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OFFSET EFFECT AMONG MEDICAL PATIENTS

University of Hawaii

PH.D. 1986

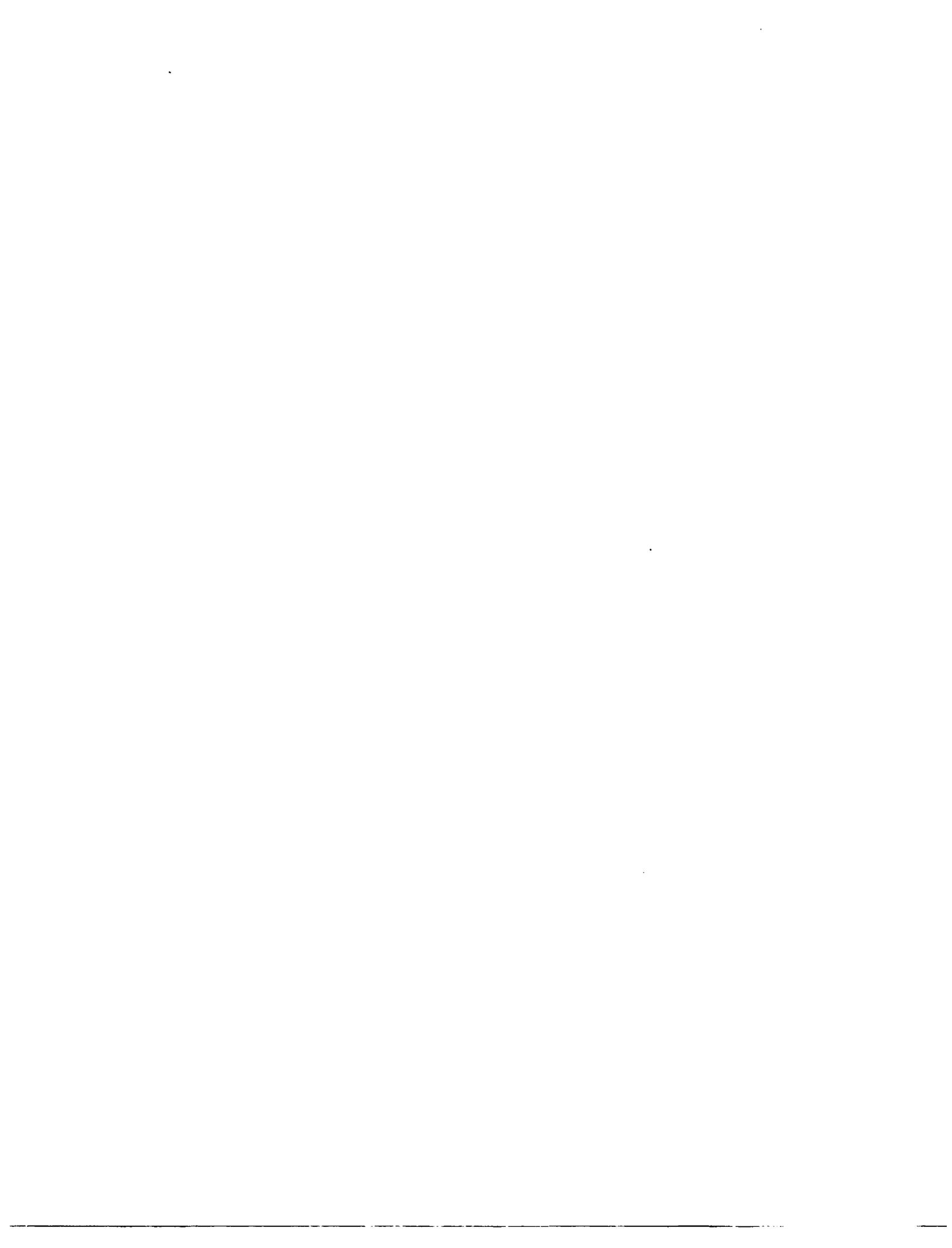
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THE DEVELOPMENT OF MMPI PREDICTORS OF THE PSYCHOTHERAPY
OFFSET
EFFECT AMONG MEDICAL PATIENTS

A DISSERTATION SUBMITTED TO THE GRADUATE DIVISION OF THE
UNIVERSITY OF HAWAII IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

IN PSYCHOLOGY

DECEMBER 1986

By

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ABSTRACT

The goal of the study was to discover Minnesota Multiphasic Personality Inventory (MMPI) scores that can be used to predict which patients will show a decrease in medical utilization after psychotherapy. The identification of such patients through psychological testing both assures that they will receive needed services as quickly as possible and contributes to cost-containment efforts. Furthermore, if psychological assessment and treatment can be shown to reduce the overall cost of medical care then the presence of psychologists in health maintenance organizations, on hospital staffs, and in third-party insurance plans will have been empirically justified. To provide background for the study literature is reviewed on several types of factors, i.e., patient-based, sociocultural, and health provider/health environmental, that have been shown to influence utilization rates. Important psychological factors include psychophysiological disorders, psychological problems with somatic symptoms (e.g., depression), somatization and substance abuse. The literature review also revealed that in contrast to the multitude of studies on the effects of psychotherapeutic interventions upon

medical problems, far less has been written on the health care applications of psychological assessment. Similarly, although the MMPI has a long and varied history of use in medical settings it had not yet been used to identify patients whose response to psychotherapy will include a decrease in medical utilization. MMPI researchers have also not been completely successful in using the MMPI to determine the role of psychological factors in medical complaints. This study took a fresh look at the problem by asking, not whether psychological factors are involved per se, but rather whether psychotherapy will bring about a decrease in medical care seeking. This addresses a practical concern that is frequently behind referrals. To answer these questions archival data from the medical and psychological records of a private medical clinic was used in two statistical analyses. First, a 2X2 factorial multivariate analysis of variance of the 13 standard MMPI scales was performed with the two independent variables of 1) presence vs. absence of psychotherapy and 2) presence vs. absence of an at least 20% decrease in physician visits in the year following the MMPI administration. There were 35 subjects per cell. Only the main effect for the receipt of psychotherapy was significant. The nonsignificant results of the interaction were of the greatest clinical relevance. The Hs, D, and Hy scores of the patients who received

psychotherapy but did not experience a decrease in physician visits were the highest elevations in any of the group comparisons. The second series of analyses developed a new MMPI utilization prediction scale by comparing the item endorsements of 63 patients who had received psychotherapy of which approximately half had shown a 20% or greater decrease in subsequent outpatient utilization. The resulting 38 item scale was cross-validated on a different sample of 60 subjects. Results revealed that the scale did not predict utilization decreases above chance levels, but 83% of the patients who failed to show a decrease after therapy were correctly identified. The findings of the two sets of analyses suggested that somatization processes prevent patients from decreasing their utilization after psychotherapy. Although other types of therapies may have been more effective with these patients, the psychological characteristics and problems of potential decreaseers still need to be identified. The results of this study suggest that psychotherapeutic approaches directed at remediation of lifestyle disorders (e.g., excessive alcohol use, smoking), social skills deficits, and somatization-related behaviors may effectively decrease utilization. Uses for the new scale and directions for future research are discussed.

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INTRODUCTION

An imperfect, but on the whole convincing, body of studies has shown that one effect of psychotherapy is the reduction of subsequent medical utilization in a significant percentage of patients. These studies, often referred to en masse as the "offset literature," because of a common assumption that the cost of psychotherapy services will be compensated for by the subsequent savings in medical care, have caused considerable excitement in the professional community (Cummings, 1977; Yates, 1984), because if psychological services can be shown to reduce the overall cost of medical care then the presence of psychologists and psychiatrists in health maintenance organizations, on hospital staffs, and in third-party insurance plans will be empirically justified. The ability of psychotherapy to improve the quality of patients' lives is not at issue here. Yet, while the therapy offset effect is not the touchstone for the value of psychotherapeutic services in the medical setting, Dana and May (1986) have pointed out that cost-containment is one of the major health care trends with which psychologists will have to contend. The future of the discipline of health psychology will certainly be affected

by research results that document the cost-effectiveness of psychological services.

Perhaps it is because these professional and political aspects are so pressing that the scientific questions suggested by the offset studies have not been raised in a systematic fashion. Very little, for example, has been written about the psychological characteristics of those patients whose response to psychotherapy includes decreased medical utilization. Knowing this would help explain why psychotherapy results in a decrease in use of medical services. The goal of this study was to explore more fully the role that psychological assessment may play in predicting and increasing the offset effect. Specifically, I attempted to discover a pattern of Minnesota Multiphasic Personality Inventory (MMPI) scores that would discriminate between patients who do and do not show a decrease in medical utilization after psychotherapy. Psychotherapy was treated as a homogeneous construct, i.e., no attempt was made to determine the relative effects of different types of therapy. The MMPI was chosen because it has a long history of use with medical patients and is widely used in medical centers today. Furthermore, it is an inexpensive procedure that can be administered and scored by nonprofessional staff.

This overview has the following structure: The first chapter reviews a representative sample of offset studies. Next, it is argued that a complete understanding of the offset effect is not possible unless it is discussed in the context of the many factors, beside psychotherapy, which have been shown to influence utilization rates. Three such groups of factors, patient-related, social/cultural, and health provider/health environment are reviewed. While making reference to this broader perspective, the subsequent section describes the ways in which psychological assessment in general, and the MMPI in particular, may be applied to the offset question.

THE OFFSET EFFECT

Representative Offset Studies

In keeping with the convention developing in the literature, any study which attempts to demonstrate a decrease in consumption of medical services will be referred to in this paper as "offset" research even when it does not directly address the issue of cost savings. There is a considerable body of data that suggests medical utilization decreases after psychotherapy. This is a relatively new area of study with the first work being performed by Duehrssen in Germany in 1962 and the early classic study at Kaiser Permanente in California done by Follette and Cummings in 1967.

Duehrssen (1962) (cited in Jones and Vischi, 1979) reported a mean decrease in hospital utilization for 845 patients who received 100 (or more) hours of psychoanalysis or analytic psychotherapy. The majority of the patients were employed and under 50 years of age. The average number of hospitalization days per year decreased from 5.3 prior to treatment to an average of 0.8 days for the next five years. The mean number of yearly hospitalization days for the entire insurance plan of which the subjects were members was 2.5.

Follette and Cummings (1967), in a record review study performed at Kaiser Foundation Health Plan in California, compared the inpatient and outpatient utilization of three groups of patients that each received a different number of psychotherapy sessions (one session only, mean of 6.2 sessions, and mean of 33.9) with a no treatment control group matched for "psychological distress" on the basis of medical records review. Results showed significant decreases in both inpatient and outpatient utilization for all three psychotherapy groups in comparison to the control subjects. The largest decreases in utilization occurred during the second year after the initial psychotherapy session. Utilization levels then continued to decline during the three additional years of follow up. For outpatient medical visits the percentage decreases, which were all statistically significant, were 21%, 39%, 48%, 52%, and 63% respectively for the five consecutive years. Averaged days of hospitalization for the year prior to psychotherapy was 2.2 for the treatment groups combined and decreased to 1.05, 0.68, 0.64, 0.67, and 0.71 for the five consecutive follow up years. All these decreases were significant. In contrast, the control group failed to show any significant decreases either in inpatient or outpatient usage over the subsequent five years.

Several recent studies (Borus, Olendzki, Kessler, Burns, Brandt, Boverman, & Henderson, 1985; Felitti, 1984; Graves & Hastrup, 1981; Rosen & Wiens, 1979) have also used retrospective records review designs and arrived at similar results. Rosen and Wiens (1979) evaluated changes in utilization and in presenting problems for four groups of patients. The first group received a thorough psychological evaluation consisting of three to five hours of social, personality, and intellectual assessment including interviews with family members and detailed feedback to the patient. For this group evaluation was followed by psychotherapy. The second group received the same evaluation, but no therapy. The third group was composed of people who were referred for psychological evaluation, but did not keep their referrals. The final group was a non-referred control group of randomly selected patients. Dependent variables, which included number of outpatient visits, hospital days, emergency room contacts, pharmaceutical prescriptions, and diagnostic services (laboratory tests, x-rays, etc.), were compared for one year periods before and after the referral. The results were as follows. The evaluation only and the evaluation plus treatment groups had significantly lower post-referral utilization of outpatient visits, prescriptions, and diagnostic services than the groups who received neither

service. These two groups did not differ from each other on any measures. Both, in contrast to the others, also had a significant decrease in the number of medical problems in the post-referral year. In terms of within group changes, patients in the evaluation only group showed significant decreases in outpatient visits, prescriptions, E.R. visits, and diagnostic tests. Interestingly, patients who also received psychotherapy showed fewer significant decreases affecting only outpatient visits and prescriptions. The percent of reduction in a composite measure of medical use varied by psychiatric diagnosis as indicated by the following selected examples: mental retardation, 53%; behavior disorder of childhood, 51%; anxiety, 47%; organic brain syndrome, 47%; depressive neurosis, 26%. Patients with no psychiatric diagnosis showed the least change with a 16 percent decrease.

Graves and Hastrup (1981) studied the effect of psychological services on subsequent physician visits of children and adolescents from black, Caucasian, and Mexican-American low income families in a completely subsidized health program. The mean age of the treatment group (N=21) was 7.7 years (sd=2.9). Graves and Hastrup compared physician visits for one year before and one year after psychological intervention. A significant decrease from 5.8 in the year prior to intervention to 3.7 in the following

year was found. They also compared the treated group's utilization to that of a no treatment control group matched on the basis of age, sex, ethnicity, number of visits in the past year, and a measure of psychological distress compiled from record review. Results showed that the matched control subjects had significantly higher utilization in the year following psychotherapy.

Felitti (1984) describes a pilot study conducted by Kaiser Permanente in which a psychiatric consultant was made available for immediate contact during the annual multiphasic physical examination. This psychiatrist was asked to see a subset of examined patients although the situations that might prompt this referral were not listed. A retrospective review of 134 consecutive referred patients revealed that there was a 50% decrease in medical utilization in the year following (compared to the year preceding) this one time diagnostic/therapeutic session. The author concludes that "a measureable benefit can derive from one time 'diagnostic' contact" (p. 14). An anonymous questionnaire indicated that the consultation was appreciated by almost all of the patients.

Borus, Olendzki, Kessler, Burns, Brandt, Boverman, and Henderson (1985) used a retrospective analysis of medical and billing records to compare the medical utilization and expenses of two groups of patients only one of which

received mental health treatment. Although no attempt was made to match these groups on psychological distress the study does include other refinements such as the elimination of medical utilization that occurred during the month of referral. This was done to minimize the "peaking" in utilization rates which may occur due to the presence of the referral visit itself. In addition, utilization data were tallied for each month for at least two years before and after psychotherapy. Results showed that treatment by a mental health specialist was associated with significantly lower nonpsychiatric utilization and with lower charges for nonpsychiatric care. But when medical and psychiatric visits were summed for each patient it was found that their number and their cost exceeded the number of nonpsychiatric visits and associated costs of the control group. Thus, psychotherapy did decrease utilization, but not enough to offset its own expense.

A very different type of study was performed by Mumford, Schlesinger, Glass, Patrick, & Cuerdon (1984) who analyzed millions of claims files from the Blue Cross and Blue Shield Federal Employees Plan for 1974-1978 to look for cost-offset effects of outpatient mental health treatment. They found a greater decrease in hospital days than in physician visits. People over age 55 showed larger decreases after psychotherapy. The foregoing studies

represent a sample of the offset literature. The next section summarizes the findings of several reviews which evaluated these as well as other studies.

Reviews of the Offset Literature

A number of researchers (Cheifetz & Salloway, 1984; Inman, undated; Jones & Vischi, 1979; Mumford et al., 1984; Yates, 1984) have reviewed the literature on the effect of psychotherapy on subsequent utilization and have come to varied conclusions. There seem to be two basic issues. First, does psychotherapy reduce subsequent medical utilization? Second, if we grant that therapy does reduce utilization, is the total cost of medical and psychotherapeutic treatment combined less than the original cost of the medical utilization?

The answer to the first question is a qualified "yes." Qualified because most studies are at least somewhat flawed methodologically. Jones and Vischi (1979) performed a very detailed critique of the research investigating the effect of alcohol, drug, and mental health treatment on subsequent use of medical services. They found that 12 out of 13 studies of mental health care showed reductions in medical service use of five to 85 percent. The median reduction was 20 per cent. All 12 of the alcohol treatment studies showed subsequent decreases in utilization (or in indirect measures

like sick leave from work) of 26 to 69 percent, with a median reduction of 40 per cent. There was very little information available on the effect of drug addiction treatment on the subsequent medical utilization of addicts.

Jones and Vischi criticize the offset research as a whole on several grounds including the use of small sample sizes, inadequate control groups, time spans too brief to show maximum effects, failure to adjust for referral-related peak in medical utilization, and failure to identify and measure utilization that may have occurred outside of the setting in which the study was run. Although they state that "causality was not definitively established, due to the frequent methodological limitations" (p. vi), they nevertheless conclude that "there is strong evidence that treatment for alcoholism and mental illness is closely associated with a subsequent reduction in medical utilization in at least employee-based alcoholism programs and organized health care settings" (p. 15).

Mumford, et al. (1984) performed a meta-analysis of 58 published and unpublished studies on the effect of outpatient psychotherapy on subsequent medical utilization. Results ranged from a 182% decrease to a 72% increase in utilization with 85% of the studies showing a decrease. They conclude that reductions are more likely in hospitalization as opposed to outpatient care, and that they

are more pronounced for older patients. Mumford et al. (1984), discovered a negative correlation between age and the degree of utilization decrease post-psychotherapy in a meta-analysis of the 23 offset studies that provided age data. Older people showed greater decreases in both inpatient and outpatient utilization.

The question of cost-offset is much more difficult to answer. Currently, there is no consensus in the literature as to the presence or strength of a cost-offset effect for psychological treatments. Inman (undated), in a document prepared for the North Carolina Psychological Association Insurance Committee, concludes that "several studies have shown that psychological treatment...results in marked reductions of other medical expenses" (p. 2). Yates (1984) notes that psychological services "can reduce medical care overutilization and unnecessary medical expenditures by offering less costly <emphasis added> and more appropriate alternatives" (p. 445). In contrast, Cheifetz and Salloway (1984) conclude after reviewing the same literature that "studies do not support arguments for mental health services, on the basis of their cost-offset effects, as strongly as one might wish" (p. 152). Perhaps more convincing results will be provided by Cummings and Herb Dworkin when the results of Hawaii's Biodyne Center cost offset study are available in 1987. Mumford, Schlesinger,

and Glass (1981) raise an interesting point about efforts to prove cost-offset. Why, they ask, should mental health services be expected to prove their worth by "displacing" (p. 264) other medical services? This is not the standard of effectiveness for other procedures. The mixed findings concerning the presence and degree of the offset effect may result from the fact that many types of psychotherapeutic interventions have been employed in these studies. The following section reviews some of these interventions.

Types of Therapeutic Interventions in the Offset Literature

Several dissimilar psychotherapies have all been associated with decreased utilization. Cummings (1977) described his use of brief psychodynamic therapy as follows: "brief, active psychotherapy that involves the analysis of transference and resistance and the uncovering of unconscious conflicts, and that has all of the characteristics of long-term therapy except length" (p. 716). Graves and Hastrup (1981), who also obtained subsequent utilization decreases, used an "active problem-solving approach, based on behavioral and family systems theories" (p. 428).

The offset literature tends to emphasize psychotherapy devoted to psychological or psychosocial problems, but other types of interventions have also been shown to decrease

utilization. Research (Mumford, Schlesinger, & Glass, 1982; Devine & Cook, 1983) has shown that psychoeducational interventions can significantly reduce length of hospital stays for heart attack and surgical patients. Any psychological intervention that increases compliance to medical regimens and/or prevention-related behaviors will also be cost-effective (Yates, 1984).

The fact that so many different types of interventions have been found to decrease the use of medical services suggests that the effective features may be of a very general nature. Perhaps it is the opportunity to talk about personal problems with a sympathetic listener. It is also possible that the patient has learned effective anxiety reduction skills. On the other hand, the decrease may be brought about because the patient learns through the process of psychotherapy to relabel his or her distress as being of a psychological, as opposed to medical nature. This relabeling could be responsible for the decrease in utilization. Further research is necessary to answer this question.

Summary of Offset Literature Findings

Although suffering from methodological weaknesses the offset literature as a body does provide very strong evidence that psychotherapy results in subsequent decreases in medical utilization. Decreases in both inpatient and outpatient use occur after as few as one session and maintain well over time (Mumford, et al., 1984). Short-term therapy is the standard. And assessment alone may be as effective as brief therapy (Rosen & Wiens, 1979). The utilization of older people seems to be more strongly affected than that of younger people suggesting that psychological as well as medical problems may be responsible for the higher utilization associated with old age (Mumford, et al., 1984). Although decreases are fairly well documented there is still considerable question as to whether they are of sufficient magnitude to offset the costs of the psychotherapy services (Cheifetz & Salloway, 1984). To gain an understanding of the causes and limits of the offset effect it will be helpful to know more about the many factors affecting utilization. This is the topic of the following section.

FACTORS AFFECTING UTILIZATION RATES

The offset effect has been studied with very little reference to the other factors that are known to or suspected of affecting utilization. However, it is important to place offset findings into a broader theoretical understanding of utilization behavior. Why is this so? First of all if we can learn more about which patients show a decrease in utilization and for what reasons we may be able to bring about larger utilization decreases. In addition, a more thorough knowledge of the factors affecting utilization will be beneficial for the assessment of patients whose utilization behavior is targeted for change. Finally, from the point of view of basic science it will be gratifying to understand this complex phenomenon more fully.

Although there are several studies of utilization behavior, some of which included multivariate statistical models predicting physician or hospital usage, work in this field has generally been concerned with increasing, not decreasing, utilization. Similarly, several researchers (e.g., Rosenstock & Kirscht, 1980) studied factors that influence the practice of preventive health behaviors, such

as participation in cancer screening programs, with the intention of increasing the use of these medical services. Hulka and Wheat (1985) point out the health research of the 1960s and early 1970s was guided by social policy that sought to "improve access to and availability of health care" (p. 438) in order to increase the utilization of the disadvantaged. Although the goal of equal access has only been partially met Hulka and Wheat (1985) note that in response to the wide spread concern for rising medical costs, "the major thrust of health services research today is cost containment" (p. 439). In order to decrease medical costs without sacrificing the effectiveness of treatments it is necessary to understand what is behind the extreme levels of use shown by some patients.

It is possible that the independent variables that have been studied to increase utilization may not be the important ones for decreasing it. On the other hand many of the factors may be the same. For example, where a health belief concerning the efficacy of visiting a physician when a certain symptom or symptoms appears may increase utilization to desired levels, a very similar belief in the appropriateness of visiting an M.D. for every unusual physical sensation may be responsible for elevated rates.

In seeking to categorize the many variables that have been conceptually or empirically related to utilization one

is impressed by the numerous perspectives that have been applied to the topic. In addition to the psychological study of health care, substantial attention has been paid the health care system by medical sociologists, medical anthropologists, health economists, and political scientists all of whom have sought to explain many aspects of health behavior from the perspectives of their disciplines (Adler & Stone, 1979). In his review of utilization of medical and social services McKinlay (1972) categorized existing studies into six groups: economic, socio-demographic, geographical, social-psychological, socio-cultural, and the organizational/delivery system approach. Rosenstock and Kirscht (1979) noted three types of explanatory theories for illness behavior: cultural theories which examine differences between cultural or subcultural groups, sociopsychological theories exploring beliefs, motives, and perceptions, and situational or eclectic approaches which combine a variety of elements. In their review of the literature on medical utilization Hulka and Wheat (1985) group variables into the following five categories: health status and need, demographic characteristics, physician availability, organizational characteristics of health services, and financing mechanisms. Andersen (1968) in his extremely influential study of family health care utilization classified causal factors into predisposing,

enabling and need components. The predisposing component refers to a "propensity toward use" (p. 15) of health services and includes certain health beliefs and family characteristics. Conditions which permit a family to obtain care are enabling factors. These include adequate financial resources and geographical accessibility of services. Need for health services is the final factor determining utilization. Andersen's is still a widely used model (e.g., Evashwick, Rowe, Diehr, & Branch, 1984) and many literature reviews categorize variables under the three headings of predisposing, enabling and need groupings.

Considering this great variety in perspectives it is not surprising that Cummings, Becker, and Maile (1980) noted that the researcher interested in explaining health actions is confronted with a confusing array of models, many of which are not entirely unique. They note that although the models which are frequently cited in the literature: "differ considerably in the theoretical perspective used to explain behavior, and in the terms employed...the general classes of factors included in each of the models appear, at least superficially, to be quite similar (p. 124)." Cummings et al. asked a panel of expert judges (the authors of the models in question) to sort 109 variables from the different models into 12-14 groups. The structural similarities of the groups were investigated using smallest

space analysis. The six interpretable resulting factors were: accessibility of health care, evaluation of health care, perceptions of symptoms and threat of disease, social network characteristics, knowledge about disease, and demographic characteristics. The authors conclude that in spite of theoretical disparities between the models, the variables included in them, have these several important similarities.

The preceding points suggest that any categorization of variables will necessarily be colored by the author's professional training and theoretical stance. After reviewing the literature I decided to structure my review under three major headings: patient-related, sociocultural, and health provider/health environment variables. The goal of this review is not to prove that these variables affect utilization, but to present existing evidence suggesting that they might. While not all of the factors discussed are amenable to intervention (e.g., age, ethnicity) the decision as to category was made partly on the basis of logical site of intervention. For example, cognitive factors are placed within the patient factors group, not because cognitions do not have important social and cultural influences, but because the individual person is the most likely site of intervention. Similarly, although "illness behavior" is performed by the individual, it is discussed under the

social and cultural category because it is conceptualized here as a social role. As a final example, the policies of hospitals and clinics are classified under the health provider/health environment section in spite of the fact that they are influenced by numerous social and cultural forces. Of course many of the categorization decisions are somewhat arbitrary. It is also important to note that while utilization of medical services is not simply a function of health status, any factors which affect bodily functioning will also be causally related to use of health services. In every individual these two sets of factors are confounded. A final limitation of this review is that the sources of information consulted in its creation were quite various. Empirical studies with inferential statistics, government surveys utilizing stratified National samples and conceptual papers are all included.

Patient Factors

Medical Status and Need for Medical Care

While it is valuable to compile a comprehensive list personological, social and cultural factors affecting utilization the patient's organic condition or objective medical status is, of course, a crucial, if not the crucial factor influencing utilization (e.g., Hershey, Luft, & Gianaris, 1975). Hulka and Wheat (1985) conclude that in

comparison to need for medical care all other factors are of secondary importance. However, as these same authors note "need...is an imprecise concept that promotes diversity in the ways it is measured" (p. 441). For example, estimates of need may be based on the presence of symptoms, on the degree of disability (number of days in bed or limitations in basic functioning), on formal diagnosis, on the presence of chronic conditions, or on the patient's global self-ratings of health status, i.e., "poor" to "excellent." It is also possible to use multiple indexes to operationalize need. Evashwick et al. (1984) exemplify this in their use of an instrument designed to measure the degree of functional impairment, the Katz Activities of Daily Living scale (Katz, Downs, Cash, & Grotz, 1970), the ability to perform specified physical activities, physical condition, and perceived health status. Arling (1985) employed self-report data in a multivariate study of medical service use among elderly people and found that need for medical care was the strongest predictor of physician visits. Other multivariate studies discovered the same pattern. (e.g., Andersen, 1968; Aday and Eichhorn, 1972).

Previous Level and Pattern of Health Care

Previous levels of utilization may be used to predict current rates since people tend to show continuity in their usage over time (Aday & Eichhorn, 1972; Hulka & Wheat, 1985). However, some caution is needed in the interpretation of consistently high levels of utilization because a high level of previous use may also be an indication of greater need, so that need (not habit) could be responsible for continuing high levels. Several authors (e.g., Aday & Anderson, 1972; Hulka & Wheat, 1985) have also concluded that people who have a regular source of medical care have higher levels of utilization. Finally, the number of affiliations with separate physicians has also been found to be positively correlated with frequency of utilization (Hershey, et al., 1975; Hulka & Wheat, 1985). Both medical need and patterns of health care are affected by several of the demographic variables discussed in the following section.

Demographics

Age has a major effect on need for medical care and has been found to have a U-shaped relationship with utilization. Specifically, the very young on the one hand and the elderly on the other, have the highest rates of use (Aday and Eichhorn, 1972; Hulka and Wheat, 1985; National Center for

Health Statistics, 1984). Statistics for 1981 (National Center for Health Statistics, 1984) showed 6.4 visits per year for children under six years old, 3.0 for those six to sixteen year olds, 4.2 for 17-44 year olds, 5.1 for 45-64 years, and 6.3 for people 65 years and over. This pattern occurs because infants and children have a high number of acute conditions and more older people suffer from chronic conditions. However, Hulka and Wheat note that contrary to what might be assumed it is a minority of the over 65 group that uses medical services at a very high rate. Among people in this age group only 9% accounted for 78% of the hospitalization and 31% were responsible for 72% of the physician visits. These researchers conclude that "relatively few <of the aged> become very heavy users that weigh the aggregate statistics" (p. 447).

