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PSYCHOLOGICAL VARIABLES

AND ONSET OF CANCER

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AND ONSET OF CANCER

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PREFACE

This study was an attempt to identify relationships between Minnesota Multiphasic Personality Inventory (MMPI) responses of 177 male and female subjects and their later manifestation of cancer, heart disease or hypertension, or continued good health. It may be the first published report involving manifestation of cancer with an objective psychological measure administered to healthy subjects whose medical progress was then carefully recorded over an approximate decade.

This study was a product of cooperation among a number of people in several states. I particularly appreciate the characteristic understanding and valuable advice of my committee chairman, Ken Sandvold, Ph.D. Committee members Walter Ward, Ph.D., Julia McHale, Ph.D., and W. E. Jaynes, Ph.D., were also very helpful. Dr. Ward's unusual grasp of conceptual logic, through his study of general semantics, was a major factor. His skill in professional writing improved the entire dissertation. Dr. McHale was particularly helpful in her knowledge of personality processes, the strengths and weaknesses of the MMPI, and the status of relevant research. Dr. Jaynes, with expertise in scientific procedure and statistics, provided valuable suggestions concerning design and interpretation.

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CHAPTER I

INTRODUCTION TO CANCER AND CANCER RESEARCH

Cancer has been described as the erratic proliferation of alien cells, a process which could occur in any organ or tissue and was often fatal, particularly if the malignancy was inoperable. Cancer cells retained some of the features of the host organ or tissue, resulting in many different types of malignancies. Although all were related, more than 100 unique forms of cancer had been identified (DeVita and Rauscher, 1975). Cancer cells often metastasized to other areas of the body through the blood and lymph systems, resulting in additional tumors. These impaired vital functions and were responsible for death in the majority of cases. The various forms of cancer were considered the second most common cause of death in the United States in 1974, directly affecting one person in four (DeVita and Rauscher, 1975). Malignancies appeared increasingly with advancing age to such a degree that cancer could almost be considered a disease of aging. The death rate for persons under the age of 15 was about 1 in 1,000 with a moderate increase between age 15 and age 45 to 1 in 110 (Hammond, 1975). But after age 45, incidence increased geometrically and alarmingly. "The rates are so high in old age as to suggest that almost all of us would eventually develop cancer were it not for competing causes of death," said Hammond (1975, p. 652), an American Cancer Society medical statistics specialist. Interestingly, the change in cancer

incidence occurred at the end of the usual human reproductive period. The study of geographical and historical influences on cancer rate was complicated by contaminating factors such as the high death rate from infections and parasitic diseases in the 1800's, along with the usual less-than-complete reporting of cancer diagnoses. Even in 1976 many deaths were attributed to such factors as heart disease or stroke completely on the basis of the examiners' initial impressions. Concerning cancer etiology, the most predominant view among physicians in the mid-1970's was that about 85 per cent of all human cases were directly attributable to environment factors such as industrial by-products.

General Cancer Research

There was considerable success in the identification of carcinogens during the late 1960's and early 1970's, but despite relatively large research expenditures and decades of experience, the rates of cancer onset remained basically out of control. Whether research funds were applied wisely was a topic of debate between funding administrators and such skeptics as journalist Daniel Greenberg.

Greenberg (1975) argued that the general press had been gullible in accepting recent reports of progress in cancer treatment when in fact the National Cancer Institute figures were reflecting improvements which occurred prior to 1950. These in turn were probably more related to fewer operating room deaths than advances against cancer, he said. Greenberg particularly took issue with the statement, "Cancer is one of the most curable of the major diseases in this country," an assertion he attributed to widely-published pamphlet of the American Cancer Society (Greenberg, p. 707). The statement may have been close

to correct in view of the difficulty controlling such other major illnesses as heart disease, stroke and emphysema, however. Regardless, Greenberg termed the anticancer program in this country a huge bureaucracy which obscured new discoveries, stifled dialogue and maintained an official line that significant progress was being made in order to protect its existence.

In contrast to this view, the director of the National Cancer Program, Rauscher, found accomplishments during the previous year to be significant to the degree that they influenced the long-term survival rates for three major malignancies--lung, breast and colon cancers--which accounted for 45% of all cancer deaths (Rauscher, 1975). Although he discussed improvements in diagnostic equipment, chemotherapy and surgical strategy, examples of changes in morbidity statistics were lacking and he did not even hint that malignant processes were routinely controllable. Treatment success was also limited with other major illnesses, as noted, but cancer research appeared to be unique, both in massive funding and lay interest. In 1974 the NCI was funding or directing research concerning cancer treatment in 400 hospitals, involving more than 2,000 doctors and 20,000 patients. These figures were separate from those of the massive basic research efforts funded by NCI and usually centered in laboratories. Table I illustrates the diversity of NCI-sponsored clinical research:

NCI-sponsored cancer research through 1975 was almost entirely focused on the biological level of abstraction. Biological cancer research was often extremely complicated and seemed to frequently involve fundamental biological problems, such as the action of RNA (Medical World News, 1975). Even with the help of computer systems, the data were often unwieldy. More-sensitive medical measurements were successfully utilized, but certain basic cell processes remained poorly understood.

While the basic factors in "normal" cell activity were sometimes puzzling, the characteristics of cancer cell development and behavior were often viewed as bizarre. The Bilharzia parasite was reported to trigger cancer only very rarely while certain hydrocarbons had a nearly 100 per cent carcinogenic effect in the laboratory (Barnhard, 1970). Malignant cells known as "minimal deviation cells" were indistinguishable in morphology from their host cells without biochemical assay while the histologic origin of other neoplastic cells was obscured by their chaotic mixture of morphologic characteristics. Some cancerous tumors first responded to therapy and then quickly changed to a new, resistant cell line with fatal results (Bernhard, 1970). A new medical speciality, oncology, evolved to deal with such phenomena.

Psychological Variables and Cancer

There was increasing interest in the application of psychological concepts toward the understanding and prediction of clinical onset and/or course of cancer during the past 50 years, following reports of useful applications with such diseases as duodenal ulcer, rheumatoid

arthritis and coronary dysfunctions. The most dramatic increase in the application of psychological concepts to cancer during the 1970-1976 period, and particularly during 1975 and 1976. Table II (Chapter III) illustrates the increase in number of scientific publications relating psychological concepts to clinical onset and/or rate of progression of cancer based on the author's survey of the American and major international literature from 1925 through 1975.

More than 180 journal articles appeared between 1925 and 1976 on the topic of psychological variables as factors in the onset of cancer, the great majority suggesting to one degree or another that such a relationship existed. These hypotheses were usually made on the basis of subjective observation or opinion. Conceptualizations included impaired host resistance from chronic stress and psychodynamid compensation for object loss. A much fewer number of articles appeared during that time on the topic of personality variables and variation in the progression of cancer.

The idea that psychological factors can cause cancer has been a matter of interest and speculation for thousands of years. Galen, the physician of ancient Greece, theorized that cancer was more likely to occur in melancholy (sad) women than sanquine (warm-hearted, volatile) women (Marcus, 1976). Physicians in the 18th and 19th Century also saw sadness or hopelessness as a neoplastic precursor, according to Kowal's (1955) review of approaches to cancer in America, England and France during that time. Kowal found that methods of investigation then were "the ones that have been available to physicians at all times," an adequate history of disease onset and a complete physical examination (p. 236). If the consistent appearance of some

psychological variable and cancer was observed, it was assumed a casual relationship might exist, he said. "Of this relation between despair and cancer they were convinced," he added (p. 227).

Evans (1926) wrote a detailed, theoretically-oriented book concerning her experiences as a Jungian analyst with a number of cancer patient analysands, a heavily psychological approach to cancer etiology often cited in later studies as both pioneering and extensive. But in large part, the psychological level of abstraction has been avoided in cancer research as not useful for understanding or predicting cancer onset or rate of progression.

Biological concepts have been almost exclusively, and often unsuccessfully, employed. Ellis (1975) encountered "considerable resistance, if not outright hostility, to our work" after he, Blumberg and West published their landmark report of Minnesota Multiphasic Personality Inventory (MMPI) differences between cancer patients with unusually slow and unusually rapid tumor progression (Blumberg, West and Ellis, 1954). Ellis believed there were many opportunities involved in the study of psychological variables as related to illness, a view he acquired while practicing internal medicine.

Psychoanalyst Renneker termed overly emotional reactions to the idea of personality variables as related to cancer "countertransference reactions to cancer," a characteristic found both in psychoanalysts and more biologically-oriented professionals (Renneker, 1957). He was involved in the area as a member of a team from the Chicago Institute for Psychoanalysis which studied personality factors as related to breast cancer.

Cultural Influences on Conceptualizations

Certain conceptualizations highly related to cultural processes were major factors in the research conducted in this area, their logical assumptions often accepted without awareness after years of frequent use. Examples included the relatively concrete concepts of duality of bodily processes (the "mind-body problem") and "cause and effect" relationships. The importance of conceptualization, particularly "hidden" assumptions of widely-used terms, is discussed in Chapter IV.

CHAPTER II

DEVELOPMENT OF PSYCHOSOMATIC MEDICINE

Summary

The idea of significant relationships between physical disease manifestations and psychological processes appears to be as old as there are records. While the concept of a unitary organism without division into "mind" and "body" is ancient, the use of the term "psychosomatic" occurred in titles of articles in a German medical journal in 1838 but was thought to have appeared prior to this, probably soon after the turn of the 19th Century in Germany or England (Margetts, 1950).

Freud (1948) supported the idea that greater understanding of disease would follow increased understanding of intrapsychic processes, as did Dunbar (1943), Alexander (1950) and Wolff (1962). A "psychosomatic revolution" took place during the 40's, 50's and early 60's but acceptance of psychosomatic views grew much less rapidly during the later 60's and early 70's, as was the case concerning psychoanalysis in general.

A number of writers, including Dunbar (1943) and Alexander (1950), discussed specific personality types as related to specific diseases, a view considered by many as inconsistent with literature. The unpopularity of specificity theory appeared to be related closely to the

leveling of interest in psychosomatic medicine in the 60's. Selye (1956, et al.) and Mahl (1953) presented nonspecific models involving diffuse psychological concomitants to central states of stress or chronic anxiety, with considerably greater although incomplete success in describing psychosomatic phenomena. Lacey (et al., 1953) composed a model involving "affective arousal patterns" which were specific to individuals, with the psychophysiologic symptom or disease being a function of this pattern rather than the conscious or unconscious stimuli which brought about the arousal.

Gitelson (1959) was among the advocates of nonspecific disease models, noting in this excellent review of psychosomatic approaches, "...We no longer speak of etiology but rather ask: What are the necessary and sufficient conditions which, taken together, eventuate in a disease process?" (Gitelson, 1959, p. 165). Many of the views of specificity writers such as Dunbar (1943) and Alexander (1950) remained untested and other lines of research were in the early stages. A team of New York investigators known as the Rochester Group began to study the role of affect as opposed to specific personality syndromes (Schmale, 1964, et al.), for instance. Bahnson (1958) was one of relatively few to conceptualize conscious and nonconscious emotions as factors in symptom formation.

Major Theorists

Flanders Dunbar's Specificity Approach

Dunbar's pioneering and exhaustive research involved 1,600 admissions over a 12-year period at Presbyterian Hospital in New York.

Her findings and theoretical formulations were published in a volume of more than 700 pages (Dunbar, 1943) which became a classic in the field. She was one of the first to write about a coronary personality and clearly established the merit of a previously seldom-mentioned term, "accident-proneness."

The patients she studied represented seven diagnostic groups: fractures, including the accident-prone; hypertensive cardiovascular disease; coronary occlusion; anginal syndrome; rheumatic heart disease; cardiac arrhythmias and recurrent decompensation; and diabetes. She reported significant correlations between personality types and diagnostic categories. The personality types related to various heart disorders were reported to be very similar, the differences "being one of emphasis." This appeared to fit with the belief of many that such disorders were so physiologically similar as to be manifestations of basically the same disease process, she said (p. 365).

