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REPORT NUMBER 764

FACTORS RELATED TO DRUG ABUSE  
IN THE SUBMARINE SERVICE

III. Characteristic Biographical Profiles and Related Data

by

Benjamin B. Weybrew

and

Ernest M. Noddin

Bureau of Medicine and Surgery, Navy Department  
Research Work Unit MF51.524.004-2009DA5K.01

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R. L. Sphar, CDR MC USN  
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Naval Submarine Medical Research Laboratory

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Involving two drug abuse (DA) Samples(N=200 and 41), this study was designed to re-examine certain of the findings reported in earlier reports of this series and to investigate the relationships of selected sociological, personality and background factors to propensity for DA in the submarine service. As compared to appropriate control groups, the DA cases tended: (1) to be younger, (2) to have an inferior academic record, (3) to more frequently have a history of treatment for emotional conditions, (4) to have negative attitudes toward both their civilian and Navy instructors, and (5) to have more often a history of adjudicated crime. However, the DA group's paygrade level (corrected for time in service) was not different from the control group and their motivation for volunteering for submarines and their goal orientation generally were appropriate. Their below-average performance in submarine school appeared to result from low verbal aptitude and/or emotional instability. While more DA cases came from homes in metropolitan areas, the socioeconomic level, the marital stability and the geographical location of these homes were not significantly different between the two groups. Though the mechanisms are unknown, there appears to be a non-chance correlation between Submarine School output and incidence of DA during equal time segments. A gross estimate of the incidence of DA in the submarine service for FY71 was comparatively low, of the order of 25 per 1000 enlisted men across all submarine classes, but possibly slightly higher for men in attack class as compared to those in either fleet type or Fleet Ballistic Missile billets.

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Reviewed and Approved by:



Charles F. Gell, M.D., D.Sc. (Med)  
SCIENTIFIC DIRECTOR  
NavSubMedRschLab

Approved and Released by:



R.L. Sphar, CDR MC USN  
OFFICER IN CHARGE  
NavSubMedRschLab

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## SUMMARY PAGE

### THE PROBLEM

Involving larger drug abuse samples than previously employed, to replicate certain aspects of the first two reports of this research series and to identify additional personality, sociological and background variables related to drug abuse in the submarine service.

### FINDINGS

Tending to substantiate some of the results reported in the first study of the drug abuse (DA) series, data from more than 200 DA cases disqualified for submarine duty showed that the DA cases: (1) tended to be younger, (2) that more were high school dropouts, (3) that more had a history of treatment for emotional problems, and (4) that more had a history of adjudicated crime. Overall differences in socioeconomic level, location, and stability of homes were not significantly different for the members of the DA and control groups. While the DA group as a whole indicated negative attitudes toward high school and Submarine School teachers, their motivation for volunteering for the submarine service and their goal orientation appeared favorable. A gross estimate of incidence of DA in this branch of the service was relatively low, something on the order of 25 per 1000 for FY71.

### APPLICATION

More comprehensive characterization of the drug abuse cases disqualified for submarine duty is provided by the results of this study. Accordingly, several, somewhat gross but possibly useful guidelines for identifying potential DA cases at the recruiting or assignment desk level appear to be emerging.

### ADMINISTRATIVE INFORMATION

This investigation was conducted as part of Bureau of Medicine and Surgery Research Unit MF51.524.004-2009DA5K.01. The present report is Number 1 on this work unit. It was submitted for review on 17 July 1973, approved for publication on 24 September 1973 and designated as NavSub MedRschLab Report No. 764. The two previous reports on this study were NSMRL No. 726 and 737.

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## ABSTRACT

Involving two drug abuse (DA) samples (N=200 and 41), this study was designed to re-examine certain of the findings reported in earlier reports of this series and to investigate the relationships of selected sociological, personality and background factors to propensity for DA in the submarine service. As compared to appropriate control groups, the DA cases tended: (1) to be younger, (2) to have an inferior academic record, (3) to more frequently have a history of treatment for emotional conditions, (4) to have negative attitudes toward both their civilian and Navy instructors, and (5) to have more often a history of adjudicated crime. However, the DA group's paygrade level (corrected for time in service) was not different from the control group and their motivation for volunteering for submarines and their goal orientation generally were appropriate. Their below-average performance in "Sub" School appeared to result from low verbal aptitude and/or emotional instability. While more DA cases came from homes in metropolitan areas, the socioeconomic level, the marital stability and the geographical location of these homes were not significantly different between the two groups. Though the mechanisms are unknown, there appears to be a non-chance correlation between submarine School output and incidence of DA during equal time segments. A gross estimate of the incidence of DA in the submarine service for FY71 was comparatively low, of the order of 25 per 1000 enlisted men across all submarine classes, but possibly slightly higher for men in attack class as compared to those in either fleet type or Fleet Ballistic Missile billets.

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## FACTORS RELATED TO DRUG ABUSE IN THE SUBMARINE SERVICE

### III. Characteristic Biographical Profiles and Related Data

#### INTRODUCTION

This is the third paper in the U. S. Naval Submarine Medical Research Laboratory series, "Factors Related to Drug Abuse in the Submarine Service", this one involving larger subject samples than the previous two and, at the same time, encompassing a wider variety of background variables. It is important to point out one significant difference between the sampling conditions for the first<sup>2</sup> and second<sup>3</sup> papers of this series, namely, that the former focussed upon a sample of drug abuse (DA) cases processed before the so-called drug amnesty authority (z-gram 94)<sup>6</sup> was promulgated, while the latter involved a sample of men entering the amnesty program following its issuance. Briefly, the first study demonstrated that the enlisted men in the DA group tended: (1) to be younger than the control (non-DA) group; (2) to have achieved less formal education; (3) to earn poorer grades in Submarine School; and, (4) to earn lower scores on the ARI (Arithmetical) aptitude test of the USN Basic Test Battery. On the other hand, all of the personality subtests contained in the Psychiatric Screening Battery for Submariners failed to discriminate between the DA and control groups.

The second study was more narrowly focussed upon a comparison of the Minnesota Multiphasic Personality Inventory (MMPI) profiles of 20 enlisted DA

cases with a similar civilian DA sample and a navy and civilian control sample. Some of the major findings may be quoted from the summary page of that paper, "Overall, the Minnesota Multiphasic Personality Inventory (MMPI) profiles of the Navy drug abuse cases were similar to those of two civilian drug groups, the most prevalent traits being sociopathic in nature. For the Navy group, the traits of immaturity, and social alienation are characteristic, but with little evidence of acute emotional instability. Further, the data indicated that many, if not most, of the Navy drug abuse groups may be quite resistive to rehabilitative effort."

Neither of the two previous studies involved sufficiently accurate data to attempt even a gross estimate of the incidence of D.A. in the submarine service. A number of unofficial and semi-official incidence statistics for D.A. in some of the other U.S. services, have been published and indicate that of the order of 16% and 45% of the Vietnam combat veterans used marijuana in significant amounts daily.<sup>7,8</sup> Potentially a more serious DA problem may be inferred from the reported DA incidence of 46% of U.S. soldiers in West Germany, the alleged drugs being, in the main, marijuana but with significant amounts of a potent form of hashish, amphetamines and barbituates also included in the user's "bag".<sup>1</sup> It may be recalled that a comparable incidence of DA of 42% for civilian college students was pub-

lished in a 1971 Gallup poll (cited in reference #1). While the accuracy of these statistics\* may be questioned, the magnitude of the incidence figure appears to be remarkably similar across quite varied population samples.

Insofar as is known, DA incidence statistics for the U.S. Navy in general or for the submarine service in particular have not been published, at least in the open literature.

Whereas it is believed that drug abuse involving other than marijuana is extremely low in the submarine service, substantial data bearing directly on this matter, particularly information bearing on the question of the specific drugs characteristically being misused by the DA cases originating from the operating Submarine Fleets is inadequate or completely lacking.

However, an attempt will be made to estimate the incidence of DA within the operating submarine force and at the same time provide an examination of the monthly submariner disqualification data, hopefully to identify possible trends both for the segment disqualified by reason of DA and for the interrelated disqualified group bearing the somewhat obscure classification, Environmentally Unadaptable (EU).

