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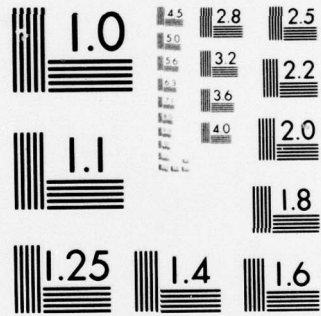
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IDENTIFICATION OF PSYCHIATRIC VULNERABILITY: AN OVERVIEW

LCDR Marc A. Schuckit, MC, USN\*  
L. K. Eric Gunderson, Ph.D.\*

INTRODUCTION

Primary prevention is becoming a major thrust of the health care sciences. While stopping illness before it begins has relevance to general medicine (e.g., hypertension screening) and surgery (e.g., uterine cervical cancer), it may not be as appropriate in the area of mental health. This paper represents a preliminary look at the problem of screening with the goal of optimizing mental health. The conclusions to be drawn will be tentative and are aimed at stimulating thought and careful evaluation of a number of goals and practices that are perhaps too often accepted uncritically as truths.

BACKGROUND

There are no objective laboratory tests for propensity towards psychiatric illness. Major psychiatric syndromes may come on without antecedent warning signals. Prediction in the mental health field has historically depended upon clinical impressions and the use of interview or paper-and-pencil psychological testing. Formal predictive efforts began with World War I when the need to gauge the psychiatric vulnerability of soldiers was recognized /1,2/. Intensive efforts along these lines awaited the next war and began with gross attempts to measure the entire personality as a predictor of future impairment. These grandiose efforts gave way to more practical attempts to look for specific predictors rather than describe the entire personality structure /2/: such efforts met with limited success if judged by their ability to select a homogeneous group at very high risk for psychiatric illness.

A number of psychological instruments resulted from these studies, including the Cornell Selective Index and the Shipley and Landis Personal Inventory and Sentence Completion Test. While these measures had some success in identifying men ill at the time of testing, prediction of future illness was quite limited /2/. One of the major difficulties was that serious psychiatric illness is a relatively infrequent occurrence and, as a result, the prediction instrument had to be very accurate with a low rate of false positives.

The military psychological screening tools were aimed at a specific population facing somewhat predictable stresses. The lack of clinical success of these efforts indicates that mental illness prediction in general population samples might be even more difficult. The first problem is the definition of "caseness." Population surveys have found

that between 10% and 60% of the population exhibits psychological symptoms /3/. The differing rates can be related to differences in interview instruments, population selection, and definitions of symptomatology.

The presence of symptoms does not necessarily mean the individual is impaired /1/. Nor has it been established that there is a continuum between emotional discomfort in day-to-day living and the subsequent development of psychiatric illness — any more than that there is a link between warts and cancer.

Thus, defining and measuring optimization of mental functioning in a population is not a simple procedure. Problems range from questions about what is a case and what is the usefulness of current symptomatology in predicting future illness to, as we shall discuss later, what to do with the "case" once it is found.

This paper will examine the problem through studies of military populations. While the conclusions reached in such a limited look must be considered tentative, the military offers the advantages of a relatively uniform definition of what is normal functioning, a homogeneity of diagnostic and record-keeping procedures, and 24-hour observation of the population. Our analysis is two-pronged: the first portion is a rapid review of selected illness prediction studies in the Armed Services, and the second is a report of an attempt to use some simple instruments to predict psychiatric morbidity.

Past Studies

To be of clinical usefulness, a screening instrument needs to be applicable to large numbers of men. This requires that it be inexpensive, easy to administer, and short. The first measure, the Minnesota Multiphasic Personality Inventory (MMPI) is both too long and expensive to be used routinely. The MMPI was used to predict functioning in military populations by Callan, but the author found that it resulted in too many false positives to be clinically effective /4/.

Another device was a Personal History Inventory which consisted of 195 biographical and attitudinal items given to 20,000 Navy recruits during the first week of training /5/. The men were subsequently followed up and those later incurring psychiatric or disciplinary problems were compared with the remainder. The test correlated significantly with outcome, but this relationship was not of sufficient magnitude to allow for clinical intervention with high risk individuals. The best items related to past history (e.g., Did you complete high school?) raising the issue of whether psychological tests add anything to history and demography in prediction studies /5,6/.