Her approach relied heavily on detailed history taking and depth interviews. The histories included such information as the emotional state at the time of onset and previous exposure to others with similar disorders. The interviews involved such techniques as free association and relaxation exercises to facilitate recovery of repressed material. Occasionally, psychological tests such as the Rorachach were employed, primarily to investigate specific clinical hypotheses rather than a means of routine data collection. Despite Dunbar's high regard for projective tests, she found them too time consuming and complicated for frequent use. The Stanford-Binet sometimes was used to aid in eliminating prospective subjects who were below average in intelligence, and therefore ineligible as participants in her research.

Dunbar's support of the specificity view had a major impact. Although her project lacked formal controls or rigorous objective measurements, the involvement of such large numbers of subjects and the sheer detail of her observations were major factors. Only a small fraction of her numerous theoretical ideas and hypotheses were tested despite the early date of publication.

Dunbar's Hypotheses. She viewed cardiac patients as more or less continuously occupied with the intellectual pursuit of success, particularly in cases of coronary occlusion. When this trait was found to coexist with a creative enjoyment of life, angina was often diagnosed, she reported, while in cases of failure or limited success, hypertensive characteristics were often noted.

The fracture patients were reported to be included toward impulsive behaviour and overt activity rather than more mental pursuits. Rheumatic patients were seen as uniform in lower-middle class background and general cultural lifestyle, but different in other respects. They were divided into three groups: Type A rheumatic fever patients tended to be more spontaneous and aggressive than the second rheumatic group. Accident-proneness and hypertension appeared to involve similar traits. The second rheumatic fever group, Type B, included those who were less likely than group A patients to recover from the first rheumatic fever attack without cardiac damage. Type B involved a higher percentage of females, greater passiveness and increased extratensiveness. A third group comprised rheumatic heart disease patients without a history of acute rheumatic fever who were found to be repressed, passive, and submissive with little creative inner life. Extratensive tendencies were dominant. Additional description of patients with

general rheumatic disorders was too lengthy to repeat, but included such sections as:

They have smooth, untroubled faces with a childish, often cherubic, quality. This is especially marked in patients with rheumatic fever, type B, and with rheumatic heart disease. There are few overt neurotic symptoms but definite signs of anxiety just beneath the surface. This is sometimes inhibited by a spasm in the throat, for example, or a hysterical trend which gradually becomes more obvious (p. 433-434).

Personality characteristics for the diabetes group were reported to antedate disease onset a number of years and included generally good health records, a tendency among males to remain unmarried and, when married, to have few children, hysterical traits, and, frequently, psychotic tendencies. Dunbar also noted a distant and wavering interpersonal stance described as tentative friendliness followed by suspicious withdrawal. The focus of their conflict tended toward sexual identification rather than such factors as active-passive struggles, power strivings or creative independence as in some of the other categories. Another major attribute was indecisiveness (p. 541).

Dunbar viewed chronic repression of affect and exclusion of conflicts from awareness as creating the long-standing emotional tension which resulted in organic disease, a position she adopted from Freud (Dunbar, 1968, p. 15). It was both the long-standing nature of unconscious emotion and the inability to resolve the related conflict without awareness which in particular posed threats to organic health, she believed. She encouraged investigation of physiological correlates of emotion, both conscious and unconscious.

Some of Dunbar's chapters were written very carefully, including convincing conclusions as well as comment about opportunities for

future research. The discussion and statistical approach to fractures particularly was strong as were descriptions of the coronary personalities. However, the chapters on diabetes and rheumatic disease had a superficial quality in comparison, perhaps reflecting the pioneering quality of her work.

Franz Alexander's Approach

Franz Alexander's specificity theory (Alexander, 1950) was very influential during the 1930-1955 period. Central to the theory was the idea that, just as certain pathogenic micro-organisms can be said to have a particular affinity for certain organs or organ systems, specific intrapsychic conflicts and the resulting emotions influence certain organs or organ systems. Alexander advocated multi-causality of all diseases and believed that "psychosomatic disease" was not an independent entity, but many of his clinical examples and discussions were viewed as highly specific and his theory was often termed Alexander's Specificity Theory. Alexander found much of psychoanalytic theory helpful and stressed such constructs as regression, stage of psychosexual development and repression. Object relationships were considered crucial in the development of diseases, which were viewed as highly influenced by psychological variables.

In Alexander's theory, an unconscious conflict would be evoked by an event with consequent experience of anxiety, the warning signal to the ego to defend against dangerous repressed impulses. The individual who developed disease regressed to the time the conflict originated or to the time that the person's development had been arrested, both considered to involve primitive object relating. This combination of

psychological and physiological regression was termed "regressive innervation," and is similar to Bahnson and Bahnson's (1964b) "somatic regression."

Wolff's Approach

Wolff (1950, 1960) made both theoretical and methodological contributions. He developed new techniques to aid in the study of psychological and physiological relationships and applied them to the study of both healthy and ill patients. A wide variety of phenomena were studied with such results as a reported correlation between constipation and psychological "holding on." While he used various specificity hypotheses, he left aside the more abstract psychodynamic constructs.

Selye's Stress Theory

Selye (1956, 1974) described the effects of stress upon the body in terms of the General Adaptation Syndrome (GAS), a process he stated develops in three stages: the alarm reaction, the stage of resistance and the stage of exhaustion. The definition of stress particularly was difficult for him. He found the stress-induced changes in the chemistry and structure of the body much easier to discuss and measure.

His definition of stress evolved from "the state manifested by a specific syndrome which consists of all the nonspecifically-induced changes within a biological system" (1956, p. 54), to a much more concise definition in 1974, "Stress is the nonspecific response of the body to any demand made upon it" (1964, p. 27). He specified that stress is not nervous tension itself nor is it limited to agents which

cause tissue damage (1956, 1974). Since the word had no exact equivalent, difficulties with semantics required a considerable amount of Selye's time.

Following the initial stage of alarm, he theorized that the nervous and endocrine systems play major roles in continuing the resistance to the stressful influence, maintaining processes and structures in a homeostatic condition. The GAS can be viewed as adding the dimension of time to the activities of three areas of the body found to be particularly responsive to stress: adrenal, thymicolymphatic and intestinal areas. These operate in a coordinated manner during the GAS (1956, p. 33).

Selye reported (1956) that an organism's ability to resist stress drops sharply immediately after onset of stress and during the alarm reaction. The ability to resist then rises rapidly, reaching a stable level above the average for times other than during the GAS and signaling the beginning of by far the longest stage, the stage of resistance. When the ability to resist is depleted, major tissue damage or death follows as resistance to stress dives from its above average position to well below average.

Selye considered the application of his GAS conceptualization to cancer. He noted that many types of cancer develop at sites of chronic tissue stress, such as lip cancer from pipe smoking (1956, p. 186) and that extremely malignant forms of cancer had been produced in the laboratory following chronic irritation of an area with croton oil. Ironically, general stress (as opposed to local stress) seemed to suppress cancer spread. Such general stressors as intoxication and infection had been found to retard tumor growth (1956, p. 186). Selye

considered many of the various research findings tentative, particularly when linking aspects of the GAS with cancer, but it appeared clear to him that a large variety of cancers failed to grow well in both humans and animals who had experienced severe stress. He cited a number of cases of incomplete regression of cancer under the influence of ACTH, cortisone and other hormones (1956, p. 304).

Selye believed research concerning bodily defenses against stress and disease was essentially different from most medical research in that the results tended to have a much more broad effect than breakthroughs with single diseases. In fact, advances in the understanding of the body's methods of resisting illnesses could profoundly influence human activities for years to come, he said (1956).

Theoretical Puzzles

Puzzle One. While it had been thought since 1882 that the Koch Bacillus "caused" tuberculosis, only certain few who were exposed to it developed the disease. Booth (1975) noted a report from Dubos which illustrated this. During the 1926 Leubech Catastrophe 249 babies were mistakenly "vaccinated" with enormous numbers of virulent tuberculosis bacilli. While 35 per cent died, the others were still free of the disease 12 years later. Puzzle One is this immune system phenomenon in which relative few of those who have pathogenic microorganisms of a potentially serious nature become ill, a process only partially understood.

Puzzle Two. In cancer research, the effect of carcinogens has been found to be related in a non-additive manner in that the probability of developing cancer increased with addition of a second

carcinogen at a rate greater than the combined probability of the two on a separate basis. Hammond (1975) discussed this as a synergistic relationship. This phenomenon can be viewed as reflecting overtaxing of the immune system.

Puzzle Three. While there was considerable support in the literature for the analytic view of regression as a central factor in various disease states, some patients were found free of unusual regressive phenomena when given psychological tests. One attempt to deal with this was the recent introduction of the concept of partial ego regression to account for clinical observations of the absence of such regressive aims or object phenomena (Freedman and Kaplan, 1967).

Puzzle Four. Two major conceptual approaches have been found useful in understanding relationships between psychological and disease processes. The "weak link" view involved an organ system considered to be unusually vulnerable to stress and the first to fail with overloading of the body's defenses. The "conversion reaction" was a central concept in an approach where certain illnesses were symbolic expressions of specific psychological conflicts, most clearly demonstrated in individuals with marked hysterical traits. While both viewpoints were usefully applied in clinical practice over many years, most patients' illnesses were not readily conceptualized as either. When the illnesses of certain patients could be so described, often little more was gained than an extremely general and necessarily vague explanation. The once frequent conversion reaction was less and less seen as the culture became more sophisticated.

Psychological Processes and Other Diseases

Significant correlations were reported between psychological measurements and presence of a large number of syndromes and diseases aside from the malignancies, including headache, chronic pain, rheumatoid arthritis, allergic reaction, endocrine disturbance, impotence, asthma, hyperventilation, skin reaction, heart disease, hypertension, obesity, irritable bowel, ulcerative colitis, regional enteritis, celiac disease, disorders of elimination and accident proneness.

For instance, certain Minnesota Multiphasic Personality Inventory Test (MMPI) patterns were found overly represented in various diagnostic categories. The most common appeared to be the "Conversion V" pattern (high Hs, low D and high Hy Scales), which was also called the "Ulcer Pattern" for its association with duodenal ulcer (Dahlstrom, Welsh and Dahlstrom, 1975, p. 43). This particular sign was found in individuals with a variety of other medical diagnoses as well, however, and many viewed it as related to general illness. Other MMPI signs were found to be more specifically related to bodily processes, including such diverse phenomena as vitamin B complex deficiency and psychomotor epilepsy. Significant correlations between MMPI variables and other types of epilepsy were lacking, despite numerous attempts (Dahlstrom, Welsh and Dahlstrom, 1975, p. 47).

MMPI test results of coronary patients were reported to be consistent with clinical observations. These patients were described as ambitious and energetic, often working excessively and sometimes neglecting their diet and exercise (Dahlstrom, Welsh and Dahlstrom, 1975, p. 50). Interestingly, MMPI characteristics of coronary patients

tended to resemble those of manic-depressive patients. Some believed that the behavior manifested by these two groups was in part motivated by the need to ward off unconscious depression (Dahlstrom, Welsh and Dahlstrom, 1975, p. 50).

The MMPI and Disease Progression

Moos and Solomon (1964) administered the MMPI to two groups of arthritis patients to study possible personality differences between patients with rapidly progressing, severe arthritis and those whose illness was unusually slow and relatively mild. They selected the 11 fastest cases and the 11 slowest cases among a group of 49 female arthritis patients and were able to match the two groups according to age, education, marital status, number of children and parent occupational class.

They reported significant MMPI differences between the two groups. The scores were considered to indicate that patients with rapidly progressing arthritis experienced feelings of ego disorganization with anxiety and depression. These patients were believed to be unable to continue former modes of psychological coping. Patients with slowly progressing arthritis were reported to be more compliance oriented, perfectionistic, and interested in social status. Use of denial of hostility was also indicated by their MMPI profiles, Moos and Solomon reported.