In a sense, the results of this trend analysis should provide some back-

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*\*There are at least three kinds of difficulties which limit the accuracy of many, if not most, DA incidence statistics, viz., (1) difficulty in identifying the user (insufficiency of urine tests, denial of information); (2) the proper delineation of the "population at risk" as the denominator of the incidence ratio; and (3) the point in time when the cross-sectional sample of DA's was drawn.*

ground material for the two somewhat interrelated phases of this study. The overall objective of Phase I was to replicate or expand certain aspects of the first study in the submariner D.A. series but this time employing a much larger DA and control sample. In addition, this part of the study was designed in such a way that it allowed for a comparison of the men disqualified for submarine duty because of DA with a similar-sized sample of men disqualified as EU. On the other hand, the major goal of Phase II of this study was to characterize a sample of enlisted men disqualified for submarine duty by reason of DA on terms of an array of selected biographical items designed to "tap" meaningful demographical sociological and psychological history of the members of this group.

Already collected and partially analyzed, the data for the fourth study of this research series on DA in the submarine service has been designed to investigate the complex interrelationships between knowledge of drugs and permissiveness of attitudes toward the use of nonprescribed drugs for members of the submarine force.

#### METHOD AND PROCEDURE

The overall methodological approach to Phase I and II was essentially alike, namely, to collect identical items of information from both the DA and control groups, then compare the most relevant response distributions item by item. Nonparametric statistical tests of reliability of group differences were used throughout,  $X^2$  for item distribution with independent response categories and the

Wilcoxin Unpaired Replicates Test<sup>9</sup> for overlapping, within-group response categories. Finally, the significance of t-tests differences between proportions of experimental and control groups giving a specific response to an item was estimated from a table provided for that purpose by Tate and Clelland.<sup>10</sup>

## Subjects

The data for Phase I were collected from 2 independent samples of enlisted men disqualified for submarine duty between July '70 and November '71 by reason of alleged DA or, in a more general sense, as environmentally unadaptable (EU). These two groups numbered 226 and 209 respectively. As a control group, a random sample was drawn from the total number of men who had completed Submarine School within the same approximate time frame that the members of the DA and EU had graduated. The size of this group turned out to be 176, having taken care to eliminate from the control sample all of the men who had become disqualified for whatever reason subsequent to graduation. The Phase II experimental group consisted of 41 enlisted men who had entered the local Drug Re-education Program while the control group consisted of a sample (N=83) of students enrolled in the Basic Enlisted Submarine School at the Submarine Base, Groton, Connecticut.

## Data Collection Techniques

The experimental group data for Phase I of this study originated from administrative information describing the circumstances surrounding each

man disqualified for submarine duty. Originating from official letters mailed directly to the Submarine School, these data provided the basis for separating each disqualified man into one of two major categories, drug abuse (DA), or environmentally unadaptable (EU).\*

The data for Phase II of this study were collected by means of a brief background inventory designed for collecting information pertinent for conducting individual assessment interviews (See Appendix A). This Preinterview Inventory (PII) was administered to 41 Submarine School students who became disqualified for Submarine School because of DA. Control data were obtained by administering the PII to another sample of 100 Submarine School students. After eliminating from this group those men who had been disqualified subsequent to Submarine School graduation after at least 15 months submarine duty, there still remained a total of 83 enlisted men as the final control group.

## RESULTS

### Phase I Results

As indicated to the introductory statements this paper has two phases, the first investigating very general characteristics of the DA and EU population and the second more narrowly focussed upon specific aspects of the DA's adjustment history. The results of both phases will be presented in that order. A brief examination of the month-to-

*\*The remainder, a small portion of the disqualified population, was classified as "miscellaneous", a segment not included in this study.*

month disqualification data originating from the operational submarine fleets will be examined first to be followed by individual analyses of specific variables presumed to be related to the causes of disqualification for submarine duty.

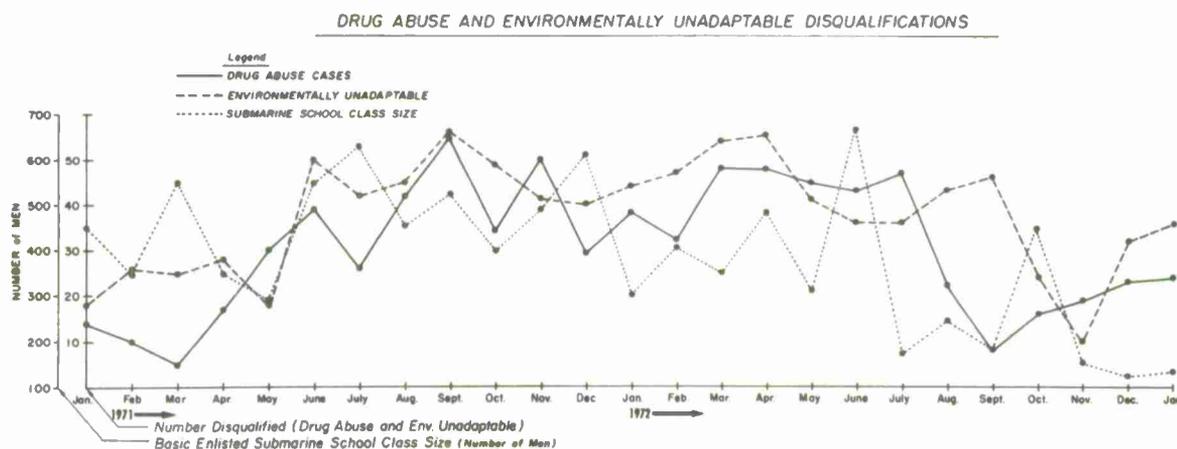
### Search for Trends in the Monthly Disqualification Data.

Whereas longitudinal investigations seldom provide substantial evidence for cause-and-effect relationships, nonetheless suggestive trends often appear from this kind of analysis. Figure 1 provides line graphs of the monthly frequency of submarine disqualifications by reason of DA or EU plotted in parallel with monthly Submarine School graduation information.

At the outset one seemingly spurious aspect of the three line graphs in Fig. 1 should be explained. That is, the D.A. and E.U. monthly frequencies obtained the first 5 months of 1972 are remark-

ably lowered, since virtually all of the data collected during that time frame originated from the Submarine Atlantic Fleet, the letter to SUBPAC requesting the D.A. and E.U. information having been disseminated sometime after May, 1971. As a result, most of the following comments pertaining to the graphs in Fig. 1 were based upon the data collected during the 19 months extending from June '71 through January '73. This change in sampling procedure is indicated by an increase in D.A. and E.U. frequency from April '71 to June '71 of 129% and 80% respectively.

Casual scrutiny of the line graphs in Fig. 1 suggests covariation of the graphs, particularly those for D.A. and E.U. frequency and between D.A. frequency and monthly Submarine School output. Rho correlation coefficients based upon the 19 monthly data points extending from July '71 to January '73 supported this observation in that this statistic between D.A. and E.U. was 0.48 and between D.A. and monthly Submarine School graduate output was



0.44, both coefficients being significant at the 5% confidence level.\* While the positive sign on the correlation statistic suggests, in the case of the D.A./E.U. relationship, that the monthly frequencies of disqualification by reason of D.A. and E.U. tend to covary. That is to say, plotted in the manner of Fig. 1, they tend to rise and fall together. While unproven by this analysis, this finding nonetheless argues that some of the etiological factors are, or may be, common to both classes of submarine disqualifications. Examples of these factors may be insufficient or inappropriate motivation, and a variety of maladaptive reactions to the stresses of submarine duty.<sup>1,15,16</sup>

Interpretation of the significant positive correlation between the monthly Submarine School output and D.A. frequency during the same time interval is extremely difficult and speculative. Glancing at Fig. 1 several exceptions to the expected positive covariance of these two plots are seen. Thus, from June to July ('71) the number of men graduated increased 14%\*\* and the D.A. frequency dropped 33%. Similarly, inverse trends (but in the opposite direction) occurred the next month (July to August),\*\*\* with the Submarine School datum dropping 24% and the correlated D.A. figure rising 61%. However, in general the two

---

\*The Rho coefficient between Submarine School output and monthly E.U. incidence was not significant at the 5% level.