Another instrument more widely used is the Cornell Medical Index (CMI). This simple paper-and-pencil test of 195 questions has sections on both

\*Epidemiological and Operational Psychiatry  
Division  
Navy Medical Neuropsychiatric Research Unit  
San Diego, California 92152  
(714) 225-6753

Marc A. Schuckit

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Navy Medical Neuropsychiatric  
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San Diego, California 92152  
(714) 225-6753

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somatic and psychological symptoms /7,8/. High scores or an inordinate number of omitted questions or added remarks have been found to correlate with psychiatric patient status. The test has been used to predict future undesirable discharges of military recruits (many of which were for "psychiatric" problems), but the low predictive validity (scores over 50 were found for 8% of the discharges vs. 1% for others) did not yield a homogeneous high risk population amenable to intervention /8/. When this instrument was shortened to the most relevant 49 questions, similar results were obtained, i.e., a predictive validity which did not greatly improve upon that of demography and past history alone /6/.

A different approach to the problem has been taken by Kane and associates using a modification of an instrument developed at the University of Washington, the Schedule of Recent Events (SRE) /9/. The 41 items document the occurrence of life events over the preceding months which generate a score, the number of Life Change Units (LCU), which has been found to predict physical illness. The instrument has been used on diverse populations and has been found to be associated with the future occurrence of minor medical problems in military and civilian populations. No work has been done with this scale as a predictor of psychiatric illness.

A particularly interesting test is the Health Opinion Survey (HOS) which is short (20 questions), simple, inexpensive, and nonthreatening to the subject, as most questions are about medical problems. This instrument was first devised for the Stirling County Study /2,10/, and has been found of use in epidemiologic surveys of illness in various populations. The original interview questionnaire was modified to be presented in paper-and-pencil form. Navy psychiatric patients scored high on this test, and the higher the score, the smaller the chance for successful return to active duty /11/. This test was found to be the most powerful single predictor of future medical illness for 1,651 Navy men aboard two combat ships.

To evaluate the clinical significance of the above results and to demonstrate one methodology of predicting psychiatric illness, we will describe a series of studies done with the HOS and SRE.

#### Methods for Study

The subjects were 5,898 Navy officers and Navy and Marine Corps enlisted men who were studied in 1967-68 aboard a wide-range of ships /12,13,14/. The men were given a series of questionnaires including a demographic data sheet, the HOS, and the SRE, under standardized conditions at the beginning of an overseas cruise. At the end of the 6-8-month deployment, the numbers of visits to the dispensary (sick call) were tabulated for all individuals, and the men were followed to determine future hospitalizations using the computer files maintained by the Navy Medical Neuropsychiatric Research Unit, San Diego, as described by Gunderson /15/.

The original sample was primarily Caucasian (89%) and had a mean age of 22; two-thirds of the men were high school graduates. One hundred twenty-three of the men were subsequently psychi-

atrically hospitalized an average of 1.5 years after testing. The diagnoses assigned to these 123 cases were: Personality Disorder (30%), Alcoholism (15%), Transient Situational Maladjustment (14%), Neurosis (12%), Schizophrenia (6%), Psychophysiological Reaction (6%) with the remaining 17% given a number of other diagnostic labels.

The HOS and SRE were evaluated in a routine manner: higher scores reflected more health or life adjustment problems. In addition to the usual HOS total score, a modified score based upon dichotomous scoring of the 17 most discriminating items in a previous study was used. SRE raw scores were divided into decile intervals, and decile scores were used in the analysis.

Table 1

HOS Score for Fleet Sample by  
Future Patient Status (in %)

Original HOS Score	Future Psychiatric Status	
	Ill	Well
20-24	6	16
25-31	44	49
32-38	32	27
39 and over	18	8
Total	100	100
Number of cases	123	575

#### RESULTS

The overall goal was to establish the clinical importance of the tests in predicting future psychiatric illness. The first analysis was a comparison of test scores and major demographic characteristics for the 123 future patients and 5,775 controls at the time of original testing. The two samples were demographically similar but differed on both HOS and SRE. The future patients had a mean HOS score of 32.5 (SD 6.4633) and a mean SRE decile of 5.39 (SD 2.6564) while the control sample scores were 30.08 (SD 5.6814) and 4.89 (SD 2.5104), respectively. The clinical importance of these results is shown in Table 1 and it can readily be concluded that these scales did not isolate a group at high risk for psychiatric illness who could be the subjects of clinical intervention.