Birth order may also influence utilization rates. Kushnir (1984) notes a general trend in studies of birth order effects showing that first borns are "more concerned about their physical welfare" (p. 123) than are later borns. He provides a brief review of the effect of parity on medical utilization and related factors and notes that first born college students have been found to make more medical visits than later borns. Kushnir believes this to be the case because first borns are raised by relatively inexperienced parents who are more anxious about their first

child's health than they will be about subsequent offspring. Thus, he reasons, first borns learn to perceive illness as a stressful event.

The data on the effect of gender on utilization are consistent: beginning at age 15 and continuing through old age females use more physician services than do males, even when utilization related to child bearing is excluded. (Aday & Eichhorn, 1972; Hulka & Wheat, 1985; National Center for Health Statistics, 1984). Although women live considerably longer than men, they report poorer health, perceive greater medical need, go to the physician more often, show higher compliance with preventive visits, have higher hospitalization rates and more surgeries. National Center for Health Statistics figures for 1981 show an average of 4.1 physician visits per year for males and 5.1 for females.

Medical utilization has been found to increase as level of education increases, due especially to the greater use of preventive services by the more highly educated (Aday & Anderson, 1972). These same authors note that it has been difficult to show an effect for marital status that can be separated from other main effects of need, gender, and age. For example, widowed people use more because they are older; married women use more due to pregnancies. They conclude as well that no consistent relationship has been found between religion and medical utilization rates.

Utilization levels are also effected by ethnicity. During the 1960s and early 1970s national policy in the form of Medicare, Medicaid and related programs, sought to provide access to medical care to the poor and minorities. Hulka and Wheat (1985) reviewed utilization trends and concluded that by 1976 the percentage of whites and nonwhites to visit a doctor during the previous year was approximately equal. Department of HHS statistics do reflect an equalization in usage over time with white people having 4.7, 4.9, and 4.6 physician visits and blacks 3.6, 4.8, and 4.7 visits in 1964, 1976 and 1981 respectively. However, nonwhites below the age of 17 and in the 65 year old and above group more frequently reported poor or merely fair health. Black people of all ages reported poor health more frequently.

Other research has studied the effect of degree of acculturation on utilization behavior. Markides, Levin, and Ray (1985) noted that level of acculturation has been found to be positively correlated with the degree of physician utilization, but were unable to show any effect of acculturation on medical services use in a study of three generations of Mexican-Americans.

Economic/Financial Factors

While a significant portion of the poor are also members of minority groups, socioeconomic status and income level have been analyzed separately to determine their effects on medical utilization. In the 1960s and early 1970s people with lower incomes had, on the whole, fewer physician visits and lower hospitalization rates. They were particularly less likely to use preventive services. However, as early as 1972 Aday and Eichhorn were able to note that the "gap is narrowing" (p. 22) between the utilization rates of widely disparate SES groups. This equalization results from the development of government funded medical insurance and general welfare programs. In fact, recent data show that the trend may be reversing itself with poorer groups showing the highest rates of utilization in the 1980s. National Center for Health Statistics (1984) figures show that people from the poorest group (i.e., family income less than \$7,000) and people from the most well to do group (income of at least \$25,000 per year) had utilization rates of 3.9 and 5.2 visits respectively in 1964. The same groups had 5.6 and 4.4 visits respectively in 1981. Klienman (1981) also found that patients with incomes below the poverty level had more physician visits than people in higher income groups. He suggests that this may be due to the fact that the poor have greater medical need since members of lower SES groups

more frequently describe their health status as merely fair or as poor on global self-report measures. It appears that lower income levels used to be associated with less medical utilization, but that this is no longer the case due to social programs. Perhaps the higher rate of use now shown by poorer people results from a continued lack of prevention related visits which, among other factors, brings about a poorer health status.

Having medical insurance has generally been found to have a positive relationship with medical utilization. Aday and Anderson (1972) conclude that people who have voluntary (purchased) third party insurance consume more physician services than those without. They also found that people without insurance have longer hospital stays, regardless of income. Hulka and Wheat (1985) conclude that third party payment is associated with both higher outpatient and higher hospital utilization. Arling (1985), however, in a study of factors affecting the utilization among elderly persons, found that having an insurance plan that covered physician services (as opposed to having no insurance or a plan which covered hospitalization only) was not related to frequency of doctor visits. Research has also investigated the effect of the size of the patient's copayment on utilization rates. Hulka and Wheat conclude that there is a negative correlation between the size of required copayment and the rate of utilization.

Health Habits and Lifestyle

The factors which influence compliance with health screening procedures and other preventive regimens have been studied for decades (e.g., Hochbaum, 1958). Research has discovered a large subset of the population that does not participate in preventive regimens, e.g., eschews regular physicals. While this may lower utilization early in a person's life it may result in a net lifetime higher utilization for a person who fails to detect and control a potentially serious medical condition. Mumford, Schlesinger, and Glass (1981) reviewed studies bearing on this point and concluded that preventive visits decrease utilization.

Other elements of one's health lifestyle may also effect utilization. Several common habits like smoking and the excessive consumption of alcohol contribute directly to increased disease and injury (Davidson & Davidson, 1980; Matarazzo, Weiss, Herd, Miller, & Weiss, 1984).

Stress and Life Change

Stress has been conceptualized in numerous ways. The "transactional approach," pioneered by Lazarus and his colleagues is currently well accepted (Coyne & Holroyd, 1982). In this approach stress is defined as a "person-environment relationship in which demands tax or exceed the resources of the person" (Coyne & Holroyd, 1982, p. 104).

It is widely believed that stress is an important factor in the development and exacerbation of illness (e.g., Dohrenwend & Dohrenwend, 1982). Cohen noted that three types of stress-related variables: loss events, accumulation of life changes, and stress-appraised events have been implicated in disease. This stress-disease link has been studied for such disparate conditions as heart disease, bone fractures and cancer (Dohrenwend & Dohrenwend, 1982; Womack, Vitaliano, & Maiuro, 1983). However, Cohen (1980) reviewed the literature showing a causal link between stress and the development of disease and noted the presence of a major confound. Since, as Cohen notes, there are strong individual and cultural differences in the propensity to seek medical care and since much research in this area has looked at "cases of illness who self-select for medical treatment" (p. 81) then:

much of the present literature cited as support for the idea that psychological factors are related to the development of physical disease may support only the notion that psychological factors influence illness behavior, that is, result in increased treatment seeking <emphasis added> or increased reports of illness but not necessarily increased incidence of illness (p. 81).

Cognitive Factors

Health beliefs and the appraisal of symptoms are examples of cognitive factors that might be expected to have an effect on medical utilization rates. In their 1972 review of the utilization literature Aday and Eichhorn concluded that health care attitudes such as those concerning the availability of care and skepticism about physicians, were not useful in predicting utilization. However, recent research suggests otherwise. In one of the very few studies aimed specifically at the very frequent user of medical services, Wagner and Curran (1984) found that patients' health beliefs concerning susceptibility to illness, perceived seriousness of symptoms, and perceived barriers to treatment were significantly related both to utilization rates and to physicians' views of utilization appropriateness. Weimer, Hatcher, & Gould (1983) found that the patients with the greatest skepticism about medical care and physicians were the highest utilizers.

One's interpretation of the meaning and seriousness of physical symptoms may also effect utilization. Turk (1982) notes that "the decision to make a medical contact" (p. 49) will be influenced by cognitive factors. He goes on to point out that appraisal processes are particularly important when the information provided to us is ambiguous. Interpretation or appraisal of ambiguous symptoms is a step

that frequently precedes the decision to see the doctor. Several authors (e.g., Kasl & Cobb, 1966) have noted that the perception and interpretation of symptoms is affected by cultural factors.

Psychological Factors

It is widely recognized that many patients seek medical care for reasons that are in part or entirely psychological. The distress of these patients, their depression, anxiety, and loneliness, is frequently evident to physicians, nurses and office staff alike. Medical slang terms like "crock," "problem," "professional," and "GOK" (God only knows) used in reference to certain patients testify to their prevalence and frustrating nature (Novack & Landau, 1985; Turk, 1985). However, the type of psychological factors that may cause patients to seek medical care is a controversial issue. Physicians, consultation-liaison psychiatrists, and health psychologists share a confused jumble of explanatory labels, the use of which varies not just between disciplines, but among professionals with very similar training. Pilowsky (1969) lists several terms that may be interchanged, or used differently by various medical professionals. These include: "functional illness, functional overlay, hysteria, hysterical overlay, conversion reaction, psychophysiological reaction, somatization reaction, hypochondriasis, invalid

reaction, neurasthenia, psychogenic regional pain, 'psychosomatic,' psychological invalidism, malingering, Muenchausen's syndrome, and organ neurosis" (p. 347).

In this investigator's view there are four fairly discrete, but overlapping, ways that psychological factors can affect medical utilization. First, chronic psychological distress may result in the development of psychophysiological (AKA psychosomatic) disorders which require medical care. Vingoe & Taylor (1981) describe the etiology of these conditions as "intense, frequent, and persistent emotional responses which ultimately lead to physiological and structural pathology" (p. 102). Peptic ulcers, colitis, essential hypertension, and headaches exemplify this type of problem (Millon & Millon, 1975; Vingoe & Taylor, 1981). By definition they effect one or another of the organ systems that are under autonomic nervous system control. Millon and Millon (1975) describe several early psychoanalytic theories which attempted to explain which organ system would fall prey (e.g., a neglected, hungry child may develop an ulcer as an adult due to unexpressed resentment toward her parents). The evidence for such theories was not strong and these same authors note that it is now generally assumed that a combination of genetic vulnerablity and learning mutually codetermine the development and site of the psychosomatic disorder.

The second way in which psychological factors may affect medical utilization is through somatization. In contrast to psychophysiological disorders there is no tissue damage in this type of case and the associated physical symptoms do not correspond to autonomic nervous system pathways. Once one has delineated the features which may be excluded from somatization, the remaining task of definition is still very difficult. Lipowski (1985) notes that the concept is in a "semantic muddle" (p. 23). He goes on to provide the following definition of somatization: "the tendency to experience, conceptualize, and/or communicate psychological states or contents as bodily sensations, functional changes, or somatic metaphors" (p. 23). Perhaps Katon and Dengerink's (1983) definition is somewhat clearer: somatization is the "phenomenon of patients presenting physical complaints in the absence of biological abnormalities or with discernable pathology that does not warrant either the degree of patient complaints or utilization of the health care system" <emphasis added> (p. 105). Smith (1985) states that a common somatization syndrome underlies somatization disorder, hypochondriasis, and malingering as defined by the DSM-III (American Psychiatric Association, 1980). This syndrome is described as "a chronic, nonremitting disorder with the usual onset in the teens or early 20s...patients present with multiple and

chronic nonspecific somatic complaints of virtually any type including pain" (p. 297). According to Smith, diagnosis is usually made after the physician recognizes that the patient is not relieved when told that there is no serious organic disease responsible for his symptoms. Instead he "persists in believing and behaving as though organic disease were present" (p. 297). Somatization as defined here encompasses several types of problems (Katon & Dengerink, 1983; Millon & Millon, 1975; Smith, 1985; Vingoe & Taylor, 1981). Conversion disorders in which physical symptoms (e.g. glove anaesthesias, paralysis, blindness) have no organic correlates are included. Functional disability/invalidism among patients whose degree of documented injury does not seem to warrant the level of handicap they show (e.g., among back injury patients) is also a somatization disorder.

The causes of somatization have been debated for decades. A currently prevalent psychodynamic explanation (e.g., Katon, Klienman & Rosen, 1982) views somatization as a coping mechanism or defense "that provides that patient with primary gain, i.e., intrapsychically focusing on somatic symptoms instead of an emotion or affect may protect the person from psychological pain" (p. 245) Whether this refocusing on the physical happens as a conscious or unconscious level is disputed. The behavioral conceptualization is quite similar to the dynamic view.

From a behavioral perspective somatization offers the patient the opportunity to escape or avoid confronting a painful cognitive or affective stimulus and may, thus, be negatively reinforced (Millon & Millon, 1975). It is also widely recognized that secondary gain, the receipt of desirable environmental (as opposed to intrapsychic) outcomes is frequently a force maintaining somatization. As noted in a later section on secondary gain and medical utilization, illness-related behavior may be positively rewarded (e.g., by increased tenderness on the part of family members) or negatively reinforced (by escape or avoidance of disliked tasks at home or work).

The third way in which psychological factors may influence utilization is related to the fact that some psychological disorders have physical symptoms. Depression is the most frequently cited example of this phenomenon. The various physical correlates of depression, including sleep disturbance, weight loss, and decreases in energy, libido, and concentration, may all be presented to the M.D. by patients who are only partially aware of the affective element of their depression (Katon, Kleinman, & Rosen, 1982). Several investigators have noted that depression is among the most common of, if not the primary psychological disorder, seen by general practitioners (Culpan & Davies, 1960; Katon, Kleinman, & Rosen, 1982; Smith, 1985). Culpan

and Davies found that of 100 consecutive newly referred patients at a medical clinic 51 had psychiatric illness and 38 showed no relevant organic disease. Seventeen of the 38 were depressed and 16 were anxious, nervous, or under stress. In comparison, 21 per cent of new surgical clinic referrals had a psychological condition, but only five lacked a relevant organic condition. Novack and Landau (1985) noted that there has been very little scientific study of the problem patient who has "persistent symptoms unrelated to the severity of the underlying disease" (p. 853). A retrospective record review of 52 such patients who were referred for psychological/psychiatric evaluation revealed the following diagnoses: Thirty-one percent psychogenic pain disorder, 17% conversion disorder, 15% major depression, 7% panic disorder, 4% somatization disorder, 4% schizophrenia, with the remaining miscellaneous diagnoses accounting for 2% each.

Substance abuse, particularly alcoholism, is the fourth and final psychological factor which appears to influence utilization rates. The review paper by Jones and Vischi (1979) provides strong evidence for this, showing that utilization rates decrease after alcoholics receive treatment for this problem. The median utilization reduction in the 12 offset studies reviewed by these authors was 40%. This certainly suggests that untreated substance

abuse, including the abuse of alcohol, tobacco, and other drugs, is an important psychological factor that has the effect of increasing utilization rates.

Further complicating our understanding of the ways in which these four psychological phenomena may affect medical utilization is the fact that both psychiatric/psychological and medical symptoms are very common in the general population (c.f. Zola, 1966). So the diagnostic task is not just to discover whether psychological distress is present, but to determine whether it is related etiologically, occurs as a result of, or is merely coincidental to the presented physical problem. This determination is important because treatment decisions depend on it.

There have been a few multivariate studies of utilization which include psychological distress in the prediction equations. Arling (1985) found scores on a 15 item geriatric psychosocial questionnaire which included psychosomatic, mood, and psychopathology items, to be a significant positive predictor of self-reported utilization in his sample of people age 60 and older. Tessler, Mechanic, and Dimond (1976) found that psychological distress explained a small, but statistically significant amount of the variance in physician utilization, with distress and utilization showing a positive relationship.

The magnitude of the statistical effect was comparable to those of gender and health status.

In summary, several patient-related factors, including medical condition, age, gender, previous level of utilization, socioeconomic status, lifestyle, stress, and degree of psychological disturbance, have all been shown to affect medical service utilization rates. Influential social and cultural factors are discussed in the next section. Once again, it should be noted that many of these variables could have been classified as patient-related ones. In some cases it is difficult to determine whether the personal or social features of a given variable (e.g., the social network) are the most important.

Social and Cultural Factors

Several social and cultural factors have been found to be associated with utilization rates. The influence of the family, the social network, social roles, cultural differences in and social reinforcement for illness behavior will each be discussed in turn.

Family

There are several ways in which the family may influence utilization rates. For example, Andersen (1968) defended his use of the family as the unit for studying utilization

behavior on the grounds that the family often acts as a decision making unit when an individual member experiences a symptom. Second, the need for medical care varies with the "family life cycle" (p. 5). For example, medical utilization is low in the pre-child family, but quite high during the family's reproductive stage. In addition, the decision to care for a family member at home instead of in the hospital depends, in part, on the time and skills of family members.

Certain family-related events may also affect utilization indirectly. Quill, Lipkin, and Lamb (1984) found that married men enrolled in a HMO had lower utilization during their wives pregnancies than they had before or after. A matched control group did not vary over the same time period.

The effect of family dynamics on medical utilization has also been studied. For example, Weimer, Hatcher, and Gould (1983) compared families of high and low utilizers and found that high utilizers' families were less expressive and more achievement oriented. Children in high utilizers' families perceived more parental control. There was also a greater divergence of in perspectives between spouses in these families.

Family members may also affect utilization indirectly by reinforcing or discouraging doctor visits. The work of

Fordyce and his colleagues (e.g., Fordyce & Steger, 1979) on the operant conditioning of illness behavior will be discussed in a subsequent section, but the family should be recognized as a major locus of contingencies for illness behavior.

Social Network Effects

Several studies have investigated the effect of social support on utilization. Arling (1985), for example, found that social support (as measured through self-report of ten forms of assistance, e.g., with personal care or transportation, received from family, neighbors, and friends) found that social support was positively correlated with physician visits. There was also a significant interaction between degree of impairment and social support. When level of impairment was low, utilization was a function of medical status and psychosomatic symptoms. But, for people with substantial impairment (e.g., in mobility, grooming) number of doctor visits was strongly affected by social support. These results suggest that people who are handicapped must rely on others to help them to get to the doctor. Coe, Wolinsky, Miller and Prendergast (1984), on the other hand, failed to find significant differences in number of physician visits or days of hospitalization for people over age 65 who were members of three different types of family/friend social networks.

Social Roles, Illness Behavior and the Sick Role

Medical sociologists have theorized extensively concerning the social role features associated with illness. Kasl and Cobb (1966) in their frequently cited paper classify health related actions into the three categories of health behavior, illness behavior and sick role behavior. Health behavior is defined as those actions which people who believe themselves to be well, take to preserve their health. Illness behavior encompasses activities "undertaken by a person who feels ill, to define the state of his health and discover a suitable remedy" (p. 246). Sick role behavior includes all activities that people who believe themselves to be ill, engage in for the purpose of getting well. Kasl and Cobb note that the sick role supersedes other social roles, and that the sick person is temporarily exempt from normal obligations. However, the sick role has its own requirements: it is expected that the sick person will try to get well and s/he is "under an obligation to seek competent help" (p. 248).

The authors state that utilization of medical services can be considered either as illness behavior (as when a person visits a physician for diagnosis) or sick role behavior (visits for treatment or follow up). According to Mechanic (1975):

The extent to which symptoms are differentially perceived, evaluated, and acted (or not acted) upon <emphasis added> by different kinds of people and in different social situations is obvious. Whether because of earlier experiences with illness, because of differential training in respect to symptoms, or because of different biological sensitivities some persons make light of symptoms, shrug them off, and avoid seeking medical care. Others respond to little pain and discomfort by readily seeking care (p. 355).

The tendency to adopt the sick role was found by Mechanic and Volkart (1961) to have more effect than the level of stress on the frequency of clinic visits.

Cultural Differences in Response to Symptoms

Cultural factors may also affect the way in which people respond to physical symptoms. Zola (1966, 1973) asserts that physical symptoms that could reasonably be brought to the attention of a physician are present in most people 90 per cent on the time. Yet we do not go to the doctor for the majority of these. Zola further states that: "Given that the prevalence of abnormalities is so high, the rate of acknowledgement so low, and the decision to seek aid unrelated to the objective seriousness and discomfort, it is suggested that a socially conditioned selective process may

be operating on what is brought in for treatment" (1966, p. 615). He describes several social processes which may effect utilization. First, social group standards concerning the expected prevalence of various symptoms may have an influence. He notes that for some groups of Mexican-Americans in the Southwest diarrhea is an everyday experience and not interpreted as an indication of illness. Second, different subcultural groups may respond differently to very similar symptoms because of social learning processes. Zola (1966) noted differences between Irish- and Italian-Americans seen in medical clinics in Boston. Italians complained of problems that affected a significantly greater number of body parts, had diffuse as opposed to specific reactions to symptoms, and described symptoms in a dramatic, emotional fashion. Finally, the decision to seek medical care may be made not when symptoms are most severe, but rather when the patient experiences a "break in the accommodation to the symptom" (Zola 1973, p. 681). Zola notes five psychosocial situations which may, in the presence of symptoms, result in the patient seeking medical care. These are: interpersonal crisis, perceived interference with social or personal relations, encouragement of doctor visit by significant other, perceived interference with job or with physical activity, and passage of an allotted amount of time (e.g., a person

says to himself "I will go to the doctor if this symptom does not go away in a week.") Once again there were subcultural differences between the Irish and Italians. The Italians were more likely to come in for treatment after an interpersonal crisis or perceived social problem. The Irish were most affected by their significant other, but also fell into the latter two categories. One implication of these findings is that offset researchers in multiethnic communities will need to investigate cultural factors in efforts to understand the decision to seek care.

Reinforcement of Illness, Secondary Gain

Fordyce and his colleagues (e.g., Fordyce & Steger, 1979) have developed a method of treatment for chronic pain that is based on operant principles. Briefly, they find that many behaviors associated with pain (guarded posture, immobility) are brought about, in part, by positive and negative reinforcement. Their rehabilitation program consists of removing reinforcements for pain behavior and providing positive contingencies for healthy behaviors. Fordyce's theory is applicable to the study of medical utilization in that increased use of health services may be brought about by reinforcement. The attention and concern shown by physicians and others may be reinforcing for the patient, especially when she or he lacks other social

contacts. Operant principles may also affect length of hospitalization. Hochstadt, Shepard, and Lulla (1980), for example, found that the excessive hospital stays of a selected group of asthmatic children were decreased when the the level of social reinforcement was reduced. Mechanic (1975) also noted that people may take on, or exaggerate the illness role for social or monetary compensation. However, individual differences, some of which may be measureable by means of the MMPI, must mediate the effect of reinforcement. Many people are rewarded during illness, but only some develop patterns of persistent high utilization.

Health Provider/Health Environment Factors

Geographic Factors

Geographical region and proximity to the source of health care have both been related to medical utilization patterns. The western section of the United States has a higher number of physician visits per year than other parts of the country (Aday & Eichhorn, 1972; National Center for Health Statistics, 1984). In 1981 residents of the west made an average of 4.8 visits as compared to 4.6 for the northeast and 4.5 for the other regions. Utilization rates are also higher for urban as opposed to rural areas (Rosenstock & Kirscht, 1979). Farm residents have been found to use fewer services than other rural people who do not live on farms (Aday & Eichhorn, 1972).

The history of the medical care delivery system in a given area may affect current utilization patterns. Hawaii's hospital utilization, the lowest in the country, is a case in point (M. Hall, President of Hawaii Medical Services Association, January 28, 1985). Historically, sugar and pineapple companies provided 100% medical care for their plantation workers. Most hospitals outside of Honolulu and virtually all hospitals on the neighbor islands were entirely owned by these industries, which also provided salaried physicians to care for the workers. The object of care, from the companies' point of view, was to get people well and back to work. The incentives worked against unnecessary hospitalizations. When Hawaii Medical Services Association began in the 1930s it continued the emphasis on outpatient care by providing coverage, not just for hospitalization, which was the standard on the mainland, but extensive outpatient benefits as well. Currently, there is still a considerable difference in the type of insurance offered in Hawaii and on the mainland. Mainland policies emphasize hospitalization, and coverage for physician visits is less certain. Deductibles are common and the M.D. cannot be as sure of payment. In contrast, mainland hospital coverage is very thorough with Hawaii Medical Services Association, Hawaii's major medical insurance company, being less generous. This pattern results in Hawaii's physicians

having a "different style of practice." Specifically, there are not strong financial incentives which encourage the hospitalization of patients. If hospitalization is not necessary for the provision of a given service the physician can provide it on an outpatient basis, and still be assured of receiving payment.

Another, very different example of the effect of geography on utilization rates is the case of the Greater New York City area which has one of the lowest hospital utilization rates in the country. The city owns half of the hospitals within its boundaries. When New York City suffered financial difficulties hospitals were closed and the large scale financial situation worked against unnecessary hospitalizations (Hall, 1986).

Hall (1986) also noted that geography appears to be related to the very high hospital utilization of many mainland states. West Virginia, with the highest hospital utilization in the country is just one example of a state with a low population in which many services are provided by small town hospitals. According to Hall, these small town hospitals struggle to survive. If hospitals close, the community suffers both because an important source of jobs is lost and because residents may leave an area that does not have adequate medical care. There is, thus, considerable pressure on physicians to hospitalize whenever

reasonable to do so. There are no incentives for getting them out quickly. Also, in consideration of the long distances that patients must travel to return to the hospital, physicians may keep their patients in longer to assure that they will not have to return unnecessarily.

Aday and Anderson (1974) in a conceptual paper on utilization note that transportation requirements to distant medical services may deter patients from seeking help. However, Aday and Eichhorn (1972) after reviewing numerous studies conclude that distance does affect the choice of site of medical services, but not the overall volume of medical services obtained.

In summary, utilization rates are influenced by history, geography, and proximity. This suggests that future studies of utilization and cost-offset may be able to explain a greater proportion of variance in the phenomenon of interest by including measures of these variables. At the very least researchers should note the average utilization rates of their areas so that readers may evaluate results with these in mind.

Physician Density and Physician-induced Utilization

There is conflicting, but generally persuasive, evidence suggesting that areas with more physicians and hospital beds have higher outpatient and inpatient utilization. In their

review of the factors affecting medical utilization rates Hulka and Wheat (1985) conclude that "the data are consistent in indicating that the greater the availability of physicians, the greater will be their use" (p. 448). They note that studies show physician to population ratio to be positively associated with number of physician visits made by residents and with hospitalization rates. It is negatively related, however, to length of hospital stay. Medical specialist to population ratio is also positively correlated with hospitalization rates. Eisenberg (1985), who holds both an M.D. and a degree in business administration, states that there is conflicting evidence suggesting that medical utilization tends to be higher in areas with larger physician and hospital bed per capita ratios. He concludes that physicians may be able to induce demands for their services. But, they should not be viewed primarily as income seekers. Rather, M.D.s, like many professionals are motivated by income, but also are active agents for their clients' well-being. Rossiter and Wilensky (1983) performed an interesting multivariate study which evaluated the effect of several variables (e.g., demographics, health status, appointment waiting times) on both patient and physician-initiated demand. They conclude that doctors are primarily motivated by medical, not financial concerns.

There is, in addition, a substantial body of studies on the question of "unnecessary" surgery. Rutkow (1982) notes that this topic has been under debate since the beginning of this century. He concludes that while some unnecessary surgeries are no doubt performed, the extent of this problem has not been determined. Phillips, Thornton, and Gleicher (1982) performed a study that suggests that cesarean sections are not performed as a matter of convenience and that the overall rate of cesareans is not increasing. However, the reasons for doing this particular surgery appear to be changing. Clearly, our understanding of utilization and of the offset effect will be increased if we attend, not only to the patients cognitions and motivations, but to those of physicians as well.

Type of Medical Organization

Goodman and Swartwout (1984) have described the financial aspects of several forms of medical organizations, but a basic distinction can be made between fee-for-service practices and health maintenance organizations (HMOs). Aday and Eichhorn note that in many studies of medical utilization the type of organization and the mode of payment are confounded. As a result it is difficult to note their separate effects. Generally speaking however, in the fee-for-service arrangement the physician is paid for each

service rendered. Thus, there is a financial incentive that may function to increase the number of visits. In the HMO this incentive is not present because physicians receive a salary that is independent of the number of patients seen and procedures performed. Hulka and Wheat (1985) conclude that HMOs in comparison to other organizational forms are associated with increased frequency of patient-initiated and prevention-related visits, with fewer surgeries, and lower hospital admission rates. Patients in HMOs have fewer illness-related and follow-up visits. Thus, the degree of offset may be affected by the type of medical organization in which a study is preformed. Speculatively, one might expect greater decreases in utilization after psychotherapy in HMOs where the relative lack of physician-induced demand will contribute to the offset effect.

Hospital and Clinic Policies

Cannoodt and Knickman (1984) found that several organizational and policy features of hospitals affected the length of pre- and post-surgical hospital stays. For example, patients admitted in the afternoon (as opposed to the morning) had significantly longer preoperative stays because tests and physician consults often had to be postponed until the following day. Postoperative stays were longer in hospitals located in areas in which rehabilitation

and nursing care facilities were rare. Clinic staffing and scheduling policies may also affect outpatient utilizations. Aday and Anderson (1974) note that long waiting periods may represent a barrier to obtaining medical care. Presumably long waits may also decrease utilization.

Types of Utilization

There are several ways of operationalizing medical utilization (Aday & Anderson, 1974; Hulka & Wheat, 1985) and no standard method of doing so. Measures of outpatient utilization include volume or rate of visits in a given time span (usually one year), type of visit (medical, surgical, obstetric, dental, pharmacy), reason for visit (preventive, illness-related, custodial care, for acute vs. chronic illness), location of visit (physician's office, hospital outpatient department, emergency room). For hospital utilization volume may be measured by number of admissions in a given period, by length of admission, or by total days in a given year. Admissions may also be classified as medical, surgical or obstetric. Aday and Eichhorn (1972) note that utilization statistics can be compiled for the individual or for population groups. In a variation of the latter method, Anderson (1968) compiled figures for family group use. Hershey et al., (1975) discovered that the same set of independent variables (e.g., need for medical care

and demographics) accounted for differing degrees of the variance in five different measures of utilization. These authors suggest that the medical utilization literature often produces mixed and conflicting results because many different measures of utilization are used. There is no one answer as to the type of utilization variable that should be employed. The selection depends on the type of question being asked. Hulka and Wheat (1985) note that predictor and utilization variables should be matched in a "conceptually coherent" (p. 443) manner.