\*\*It should be noted that the extreme "peaks" in Basic Submarine School monthly output (c.g. July, and Dec, 1971) resulted from the superimposition of a nuclear power graduating class upon the Basic Enlisted Class(es).

\*\*\*It may be no more than coincidental that the transmittal date of the CNO message, Z-94 outlining the USN drug amnesty program was 14 July, 1971. 6

curves tend to show a covariance as the positive correlation coefficient would suggest. Dailey<sup>12</sup>, a member of the Bureau of Naval Personnel research staff, more than a decade ago, pointed out the rather constant inverse relationship between reenlistment rate and input to the Navy at the recruiter level. Implied by the 1958 analysis was the assumption that there were some personnel management procedures which accounted for the correlation between retention and recruitment policy reported by Dailey (op cit.). Possibly in a similar vein, it appears that the number of Submarine School graduates assigned to the operational fleet with the "SU" or "SG" designator\*\*\*\* within a given time frame somehow varies directly with the number of men disqualified as D.A. cases. Apparently, some analog of the econometric concept of the inverse relationship between "supply" and "demand" explains in part the Dailey data and possibly the interrelationship between D.A. and input into submarines found in this study.

Still on the topic of the interrelationship of the number of personnel entering the submarine service and numbers of D.A. cases, a precautionary note should be introduced. That is, if one computes a percentage figure, month-by-month, equal to the ratio of D.A. frequency to input from the Submarine School, a ratio indicating the relative number of men "going out" as D.A. cases as compared to the number coming into the submarine service in a given time span is obtainable from the data in Fig. 1.

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\*\*\*\*SU and SG refer to enlisted Submarine School graduates who are not yet designated SS (submarine qualified), the former being regular Navy and the latter a member of the active reserves.

Computed for the last 19 data points (months) in Fig. 1, this percentage ranged from 3% to 27% with a mean of 11%. The caveat appropriate here is that these percentages are not in any sense to be construed as D.A. incidence statistics since the population-at-risk must of necessity be the total number of men on operational submarines rather than input from Submarine School\* as plotted in Fig. 1.

#### Drug Abuse Cases by Class of Submarine.

As indicated in the above discussion, incidence statistics tend to be elusive and most often very inaccurate for reasons mentioned earlier. It is possible however to break down segments of the monthly data presented in Fig. 1 so as to shed some light on certain aspects of the D.A. question as it pertains to the submarine service. Table I presents such a breakdown.

It should be pointed out at the outset that the three-month sample obtained in 1971 was composed of D.A. cases processed just before Z-94<sup>6</sup> was disseminated.\*\* Further, the sample of D.A. cases was drawn in the three months after June '71 because, it may be re-

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\*A very gross incidence figure may be calculated by accepting an estimate of an average of 19,500 enlisted men assigned to operating "subs" in FY71 (from Table I in reference #17). The ratio of the sum of D.A. cases for FY71 (from Fig. 1, this paper) is 493 to 19,500 which equals approximately 25 per thousand. Cited earlier was the published incidence of DA in the U.S. Army in West Germany of 460/1000.<sup>1</sup>

\*\*As mentioned earlier, the transmittal date for Z-94 was 14 July 1971; however, it was assumed that dissemination and implementation of the CNO message required a month or more.

called, that this time span coincided with the first three months that complete DA information was available from both Fleets (see Fig. 1). On the other hand, the '72 sample was collected well after the CNO message had been implemented. Accordingly, the first question to be considered from the data in Table I, was whether there were any observable changes in the composition of the DA samples obtained before and after Z-94? Accordingly, comparison of the SUB-LANT DA samples for '71 and '72 indicated a 100% increase in SS's and a 375% increase in SSN's. Unexpectedly, a similar comparison for SSBN's showed a 40% decrease rather than increased for the two DA samples during the same time span. While these changes were acceptably reliable ( $p$  of  $X^2 < .01$ ), a similar comparison of the more sparse SUBPAC data resulted in no significant\*\*\* differences for the D.A. groups. Similarly, none of the differences between the '71 and '72 data for the EU groups within submarine types was reliable. Somewhat misleading are the obvious disproportionalities of D.A. cases between fleets for the same submarine types. The spuriousness in the between-fleet data which, as it stands, is nonchance ( $p < 0.01$ ) resulted of course from the failure of the data in Table I to be corrected for the relative differences in the numbers of the 3 submarine types in the two fleets as well as failure to compensate for differences between SS, SSN and SSBN crew size (see Tables I and II in ref. 17). Further discussion of these results is reserved for the final section of this paper.

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\*\*\*Hereafter, for the purpose of this paper "significant" will refer to sample differences with null probability less than 5%.

Table I. Comparison of Two Three-Month Samples of Drug Abuse and Environmentally Unadaptable Cases Drawn Twelve Months Apart

<u>June-Aug. 1971</u>								
SUBMARINE TYPE	<u>SUBLANT</u>				<u>SUBPAC</u>			
	N	<u>D.A.<sup>a</sup></u> %	N	<u>E.U.<sup>a</sup></u> %	N	<u>D.A.<sup>a</sup></u> %	N	<u>E.U.<sup>a</sup></u> %
SS	8	10	19	21	2	9	18	46
SSN	8	10	19	21	15	68	15	39
SSBN	64	79	51	55	2	9	6	15
Other (Flotilla Staff, etc.)	1	1	3	3	3	14	0	0
TOTALS	81	100	92	100	22	100	39	100
<u>June-Aug. 1972</u>								
SUBMARINE TYPE	<u>SUBLANT</u>				<u>SUBPAC</u>			
	N	<u>D.A.<sup>a</sup></u> %	N	<u>E.U.<sup>a</sup></u> %	N	<u>D.A.<sup>a</sup></u> %	N	<u>E.U.<sup>a</sup></u> %
SS	16	17	24	29	1	4	12	38
SSN	38	40	21	25	20	92	17	53
SSBN	38	40	37	45	0	0	3	9
Other (Flotilla Staff, etc.)	4	3	1	1	1	4	0	
TOTALS	96	100	83	100	22	100	32	100

<sup>a</sup>D.A. - Drug Abuse; E.U. - Environmentally Unadaptable

As was indicated above, disproportionalities of D.A. incidence among the three submarine types indicated in Table I are not valid largely because of inability to ascertain a meaningful estimate of the population at risk. However it is possible to conduct a gross examination of the disproportionality question stated above, using estimations of the numbers of enlisted men in operational billets on each "sub" type extrapolated, as before (footnote, p. 6) from Table I in reference #17. Table II contains these data.

Assuming that the population-at-risk estimates of operational billet strength in 1972 were usefully accurate, the results in Table II first of all indicate that the incidence of D.A. on diesel submarines is proportionate to billet strength. However, it is at the same time suggested that disproportionately more D.A. cases originate from SSNs and fewer from SSBNs. Whereas a variety of factors may account for this incongruity, one thinks of such factors as differential availability of drugs, duration and type of submerged missions, amount of shore leave and location of homeport, to name a few. Too, since the D.A. sample had accumulated almost a year subsequent to the issuance of Z-94, the relative accessibility of D.A. rehabilitation and counselling facilities in the homeports of SSNS vice SSBNs may be a consideration. Additional comments regarding these findings will be included in the discussion section.

#### Age, Education, Paygrade and Time in Submarine Service.

Age. A relatively recent study demonstrated that the younger Submarine School students have a higher probability to fail at the school level<sup>5</sup>. Similarly, it was shown in the first of the present series<sup>2</sup> that the mean age of the DA group was significantly less than that of the control sample. Comparison of the age distributions for the D.A., EU and control groups used in the present study are contained in Table III.

In terms of age distributions, the three samples are obviously different. As mentioned above, the finding in Table III that the members of the D.A. group tended to be younger is consistent with the results reported in the first paper of the present D.A. series<sup>2</sup>. It is important to note that the F-ratio computed for the D.A. and C samples was significant (1% level) indicating that the age differences are somewhat more constricted within the D.A. group. A practical implication for the submarine service at least arises from the range data for the D.A. group (17-24), namely, that the recommended maximum age of 28 for inclusion in the DOD, D.A. Urinalysis Testing Program<sup>11</sup> may be unrealistically high. Finally, insofar as age distributions are concerned, those enlisted men disqualified for submarine duty as E.U. tend to be systematically older than the D.A. group and younger than the control sample.

