

Predicting Personality Disorder Diagnoses
of Hospitalized Navy Personnel

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Summary

Problem

Personality disorders are believed to begin early in life and to represent a long-term maladaptive pattern. Therefore, individuals with a personality disorder prior to joining the Navy are likely to be at risk for adjustment difficulties and hospitalization.

Objective

The purpose of the study reported herein was to examine the relationship between type of nonpsychotic diagnosis at time of hospitalization, pre-Navy nonpsychotic condition, and paygrade for active duty, enlisted Navy personnel.

Approach

The sample (N=27,210) consisted of all hospitalized cases of active duty, enlisted Navy personnel between 1981 and 1984, inclusive, with a nonpsychotic mental disorder as the primary diagnosis.

Results

Results indicated that personality disorders were more likely than other nonpsychotic diagnoses to be associated with a pre-Navy nonpsychotic condition and lower paygrades. More specifically, the strong relationship between a personality disorder diagnosis and a pre-Navy nonpsychotic condition was only true of paygrades E-1 through E-4.

Conclusions

Active duty, enlisted Navy personnel with a pre-Navy history of some personality disorder are at risk of being hospitalized for that problem after they join the U.S. Navy. Substantial savings to the U.S. Navy could be accrued by targeting those individuals with a personality disorder at time of recruitment.



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Introduction

Active duty, enlisted Navy personnel who experience continuing adjustment difficulties are probably less likely to remain in the Navy and, therefore, less likely to provide the Navy with a favorable return on its investment of time, training, and money. Individuals with certain psychiatric histories are more likely than others to experience continued adjustment difficulties in military service. Kilbourne, Goodman, and Hilton (1988), for example, recently reported that active duty, enlisted Navy personnel who were hospitalized with a functional psychosis, especially schizophrenia, were more likely than those with an organic psychosis to indicate a pre-Navy psychiatric history.

However, Kilbourne, et al. (1988) only examined psychotic disorders. Certain nonpsychotic disorders, although less severe than psychotic disorders, are just as likely to manifest a longstanding pattern of maladjustment. Personality disorders are a particularly good case in point. According to the revised third-edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R, 1987), personality disorders are characterized by personality traits which are inflexible, maladaptive, cause marked personal distress, and interfere with social and/or occupational functioning. An essential feature of a personality disorder is that maladaptive traits are part of the individual's long-term functioning and not merely attributable to an episode of illness.

Since personality disorders are believed to begin early in life and to represent a long-term maladaptive pattern, it stands to reason that individuals with a personality disorder prior to joining the Navy are at risk for later adjustment difficulties and hospitalization. Such individuals should experience adjustment difficulties relatively early in their Navy careers. Thus, the purpose of the study reported herein was to examine the relationship between type of nonpsychotic diagnosis at time of hospitalization, pre-Navy nonpsychotic condition, and paygrade for active duty, enlisted Navy personnel.

It was hypothesized that personality disorders at time of hospitalization, as opposed to all other nonpsychotic disorders, would be more likely associated with a pre-Navy nonpsychotic condition and lower paygrade levels.

Methods

Subjects

The sample (N=27,210) consisted of all hospitalized cases of active duty, enlisted Navy personnel between 1981 and 1984, inclusive, with a nonpsychotic mental disorder as the primary diagnosis.² The majority of the sample was white (87%), male (90%), not married (57%), and had twelve years of education (72%). The average age was 24.9 (SD=5.9, range=17-60 years). The median paygrade was E-3 (range=E-1 to E-9). Approximately 17% (n=4,602) of all nonpsychotic diagnoses were personality disorders.

Procedures

Data Collection Procedures. Data were obtained from the Navy Enlisted Career/Medical History File (NECMHF). NECMHF is based on two compiled files. One is the Service History File, which consists of demographic and military-service history data from Navy Military Personnel Command in Arlington, Virginia. The other is the Medical History File, which contains hospitalization, death, Medical Board action, and Physical Evaluation Board action data from Naval Medical Data Services Center in Bethesda, Maryland. NECMHF is compiled and maintained by the Naval Health Research Center, San Diego, California (Garland, Helmkamp, Gunderson, Gorham, Miller, McNally, & Thompson, 1987).