This study was weakened somewhat by a vague description of the statistical procedures. It appeared that comparisons were made on the basis of the usual MMPI scales as well as a number of "rationally-derived" special scales. Previously the authors had used the MMPI to

compare a group of arthritic patients with a control group of their healthy family members (Moos and Solomon, 1964b), which indicated the arthritis patients were more depressed, more "neurotic" in terms of masochism, anxiety, self-alienation and over-compliance, more psychologically rigid and, in general, similar to patients with various other diseases. Their results were based on both scale and item scores which were computer analyzed. It was their impression that the overall results pointed toward future study of chronically inhibited rage.

CHAPTER III

RESEARCH INVOLVING PSYCHOLOGICAL AND NEOPLASTIC PROCESSES

History

Summary

Early reports of significant correlations between psychological variables and later cancer onset or speed of progression were followed by several conferences on the subject, the most important, in terms of stimulating research, being two sponsored by the New York Academy of Sciences in the 1960's. The Chicago Institute for Psychoanalysis studied psychoanalytic factors in breast cancer, resulting in several significant papers (Renneker, et al., 1963; etc.).

The American Psychological Association held a symposium on conscious and nonconscious emotion in 1958. At least one paper concerned the role of affect in the onset of cancer (Bahnson, 1958), but, unfortunately, the papers were never published as a group and many remained unpublished. In 1960, an interdisciplinary group of scientists who had formed the International Psychosomatic Cancer Study Group met for the first of several conferences.

Bruno Klopfer delivered the 1957 presidential address of the Society for Projective Techniques in New York on the topic of psychological factors in cancer onset, discussing relevant Rorschach

characteristics and related theory. He also spoke during a 1956 conference at the M.D. Anderson Hospital in Houston, Texas, in which some 40 psychologists and physicians were actively involved in the study of psychology as related to cancer.

New York Conferences. The first of the two New York Academy of Sciences symposiums was held in 1965 with the title "Psychophysiological Aspects of Cancer." Merely by holding the conference, the academy took to position that the topic was worthy of scientific study, an action in itself a milestone. Weyer (Weyer, 1966, p. 1038), appeared to express the view of a number of the participants: "To many of our colleagues the notion of a psychological component of cancer--except, perhaps in terms of the consequence of the disease--must generate an attitude of utter disbelief." Nevertheless, 27 papers written by psychologists, psychiatrists, chemists, physiologists and anatomists were presented and published in the academy's annals (Weyer, 1966), the first comprehensive approach to the problem. Human as well as animal subjects were used. The level of analysis ranged from clinical observations of cancer patients to a few biochemical investigations. The study of relationships between physiological and psychological processes proved an overwhelming task. While it was suggested that the symposium had been misnamed due to the sparsity of actual psychophysiological data obtained (Weyer, p. 1041), the target for investigation was at least clearly identified.

Several theories concerning psychological influences upon both the etiology and later progress of cancer were presented. One group tended to suggest hopelessness and object loss as the key, as in the three papers by LeShan, Greene and Iker. Another group of papers could be

classified as more specifically oriented toward defense mechanisms, such as the three by Feder, Henderson and Kissen. Denial and repressive ego-coping mechanisms were most prominent here. While at first glance these two groups appeared to conflict, they may have only represented slightly different levels of analysis.

In general the papers represented a shift away from the view that specific psychological factors led to certain types of cancer in favor of more complicated conceptualizations such as impaired host resistance to the disease as a result of a combination of psychological and biochemical processes. Hypotheses involving diminished energy available to the ego were also viewed as reasonable, in keeping with Klopfer's (1957) ego strength model.

Claus Bahnson (Weyer, 1966, p. 1034) suggested that future efforts include attention to early childhood when fusion of psychological and physiological processes may be more visible, and therefore helpful in understanding complex factors in later life. Research should allow for evaluation of conscious as well as unconscious aspects of experience in the future, he said. Bahnson and Bahnson followed their presentation at the 1966 symposium with another article in the annals three years later, extending their study of the relationship between psychological and physiological regression. The Academy-sponsored follow-up conference was equally successful. The proceedings here were published in 1969.

Other Conferences. Members of the Chicago Institute for Psychoanalysis investigated dynamic factors in breast cancer and placed special emphasis on the emotional climate prior to clinical onset (Renneker, et al., 1963), as did many of the papers presented at the

New York Academy conferences. The 1960 International Psychosomatic Cancer Study Group meeting in Amsterdam included the presentation of 15 papers, but like the A.P.A. papers these were never published as a group, nor were the 14 papers read at the group's second meeting held in Paris in 1961. The 22 papers presented at the third world conference were published in book form (Kissen and LeShan, 1964) and were a substantial contribution. This conference was held in Cambridge, England, in 1963, and included papers involving a variety of approaches and research sophistication. The early stage of research involving psychic and somatic variables was recognized. Davies offered a painfully blunt analysis of the research situation at that time: "...but it is certainly true enough for us to have to admit that we have no idea at all how psychological processes occur, or how they are connected with the physiology of the body (Kissen and LeShan, p. 218)." Difficulties in defining the word "psychosomatic" were encountered, but there was sufficient agreement about etiology to place emphasis upon multiple causative factors. Several papers involved impairment of cancer resistance from stress, particularly the growth of implanted tumors in stressed rats.

Klopfer's Influence. Bruno Klopfer's discussions of psychological variables in human cancer (Klopfer, 1957) were particularly important because of his status in depth psychology. He had been director for eight years of the organization which was to become the Society for Projective Techniques and became president of the society in 1957, the subject of his presidential address being psychological factors and cancer. In particular, he discussed Rorschach differences between patients with fast-growing and slow-growing cancers, the same

topic he discussed at the 1956 M. D. Anderson Hospital conference on psychological variables and cancer.

The modest attendance at these psychologically-oriented conferences and meetings contrasted with the more than 7,000 scientists, physicians and observers at the 1970 biological conference of the International Union Against Cancer in Houston. The huge numbers of scientists and professionals involved studied various complex biological issues.

Blumberg, West and Ellis. Aside from the activities of the various psychologically-oriented groups, one paper published in 1954 had an enormous impact on the psychological approach to cancer research and probably has been the most widely quoted single paper in the area. This concerned a somewhat startling MMPI experiment designed to study the personalities of male cancer patients who survived for shorter than usual periods of time as compared with similar patients who lived longer than expected (Blumberg, West and Ellis, 1954). Although results were very positive, there was only one immediate attempt to replicate or cross-validate. That study used only a few subjects and did not support the 1954 findings. The matter was neglected until recently when Gay (1970) performed an experiment similar to the 1954 work with similar and highly positive results.

Review of the Literature

Methods of studying the relationships between psychological and neoplastic processes ranged from reports of accidental observations during psychotherapy to designs involving postmortem examinations to experiments employing well-controlled, objective measures. These

latter types of studies were a minority representation among the much more numerous theoretical and subjective reports.

Experimental Topics

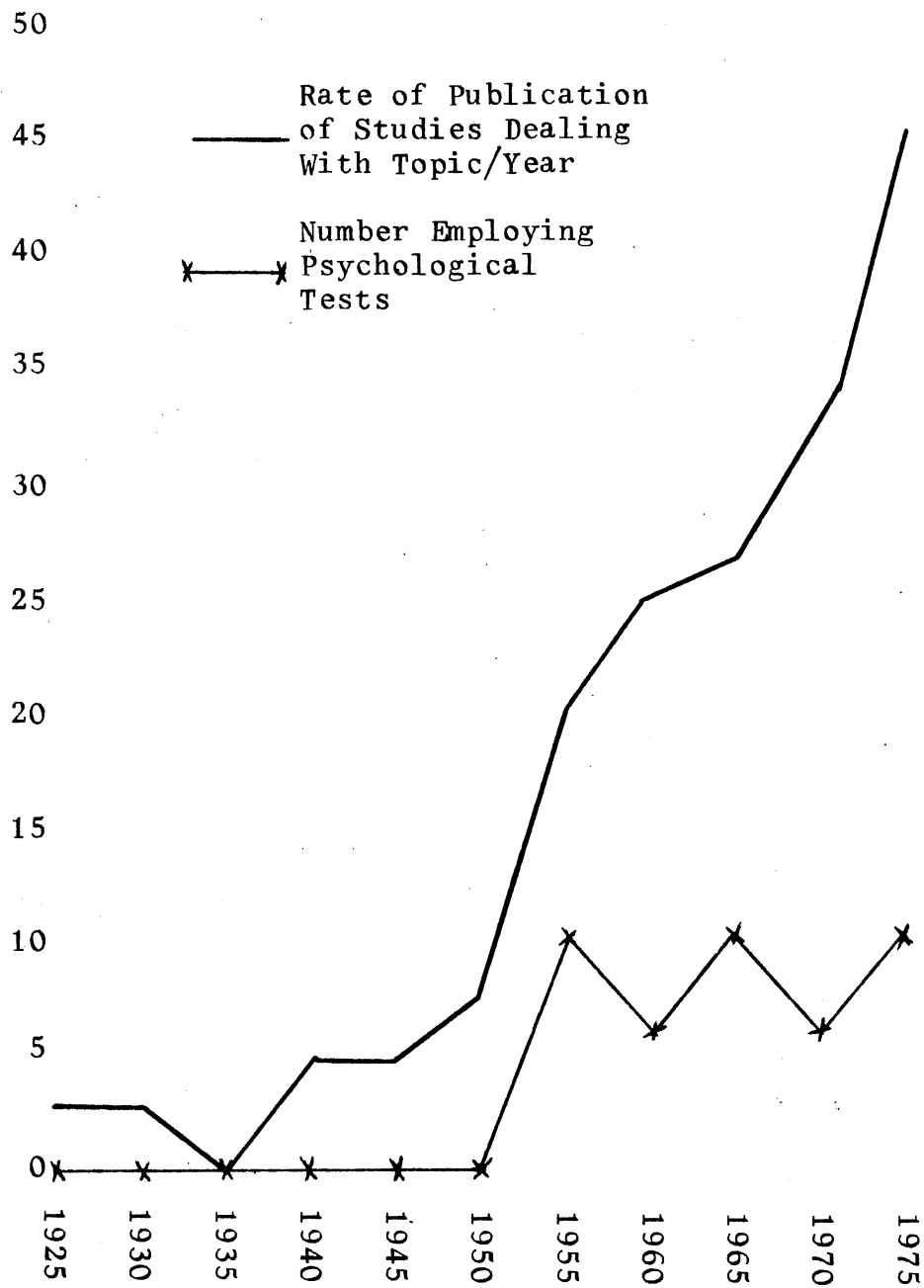
The literature could be divided into four subject areas: (1) psychological variables and onset of cancer, (2) psychological variables and progression of the disease, (3) a newer area involving personality variables and ability to return to previous social and vocational pursuits once the neoplastic process has been arrested (Nichson, 1975), and (4) the psychological reaction to the appearance of cancer symptoms or knowledge of a cancer diagnosis. Many patients who were considered medically free of cancer following successful cancer treatment or surgery failed to resume their previous lifestyles, withdrew socially and often deteriorated physically from non-cancer factors. It also had been observed that patients frequently delayed seeking medical consultation about cancer symptoms, even though they were severe. These delays tended to insure a fatal outcome. The attitude of the patient appeared to be disinterest in the illness, involving defense mechanisms of repression and denial. A number of authors commented about this unusual lack of concern regarding life and death of many cancer patients (Hagnell, 1966; Henderson, 1966; etc.).

Most research reports concerned the first subject area, with the fewest number dealing with the last two areas. The relationship of psychological measurements to onset and progression of cancer is of primary concern in this report. Most articles dealing with these two areas indicated significant relationships, with considerable diversity of methodologies.

Table II indicates the increase in number of publications dealing with personality variables and onset or course of cancer and the low percentage employing objective measures. The table is based on the author's extensive search of the scientific literature from 1925 to 1975:

TABLE II

NUMBER OF PUBLICATIONS CONCERNING PERSONALITY
AS RELATED TO CANCER MANIFESTATION*



*Estimated on the basis of extensive review of relevant literature, 1925-1975.