Table II. Frequency of Drug Abuse Cases as Compared to Gross Estimates of Populations-at-Risk

TYPE SUBMARINE	Drug Abuse <sup>a</sup>		Estimated Populations-at-Risk <sup>b</sup>	
	f	%	f	%
SS	17	15	3840	20
SSN	58	51	5336	27
SSBN	38	34	10250	53
With df=2, p of $X^2 < .01$				

<sup>a</sup> Three month sample (June - Aug. '72) drawn from both submarine fleets (Flotilla and other billets in Table I deleted).

<sup>b</sup> Estimated numbers of enlisted men in operational billets during CY72 (From Table I, Ref.#17).

Table III. Age Distributions for Drug Abuse, Environmentally Unadaptable and Control Groups

Group	N	Mean	S.D.	Range
Drug Abuse (DA)	226	18.96	1.13	17-24
Environmentally Unadaptable (EU)	209	19.34	1.99	17-26
Control (C)	176	19.86	2.27	17-29

DA/C t-ratio = 5.3,  $p < .01$

DA/EU t-ratio = 2.2,  $p < .01$

EU/C t-ratio = 2.3,  $p < .05$

Education. Based upon a relatively small subject sample (N=67), the first study in the present D.A. series<sup>2</sup> reported that 15% of the drug abuse group as compared to 4% of the control group were high school dropouts (5% level, by X<sup>2</sup>). The data pertaining to the educational achievement of the present, much larger D.A. sample was analyzed using years of formal education as the index. The distributions of this educational index for the D.A., E.U. and control groups are contained in Table IV.

It is immediately apparent that the distributions of educational achievement of the D.A. and E.U. are virtually parallel. At the same time the mean educational index of both of these groups is

significantly lower than that of the control group. One of the most consistent findings in the literature dealing with the prediction of individual differences in the quality of an enlisted man's adjustment to the Navy is that inadequate adjustment is associated with below-average educational achievement. For example, this relationship has been shown for the Navy in general<sup>14</sup> and for the submarine service in particular<sup>5,15</sup>. It is not implied that lack of educational skills is a direct cause of inadequate adjustment to the Navy including D.A. Rather, poor educational attainment is but one indicator or symptom of a configuration (syndrome?) including inappropriate attitudes and motivation, lack of social skills and ineffective study habits.

Table IV. Comparison of the Educational Achievement of the DA, EU and Control Groups

Group	Educational Achievement <sup>a</sup>		
	N	Mean	S.D.
Drug Abuse (DA)	227	11.7	1.2
Environmentally Unadaptable (EU)	209	11.7	1.0
Control (C)	176	12.3	1.1

DA/C t-ratio = 6.1, p < .001

EU/C t-ratio = 3.7, p < .001

DA/EU t-ratio n.s.

<sup>a</sup> Units are years formal education.

Paygrade and Time in Submarine Service. The mean duration of time in the submarine service for the D.A. group was 5.8 months with a range of <1 to 19 months as compared to a mean of 6.9 months (range, 1-19 months) for the E.U. group, a mean difference significant at the .005 level (t-test). On the other hand the control group had been in an operational submarine billet significantly longer than either the D.A. or E.U. group members, the duration ranging from 12 to 25 months.

Obviously correlated with time-in-service is the paygrade a man is able to achieve. Comparison of the paygrade distributions for the D.A., E.U. and control group is contained in Table V.

As compared to those submarine personnel disqualified as EU, the paygrade distributions (upper half Table V) for the DA sample showed that significantly more of the DA cases were non-rated.\* Further, disproportionately more of both the DA and EU samples are in the SR/SA and SN paygrades and significantly less at the E-4 level as compared to the control group. Finally, fewer of the DA group reach the PO/2 grade as compared to both the EU and C groups.

However, since there are time-in-service requirements for eligibility for paygrade advancement, disproportionalities in enlisted grade distributions as indicators of individual differences in motivation to achieve in the U.S. Navy may be misinterpreted unless some correction for time in service is

\*This finding is consistent with the data in a recent publication on drug abuse in the total Navy population.<sup>34</sup>

applied. Accordingly, it is seen in the lower half of Table V that matching the groups for time-in-submarines (12 to 19 months), fractionates the data to about 10% of the DA and EU samples and to about 57% of the control group. Although, 20% fewer of either the DA or EU are in paygrades E-1 and E-2 than are found in the control group, this difference is significant only at the 9% confidence level ( $X^2$ ). In sum, using paygrade attainment as the index, the data in Table V failed to demonstrate that the men disqualified for submarine duty for DA and EU are less well-motivated for achievement in the Navy than are a comparable control group.

#### Submarine School Performance.

The first paper in the present series on drug abuse<sup>2</sup> demonstrated that the DA group as a whole characteristically earned lower grades in Basic Submarine School. The same paper failed to show however that the members of the DA sample tended to obtain different scores on a psychiatric screening test, a motivation test, or a depression test. Too, there were no significant differences on any of the Basic Test Battery scores except for the Arithmetical Test.\*\*

With more than a 200% larger DA sample than the first study, the present study provided an opportunity to examine some highly relevant interactional effects among selected test scores and the quality of performance in Submarine School. The first such interactional question pertained to the relationship of

\*\*The DA group members tended to earn lower scores than the control group.

Table V. Paygrade Distributions for the DA, EU and Control Groups

Groups	Paygrade Distributions							
UNCORRECTED <sup>a</sup>	<u>SR/SA</u>		<u>SN</u>		<u>PO/3</u>		<u>PO/2</u>	
	f	%	f	%	f	%	f	%
Drug Abuse (DA) (N=227)	140	62	50	22	30	13	7	3
Environmentally Unadaptable (EU) (N=209)	122	59	34	16	34	16	19	9
Control (C) (N=176)	66	37	38	22	54	31	18	10
With df=3, p of X <sup>2</sup> : DA/EU=.05; DA/C=.001; EU/C=.005								
CORRECTED <sup>a</sup>	<u>SR/SA</u>		<u>SN</u>		<u>PO/3</u>		<u>PO/2</u>	
	f	%	f	%	f	%	f	%
Drug Abuse (DA) (N=20)	11	55	3	15	5	25	1	5
Environmentally Unadaptable (EU) (N=22)	12	55	2	9	6	27	2	9
Control (C) (N=100)	35	35	28	28	28	28	9	9
With df=1, p of X <sup>2</sup> : DA/EU=n.s.; DA/C=n.s.; EU/C=n.s.								

<sup>a</sup> Corrected/Uncorrected — "Corrected" contingency table (lower half of table) results from approximately equating the DA, EU and C groups in terms of time-in-the-submarine service.

verbal aptitude (GCT scores) and Submarine School grades within the DA and control groups. Table VI presents the relevant data in crossbreak format.

At the outset, the well known positive relationship between GCT scores and Submarine School grades is clearly

demonstrated by the data in Table VI but in different ways for the DA and C groups. That is, for the control group only disproportionately more of the men with high GCT scores earn above average grades in Submarine School. In like manner, more of the men with below average GCT scores tend to "fall" in the

Table VI. Interaction of the Submarine School Performance of the Drug Abuse and Control Groups with GCT Scores

Submarine School Grades		
	Below 50th Percentile <sup>b</sup>	Above 50th Percentile <sup>b</sup>
<u>Above Mean GCT<sup>a</sup></u>		
Control	37 (40%)	56 (60%)
Drug Abuse	49 (48%)	52 (52%)
	With df=1, p of X <sup>2</sup> =n.s.	
<u>Below Mean GCT<sup>a</sup></u>		
Control	51 (61%)	32 (39%)
Drug Abuse	98 (84%)	19 (16%)
	With df=1, p of X <sup>2</sup> =0.005	

<sup>a</sup> Above and below the Mean of the distribution of GCT scores for both groups combined.