Coding Procedures. Type of nonpsychotic primary diagnosis at time of hospitalization was treated as an ordinal variable (personality disorders [more likely to involve a longstanding maladaptive pattern] versus all other nonpsychotic disorders [less likely]). Pre-Navy nonpsychotic condition was extracted from the patient's admission record, and indicated whether the condition for which the patient was admitted to the hospital existed prior to entry into the service. Since data only indicated whether the condition for which the patient was admitted existed prior to entry into the Navy, and not the duration or frequency of the prior condition, pre-Navy nonpsychotic condition was treated as an ordinal variable (no pre-Navy nonpsychotic condition versus some pre-Navy nonpsychotic condition). Paygrade level was also treated as an ordinal variable (E-1, E-2 to E-4, E-5 to E-6, and E-7 to E-9). A control variable, admission history of mental-problem primary diagnosis at

time of hospitalization (first-admission case versus multiple-admission case), was treated as a categorical variable.

Results

An initial inspection of the data indicated that personality disorders, as opposed to all other nonpsychotic diagnoses combined, were more likely to be associated with some pre-Navy nonpsychotic condition and lower paygrades. Table 1 shows the percentage of personality disorders versus all other nonpsychotic diagnoses combined that indicated a pre-Navy nonpsychotic condition. Table 2 shows the percentage of cases within each paygrade grouping that were given a primary diagnosis of personality disorder at time of hospitalization.

Table 1

Proportion of Nonpsychotic Diagnoses at Time of Hospitalization
with a Pre-Navy Nonpsychotic Condition

Primary Diagnosis (Hospital)	Pre-Navy Nonpsychotic Condition		
	None	Some	
All Other Nonpsychotic Disorders	17,796 (79%)	4,766 (21%)	22,562
Personality Disorders	1,530 (33%)	3,051 (67%)	4,581
			27,143

Table 2

Percent of Nonpsychotic Diagnoses Across Paygrade Level

Paygrade Level	n	% of Paygrade
E-1		
Personality Disorders	884	30.5
Other Nonpsychotic Disorders	2011	69.5
E-2 to E-4		
Personality Disorders	3,083	19.2
Other Nonpsychotic Disorders	12,961	80.8
E-5 to E-6		
Personality Disorders	587	8.6
Other Nonpsychotic Disorders	6,214	91.4
E-7 to E-9		
Personality Disorders	48	3.3
Other Nonpsychotic Disorders	1,422	96.7

An analysis of the cross-tabular frequency distributions of type of diagnosis (i.e., personality disorders versus all other nonpsychotic disorders combined) by pre-Navy nonpsychotic condition and paygrade revealed significant relationships among these variables (the p values for all chi square tests were $\leq .0001$). The proportional reductions of error (Kendall's tau-b)³ in predicting nonpsychotic diagnosis from each of the predictor variables were significant ($p < .0001$). Knowledge of pre-Navy nonpsychotic condition alone would reduce the errors in predicting type of nonpsychotic diagnosis at time of hospitalization by 38%, while knowledge of paygrade alone would reduce prediction errors by 18%.

Using the partial tau-b procedure to control for a third variable (Agresti & Agresti, 1979; Blalock, 1979), both predictor variables remained statistically independent of admission history (first-admission case versus multiple-admission case). However, the tau-b analysis indicated a modest interaction between the two predictor variables and type of nonpsychotic diagnosis. The relationship between type of nonpsychotic diagnosis at time of hospitalization and pre-Navy nonpsychotic condition was reduced by .07 (about 18%) when controlling for paygrade ($\bar{r}_b = .31$). The relationship between type of nonpsychotic diagnosis at time of hospitalization and paygrade was reduced by .03 (about 17%) when controlling for pre-Navy nonpsychotic condition ($\bar{r}_b = -.15$). Thus,

pre-Navy psychiatric history remained the stronger predictor of type of non-psychotic diagnosis at time of hospitalization. Table 3 shows the interaction between the two predictor variables and type of nonpsychotic diagnosis.