Methods

The case study method has been employed by a number of writers, including the Chicago group (Renneker, et al., 1963) and such writers as Inman (1964) and Aronson (1952). Other authors simply have reported their clinical impressions, including Booth (1975) who also has made theoretical contributions. Writers such as Lombard (1950) have attempted to study the problem by use of epidemiological data. Marcial (1960) approached the topic by attempting to link socioeconomic factors with cancer incidence. Quisenberry (1960) investigated cultural factors and cancer.

Animals have been used to investigate experiential and environmental factors in cancer (LaBarba, 1970). McDonald et al., (1960) noted the effects of physiological stress upon resistance to cancer in animals. Pollak (1944) conducted postmortem studies of mental patients to measure the correlation of paranoia and cancer. Segraves (1971) looked into the family history of disease as well as the subject's personality. Solomon (1968) reported the importance of early childhood experiences on immunity from diseases such as cancer. LeShan and Reznikoff (1960) discussed cancer in terms of sibling order.

A few authors sought to treat cancer by psychological techniques and thereby to demonstrate the importance of inner conflict on the course of the disease. Hedge (1960) reported regression of tumors following hypnotic treatment. Simonton and Simonton (1975) obtained "remarkable results" by using a combination of psychological exercises and radiology. Surman, Gottlieb, Hackett and Silverberg (1973) reported disappearance of warts following hypnotherapy. All these studies

fell short of psychoanalytic treatment of cancer, which apparently has not been reported. Several psychoanalysts have noted unusual behavior in patients who, unknown to either therapist or patient, were developing cancer (Giovacchini and Muslin, 1964; et al.). Evans (1926), a Jungian analyst, published her observations of patients in psychoanalytic treatment who developed cancer and, unlike Giovacchini and Muslin, stated dynamic factors were crucial to disease onset and course.

Previous Literature Reviews

Fred Brown. After reviewing the literature concerning influence of personality on cancer onset and course, Brown (1966) found indications of significant relationships despite the early stages of research. "Empirical evidence for a psychosomatic factor in neoplastic disease is impressive, offering teasing glimpses of a possible etiology for cancer," he said (P. 871). He cautioned against thinking in terms of a single cause, which he saw as an oversimplification. Psychodynamic variables had a "high probability" of being more related to course and onset rather than etiology in the strict sense of the word, he reported. Such factors could act as a catalyst in a partnership with biological variables. Greatest progress would result when biological and psychological scientists combined their efforts, he noted.

Concerning treatment of cancer, Brown speculated that psychotherapeutic modalities, in conjunction with medical techniques, might be found to retard or arrest the malignant process (P. 872). He noted the work of other authors who had suggested a defect in the psychoeconomics of the cancer patient, in that the energy required for

chronic and massive defense of a vulnerable ego hastens cancer development (Bahnson and Bahnson, 1964a and 1964b; Evans, 1926; LeShan and Worthington, 1955). Related to this view was the object loss and hopelessness reported by LeShan (1956) to precede cancer.

Brown also discussed the unusual and independent style of Booth (Booth, 1956, 1964, 1969), who discussed Rorschach protocols of cancer patients without use of the more common interpretation methods. He termed Booth's work "highly original" and advised against dismissing it in favor of "more formal" Rorschach studies. Brown discussed his own cancer studies, which employed the House-Tree-Person Technique, and their subsequent validation by Netzer (1964). Both found significantly greater body image distortion, disturbed sexual identity, impaired interpersonal abilities and problems with hostility in the cancer groups, with female subjects. Netzer, in particular, noted his cancer group withdrew from adequate contact with the "outside objective world," a frequent finding, and reported they felt helpless in controlling impulses with a fear of loss of control which could be representative of the fear of malignant growth.

The literature reviews of Perrin and Pierce (1959), LeShan (1959) and LeShan and Reznikoff (1960) were noted. Brown stated that Perrin and Pierce prematurely dismissed some studies which reported positive findings. He also noted the clearly cautious element in the 1960 LeShan and Reznikoff article, which was absent in the more optimistic LeShan (1959) article.

LeShan and Worthington. Four factors which consistently appeared in a number of diverse studies of personality and pathogenesis of cancer were reported by LeShan and Worthington (1956). These were the loss of

an important relationship in reality, or in symbol, prior to onset of the tumor; the inability to express hostility successfully; the presence of marked unresolved tension concerning a parental object, and sexual disturbance. These factors had been reported by authors who had employed a variety of research methods, including psychiatric interviews, projective tests, objective tests, long-term psychoanalytic case studies, life-history questionnaires and other methods. They noted the sparse use of well-controlled experimental designs and suggested further study might be the most illuminating.

Aimez. French investigator Aimez found the literature to be supportive of the idea that personality influences malignant growth (1972). He noted particular support for depression as a key factor, and listed the stages of a process which included object loss and later development of malignancy. The first stage involved a rigid quality in the principle object relationship prior to its loss, followed by accumulation of other losses of relationships, development of a depressive reaction and onset of a transitory stage of repression and denial. He termed the cancer-prone personality as one in which a "host-tumor equilibrium" has been threatened by such a series of events. To support his view he cited studies of immunological and neuroendocrinological functions which indicated strong bodily influences from psychological stages, such as loss, alienation and personal disorganization comparable to psychosis. Aimez considered the possibility that tumors could in some manner substitute for psychosis, as did Bahnson and Bahnson (1964b). He credited other authors with previously proposing psychosomatic models similar to his own.

Kissen. A well-known writer in the field, Kissen, reviewed the

status of psychosomatic cancer research prior to mid-1968 in a posthumously published article (1969). He noted that psychosomatic cancer research remained in its infancy, but on the basis of the data available, concluded that personality factors played an important role in onset and course of the disease. Attempts to refine personality measures, as well as indicators of hormonal and autonomic functioning, were welcomed. These three levels of abstraction would increasingly be pooled in the future, he reported. "The possibility is real that a variety of these measures may be integrated to provide a means of discriminating the cancer-prone individual with reasonable precision." he said (p. 136).

Kissen discussed the often-reported loss of an important object, noting that the greater-than-chance appearance of such loss in people who developed cancer had been fairly well documented (Kissen, 1967; Schmale, 1958; LeShan and Worthington, 1956; et al.) He particularly was impressed by LeShan's and Worthington's report of increasing cancer rates from the single, to married, to divorced and then widowed (1956), an apparent reflection of the object loss phenomenon. He noted that the concepts of denial and repression in cancer patients had been well supported in studies which differed widely in method and sophistication. The inhibition of rage and other affects likewise appeared repeatedly in the literature on this topic, he said.

Kissen also noted that advances in the study of the central nervous system's influence on cancer growth included Brain's (1964) work describing evolutionary effects upon brain anatomy and function. The report of Kavetsky, Turkevich and Balitsky (1966) which suggested the central nervous system was the dominant factor in malignancy also was

reported. This work concerned the idea that inhibition of the CNS favored tumor growth while excitation of the CNS hindered development of neoplasms.

Kissen suggested that this type of brain research, when considered with studies of hormonal factors and previously published psychological variables, formed an incomplete but promising picture of the nature of cancer. "So far there has been no published work relating cancer, personality, and hormonal excretion patterns..." (P. 136), he said, identifying this particularly complex task as in the most need of exploration.

Simmons. A sweeping theory of causation of serious illnesses based entirely on psychological stress was proposed by Simmons (1966). He believed psychological stress "catalyzed" glandular products, resulting in a disease-producing hormonal imbalance. He speculated that such disequilibrium was responsible directly for cancer as well as a large number of other disorders, including asthma, arthritis, congestive heart failure, diabetes, and indirectly, mental retardation. His theory differed from psychosomatic theories per se in that the approach involved emotional stress as a direct cause of diseases while psychosomatic models held that psychological conditions exacerbated existing ailments, he indicated. His views were supported with previous research and brief reviews of the literature regarding a number of diseases.

Perrin and Pierce. The most critical review of the literature in this area was written by Perrin and Pierce (1959), who dismissed many studies on the basis of inappropriate experimental design. They concluded that little had been accomplished after reviewing the

literature since 1900. Among the difficulties they cited were lack of statistical tests in many studies and inappropriate use of statistics in others. They particularly criticized misuse of statistics in several studies of cancer incidence among psychotics. The sparsity of literature was found puzzling in view of the importance of a possible relationship between psychological factors and the pathogenesis of neoplasms.

The consistency between writers concerning the role of psychological factors in cancer onset and course was viewed as an unfortunate consequence of early studies which were "speculative" and "poorly designed" and strongly diverted future research. Recent authors, they noted, "...tended to draw their hunches directly from their predecessors who often used faulty sampling, inadequate statistical treatment, etc." (P. 417). Perring, a physician, and Pierce, a psychologist, were unwilling to accept the conclusions of a large number of other investigators. The major contributions of their report appeared to be the identification of a number of design weaknesses and several useful suggestions for future research.

Individual Studies

Giovacchini and Muslin (1965) reported the unusual situation of a married woman in her early forties who in two years of psychoanalytic treatment reverted to a puzzling regressive period which signaled onset of undetected cancer of the breast. The authors made no etiological connections between psychological and somatic processes but noted the cancer was reflected in general ego disintegration before it was medically detectable.

In a study drawing heavily on personal observation, Cutler (1954) reported being struck, as a cancer surgeon, by the personality organizations of a sample of patients he treated for advanced and widespread cancer. In a small but significant group of these patients, the cancer was arrested and the patient lived in exceptionally good health. He reported this group was treated identically to others whose disease progressed rapidly and fatally, but differed from the terminal patients in the expression of some special, strongly-held attitude, such as an overwhelming faith that all is well.

An example of this was a woman who believed she would not die because she had received assurance from the stars. Although her cancer was extremely advanced and beyond any reasonable hope for recovery, she lived in good health for a number of years. He reported all the surviving patients he observed had a similar peaceful demeanor and usually looked at him with astonishment when he relayed the initial prognosis.

He discussed another group of 40 female patients treated for breast cancer. This included 20 who never had children, apparently a reflection of their inner conflicts, and 20 with children who were believed to be unusually close-binding mothers. All 40 patients were thought to have experienced unusually pathological relationships with their own mothers, with consequent impairment of ability to vent rage toward the maternal figure, as well as a masochistic character structure, sexual inhibition, impairment of the ability to mother, increased use of denial and delayed seeking of treatment for their cancer.

Goldfarb and Driesen (1967) reported partially successful treat-

ment of three patients with advanced carcinomatosis by means of combined electroconvulsive therapy (ECT) and anti-cancer medication. While stating the three experienced significant cancerocidal effects, the authors noted their experimental design involved uncontrolled sources of variance and too few subjects, which seriously limited conclusions. One of the patients eventually died of cancer, another died a year after treatment of another disease (pneumonitis), which may or may not have been related to the cancer, and the third remained free of cancer at the time of publication, 17 months after treatment. The survival rates (they reported) were very lengthy for patients with carcinomatosis.

Picard and Horne (1974) provided some startlingly impressive data in their presentation at the 1974 annual meeting of the American Psychosomatic Society. Using only a social and psychiatric interview, they were able to identify correctly 20 of 28 cancer patients totally on the basis of non-medical information. The 28 were included in a pool of 62 general medical patients interviewed. The factor found most helpful in identifying the cancer patients was frequent and unpredictable life changes during childhood, including geographic changes, death of a parent, abandonment by a parent and shifts in family financial status. These changes seemed to occur in an otherwise stable atmosphere where the child had little practice in coping with such changes. As adults, these subjects constricted their interests markedly. When they lost their primary interests, hopelessness and then cancer appeared, they said.

Sugar and Watkins (1961) investigated the personalities of female charity patients with presenting complaints of a breast mass. They

interviewed 50 patients before a definite diagnosis had been made. Eleven of these were found to have breast cancer, while the remainder had benign tumors. They concluded the majority of the patients who delayed seeking treatment were depressed and had little fear, often not caring what happened to them. Most of the cancer patients were in this category. The benign patients were anxious and sought treatment promptly, they reported.