<sup>b</sup> Based upon percentile ranks for the specific "sub school" graduating class of which each man was a member.

lower half of their respective grade distributions. However, this relationship is three times as strong for the DA group as compared to the control group. Stated another way, the data in Table VI argue that men with admitted history of DA of some kind will be much more likely to achieve less than average grades in Submarine School, but only if they have below average GCT scores. The finding that the DA with low GCT scores tend to earn lower Submarine School grades is not interpreted as the result of low verbal aptitude per se. For one thing, more of the DA group are high school dropouts.<sup>2</sup> Also, to anticipate some findings from Phase II of this study, DA cases are more likely to have been expelled from high school, to have failed more subjects, and to have negative attitudes towards their teachers than a matched, non-DA control group. Thus, as stated concerning a similar finding in a previous DA study, "the kind of person who has a drug abuse history is more likely to be poorly motivated for the submarine service and to have inadequate study skills, both factors combining to result in poorer grades"<sup>2</sup> (p. 11). This quote suggests that the poorer Submarine School achievement of the DA group as a whole may be construed as an indirect effect, that is, the type of enlisted man who admits DA also tends to be the kind of man who makes low grades, has poor attitudes and so on.

Further, consistent with the above quoted paper<sup>2</sup> the larger DA and C samples contained in the present study again failed to demonstrate differences between the groups in terms of personality test scores designed to measure emotional stability, depression, and moti-

vation for the submarine service. But again in these studies questions related to trait interactional relationships with Submarine School performance remained unanswered. Table VII presents data bearing on this interactional question for one psychometric measure of general emotional stability, the Personal Inventory Barometer (PIB)<sup>20</sup>.

A brief comment regarding the PIB test would appear to be in order. Aggregated from weighted responses on a 9-point Likert-type scale to 52 objective items of the MMPI variety, the PIB score obtained from a representative sample of Submarine School students results typically in a distribution with means ranging from 102 to 107 and standard deviations from 46 to 62.<sup>21</sup> While the PIB distributions for the DA and C groups were slightly different (means 134 and 122 and SD's 83 and 77 in the same order), the t-test was not significant.\*

In a sense corroborative of the major finding from Table VI, the data in Table VII again argue for the general conclusion that having a DA history does not allow one to predict below-average grades in Basic Submarine School. It is true that if the segment of the DA group also has symptoms of emotional instability as measured by the PIB then the likelihood of this group's performing poorly in Submarine School is greatly increased. This finding coupled with the major conclusion drawn from Table VI, namely, that a man with a DA history in his background is likely to be a

*\*One reason for the larger PIB means and SDs in both the DA and C samples as compared to those published in reference #20 is that 2 additional test items were included in the scoring key used to score the PIB protocols used in this study.*

Table VII. Crossbreak Analysis of the Interaction of PIB and Submarine School Performance for the DA and Control Groups

Submarine School Performance		
	<sup>a</sup> Below 50th Percentile	<sup>a</sup> Above 50th Percentile
<u>Above Mean PIB</u>		
Drug Abuse	72 (76%)	23 (24%)
Control	29 (49%)	30 (51%)
With df=1, p of $X^2=0.02$		
<u>Below Mean PIB</u>		
Drug Abuse	76 (60%)	50 (40%)
Control	59 (50%)	58 (50%)
With df=1, p of $X^2=n.s.$		

<sup>a</sup> Above/Below 50th percentile in the total Submarine School Class grade distribution from which each man's scores were drawn.

poor performer in Submarine School only if he has a low GCT, tend to support one basic assumption underlying this and previous studies viz., that many of the DA cases disqualified for submarine duty may in reality constitute a valuable source of personnel for the surface Navy.

Phase II Results.

It should be recalled that Phase II of this study involved samples of 41 DA cases and 83 control cases all of whom had completed the PII (Preinterview Inventory). Upon examination of the content of this inventory (Appendix A) it

is seen that the subject matter includes areas examined previously<sup>2</sup>, for example, educational history and selected sociological and demographical variables. However, this part of the study emphasizes the motivational, attitudinal and selected background variables shown in the literature to be highly relevant for understanding the dynamics of drug abuse.

#### Additional Educational History of DA Cases.

As with previous DA samples, significantly more of the DA group in the Phase II sample were high school drop-outs as compared to the control group (44% as compared to 8%). Also, the members of the DA sample had failed significantly more subjects had more often been expelled from high school. Response distributions to item 3.4 in Appendix A (best and poorest subjects), while not statistically different for the two groups, suggested nonetheless that the "best" 3 subjects were Shop, History and Science for the DA group and History, Shop and English for the C group, both in descending order. Further, both groups indicated that English and Mathematics were their poorest subjects.

Approximately equal proportions of both groups had held a part-time job while in high school (16 and 19 percent) as did about the same relative numbers of the DA and C groups participate in sports (54 and 59 percent) during that developmental period. But the response distributions to items 3.7 in Appendix A were significantly different for the two groups, with three times the

proportion of the DA group admitting that they had gotten along "very poorly" with their high school teachers as was found in the control group.

#### Quality of Adjustment at the Submarine School Level.

Previous research has shown that those submarine candidates who had difficulty passing the pressure chamber test also showed more symptoms of emotional instability than those who passed the first trial.<sup>21</sup> However, examination of the performance of the DA and control groups in the pressure chamber showed that approximately equal proportions of both groups (17 and 19 percent) either failed the training or had some trouble of an undisclosed nature during the procedure (item 4.9(a) in Appendix A).

Consistent with the finding reported previously that the DA, more so than the C-group, tended to have more trouble "getting along" with their high school teachers, the response distributions to item 4.9(b) (Appendix A) "How have you gotten along with your Submarine School instructors", showed that significantly more of the DA group (50%) as compared to the C-group (7%) admitted difficulty in their relationships with their instructors in Submarine School. Taken together, these two findings strongly suggest that one significant component of DA in the submarine service has to do with the man's apparent social ineptness in terms of his interrelationships with his shipmates within the constraints imposed by the Navy system. It should be noted in passing, that this generalization is consistent with published diag-

nostic test data arguing that sociopathic trends may be the most significant class of etiological factors characterizing the DA cases originating from the submarine service.

### Sociological, Demographical and Epidemiological Information.

Historically, one of the causes of sociopathy generally and including DA has been ascribed to the psychosocial effects of group instability at the family level as well as the interrelation of families within the larger context of urban and suburban communities. Items II-1, and II-2 in Appendix A were designed to collect two kinds of sociological data related to this relationship namely the marital status of the parents of the DA and C-groups and the type of community these men had lived during their developmental years. Table VIII contains these distributions.

It is immediately apparent that the distributions in the upper half of Table VIII show no disproportionalities between the DA and control groups sufficiently great to indicate that relative family stability was in any way related to DA in the submarine service.

A second sociological finding appearing frequently in the DA literature is that the social conditions, crowding, substandard housing and the like, typical of most large metropolitan areas contribute in various ways to the DA problem. The breakdown of the type of communities in which the members of the DA and C-groups spent their pre-adult years does indicate that more of the DA group were reared in the more

populated areas, though the disproportionalities reached significance only at the 9% level ( $df=3$ ). However, by grouping the "farm" and "country" categories, and the three lower "city" categories, a  $X^2$  analysis ( $df=1$ ) reached the 5% confidence level. Thus, there is a greater likelihood of submariners who grew up in large cities to have DA problems as compared to those originating from less densely populated areas.

The term "drug culture" as referring to the socio-cultural conditions wherein DA thrives is found frequently in the more popularized drug literature. Based upon the assumption that cultural differences occur between geographical areas, Item II 2(a) in Appendix A was designed to provide information pertaining to the geographical locations of the homes of the members of the DA and C-groups. Table IX contains data bearing on this point.

It is readily apparent in Table IX that the distributions of the geographical location of the homes of the DA and C group members are remarkably similar as indicated by the insignificant  $X^2$ . Though based upon rather small subject samples, there is however one sizeable percentage difference, namely between those from the "West", 20% for the DA group and 9% for the C-group. But the reliability of this difference (t-test) reached significance only at the 10% confidence level, suggesting the tenuousness of this finding. Another noteworthy finding in Table IX was that none of the DA group had spent his developmental years in the southern section of the USA while 18% of the control group had (differences between the proportions significant at the 1% level, t-test).