A close inspection of the partial-association tables clarified the nature of this interaction.⁴ The strongest relationship between a personality disorder diagnosis and a pre-Navy nonpsychotic condition was for paygrades E-1 through E-4. On the other hand, a personality disorder was about equally likely to be associated with either a pre-Navy condition or a no pre-Navy condition for paygrades E-5 through E-9. Whereas the other nonpsychotic disorders were much less likely than the personality disorders across all paygrades to be associated with a pre-Navy nonpsychotic condition and were least likely at higher paygrades (see Table 4).

Table 3
Effect of Control Variables on Relationships of
Type of Nonpsychotic Diagnosis with Predictor Variables^a

	Type of Nonpsychotic Diagnosis (Others, <u>Personality</u>)	<u>Control Variables</u>		
		<u>Pre-Navy Nonpsychotic Condition</u>	<u>Paygrade</u>	<u>Admission History</u>
Pre-Navy Nonpsychotic Condition (None, Some)	.38	--	.31	.39
Paygrade (Low, High)	-.18	-.15	--	-.18

^aTable values are tau-b coefficients of Type of Nonpsychotic Diagnosis (personality disorder versus all other nonpsychotic disorders combined) with the predictor (row) variables.

Table 4
Percent of Nonpsychotic Diagnoses Across Paygrades
with a Pre-Navy Nonpsychotic Condition

<u>Paygrade Level</u>	<u>n</u>	<u>% of Disorder with a Pre-Navy Nonpsychotic Condition</u>
E-1		
Personality Disorders	878	68.8
Other Nonpsychotic Disorders	2,001	27.2
E-2 to E-4		
Personality Disorders	3,070	68.4
Other Nonpsychotic Disorders	12,938	23.6
E-5 to E-6		
Personality Disorders	585	55.7
Other Nonpsychotic Disorders	6,205	16.4
E-7 to E-9		
Personality Disorders	48	45.8
Other Nonpsychotic Disorders	1,418	10.6

In order to better understand the relationship between type of nonpsychotic diagnosis and the two predictor variables, a multiway contingency analysis was performed. Various logit models (contingency table models in which a two-category dependent variable is specified) were compared. Specifically, nonpsychotic diagnosis (personality disorders versus all other nonpsychotic disorders combined) was treated as a dichotomous dependent variable whose outcome was affected by pre-Navy nonpsychotic condition and paygrade; length of service was treated as a covariate (continuous). The most parsimonious model (which provided no significant departure from the saturated model [all main effects and all interactions included] and which was simplest in terms of the number of variables and the complexity of the interaction effects) indicated clear main effects of pre-Navy nonpsychotic condition and paygrade upon type of nonpsychotic diagnosis. No significant interactions (non-additive effects of the main effects) were found. Thus, the modest interaction effect of the tau-b analysis is of minimal importance for the interpretation of the data. Pearson and Likelihood Ratio Chi Squares were not significant (both p values = .35) and all adjusted residuals were less than 1.65, which indicated a fairly good fit of the model with the data. Contrast comparisons thus confirmed that: 1) personality disorder diagnoses were more likely than all other non-

psychotic diagnoses combined to be associated with some pre-Navy nonpsychotic condition ($p < .0001$), and 2) paygrades E-2 through E-9 were less likely than E-1s to be associated with a personality disorder diagnosis at time of hospitalization (all p values $< .0001$).

Discussion

As hypothesized, personality disorder primary diagnoses at time of hospitalization were more likely than all other nonpsychotic disorder diagnoses combined to be associated with a pre-Navy nonpsychotic condition (i.e., a prior personality disorder) and lower paygrade levels. It is important to keep in mind, however, that the present study examined only hospitalized nonpsychotic cases; individuals with a pre-Navy nonpsychotic condition who were not hospitalized for a nonpsychotic mental disorder as the primary diagnosis during the time period of the study were not identifiable for comparative analysis.