Summary of Factors Affecting Utilization

This chapter has reviewed the several types factors, in the patient, in the society and culture, in the health care environment, and even in our conceptualizations of utilization itself, which may affect the usage of medical services. This is important background material against which the rationale and findings of the current study must be evaluated. Specifically, although the subsequent sections of this paper will focus exclusively on the measurement of the psychological factors affecting utilization, it should be clear that these represent only some of several forces which interactively affect medical utilization rates.

RATIONALE FOR THE PRESENT STUDY

The foregoing review of factors which affect utilization rates suggests that it is important to assess psychological and social aspects of the patient's life and the organizational/environmental aspects of the health care setting as well. Yet, in contrast to the multitude of studies on the effects of psychotherapeutic interventions upon medical problems, far less has been written on the health care applications of psychological assessment. However, several authors (Dana, 1984; Millon, 1982; Schofield, 1980; Sechrest & Cohen, 1979; Smilkstein, 1983) have all noted that assessment should constitute an important part of the health psychologist's activities. Sechrest and Cohen (1979) state that "So much of the impact of health and illness is clearly in the domain of psychology that the discipline should be central to the development of more powerful means of assessing these impacts" (p. 394). Smilkstein, a physician, spoke out strongly for the biopsychosocial model of health care stating that the unification of "physical, psychological, <italics added> and sociocultural assessment of a patient's health problems, represents the ideal patient care" (p. 163). Schofield

(1979), in an excellent discussion of the professional roles of health psychologists, describes the many functions of the assessment, including: the discrimination of functional and organic disability, recommendations aimed at improving the likelihood of patient compliance, and explanations to staff concerning perplexing patient behaviors. Dana (1984) reviewed the literature on assessment in health psychology and concluded that there are four assessment domains which have repeatedly been found to relate to illness: power and responsibility for health (e.g., locus of control), life stress and life events, personality dispositions/coping styles, and psychiatric symptoms.

In spite of the growing recognition of the importance of assessment for health psychology, the author's review of a representative sample of medical psychology, behavioral medicine, and health psychology sources including The Journal of Behavioral Medicine, Health Psychology, and several texts (Carr & Dengerink, 1983; Davidson & Davidson, 1980; Doleys, Meredith, & Ciminero, 1982; Gatchel & Baum, 1983; Hamburg, Elliott, & Parron, 1982; Haynes, Taylor, & Sackett, 1979; Matarazzo, et al., 1984; Milby, 1982; Millon, Green, & Meagher, 1982; Pinkerton, Hughes, & Wenrich, 1982; Pomerleau & Brady, 1979; Prokop & Bradley, 1981; Rachman, 1977, 1980, 1984; Stone, Cohen, & Adler, 1980; Tryon, 1985; Vingoe & Taylor, 1981) revealed only four papers devoted to

the application of psychological assessment to the questions of medical utilization, cost containment or cost offset. Each of these are described briefly in the following section.

Cummings and Follette (1968) designed a 155 item automated questionnaire for use during multiphasic annual medical checkups to determine the presence of psychological problems worthy of treatment. Approximately 8% of patients with a positive score on the questionnaire were found to also have three or more signs of emotional distress based on a standardized medical chart review procedure. The medical utilization for the year preceding testing was not significantly different for patients with and without positive scores on the questionnaire. No attempt was made to predict subsequent utilization.

Marron, Fromm, Snyder, and Greenberg (1984) administered the Millon Behavioral Health Inventory (MBHI) to 33 female patients who were divided into infrequent (two or fewer visits per year) and frequent (six or more) attenders on the basis of previous utilization. They found that frequent users scored significantly higher on the inhibition, premorbid pessimism and social alienation of the MBHI.

Westhead (1985) compared frequent attenders (N=109) at a general practice clinic in England to a group of matched

controls (N=86). Frequent attenders were defined as the patients in the highest ten percent of visit frequency in each of several age groups for each sex. The frequent attenders had significantly higher scores on Eysenck's neuroticism scale and also showed a higher prevalence of neurotic conditions. Anxiety and depression were especially common. The female high utilizers were more likely to be depressed. The males more commonly received diagnoses of alcohol abuse.

Peroff (1985) administered a newly developed questionnaire measuring stress, depression, and lifestyle features to 220 medical patients in a prepaid health plan. Her results indicated that depression was significantly correlated with both inpatient and outpatient utilization of the previous three years. The stress scale was only related to outpatient utilization, while the lifestyle measure did not predict either.

The scales developed by Cummings and Follette have not been standardized and the MBHI and Eysenck scales have not been as thoroughly studied as the MMPI. However, the findings of these studies suggest that it may be possible to use psychological assessment devices like the MMPI to predict subsequent medical utilization and the offset effect. This point of view is supported by Schofield (1979) who has noted that psychological assessment devices may be

used to screen medical patients for the presence of emotional disturbance. He also stated that estimates of the percent of patients in the caseloads of general practitioners who have a significant "psychological component" (p. 455) to their presenting complaints vary from one-third to three-fourths. Then, referring to the work of Follette and Cummings (1967), he makes the point that psychological assessment can decrease subsequent medical utilization by identifying those for whom psychotherapy may be appropriate. However, this investigator was not able to find any studies that have attempted to use a psychological assessment device to predict subsequent medical utilization.

The Relevance of the MMPI to the Offset Issue

This section first describes the MMPI's clinical and validity scales. Next a selective review of the medical applications of the MMPI is presented. The final section notes the absence of an offset-related MMPI literature.

The MMPI Scales

The MMPI (Hathaway & McKinley, 1967) consists of 566 true-false items which produce ten clinical scores listed here by their names, conventional abbreviations and by the identification numbers: hypochondriasis (Hs, 1); depression (D, 2); hysteria (Hy, 3); psychopathic deviate (Pd, 4);

masculinity-femininity (Mf, 5); Paranoia (Pa, 6); psychasthenia (Pt, 7); schizophrenia (Sc, 8); hypomania (Ma, 9); and social introversion (Si, 0). Three validity scales, L, F, and K, are included to allow determination of the patient's test taking attitude. The L scale was designed to detect the tendency to present one's self in an unrealistically positive light. The F scale may detect efforts to exaggerate degree of psychopathology and other deviant response sets. Finally, high scores on the K scale suggest that the patient is attempting to deny problems and psychopathology. Both the clinical and validity scales are affected by many factors besides psychological status. As a result, race, educational level, gender and age should all be considered when the MMPI is being used to detect the presence of psychopathology (Graham, 1977; Colligan, Osborne, Swenson, & Offord, 1984). Every patient receives a standardized score on the clinical and validity scales. Although something of an oversimplification, it can be stated that a score on the clinical scales is abnormal if it is more than two standard deviations above the mean, i.e. if it is over 70. If the score on any of the validity scales is sufficiently abnormal the validity of the scores on the clinical scales is called into question. In such a case the patient may be asked to take the test a second time in an effort to obtain a valid profile. Prior to the second

administration she or he would be counseled about the importance of candid answers. The pattern of the scores, often shown graphically by drawing a line to connect them on the score sheet, is referred to as the profile. The fact that new scales are also continually being created from the pool of 566 items ensures that the MMPI will remain a flexible tool. For example, the Ego Strength (Es) scale was not among the 13 original scales, but is now frequently used to predict response to psychotherapy (Graham, 1977).

A Review of MMPI Uses With Medical Patients

The MMPI has an extremely wide range of uses including pre-therapy evaluation, psychiatric and forensic assessment, personnel evaluation (Butcher, 1979). It is also extensively used in medical settings. In fact, the assessment of medical patients was a major force behind the creation of the inventory (Hathaway & Mckinley, 1940; Mckinley & Hathaway, 1943). The following quote from Mckinley and Hathaway concerning the development of the MMPI sounds as though it were extracted from a contemporary medical utilization offset article:

A considerable proportion of medical patients are beset by and wish relief from emotional states rather than from bodily disease of seriously crippling importance. Furthermore, many patients with more or less severe

organic disease are simultaneously suffering from undesirable emotional reactions which may definitely impede improvement or produce a worsening of the organic condition; often these patients are as much influenced for the better by reassurance, suggestion and encouragement as by those measures directed at the organic state... recognizing this problem and desiring to contribute to its solution we began to work in 1937 on the development of an objective personality test <emphasis added> which is simple to use, easy to interpret and conserving of time. We have chosen to name this test the Minnesota Multiphasic Personality Inventory. (p. 161)

The test developers and other early researchers (e.g., Kamman & Kram, 1955) realized that the delineation of psychological and medical components could guide treatment in at least two ways. First, a severely abnormal elevation in the hypochondriasis, depression and hysteria scales would suggest the presence of significant psychological distress which could be causing, precipitating, or exacerbating the physical disorder. Such a finding may indicate that surgery and other invasive procedures should be postponed until a course of psychiatric/psychological treatment has been completed. Conversely, a very normal MMPI profile in an ambiguous case would encourage the physician to search

further for an organic explanation. Osborne (1979) notes that the contemporary applications of the MMPI in the medical setting are essentially the same as those intended by the developers. In addition, recent work tends to emphasize the cost containment applications. For example, Swenson, Pearson, & Osborne (1973) note that there is a "growing appreciation of the MMPI as a screening device that may be used to identify emotional problems in the medical setting, hence permitting conservation and better utilization of scarce manpower and skills in mental health occupations" (p. 3). Sime (1984) reflected the feelings of many medical and health psychologists when he wrote that "the MMPI is the most valid, reliable, and prominently utilized inventory for assessment of long-term stress on the personality of the <medical> patient" (p. 502).

There are many ways in which the MMPI has been used to assess the presence of psychological distress in the medical patient. A number of these approaches will be described here briefly. Numerous studies (Gilberstadt & Jancis, 1967; Schwartz & Krupp, 1971; Schwartz, Osborne, & Krupp, 1972) have attempted to use abnormal elevations on the hypochondriasis (scale 1) and hysteria (scale 3) (and sometimes on depression, scale 2, as well) to predict functional or psychiatric diagnoses in medical patients with a variety of disorders. On the whole these efforts have

been rather disappointing. Osborne (1979) notes that the three scales are quite high both for patients with documented chronic physical disease and for those with apparently functional complaints. Schwartz et al. (1972) did find that the concurrent validity between 1, 2, and 3, and the organic vs psychological vs. mixed diagnoses improved when gender and age were included as moderating variables. In spite of these research findings almost all of the manuals used for MMPI interpretation (e.g., Graham, 1977) provide evidence that a simultaneous elevation in the 1 and 3 scales (particularly in the absence of depression) strongly indicates somatization.

There have also been several studies (e.g., Armentrout, Moore, Parker, Hewett, & Feltz, 1982; Bradley & Van der Heide, 1984; Moore, Armentrout, Parker, & Kivlahan, 1986; Smith, Aberger, Follick, & Ahern, 1986) which have identified subtypes of chronic pain patients by applying statistical clustering procedures to their MMPIs. The findings typically reveal several pain patient subgroup with distinctive MMPI profiles. Among these profiles are the expected 1-2-3 or 1-3 elevation pattern, others which include elevations on scales 4, 7, and 8, and some which are completely normal with no scores over 70. However, Moore, et al. (1986) found that MMPI subgroup membership did not predict treatment outcome among pain patients.

Another branch of research has applied specially created scales to patients with specific diagnoses. Several researchers (e.g., Calsyn, Louks, & Freeman, 1976; Freeman, Calsyn, & Louks, 1976; Hanvik, 1951; Towne & Tsushima, 1978) used a number of such scales to attempt to discriminate functional from organic cases of low back pain. In spite of the relatively positive results of the early studies, Towne and Tsushima found that while two back pain scales were able to discriminate functional from organic cases (at a hit rate of 75% that did not exceed chance), neither scale was capable of separating back pain patients from those with gastrointestinal or psychiatric diagnoses. This finding suggests that the back pain scales may be measuring some aspect of personality or distress that is not specific to low back somatization.

Three other special scales have been developed also with the goal of discriminating between medical patients with simple organic diagnoses and those with substantial psychological involvement. First, several studies (Byrne, 1980; Byrne, Steinberg, & Schwartz, 1968; Schwartz, 1972; Schwartz, Krupp, & Byrne, 1971) have described the repression-sensitization scale which is thought to measure two ways of responding to threatening stimuli. According to Schwartz et al. (1971) the scale was designed "to measure a continuum of psychological defenses that range from anxiety-

avoidance behavior (repression-denial) to anxiety-approach behavior (obsessive thinking and ruminative worrying)" (p. 286). Results show that among medical patients repressors tend to have more organic diagnoses and sensitizers receive diagnoses involving psychological factors (Schwartz, 1972; Schwartz et al., 1971). Other medical applications have been found as well. For example, Linden, Paulhus, and Dobson (1986) found that high repression-sensitization scores were associated with reduced reporting of physical symptoms. They note that their findings "raise doubt about the validity of even honest self-reports of physical symptoms...among repressors" (p. 312). They caution that direct observation and collection of physiological data may be necessary to determine the actual physical status of repressors. A second special scale, panic-fear, was developed by Dirks, Jones and Kinsman (1977) for the assessment of asthmatics. Panic-fear scores successfully predicted the intensity of discharge drug regimens for this group of patients. The authors suggest that the scale may also be applicable to patients with other diagnoses. A third special measure, the pseudo-neurological (PsN) scale was derived by Shaw and Matthews (1965) in an attempt to use the MMPI for discriminating patients with known brain damage from others with neuropsychological symptoms but no documentable lesions. They found that a cutoff point of

seven was able to correctly identify 81% of the pseudo-neurological patients, but had a 25% false positive rate. Shaw (1966) showed that the PsN scale was capable of discriminating epileptic patients from those with "pseudo-seizures," (p. 271) seizure-like behaviors unrelated to brain damage. Although other investigators (e.g., Silliti, 1982) have found the PsN scale was not capable of discriminating between patients with organic and schizophrenic diagnoses. A new application of the pseudo-neurological scale was developed very recently by Tsushima and Higuchi (1986, in submission) who showed that pain patients whose complaints could not be documented by liquid crystal thermography (LCT) measures had significantly higher PSN scores than patients with positive LCT findings.

In spite of the great number of studies devoted to medical patients the author was able to locate only two which used number of physician visits as an outcome variable. In both cases medical visits were not studied as an index of utilization but were used as proxy measures of illness. Canter, Imboden, and Cluff (1966) for example, divided civilian employees of a military biological laboratory into psychologically vulnerable and nonvulnerable groups based on the medians of the raw scores on the hypochondriasis, ego strength, and moral-loss scales and on the total score of the Cornell Medical Index Health

Questionnaire. There were 93 and 219 subjects, respectively, in the vulnerable and nonvulnerable categories. The two groups were compared on the number of visits made to the laboratory's dispensary during the subsequent 18 months. Vulnerable subjects were found to have a significantly larger number of visits than the nonvulnerable individuals (3.9 vs. 2.2). The nature of the two groups' complaints varied as well. Psychologically vulnerable people had more gastrointestinal and fewer upper respiratory infections. Byrne, Steinberg and Schwartz (1968) found that male sensitizers, as measured by the repression-sensitization scale, made more clinic visits than male repressors. No differences were found for females. The fact that sensitizers go to the doctor more frequently probably results from the fact that they attend to, and worry about, symptoms more than repressors do. The findings of these two studies suggest that selected MMPI scales are capable of predicting medical utilization behavior, at least among male patients. Future researchers should not restrict themselves to an analysis of scale scores, but should look at differences in item endorsement patterns between high and low utilizers as well. Similarly, separate statistical analyses should be run for males and females since research (e.g., Hulka & Wheat, 1985) has shown that their utilization patterns are not the same. As a result it is likely that

different items will discriminate between frequent and infrequent users of each sex.

Surprising Lack of Utilization-Related MMPI Studies

The author reviewed relevant journals including the major source of medical MMPI articles, The Journal of Clinical Psychology (in this case for the years 1960-1985), ran computerized literature searches on the Psychological Abstracts and Index Medicus data bases, and contacted J. Butcher (personal communication, September, 1985) at the University of Minnesota, all in an unsuccessful effort to discover existing research in which the MMPI was used to study the offset effect. Considering its long history in medical settings and the variety of applications therein, the fact that the MMPI has not been used in this manner is truly surprising. That it is well-suited for the purpose is suggested by Dana (1984) who noted that traditional psychological inventories may be used to:

delineate homogeneous patient subgroups within heterogeneous populations...that may show differential responses to treatment modalities. The use of actuarial prediction techniques eventually may allow behavioral medicine practitioners to determine which treatment techniques (or treatment packages) may be most effectively administered to particular patients (p. 498).

Rationale for the Present Study

The fact that the MMPI is already "in place" is perhaps the strongest reason for using it to study the offset effect. Hospitals and outpatient clinics across the country commonly use the MMPI in their evaluation batteries. It will be many years before other instruments such as the Millon Behavioral Health Inventory (Green, 1982) are in wide enough use to allow a thorough study of the offset phenomenon. Results from the proposed study could be applied immediately.

The goal of this study was to discover MMPI scores that can be used to predict which patients will show a decrease in medical utilization after psychotherapy. There are several reasons why this application of the MMPI is valuable. Briefly, it may increase the quality of medical care while containing costs, add to the usefulness of an already widely applied questionnaire, and improve psychology's theoretical understanding of medical utilization, somatization disorders, and other conceptually important issues. And, as shown by the brief review of its medical applications, psychologists have not been altogether successful in determining the presence of somatization and functional overlay by means of this inventory. This study takes a fresh look at the problem by asking, not whether psychological factors are involved per se, but rather whether psychotherapy will result in a decrease in medical

care seeking. This would address a practical concern that is frequently behind referrals to psychiatry/psychology departments.

Questions to be Addressed in this Study

This study was based on the assumption that patients whose response to psychotherapy includes a subsequent decrease in medical utilization differ in their emotions, cognitions, and other behaviors from those who do not show a decrease. It was also assumed that the MMPI would be able to tap some of the important differences. Thus, it was hypothesized that the MMPI scale scores and item endorsements of post-psychotherapy utilization decreaseers and those of nondecreaseers are significantly different from one another. No specific predictions were made concerning which scales or items would discriminate between the two groups.

The methods of this study were designed to allow three questions to be answered: First, how well does the MMPI predict medical utilization? Second, what are the demographic and medical characteristics of patients who do and do not experience a decrease in medical utilization after psychotherapy? Finally, what can the MMPI tell us about the role of psychological factors in the offset effect?

METHOD

Subject Selection Procedures

This study made use of archival data found in the psychological and medical records of Straub Clinic and Hospital in Honolulu.

Characteristics of the MMPI Referrals

Several types of patients are referred for an MMPI at Straub (W. Tsushima, personal communication, February 12, 1986). Five types of referrals are described below. First, there are patients referred to the psychiatry/psychology department by physicians because of suspected psychological problems. However, only about half of the patients referred for this reason are given the MMPI. The decision to give the MMPI is guided by the form of the referral. Only if the referral specifically requests the MMPI will it be administered. If, on the other hand, it requests evaluation and/or treatment without asking for an MMPI, the test is generally not given. Furthermore, some Straub physicians when making a referral to the psychiatry/psychology department will tend to request the MMPI, others consistently do not. Some physicians request an MMPI for

patients who are resistant to the idea of receiving psychotherapy. In this case abnormal MMPI scores may be used to bolster the argument in favor of therapy. It is very rare for a psychologist or psychiatrist within the department to initiate the MMPI for patients who are self-referred. Thus, the source of the referral is the major factor that determines which of those patients who are suspected of having psychological problems will receive the MMPI. However, not all physician referrals concern psychological problems. Specifically, a small proportion of these come from surgeons who want to know if the patient is a good candidate for a particular surgery. For example, the appropriateness of the gastroplasty procedure ("stomach stapling") for morbid obesity was the referral question for several MMPIs. These presurgical referral MMPIs are the only full-length protocols that were routinely eliminated from the study. This was done because in all other cases there is a least an implied question concerning the patient's possible need for psychotherapy.

The second type of MMPI referral is made by physicians who feel that their patient may benefit from the psychology/psychiatry department's biofeedback therapy program. This is a discrete subset of the first type of referral. Neuropsychology cases constitute the third group of MMPI referrals. All people who receive this type of

evaluation are given an MMPI regardless of referral source. A short form is administered, verbally if necessary, to patients who cannot tolerate the longer version. The fourth group of MMPI referrals are those generated by psychiatrists. These may be either consultation or therapy cases on whom the psychiatrist desires more information. The fifth and final group of patients are those whose lawyers have requested that the MMPI be given as part of a personal injury case. None of this type was included in the study because they failed to make it through the second set of subject selection criteria described in the following section. In total these various types of referrals result in approximately 276 MMPI administrations per year. As a rule the MMPIS are completed on an outpatient basis under the supervision of the psychiatry/psychology department office staff. However, 10 subjects in the MANOVA sample, or 7.1%, were hospitalized at the time they took their MMPIS.

Thus all of the subjects in this study received an MMPI referral from a physician. This raises a question concerning how well the results obtained from this sample will generalize to patients who have not received an MMPI referral. Appendix A contains the results of a substudy that was done to determine the extent of the differences between patients who receive MMPI and other types of psychiatric/psychological referrals and patients who do not

receive either form of referral. Although the study did reveal some interesting differences between the two groups, its results indicated that the magnitude of the psychological differences between patients who do and do not receive MMPI referral was rather small. Therefore, the results should generalize fairly well to the nonreferred patients.

Three Sets of Subject Selection Criteria

Three sets of screening procedures were applied to select subjects. The first set of subject selection criteria included several MMPI and demographic constraints. Specifically, subjects were eliminated if any of the following held true:

1. age less than 18,
2. residence not on the island of Oahu,
3. patient received a short-form of the MMPI,
4. MMPI validity scales L, F, or K above T-score of 80 or F minus K is greater than +12,
5. patient had received multiple MMPIs,
6. patient was referred for an MMPI for the purpose of pre-surgical evaluation (e.g., gastroplasty) and not because s/he was thought to be suffering from a psychological disorder.

The medical records of subjects not eliminated by these restrictions were next evaluated using a second set of criteria.

The second set of criteria was developed by the author in a separate substudy reported in Appendix B. The goal of the substudy was to find a way of assuring that the medical files selected for study contained a complete, or nearly complete, record of that patient's medical utilization. It is important to study patients who did not get a sizable proportion of their care from other medical facilities. This is due to the fact that if a patient were receiving a substantial amount of medical care outside of Straub we could not be certain that utilization decreases observed in the year following the MMPI referral, were the result of the referral or simply a function of shifting patterns of outside utilization. The results of the criteria development substudy show that almost 90% (i.e., 88.7%) of the patients who meet the criteria get at least 90% of their medical care at Straub. The criteria were applied to medical record of potential subjects as follows. Subjects were included if they met any of the following three sets of conditions:

1. membership in one of Straub's HMOs in the years prior to and post MMPI,
2. the MMPI referral was from a Straub physician and the patient made at least one visit to an internist

(i.e., to a nonspecialist) during the year prior to the MMPI,

3. the MMPI referral was from a Straub physician and patient made visits to at least three different physicians in the year prior to the MMPI.

The medical record of patients who were not eliminated by these criteria were subjected to a third and final screening process.

For this third set of criteria a subject was included if his or her medical record satisfied both of the following conditions:

1. showed that the patient had received medical care at Straub within one to two months of the beginning of the pre-MMPI year and within one to two months of the end of the post-MMPI year and
2. did not include entries or letters indicating that the patient was receiving medical or psychotherapeutic care at other facilities during the pre- and post-MMPI years.

The records of over 2,200 patients who received the MMPI between the years of 1976 and 1985 were evaluated by these three sets of criteria. Of these 203 were eligible for inclusion. The procedure for reviewing the records was guided by the MMPI administration date. That is, the medical records of the most recent year, 1985, were reviewed

first. Next, the 1984 records were evaluated, then 1983, and so on.

Categorization of Subjects into Three Samples

The subject selection process continued until three samples of subjects were gathered. The first sample, referred to as the "MANOVA sample," was used for the multivariate analysis of variance (MANOVA) of the 13 standard MMPI scale scores described in the Design and Statistical Procedures section of this chapter. It also used for several supplemental analyses. The MANOVA sample consisted of four subgroups of 35 subjects each. These subgroups are referred to throughout the Results and Discussion sections of this paper as the "four groups of the MANOVA interaction." Table 5 contains demographic and medical utilization information for the subgroups. Each subgroup is defined below.

The No Therapy/No Decrease subgroup was made up of patients who had not received any psychotherapy or biofeedback during either the pre- or post-MMPI years and did not experience a 20% or greater decrease in the number of outpatient physician visits in the year following the MMPI. The cutoff of 20% was chosen because Jones and Vischi (1979) found this to be the median utilization reduction after mental health care. The No Therapy/Decrease subgroup consisted of patients who had not received any psychotherapy

or biofeedback during either the pre- or post-MMPI year and did experience a 20% or greater decrease in the number of outpatient visits in the year following the MMPI. The Therapy/No Decrease subgroup included patients who had received at least one psychotherapy or biofeedback session in either the pre- or post-MMPI year and did not experience a 20% or greater decrease in the number of outpatient physician visits in the post-MMPI year. Finally, the Therapy/Decrease subgroup was made up of patients who had received at least one psychotherapy or biofeedback session in either the pre- or post-MMPI year and did experience a 20% or greater decrease in the number of outpatient physician visits in the post-MMPI year.

The second and third samples were selected for the development of a new utilization prediction MMPI scale also described later in this chapter. The second sample, referred to as the scale development sample, was used to create the utilization prediction scale. It consisted of 60 patients all of whom had received at least one session of psychotherapy or biofeedback in either the pre- or post-MMPI year. Thirty-one of these patients had at least a 20% decrease in number of outpatient visits in the year following the MMPI and 29 did not show a minimum of 20% decrease in that year. The third sample, the cross-validation sample, was used to cross-validate the new scale.

The 62 patients in this sample had all received at least one session of psychotherapy in either the year pre- or post-MMPI. Thirty-two of them had shown a 20% or greater decrease in physician visits in the post-MMPI year and 30 did not.

The subjects in the Therapy/Decrease (n=35) and Therapy/No Decrease (n=35) subgroups of the MANOVA sample were also used in the scale development and cross-validation samples. These 70 subjects plus 52 others who had received psychotherapy or biofeedback were ranked according to the date of the MMPI administration and then assigned alternately to either the scale development or cross-validation samples. Thus, while subjects from the MANOVA sample also appear in the scale development and cross-validation samples, there is no overlap in subject membership between the latter two groups.

All three of the samples depended on the Therapy/No Therapy variable for their creation, the definition of which requires some explanation. Some subjects had received therapy or biofeedback sessions prior to the administration of the MMPI. It is not unusual for the MMPI to be given immediately after the first biofeedback session for example. In other cases a psychiatrist may request an MMPI assessment after seeing the patient several times in therapy. For example, 30 subjects of the 140 in the MANOVA sample

described below (or 21.4%), had had at least one session of psychotherapy prior to their MMPI. Twenty of these (or 14.3% of the sample) had only one session before test administration. Similarly, 5.7% of the MANOVA sample had had at least one pre-MMPI biofeedback session. This raises some problems in interpretation. In so-far-as the goal of this study is to develop MMPI predictors of the therapy offset effect, this confounds the interpretation of the MMPI results. Specifically, for patients who have therapy sessions prior to the MMPI, the test results will already be affected by the therapy and cannot be considered to be purely predictors. In these cases the test is also, in a sense, functioning as an outcome measure. Still, it would have been problematic to eliminate these cases. First, because this would have substantially reduced the number of available subjects. And, second, because the study would no longer be generalizable to this type of MMPI referral, which is after all fairly common. The decision was made to include patients with up to six pre-MMPI therapy sessions. However, some of the subjects received a greater number of pre-MMPI biofeedback sessions. The results section contains a table showing the mean number of pre-MMPI sessions per experimental group.

Research Staff

This study, and the two substudies described in Appendices A and B, were carried out by the investigator and eight research assistants. Three of these assistants received payment for their work from the Straub Medical Research and Education Foundation. Of these, two had B.A.s in psychology and one was an undergraduate psychology major. The remaining five were all psychology majors who received research practicum class credit for their participation. All research assistants received training in medical records handling and data abstraction. The accuracy of their data abstraction was verified in a interrater reliability study which is reported in Appendix C.

Materials

Materials included data coding sheets, medical records and MMPIs. Copies of the data coding sheets appear in Appendix D.