Table VIII. Comparison of the Home Environment and Parents Marital Status of the DA and Control Groups

	DA		Control	
	f	%	f	%
<u>Parents Marital Status</u>				
Married, living together	21	52	49	59
Apart, divorced, separated	12	29	20	24
One or both deceased	8	19	14	17
With df=2, p of $X^2 = n.s.$				
	f	%	f	%
<u>Home Environment</u>				
Farm	1	2	8	10
Country (<2.5K pop.)	4	10	20	24
Small City (Pop. 2.5 - 25K)	13	32	20	24
City (Pop. 25 - 100K)	12	29	18	22
Large City (>100K)	11	27	17	20
With df=3, p of $X^2 = n.s.$				

While the literature of DA supports the general finding that there are differences between different geographical areas in terms of incidence of DA (e.g. ref. #23), the explanation of this finding is not obvious, though one thinks of the fact that fewer heavily-populated cities are found in the South as compared, for example, to the Mid-Atlantic or West Coast states.

One final sociological factor of concern in this study had to do with possible differences in the socioeconomic levels of the DA group as compared to the control sample. There is considerable evidence indicating, at least since World War II, that the highest incidence of DA tends to occur in areas of high population density and within communities sustained at a below-

Table IX. Comparison of the DA and C-groups in Terms of the Section of the U.S.A. in which the Men Grew Up

Geographical Area of U.S.A.	<u>DA</u>		<u>Control</u>	
	f	%	f	%
New England	4	10	5	6
Mid-Atlantic	8	20	17	20
Mid-West	11	25	25	30
South	-	-	15	18
West	8	20	7	9
West Coast	6	15	13	16
No Response	4	10	1	1
TOTALS	41	100	83	100

With  $df=4$ ,  $p$  of  $X^2 = n.s.$

average socioeconomic level. Using the major occupation\* of the father of the DA and C-group members as an index of the socioeconomic level from which the man had come, a comparison of the two groups was possible. These data are contained in Table X.

There appears to be little discussion of the data in Table X warranted in that the distributions are quite similar, both in approximate agreement with Labor Department information cataloged in a

similar manner.\*\* Possibly remarkable is the fact that more of the fathers of the C-group members, as compared to those in the DA sample, are or were in the skilled and profession occupational groups (68% vice 51%), though these differences are not statistically significant. While highly tenuous because of sparse subject sampling, the proportion of the parents of the C-group in the "military" category was 5 times that found in the DA group. Possibly the most significant item of information in Table X is the greater number of

\*The method for occupational classification used in this study was taken from reference 24.

\*\*Reference No. 24, Volume I.

Table X. Comparison of Father's Occupation of the DA and Control Groups

Occupational Grouping	<u>DA</u>		<u>Control</u>	
	f	%	f	%
Major Professional	1	2	1	1
Professional	6	15	15	18
Minor Professional	5	12	10	12
Skilled	13	32	31	37
Semi-Skilled	3	7	5	6
Labor	6	15	8	10
Farmer	-	-	3	4
Military	1	2	8	10
No Codable Data	6	15	2	2
<b>TOTALS</b>	<b>41</b>	<b>100</b>	<b>83</b>	<b>100</b>

With df=3, p of  $X^2 = n.s.$

indeterminant responses, suggesting some obscurity of the role of the father of DA cases. In passing, it should be noted that frequently in the DA literature appears the notion, more-or-less supported by fact, that the lack of a stable male role model may be one of the major causes of DA in adolescent males.

History of Maladjustment or Mental Illness.

Whereas the literature of modern psychiatry does not provide a great deal of substantive evidence for direct genetic causes of psychiatric illness, there is some evidence for predispositional effects which are genetically controlled

at least for certain psychotic conditions.<sup>22</sup> Item II-4 in Appendix A was aimed at obtaining information pertaining to the presence or absence of any history of mental illness in the parents of the DA and C-groups. Accordingly, fifteen percent of the parents of the DA group had been hospitalized or treated for some mental condition. A comparable statistic for the control group was much lower (6%), however, this difference was not significant. Still, the group differences in response to Item II-5 (Appendix A), "Have you ever been treated for any kind of an emotional condition", were significant. Thus, 27% of the DA group indicated that they had been treated for some emotional condition of undisclosed nature some time in the past. By comparison, none of the 82\* members of the control group responded "Yes" to this item. A related finding was based upon a comparison of the responses of the DA and C-groups to Item II-3 in Appendix A, the item content having to do with a history of adjudicated crime. Thus significantly more (24%) of the DA group admitted that they had been brought before a judge and convicted of some crime of undisclosed nature. The comparable percentage for the control group was 8%. These results will be subsequently discussed in the final section of this paper.

#### Motivational Differences of the DA and Control Groups.

The first paper of this series indicated that the motivation for submarine duty as indicated by objective test scores was not significantly different

\*One man in the control group did not respond to this item.

for the DA group as compared to the control group.<sup>2</sup> But frequently throughout the DA literature mention is made of the decline in intensity and/or appropriateness of the motivation of DA cases, achievement motivation for example as indicated by poor performance and attrition in high school, in Submarine School<sup>2</sup> and in college.<sup>25</sup>

One aspect of the total motivation of the DA cases investigated in this study dealt with the differential motivational patterns underpinning the man's decision to volunteer for the submarine service. Presented in Table XI, these data were obtained from the open-ended Item II-6 in Appendix A\*\*.

As indicated by the insignificant statistical test, the overall distributions of "reasons for volunteering" for the two groups were quite similar. However, one finding of possible significance was that the largest percentage difference (significant at the 5% level by t-test) occurred for category A, "Educational Opportunities". Since the mean educational achievement level of the DA group was significantly less than the control group (Table IV), one interpretation of this finding is that more of the DA group members saw the submarine service as offering realistic opportunities to compensate for educational deficiencies. The high proportion of DA cases whose motivation for volunteering "fell" in categories A and K (41%) may be interpreted as evidence against the notion that the DA cases in the submarine service tend to be inadequately or inappropriately motivated. It is interesting to

\*\*The responses to the questionnaire item "reasons for volunteering" were classified by Q-sorting techniques.

Table XI. Stated Reason<sup>a</sup> for Volunteering for the Submarine Service

Reason for Volunteering	DA		Control	
	f	%	f	%
A. Educational Opportunities	7	17.1	6	7.2
B. Good Duty (Living conditions, caliber crew, good duty schedules, etc.)	5	12.2	13	15.7
C. Didn't Volunteer (Tricked, etc.)	1	2.4	4	4.8
D. More money	10	24.4	18	21.7
E. Adventure, travel, excitement	1	2.4	3	3.6
F. Negative Motivation (Avoid other duty, etc.)	1	2.4	3	3.6
G. Others' Influence	2	4.9	3	3.6
H. Status and Prestige of Sub. Service	-	-	1	1.2
I. Serve County	-	-	2	2.5
J. Duty near home	2	4.9	-	-
K. Positive Motivation (Interest, challenge)	10	24.4	24	28.9
No Response	2	4.9	6	7.2
TOTALS	41	100	83	100

With df=3, p of  $X^2 = n.s.$

<sup>a</sup> Only the first of two reasons listed in response to item #6, Part II in Appendix A was analyzed.

note in passing that one of the most prevalent reasons for volunteering given by the DA group was for the additional hazardous duty pay (Category D in Table XI). In an older study of enlisted motivation for the submarine service,<sup>26</sup> the "extra money" category was superlative only for the segment of the submariner candidate sample which subsequently failed in Submarine School.

Whereas it is a reasonably well established fact that the long or short range vocational plans of late adolescent and young adults are diffuse at best<sup>27</sup>, it was nonetheless considered relevant in planning the present study to obtain some data bearing on the question of DA and C-group differences in goal orientation. Table XII presents the distributions of responses obtained from Item 9

Table XII. Stated Vocational Choice of the DA Group Compared to the Control Group

Vocational Choice	<u>DA</u>		<u>Control</u>	
	f	%	f	%
Major Professional	3	7	7	9
Professional	7	19	12	14
Minor Professional	3	7	13	16
Skilled	12	30	20	24
Semi-Skilled	1	2	-	-
Labor	1	2	2	2
Farmer	1	2	4	5
Military	-	-	5	6
Peace Corps	1	2	-	-
Pro Sports	1	2	-	-
Own Business	1	2	-	-
Musician	3	7	-	-
Responses, Not Codable	6	18	20	24
<b>TOTALS</b>	<b>41</b>	<b>100</b>	<b>83</b>	<b>100</b>

With  $df=3$ ,  $p$  of  $X^2 = n.s.$

(Appendix A) bearing on the question of the vocational preferences of the two groups.