Evans, Baldwin and Gath (1974) were unable to find evidence that a form of clinical depression is a precursor of cancer in their study of general medical and psychiatric patients admitted to English hospitals in 1963 and 1964. Using data from the Oxford Record Linkage Study, they scrutinized the records of 823 patients between the ages of 10 and 85 who received a primary diagnosis of depression. While deaths from suicide and natural causes in general were significantly higher for this group than the population, they failed to find increased rates of malignant diseases. A number of authors (Bahnsen and Bahnsen, 1964a; Blumberg, West and Ellis, 1954; etc.) had suggested etiological factors for cancer could involve depression-related factors such as rigid avoidance of recognition of affects and conflicts and denial of need for treatment.

By carefully collecting information from 33 children and adolescents with leukemia, Greene and Miller (1958) found 31 of the 33 had suffered at least one severe personal loss within a two-year period of onset of the disease. They also reported that 27 of the 33 mothers were depressed or anxious, or both, to an unusual degree for a period of weeks or months prior to symptom development in the child.

A major loss-separation from a significant object--was consider-

ed a possible determinant of manifest development of childhood leukemia. Greene and Miller discussed elements of the psychophysiological mother-child unit, both in prenatal and postnatal terms, and collected data through such methods as interviewing the mother and father separately. This followed a similar study two years earlier (Green, Young and Swisher, 1956) in which observations were made on 32 women with lymphocytic, myelocytic or monocytic leukemia; Hodgekin's Disease; reticulum-cell sarcoma, and lymphosarcoma. They concluded that all these women had unresolved attachments to their mothers, expressed in part through one of four interpersonal styles designated as mothering, clinging, isolated and manly.

In the 1956 study, they described the occurrence of serious losses of significant others or threats of such losses during a period of four years prior to onset of the disease. These included death of the mother, father, husband or child as well as such loss experience as menopause and change of home. Half the losses occurred during the 12-month period prior to apparent disease onset, with the majority of these patients showing an affect of hopelessness or sadness for weeks or months prior to apparent onset. They also reported exacerbations of the disease process took place during times of stress or loss. Duration of the lymphoma or leukemia and personality characteristics were reported to be related.

Weisman and Worden (1975) studied personality and life history variables in regard to cancer survival in 46 preterminal and terminal patients. The patients, including 35 who died during the experimental period, were studied by means of contacts with family members, open-ended interviews, nursing reports and such psychological tests as a

modified version of the Thematic Apperception Test, a sentence completion test, the Cole animal test, the Profile of Mood States and a sentence completion test.

They reported patients who lived significantly longer than expected tended to cultivate "cooperative and mutually responsive relationships, especially towards the end of their lives" (P. 61). Those who survived for shorter than expected periods were described as having been involved in chronically and mutually destructive relationships, and as being depressed, apathetic and harboring death wishes. The authors also noted that better understanding of terminal patients conceivably could improve or lengthen survival in cancer victims.

Statistical specialists from the New York City Health Department obtained 1940 U.S. Census information and cancer mortality records to study correlations between statistical characteristics and mortality from various cancer types (Duffield and Jacobson, 1945). While their study was confined to the caucasian population of New York City, the results may have reflected national or international characteristics. Significantly higher death rates from breast and genital organ cancer, other than cancer of the uterus, were found for single females. Among single males, Duffield and Jacobson found significantly higher mortality rates for cancer of the cheek and mouth area. Unmarried women had lower mortality from uterus and stomach cancers while bachelors had lower mortality from cancer of the peritoneum and digestive tract other than the stomach. Results were inconclusive for other sites. They noted the findings were consistent with those of similar studies in Wales and Australia.

Dechambre (1974) reported a series of experiments using mice to

study development of grafted leukemia, melanoma and ascites tumors. The results included longer survival for mice in isolation than in groups of 10. He also noted that the volume of ascitic fluid tumors was greater in isolated mice. This finding appeared related to adrenal hypertrophy resulting from lack of stimulation in isolation cages.

A particularly interesting finding was that psychological characteristics of tumor-free control mice influenced tumor growth in the grafted experimental mice when the two groups were mixed. Both handling and social experiences of the control mice affected tumor development in grafted mice. Dechambre interpreted these results as providing objective support for psychosomatic theories of human tumor development. Riley (1975) found environmental stress could be manipulated to result in a seven per cent incidence of mammary tumors in mice in protected environments to a 92 per cent incidence under stress conditions.

Studies Involving Psychological Tests

Summary. Use of more objective means of data collection had an unusual advantage in the study of psychological and cancer processes because of the great predominance of subjective studies in the literature and the numerous and crucial theoretical issues which remained basically untested. Subjective approaches were valuable for identification of areas for later investigation, but the balance between the number of subjective and objective reports had reached a very cumbersome level by 1976.

Often associated with the more subjective reports was the molar, abstract approach which was most valuable in the light of its counter-

part, the less ambitious but more objective investigation of specific details. Under optimal conditions, these two types of reports were used to modify and improve experimental design at a rapid and successful pace.

The objective study of psychological processes involved use of certain quantifiable psychological tests, a dozen or so having been employed in this area with varying attention to their quantifiable potentials. This was particularly the case with the Rorschach, which was used frequently (Booth, 1956; Wheeler and Caldwell, 1955; Waxenberg, 1955; Tarlau and Smalheiser, 1951; Shrifte, 1962; and Nemeth and Mezei, 1964). The unusual sensitivity of the Rorschach in the hands of an expert was matched by its enormous complexity, as to be expected in view of the complexity of psychological theories and concepts. Many were unable to integrate appropriately the Rorschach labyrinth into research designs.

The MMPI had the added advantages of increased objectivity and easily quantified scores which could be studied by computer. Authors who used the MMPI included Blumberg, West and Ellis (1954), Schonfield (1973), Stavraky (1968), Schmale and Iker (1966), Krasnoff (1959) and Gay (1970). Klopfer (1957) discussed both the MMPI and Rorschach as applied to cancer research.

Other studies have employed the Tennessee Self-Concept Scale and Recent Life Changes Questionnaire (Grisson, Weiner and Weiner, 1975), the Bahnson Check Lists (Bahnson and Bahnson, 1969), the Hourse-Tree-Person Technique (Brown, Katz and Kaufman, 1961), the Adjective Check List (Evans, Stern and Marmorston, 1964), a "clinical questionnaire" (Kissen, 1963), the Maudsley Personality Inventory (Coppin and

Metcalfe, 1963), and the projective Worthington Personal History Test (LeShan and Worthington, 1956).

Findings from cancer studies using different tests were often viewed as very similar, particularly in regard to indications of increased use of repression, somatic regression or the inability to recover psychologically from object losses. Meerloo (1954) summarized frequently cited hypotheses which concerned psychological processes and cancer. Of some 150 located articles concerning personality factors and cancer onset or course, only about 35 involved the use of psychological tests, and of these none concerned test scores of cancer patients obtained before onset of the disease.

Intellectual Variables. Several authors reported a disproportionate number of above-average IQ's among adult and child retinoblastoma patients (Eldridge, O'Meara and Kitchin, 1972; Williams, 1968). Eldridge and associates administered complete Wechsler intelligence scales to 23 sighted retinoblastoma patients and one unaffected close relative of each. There was no significant difference between the two groups in full scale, verbal or performance IQ, but the average full scale IQ scores of the patients was 116 and the average full scale IQ of the controls was 115, both significantly above average.

They speculated that high intelligence was not the result of a gene for retinoblastoma because unaffected close relatives also were "bright." Possibilities that the disease occurred more frequently in intellectually bright families, or that intellectually bright patients were more likely to survive the illness, were considered.

General Identification. Reznikoff (1955), using a series of psychological tests, found disturbances in feminine identification and

negative feeling toward pregnancy and birth among women with malignant cancer of the breast. He compared this group with two control groups, one comprising women with nonmalignant tumors of the breast and one comprising women completely free of breast pathology. Fifty women, awaiting diagnosis of tumors of the breast, were administered the Thematic Apperception Test, a sentence completion test and a series of childhood history questionnaires prior to determination of whether the disease process was malignant or benign. When specific diagnosis was determined, the women were divided into two groups, with and without malignancy. A third group of 25 women, free of breast pathology, was administered the same tests.

In addition to greater disturbance of the mothering role among malignant subjects, they also were characterized by a far greater number of deaths of siblings at birth or infancy, excessive responsibilities associated with caring for younger children during childhood, and less successful marriages as adults. In addition, the malignant group had significantly more incidences of death of both parents prior to onset of symptoms.

Lung Cancer Subjects. Grissom, Weiner and Weiner (1975) employed the Research and Clinical Form of the Tennessee Self-Concept Scale (TSCS) and the Recent Life Changes Questionnaire (RLC) to compare lung cancer patients with emphysema patients and healthy controls. They reported at least two personality factors appeared different for the cancer patients than the others and suggested further research. The Personal Integration Score of the TSCS was the most significantly different for the cancer group, which had scores indicating the lowest sense of personal worth and adequacy. The emphysema patients received

more positive scores, but the healthy controls had the highest self-worth and adequacy, as indicated by this measure.

The second major variable was the Moral-Ethical Score of the TSCS, considered to indicate that cancer patients defensively espoused high moral and ethical values, a finding similar to those of a number of other authors (Schonfield, 1972; Gay, 1970, Blumber, West and Ellis, 1954; etc). The authors noted this may simply reflect the trauma of a terminal disease, however. The subjects in the Grissom, et al., 1975, study were all male veterans, with the two illness groups comprising patients in treatment at a Veterans Administration hospital. The groups included approximately the same age range, 23-87, and were matched for smoking behavior.

Surprisingly, no significant difference was found between means of the three groups on the life changes questionnaire. This was employed as a measure of stress from disruption in life style, but scores indicated most of the veterans were under marked stress regardless of their group. Among the healthy controls, those who experienced a level of intense stress, associated with onset of various illness in others, also had above-average personal intergration scores, a factor viewed as important in their remaining healthy. In contrast, cancer patients receiving scores indicating relatively low levels of recent life stress characteristically had very poor personal integration scores. Although the authors were unable to secure test results prior to illness onset in the two experimental groups, they found nothing to indicate post onset confounding.

Anxiety. The Cattell 16 PF questionnaire was administered by Finn, Mulcahy and Hickey (1974) to 40 cancer patients, 40 coronary

patients and 40 healthy controls in an attempt to determine whether anxiety followed or preceded disease onset. The subjects were all males, matched for age, socio-economic status and rural or urban residence. The profiles of cancer and coronary groups were similar in indication of above-average anxiety, while controls failed to receive high anxiety scores. This was interpreted as support for anxiety as a reaction to knowledge of being seriously ill. It also was reported that cancer patients differed significantly from both coronary and control subjects in increased scores for social withdrawal, overly-cautious behavior and self-deprecatory thought.

In an early study, Taulau and Smalheiser (1951) used the Rorschach Test, human figure drawings and interviews to compare 11 patients with malignancy of the cervix uteri and 11 with cancer of the breast. All the subjects were married females ranging in age from 27 to 58 and of a similar socio-economic status. Mean age of the breast group was 50 with a time of illness averaging 32 months, while the mean age of the cervix group was 48 with an average length of illness of 31 months. They were all patients in a hospital known for its treatment of terminal cases.

Normative Rorschach data from another study also was used. Characteristics of these subjects were not reported, unfortunately. The authors noted that both cancer groups were significantly below average in number of responses and tended to overemphasize whole responses, which were uniformly poor in quality. They characterized the cancer patients' approach to the Rorschach as one of clinging to the obvious and unusual defensiveness. They also noted an inability to generalize in the cancer patients' protocols. Only one major difference was found

between the two cancer groups--a greater use of unusual detail and white space in the cervix group.

They discussed poverty of movement responses for both cancer groups, as well as the major finding that while both groups expressed sexual conflicts in their percepts, the cervix group's sexual difficulties were much closer to consciousness, with an associated development of paranoid defenses to deal with the increased anxiety. In fact, Tarlau and Smalheiser reported the cervix group demonstrated such violent hostility, suspiciousness and irrational ideas of reference and persecution as to approach hallucinatory proportion. The cervix group appeared to be genitally fixated while the breast group appeared to be fixated at the oral stage.