Medical Records

The medical records were reviewed to obtain demographic data and medical and psychiatric utilization information for the year preceding and the year following the administration date of the MMPI. Specific utilization data included frequency counts of: outpatient physician visits,

outpatient psychiatrist or psychologist visits, biofeedback sessions, physical therapy visits, days of hospitalization, and visits to the emergency room. While all of this information was not necessary to answer the main questions of this study, it did allow for a more complete picture of the pattern of utilization. In addition, the psychological and medical diagnoses received by each subject during the two years of the study were recorded. The diagnoses were then assigned International Classification of Diseases-Ninth Revision (ICD9) numerical codes (United States Department of Health and Human Services, 1980). These code numbers were assigned by trained medical billing technicians. Due to funding constraints only a subset of the MANOVA sample had code numbers assigned to the medical conditions.

The MMPIs

The MMPIs were collected from the Psychiatry/Psychology Department. Straub psychiatry referrals receive the first 399 items of MMPI Form-R plus nine additional items which are used for scoring a special neuropsychological scale. Technically speaking this is not a "short-form" because all of the items necessary for computing the 13 standard scales are present. However, some required for scoring several medical research scales (e.g., panic-fear, repression-sensitization) are missing (Dahlstrom, Welsh, & Dahlstrom,

1972). Although concerns have been raised about the use of shortened or altered versions of the MMPI (e.g., Dahlstrom, 1980) numerous health psychologists have noted that the administration time required for the full 566 items is often too much for medical patients who may be in pain or feel fatigued (Bradley, Prokop, Gentry, Van Derheide, & Prieto, 1981; Dana, 1984; Schofield, 1980; Sime, 1984; Straw & Rogers, 1985; Tsushima, 1975).

Design and Statistical Procedures

Statistical analysis was done in three steps: the MANOVA of the 13 standard MMPI scale scores, a set of analyses of demographic and diagnostic variables for the MANOVA sample, and the analyses necessary for the development of the new MMPI utilization prediction scale. Each of these steps is described in detail in the following section.

MANOVA of the 13 Standard MMPI Scale Scores

A 2X2 factorial multivariate analysis of variance (MANOVA) of the 13 standard MMPI scale scores was performed with the two independent variables of 1) receipt of a least one session of psychotherapy in either the pre- or post-MMPI year (yes/no) and 2) presence versus absence of an at least 20% decrease in outpatient physician visits in the year following the MMPI administration. The Pseudo-Neurologic

and Ego Strength scales were not included in the analysis because they were only available for a subset of the sample.

Manova-related Supplemental Analyses

Several supplemental analyses were done to provide more information about the differences between the subjects in the four subgroups of the MANOVA described in the preceding section. First, two 2X2 factorial analyses of variance (ANOVAS) of age and years of education, using the same independent variables as the original MMPI MANOVA, were done to determine whether the groups differed on these variables. Second, chi-square analyses of gender, marital status, employment status and ethnicity by the MANOVA main effects and interaction were performed. Third, the intercorrelation matrix for the various types of medical utilization was produced to determine how these behaviors covary in the MANOVA sample. Fourth, a chi-square of the four groups of the MANOVA interaction by psychological diagnosis was done to discover whether there were significant diagnostic differences between these groups. These four analyses were all done using the original MANOVA sample. Finally, a supplemental MANOVA of the total number of medical diagnoses using the same independent variables as the original MANOVA was done to discover if the groups differed on this variable. The total number of diagnoses was derived by

summing the number of separate ICD9 code numbers that were assigned each patient. The sample used for this last analyses contained some cases that were not included in the MANOVA sample and it did not contain all of the MANOVA sample cases.

Creation of a New MMPI Scale for Utilization Prediction

The creation of the new utilization prediction scale was accomplished in four steps. In the first step a true/false by utilization decrease/no decrease chi-square was performed for each of the 408 MMPI items using the scale development sample. In steps 3 and 4, which both used the cross-validation sample, the new scale score for each subject was calculated and a cutoff score was selected. The details of these procedures are described in the results section.

RESULTS

MMPI Profile MANOVA Results

The multivariate analysis of variance (MANOVA) of the 13 standard MMPI scales performed with the two independent variables of 1) receipt of a least one session of psychotherapy vs. receipt of no psychotherapy and 2) presence vs. absence of an at least 20% decrease in physician visits in the year following MMPI administration yielded the following results. There was a significant main effect, $F(13,124)=2.18$, $p<.05$, for receipt of psychotherapy with significant univariate differences on the L scale, which was higher for the no therapy group, and Hy which showed the opposite pattern. The MMPI scale means, standard deviations and F-values for the patients who did and did not receive psychotherapy are shown in Table 1. Table 1 also includes the means for the Ego Strength (Es) and Pseudo-Neurologic (PsN) scales which, because they were available for fewer subjects, were not included in the MANOVA analysis. Neither the main effect for utilization decrease after psychotherapy $F(13;124)=1.53$, $p>.05$, nor the psychotherapy by decrease interaction $F(13,124)=1.41$, $p>.05$, was significant.

Table 1

Means and Standard Deviations of MMPI Scales
For Psychotherapy and No Psychotherapy Groups

	Therapy (N = 70)	No Therapy (N = 70)	F Value (df=1,136)
L	49.8 (7.5)	52.6 (7.8)	4.6*
F	58.6 (9.5)	57.8 (8.8)	0.3
K	52.8 (9.3)	54.0 (9.0)	0.6
Hs	67.9 (13.3)	65.2 (11.6)	1.7
D	69.9 (14.1)	68.2 (12.5)	0.6
Hy	69.0 (10.2)	65.0 (10.3)	5.5*
Pd	63.9 (12.6)	60.1 (13.1)	3.2
Mf	51.6 (11.8)	52.4 (12.0)	0.2
Pa	61.0 (9.1)	60.5 (10.8)	0.1
Pt	63.8 (12.1)	61.8 (11.2)	1.1
Sc	63.3 (13.1)	63.2 (13.0)	0.0
Ma	57.7 (11.5)	55.4 (12.6)	1.3
Si	57.8 (11.0)	56.4 (10.5)	0.7
Es ^a	47.3 (12.5) N = 63	48.3 (12.7) N = 68	---
PsN ^a	58.0 (16.2) N = 42	49.5 (16.0) N = 50	---

^aMMPI scale was not included in multivariate analysis

*p <.05.

In spite of the nonsignificant MANOVA Fs, exploratory univariate comparisons were performed for the decrease effect and the interaction. Table 2 shows the means, standard deviations and F-values for the decreasers and nondecreasers. The mean scores on the F, Hy, and Sc scales are all significantly higher for the patients who do not experience a decrease in medical utilization. Figure 1 shows the MMPI profiles of the Decrease/No Decrease and Therapy/No Therapy Groups.

The descriptive statistics and F-values for the four groups of the psychotherapy by decrease interaction appear in Table 3. Significant differences are found on the F, K, and Hs scales. One must, however, exercise caution in interpreting the univariate findings given the lack of significance in the overall F-values for the decrease main effect and the psychotherapy by decrease interaction. Figure 2 shows the MMPI profiles for the four groups. It can be seen in this figure that the scores on scales 1, 2, and 3 are over the cutoff of 70 for the Therapy/No Decrease group only. Thus, the Therapy/No Decrease group is clinically, though not statistically, different from the other three groups of the interaction. The implications of this finding will be covered at length in the discussion section.

Table 2

Means and Standard Deviations of MMPI Scales
For Utilization Decrease and No Decrease Groups

	Decrease (N = 70)	No Decrease (N = 70)	F Value (df=1,136)
L	52.4 (7.9)	50.0 (7.4)	3.7
F	56.0 (8.3)	60.4 (9.4)	8.8**
K	53.9 (10.2)	53.0 (8.1)	0.4
Hs	64.3 (11.6)	68.7 (13.1)	4.6*
D	67.2 (14.3)	70.8 (12.1)	2.5
Hy	66.0 (9.0)	68.0 (11.6)	1.3
Pd	60.5 (13.2)	63.5 (12.6)	2.0
Mf	52.6 (11.4)	51.4 (12.4)	0.4
Pa	59.5 (10.4)	62.1 (9.5)	2.4
Pt	61.0 (11.9)	64.5 (11.2)	3.2
Sc	61.0 (12.2)	65.5 (13.5)	4.2*
Ma	56.2 (12.1)	56.9 (12.2)	0.1
Si	55.5 (11.2)	58.7 (10.1)	3.0
Es ^a	49.1 (12.2) N = 65	46.5 (12.8) N = 66	---
PsN ^a	50.8 (16.4) N = 46	56.0 (16.6) N = 46	---

^aMMPI scale was not included in multivariate analysis.

** p < .01 (multivariate F for this effect was not significant).

* p < .05 (multivariate F for this effect was not significant).

Table 3

Means and Standard Deviations of MMPI Scales
For Psychotherapy by Decrease Interaction^a

	Therapy = no Decrease = no N = 35	Therapy = no Decrease = yes N = 35	Therapy = yes Decrease = no N = 35	Therapy = yes Decrease = yes N = 35	F Value (df=1,136)
L	51.9 (7.1)	53.3 (8.4)	48.1 (7.3)	51.6 (7.4)	0.7
F	58.3 (8.5) ^{a,b}	57.3 (9.1) ^b	62.4 (10.1) ^a	54.7 (7.2) ^b	5.2*
K	55.5 (7.5) ^a	52.6 (10.2) ^{a,b}	50.4 (7.9) ^b	55.3 (10.1) ^a	6.6*
Hs	65.1 (12.4) ^b	65.3 (11.0) ^b	72.3 (13.0) ^a	63.4 (12.2) ^b	4.9*
D	68.9 (11.8)	67.5 (13.3)	72.7 (12.2)	67.0 (15.3)	0.9
Hy	64.4 (11.8)	65.6 (8.6)	71.6 (10.3)	66.5 (9.5)	3.4
¹⁶ Pd	60.3 (11.7)	59.9 (14.6)	66.8 (12.9)	61.1 (11.9)	1.5
Mf	51.8 (12.6)	53.1 (11.6)	51.0 (12.3)	52.2 (11.4)	0.0
Pa	61.4 (10.1)	59.7 (11.6)	62.7 (8.9)	59.2 (9.2)	0.3
Pt	62.2 (10.6)	61.3 (11.9)	66.9 (11.5)	60.8 (12.1)	1.8
Sc	63.8 (13.6)	62.5 (12.7)	67.1 (13.5)	59.5 (11.6)	2.1
Ma	53.9 (11.7)	56.9 (13.3)	60.0 (12.0)	55.5 (10.8)	3.3
Si	57.0 (10.7)	55.7 (10.4)	60.3 (9.3)	55.3 (12.0)	1.1
Es ^b	49.6 (12.9) N = 35	47.2 (12.6) N = 33	43.2 (12.2) N = 31	51.2 (11.7) N = 32	---
PsN ^b	48.5 (16.7) N = 25	50.5 (15.6) N = 25	65.0 (11.3) N = 21	51.1 (17.6) N = 21	---

^a means having the same subscript are not significantly different at p .05.

^b MMPI scale not included in multivariate analysis.

* P < .05 (multivariate F for this effect was not significant).

FIGURE 1 MMPI Means for the Main Effects

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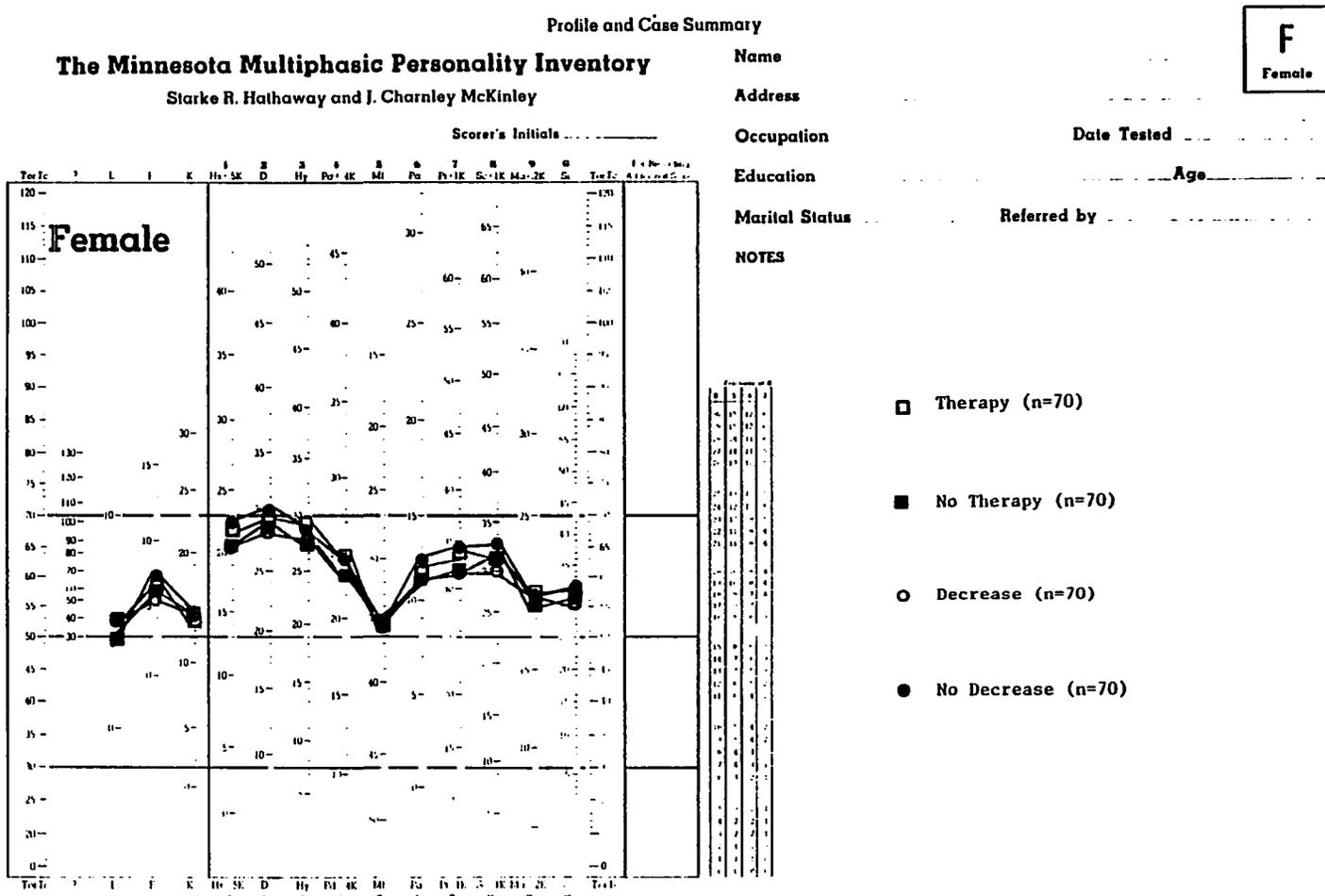
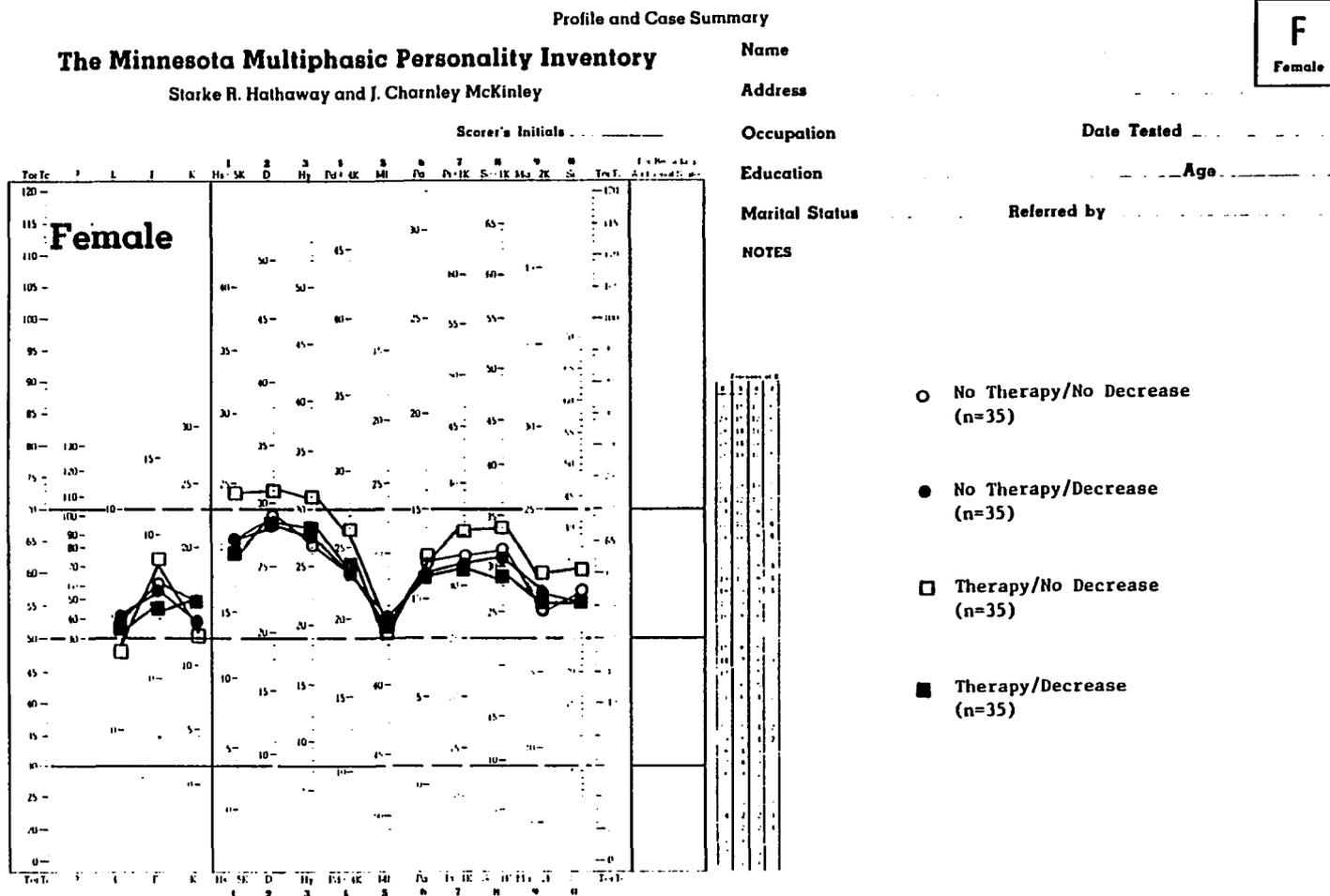


FIGURE 2 MMPI Means for the Interaction

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MANOVA-related Supplemental Analyses

These supplemental analyses provide additional information about the differences between the subjects in the four cells of the MANOVA described in the preceding section. Table 4 contains demographic and other background information for the utilization decrease and no decrease groups and for the psychotherapy and no psychotherapy groups. The same type of information for the four groups of the interaction is contained in Table 5. Table 6 contains the results of the two 2X2 factorial ANOVAs of age and years of education and also the findings of the chi-squares of the other demographic variables, i.e., sex, marital status (single/married/divorced), employment status (employed/unemployed), ethnicity (Caucasian/Japanese/other). Statistically significant results reveal that Japanese people are less likely to receive psychotherapy than the other two ethnic groups. Caucasians are more likely than the other groups to receive psychotherapy. People with less education are also less likely to receive therapy. People who experience a decrease in utilization are significantly younger than those whose physician visits do not decrease. Table 7 shows the average yearly frequency data for several types of utilization for the decreasers and nondecreasers and for the psychotherapy and no psychotherapy groups. Similar data for the four cells of the interaction appear in table 8.

Table 4

Background Information for the
Utilization Decrease vs. No Decrease and Psychotherapy
vs. No Psychotherapy Groups (N=70)

	D E C R E A S E				T H E R A P Y			
	Yes N	(%)	No N	(%)	Yes N	(%)	No N	(%)
<u>Age</u> (\bar{x} ,sd.).....	41.1	(11.4)	47.0	(15.2)	42.6	(12.9)	45.6	(14.5)
<u>Sex</u>								
Female	47	(67.1)	46	(65.7)	49	(70.0)	44	(62.9)
Male.....	23	(32.9)	24	(34.3)	21	(30.0)	26	(37.1)
<u>Marital Status</u>								
Married.....	43	(61.4)	37	(52.9)	41	(58.6)	39	(55.7)
Single.....	13	(18.6)	14	(20.0)	13	(18.6)	14	(20.0)
Divorced/Separated.....	10	(14.3)	12	(17.1)	11	(15.7)	11	(15.7)
Widowed.....	1	(1.4)	4	(5.7)	3	(4.3)	2	(2.9)
Missing.....	3	(4.3)	3	(4.3)	2	(2.9)	4	(5.7)
<u>Employment</u>								
Employed.....	46	(65.7)	42	(60.0)	42	(60.0)	46	(65.7)
Unemployed.....	13	(18.6)	8	(11.4)	10	(14.3)	11	(15.7)
Retired.....	3	(4.3)	5	(7.1)	3	(4.3)	5	(7.1)
Disabled.....	3	(4.3)	6	(8.6)	5	(7.1)	4	(5.7)
Student.....	1	(1.4)	1	(1.4)	2	(2.9)	0	(0.0)
Missing.....	4	(5.7)	8	(11.4)	8	(11.4)	4	(5.7)

Table 4. (Continued) Background Information for the Utilization Decrease vs. No Decrease and Psychotherapy vs. No Psychotherapy Groups

	D E C R E A S E		T H E R A P Y	
	Yes N (%)	No N (%)	Yes N (%)	No N (%)
<u>Ethnicity</u>				
Black	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Caucasian.....	29 (41.4)	36 (51.4)	40 (57.1)	25 (35.7)
Chinese.....	4 (5.7)	2 (2.9)	2 (2.9)	4 (5.7)
Hawaiian/Pt. Hawaiian.....	4 (5.7)	2 (2.9)	4 (5.7)	2 (2.9)
Japanese.....	12 (17.1)	13 (18.6)	9 (12.9)	16 (22.9)
Filipino.....	2 (2.9)	4 (5.7)	4 (5.7)	2 (2.9)
Mixed/No Hawaiian.....	3 (4.3)	0 (0.0)	0 (0.0)	3 (4.3)
Other Asian.....	0 (0.0)	1 (1.4)	1 (1.4)	0 (0.0)
Other Polynesian.....	1 (1.4)	0 (0.0)	0 (0.0)	1 (1.4)
Other.....	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Missing.....	15 (21.4)	12 (17.1)	10 (14.3)	17 (24.3)
<u>Religion</u>				
Buddhist.....	5 (7.1)	6 (8.6)	4 (5.7)	7 (10.0)
Catholic.....	16 (22.9)	12 (17.1)	15 (21.4)	13 (18.6)
Protestant.....	14 (20.0)	21 (30.0)	20 (28.6)	15 (21.4)
Jewish.....	1 (1.4)	0 (0.0)	0 (0.0)	1 (1.4)
Other.....	13 (18.6)	10 (14.3)	16 (22.9)	7 (10.0)
Missing.....	21 (30.0)	21 (30.0)	15 (21.4)	27 (38.6)
<u>Education</u>				
Graduate Degree.....	6 (8.6)	2 (2.9)	7 (10.0)	1 (1.4)
College Graduate.....	13 (18.6)	23 (32.9)	22 (31.4)	14 (20.0)
Some College.....	14 (20.0)	12 (17.1)	8 (11.4)	18 (25.7)
High School Graduate	23 (32.9)	19 (27.1)	19 (27.1)	23 (32.9)

Table 4. (Continued) Background Information for the Utilization Decrease vs. No Decrease and Psychotherapy vs. No Psychotherapy Groups

	D E C R E A S E				T H E R A P Y			
	Yes		No		Yes		No	
	N	(%)	N	(%)	N	(%)	N	(%)
<u>Education</u>								
Some High School.....	4	(5.7)	3	(4.3)	4	(5.7)	3	(4.3)
Jr. High School.....	3	(4.3)	4	(5.7)	2	(2.9)	5	(7.1)
Less than 7 Years.....	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)
Missing	7	(10.0)	7	(10.0)	8	(11.4)	6	(8.6)
<u>Type of Referral</u>								
97 Physician.....	52	(74.3)	46	(65.7)	39	(55.7)	59	(84.3)
Biofeedback.....	2	(2.9)	3	(4.3)	5	(7.1)	0	(0.0)
Psychiatrist.....	8	(11.4)	8	(11.4)	13	(18.6)	3	(4.3)
Neuropsychology.....	6	(8.6)	10	(14.3)	8	(11.4)	8	(11.4)
Other.....	1	(1.4)	3	(4.3)	4	(5.7)	0	(0.0)
Missing.....	1	(1.4)	0	(0.0)	1	(1.4)	0	(0.0)
<u>Psychotherapy Recommended</u>								
No.....	40	(57.1)	29	(41.4)	31	(44.3)	38	(54.3)
Yes.....	19	(27.1)	29	(41.4)	29	(41.4)	19	(27.1)
Further Evaluation.....	11	(15.7)	10	(14.3)	10	(14.3)	11	(15.7)
Missing.....	0	(0.0)	2	(2.9)	0	(0.0)	2	(2.9)
<u>Legal Involvement</u>								
No.....	62	(88.6)	61	(87.1)	59	(84.3)	64	(91.4)
Yes.....	7	(10.0)	8	(11.4)	11	(15.7)	4	(5.7)
Missing.....	1	(1.4)	1	(1.4)	0	(0.0)	2	(2.9)

Table 4. (Continued) Background Information for the
Utilization Decrease vs. No Decrease and Psychotherapy vs. No Psychotherapy Groups

		D E C R E A S E		T H E R A P Y	
		Yes	No	Yes	No
		N (%)	N (%)	N (%)	N (%)
<u>Industrial Injury</u>					
	No	57 (81.4)	57 (81.4)	54 (77.1)	60 (85.7)
	Yes.....	13 (18.6)	13 (18.6)	16 (22.9)	10 (14.3)
	Missing	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
<u>Utilization Category - Year pre-MMPI</u>					
	Low.....	19 (27.1)	33 (47.1)	21 (30.0)	31 (44.3)
86	Medium.....	25 (35.7)	16 (22.9)	20 (28.6)	21 (30.0)
	High.....	26 (37.1)	21 (30.0)	29 (41.4)	18 (25.7)
<u>Utilization Category - Year Post-MMPI</u>					
	Low	37 (52.9)	15 (21.4)	18 (25.7)	34 (48.6)
	Medium.....	25 (35.7)	19 (27.1)	23 (32.9)	21 (30.0)
	High.....	8 (11.4)	36 (51.4)	29 (41.4)	15 (21.4)

Table 5

Background Information for the Four Groups of the Psychotherapy by Decrease Interaction

	Therapy=No Decrease=No (N=35)		Therapy=No Decrease=Yes (N=35)		Therapy=Yes Decrease=No (N=35)		Therapy=Yes Decrease=Yes (N=35)	
	N	(%)	N	(%)	N	(%)	N	(%)
<u>Age</u> (\bar{x} , sd.)	48.7	(16.1)	42.5	(12.1)	45.3	(14.4)	39.8	(10.8)
<u>Sex</u>								
Female.....	21	(60.0)	23	(65.7)	25	(71.4)	24	(68.6)
Male.....	14	(40.0)	12	(34.3)	10	(28.6)	11	(31.4)
§ <u>Marital Status</u>								
Married.....	18	(51.4)	21	(60.0)	19	(54.3)	22	(62.9)
Single.....	8	(22.9)	6	(17.1)	6	(17.1)	7	(20.0)
Divorced/Separated.....	5	(14.3)	6	(17.1)	7	(20.0)	4	(11.4)
Widowed.....	1	(2.9)	1	(2.9)	3	(8.6)	0	(0.0)
Missing.....	3	(8.6)	1	(2.9)	0	(0.0)	2	(5.7)
<u>Employment</u>								
Employed.....	22	(62.9)	24	(68.6)	20	(57.1)	22	(62.9)
Unemployed.....	4	(11.4)	7	(20.0)	4	(11.4)	6	(17.1)
Retired.....	3	(8.6)	2	(5.7)	2	(5.7)	1	(2.9)
Disabled.....	2	(5.7)	2	(5.7)	4	(11.4)	1	(2.9)
Student.....	0	(0.0)	0	(0.0)	1	(2.9)	1	(2.9)
Missing.....	4	(11.4)	0	(0.0)	4	(11.4)	4	(11.4)
<u>Ethnicity</u>								
Black.....	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)
Caucasian.....	14	(40.0)	11	(31.4)	22	(62.9)	18	(51.4)

Table 5. (Continued) Background Information for the Four Groups of the Psychotherapy by Decrease Interaction