Nevertheless, these findings have important implications. Active duty, enlisted Navy personnel with a pre-Navy history of some personality disorder are at risk of being hospitalized for that problem after they join the U.S. Navy. In fact, personality disorder cases with a pre-Navy nonpsychotic history were disproportionately represented in paygrade levels E-1 to E-4. Similar to the Kilbourne, Goodman, and Hilton (1988) study of functional, psychotic disorders, there appeared to be a selection factor operating, in that fewer personality disorders were associated with a pre-Navy nonpsychotic condition at higher paygrades. However, in contrast to the Kilbourne, et. al (1988) study of functional, psychotic disorders, there was not a dramatically decreasing trend across paygrades for personality disorders to be less likely associated with a pre-Navy nonpsychotic condition. The declining trend of personality disorders associated with a pre-Navy condition was gradual and limited. Personality disorders reached a point where they were about equally likely to be associated with either a pre-Navy or a no pre-Navy nonpsychotic condition. On the other hand, the declining trend of the functional, psychotic disorders (Kilbourne, et al., 1988) to be associated with a pre-Navy psychotic condition was steep and tended to bottom-out at a point (e.g., E-7s and E-9s) where few functional, psychotic disorders were associated at all with a pre-Navy psychotic condition.

Thus, while Kilbourne et al. (1988) found that a minority of all functional psychotic disorders were associated with a pre-Navy psychotic condition (25%) and that this association decreased linearly as a function of paygrade, the present study of personality disorders found a different pattern. The majority of personality disorders (67%) were associated with a pre-Navy nonpsychotic condition. However, lower paygrades with a personality disorder were more likely to be associated with a pre-Navy personality disorder, while higher paygrades with a personality disorder (E-5 through E-9) were about equally likely or unlikely to be associated with a pre-Navy personality disorder. It would appear, then, that some individuals with a pre-Navy personality disorder remain functional for a longer period of time than others, and, therefore, personality disorders are not as incapacitating overall as functional psychotic disorders.

In sum, substantial savings to the U.S. Navy could be accrued by targeting those individuals with a history of a personality disorder at time of recruitment. By definition, a personality disorder is a chronic problem that can be aggravated by stressful life situations and is not generally responsive to either psychiatric or psychological treatment. Some individuals with a personality disorder are even at risk for developing a more severe psychiatric disability. Given the elevated risk of hospitalization, the high cost of training (about \$18,000 per recruit), and the relatively high cost of treatment and/or premature discharge from the Navy, it would seem cost-beneficial to screen out individuals with a history of a personality disorder at time of recruitment.

Footnotes

- 1 Brock Kilbourne is a research associate with the National Research Council, National Academy of Sciences, and a licensed psychologist (CA. #PV10467). Jerry Goodman is a sociologist and statistical consultant with the Naval Health Research Center, San Diego, CA. Susan Hilton is a research psychologist and a member of the Health Services Research Department, Naval Health Research Center.
- 2 The nonpsychotic diagnostic codes were: neuroses (approximately 6%), personality disorders (17%), alcoholism (52%), drunkenness (6%), transient situational disturbance (11.5%), and other nonpsychotic disorders (7.5%).
- 3 Kendall's tau-b has a proportional reduction in error interpretation and can be used to compute a summary partial tau-b measure ($\bar{\tau}_b = \text{tau-b-bar}$) to control for third variables of any scale (Agresti & Agresti, 1979).
- 4 One-third (34%) of the personality disorders with a pre-Navy personality disorder were hospitalized before the end of the first year of service, over half (59%) by the end of the second year, and 75% before the end of the third year of service.

References

- Agresti, A., & Agresti, B.F. (1979). Statistical methods for the social sciences. Santa Clara, CA.: Dollen.
- Blalock, H.M. (1979). Social statistics (revised second edition). New York: McGraw-Hill Book Company.
- Diagnostic and statistical manual of mental disorders (Third Edition-Revised). (1987). Washington, DC.: American Psychiatric Association.
- Garland, F.C., Helmkamp, J.C., Gunderson, E.K.E., Gorham, E.D., Miller, M.M., McNally, M.S., & Thompson, F.A. (1987). A guide to the computerized medical data resources of the Naval Health Research Center (NHRC Report No. 87-13). San Diego, CA.: Naval Health Research Center.
- Kilbourne, B.K., Goodman, J., & Hilton, S. (1988). Predicting functional versus organic psychotic diagnoses for hospitalized Navy personnel. (NHRC Report No. 88-46). San Diego, CA.: Naval Health Research Center.

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