored misclassification of those who received drug related discharges and those who received favorable discharges.

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