	Therapy=No Decrease=No (N=35)		Therapy=No Decrease=Yes (N=35)		Therapy=Yes Decrease=No (N=35)		Therapy=Yes Decrease=Yes (N=35)	
	N	(%)	N	(%)	N	(%)	N	(%)
<u>Ethnicity (Continued)</u>								
Chinese.....	2	(5.7)	2	(5.7)	0	(0.0)	2	(5.7)
Hawaiian/Pt. Hawaiian.....	1	(2.9)	1	(2.9)	1	(2.9)	3	(8.6)
Japanese.....	10	(28.6)	6	(17.1)	3	(8.6)	6	(17.1)
Filipino.....	1	(2.9)	1	(2.9)	3	(8.6)	1	(2.9)
Mixed/No Hawaiian.....	0	(0.0)	3	(8.6)	0	(0.0)	0	(0.0)
Other Asian.....	0	(0.0)	0	(0.0)	1	(2.9)	0	(0.0)
Other Polynesian	0	(0.0)	1	(2.9)	0	(0.0)	0	(0.0)
Other.....	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)
Missing.....	7	(20.0)	10	(28.6)	5	(14.3)	5	(14.3)
<u>Religion</u>								
Buddhist.....	3	(8.6)	4	(11.4)	3	(8.6)	1	(2.9)
Catholic.....	5	(14.3)	8	(22.9)	7	(20.0)	8	(22.9)
Protestant.....	10	(28.6)	5	(14.3)	11	(31.4)	9	(25.7)
Jewish.....	0	(0.0)	1	(2.9)	0	(0.0)	0	(0.0)
Other.....	2	(11.4)	5	(14.3)	8	(22.9)	8	(22.9)
Missing.....	15	(42.9)	12	(34.3)	6	(17.1)	9	(25.7)
<u>Education</u>								
Graduate Degree.....	0	(0.0)	1	(2.9)	2	(5.7)	5	(14.3)
College Graduate.....	9	(25.7)	5	(14.3)	14	(40.0)	8	(22.9)
Some College.....	9	(25.7)	9	(25.7)	3	(8.6)	5	(14.3)
High School Graduate	12	(34.3)	11	(31.4)	7	(20.0)	12	(34.3)

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Table 5. (Continued) Background Information for the Four Groups of the Psychotherapy by Decrease Interaction

	Therapy=No Decrease=No (N=35) N (%)	Therapy=No Decrease=Yes (N=35) N (%)	Therapy=Yes Decrease=No (N=35) N (%)	Therapy=Yes Decrease=Yes (N=35) N (%)
<u>Education (Continued)</u>				
Some High School	1 (2.9)	2 (5.7)	2 (5.7)	2 (5.7)
Jr. High School.....	2 (5.7)	3 (8.6)	2 (5.7)	0 (0.0)
Less than 7 Years.....	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Missing.....	2 (5.7)	4 (11.4)	5 (14.3)	3 (8.6)
<u>Type of Referral</u>				
101 Physician.....	27 (77.1)	32 (91.4)	19 (54.3)	20 (57.1)
Biofeedback.....	0 (0.0)	0 (0.0)	3 (8.6)	2 (5.7)
Psychiatrist.....	2 (5.7)	1 (2.9)	6 (17.1)	7 (20.0)
Neuropsychology.....	6 (17.1)	2 (5.7)	4 (11.4)	4 (11.4)
Other.....	0 (0.0)	0 (0.0)	3 (8.6)	1 (2.9)
Missing.....	0 (0.0)	0 (0.0)	0 (0.0)	1 (2.9)
<u>Psychotherapy Recommended</u>				
No.....	18 (51.4)	20 (57.1)	11 (31.4)	20 (57.1)
Yes.....	11 (31.4)	8 (22.9)	18 (51.4)	11 (31.4)
Further Evaluation.....	4 (11.4)	7 (20.0)	6 (17.1)	4 (11.4)
Missing.....	2 (5.7)	0 (0.0)	0 (0.0)	0 (0.0)
<u>Legal Involvement</u>				
No	32 (91.4)	32 (91.4)	29 (82.9)	30 (85.7)
Yes.....	3 (8.6)	2 (5.7)	6 (17.1)	5 (14.3)
Missing.....	0 (0.0)	1 (2.9)	0 (0.0)	0 (0.0)

Table 5. (Continued) Background Information for the Four Groups of the Psychotherapy by Decrease Interaction

	Therapy=No Decrease=No (N=35) N (%)		Therapy=No Decrease=Yes (N=35) N (%)		Therapy=Yes Decrease=No (N=35) N (%)		Therapy=Yes Decrease=Yes (N=35) N (%)	
<u>Industrial Injury</u>								
No.....	32	(91.4)	28	(80.0)	25	(71.4)	29	(82.9)
Yes.....	3	(8.6)	7	(20.0)	10	(28.6)	6	(17.1)
Missing.....	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)
<u>Utilization Category</u>								
<u>Year Pre-MMPI</u>								
102 Low.....	22	(62.9)	9	(25.7)	11	(31.4)	10	(28.6)
Medium.....	5	(14.3)	16	(45.7)	11	(31.4)	9	(25.7)
High.....	8	(22.9)	10	(28.6)	13	(37.1)	16	(45.7)
<u>Utilization Category</u>								
<u>Year Post-MMPI</u>								
Low	12	(34.3)	22	(62.9)	3	(8.6)	15	(42.9)
Medium.....	9	(25.7)	12	(34.3)	10	(28.6)	13	(37.1)
High.....	14	(40.0)	1	(2.9)	22	(62.9)	7	(20.0)
<u>Psychotherapist</u>								
<u>Year post-MMPI</u>								
<u>Psychologist</u>								
1.....	--		--		11	(31.4)	11	(31.4)
2.....	--		--		3	(8.6)	5	(14.3)
3.....	--		--		1	(2.9)	0	(0.0)
Total Psychologist.....	--		--		15	(42.9)	16	(45.7)

Table 5. (Continued) Background Information for the
Four Groups of the Psychotherapy by Decrease Interaction

	Therapy=No Decrease=No (N=35)		Therapy=No Decrease=Yes (N=35)		Therapy=Yes Decrease=No (N=35)		Therapy=Yes Decrease=Yes (N=35)	
	N	(%)	N	(%)	N	(%)	N	(%)
	Psychiatrist							
1.....	--	--	--	--	3 (8.6)		4 (11.4)	
2.....	--	--	--	--	1 (2.9)		1 (2.9)	
3.....	--	--	--	--	6 (17.1)		0 (0.0)	
4.....	--	--	--	--	8 (22.9)		2 (5.7)	
Total Psychiatrist.....	--	--	--	--	18 (51.5)		7 (20.0)	
103 Other.....	--	--	--	--	2 (5.7)		8 (22.9)	
Missing.....	--	--	--	--	0 (0.0)		4 (11.4)	

Table 6

Statistical Comparisons of Demographic
Variables for the MANOVA Main Effects and Interaction

	N	Chi Sq.	p	F-Value	p
Receipt of Psychotherapy vs. No Psychotherapy^a					
Sex	135	0.71	n.s.	--	--
Marital Status	129	0.08	n.s.	--	--
Employment Status	114	0.00	n.s.	--	--
Ethnicity	110	6.49	.05	--	--
Age	135	--	--	3.43 (3,131)	n.s.
Education	122	--	--	7.76 (3,118)	.01
Decrease in Utilization vs. No Decrease^a					
Sex	135	0.14	n.s.	--	--
Marital Status	129	0.60	n.s.	--	--
Employment Status	114	0.04	n.s.	--	--
Ethnicity	110	1.7	n.s.	--	--
Age	135	--	--	5.21 (3,131)	.05
Education	122	--	--	0.90 (3,118)	n.s.
Psychotherapy by Decrease^b					
Sex	140	1.12	n.s.	--	--
Marital Status	129	1.74	n.s.	--	--
Employment Status	114	0.33	n.s.	--	--
Ethnicity	110	12.01	n.s.	--	--
Age	135	--	--	0.49 (3,131)	n.s.
Education	122	--	--	0.01 (3,131)	n.s.

^aMeans and frequencies appear in Table 4. ^bMeans and frequencies appear in Table 5.

Table 7

Yearly Frequency Information for Several Types of Utilization
For the Decrease vs. No Decrease and Psychotherapy vs. No Psychotherapy Groups^a

	D E C R E A S E				T H E R A P Y			
	Yes		No		Yes		No	
	M	s.d.	M	s.d.	M	s.d.	M	s.d.
<u>Pre-MMPI Year</u>								
Physician Visits	16.3	(11.2)	13.2	(11.5)	16.4	(11.6)	13.1	(11.1)
E.R. Visits	0.5	(1.0)	0.5	(0.8)	0.6	(0.9)	0.4	(0.9)
Physical Therapy	3.0	(7.9)	2.0	(9.6)	1.8	(6.5)	3.1	(10.6)
No. Hospitalizations	0.3	(0.5)	0.4	(0.8)	0.4	(0.8)	0.3	(0.5)
Days Hospitalized	1.2	(2.4)	2.3	(5.2)	2.4	(5.1)	1.1	(2.5)
Psychotherapy Sessions	0.4	(0.9)	0.3	(0.8)	0.7	(1.1)	0.0	(0.0)
Biofeedback Sessions	0.3	(1.4)	0.1	(0.4)	0.3	(1.4)	0.0	(0.0)
<u>Post-MMPI Year</u>								
Physician Visits	7.6	(5.8)	17.9	(13.1)	15.4	(12.8)	10.1	(9.0)
E.R. Visits	0.3	(0.8)	0.4	(0.7)	0.4	(0.8)	0.3	(0.7)
Physical Therapy	2.8	(9.5)	2.7	(9.6)	3.2	(9.5)	2.2	(9.5)
No. Hospitalizations	0.2	(0.6)	0.3	(0.8)	0.3	(0.8)	0.2	(0.6)
Days Hospitalized	0.8	(2.7)	1.8	(4.9)	1.7	(4.8)	0.9	(3.0)
Psychotherapy Sessions	2.2	(4.7)	4.0	(7.5)	6.3	(7.7)	0.0	(0.0)
Biofeedback Sessions	1.7	(4.4)	1.8	(5.9)	3.5	(7.0)	0.0	(0.0)

^aN for all groups = 70.

Table 8

Yearly Frequency Information for Several Types
of Utilization for the MANOVA Interaction^a

		Therapy=No Decrease=No		Therapy=No Decrease=Yes		Therapy=Yes Decrease=No		Therapy=Yes Decrease=Yes	
		M	s.d.	M	s.d.	M	s.d.	M	s.d.
<u>Pre-MMPI Year</u>									
	Physician Visits	10.7	(11.2)	15.4	(10.6)	15.6	(11.4)	17.2	(11.9)
	E.R. Visits	0.3	(0.7)	0.4	(1.1)	0.7	(1.0)	0.6	(0.9)
	Physical Therapy	3.3	(13.4)	3.0	(6.9)	0.7	(1.9)	2.9	(8.9)
	No. Hospitalizations	0.3	(0.5)	0.3	(0.5)	0.5	(1.0)	0.3	(0.5)
	Days Hospitalized	1.3	(3.0)	0.9	(2.0)	3.3	(6.6)	1.4	(2.8)
906	Psychotherapy Sessions	0.0	(0.0)	0.0	(0.0)	0.6	(1.1)	0.9	(1.2)
	Biofeedback Sessions	0.0	(0.0)	0.0	(0.0)	0.2	(0.6)	0.5	(1.9)
<u>Post-MMPI Year</u>									
	Physician Visits	14.0	(10.9)	6.3	(3.8)	21.9	(14.0)	8.9	(7.1)
	E.R. Visits	0.3	(0.6)	0.3	(0.9)	0.4	(0.9)	0.3	(0.8)
	Physical Therapy	2.9	(12.2)	1.5	(5.9)	2.4	(6.1)	4.0	(12.0)
	No. Hospitalizations	0.2	(0.4)	0.2	(0.8)	0.5	(1.0)	0.2	(0.5)
	Days Hospitalized	0.8	(2.5)	1.0	(3.4)	2.9	(6.4)	0.5	(1.6)
	Psychotherapy Sessions	0.0	(0.0)	0.0	(0.0)	8.0	(8.9)	4.5	(5.9)
	Biofeedback Sessions	0.0	(0.0)	0.0	(0.0)	3.5	(8.0)	3.4	(5.8)

^aN for all groups = 35.

The intercorrelation matrix for the various types of medical utilization for the MANOVA sample is shown in Table 9. The highest correlations occur among related types of utilization (e.g., between number of hospitalizations and days of hospitalization, between physical therapy visits in the pre- and post-MMPI years). In contrast, neither physical therapy nor emergency room visits correlate well with any other type of utilization, suggesting that they are determined by factors other than those that influence physician visits and hospitalization. Indeed, the correlation matrix suggests that each type of utilization may need to be predicted separately. While much of the information in Tables 7-9 is not central to the discussion of the MMPI scores it may provide helpful background for conceptualizing the role of psychological and other factors in determining medical utilization rates.

Table 10 shows the five most frequent psychological diagnoses (based on the interpretation of the MMPI) for the four groups in the MANOVA interaction. In evaluating this breakdown it is important to note that a total of 40 different diagnoses were applied, some as secondary or tertiary diagnoses, to the 140 patients in the MANOVA sample. Some of these were based purely on the interpretation of the MMPI. Others were assigned on the basis of clinical interview. The reliability of the

Table 9

Intercorrelations Among Five Measures of Medical Utilization for
the Pre- and Post-MMPI Years (N=135)

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Physician Visits Pre									
2. Physician Visits Post	.62 .0001								
3. No. of Hospitalizations Pre	.42 .0001	.34 .0001							
4. No. of Hospitalizations Post	.21 .05	.29 .001	.48 .0001						
5. Days of Hospitalization Pre	.31 .001	.33 .0001	.86 .0001	.48 .0001					
6. Days of Hospitalization Post	.17 .05	.22 .01	.55 .0001	.89 .0001	.56 .0001				
7. Physical Therapy Visits Pre	.34 .0001	.17 n.s.	.04 n.s.	.10 n.s.	-.02 n.s.	.08 n.s.			
8. Physical Therapy Visits Post	.34 .0001	.24 .01	.07 n.s.	.07 n.s.	.05 n.s.	.03 n.s.	.68 .0001		
9. Emergency Room Visits Pre	.01 n.s.	.12 n.s.	.15 n.s.	.05 n.s.	.15 n.s.	.05 n.s.	-.00 n.s.	-.05 n.s.	
10. Emergency Room Visits Post	.10 n.s.	.15 n.s.	.26 .01	.22 .05	.21 .05	.14 n.s.	.08 n.s.	.12 n.s.	.26 .005

Table 10
 Number (and Percent) of
 The Five Most Frequent MMPI-based Psychological
 Diagnoses for the Four Groups of the MANOVA Interaction

	Therapy=No Decrease=No	Therapy=No Decrease=Yes	Therapy=Yes Decrease=No	Therapy=Yes Decrease=Yes
Normal MMPI	12 (35.3)	13 (38.2)	4 (12.1)	9 (28.1)
Psychophysiological Disorder	5 (14.7)	8 (23.5)	10 (30.3)	9 (28.1)
Depression--Mild to Moderate	7 (20.6)	5 (14.7)	5 (15.2)	4 (12.5)
Adjustment Disorder	3 (8.8)	2 (5.9)	---	---
Organic Mental Disorder	---	---	3 (9.1)	2 (6.3)
Anxiety Disorder	3 (8.8)	---	2 (6.1)	2 (6.3)
Passive-aggres- sive Personality	---	2 (5.9)	2 (6.1)	---
Personality Disorder Unspecified	---	---	2 (6.1)	---
Adjustment Disorder with Depressed Mood	---	2 (5.9)	---	---

^aN = 34 for each group.

assignment of diagnoses was not determined. The same nine primary MMPI diagnoses shown in Table 10 are used for 116 or 83% of the sample. Visual inspection revealed that depression and psychophysiological disorders are the most common problems among all four of the groups. A group by diagnosis chi-square using the four groups of the MANOVA interaction and the three MMPI diagnoses of normal, psychophysiological disorder, and depression, failed to reach significance (chi-square (6)=7.03, $p>.05$). Suggesting that the frequency of these three diagnoses does not differ across groups. Other prevalent disorders included adjustment disorder and anxiety.

The average number of psychological and medical diagnoses received by each of the four groups are shown in Table 11. The total for medical diagnoses was derived by summing the number of separate ICD9 code numbers. This subsample contained some cases which were not included in the original MANOVA. A supplemental 2X2 MANOVA was performed using the same grouping variables of psychotherapy vs. no psychotherapy and utilization decrease post therapy vs. no decrease, and the two dependent variables of number of medical diagnoses in the pre- and post-MMPI years. The results indicated that there were no significant differences for either main effect or for the interaction on the number of medical diagnoses in the pre-MMPI year. However, the

Table 11

Mean Number of Psychological and Medical
Diagnoses for the Four Groups of the MANOVA Interaction

	Therapy=No Decrease=No	Therapy=No Decrease=Yes	Therapy=Yes Decrease=No	Therapy=Yes Decrease=Yes
Number of Psycholo- gical Diagnoses ^a	0.7 (0.5) N=35	0.7 (0.5) N=35	1.7 (0.8) N=34	1.4 (0.8) N=34
Number of Medical Diagnoses Year Prior ^b	7.0 (3.9) N=16	10.3 (5.9) N=15	9.5 (7.3) N=16	8.6 (3.6) N=15
Number of Medical Diagnoses Year Post ^b	7.5 (4.5) N=16	3.5 (2.1) N=15	8.1 (5.8) N=16	4.9 (4.4) N=15

^aNumber of unique diagnoses for pre-and post-years combined.

^bSome cases in subsample were not in multivariate analysis.

number of post-MMPI year diagnoses was significantly different for the decrease (mean=4.2) vs. no decrease (mean=7.8) effect $F(2,57)=16.54$, $p<.0001$ and the psychotherapy by decrease interaction $F(2,57)=3.62$, $p<.05$. The Duncan's multiple range test revealed that the 3.5 mean of the No Therapy/Decrease group (but not the 4.9 mean of the Therapy/Decrease group) was significantly different from the means (7.5 and 8.1) of the No Decrease groups. Appendix E contains the MMPI scale score means for high, medium, and low frequency utilizers in the MANOVA sample.

Creating a New MMPI Scale for Utilization Prediction

The new scale creation process was carried out in the following four steps. In the first step the results of the 408 true/false by utilization decrease/no decrease chi square analyses described in the method section were evaluated. These chi-squares were performed on the scale development sample ($n=60$) of whom 31 had decreased subsequent utilization and 29 had not. Although the performance of 408 tests invalidates the assumptions which underly the meaning of the alpha level of each individual analysis, it was felt that this was acceptable because the scale cross-validation procedure would reveal whether the items, however selected, have predictive validity for other samples. Only chi-squares with true/false marginal values

no more extreme than 30/70 or 70/30 were used. Choosing a 30/70 cutoff helped to assure that the chi-square would be a valid discriminator between decrease and nondecrease. Of these only 18 items were significantly different at $p < .05$ or lower probability levels. Table 12 contains these items and 20 others which, though not significant at the $p < .05$ level, had probability levels of $p < .10$. It also lists the standard scale membership and scored direction for each of the items. These 38 items make up the utilization prediction scale. The number of items and the probability level criterion were chosen to meet two goals. First, I wanted to have a scale short enough to be completed by the patient in 15 minutes or less. Brevity is important because it will allow the scale to be completed as patients wait for medical appointments or during annual physicals. Second, it was necessary to include enough items to achieve adequate discrimination between the decrease/no decrease groups.

The second step involved establishing a scoring procedure for the new scale items. This was done by assigning a value of 1 to the response (true vs. false) which was more frequent among the patients who showed a decrease in their medical utilization. Thus, the scale was keyed for decrease. That is, the higher the scale sum, or score, the greater the likelihood that the patient would show a utilization decrease in the following year.

Table 12

Traditional Scale Membership and Scoring of New Scale Items^a

Item No. ^{b,c} (Chi Square, Probability)	Item Content	Original Scale Membership (Scored Response)	New Scale Scored Response ^d
64. (11.25, .0008)	I sometimes keep on at a thing until others lose their patience with me.	2 (F) 9 (T)	F
415. (7.59, .006)	If given the chance I would make a good leader of people.	0 (F)	T
114 148. (7.16, .008)	It makes me impatient to have people ask my advice or otherwise interrupt me when I am working on something important.	K (F) 9 (F)	F
262. (7.16, .008)	It does not bother me that I am not better looking.	5 (F) 0 (F)	T
142. (6.28, .01)	I certainly feel useless at times.	K (F) 2 (T) 7 (T)	F
188. (5.51, .02)	I can read a long while without tiring my eyes.	1 (F) 3 (F)	T
244. (4.94, .03)	My way of doing things is apt to be misunderstood by others.	4 (T)	F

TABLE 12. (Continued) Traditional Scale Membership and Scoring of New Scale Items^a

Item No. ^{b,c} (Chi Square, Probability)	Item Content	Original Scale Membership (Scored Response)	New Scale Scored Response ^d
94. (4.83, .03)	I do many things which I regret afterwards (I regret things more or more often than others seem to.)	4(T) 7(T)	F
336. (4.80, .03)	I easily become impatient with people.	7(T) 0(T)	F
9. (4.80, .03)	I am about as able to work as I ever was.	1(F) 2(F) 3(F)	T
361. (4.79, .03)	I am inclined to take things hard.	7(T)	F
62. (4.77, .03)	Parts of my body often have feelings like burning, tingling, crawling, or like "going to sleep."	1(T)	F
310. (4.59, .03)	My sex life is satisfactory.	F(F) 4(F) 8(F)	T
138. (4.24, .04)	Criticism or scolding hurts me terribly.	K(F) 2(T) 0(T)	F

TABLE 12. (Continued) Traditional Scale Membership and Scoring of New Scale Items^a

Item No. b, c (Chi Square, Probability)	Item Content	Original Scale Membership (Scored Response)	New Scale Scored Response ^d
481. (4.21, .04)	I can remember "playing sick" to get out of something.	0(F)	F
377. (4.16, .04)	At parties I am more likely to sit by myself or with just one other person than to join in with the crowd.	0(T)	F
243. (4.02, .05)	I have few or no pains.	1(F) 3(F)	T
911 408. (4.02, .05)	I am apt to hide my feelings in some things, to the point that people may hurt me without their knowing about it.	- (-) ^e	F
267. (3.68, .06)	When in a group of people I have trouble thinking of the right things to talk about.	K(F) 3(F) 4(F) 9(F) 0(T)	F
192. (3.46, .06)	I have had no difficulty in keeping my balance walking.	1(F) 3(F) 8(F)	T
278. (3.46, .06)	I have often felt that strangers were looking at me critically.	5(T) 0(T)	F

TABLE 12. (Continued) Traditional Scale Membership and Scoring of New Scale Items^a

Item No. ^{b,c} (Chi Square, Probability)	Item Content	Original Scale Membership (Scored Response)	New Scale Scored Response ^d
366. (3.46, .06)	Even when I am with people I feel lonely much of the time.	6(T) 7(T) 8(T)	F
397. (3.44, .06)	I have sometimes felt that diffi- culties were piling up so high that I could not overcome them.	K(F)	F
117 304. (3.35, .07)	In school I found it very hard to talk before the class.	7(T) 0(T)	F
313. (3.35, .07)	The man who provides temptation by leaving valuable property unprotected is about as much to blame for its theft as the one who steals it.	6(F)	F
383. (3.34, .07)	People often disappoint me.	K(F) 0(T)	F
311. (3.34, .07)	During one period as a youngster I engaged in petty thievery.	4(T) 8(T)	F
51. (3.27, .07)	I am in just as good physical health as most of my friends.	1(F) 2(F) 3(F)	T
78. (3.22, .07)	I like poetry.	5(T)	T

TABLE 12. (Continued) Traditional Scale Membership and Scoring of New Scale Items^a

Item No. ^{b,c} (Chi Square, Probability)	Item Content	Original Scale Membership (Scored Response)	New Scale Scored Response ^d
39. (3.22, .07)	At times I feel like smashing things.	K(F) 2 (F)	F
158. (3.20, .07)	I cry easily.	2 (T) 6 (T)	F
129. (3.20, .07)	Often I can't understand why I have been so cross and grouchy.	K(F) 3 (F)	F
811 120. (3.20, .07)	My table manners are not quite as good at home as when I am out in company.	L(F) 5 (F) 9 (F)	F
374. (3.00, .08)	At periods my mind seems to work more slowly than usual.	K(F)	F
402. (2.92, .09)	I often must sleep over a matter before I decide what to do.	- (-) ^f	T
307. (2.85, .09)	I refuse to play some games because I am not good at them.	8 (T)	F
46. (2.78, .095)	My judgment is better than it ever was.	2 (F)	T

TABLE 12. (Continued) Traditional Scale Membership and Scoring of New Scale Items^a

Item No. ^{b,c} (Chi Square, Probability)	Item Content	Original Scale Membership (SCORED Response)	New Scale Scored Response ^d
43. (2.78, .095)	My sleep is fitful and disturbed.	1(T) 2(T) 3(T)	F

^aItems appear in order of descending chi square magnitude. ^bItem numbers are from the group administration booklet test form (catalog no. 5F061) published in 1947 by the Psychological Corporation. ^cChi square df = 1. ^dResponses shown are more frequent among patients whose medical utilization decreases after psychotherapy than among those for whom it does not decrease. ^eItem does not appear on any of the 13 standard scales. It was answered true by the majority of the Minnesota normals. ^fItem does not appear on any of the 13 standard scales. It was answered false by the majority of Minnesota normals.

The third and fourth steps were both done using the cross-validation sample (n=62). In the third step the points of each subject were summed to produce his/her new scale score. The mean new scale score for the entire cross-validation sample was 18.9 (s.d.=6.8). The group mean for the 30 patients who did not show a utilization decrease was 16.4 (s.d.=6.4). The 32 decreaseers had a higher mean of 21.3 (s.d.=6.3).

The determination of the cutoff score took place in step four. Initially, the new scale score frequency distributions were examined for the decreaseers and nondeceasers. The degree of score overlap was extreme enough that it was not possible to determine a cutoff score based on visual inspection. As a result, a different strategy was adopted. The effectiveness of each score of 21 (the mean for the decreaseers) and greater was evaluated by producing cross-tabulation tables with that cutoff against the actual decrease/nondecrease status. The overall hit rates, as well as the false positive and false negative categorization errors were examined. Several subjective judgements were used in determining the optimal cutoff score. Specifically, false positives and false negatives were considered equally undesirable. On the one hand, false positives result in patients needlessly being encouraged to receive psychotherapy-resulting for some, in

unnecessary stigma, shame, or anger. False negatives, on the other hand, may contribute to a failure to refer for psychotherapy with the increased likelihood of continued suffering by the patient. In addition, cost-containment goals are not as likely to be met when potential utilization decreasers do not receive therapy.

After taking all of these factors into consideration the cutoff score of 23 was selected. Patients with a score of 23 or greater were categorized as likely to decrease. Those with scores less than 23 were considered unlikely to decrease. The contingency table is shown in Appendix F. When this new dichotomous variable (score 23 and above versus less than 23) was evaluated against actual observed decrease/no decrease status the results were as follows. Forty-one of the 62 subjects were correctly categorized producing a 66.1% overall hit rate. Sixteen subjects (26% of the entire sample of 62) were correctly identified as decreasers and 25 (40% of the entire sample) as nondecreasers. Another 16 subjects (26%) were false positives, i.e. their scores predicted that they would decrease but in actuality they did not. There were only 5 (8.1% of the entire sample) false negatives, actual decreasers who were predicted to fail to show a decrease.

When looking only at the 32 patients who actually did decrease in utilization, the cross-tabulation table revealed

that exactly half were predicted to decrease and half were not. Thus, a new scale score of 23 or greater fails to predict actual utilization above chance levels. However, 25 of the 30 patients who actually showed no decrease were predicted to show none. Five out of six or 83% actually behaved as predicted. So a scale score of less than 23 predicts subsequent utilization behavior well above chance levels. The chi-square statistic for the score cutoff of 23 against actual decrease/no decrease status was 7.68(1), $p < .01$ ($p = .0056$).

The correlation table of the new scale score and the 13 standard scales scores (as well as the Ego Strength and Pseudo-Neurologic scales) are shown in Table 13. This table also contains the original scale membership for each of the items.

Additional analyses were done to determine the degree of correlation between the new utilization prediction scale score and the amount of decrease. The amount of decrease was obtained by subtracting the number of outpatient visits in the year prior to the MMPI from the number of visits in the post-MMPI year. The amount of decrease is a negative number for patients who experienced a decrease in utilization and it is positive for those who increased. For example, if a patient had six visits prior to the MMPI and four afterwards the amount of change would be -2.

Table 13

Shared Items and Correlation of the
New Scale and Standard Scales^a

Traditional Scale	New Scale Correlation	Shared Items Decrease Endorsement ^{b,c}		Shared Items Nondecrease Endorsement ^{d,e}	
		N	(%)	N	(%)
L	.48****	1	(4.5)	0	(0)
F	-.59****	0	()	1	(2)
K	.78****	9	(41)	0	(0)
1 Hs	-.20 n.s.	0	()	7	(14)
2 D	-.45***	2	(9)	7	(14)
3 Hy	-.22 n.s.	2	(9)	6	(12)
4 Pd	-.27*	1	(4.5)	4	(8)
5 Mf	.13 n.s.	2	(9)	2	(4)
6 Pa	-.44***	1	(4.5)	2	(4)
7 Pt	-.41***	0	(0)	6	(12)
8 Sc	-.40***	0	(0)	5	(10)
9 Ma	-.12 n.s.	3	(13.6)	1	(2)
0 Si	-.58****	1	(4.5)	9	(18)
Es	.65****	---	---	---	---
PsN	-.48**	---	---	---	---

^aN = 62, except Es N=54 and PsN N = 34. ^bIncludes only items for which the new scale answer (T vs. F) more frequent among decreaseers is the same as the scored answer on the traditional scale. ^cPercents derived using denominator of 22, the sum of the shared items on the 13 standard scales. ^dIncludes only items for which the new scale answer (T vs. F) more frequent among nondecreaseers is the same as the scored answer on the standard scale. ^ePercents derived using denominator of 50, the sum of shared items on the 13 traditional scales.