It is immediately apparent that the overall distributions of vocational preferences for the DA and C-groups are quite similar. However, the between-group differences for the individual occupational groupings in Table XII reached significance only for the "Minor Professional" category (5% level, t-test). One plausible explanation of the finding that less of DA group indicated vocational choices in the minor professional area (i.e. minor proprietary or managerial, minor sales, etc.) is that similar between-group differences are to be found in the occupational distributions of the group members' fathers (Table X). Since the proportions of the fathers of both the DA and C-group members in this job class were identical, namely 12% (Table X), the reasons for these differences probably are to be found elsewhere. Probably the most important general observation regarding the data in Table XII is the demonstration that the goal orientation, insofar as long range vocational designs are concerned, of the DA group appears to be no more obscure or diffuse than that of the control group. In fact, though not statistically significant, disproportionately less rather than more of the responses given by the DA group fell in the "not codable" category in Table XII.

#### GENERAL DISCUSSION OF RESULTS

From the standpoint of numbers of pharmacological agents made available to the consumer as medication, the history of modern medicine is relatively

brief. For example, it has been estimated that 70% of the drugs presently being prescribed were not known as medicating agents prior to World War II.<sup>28</sup> Moreover it has also been estimated (op.cit.) that 60% of the drugs currently in use produce significant psychoactive effects either directly or as side effects of the major pharmacological action for which the drug was compounded. Thus, as mentioned in an earlier paper<sup>2</sup>, the trend toward greater severity of the drug abuse problem has coincided historically with similarly accelerating trends in the availability of prescription drugs such as sedatives, stimulants, and a variety of so-called ataractic or tranquilizer substances. The point of this discussion of course is that as more and more behavioral-affecting agents have become available, legally or illegally, the problem of drug abuse, dependency, and addiction has similarly become more acute. In fact, one type of addiction mentioned frequently in the DA literature (e.g. Ref. 31) is "iatrogenic addiction" (meaning literally, physician-caused addiction) to refer to drug dependence developed as the result of prescribed medication administered during a prolonged illness or incapacitation. Thus what appears to have happened in the past 30 years is a change in one of the attitudinal components of our cultural "life style" namely, that "pills", however acquired, can somehow solve our adjustment problems. Therefore, it is our assumption that the DA problem, if it is a problem for the submarine service, is but a symptom of this change in one aspect of our culturally-accepted life style. Accordingly, the present paper as well as the two previous papers of this series<sup>2,3</sup>, have attempted to identify and describe the

submariner or submariner candidate who is most (and least) likely to incorporate this life style modification to such an extreme degree that it poses a significant adjustment handicap for him as a member of the submarine service.

Planned as an extension of certain aspects of the first DA paper of this series<sup>2</sup>, Phase I of this study involved more than 200 men disqualified for submarine duty by reason of DA. In addition, a similar-sized sample of men disqualified for submarine duty as "Environmentally Unadaptable" (EU) was included as a comparison group for both the DA and control groups.

First of all, the significant covariation of the monthly incidence of DA and EU cases clearly suggested that there are probably a number of causal factors common to both classes of submariner disqualifications (Fig. 1). Unexpectedly, significant positive covariance was also found between the number of Submarine School graduates and the number of DA cases plotted month by month (Fig. 1). While it is suggested quite tenuously that some managerial principle like the supply/demand concept in economics may be involved, a more parsimonious explanation, reported at the Submarine School level 20 years ago<sup>29</sup>, is that the criteria for disqualification, by reason of DA, EU, or Submarine School attrition fluctuates systematically with the number of men available and the personnel requirements of the fleet in the time segment under consideration. In passing, it should be mentioned that the above relationships allows one to predict that if, in an all-volunteer force era for example, the personnel requirements become

lower, the criteria for DA disqualification will also change in such a way as to result in a correlated decrease in incidence. An example of evidence of changes in the criteria for submariner disqualification for DA may be inferred from Table I wherein 100% to 375% increases in DA incidence found on SSs and SSNs occurred before and after the issuance of Z-gram 94.

Another question was examined, namely, "Do DA and EU incidence vary with type of mission?". The data in Table II, though based upon somewhat gross estimates of the populations-at-risk, argue that disproportionately more DA cases originate from SSNs and fewer from SSBNs. Differences in duration and predictability of missions and differences in crew composition were cited as two possible explanations of these results.

Tending to corroborate certain findings reported in the first DA paper of this series<sup>2</sup>, data based upon a DA sample four times the size that of the earlier study showed that the DA cases disqualified for submarine duty tended to be younger (Table III), to have a history of poorer high school performance, to earn lower BTB scores, and to more frequently have a history of adjudicated crime. A related finding involving marine aviators and reported in the very recent literature<sup>13</sup> found lower AFQT scores and lower (OES)\* Odds-for-Effectiveness<sup>14</sup> scores for DA cases as compared to controls.

The first paper of this series presented data to support the general as-

\*The OES score is computed from additive linear regression weights assigned to education achievement, aptitude scores, delinquency history and other variables.

sumption that the most appropriate focus for DA research was upon the motivational dynamics of the drug user himself.<sup>2</sup> However, the psychometric indices of motivation included in the first study failed to discriminate between the DA and C-groups. Therefore, more indirect indicants of motivation were employed in the present study. In the first place, the differential motivation underlying the DA and C-groups decision to volunteer for the "sub" service was examined (Table XI) and showed the DA group (more so than the control group) stated that they had volunteered because of the educational opportunities afforded. In the context that the DA group tended to have a history of poor academic performance and school dropout (this study and Ref. #2), the above finding was unexpected. Coupled with the absence of obscurity in vocational plans (Table XII), the apparent incentive value of educational opportunities for the DA group certainly does not appear to be consistent with the often-stated characterization of DA cases generally as dyssocial and poorly motivated.<sup>23</sup>

Still another somewhat oblique indicator of motivation was the comparative paygrade level the DA and C-groups had achieved after a stated period of submarine duty. The data presented in Table V demonstrated that more of the DA as compared to the C-group tended to be in the E-1 and E-2 categories and fewer in the E-4 and above grades. That these differences were not indicative of true achievement deficiencies however, is attested by the fact that they fail to reach significance if the comparison groups are equated for time-in-service. Therefore the notion that young males

with a DA history are poor risks from the standpoint of job achievement probably is not true for the submarine service.

One final indicator of individual differences in motivation was inferred from the grades in Submarine School the DA and C-groups had earned in Submarine School. In the same way the paygrade data (Table V) were subject to misinterpretation unless the moderator variable time-in-service was controlled, the data dealing with the Submarine School performance of the DA and C-groups were shown to have meaning only if verbal aptitude (GCT scores) and emotionality traits (PIB scores) are treated as moderator variables (Tables VI and VII in the same order). Thus, only those segments of the DA sample with below average GCT scores or above average PIB scores tended also to have a history of below average performance in Submarine School. In sum, these interactional findings tend to support the previously stated contention (Ref. 2, p. 10) that drug usage itself is not the cause of poor academic performance. Rather the causes are to be found in the motivational, emotional, and, aptitudinal areas.

The search for possible causal factors for DA in the submarine service included a brief examination of selected demographical and sociological variables which have been shown in the non-military DA literature at least to be related to the problem.<sup>23</sup> Accordingly, the DA cases in this sample did not originate disproportionately more frequently from broken homes though these men were more likely to have been reared in metropolitan areas (Table

VIII). Though somewhat tenuous because of sparse data, there may be fewer of the parents of the DA group who were or had been in the military (Table X). Equally tenuous but nonetheless suggestive is the higher percentage of the DA group who gave obscure, at least non-codable information, pertaining to their father's occupation. This finding may be interpreted as tending to support the often-stated notion that one cause of adolescent male delinquency as well as DA is an unstable male parent or parental surrogate.<sup>27</sup>

Are differences in incidence of DA in the submarine service coincident with differences in the geographical area of the USA in which the man had spent most of his developmental years? The distributions presented in Table IX were related to this question and showed no significant overall patterns; however, there were suggestive trends indicating that fewer DA cases (none in the present sample) originated from the South and disproportionately more grew up in the West, Arizona, Nevada, New Mexico, Montana and the Dakotas.