Analysis of the human figure drawings supported conclusions from the Rorschach data, with the breast patients producing drawings of a primitive infantile nature. This included great emphasis upon the mouth and teeth and a complete absence of clothing, they said. Sexual characteristics were lacking completely with only one breast patient including the breast area in her female drawing. The cervix patients always included clothing and used significantly more shading in their drawings, Tarlau and Smalheiser indicated. Both groups showed evidence of homosexual conflict, which was more acute and closer to consciousness in the cervix patients. The authors learned from interviews that members of both groups tended to come from families with dominant mothers, a situation which seemed to be at the basis of rejection of the feminine role in most of the subjects. Both groups had negative attitudes about sexuality, although the breast group seemed to be more able to adjust superficially to this condition. The marriages of the

breast subject women tended to be stable, but seemed to be characterized by a lack of demands by their partners.

The breast patients had little premarital experience and tended to marry at a young age, while the cervix patients had a higher incidence of premarital relations, a lower age of marriage and a very high rate of overt marital disruption. The interview material strongly indicated that Rorschach findings of severe psychological difficulties were long-standing rather than reactive to cancer, the authors said. Further study of the problem with larger groups was suggested.

Rorschach Malignancy Score. Nemeth and Mezei (1964) attempted to follow the work of LeShan and Worthington (1956) and Booth (1961) by further exploring the object loss hypothesis of cancer genesis by means of the Rorschach Test. Unlike their predecessors' methods of using the Rorschach, they formulated a "malignity score" on the basis of the Rorschach protocols of 50 cancer patients. The score was based upon the presence of four signs in a record, all of which were hypothesized to indicate marked tendencies toward malignancy. The basis for the signs was the belief that somatic illness was the result of internalized broken interpersonal relationships, the conflict being withdrawn into the body scheme. The lost object was viewed as replaced by narcissistic preoccupation with the body, often reflected in the Rorschach through a greater number of anatomy responses. Unable to adjust to the outside world, patients reoriented within their own bodies. It was when this withdrawal was unsuccessful that malignancy began. The first of the four signs was the criticism or withdrawal of anatomy responses. Severe cases of this involved vain attempts to find certain body parts in the blot, such as remarks that the heart should

be in a particular area but is not. This first sign was called "failure in somatic reorientation" (P. 13).

The second sign was a marked self-depreciation which differed from the more usual self-criticism seen in Rorschach records in that it approached the wish for self-annihilation. Such behavior was considered a supplication for help. The third sign was increasing difficulty as the Rorschach Test progressed, as if the patient were running out of energy or becoming more and more frightened. The element of threat was basic to the increasing difficulty.

The fourth sign involved a milder form of self-criticism which was quantitatively similar for the two groups but differed qualitatively. Like the second sign, it involved such statements as, "I am not worth the trouble you are going to," or remarks that the patient is ashamed of responses. In benign patients, this was often expressed as criticism of the individual card of the Rorschach Test itself, in contrast to the passive resignation of cancer subjects. This sign involved much less supplication for help than the second sign.

Nemeth and Mezei had compared Rorschach protocols of 50 cancer patients with protocols from 48 patients who had or previously had benign tumors (primary myomas) and were free of cancer. The two groups were matched for socio-economic status and included mostly unskilled clerical workers or light physical laborers. Presence of three of the signs was considered significant, but further information about the experimental design was not given.

Only four of the benign group had the failure of reorientation sign, but it was present in 17 of the cancer group. Likewise, three of the benign group, eight of the benign group and 11 of the cancer

group had the increasing-difficulty sign. Records were not compared with those from patients who were free of tumors.

A second method of analyzing the Rorschach protocols was also attempted by Nemeth and Mezei. Records were scored according to the number of M responses, F+ percentage and number of content categories. High scores indicated liberal usage of the three variables. Benign patients were found to have much higher scores than cancer patients, whose records had less M, lower F+ percentage and fewer content areas.

The authors noted that cancer patients often had reported benign tumors previous to onset and suggested this as one source of contamination. Their overall findings were consistent with the MMPI results reported by Blumberg, West and Ellis (1954), and particularly with the theoretical formulations of Klopfer (1957) and Bahnson and Bahnson (1964b, 1969, etc.).

MMPI Studies

In a pioneering investigation of personality organization and resistance to cancer growth, Blumberg, West and Ellis (1954; Blumberg, 1954) employed the MMPI, Wechsler-Bellevue Scale and, to a lesser degree, the Rorschach, to study V.A. Hospital patients with fast-growing and slow-growing neoplasms. They were unable to find previous studies in this area which used objective measures. In fact, little had been reported to 1976 with objective measures.

The Wechsler-Bellevue was used to match slow-growing and fast-growing tumor patients for intelligence. The subjects were nearly all males. They were patients on a neoplastic disease service of the hospital and were generally homogeneous in terms of age, economic

background and occupation. They were administered the tests during periods of relative remission and comparatively good health. A variety of cancer types and locations were involved. The experimenters were unaware of the diagnostic and prognostic status of the patients until testing ended.

Two studies were conducted. The first comprised 18 patients (six with fast-growing and 12 with slow-growing cancer). From these subjects, three MMPI signs were derived and then applied in a predictive sense to 32 patients (19 fast and 13 slow).

The signs were: (1) an F minus K index of ≤ -11 (-12, -13, etc.) was a fast indication. An F - K index > -12 (-11, -10, etc.) was a slow sign. (2) A D \underline{t} score equal to or greater than Hs and/or Hy \underline{t} scores was a fast indication. A D of ≤ 55 or a D below Hs and Hy by "about five \underline{t} score units" was a slow sign. (3) The fast sign was Ma $\underline{t} \leq 60$ while the slow counterpart was a Ma $\underline{t} > 60$. Profiles with no \underline{t} score above 54 except Ma and/or Pd also were considered to indicate slow progression. Presence of at least two consistent signs was required to classify a subject.

The crucial personality differences between the two groups were reported to be greater defensiveness, increased anxiety and less ability to reduce inner tensions through activity or other means in patients with the fast-growing tumors. Although Rorschach data were not obtained for all patients, characteristics of the two groups were compared with the available protocols (ten for the fast group and 10 for the slow group.) The authors noted Fc scores occurred with much greater frequency in the slow group. While Rorschach results were obtained from only 20 patients, the difference between the two groups for the Fc variable was highly significant ($p. = \leq .01$).

Although tests of significance were not employed for content factors, Blumberg, West and Ellis noted the fast group reported anatomy percepts with greater frequency. Twenty-two such responses were attributed to that group, and only two, which were not even clearly anatomical, were found in the slow group. One of the patients placed in the slow group on the basis of the MMPI signs had reported Rorschach percepts of disease, growths and torn anatomy to the degree that one of the authors confessed to the patient's physician considerable doubt about the decision. This was followed by a marked reappearance of the intensity of the illness and a steep downhill course, resulting in an MMPI placement error.

Rorschach responses involving coldness, such as ice or snow, were found in the protocols of three of the 10 fast cases and were totally absent from those of the slow cases. Use of the word "ugly" was likewise found only in three fast cases. (The commonly reported percept of bears on Card VIII was called an ugly sloth, for example). Sex responses were given in five of the fast group and only one of the slow group, but general reality testing appeared to be better in the fast group. This was consistent with Klopfer's (1957) theoretical model. The usual quantitative indications of anxiety were low for both groups.

Discomfort with color was verbally expressed in six of the fast records but did not appear in any of the slow records. Five of the fast cases also reported a dysphoric use of color and/or shading, as did one slow case. Witches appeared in two fast cases and were not found in the slow group. There were four rejections, three in the slow group and one in the fast group.

Blumberg, West and Ellis stated that the Rorschach findings, in

general, supported the MMPI indication of high levels of defensiveness for the fast group, particularly in light of an extreme degree of rejection of the need for affection in the fast group's denial of shading elements. They also noted that the Rorschach results indicated qualitatively not only an inability to handle the threat of anxiety for the fast group but also an attempt to compensate for this through participation in emotionally stimulating, counter-phobic situations, giving a superficial appearance of emotional control.

Other Rorschach findings included greater impulsivity in the slow group with a greater number of FM responses, similar to the MMPI results. The fast group's relative restraint was thought to be reflected in the high M and low Fc values.

When Rorschach results for both groups were pooled, the authors found support for the idea that male cancer patients had an ambitious overstriving beyond their resources. The view that prolonged personal frustration could influence the development of cancer was considered. Further use of the Rorschach in this area was strongly recommended. The authors presented their own Rorschach findings in a tentative light.

Krasnoff (1959) attempted to cross-validate the Blumberg, West and Ellis study using both males and females and using only one type of cancer, malignant melanoma, in contrast to the earlier use of a variety of cancer cell types and sites. Using six fast patients and 16 slow patients, he administered the MMPI, the verbal subtests of the Wechsler-Bellevue Intelligence Scale, Form I, and the Rorschach. He reported insignificant differences with the Blumberg, West and Ellis signs.

Gay (1970) reported results consistent with the Blumberg, West

and Ellis findings, however, using three groups of 15 hospitalized male patients, matched "as closely as possible" for age, socio-economic status and length of hospitalization. He found strikingly significant differences with the MMPI. One of the groups comprised patients with rapidly-progressing cancer, one was patients with cancer which progressed more slowly than expected, and one was a control group of bone fracture patients.

A number of differences were found among group means for the 13 MMPI Scales. Gay concluded the group of rapid-progressing patients was experiencing greater psychopathology than the slow-progressing group, and that both cancer groups had greater psychopathology than the control subjects. The rapidly-progressing group was particularly considered to be under great psychological stress in that it lacked the ability to act on impulses. The elevations on Scales F, Pd, Sc and Ma found for the slow group reflected their greater ability to act on impulses, he said.

Among the specific differences were higher L scores for the rapid group when compared with the slow group. The slow group and control group did not differ in this respect. The F Scale was different for the slow and fast groups with the slow group receiving the most elevated scores. The fast and control groups did not differ here.

Gay also noted that the rapid group scored higher than the slow group on the measure of defensiveness, the K Score, but no difference was found between the K means of the Rapid and Control groups or between the Slow and Control groups.

This was particularly important in that it supported the Blumberg, West and Ellis (1954) sign of a strongly negative F - K index indicating rapid disease progression. Gay's report of the differences in L

Scale results for his groups is consistent with Schonfield's (1973) finding with female cancer patients who scored higher on the L Scale than female benign tumor patients.

The most startling finding, however, concerned the Ma Scale. This scale discriminated between the two groups at a highly significant level ($p. + \leq .001$). The rapidly progressing group's mean for this scale score was remarkably below average, while the control group mean was about average and the slowly progressing group Ma mean was highly elevated. This finding was strongly supportive of the third Blumberg, West and Ellis (1954) sign.

The remaining second sign--elevated D Scale without corresponding elevations on Hs and Hy Scales or so-called depression without neurotic relief--was not clearly supported in the Gay study. In Gay's paper, both the fast and slow group means for the three scales were elevated with Hs the highest, D the second highest and Hy the lowest. A more accurate determination of whether his results can be considered supportive of this Blumberg, West and Ellis sign would require inspection of individual profiles to determine the order of the three scales on each profile.

Since Blumberg, West and Ellis did not require all three signs to be present for an indication of rapid progression, the results reported by Gay were considered independent support of their original work. There were several possibilities why Gay results were consistent with those of Blumberg, West and Ellis and the Krasnoff findings were not. Krasnoff used both men and women in contrast to the nearly all-male Blumberg study, and confined the cancer patients to one type of cancer, malignant melanoma, in contrast to the variety of cancer types in the

first case. Also, Krasnoff's use of only six subjects for the fast group seriously limited his study.

Other differences between the two included some of the subjects in Krasnoff's study being told a great deal about their disease prior to testing, while others were told nothing. This is in contrast to the Blumberg, West and Ellis study in which all patients were informed of their disease. Also unlike the first paper, some of Krasnoff's subjects had been through surgical procedures prior to testing.

A final difference between the two was the fast-slow determination--made on the basis of "clinical prognosis" in the first work--was derived from epidemiological criteria in Krasnoff's study. Gay left the matter up to the individual physicians who apparently used a mixture of these two techniques.