*p < .05. **p < .01, ***p < .001. ****p < .0001.

Similarly, if a patient had four visits prior to the MMPI and six after it the amount of change would be +2. The sample (n=130) used for this analysis consisted of all patients on whom the MMPI item scores were available. Results revealed that the overall correlation between the amount of decrease and the new scale score was $-.33$ ($p=.0002$). Thus, the new scale accounts for approximately 11% of the variance in the amount of decrease. This suggests both that psychological factors play an important role in the offset effect and that other forces (e.g., physical health, sociocultural variables) also exert a substantial influence. It is not surprising then that several moderator variables were discovered. For example, the correlations between amount of decrease and the new scale score were different for each sex. For males the correlation was $-.41$ ($p=.006$). It was $-.28$ ($p=.02$) for females. There were also age differences. For younger patients with an average age of 31 years the correlation was $-.23$ ($p=.09$). For patients with a mean age of 52 years the correlation was $-.44$ ($p=.0004$). The relationship also differed by ethnicity. For Caucasians the correlation was $-.44$ ($p=.0004$), for Japanese patients it was $-.54$ ($p=.01$), and for patients of other ethnic backgrounds it was $-.13$ ($p=.62$). Finally, the correlations were different for patients with low (mean=5.2 physician visits during the pre-

MMPI year), medium (mean=12.4 visits), and high (mean=27.9 visits) rates of utilization. They were $-.43$ ($p=.006$), $-.31$ ($p=.05$), and $-.33$ ($p=.03$) respectively.

DISCUSSION

We can now address the three questions that were raised in the introduction section of this paper. First, how well does the MMPI predict subsequent medical utilization? Second, what are the demographic and medical characteristics of patients who do and do not experience the offset effect? Finally, what do the results tell us about the role of psychological factors in medical utilization and the offset effect? In this section I will also discuss several other issues including the weaknesses of the present study and directions for future research.

Question 1: Utilization Prediction Capabilities of the MMPI

Elevations on the standard MMPI scales 1, 2, and 3 all in the range of T-score 72, appear to be typical among patients who do not decrease their medical utilization after psychotherapy. However, these scales do not predict decrease or lack of decrease at a statistically significant level. Thus, this study was unable to discover a MMPI profile that can be used to reliably predict the offset effect. This suggests the need for a new MMPI scale designed specifically to identify likely decreaseers.

However, as with the 13 standard MMPI scale scores, the new utilization scale prediction developed in this study does not offer a way of predicting which patients will decrease their medical utilization after psychotherapy, although it does correctly predict failure to decrease in 5 out of 6 cases. In addition, considering the findings concerning the effect of various moderator variables on the magnitude of the correlation between the new scale score and the amount of decrease, it appears that the scale will predict more accurately among certain subgroups of patients. Tentatively, it seems to predict better for males, older patients, Caucasians, and low utilizers. It is surprising that the scale should work best among patients who use fewer medical services. This and other findings concerning moderator variables need to be explored more fully in subsequent research. The practical applications and theoretical implications of the new scale will be described in the following section.

Practical Applications For the New Scale

The new utilization prediction scale has practical applications for both therapy and research. We can use this new scale to predict quite well who will not experience a decrease in their utilization after psychotherapy. This may be important in clinical decision making if a patient is

referred for therapy primarily because he or she is felt to be overutilizing medical services. However, it is a rare case in which very high medical utilization is the only reason for psychological referral. Most clinicians consider elevated utilization to result from a more complex psychological/behavioral problem that includes elements of somatization, anxiety, depression, dependency, and so on. In so far as these problems may be effectively treated by psychotherapy it would not be practical or ethical to withhold therapy from a patient based on his/her receiving a low score on the new scale.

Psychotherapists could also use the new scale, as well as elevations on scales 1-2-3, in selecting the type of therapy that should be applied. For example, if it is determined that the patient sometimes seeks medical care when she/he is depressed or anxious, alternative ways of coping with these states could be discussed. The hypothetical personality composite of the nondecreaser (to be discussed later in this section) also suggests that certain types of therapy, not previously used to decrease utilization, might be effective in bringing about a decrease. For example, cognitive therapy or medications could be used to ameliorate the anxiety, rumination and depression which appear to be typical of the nondecreaser. In addition, social skills training emerges as a promising

treatment for the social discomfort, self-consciousness, and introversion which are also part of the nondecreaser's personality.

Perhaps the most important application of the new scale will be in the area of research. Specifically, researchers who study the offset effect should have their subjects complete the new scale so that the percent of people expected to be recalcitrant to psychotherapy may be calculated. Considering the goals of offset research, there would seem to be as great a need to measure this subject characteristic as there is to know age and medical status. This could give us a gauge of how "hard core" the sample is vis-a-vis their utilization habits.

Question 2: Offset-related Medical and Demographic Findings
Medical Status

Are there differences in pre-MMPI medical status which may explain observed utilization findings? There were no significant differences in the number of medical conditions in the year prior to the MMPI for either the main effects or interaction. However, there were differences in the year following the MMPI. To review: in the interaction the Therapy/No Decrease and the No Therapy/No Decrease groups had means of 8.1 (s.d.=5.8) and 7.5 (s.d.=4.5) respectively. While the Therapy/Decrease and the No Therapy/Decrease group

means were 4.9 (s.d.=4.4) and 3.5 (s.d.=2.1). Overall, the mean number of medical diagnoses for the decreasers was significantly lower than for the nondecreasers. However, considering the fact that the pre-MMPI medical condition was roughly equivalent across the four groups, it seems possible that it is the continued health care seeking that results in the awarding of more diagnoses. That is, nondecreasers may not go to the doctor more because they have a greater number of medical conditions. Rather, perhaps they get more diagnoses in the second year because they persist in going. Physicians, after all, must submit diagnoses for billing and record keeping purposes. Nevertheless, we cannot rule out the possibility that the patients who did not experience a decrease in medical utilization actually were sicker in the post-MMPI year. At any rate, medical status in the year prior to the MMPI could not be used to predict subsequent utilization. Nor could it be used to determine which patients would be expected to show the offset effect. It also does not seem appear to be responsible for the observed pattern of MMPI score differences. Medical status also does not appear to influence who, among MMPI referrals, will receive psychotherapy. However, the type of medical condition may affect who will be referred for an MMPI. For example, although the types of medical diagnoses received by the various groups were not systematically analyzed, it

appears that the diagnosis of cancer was absent in virtually all of the cases. Cancer patients may well receive referrals to the psychiatry/psychology department for supportive therapy, but physicians making these referrals do not request MMPIs. The physician survey results (see Appendix A) show that MMPI referrals, as opposed to other types of psychiatric/psychological referrals, are made more frequently for patients whose psychological symptoms cannot be explained by medical data.

Demographics

There were no significant demographic differences between the four MANOVA interaction groups. However, in looking at the decrease main effect, age is a variable on which the decrease/no decrease group means are significantly different. Nondecreasers (mean age=47.0, s.d.=15.2) are significantly older than decreasers (mean age=41.1, s.d.=11.4). This might suggest that it is greater physical disability, an expected concomitant of age, that is preventing older patients from decreasing their utilization. Another interpretation is possible, though. The mean age of the subjects who do not get psychotherapy (45.6, s.d.=14.5) is slightly greater than the age of people who receive it (42.6, s.d.=12.9). Although this is not a significant difference it does raise the possibility that greater age is

associated with a reluctance to enter psychotherapy. Physicians may also be somewhat less likely to refer older people for psychological evaluation. Perhaps it is the lower exposure to psychotherapy, in addition to greater physical disability, which makes these patients less likely to decrease.

The demographic differences between recipients and nonrecipients of therapy are not central to the questions addressed in study, but warrant some discussion nevertheless. Subjects with fewer years of education and those of Japanese ancestry are less likely to receive psychotherapy. Speculatively, this is probably due to the fact that people in these groups are reluctant to accept a referral for psychotherapy. Again, these patterns might also reflect differential referral patterns on the part of the physician.

Question 3: The Role of Psychological Factors in Offset

This section will first discuss the behavioral and psychological correlates of the MMPI scales for which clinically or statistically significant results were obtained. Next the similarities and differences in the frequency of several psychological diagnoses across the groups will be covered. In the final subsection I will make the point that while we now know something about the

psychological factors that prevent a decrease in utilization after psychotherapy, we know very little about the psychological characteristics of deersers.

Psychological and Behavioral Correlates of MMPI Scores

This section will describe the psychological and behavioral correlates of the MMPI scales relevant to the prediction of medical utilization rates. These descriptions are derived from several manuals that are used for the interpretation of MMPI profiles. These manuals represent attempts to discover groupings of MMPI profiles which are "homogenous, mutually distinct, and of sufficient frequency to provide a basis for reliable predictions" (Wiggins, 1973, p. 98). Each of these manuals is briefly described in the following section. Dahlstrom, Welsh and Dahlstrom (1972) is a major reference for the behavioral correlates of the MMPI. The psychological and behavioral correlates of high and low scores on each of the standard scales were based on the authors' review of several of the early MMPI validation studies. Gilberstadt and Duker (1965) developed a typology of 19 frequently occurring MMPI profile types and the behavioral tendencies associated with each. These were derived by reviewing the discharge summaries and social work notes on male veteran psychiatric inpatients. Similarly, Marks, Seeman, and Haller (1974) isolated 16 separate

codetypes with associated behavioral correlates in their research on a sample of psychiatric patients. Graham (1977) compiled the data from several sources, including those just described, to arrive at their own interpretive manuals. Thus, the following section is based on correlates derived from several entirely independent sources of data.

Although the subsequent section will make reference to individual items from the MMPI scales it should be noted that there is no theoretical or empirical basis for the interpretation of individual items. The literature on behavioral correlates is based on scale scores, not on separate items. Since the MMPI items were originally selected on empirical, not theoretical, grounds they are difficult to interpret. As a result, all of the remarks concerning the implications of individual items must be considered tentative.

Scales 1, 2, and 3. The standard MMPI scales 1, 2, and 3 figure prominently both among the results of the MANOVA of the 13 scale scores and the items of the new utilization prediction scale. To review, the Therapy/No Decrease group had 1, 2, and 3 scale scores over the cutoff of 70, while the three other groups did not. Furthermore, these were the highest scores in the entire study, and with the exception of the 70.8 elevation on the D scale for the Decrease/No Decrease comparison, these are the only elevations over 70.

This was the MANOVA finding of the greatest clinical significance, although there were also statistically significant differences for the MANOVA main effects. Nondecreasers, as a group, had significantly higher scale 1 scores and patients who received psychotherapy obtained more elevated scores on scale 3. Turning to the new utilization prediction scale results, the far right column of Table 12 shows the items for which the new scale answer (true versus false) more frequent among nondecreasers is the same as the scored response on the standard scale. (The endorsements more frequent among decreasers will not be discussed because they do not predict decrease in subsequent utilization.) There are seven (or 14%) of the "nondecrease items" from scale 1, seven (14%) from scale 2, and six (12%) from scale 3.

What can the elevated scores on scales 1,2 and 3 for the Therapy/No Decrease group tell us about the psychological factors associated with failure to show the offset effect? Green (1980) provides correlates for several patterns of 1-2-3 elevations: the "V," inverted "V," and ascending and descending slopes. Gilberstadt and Duker (1965) list descriptors for a 1-2-3 profile code type for which $1 > 2 > 3$ with the scale 1 score typically around 90, and 2 and 3 above 80. However, I was unable to locate any descriptions of the exact profile under consideration here:

very low and approximately equivalent elevations in scales 1,2 and 3. Although this is technically a 2-1 profile, the score differences are so small that it seems more reasonable to treat the elevations as equivalent. As a result, this section will be based on the descriptions of individual elevations in scales 1,2 and 3 as well as the 2-1 and available 1-2-3 profiles.

Scales 1,2 and 3 are known as the "neurotic triad" (Dahlstrom, et al., 1972). They indicate the presence of significant psychological discomfort and perhaps poor social and occupational functioning. When scales 1 and 3 are considerably more elevated than 2 the terms "conversion V" or "conversion valley" are applied, reflecting the finding that this pattern is associated with conversion symptoms and somatization (Graham, 1977; Green, 1980). However, profiles which include only a single abnormal elevation in scale 1 or 3, as well as the 2-1 pattern are also associated with somatization (Dahlstrom, et al., 1972; Graham, 1977; Green, 1980; Marks, et al., 1974).

Patients with elevations in scale 1 are described as having excessive concern about their bodily functions and as complaining frequently of vague somatic symptoms affecting numerous organ systems, often including but by no means restricted to epigastric problems. Pain, fatigue and weakness are also common complaints for patients with this

profile type. Green (1980) notes that their complaints differ from those of people who are known to be physically ill; sick people "do not endorse the entire gamut of vague physical complaints" (p. 71) like these people do. Patients with scale 1 elevations are also described as being unhappy, self-centered, demanding, pessimistic, and cynical. Scale 1 scores have also been found to be negatively correlated with intelligence and may be used as a rough indicator of the degree of "psychological mindedness" and sophistication (Green, 1980).

Patients with scale 3 elevations are described in very similar terms. In addition, they clearly use their physical symptoms as a way of coping with life. According to Dahlstrom, et al. patients resort to these symptoms "to solve difficult problems and avoid mature responsibilities" (p. 191). Several interpretive manuals (Dahlstrom, et al., 1972; Graham, 1977; & Green, 1980) all concur that these physical symptoms may develop only during times of special stress and otherwise not be bothersome. Interestingly, people with scale 3 elevations do not appear to suffer from anxiety, tension, or depression. In fact, the denial of psychological distress is a hallmark of this group. They are further described as socially involved and friendly, but these ties with other people tend to remain on a superficial level.

When scales 1 and 3 are both above 70 and scale 2 is under 70 (or at least several T-score points below 1 and 3) the behavioral patterns associated with isolated 1 and 3 elevations are intensified. The tendency to use physical complaints to avoid coming to grips with psychosocial problems is even clearer and secondary gain is often extremely obvious. In addition, these patients are described as using the defense mechanisms or avoidance patterns of repression and denial to keep their problems from conscious awareness. Classic conversion symptoms may even be present in patients with an extreme V-pattern. When scale 2 is over 70, as it is in the Therapy/No Decrease group, sadness, pessimism, guilt, and self-criticism may also be present.

Gilberstadt and Duker (1965) note that when $1 > 2 > 3$ the most common diagnosis is psychophysiological disorder in which physical symptoms occur as a result of chronic autonomic nervous system activation which results in structural changes in the involved tissues. This is in contrast to most of the preceding descriptions of patients with 1-2-3 profiles whose symptoms are not considered to be based on actual physiological disorders. This difference may result from the previously discussed confusion in the meaning of the terms: "somatization," "psychosomatic," and "psychophysiological."

Dahlstrom, et al. (1972) note that the 2-1/1-2 elevation is an infrequent one both among normal and clinical populations. Depression is not the major presenting problem for these patients. Rather, they too, are viewed as overconcerned with their physical functioning. As Green (1980) notes, they are preoccupied with complaints that are "vague, nonspecific, difficult to isolate medically" (p. 122). Personality descriptors for 2-1/1-2 elevations include: tense, worrisome, introverted, and self-conscious.

In summary, the 1-2-3 elevation is associated with somatization. These patients complain of multiple physical symptoms which are difficult to substantiate with objective medical data. Psychologists interpret these multiple, various, and repeated physical complaints as being the patient's way of dealing with psychosocial distress or abnormality. Some researchers believe that the patient is not consciously aware of his or her psychological difficulties. But, whether this redirection of attention is conscious or not, these patients do not seem to be motivated to define problems in psychological terms and come to grips with them on that level.

Research in Conflict with 1-2-3 Findings. While the psychological and behavioral correlates of MMPI elevations which appear in interpretive manuals are highly regarded by

clinicians, several research findings concerning the 1-2-3 elevation suggest that we must be cautious in our acceptance of these descriptors. There have been a number of rather unsuccessful attempts to use the 1-3, or conversion-V profile, to predict the functional versus psychiatric origin of several specific disorders among medical patients. A number of these studies (e.g., Gilberstadt & Jancis, 1976; Schwartz & Krupp, 1971; Schwartz, Osborne, & Krupp, 1972) were described in the introduction of this paper. However, Calsyn, Louks, and Freeman (1976) did find the 1-2-3 scales to be significantly more elevated in patients whose chronic pain, in the judgement of their physicians, could not be fully explained by organic findings. In addition, Prokop (1986) in his work with low back pain patients has noted that while subjects with a conversion-V MMPI profile do focus on physical symptomatology more than normals, this does not imply the presence of conversion dynamics. He suggests that this profile may be produced by a response set in which the patient is motivated by a "desire to communicate the presence of physical distress and dysfunction" (p. 561). These discrepant findings do not discredit the empirically derived correlates in the interpretive manuals. Rather, they suggest the need for continued MMPI research which, like this study, is targeted toward very specific questions. In addition, it would be

valuable to determine the predictive function of individual items on scales 1, 2 and 3.

Scales 7, 8, and 0. Since none of these scales was over the cutoff of 70 for any of the MANOVA comparisons the observed statistical differences are only suggestive of trends. For scale 7, Psychasthenia, there were no MANOVA findings of statistical or clinical significance. However six (12%) of the new scale "decrease items" originate from this scale. Interpretive manuals describe patients with scores of 70 or greater on scale 7 as being in considerable turmoil and discomfort, anxious, tense, and indecisive. Obsessive ruminations and compulsive rituals may also be present (Dahlstrom, et al., 1972; Graham, 1977; Green, 1980).

Turning to scale 8, schizophrenia, we find that it is the origin of five (10%) of the new scale items. In addition, there was a significant difference for the decrease/no decrease main effect. As shown in Table 2 the mean score was significantly higher for the patients who did not show a decrease in subsequent use of medical services. Scale 8 is highest for the Therapy/No Decrease group of the interaction although this difference is not significant. All group means are below the clinical cutoff, however. Behavioral correlates of elevations in this low 60-69 T-score range include unusual thoughts, creativity, and

possible avoidance of life's challenges through fantasy and daydreaming (Green, 1980). Scales 7 and 8 have also figured prominently in investigations of MMPI profile subgroups among pain patients (e.g., Armentrout, Moore, Parker, Hewett, & Feltz, 1982; Bradley & Van der Heide, 1984; Moore, Armentrout, Parker, Kivlahan, 1986; Smith, Aberger, Follick, & Ahern, 1986).

Although there were no clinically or statistically significant mean score differences for the 0, Social Introversion, scale in the MANOVA, this is the scale from which the largest number (n=9, 18%) of new scale decrease items originate. People who receive elevated scores on 0 are described, not surprisingly, as socially introverted, insecure, shy, uncomfortable around members of the opposite sex, and lacking in confidence (Dahlstrom, et al., 1972; Graham, 1977; Green, 1980). It would be valuable to test the predictive utility of measures of the behavioral deficits suggested by these MMPI findings. For example, in the case of depression it would be interesting to see if social skills deficits might mediate the offset effect. For patients whose depression is related to social skills deficits we would predict that social skills therapy would decrease utilization. Patients whose depression results from physical disability and not from skills deficits would not be expected to decrease their utilization after therapy.

The Validity Scales. Since none of the MANOVA group means for the validity scales was over 70 the obtained statistically significant differences would not be considered of clinical relevance. However, just as with the preceding scales, we may learn something about the psychological factors behind utilization by noting the trends suggested by these differences.

The L scale mean score was significantly higher for patients who did not receive psychotherapy. As noted earlier, the only significant multivariate F was for the psychotherapy/no psychotherapy main effect. These results do not help us to predict subsequent utilization, but may partially explain which patients receive psychotherapy. Specifically, the psychologists who administered the MMPIs may be more likely to refer patients who have lower L scores. Alternately, it might be that the subjects with higher L scores, i.e., with greater tendency to "fake good" or put on a good front, are less likely to accept a referral for psychotherapy.

There were significant F scale differences both for the interaction and for the Decrease/No Decrease main effect. Elevations of this magnitude on the F scale can be interpreted as indicating both the degree of psychopathology and the willingness to reveal psychological problems. Turning to the four groups of the interaction we can see

that the Therapy/No Decrease group has the highest F scale mean, significantly larger than the Therapy/Decrease group and the No Therapy/Decrease group, but not significantly different from the No Therapy/No Decrease group. This pattern suggests that nondecreasers regardless of whether they received therapy or not, in contrast to decreasers, either have somewhat higher levels of psychopathology or are more willing to reveal their distress. The fact that nondecreasers have a higher mean in the Decrease/No Decrease main effect is due to the significant interaction in which the Therapy/No Decrease group had the highest F scale mean.

There were significant K scale mean differences among the four groups of the interaction. The K scale measures the degree to which patients are trying to present themselves in an unrealistically positive light. People with elevations over 70 are trying to give the appearance of adequacy, control, and effectiveness (Graham, 1977). On this scale the Psychotherapy/No Decrease group obtained the lowest mean score. This group mean is significantly different from the No Therapy/No Decrease and Therapy/Decrease means. The difference between the mean K scale score for the Therapy/No Decrease and the No Therapy/Decrease groups was not significant. These findings imply that the Therapy/No Decrease patients are the least defensive of the four groups. In an interesting related

finding Tsushima and Higuchi (in submission) report the K scale of patients whose liquid crystal thermography test results revealed an absence of organic evidence for pain to be significantly lower than those with documented organic injury. These investigators note that patients with lower K scores are more likely to report difficulties than are the patients with higher Ks. Similarly, in the present study, the F and K scale findings converge to suggest that the Therapy/No Decrease group is composed of patients who may or may not have a greater degree of psychopathology than the other three groups, but are more willing to admit to the problems that they do have. This seems to contradict the previously cited resistance to psychological interpretations on the part of patients with 1-2-3 elevations. However, because the validity means are under the 70 cutoff and the 1-2-3 are above it, it is likely that the correlates of the latter are somewhat more pronounced in the Therapy/No Decrease group.

MMPI Predictions of Psychotherapy Outcome. The developers of the interpretive manuals would probably have expected the 1-2-3 elevation to be typical of the patients who do not show a decrease in medical utilization after psychotherapy. At least in so far as a decrease in medical utilization is a sign of good psychotherapeutic outcome. The interpretive manuals show that the prognosis for

psychotherapy for patients with 1, 3 or 1-2-3 elevations is poor. These people may even refuse to enter psychotherapy because they so strongly resist psychological interpretations of their medical symptoms (Dahlstrom, et al., 1972; Gilberstadt & Duker, 1965; Graham, 1977; Green, 1980). If they do consent to try therapy they become difficult clients who are: hard to motivate, may terminate it the therapist does not produce concrete answers and solutions, and are slow to gain insight (Graham, 1977). In addition, they are frequently demanding and critical and may disparage the training and judgement of the therapist who attempts a psychological interpretation of their symptoms (Graham, 1977; Green, 1980). Graham states that these patients will only be able to achieve short-term improvements even when they do persist with therapy. Green is even more pessimistic noting that: "Despite, or perhaps because of, the transparency of the motives (behind somatization) any form of psychological intervention is almost surely doomed to fail" (p. 71). He goes on to note that the typical response to psychological interpretations of symptoms is to "trudge off to seek a more favorable second, third, and fourth (medical) opinion" (p. 71). This is a habit which would certainly make a decrease in medical utilization unlikely. In discussing the psychotherapeutic experience of patients with an elevation on scale 7 Graham

(1977) notes that they are not very responsive to brief psychotherapy. Although they may make some progress after a lengthy course of therapy, they remain difficult patients prone to rationalization, intellectualization, and expression of hostility toward their therapists.

Summary of MMPI Descriptors

If we compile the psychological and behavioral correlates of these various MMPI profiles we can construct a tentative description of the medical patient whose utilization does not decrease after psychotherapy. He or she reports numerous, vague physical symptoms the causes of which are difficult to document with objective medical tests. This type of patient also tends to deny the presence of psychological problems. However, several psychosocial problems may be present including anxiety, depression, self-criticism, indecision, rumination, introversion, and social discomfort. Due to a strong resistance to psychological interpretation of their physical symptoms and a tendency to repress, deny, rationalize, or intellectualize their psychological problems these people are hesitant to enter psychotherapy. When they do consent to do so they are frequently difficult patients for whom therapeutic gains are hard-won, limited, and short-lived.

Psychological Diagnoses

Literature on determinants of medical utilization has suggested that there are at least four major psychological factors which affect utilization rates: psychophysiological disorders, somatization, substance abuse, and psychological conditions, like depression, which have organic manifestations. But how did these affect the utilization of patients in this study? We can get some information on this by looking at the psychological diagnoses that were assigned to patients based on the clinician's interpretation of the MMPI. Table 10 shows the frequency of each diagnosis for the four groups of the interaction. The group by diagnosis chi-square, using only the most common diagnoses of depression, psychophysiological disorder, and normal MMPI, failed to reach significance. This suggests that diagnoses of depression and psychophysiological disorder, equally common among decreasers and nondecreasers, are not useful in predicting the offset effect. On the other hand it is very possible that measurements of the actual behavioral deficits associated with these diagnoses might be effective predictors.

Substance abuse was diagnosed for only one of the subjects in this study. This figure includes not only the diagnoses made on the basis of the MMPI, but those based on consultations and psychotherapy sessions as well. While we

can assume that substance abuse, especially alcohol abuse, was prevalent to a greater degree than this figure suggests, we cannot determine anything about its relative frequency among decreasers and nondecreasers.

Somatization, as measured by a 1-2-3 elevation on the MMPI, is a much more frequent pattern among patients who do not experience a decrease in subsequent utilization. Thus, somatization appears to prevent decrease. Although there are nondecreasers who do not have this profile. There are also several other psychological conditions which the MMPI findings suggest very tentatively may also prevent decrease. These, include anxiety, self-criticism, indecision, rumination, introversion, and social discomfort. Once again, measurement of the degree that each of these is present will be necessary to establish its effect on offset.

But what are the psychological factors associated with subsequent decrease in utilization? If one's utilization decreases after psychotherapy, it can be argued that psychological factors were at least partially responsible for earlier higher rates of utilization. But, both this and previous studies have failed to identify the psychological factors, which exposed to psychotherapy, contribute to a decrease in utilization. Speculatively, let us assume that they consist of a heterogeneous group of disorders and difficulties which may include substance abuse but probably

does not include somatization. Perhaps these or similar psychological problems are also present prior to the MMPI in the No Therapy/Decrease group. The presence of some psychological symptoms is certainly likely because these patients did, after all, receive a referral for psychological evaluation. It may be that their problems remitted spontaneously or with the informal counseling available from family, friends, supervisors, and so on. The challenge for psychologists who want to identify patients whose response to psychotherapy will include decreased utilization is to discover the psychological problems which are characteristic of this group.

Weaknesses of the Present Study

This study suffered from several weaknesses and its findings should be evaluated with these in mind. First, like many previous offset studies, it utilized archival data. As a result, the administration of psychotherapy was not as carefully controlled as it would have been in a prospective, experimental design. For example, some patients had had up to six sessions of psychotherapy or an even greater number of biofeedback sessions, prior to the administration of the MMPI. As a result, for these patients the MMPI is not behaving simply as a predictor of response to subsequent therapy since the scores will necessarily reflect the effect

of the prior therapy sessions. Another weakness can be found in the heterogeneous nature of the psychotherapy received by the subjects. Psychotherapy sessions by clinical psychologists and those by psychiatrists were treated as one. No attempt was made to block the groups by therapist since this would have misrepresented the actual situation (psychiatrists see older, sicker patients) and, again, would have reduced the sample size. Psychotherapy sessions were lumped with biofeedback treatments in the Therapy/No Therapy variable. No attempts were made to measure the other types of treatments (e.g., psychotropic medication, physical therapy) which were received by some subjects during the pre- and post-MMPI years. The observed utilization decreases could have been due to the effects of these other treatments.

The correlational nature of the findings is a related weakness. For example, we cannot really determine what is responsible for the high utilization of the Therapy/No Decrease group during the post-MMPI year. Perhaps it is their unresolved psychological problems which contribute to high levels of help-seeking. Or it may be that their physical condition has worsened and this is affecting both their medical and psychiatric utilization patterns. There is no way to be sure using this kind of data. It is even possible that some of the subjects classified as not having

received psychotherapy actually did get it outside of Straub.