Table 2

Correlation between Future Psychiatric  
Hospitalizations and HOS-SRE Combination  
for Fleet Sample

Item	Multiple F
HOS	.090
Modified HOS	.094
SRE decile	.097
HOS and SRE	.128
Modified HOS and SRE	.130

In order to increase predictive validities, the joint probabilities of future hospitalization based upon combinations of two variables were com-

puted. No specific HOS or SRE items proved to be of special prognostic importance. The correlation between HOS, modified HOS, SKL, and combinations of these are shown in Table 2. Combinations of SRE and HOS or modified HOS scores predicted hospitalization better than any single test, but the correlations were again of limited practical significance.

A third analysis was attempted but did not improve the results. It was assumed that men with higher numbers of cruise sick call visits might also have higher propensities toward psychiatric problems. Therefore, the men with three or more sick calls were examined separately, but they did not prove to be more psychiatrically vulnerable and the predictive validities of the tests did not increase.

#### DISCUSSION

Optimization of mental health in non-patient populations is an important research goal. The clinical realities and limitations in manpower and monies do not yet allow these results to be of clinical usefulness.

The examples cited in this paper were simple for the sake of illustration. It is unlikely that any short, simple, and economical test will predict future psychiatric morbidity with great accuracy. The base rate of definitive illness is too low, the methodologies too simplistic, the time between testing and "caseness" too long, and the underlying etiologies of psychiatric illness too obscure to allow for simple prediction.

The approach of greatest "pay off" might involve a combination of predictors. The final formula might take advantage of the predictive importance of psychiatric illness in close family members /16,17/, plus the past personal and psychiatric history of the subject (e.g., his past antisocial activities or past psychiatric visits), his most recent work or social performance (e.g., whether his present job status is commensurate with the number of years he has been on the job) /18/, his history of alcohol and drug use, and the organizational structure in which he functions /19/. The predictive value of these factors might be enhanced by using simple tools such as the HOS or SRE, and the total combination might define homogeneous groups of men at special risk for illness. To be useful the subsample should have high probabilities of becoming ill, probably 50% or more, and the prediction formula should overlook few high risk individuals. Under such conditions, intensive intervention in the morbid process could be carried out at minimum expense.

No such instruments or prediction formulae yet exist. This is of little practical significance today because the other half of the prevention process, the means of effective intervention in high risk individuals, has not yet been established. Education, counseling, and social conditioning have not proven effective in heading off illness before it begins or in improving subjects who are functional, but not optimally so.

It thus appears that the major arena for iden-

tification and treatment of high risk or non-optimally functional individuals is still in the research stage. This is presently an area of active research efforts, but the major clinical impact lies somewhere in the future.

In the meantime, there are large groups of people with high innate rates of obvious psychiatric illness who are receiving little or no active care /20/. While waiting for the development of the tools to make primary prevention possible, there are groups to whom the clinician can well turn his attention: The psychiatric and emotional problems of the elderly and dying are generally ignored; populations who live in transient hotels and migrant workers are frequently grossly mentally impaired but get little help; persons with recent important losses are often in need of help but are frequently overlooked; and some chronic medical patients, such as those who are post-myocardial infarction or on renal dialysis have high psychiatric morbidity.

#### CONCLUSION AND SUMMARY

We have reviewed the history of prediction of psychiatric vulnerability in military populations with special emphasis on the MMPI, CMI, SRE, and HOS. To illustrate one series of procedures in establishing the clinical significance of these tests, a prospective study of the HOS and SRE in about 6,000 Navy men and Marines was outlined. While the measures were statistically significant in predicting future ill populations, they failed to establish a homogeneous high risk group. This finding is not surprising considering the low base rate of significant illness, the problems of case definition, and the length of time between initial measurement and outcome. At present while such prediction is the subject of much research, the clinician can most profitably turn his active efforts towards populations of ill but uncared for patients.

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