May (1975) suggested that the stage of acceptance of the dying process as described by Kubler-Ross (1960) may influence MMPI scores in characteristic ways. Studies addressing this particular issue could not be found in an extensive literature search, nor could studies using MMPI scores obtained prior to onset of cancer symptoms.

Schonfield (1973) administered three MMPI scales to 112 Israeli women a day prior to their breast biopsies. Using the Lie, Well Being and Morale Loss Scales, he found significantly higher scores on the Lie Scale for European and American-born women diagnosed as having cancer, compared to women with benign tumors. Cancer patients born in the Middle East had unremarkable Lie Scores, he reported. Differences between groups with the other two scales were insignificant. Results of a "recent life stresses questionnaire" appeared to indicate non-cancer women experienced greater recent stress than cancer subjects.

Effect of Knowledge of Disease on the MMPI

A matter of central importance with MMPI studies was a possible effect on the profile from the subject's knowledge or suspicion of having cancer. There was some evidence that knowledge of a serious medical condition had little effect on MMPI profiles. MMPI patterns were relatively stable with distress from such sources as fractures, infections and presurgical evaluations in inpatient samples (Hastings, Hathaway and Amberg, 1957; McKinley and Hathaway, 1943; and Schiele, Baker and Hathaway, 1943).

Another matter was the defensiveness of cancer patients, particularly when questionnaires were used. Inman (1961) noted this phenomenon in his rather detailed psychoanalytical account of an unmarried nurse with breast cancer. Booth (1969) reported that understanding the dynamics of individuals who developed cancer required considerable effort because the scientist was studying "generally reticent patients" (p. 573.)

Theoretical Approaches

Several theoretical contributions have been published concerning psychological variables and cancer onset, with approaches utilizing such abstract concepts as specific intrapsychic processes and aspects of biological evolution theory. Certain combinations of these views could add theoretical depth and improve predictability to a far greater degree than individually.

Concepts often fluctuated among abstraction levels, even within single articles. An example was the conceptualization that certain

tumors symbolically replaced major object losses in a process similar to smaller organisms' changes in cellular characteristics or mutations with stress. The term "stress" was found more useful in describing both abstract psychological frustration and tissue damage than either one or the other, reflecting a change from the dualistic or dichotomous approaches to conceptualization.

Some theoretical authors shifted from abstract level to abstract level as a means to improve error correction and formulate more useful hypotheses. This involved a broad understanding of science.

Major theoretical views included the Somatic Regression Theory of Bahnson and Bahnson (1964a, 1964b, 1966 and 1969); the more evolutionary approaches of Jonas (1962) and Jungian writers Booth (1956, 1975) and Evans (1926), and the view of impairment of immunity following chronic stress. This particular approach was discussed in terms of general illnesses by Selye (1974), and from the standpoint of anticancer immunotherapy by Smith (1976), who reported recent and extremely promising findings at the biological level. These findings could be even more useful with attention to concomitant psychological measurements.

Somatic Regression Theory

Bahnson and Bahnson's theory was based on the concept "somatic regression," which involved complementarity of psychological and physiological regression (1964a, 1964b, 1966 and 1969). This view was fairly consistent with much of the literature concerning psychology and cancer, as well as the more general psychosomatic approaches of such writers as Franz Alexander (1950). Somatic Regression Theory included the pre-

diction that cancer patients extensively employed such primitive ego defenses as repression and denial in unsuccessful attempts to cope with major conflicts involving loss and depression, anger, dominance, and libidinal and narcissistic creative strivings. They viewed secondary repression and projection as extreme, opposing, mutually exclusive ego operations with the most adaptive mechanisms being located near the midpoint. Secondary repression was defined as continual defensive processes blocking expression of conflictual impulses in both ideational and behavioral modes, a more specific type of repression than primary repression (1960).

In an ingenious design, they tested the hypotheses that absence of repression indicated the presence of projection, and vice-versa, and predicted that cancer patients would use projective defenses less than normal. Cancer patients were expected to project fewer depressive characteristics onto a neutral environment. Depression in particular was chosen because of the authors' theoretical position that cancer patients had unusually serious problems with the resolution of depression following major losses. On the basis of psychoanalytic theory, it was expected they would repress dysphoric ideas more intensely than other subjects so threatened. The Bahnsons further predicted a corresponding decrease in projected depression on the basis of the hypothesized polarity relationship.

Thirty caucasian males with mixed types of cancer were subjects. None had been told the diagnosis and none would admit he believed his illness was a neoplasm. Control subjects were 64 randomly-chosen caucasian males, free of disease and selected in a street sampling procedure. Group mean ages were 53.9 and 52.2 respectively.

All subjects were administered the Bahnson Adjective Check List and the Bahnson Projective Check List. They first were given the adjective form and instructed to check adjectives differentially in accordance with their current emotional state (definitely applies to; definitely does not apply; etc., with four levels in all).

The subjects then heard a neutral auditory stimulus, "unstructured clicks of white noise," and were asked to complete the projective check list according to how this noise sounded to them. The two check lists described affect in five bipolar dimensions: anxiety-security, depression-elation, hostility-friendliness, guilt-self-acceptance and dominance-submission. A "projective score" was calculated for each of the five dimensions. This was the ratio of affect projected to the neutral sound compared with affect accepted as related to the self.

Projective score differences were compared for each of the five dimensions by means of t tests. Significant results for four of the five dimensions were reported. The cancer subjects scored below controls in the projection of depression, anxiety, hostility and guilt. The mean difference for submission-dominance was insignificant. As predicted, depression was the area of greatest mean difference. The probability of obtaining all four significant differences was .001.

Bahnson and Bahnson summarized the results as:

This analysis indicated that the cancer subjects definitely described the "environment" by affirming-pole adjectives (here such qualities are clean, gentle, peaceful, pure, trustful, etc.), in contrast to the control subjects, who strongly tended to affirm the opposite qualities in their description of the environment (1969, p. 551).

The results also were consistent with the Bahnson and Bahnson conceptualization of complementarity of somatic and psychologic processes.

After reporting their findings, two additional subject groups became available--33 caucasian male myocardial infarction patients and 26 caucasian males hospitalized for mixed various serious diseases and accidents. Their mean ages were 50.9 and 50.4 respectively. Analyses of mean differences between these two groups resulted in no significant differences. These two groups were studied both singularly and combined in comparisons with the cancer and control subjects.

Cancer patients received lower mean projection scores than any of the other groups including the coronary-mixed sick combination on all dimensions and total. (The coronary-cancer comparison for guilt self-acceptance resulting in a coronary mean slightly lower than the cancer mean for guilt projection.)

In an earlier paper (1964a), Bahnson and Bahnson discussed the role of repression and denial in the onset of cancer from a different perspective, employing Rorschach protocols from seven cancer patients along with several projective drawings. They gleaned considerable support from the literature for the conceptualization that defenses had a significant relationship to neoplastic processes. Related reports that object loss was a major factor in the development of cancer were cited, as were suggestions that cancer patients had unusual difficulty coping with setbacks. They noted that patients who developed malignancies had been found to react with blatant denial of personal losses, unable to deal with them on a conscious level. Instead, they adopted a facade of pleasantness which the authors viewed as hiding their dislike and distrust of self. Denial and repression were the major elements, rather than the loss itself, Bahnson and Bahnson said.

In the analysis of the Rorschach data, they noted the low numbers

of M, K, c, C', and C and high F per cent reported previously for cancer patients (Tarlau and Smalheiser, 1951; Blumberg, 1954), who were said to live in an atmosphere of emotional barrenness and constriction as a result of excessive use of repression and denial.

This primitiveness virtually resulted in the cancer patients becoming two people in one. While presenting the appearance of well-being, they froze out the fantasies and feelings otherwise typical of human beings, becoming psychologically robot-like but still able to operate acceptably within the social structure:

Summarizing from the formal Rorschach data, we can state that the cancer patient tends to be a rigid, constricted, practically-oriented person who cannot utilize his inner potentials in his relationship with the environment, so that this relationship develops into an empty, impersonal routine. He has withdrawn from emotional involvements which seem dangerous because they arouse primitive, regressive material existing in an isolated pocket within his personality (Bahnson and Bahnson, 1964a, p. 46).

One of the projective drawings in particular seemed to reflect the two-selves-within-one. A 44 year old policeman, recently married and overly attached to his elderly mother, developed lung cancer shortly after his wedding. He drew two male figures with inflated chests holding hands. Another patient being treated for cancer spontaneously drew a "dog gone crazy," consistent with the authors' view of cancer as the somatic counterpart of psychotic regression. The inability or lack of willingness to transcend the early dependency of childhood in these patients resulted in the development of the malignancy itself, Bahnson and Bahnson said.

Their work received support from a variety of writers, including recent reports from Bassidakis, Erotocritou and Volidou (1973), who

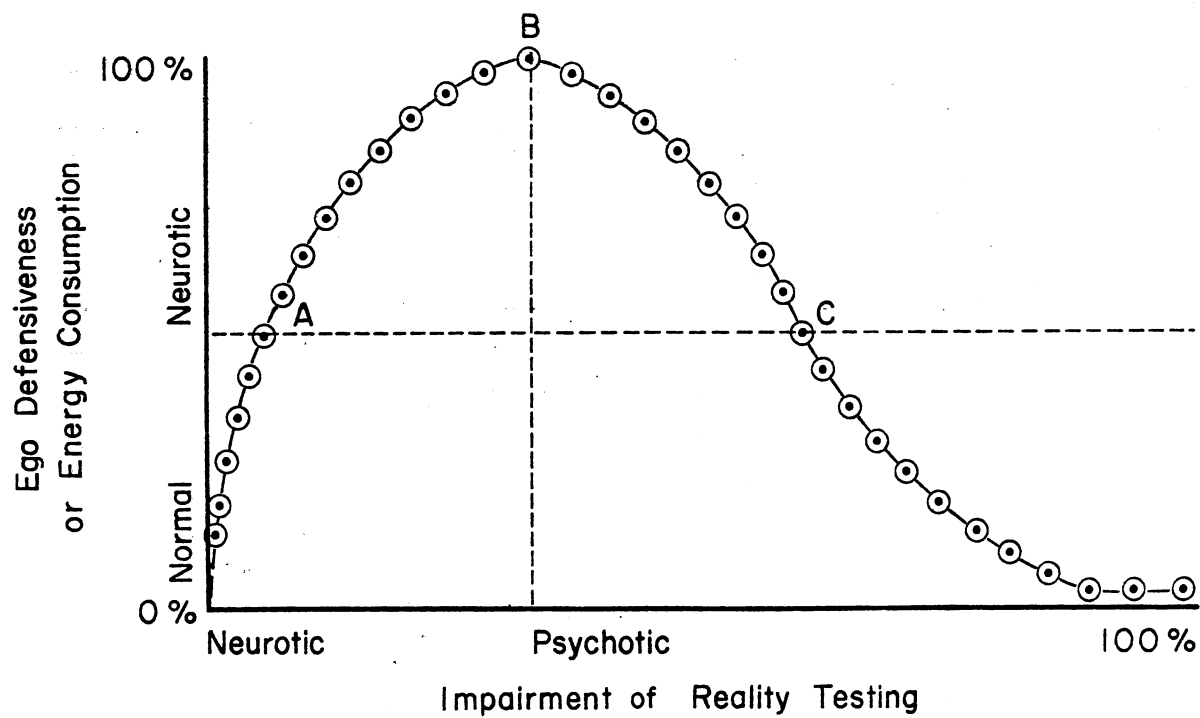
concluded on the basis of their own research and available literature that not only cancer but schizophrenia, diabetes mellitus and certain other diseases were "psychosomatic transformations of nuclear anxiety" as described by Bahnson and Bahnson (1969). They noted frequent appearance of these diseases during times of unusual anxiety, such as during adolescent and involutinal periods, and the disappearance of anxiety with disease onset in some patients.