There were also subject selection problems. For example, it was not possible to block the groups exactly by year, i.e., to make sure that there was an equal proportion of each year in every group. To have done so would have greatly reduced the n size. The groups, in addition, were not strictly comparable on demographic variables. To have forced them to be so would have misrepresented the actual proportions and would also have reduced the number of subjects. Still, because Japanese people and those with less education are underrepresented in the groups that received psychotherapy, some of the results may not generalize as well to them. In addition, the subject selection criteria developed for this study (see substudy in Appendix B) resulted in a sample of subjects whose medical utilization was quite high compared to the national norms. It is likely (as the physician substudy in Appendix A suggests) that patients who receive MMPI referrals, when compared to patients who receive other types of psychological referrals, are relatively high utilizers. So perhaps the levels of utilization obtained by these subjects is not an artifact of the selection criteria. We cannot be sure. However, because the levels of utilization are so high, it is possible that observed decreases are due

to regression to the mean and not to psychological factors or the effects of psychotherapy. Another problem with the subject selection criteria concerns the fact that there is a difference between the time period upon which the criteria were developed and the period to which they were applied in this study. This difficulty is discussed at length in Appendix B. Finally, subjects differ from typical medical patients in that they all received and complied with a referral for the MMPI.

The ideal study would have included a longer follow-up period. Long follow-ups are especially important in offset studies since some (e.g., Follette and Cummings, 1967) have found the magnitude of the post-therapy utilization decrease to become larger over time. In addition, it would be valuable to see if an even shorter version of the utilization prediction scale could be used to predict failure to decrease. Perhaps the 18 items that were significant at the .05 level should be tried by themselves. A shortened scale would be especially important for the geriatric population since it would reduce the fatigue caused by long assessment procedures. Another weakness of this investigation is the fact that it was restricted to the prediction of outpatient utilization. It would be very important to know, for example, whether different MMPI scores would predict decreases in hospital utilization.

Finally, it would also be valuable to test whether the MMPI would be able to predict decrease in health care costs. There is clearly a need for more research on this question. Other promising topics for future research are discussed in the following section.

Implications for Future Research

There are several promising areas for future research on the role of psychological factors in medical utilization and the offset effect. These include the identification of the psychological characteristics of patients whose medical utilization decreases after psychotherapy, the discovery of assessment instruments that can predict who will decrease, the application of new types of treatments to obtain the offset effect, exploration of the physician's role in bringing about utilization decreases among patients with somatization disorder, and the determination of the value of medical utilization rate as a psychotherapy outcome variable. Each of these new directions will be discussed below.

It is very important to develop a means for characterizing the psychological problems and treatment needs of patients who experience a decrease in medical utilization after psychotherapy. For, as stated in an earlier section, if we can identify potential decreaseers we

can treat their distress more quickly and contribute to cost-containment efforts. Unfortunately, the MMPI appears only to be capable of identifying patients who are unlikely to decrease their utilization after psychotherapy.

The fact that the MMPI is able to predict one aspect of the offset effect, i.e., nondecrease, suggests that it may be possible to predict decrease as well. Other instruments may do a better job of this than the MMPI. The Illness Behavior Inventory, for example, developed by Pilowsky and colleagues for the detection of a "somatically focused, illness affirming" coping style (Pilowsky, Murrell, & Gordon, 1979, p. 203) is a likely candidate. Several devices developed for the measurement of individual differences in psychophysiological responsivity may also be applicable. These include the Perceived Somatic Response Inventory (Meadow, Kochevar, Tellegen, & Roberts, 1978), the Psychosomatic Symptom Checklist (Cox, Freundlich & Meyer, 1975) and the Autonomic Nervous System Response Inventory (Waters, Cohen, Bernard, Buco, & Dreger, 1984). Measures of illness severity and illness-related disability like the Activities of Daily Living scale (Katz, Downs, Cash, & Grotz, 1970), the Sickness Impact Profile (Gilson, Gilson, Bergner, Bobbitt, Kressel, Pollard, & Vesselago, 1975) and the Index of Well-being (Kaplan, Bush, & Berry, 1976) also seem to hold promise. So does the Millon Behavioral Health

Inventory (MBHI) (Millon, Green & Meagher, 1982) described as "the first comprehensive psychodiagnostic instrument developed specifically for the physically ill" (Dana, 1984, p. 201). The MBHI is a 150-item self-report measure that yields 20 scales that are grouped under four headings: personality and basic coping styles, psychogenic attitudes, psychosomatic correlates, and prognostic indices. Since it has already been found to discriminate between frequent and infrequent medical service utilizers (Marron, 1984) it may also be able to identify likely post-therapy utilization decreaseers. Finally, there is also the possibility that other types of assessment, perhaps psychophysiological measures (e.g., EMG, GSR) could be used to predict decrease.

A third direction for future research concerns the application of treatments which have not yet been shown to decrease medical utilization. As mentioned earlier in this discussion, the MMPI results suggest that people who do not experience a decrease in medical utilization after therapy suffer from several psychological problems. These include anxiety, depression, rumination, and social discomfort/introversion. This suggests that cognitive or pharmacological treatments for anxiety and depression may provide new means for decreasing medical utilization. It would also be valuable to determine whether biofeedback, in contrast to other forms of psychotherapy, would be

especially helpful for patients with elevations on scales 1, 2, and 3 on the MMPI. Since these patients tend to resist psychological interpretations of their symptoms, they may find the direct, physical approach of biofeedback more congenial. This in turn could effect their subsequent utilization. Similarly, social skills training for the remediation of skills deficits and social anxiety, although seemingly a rather indirect means, might nevertheless result in a lower rate of physician visits.

A fourth matter for future research concerns the role of the physician in bringing about utilization decreases. For example, as the physician substudy (in Appendix A) notes, very little is known about the cognitive activities in which internists engage as they consider psychiatric referral for a given patient. Could it be that the decision to make a referral and the resulting psychiatric report (especially one which reveals the presence of psychopathology) are milestones in the physician-patient relationship? Afterward the physician may adopt a more conservative treatment approach. Perhaps it is just as much the physician's response to the patient's psychological consult/therapy, as the patient's, which brings about the observed decreases in medical utilization. A recent study by Smith, Monson, and Ray (1986) would seem to provide some evidence for this. These researchers found that when

physicians of patients with somatization disorder were instructed to avoid hospitalization and testing unless clearly necessary while continuing to see the patients on a regular basis, the health care costs decreased by half. This study also suggests that once a patient is identified as a somaticizer, their physician, not themselves, should become the target of intervention.

Finally, it would also be interesting to determine how an observed decrease in medical utilization would relate to other measures of psychotherapeutic outcome. Does a medical utilization decrease indicate that there has been an improvement in physical health or in psychological status? Will utilization decrease correlate with a decrease in psychological complaints, with psychometric measures of therapy outcome, or with patients' self-reports of improved psychological status? Should medical utilization rates be included as a routine measure in psychotherapy outcome studies? These and other questions deserve the attention of future researchers.

Closing Remarks

While the results of this type of study have obvious cost-containment applications, it is definitely not my intention to suggest that psychotherapy should be made available to patients only if can be shown to reduce subsequent medical

utilization. A full range of services should be available to all patients. The offset effect is not the touchstone for the value of psychotherapeutic services in the medical setting. Several researchers (e.g., Yates, 1984) have shown that psychological techniques can effectively treat many medical disorders. Furthermore, psychotherapy outcome studies have established the efficacy of numerous therapeutic treatments. In addition, the presence of psychology/psychiatry personnel in the medical setting adds a humanitarian element to what is sometimes perceived as a mechanistic, impersonal health care system. Their presence also assures that this important base of expertise will be available to medical professionals as they seek to understand and treat the whole patient.

APPENDIX A
PHYSICIAN RATINGS OF THREE REFERRAL GROUPS

Introduction

The goal of this substudy was to determine the degree of similarity between patients who are referred for the Minnesota Multiphasic Personality Inventory (MMPI) and those who are not. It was designed to find out how well the results of the main study, whose subjects had all been referred for an MMPI, would generalize to medical patients who have not received a referral. In the course of reviewing the health psychology and consultation-liaison psychiatry literature it became clear that very little is known about the patient characteristics that prompt physicians to make referrals for psychiatric/psychological evaluation. In fact, Schulberg, McClelland, Coulehan, Block, and Werner (1986) note that while there is a small body of research concerning the cognitive processes which physicians engage in as they assess and plan treatment for physical conditions, in contrast:

even simple descriptive reports are lacking about the manner in which primary-care practitioners approach the assessment of emotional problems and utilize potentially

relevant cues...no studies, experimental or otherwise, have yet detailed whether or how primary-care practitioners elicit information, interpret cues, and formulate hypotheses about mental illness in medical populations. (p. 4)

It is not surprising considering the general lack of information concerning the psychiatric/psychological referral process that the author was unable to locate any studies which specifically address the question MMPI referral. Lovitt (1982) however does note that the MMPI can greatly aid the diagnostic efforts of consultation-liaison services. The lack of information about the MMPI referral process is striking for several reasons. First, studies (e.g., Liese, 1986) have shown that physicians consider psychological factors to be important contributors in several common illnesses (Liese, 1986). Second, the MMPI has a long history of use with medical populations (McKinley & Hathaway, 1943; Osborne, 1975). Finally, the MMPI continues to be very widely used and well accepted by physicians, psychiatrists and psychologists employed in health care settings.

This exploratory study will provide an initial description of the types of patients who are referred for the MMPI. Specifically, it will compare physician ratings of the severity of ten common psychological symptoms among

three groups of patients: 1) those whom have been referred for the MMPI, 2) those who were referred for psychiatric or psychological evaluations which did not include an MMPI and 3) those who have not been referred for either type of evaluation. The psychiatric symptoms chosen for study have been found to be common among the patients seen by consultation-liaison staff (Brantley, Wise, & Ahmed, 1985; Burstein, 1984; Daniels & Linn, 1984; Fetting, 1984; Friedman & Cohen-Cole, 1981; Fulop & Strain, 1985; Goldberg, Wallace, Rothney, & Wartman, 1984; Lima & Brooks, 1985; Lipsitt, 1982; Lovitt, 1982; Nadelson, 1984; Schulberg, McClelland, Coulehan, Block, & Werner, 1986; Slavney, Teitelbaum, & Chase, 1985; Thompson & Thomas, 1985; Zoccolillo & Cloninger, 1986).

The impetus behind this survey was the need to determine the degree of similarity between patients who receive the MMPI and those who do not. The extent of similarity can be determined partly by answering three more specific questions:

Question #1 How similar are patients with MMPI referrals to those patients who do not receive any type of psychiatric or psychological referral?

Question #2 How will patients with MMPI referrals compare to patients who receive a psychiatric/psychological referral that does not include the request for an MMPI.

Question #3 Within each of the three referral categories which problems will be considered the most common?

Method

Subjects

The subjects were 86 physicians employed at Straub, a private medical clinic and hospital in Honolulu. Pathologists, pediatricians, and anesthesiologists were excluded from the study because physicians in these specialties do not refer adult patients for psychiatric evaluation.

Materials

The MMPI Utilization Survey and its cover letter appear at the end of this appendix. Physicians were asked to rate, on a four point scale, the frequency of ten symptoms among three groups of their patients: those who are not referred by them for any type of psychiatric/psychological evaluation, those who are referred for an MMPI, and those who are referred for other types of psychiatric/psychological evaluation.

Procedure

The cover letter, written by one of the medical facility's physicians with strong research interests, endorsed the survey and encouraged participation. A self-addressed envelope was included for return to the researcher through in-house mail. After approximately six weeks 55 questionnaires, or 64%, had been completed and returned. A second set of materials was then sent to physicians who had not yet responded. The total of completed surveys rose to 71, or 82.5%, after the second mailing.

Results

The four-point rating scales for each of the ten symptoms were treated as continuous variables and means were calculated for each of the referral categories. The results are shown in Table A-1. A Kruskal-Wallis one-way analysis of variance (ANOVA) by ranks (Siegel, 1956) was performed to determine whether the differences between the three groups were significant. The sum of the ranks was 162.0 for the nonreferred patients, 151.5 for the patients who received psychiatric referrals that did not include an MMPI, and 151.5 for the MMPI referrals. These were not significantly different. With two degrees of freedom $H=0.09$, $p=.98$. It was difficult to find an appropriate inferential statistical test for this data. Some of the assumptions of the Kruskal-

Table A-1

Means and Standard Deviations of Physician Ratings
of Frequency of Ten Symptoms Among Patients in the
Three Referral Groups

1=very uncommon 2=fairly uncommon 3=fairly common 4=very common	Non- referred	Psychiatric/ Psycho- logical Referral	MMPI Referral
Symptoms that cannot be explained by physical findings	2.70 (0.78)	2.43 (0.90)	3.07 (0.91)
Patient has difficulty accepting psychological causes of illness	2.48 (0.75)	2.29 (0.88)	2.72 (1.00)
Brain damage, dementia, OBS	2.08 (1.00)	1.93 (0.84)	1.77 (0.90)
Behavior management problem (e.g., noncompliance to regimens, acting out on ward)	2.13 (0.86)	2.14 (0.85)	1.87 (0.82)
Very high utilization of medical services	2.45 (0.90)	2.09 (0.89)	2.28 (1.03)
Anxiety	2.91 (0.67)	2.81 (0.85)	2.72 (0.96)
Psychophysiological disorder (e.g., headaches, ulcers)	2.85 (0.75)	2.28 (0.99)	2.86 (0.80)
Depression	2.48 (0.79)	3.16 (0.77)	3.00 (0.76)
Damaging lifestyle (e.g., excess stress, smoking)	2.79 (0.79)	2.33 (0.91)	2.21 (0.90)
Requires psychopharmacological management	2.03 (0.85)	2.88 (0.89)	1.97 (0.82)

Wallis have been violated in this application, i.e., the entries being ranked are means of groups, not data on individuals and ten variables, instead of one, are being measured. In addition to this test careful inspection of the pattern of differences among the means also provides tentative answers to the three questions addressed by this study.

In answer to question #1, a comparison of the means of MMPI referrals and nonreferred patients reveals that only three problems are rated as being more common among MMPI referrals: medical symptoms that cannot be explained by physical findings, difficulty accepting psychological causes of illness, and depression. Of the remaining seven problems six are rated as less frequent among the MMPI referrals while psychophysiological symptoms are viewed as equally common among the two groups. The Kruskal-Wallis results reveal that the magnitude of the observed differences is not greater than would have been expected by chance.

In answer to the second question, the following four problems were rated as more common among the MMPI referrals in comparison to other types of referrals: symptoms that cannot be explained by physical findings, difficulty accepting psychological causes of illness, very high utilization of medical services, and psychophysiological disorders. Once again the Kruskal-Wallis results show that the difference between the groups is not significant.

Question #3 may be answered as follows. There were distinctive differences between the problems ranked as most common within each of the referral categories. Anxiety, psychophysiological disorders, and damaging lifestyle were viewed as the most common problems among those patients who do not get referred for psychological evaluation. The most prevalent difficulties for the non-MMPI referrals were depression, anxiety, and the need for psychopharmacological management. Depression is also in the top three for the MMPI referrals along with psychophysiological problems and the presence of symptoms that cannot be explained.

Discussion

The practical goal of this survey was to determine how well the results of the main study (on the MMPI predictors of medical utilization rates) can be expected to generalize to patients who have not been referred for an MMPI. Overall it would seem that the results should generalize fairly well in so far as the mean differences between MMPI referred and nonreferred patients appear to be rather small and the Kruskal-Wallis ANOVA was not significant. The results will probably apply best to the nonreferred patients whose problems are similar to those identified as typical of the MMPI referrals. The MMPI referrals differ from non-referred medical patients and other types of psychiatric referrals

both in the degree to which their complaints cannot be explained by physical findings and in their resistance to the idea that psychological processes may play a role in their illnesses. Although these are not significant differences they may nevertheless be the distinctive features of the potential MMPI referral, the patient to whom the utilization study results will generalize the most readily.

The survey results also provide some information about the cognitive processes engaged in by the physician who refers for an MMPI. When medical examinations and tests have failed to reveal an observable cause for the patient's symptoms the physician is more likely to suspect psychological causes. But he or she also senses that the patient being evaluated will not be receptive to a psychological explanation. In such cases the physician may feel that the MMPI can help convince the patient of the role of emotional factors. The MMPI's true/false format and the appearance of the profile (when it is reviewed with the patient) produce an impression of objectivity which may allow a patient to accept the hard-to-swallow possibility.

These conclusions need to be evaluated in light of the study's weaknesses. Since physicians are less likely to answer long surveys, the number of questions had to be kept to a minimum. As a result several conceptually important

items were excluded. The ideal survey would include not only more psychiatric symptoms, but questions about medical status as well. It would also be interesting to know whether the physician's assessment of the degree of natural social support available to the patient (e.g., family, friends) influences his or her decision to refer a patient for psychological evaluation and therapy.

Straub
CLINIC & HOSPITAL

June 26, 1986

Dear Straub Physician,

Please find attached the "MMPI Utilization Study," which is part of the Straub Foundation's research project "The Development of MMPI Predictors of Medical Utilization Rates" being conducted by William Tsushima, Ph.D. and Victoria Stoddard, M.A.

I am writing to ask for your participation in this survey, on which I have consulted and in which I take considerable interest. While taking only 5-10 minutes to complete, the survey will generate important information concerning psychiatry/psychology referral patterns and utilization. Please return the survey in the attached envelope. All results are confidential and your name will not appear in any report or publication.

The investigators will provide you with a summary of the survey's findings, as well as an abstract of the overall study upon its completion. Thank you for your cooperation in helping us with this project.

Sincerely,



David J. Andrew, M.D.

DA:vms

Enclosure

The MMPI Utilization Study

Introduction

This survey is designed with three purposes. First, we want to discover which types of patients are referred for a Minnesota Multiphasic Personality Inventory (MMPI). Second, we would like to determine which patients are referred for a psychiatric/psychological evaluation which does not include an MMPI. Third, we would like some information about the patients who do not receive either type of referral. Even if you have never referred a patient for any type of psychiatric or psychological evaluation, we are still very interested in your observations concerning your patients. Thank you.

Background Information

1. In what year did you receive your M.D. degree? _____

2. Approximately how many times in the past year did you refer a patient for the MMPI?
_____ 0 _____ 1-10 _____ 11-20 _____ 21-30 _____ 31-40 _____ >40

3. Approximately how many times in the past year did you refer a patient for psychiatric/psychological assessment other than the MMPI?
_____ 0 _____ 1-10 _____ 11-20 _____ 21-30 _____ 31-40 _____ >40

4. What was the referral question on the last case you referred for an MMPI?

(_____ Not applicable, I have never referred for an MMPI)

Instructions

Please answer the questions in A, B, and C by placing a checkmark in the appropriate column. The example below indicates that marital problems are fairly common for the group of patients under consideration.

VU=very uncommon FU=fairly uncommon FC=fairly common VC=very common

	VU	FU	FC	VC
a. Marital problems	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

A. Patients who are not referred for any type of Psychiatric/Psychological Evaluation

How common are these problems among patients who you do not refer for any type of psychiatric or psychological evaluation? Please place a check mark in the appropriate column.

VU=very uncommon FU=fairly uncommon FC=fairly common VC=very common

	VU	FU	FC	VC
1. Symptoms that cannot be explained by physical findings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Patient has difficulty accepting psychological causes of illness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Brain damage, dementia, organic brain syndrome	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Behavior management problem (e.g., noncompliance to medical regimen, acting out on ward)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Very high utilization of medical services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Anxiety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Psychophysiological disorder (e.g., headaches, ulcers)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Depression	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Damaging lifestyle (e.g., excess stress, smoking)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Requires psychopharmacological management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

** Please continue **
on page three

B. Patients referred for other types of Psychiatric/Psychological Evaluation

How common are these problems among patients who you refer for a psychiatric or psychological evaluation that does not include an MMPI? (Please skip this section if you have never referred a patient for a psychiatric or psychological evaluation.) Please place a checkmark in the appropriate column.

VU=very uncommon FU=fairly uncommon FC=fairly common VC=very common

	VU	FU	FC	VC	
1. Symptoms that cannot be explained by physical findings	<input type="checkbox"/>				
2. Patient has difficulty accepting psychological causes of illness	<input type="checkbox"/>				
3. Brain damage, dementia, organic brain syndrome	<input type="checkbox"/>				
4. Behavior management problem (e.g., noncompliance to medical regimen, acting out on ward)	<input type="checkbox"/>				
5. Very high utilization of medical services	<input type="checkbox"/>				
6. Anxiety	<input type="checkbox"/>				
7. Psychophysiological disorder (e.g., headaches, ulcers)	<input type="checkbox"/>				
8. Depression	<input type="checkbox"/>				
9. Damaging lifestyle (e.g., excess stress, smoking)	<input type="checkbox"/>				
10. Requires psychopharmacological management	<input type="checkbox"/>				

C. Patients Referred for the MMPI

How common are these problems among patients who you refer for an MMPI? (Please skip this section if you have never referred a patient for the MMPI). Please place a checkmark in the appropriate column.

VU=very uncommon FU=fairly uncommon FC=fairly common VC=very common

	VU	FU	FC	VC	
1. Symptoms that cannot be explained by physical findings	<input type="checkbox"/>				
2. Patient has difficulty accepting psychological causes of illness	<input type="checkbox"/>				
3. Brain damage, dementia, organic brain syndrome	<input type="checkbox"/>				
4. Behavior management problem (e.g., noncompliance to medical regimen, acting out on ward)	<input type="checkbox"/>				
5. Very high utilization of medical services	<input type="checkbox"/>				
6. Anxiety	<input type="checkbox"/>				
7. Psychophysiological disorder (e.g., headaches, ulcers)	<input type="checkbox"/>				
8. Depression	<input type="checkbox"/>				
9. Damaging lifestyle (e.g., excess stress, smoking)	<input type="checkbox"/>				
10. Requires psychopharmacological management	<input type="checkbox"/>				

APPENDIX B
MEDICAL RECORDS CRITERIA DEVELOPMENT SUBSTUDY

Introduction

When confronted with the densely packed shelves of medical records how can we discriminate between the committed Straub patients, the occasional Straub users, and one time visitors, using only the information contained in the files? This study was performed to develop a set of criteria which, when applied to the medical record of a patient with a Minnesota Multiphasic Personality Inventory (MMPI) referral, would assure that s/he receives at least 90% of his/her medical care at Straub Clinic and Hospital. These criteria will allow us to select as research subjects who received all or almost all of their medical care from Straub during the years under study. It is important to select subjects who fit these criteria because if a patient obtained a substantial portion of his/her medical care outside of Straub we could not be certain that utilization decreases observed in the year following the MMPI were due to the psychological intervention or simply the result of going elsewhere for medical care (Jones & Vischi, 1979).

Psychotherapy cost offset studies, which frequently use the archival data available from medical records, have handled this problem in several ways. First, the majority of these studies have been performed in HMOs. Investigators have assumed, very reasonably, that the patient with prepaid medical care will get the great majority of his/her care from the sponsoring organization. Cummings performed a telephone survey of a subset of his subjects and found that their use of services outside the HMO under study was very limited. Smith, Monson, and Ray (1986) interviewed their subjects and requested permission to contact each of their health care facilities to obtain all physician and hospital records. The method developed in the present investigation has not been used before to the investigator's knowledge.

Method

Subjects

All of the 240 patients who received an MMPI in the Straub Psychiatry/Psychology Department during 1985 were initially eligible for inclusion in the study. Several of these potential subjects were excluded for the following reasons: 20 were not residents of Oahu, 10 were under age 18, 15 received a shortened form of the MMPI due to limited reading skills, one was dropped because he had received multiple MMPIs and therefore was not comparable to others in the

sample, and finally, one person was excluded because the medical record had been lost. Thus, 193 patients were eligible for inclusion in the criteria study.

Materials

This criteria development substudy took place in two stages. The first phase, a phone survey, made use of the Utilization Project Phone Survey. A copy of the survey is shown at the end of this appendix. In the second phase each subject's medical chart was evaluated using a data coding sheet similar to that employed in the main study. The items on the coding sheet were chosen because it seemed likely that they would be able to discriminate between patients who report getting 90% or more of their care from Straub and those who report receiving less care there. The only restriction on the items was that the information necessary for answering each one had to be available from the medical chart alone. On this last point, it may be worth noting that this study was done to pave the way for the "main" record review project which would rely on medical records and not make use of patient phone surveys. The potential criteria items were as follows:

- 1) Did the MMPI referral come from a Straub physician?
- 2) How many visits were made to an internist (nonspecialist) in 1985?

- 3) How many different doctors were seen during 1985?
- 4) Was the patient a member of one of Straub's HMO plans in 1985 (e.g., the Community Health Plan or the Straub Plan)?
- 5) For how many years prior to the MMPI had the patient been receiving medical care at Straub?

Procedure

Phase 1--Phone Survey. The phone survey was run under the auspices of the Straub Medical Research and Education Foundation. The staff for survey consisted of the investigator and four University of Hawaii psychology majors who had been trained in the standardized telephone interview procedure. All of the students received class credit for their participation. We attempted to contact each of the 193 eligible patients. Of these 67 (35%) could not be reached because they had no phone, had not informed Straub when they got a new phone number, were not listed in directory assistance, etc. Twenty-one (11%) of the sample were contacted, but declined to participate. 105 patients (54%) completed the phone survey interview.

Before being asked to participate each of the potential subjects was read the following brief standardized explanation of the research goals: "We are asking a sample

of patients who attended Straub Clinic in 1985 about their use of Straub and other medical facilities." Further information was available to patients who wanted to know more before continuing. They were told that the project's purpose was to learn "more about why they use Straub medical services, why they come to Straub when they do, and why they go to other health care facilities." Patients were not aware that they were selected because they had received an MMPI in 1985. I disguised this aspect of the research because I felt that knowledge of how they were chosen could have several negative effects including a perceived invasion of privacy, anger, increased refusal rate, and possibly biased data. The instructions that were given, though very general, were an honest representation of the project goals.

Subjects who agreed to participate answered the phone survey questions. They reported the number of physician outpatient visits, emergency room contacts, and hospitalizations which occurred outside of Straub during 1985. They also stated whether or not they had received 90% or more of their medical care at Straub during that year. For 13 of the subjects (12.4%) this survey data was supplied by a relative.

Phase 2--Medical Records Data Abstraction. The medical records of the 105 subjects who completed the phone survey were reviewed during the second phase of the study and the

Criteria Coding Sheet was completed for each patient. Record review was carried out by the author, two paid research assistants, and the four undergraduate psychology student research assistants. All assistants received training in medical file data abstraction. The accuracy of the data gathering was determined in the interrater reliability substudy described in a subsequent section.

Statistical Procedures

The statistical procedures were designed to determine which combination of potential criteria would do the best job of discriminating between two groups of patients: those who had received 90% or more care at Straub and those who received less than 90%. Six sets of criteria were selected on a rational basis. The ability of each set to categorize patients into the correct groups was tested using a 2X2 chi-square statistic. The two variables were: 1) categorized by criteria as having gotten 90% or more care at Straub (yes/no) and 2) actually got 90% or more care at Straub (yes/no).

Results

The Efficacy of the Criteria

All six chi-square analyses (n=105) were significant at .01 or lower probability levels. The least effective set of criteria (chi-square(1)=10.4, $p<.01$) consisted of the following two items:

- 1) membership in an HMO and
- 2) MMPI referral by a Straub physician.

The most effective set of criteria, and the one adopted for use in the main study, was considerably more complex. In this set patients were categorized as likely to to 90% or more care if they:

- 1) were a member of a Straub HMO or
- 2) were referred for the MMPI by a Straub physician and had had one or more visits to an internist (nonspecialist) during 1985 or
- 3) were referred for the MMPI by a Straub physician and had seen three different physicians during 1985.

The chi-square for this set was 28.49, $df=1$, $p<.0001$. The overall "hit" rate was 77.14% with 24.76% of the patients correctly categorized as getting less than 90% of their care from Straub and 52.38% correctly identified as getting 90% or more of their care there. 16.19% of the total sample were false negatives, that is they actually got

90% or more care at Straub, but were incorrectly classified by the criteria as getting less. Another way of evaluating the false negative rate is to note that 39% of the patients, or about 1 out of 3, who are categorized as not likely to receive 90% or more care actually did receive 90% or more. The false positive rate was considerably lower with only 7% of the total sample being categorized as likely to get 90% or more, but in actuality receiving less. Similarly, only 11.29% of the patients who were identified as getting 90% or more care actually received less. This means that 88.7% of the patients who are categorized as likely to receive most or all of their care at Straub actually do. This assures that almost 90% of the patients selected by these criteria for use in the main study will get 90% or more of their care from Straub.

Further support for these inclusionary criteria comes from the fact that, in contrast to patients who did not meet them, a patient who met them was also significantly more likely to answer yes when asked if s/he considered her/himself to be "a Straub patient," (chi-square=31.20, df=1, p<.0001. In the same line of reasoning, patients who met the inclusionary criteria were also significantly more likely to state that their regular physician was at Straub and that they receive both primary and specialty care from Straub (chi-square=45.15, df=1, p<.0001.

A Content Analysis of Reasons Patients Seek Outside Care

Several patients who reported that their regular physician was at Straub also said that they saw one or more specialists at other medical care facilities. In the interest of gaining a better understanding of why patients sought care outside of Straub, a sample (n=11) of patients in this group was asked why they did so. The most common reason given for visiting a physician outside of Straub was being recommended to do so by their Straub physician. Three patients gave this reason. The rest of the reasons were each given once: second opinion, member of the military, could not wait for an appointment, physician was recommended by a friend, saw the same outside gynecologist for ten years, dissatisfaction with a particular Straub specialist, anger about being "called crazy" combined with an alleged medication error during hospitalization, and visit to a company doctor for a cold.