The second study of this DA research series<sup>3</sup> presented some evidence to support the general notion that many, if not most of the men disqualified for submarine duty by reason of DA characteristically show maladjustment indices ranging from sociopathic patterns to moderately severe psychiatric symptoms. While the findings in the previous study were based upon diagnostic test data, the present study was designed to obtain direct biographical information related to the adjustment history of the DA sample. First of all, more of the men in the DA (15%) indicated that their

parents had been treated for a psychiatric condition. While a similar statistic for the control group was 6%, the difference failed to meet the 5% confidence criterion. When asked if the man himself had received psychiatric treatment in the past, 27% of the DA and 0% of the C-groups answered affirmatively (t-test significant, < 5%). A closely related finding was that significantly more of the DA (28%) as compared to the C-group (8%) had some history of adjudicated crime. A "caveat" should be expressed in interpreting data related to psychiatric history. Stated simply, many respondents generally deny, suppress or repress memories of socially-undesirable events such as psychiatric treatment and criminal or delinquent history. Thus, it is likely that the above admissions are probably underestimates at best.

Modern psychiatry has tended more and more in the recent past to require as a sine quo non of an acceptable criterion for mental illness (including DA) some evidence of social dysfunctioning.<sup>31,32</sup> Two items on the PII (Pre-interview Inventory) were aimed at obtaining data bearing on one aspect of the men's social adjustment, namely his attitudes towards others within the subculture (in this case the submarine service) to which he must adapt. Thus, the proportion of the DA group with negative attitudes toward their high school teachers was three times that of the control group. Further, 50% of the DA group as compared to 7% of the control group admitted difficulty in their relationships with their instructors in Submarine School.

Interpreted as corroborative of evidence of social dysfunctioning of the DA

population reported elsewhere,<sup>3</sup> these two instances of negative social attitudes would seem to these authors to suggest a possible methodology for screening recruits for DA potential. Briefly, assuming as others have, that social ineptness is the "nub" of the drug users problem,<sup>31,32,33</sup> it may be possible to develop and validate a personality assessment technique designed to dimension selected components of the submariner recruit's social-skills repository. Such a procedure in concert with the proper application of a custom-validated psychiatric screening technique such as recommended earlier,<sup>3</sup> could provide an effective methodology for the early identification of the DA-prone recruit.

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APPENDIX A

Mod - II  
August 1971

PRE-INTERVIEW INVENTORY (PII)

NAME: \_\_\_\_\_ SUBSCHOOL CLASS: \_\_\_\_\_ DATE: \_\_\_\_\_

PART I: EDUCATIONAL AND MILITARY HISTORY

1. Approximately how much active duty time have you had in the Navy?  
Years \_\_\_\_\_ ; Months \_\_\_\_\_ .
2. Did you graduate from High School? Yes \_\_\_; No \_\_\_. If you did not graduate, can you state ONE major reason for dropping out?  
\_\_\_\_\_  
\_\_\_\_\_
3. DURING YOUR HIGH SCHOOL YEARS:
  - 3.1 On the average, how were your grades? A's \_\_\_, B's \_\_\_, C's \_\_\_, D's \_\_\_.
  - 3.2 How many subjects did you fail? \_\_\_\_\_ .
  - 3.3 Were you ever expelled from High School? Yes \_\_\_; No \_\_\_.
  - 3.4 What was your best subject(s)? \_\_\_\_\_; your poorest subject(s)? \_\_\_\_\_ .
  - 3.4A Married? Yes \_\_\_ No \_\_\_.
  - 3.5 Did you hold a part-time job while you were in High School? Yes \_\_\_; No \_\_\_.
  - 3.6 In which sport(s) did you make the first team? Football \_\_\_; Basketball \_\_\_; Track \_\_\_; None \_\_\_; Others (please list) \_\_\_\_\_  
\_\_\_\_\_
  - 3.7 In general, how would you say you got along with your high school teachers? Good \_\_\_\_\_; Fair \_\_\_\_\_; Very Poorly \_\_\_\_\_ .

4. HAVING TO DO WITH SUBMARINE SCHOOL:

- 4.1 So far, what is your approximate grade average? \_\_\_\_\_.
- 4.2 Have you been before the Submarine School Academic Board? Yes\_\_\_\_; No\_\_\_\_\_.
- 4.3 Do you regularly attend special session (evening) classes? Yes\_\_\_\_\_; No\_\_\_\_\_.
- 4.4 How many more weeks do you have yet in Submarine School?\_\_\_\_\_. Do you expect to pass? Yes\_\_\_\_; No\_\_\_\_; Maybe\_\_\_\_\_.
- 4.5 In what type of submarine have you gotten orders to? SSBN\_\_\_\_; SSN\_\_\_\_; Diesel\_\_\_\_; Haven't gotten orders yet\_\_\_\_\_.
- 4.6 So far, how do you feel about Submarine Service? Like it very much\_\_\_\_; Like it somewhat\_\_\_\_; Dislike it somewhat\_\_\_\_; Dislike it very much\_\_\_\_\_.
- 4.7 If you have received orders, are you reasonably well satisfied with them? Yes\_\_\_\_; No\_\_\_\_\_.
- 4.8 What Navy rating or specialty are you most interested in? \_\_\_\_\_  
\_\_\_\_\_.
- 4.9 If you can remember, what was your approximate GCT Score?\_\_\_\_\_; Your combined score?\_\_\_\_\_.
- 4.9(a) How did you do in the Pressure Chamber? Didn't get in the Chamber \_\_\_\_\_; Had no trouble\_\_\_\_\_; Had some trouble\_\_\_\_\_; Had a great deal of trouble\_\_\_\_\_; failed it\_\_\_\_\_.
- 4.9(b) In general, how have you gotten along with your Sub School instructors? Good\_\_\_\_; Fair\_\_\_\_; Very poorly\_\_\_\_\_.

PART II: ADDITIONAL BIOGRAPHICAL INFORMATION

1. Which of the following describes the status of your natural parents? (Mark all that apply)
- a. Both alive and living together
  - b. Married, but living apart
  - c. Legally separated or divorced
  - d. Father deceased
  - e. Mother deceased

2. Up to age 18, what type of community did you live in, for the most part?
- On a farm
  - In the country (or a village less than 2500 persons, but not a farm)
  - In a small city (2500 to 25,000)
  - In a city (25,000 to 100,000)
  - In a large city (More than 100,000)
- 2(a) What state and city did you spend the most time in while you were growing up? State: \_\_\_\_\_; City: \_\_\_\_\_.
3. Have you ever been brought before a judge and convicted of any kind of a crime? Yes \_\_\_\_\_; No \_\_\_\_\_.
4. Have either of your parents been hospitalized or treated for a mental condition of any kind? Yes \_\_\_\_\_; No \_\_\_\_\_.
5. Have you ever been treated for any kind of an emotional condition? Yes \_\_\_\_\_; No \_\_\_\_\_.
6. Please list two (2) reasons for your volunteering for Submarine Service?
- \_\_\_\_\_.
  - \_\_\_\_\_.
7. Do you have some fairly close friends in Submarine School? Yes \_\_\_\_\_; No \_\_\_\_\_. Have you been on liberty with any of them? Yes \_\_\_\_\_; No \_\_\_\_\_.
8. Do you think you will be a career submariner? Yes definitely \_\_\_\_\_; Maybe \_\_\_\_\_; No definitely \_\_\_\_\_.
9. If you had your choice, what kind of vocational choice would you make, that is, what would you like to do in life? \_\_\_\_\_.
10. If you have one, what is your favorite hobby or leisure time activity?  
\_\_\_\_\_
11. What is (or was, if he is deceased) your father's major vocation, position, or job? \_\_\_\_\_

This experimental inventory prepared by:  
Benjamin B. Weybrew, Ph.D., NavSubMedRschLab

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