Some of the 11 patients saw more than one type of specialist outside of Straub. Optometrist/eye doctor and orthopedists were both mentioned twice. The others, each noted only once, were: neurologist, x-ray, psychiatrist, ENT, cardiologist, internist, dermatologist, urologist, gynecologist, and migraine headache specialist.

Data Abstraction Interrater Reliability Study

An interrater reliability study of the criteria coding sheet data was done by having a randomly selected sample of 16 medical records reevaluated by a second coder. The results showed that there was perfect agreement on the referral by Straub physician item (chi-square=16, df=1, $p<.0001$). The correlation for number of visits to an internist was .83 ($p<.0001$). There was a .94 ($p<.0001$) correlation between the two raters for total number of physicians seen. The HMO membership and years of registration variables were not checked for interrater reliability because during most of the criteria development study this information was gathered using the computerized medical information system, i.e., it was not abstracted from the medical files. Thus, it was not feasible or necessary to check the data abstraction accuracy for these two variables.

Discussion

Effectiveness of the Criteria

This study was successful in developing a set of criteria which effectively identify the medical records of patients who receive 90% or more of their medical care from Straub Clinic and Hospital. The false positive rate of 11.3% is acceptably low. Roughly speaking, about 90% of the patients whose charts are selected by these criteria get at least 90% of their medical care at Straub.

An Additional Criterion Decreases False Positives

Visual examination of the raw data of false positives suggested a means by which accuracy could be further improved. Specifically, one of the false positive cases had been referred for the MMPI by a Straub physician and had seen three or more different physicians at Straub. However, these three doctors were all in the specialty areas of neurosurgery, neurology, and psychiatry, suggesting that the patient was seeing them all for the same neurological problem. Many people are referred to Straub by outside physicians for evaluation of suspected or identified brain damage. Such patients would routinely see a neurologist or neurosurgeon or both. In addition, neuropsychological testing by a Straub psychologist is frequently requested by the neurologist. Almost all of the neuropsychological batteries given at Straub include the MMPI. Thus, an additional criterion was added: If all of the physicians seen were from the specialties of neurology, neurosurgery, or psychiatry/psychology then the patient does not qualify for the study. By deleting this one case the false positive rate was reduced to 9.8%.

Why Patients Seek Care Outside of Straub

Unfortunately, the content analysis of the 11 patient subsample did not reveal any consistent patterns in the reasons for seeking specialty care outside of Straub or in the type of specialists visited. However, it does appear that the most common reason for patients' visits to outside doctors may be that their Straub physician gave them a referral. This finding is extremely tentative based as it is on a such a small sample.

Weaknesses of the Study

In spite of meeting its overall goal this study suffered from several unavoidable methodological problems which may limit the validity of its findings. First, the telephone survey relied exclusively on self-reports by patients or (infrequently) on their relative's reports about them. Thus, memory problems, attempts to please the interviewer, and various Straub-related attitudes may all have worked to undermine the accuracy of reported utilization.

A second problem concerns the fact that the time period used for the development of these inclusion criteria is not identical to that of the main utilization study for which they were created. Specifically, the criteria development substudy was performed in early 1986 and patients were simply asked about their utilization "during 1985." Each

subject received the MMPI at sometime in 1985, maybe early in the year, maybe late. In contrast, the main study looked at utilization in the year prior to and the year after the MMPI administration. Accordingly, the criteria were applied to the year prior to the MMPI administration. There is undoubtedly some degree of inaccuracy created by the fact that the criteria were developed by focusing on a one year period that included an MMPI at some unspecified point and then these same criteria were applied to a one year period that completely preceded the MMPI. It is difficult to estimate the degree of error that this creates. On the other hand, it was not possible to ask patients about their utilization in the year prior to receiving the MMPI because to do so would have revealed the basis for subject selection.

Finally, it was not possible to contact 67 (35%) of the people who received an MMPI in 1985. In so far as failure to reach them was due to features of their lifestyles, perhaps instability, transience, or overwork, then these qualities are underrepresented in the sample on which the medical record selection criteria were developed. As a result, the criteria would not be as applicable to this type of patient.

Wider Applications for the Criteria?

It may be possible to use these inclusion criteria or similar ones in medical records review research in other medical settings. Caution would have to be exercised, however, due to the particular features of this sample which limit the generalizability of the criteria. Specifically, all subjects were referred for an MMPI. Thus, the criteria may not be applicable to medical patients who were never referred for an MMPI. In addition, medical utilization patterns are affected by physician behaviors which are, in turn, influenced by the types of medical institutions and fee arrangements under which the physicians work. Thus, these inclusion criteria should only be applied in settings similar to Straub, i.e., where there are HMO programs operating in a quasi-fee-for-service organization.

Generally speaking, it would probably be rather unwise to apply these exact inclusion criteria to any other setting. But, the types of criteria chosen (e.g., referral by an in-house physician, HMO membership, number of different doctors seen) should generalize very well to other health care environments. The exact values assigned (e.g., required minimum number of doctors to be seen in one year) would need to be determined on a facility-by-facility basis using a phone survey procedure like that employed in this study.

UTILIZATION RESEARCH PROJECT PHONE SURVEY

ADMINISTRATIVE RECORD

Patient's name _____

Phone nos.: home _____ work _____

Research assistant's name _____

Utilization year(s) of interest _____

Who answered the questions: Patient _____ Relative/other _____

(NOTE: RELATIVE OR OTHER PERSON MAY SUPPLY INFORMATION ONLY WHEN PATIENT IS UNABLE DUE TO MEDICAL OR LANGUAGE PROBLEMS)

Record of attempts to reach patient.

Please note date, time of day, and status (status= no answer, NA; not home, NH; number incorrect, NI; other, O,)

Attempt #1: _____ Attempt #2 _____

Attempt #3: _____ Attempt #4 _____

Attempt #5: _____ Attempt #6 _____

TEXT OF PHONE CALL

Hello, my name is (first name AND last name). I am calling you to gather information for a Straub Foundation research project. We are asking a sample of patients who attended Straub Clinic and Hospital in _____ about their use of Straub and other medical facilities. All information is completely confidential and will not appear in your _____ records. Would you mind spending a few minutes talking about your use of medical services?

IF PATIENT IS NOT WILLING, ASK: Would you be willing if I could call you back at a more convenient time?

IF PATIENT REFUSES TO PARTICIPATE: Thank her/him for her/his time.

IF PATIENT REFUSED TO PARTICIPATE CHECK HERE _____.

THE FOLLOWING INFORMATION IS TO BE GIVEN OUT TO PATIENTS ONLY IF THEY REQUEST IT, DO NOT READ THIS TO EVERYONE:

IF THEY QUESTION THE LEGITIMACY OF THE SURVEY--DESCRIBE THE FOLLOWING "CALL BACK" PROCEDURE:

This survey is being sponsored by the Straub Foundation. Our address is 888 So. King St., Honolulu, HI 96813. The phone number is 524-6755. Phone calls are made from the research assistants' homes during evening and weekend hours because these are the times when working people can be reached. If you would like to verify the legitimacy of the project you may call Ms. Ann Harada, the Straub Foundation's administrative director, at 524-6755 between 9:00 AM and 4:30 PM.

If you would like to participate in this research after calling Ms. Harada I will be glad to call you back. Or if you would prefer to call me, I can be reached at (your phone #, date, and time).

IF THEY QUESTION THE CONFIDENTIALITY OF THE DATA:

Assure them that the information that they give us is confidential. It will be not appear in their records. And no names or other identifying information will be included in any reports.

IF THEY ASK WHAT THE RESEARCH IS FOR, WHAT THE STUDY IS ABOUT, WHAT OUR GOALS ARE, ETC:

Explain that we are doing the research in order to understand the medical use patterns of Straub patients. We want to know more about why they use Straub medical services, why they come to Straub when they do, and why they go to other health care facilities.

IF THEY ASK YOU SOMETHING BESIDES THE ABOVE QUESTIONS AND YOU ARE NOT SURE WHAT TO SAY:

Tell them that you appreciate their interest and inform them that you will need to speak to your supervisor about their concern and call them back later.

!!DO NOT EVER MENTION THE MMPI OR ANYTHING ELSE ABOUT OUR STUDY!!

SURVEY QUESTIONS

1. During the year(s) of _____ did you purchase all of your perscriptions at Straub?

yes _____ no _____

(IF NO): What makes you purchase some of your medications outside of Straub? _____

2. Which of the following categories best describes your situation during the year(s) of _____
READ ALL CATEGORIES TO THE PATIENT BEFORE S/HE SELECTS ONE.

NOTE THAT SPECIALIST MEANS PHYSICIAN, I.E. A MEDICAL DOCTOR.

- A _____ Your regular physician was at Straub, but you went to see one or more specialists outside of Straub. (Specialists include dermatologists, allergists, urologists, ophthalmologists, and others).
- B _____ Your regular physician was located at a health care facility outside of Straub, but you came to Straub to see one or more specialists.
- C _____ You received both your primary medical care from your regular physician at Straub AND all or almost all of the specialists that you visited were also at Straub.
- D _____ Other, Specify _____

3. ASK THESE QUESTIONS ONLY IF THE PATIENT FALLS INTO CATEGORY "A" IN QUESTION 2 ABOVE.

- i. What type of specialist(s) did you see outside of Straub? _____

- ii. What makes you seek specialty care outside of Straub? _____

4. In _____ about how many office visits did you make to physicians who work outside of Straub? _____

5. During this same time period were 90% or more of your physician office visits made to M.D.s who work at Straub?
yes _____ no _____

6. In the year(s) of _____ were you ever hospitalized, for one or more nights, at any hospital besides Straub?

yes _____ no _____

IF YES, how many different admissions? _____

IF YES, about how many days long was each admission?
1 _____ # 2 _____ # 3 _____

7. During this time did you ever go to an emergency room besides the one at Straub?

yes _____ no _____

IF YES, about how many times did this occur? _____

8. During _____ did you consider yourself to be a Straub patient?

yes _____ no _____

9. How would you describe your health during _____:

Extremely poor _____, Poor _____, Fair _____, Good, _____ OR
Excellent _____.

10. What is your ethnic background? (ASK PERSON TO SPECIFY PERCENTAGES, E.G. 50% Chinese, 25% Hawaiian, 25% caucasian.)

11. What level of education did you complete?

_____ elementary school
_____ highschool
_____ 2 year college, vocational training
_____ undergraduate college degree
_____ graduate degree

12. Are you currently employed? yes _____ no _____

13. What is (or was) your occupation? _____

INTERVIEWER'S COMMENTS/NOTES ABOUT THE INTERVIEW: _____

APPENDIX C
INTERRATER RELIABILITY STUDY

Introduction

An interrater reliability study was done to check the accuracy of the medical records data abstraction process. This was necessary because these records were the major source of research information from which both demographics and medical utilization data were derived.

Method

The information on the Data Coding Sheet (shown in Appendix D) was gathered two times, once each by two different research assistants, on a subsample of 20 cases. On about 70% of the cases one of the assistants was aware that he or she was "double checking" another person's work. On the remaining 30% neither assistant was aware of the reliability check.

Results

Table C-1 contains the percent agreement information for the categorical variables. The correlation statistics for the quantitative variables are shown in table C-2.

Discussion

Overall the percentage agreement and correlation figures are satisfactory. However, the employment, ethnicity, and religion variables have rather low agreement statistics. On almost all of the cases this is due to one of the assistants leaving that item blank. This reflects the fact that the demographic information was often the hardest to locate in the charts and sometimes simply was not there. Some of the research assistants were more resourceful and motivated than others in their attempts to find the demographic data. When both coders did locate and record the demographics they generally agreed on the code. 89% or more of the coding disparities that led to the low agreement figures are due to missing data from one of the assistants. Thus, when information is present, it is generally accurate. This is in contrast to the disagreements on other variables (e.g., presence versus absence of a recommendation for psychotherapy) for which considerable judgement was necessary and raters often came to different conclusions.

Table C-1

Interrater Reliability Study
 Percent Agreement for Categorical Variables (N=20)

Variable	% Agreement
Sex	100%
Marital Status	100%
Employment	55% ^a
Ethnicity	70% ^a
Religion	45% ^a
Education	100%
Type of Referral	75%
Therapy Recommended	70% ^b
Presence of Industrial Injury	100%
Presence of Legal Activity	85% ^b

^a89% or more of coding disagreements result from one coder leaving item blank. ^b100% of disagreements result from coders selecting different codes.

Table C-2

Interrater Reliability Study Correlations for
Quantitative Variables (N=20)

	r^a	P-value
<u>Pre-MMPI Utilization</u>		
Physician Visits	.98	.0001
Psychotherapy Sessions	.99	.0001
Biofeedback Sessions	.69	.0008
Industrial Physician Visits	.89	.0001
Industrial Psychotherapy Sessions	1.0	.0001
Emergency Room Visits	1.0	.0001
Physical Therapy Sessions	.99	.0001
Number of Hospitalizations	.79	.0001
Total Days of Hospitalization	.99	.0001
<u>Post-MMPI Utilization</u>		
Physician Visits	.96	.0001
Psychotherapy Sessions	.99	.0001
Biofeedback Sessions	.99	.0001
Industrial Physician Visits	.96	.0001
Industrial Psychotherapy Sessions	1.0	.0001
Emergency Room Visits	.53	.05
Physical Therapy Sessions	.99	.0001
Number of Hospitalization	1.0	.0001
Total days of Hospitalization	1.0	.0001

^aCorrelations of 1.0 occur when both coders agree on all 20 cases that there had been no instances of that type of utilization.

The correlation figures are adequate except for the number of biofeedback sessions and emergency room visits. Biofeedback sessions were clearly labeled in the medical charts and easy to identify ordinarily. But, raters may have been confused in some cases about how to rate the biofeedback sessions which were conducted by the psychologist instead of the biofeedback technician. Some of these may have been classified as psychotherapy visits. Emergency room visits, on the other hand, were recorded on separate sheets which were placed in the charts in several possible locations (although these were usually interfiled with clinic visits by date). Also, some coders may have been confused about whether to count emergency room follow-up visits under the emergency or outpatient physician visit categories. Taken as a whole, however, the results of this interrater reliability study suggest that considerable confidence may be placed in the demographic and utilization data.

APPENDIX D
MATERIALS FOR THE MAIN STUDY

ID Number _____
Volume Number _____

Coder's Initials

CRITERIA CODING SHEET

Name _____ Life # _____
last, first, mi.

MMPI date _____ RESIDENCY _____

1. Was a CHP patient in the 12 months prior to and the 12 months after the date of the MMPI. (0=no, 1=yes).....[]
12 mo. prior _____
IF YES, INCLUDE SUBJECT IN STUDY. MMPI date _____
12 mo. after _____

2. Was patient referred for MMPI by Straub M.D.?.....[]
0=no 1=yes
IF NO, ELIMINATE SUBJECT FROM STUDY.

3. Number of doctors seen in the 12 months prior to MMPI administration:
Doctor's Name Type of MD

a. Internist seen in the 12 months prior to MMPI?.....[]
0=no 1=yes
IF YES, INCLUDE SUBJECT IN THE STUDY.

b. Total Number of different doctors seen.....[]
(Include BOTH specialists AND internists in total.)
IF AT LEAST 2 DIFFERENT DOCTORS IN DIFFERENT AREAS OF SPECIALTY SEEN, INCLUDE SUBJECT IN THE STUDY.

Internists:

Aoki, Vincent
Arnold, Stephen
Berthiaume, John
Cheng, Melvin
Dutton, E. Wayne
Eith, David T.
Garis, George
Gilbert, Fred
Hollison, Robert

Andrew, David
Beck, L. Clagett
Beddow, Ralph
Doolittle, Steward
Eith, David
Hertwell, A.S.
Ho, Reginald
Jones, Philip W.

Madsabe, Gloria
Mickey, John
Moore, Ronald
Nurdyke, Robert
Preston, Henry
Quizzenbury, W.B.
Rayner, Enid Lynn
Schiff, Robert
Sofio, George

DATA CODING SHEET

I. BACKGROUND Coder's Initials _____

1. Name _____
 last, first, mi.
2. Life Number _____
3. MMPI Date _____
4. Age (at MMPI date) (/ /)..... []
 date of birth
5. Sex (0=male, 1=female)..... []
6. Marital status []
 0=married 1=single 2=divorced/separated 3=widowed
7. Employment status []
 0=employed full-time 2=retired
 1=employed part-time 4=disabled & unemployed
 2=unemployed 5=full-time student
8. Occupation _____
9. Ethnicity..... []
 0=Black 3=Filipino
 1=Caucasian/Portuguese 6=mixed, no Hawaiian
 2=Chinese 7=other Asian
 3=Hawaiian/part. Hawaiian 8=other Polynesian
 4=Japanese 9=other
10. Religion..... []
 0=Buddhist 1=Catholic 2=Protestant 3=Jewish
 4=other
11. Educational level..... []
 0=completed graduate training
 1=completed 4-yr college/university undergrad degree
 2=partial college (at least one year)
 3=high school graduate
 4=partial h.s. (at least 10th grade completed)
 5=junior h.s. (at least 7th grade completed)
 6=less than 7 years of school
12. Name of referring physician/psychologist..... []

13. Type of referral..... []
 0=doctor referral 3=psychiatrist referral
 1=litigation/legal 4=neuropsych. testing
 2=biofeedback related 5=other
14. Psychotherapy recommended based on MMPI results?..... []
 0=no 1=yes 2=further evaluation recommended

I.D. NUMBER _____
Chart Vol. _____

Cedar's Initials _____

II. PRK-MMPI (from _____ to _____ inclusive)
mo, day, yr. mo, day, yr.

1. Total outpt. physician visits (exclude psychiatric).....[]
2. Total outpt. psychiatric/psychological visits.....[]
(exclude: biofeedback sessions, MMPI session)
3. Name of psychiatrist/psychologist doing therapy.....[]
0=Barnstein 1=Davis 2=DeJarlais 3=Heak 4=Higuchi
5=Taushine 6=Kreese 7=Rogers 8=Stojanovich 9=other,
combination _____
4. Total number of biofeedback visits.....[]
5. Total number of industrial visits.....physician []
psychiatric []
6. Total emergency room visits.....[]
7. Total physical therapy visits.....[]
8. Total number of hospitalizations.....[]
9. Total number of days hospitalized during the 12 months ...[]
___ * ___ * ___ * ___ * ___ * ___ * ___ * ___ * ___ *
10. List of all medical diagnoses (code "I" = industrial)

11. Total number of medical diagnoses.....[]
12. List all psychiatric diagnoses ("I" = industrial)

13. Total number of psychiatric diagnoses given.....[]
14. Treatment for industrial injury? (Comp. Inj.).....[]
15. Litigation involved with med./psych. condition.....[]
0=no 1=yes

Coder's Initials _____

II. POST-MMPI (from _____ to _____ inclusive)
mo, day, yr. mo, day, yr.

1. Total outpt. physician visits (exclude psychiatric)..... []
2. Total outpt. psychiatric/psychological visits..... []
(exclude: biofeedback sessions, MMPI session)
3. Name of psychiatrist/psychologist doing therapy..... []
0=Bernstein 1=Davis 2=DeJarlais 3=Hawk 4=Higuchi
5=Teushina 6=Kroon 7=Rogers 8=Stojanovich 9=other,
combination _____
4. Total number of biofeedback visits..... []
5. Total number of industrial visits.....physician []
psychiatric []
6. Total emergency room visits..... []
7. Total physical therapy visits..... []
8. Total number of hospitalizations..... []
9. Total number of days hospitalized during the 12 months ... []
____ * ____ * ____ * ____ * ____ * ____ * ____ * ____ * ____ * ____
10. List of all medical diagnoses (code "I" = industrial)

11. Total number of medical diagnoses..... []
12. List all psychiatric diagnoses ("I" = industrial)

13. Total number of psychiatric diagnoses given..... []
14. Treatment for industrial injury? (0=no, 1=yes)..... []
15. Litigation involved with med./psych. condition..... []
0=no 1=yes

**Administrative Decisions for Data Coding:
Medical Utilization Rates (Effective 5/26/86)**

I. Exclusions (contacts which are not to be counted)

- A. Do not include phone contacts to or from patient.
- B. Do not include the MMPI visit in the count of Psychiatric/Psychological visits.
- C. Do not include visits with nurse contact only, i.e. suture removal, height & weight, blood pressure, drug refills.

II. Special coding instructions for medical utilization

- A. Physical therapy (PT) will be coded in a separate category.
- B. Out-patient surgical visits will be counted as physician visits.
- C. Visits on the same day as the MMPI with another treating physician are counted in pre-MMPI year if prior to test administration and in post-MMPI year if the visit is after the MMPI was given.
- D. When a visit includes doctor consult and biofeedback session, count only once - as a dr. visit.
- E. Do include biofeedback administered in the Neurology Department in the count of biofeedback.
- F. When counting biofeedback visits in Psychiatry, a stamp with Dr. Hawk/Biofeedback denotes only a biofeedback, not also a therapy, visit.
- G. Generally, if a doctor signs or initials a note of a visit, s/he did see the patient on that date. Most visits are stamped with the doctor's name and specialty.
- H. If a patient sees two or more different physicians on a single day, do count each separate visit for your "doctors visits."
- I. If a patient had a visit to an MD on the same day that the MMPI was administered, then the visit to the MD should be counted as utilization in the year prior to the MMPI if the MD visit occurred earlier in the day than the MMPI visit. The MD visit will be counted in the utilization for the year after the MMPI if the MD visit occurred later in the day than the MMPI visit. To decide which visit occurred first you need to read the note in the chart or the report in the back of the chart based on the visit (e.g. a neurologist's report). Please note that the order of the two notes in the chart does not necessarily mean that the visit listed first actually occurred first.
- J. Critical Care follow-up is counted as a doctor visit rather than an E.R. visit (when there is treatment by a doctor).

III. MMPI

- A. Subjects whose MMPI's are judged invalid by the psychologist will not be included in the study. Do not take any data.
- B. Recommendations for additional medical/psychological tests or for a psychiatric consult following MMPI administration should be coded as "2" for "further evaluation recommended."

C. Referrals for MMPI's come from several sources:

- "0" doctor referrals, which may be pre-surgical, pain patients, or due to question of anxiety or depression (determine from chart)
 - "1" legal cases, in which the assessment is related to pending litigation (determine from chart)
 - "2" biofeedback related, to assess if patient is a good biofeedback candidate (after biofeedback consult - usually Dr. Taushime as referring phye.)
 - "3" psychiatrist's referral (determine from chart)
 - "4" neuropsychological assessment (will be part of a battery and the MMPI form is filed separately)
 - "5" other (ie. pre-seminary evaluation, insurance exam)
- D. If subject had short form MMPI, do not include in the study.
- E. If subject had more than one MMPI administered, always use the earlier (older) MMPI data for purposes of the study (ie. If Jane Doe had MMPI's on 2/6/85 and 2/5/82 she will be included as a 1982 subject).

IV. Coding the Diagnoses

- A. Include the diagnosis from the MMPI in the data coding for the post-MMPI year.
- B. List all new diagnoses (dx) made by a physician; note psychiatric diagnoses given by a physician on the coding section for medical diagnoses. ONLY psychiatric diagnoses given by a psychologist or psychiatrist are to be included under "psychiatric dx."
- C. To obtain the psychiatric dx. or dx. from the therapist, look for the diagnosis code on the front page summary sheet of each clinic chart. Use the list of diagnoses code numbers in our folder to determine the diagnosis given.
- D. "R/O" or rule out - means the dx is still under consideration. Be sure to include "R/O" if listed as a part of the dx.

V. Medical Criteria Coding Sheet

- A. Be sure to initial this sheet so we can easily tell who worked on the criteria. (For reliability check)
- B. As you collect data you may notice information which would indicate that the patient may not have been a Straub patient for the full two-year period we are studying:
 - 1. Please note on the criteria coding sheet an explanation of these circumstances, such as: "patient not registered or seen until 2 months before the MMPI".
 - 2. WE NEED TO BE ALERT TO THOSE CASES IN WHICH OUR CRITERIA SEEM TO INCLUDE OR EXCLUDE SUBJECTS IN ERROR. In addition to giving an explanation for these cases on your coding sheet, write "QUESTION" at the top of the page.
- C. CHP Patients - look for the account type (first digit of account number) at the top of each clinic note page for the date of the MMPI as well as the year prior and year after. Note this information on the coding sheet. If subject has CHP account on all three dates, then this is a "CHP Patient" and question #1 is answered yes.

Handling of Medical Records

We are working with records from two sources: clinic and hospital charts which we pull manually, and those charts which must be ordered through the "Medic" system because of location in a satellite clinic or use by other departments.

I. Manual Chart Handling

- A. Charts are filed by life number--8-digit numbers--by the last pair of numbers first.
- B. Use a red tag to mark where you have pulled a chart for research use, always refileing when you are through.
- C. When you find a misfiled chart, note the numbers of the charts on either side of the misfiled one and give the chart and this information to a phone clerk in medical records.
- D. From your master list of subject names, you should be able to determine which chart volumes you need for each subject. (If we have already researched on medic)
- E. We are not allowed to remove charts from the medical records room without special permission.

II. Chart Ordering

- A. Vickie, Mervina and Donna are authorized to use Medic and order charts. If a chart you need must be ordered, note the top of data coding sheet and place it in the incomplete file. Also, mark an astric in the chart ordered column of the master subject list. This is our signal to order the chart.
- B. On medic, if current file location is Psychiatry, check with that department before you order the chart.
- C. Charts which are ordered may be picked up in the tube mail room in the Straub Foundation box.
- D. Ordered charts must be logged in and out; remove the tag which has "SMREF" or your name on the front of the chart before returning the chart to the table at the entrance of the medical records department.
- E. All charts should be logged out to "C"MF or Central Medical File.
- F. We should check for ordered charts daily and try to handle those files on a same-day basis. (In our '85 study, approximately 50% of the ordered charts were received within 2 days of ordering.)

III. Charts for Cross-Validating

- A. This procedure is yet to be determined.....

APPENDIX E

MMPI SCORES OF HIGH, MEDIUM, AND LOW UTILIZERS

Although not a major focus of this study it was none the less of interest to calculate the mean MMPI scores for patients with high, medium, and low utilization. The results are contained in Table D-1.

Table E-1

MMPI Means and Standard Deviations
by 3 Utilization Categories MANOVA Sample

	Low	Medium	High
No. of M.D. Visits Year pre-MMPI	1-8 (N=52)	9-17 (N=41)	18 (N=47)
Mean M.D. Visits Year pre-MMPI	4.6 (2.3)	13.0 (2.8)	27.5 (9.9)
L	50.1 (7.1)	50.1 (8.1)	53.4 (7.7)
F	58.2 (9.1)	60.7 (9.9)	56.0 (8.0)
K	52.9 (8.7)	52.1 (9.4)	55.2 (9.4)
Hs	62.9 (13.6)	68.5 (11.6)	68.9 (11.3)
D	69.7 (12.1)	71.4 (14.6)	66.2 (13.1)
Hy	63.9 (10.7)	68.7 (9.4)	69.0 (10.2)
Pd	62.2 (12.0)	63.6 (14.5)	60.4 (12.7)
Mf	51.2 (13.3)	52.3 (10.9)	52.6 (11.2)
Pa	60.4 (9.5)	61.6 (11.3)	60.5 (9.5)
Pt	63.8 (11.1)	63.3 (12.3)	61.3 (11.9)
Sc	62.1 (11.1)	65.8 (14.4)	62.3 (13.6)
Ma	54.9 (11.9)	57.2 (13.6)	57.8 (10.8)
Si	58.7 (10.9)	56.7 (11.0)	55.7 (10.3)
Es	48.8 (11.9) ^a	45.3 (13.1) ^c	48.8 (12.7) ^e
PsN	47.9 (16.5) ^b	57.7 (15.4) ^d	56.3 (16.4) ^f

^aN=50. ^bN=36. ^cN=37. ^dN=26. ^eN=44. ^fN=30.

APPENDIX F
CONTINGENCY TABLE FOR NEW SCALE CUTOFF SCORE OF
23

Figure 3 shows the contingency table for the new scale cutoff score of 23.

FIGURE 3
Contingency Table of Score Cutoff of 23
By Observed Decrease

DECREASE		UNLIKELY TO DECR	LIKELY T O DECREA	TOTAL
FREQUENCY	PERCENT			
ROW PCT	COL PCT			
DID NOT DECREASE	25 40.32 83.33 60.98	5 8.06 16.67 23.81	30 48.39	
DID DECREASE	16 25.81 50.00 39.02	16 25.81 50.00 76.19	32 51.61	
TOTAL	41 66.13	21 33.87	62 100.00	

STATISTICS FOR 2-WAY TABLES

CHI-SQUARE	7.681	DF=	1	PROB=0.0056
PHI	0.352			
CONTINGENCY COEFFICIENT	0.332			
CRAMER'S V	0.352			
LIKELIHOOD RATIO CHISQUARE	7.987	DF=	1	PROB=0.0047
CONTINUITY ADJ. CHI-SQUARE	6.265	DF=	1	PROB=0.0123
FISHER'S EXACT TEST (1-TAIL)				PROB=0.0056
(2-TAIL)				PROB=0.0075

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