Klopfers Rorschach Approach

Bruno Klopfer constructed a model of the rate of cancer progression in individuals after finding differences in levels of psychological energy in the Rorschach protocols of cancer patients (1957). He reported considerable success with its application in his presidential address to the Society for Projective Technique (Klopfer, 1957). Klopfer correctly identified, for instance, nine fast-growing and 10 slow-growing cancer patients from a total of 24 solely on the basis of their Rorschach records with knowledge of sex (only one was female) and age. He viewed differences in progression rates among people with the same type of cancer as highly related to the degree of energy consumed for ego defense, as determined by the Rorschach. People investing high amounts of energy in ego defense were predicted to have unusually rapid cancer processes while those investing low levels of energy were thought to have slow neoplastic processes. The model could be applied to about 80 percent of the general population. Personality organizations with atypical ego defense systems, those with certain types of hypomanic or psychopathic adjustments were outside the model's scope. Klopfer's energy strength model is illustrated in Figure I:

FIGURE I

Pathway of Diminishing Ego Strength



Source: Klopfer, B. "Psychological Variables in Human Cancer." Journal of Projective Techniques, Vol. 24 (1957), Page 335.

Regardless of first impressions, the seemingly elementary two-axis graph is both complicated and highly abstract. The vertical axis represents the level of energy consumed in ego defense, with increasing levels from bottom to top. The axis also may be considered to represent the actual level of ego defensiveness itself. The horizontal axis is a measure of the degree of impairment of reality testing, with increasing levels of impairment from left to right. The central element in the graph is a skewed line termed by Klopfer the "Pathway of Diminishing Ego Strength," a reflection of the personality's available ego strength. Unfortunately, objective measures of the personality dimensions involved are very difficult to obtain, as Klopfer noted.

Point zero percent is a hypothetical utopia which would be composed of people without needs to defend their ego of fear--there were never people who qualified. In fact, Klopfer found up to about 50 percent consumption of the maximum amount of energy was characteristic of fairly well-adjusted people. People who used more than 50 percent would be found in the top half of the graph. The fast-growing cancer subjects would be on the skewed line between points A and B. At point B, there were diminishing returns for investments of energy in ego defensiveness--loyalty to reality rapidly diminished, accompanied by a peculiar and rather marked drop in the level of energy invested in ego defensiveness with the approach to point C.

From point C on down the line, the ego was considered dissociated, and "no more systematic effort in defensiveness can be recognized," Klopfer said (1957, p. 335). People with slow-growing cancers could be found along the line from point C to the 100 percent point on the horizontal axis:

When I looked at these first six preliminary experimental subjects there was no question that every one of the people with the slow-growing cancer was, in his level of discomfort, below this line, A-C. And even though none of them was clinically a psychotic, they had developed a relationship to reality which you can only describe with the simple phrase, "They didn't give a damn" (Klopfers, 1957, p. 336).

Klopfers found most of his errors with the model involved people who would be placed on the line between Points B and C, people whose fragmented ego defenses could be termed between neurotic and psychotic. Only two subjects were placed between Points zero percent and A, both amazingly well adjusted and apparently unusually able to resist cancer progression. One was a Klopfers colleague who had complained to his physician something was wrong and had argued when told it was psychosomatic. He went without further medical consultation until near death from what was found to be advanced intestinal cancer. At the time of Klopfers' article, he had survived five years and remained free of metastatic development since surgery, Klopfers said. The second was a less-spectacular case, a woman who was doing very well with Hodgkin's Disease of 20 years duration, responding quickly to occasional radiation therapy to control symptoms.

It is puzzling that little of significance was related to the area on the line between points B and C, a zone of ego disintegration which might include severe anxiety and greatly increased autonomic nervous system activity. Reyher and Basch (1970) and Reyher (1964) studied increased bodily activity, in particular biological and psychological consequences of the sudden breaking of hypnotically-induced repressions. Klopfers reported the B--C zone involved sudden changes, with immediate relief from anxiety by trading impaired reality testing for

energy.

Klopfer designed the graph to demonstrate the mental process he had been using to sort cancer subjects correctly as to progression rate with Rorschach data. He considered color shock and discomfort related to shading and color in general to be associated with use of high levels of energy for ego defense, while F quality was employed as a measure of reality testing. Klopfer limited his model to cancer progression, leaving the problem of cancer onset to others.

The important findings of Katz, et al. (1970) may have reflected at the endocrine level the psychological energy process which Klopfer described. They noted previous findings which linked a ratio of endogenous corticoid and androgenic steroids to decreased treatment responsiveness of female breast cancer patients, and discussed a possible role for psychological concepts.

Ego defenses of 30 hospitalized women scheduled for breast tumor biopsy were assessed on the basis of interviews, with rather-consistent and apparently valid findings. Affect, functioning disruption and reserve energy for psychological defense were studied for each subject by the Katz group. Endocrine measures were obtained concurrently. A highly significant covariance ($p. = \leq .02$) was found between extent of failure of defense and hydrocortisone production rate. A less significant relationship ($p. = \leq .05$) was found with urinary levels of the principal hydrocortisone metabolites, while there was no significant relationship between defensive failing and urinary levels of the principal androgen metabolites.

Evolution Theory Applications

A number of writers approached the problem from a more molecular level of abstraction, discussing cell characteristics and species adaptation. Jonas (1962) hypothesized that excessive irritation provoked a remnant autoamputative reflex in the central nervous system which acted asexually to produce neoplasia. In lower animals this process involved splitting and development of a new organism, but in humans it was pathological, he said. Either "psychological" or "physical" irritation could precipitate the process in disposed people. Despair over a personal loss, such as found with depression, was considered the equivalent of the physical loss of any part of the anatomy.

Jonas discussed puzzling cancer-related phenomena in light of his model, including subacute combined cerebellar degeneration in the presence of any type of cancer, dementia with cancer of the lungs, peripheral neuropathy with bronchogenic cancer, demyelinating neuropathy with lymphoma and leukemia and reports of neuromyopathy with ovarian tumors.

Such neurological deviations occurred prior to cancer onset, sometimes by as long as three years, and reflected central nervous system remnants of a very primitive biological reflex in our evolutionary development, Jonas said. The central nervous system was viewed as having two primary purposes--focusing resources for the benefit of the offspring and destruction and removal of the old organism.

His views about cancer were similar to the general psychosomatic approach of Brain (1964), who reported that large areas of human brain were more primitive than generally believed. Brain cited a

number of human and animal experiments to support his views, which included mapping the brain according to the conceptualization of emotional behavior as dependent on centers in the hypothalamus, which were in turn controlled in a complex manner by the cerebral cortex. Brains's map also involved primitive, antiquated relationships among some brain areas: "...there is some evidence in man that still underline those basic instinctive drives and emotional tensions which he shares with many of his evolutionary predecessors" (p. 327), he said. Brain also discussed the relationships of specific brain areas to various emotions.

A Lay View

Malignant cells were also viewed in evolutionary terms by medical writer Bernhard (1970), an observer of activities at the 1970 conference of the International Union Against Cancer, who saw them as a "...rare, observable example of evolution at the cellular level," as they increasingly varied from any endpoint in the tissues' developmental patterns (p. 27).

Use of such evolutionary concepts also could be found in the report of Kavesky, Turkevich and Balitsky (1966), who concluded following laboratory studies that the central nervous system highly influenced development of malignant neoplasms. They conducted surgical, chemical and psychological experiments with animals and found indications that inhibition of the CMS favored tumor growth while CMS excitation hindered neoplastic growth. There was some evidence that the hypophysis, adrenal gland and hypothalamus played important roles in tumor acceleration or inhibition, they said.

Booth's Perspective

In a related approach, Booth (1956) discussed cancer onset in terms of evolutionary, Jungian and psychoanalytic concepts, noting both possible dynamics related to onset and unconscious motivations for overlooking such factors. A rather outspoken writer, Booth cited several specific instances of what he considered blatant attempts to prevent study of psychological aspects of cancer. He speculated that many fellow physicians wanted to control "their object," which he considered to be the disease itself, while repressing the psychological meanings. This was a condition in some ways similar to the primitive, pregenital logic used unconsciously by the cancer patients, he said. He viewed the typical cancer patient as an anal character and considered the impact of this orientation upon the physician, who had needs to control. The goal of such unconscious thinking was to recreate magically an important loss, he said.

Booth presented Rorschach responses of cancer and tuberculosis patients, with comments to the effect that cancer patients tended to interpret areas of the blots as wild birds or wild animals while tuberculosis patients saw the same areas as domestic birds and domestic animals. He believed this and other differences were often overlooked, as was the importance of inner life in general, because many believed the future of humanity hinged on the physical conquest of nature.

But ironically he also criticized Freud, saying he, like some of the more recent physicians, sought to ultimately house the totality of the human psyche in materialistic biology. He noted the anal quality of this reasoning, as well as Freud's subsequent development of cancer.

A decade or so later, Booth (1969) told the New York Academy of Sciences that cancer was related to depression, the neoplastic process being a biological representation of the lost object. This or similar views had been suggested by Green and Miller (1965), Schmale and Engel (1967) and a number of others. Freud (1917) saw the psychodynamics of depression as turning elements of the self into the lost but unlosable object, while Booth theorized cancer patients react with conscious or unconscious depression to the loss, and then somatize it in the form of the neoplasia. He considered the tumor to be localized in the organ involved psychophysiologically in the frustrated object relationship, the tumor being the lost object symbolically regained.

To support this Booth cited epidemiological and immunological evidence that the decreased incidence of tuberculosis since the middle of the last century had been replaced. The 20 percent of the total population who died from tuberculosis became cancer prone. This rise in cancer was the result of a change in the amount of affectionate interplay between baby and mother because the industrial revolution forced mothers to work, and generally into less than optimal practices, he said.

Maternal deprivation included the belief of some mothers that cuddling of babies was unhygienic or bad for sound character, he said. As a result, personalities were created with unusual needs for object control, autonomy, affection and symbiotic relationships--the predisposing psychological condition for cancer, in his view. During the previous 25 years, childhood cancer, formerly rare, became the second-ranking cause of death in childhood. This was a direct result of the frustration of infant affectional needs and the overall emphasis on

physical rather than psychological factors, he said.

More specifically, he suggested that certain inner conflicts may play a role in the site of the tumor, citing frequently of occurrence data for various sites and individual case reports. Women who developed breast cancer were viewed as often having conflicts about autonomy which inhibited their carrying out the mutual intimate interaction of breast feeding. He reported a study with rats in which 15 percent of the females who were prevented from nursing their litters developed mammary cancer. Booth also saw a less important but more complicated second variable related to the change, the introduction into "the same gene pool" of "a new environmental factor," a development which was not discussed in detail.

Booth (1969) said he was discouraged by medical criticism of his psychophysiological views, but asked sympathetic professionals to influence others toward understanding cancer as a reaction to a personal loss. Lives could be saved if appropriate psychotherapy followed physical removal of the tumor, he said. He saw cancer as a message of social significance and urged acceptance of this view to prevent "needless recurrences." Booth's thoughts may have shifted again, however. Recently, he viewed death as natural rather than a negative aspect of life (Booth, 1975).

Jungian Viewpoint

While Booth endorsed a mixture of theoretical approaches, Evans (1926) remained fairly consistent in her application of Jungian concepts to cancer etiology. She apparently was also the first to discuss personality and cancer etiology in a comprehensive manner in this

country. A Jungian analyst, she reported her findings in an early book, A Psychological Study of Cancer, which contained her impressions from intensive Jungian analysis she undertook with 100 cancer patients. She reported they had lost a major cathexis prior to onset of the neoplasm and lacked a replacement outlet for the psychic energy. During therapy they often regressed to a primary identification with the mother, she said.

Evans viewed the tumor itself as the turning inward of primitive erotic needs. The loss of intensive cathexis prior to tumor onset was the central theme of her book, a hypothesis LeShan and Worthington (1956) credited as the first clear statement of the object-loss concept in cancer research. By examining such statistical records as cancer incidence rates and studying them in regard to personal data such as status of widow or divorcee, they found considerable support for her view.

Stress Theories

A number of writers have suggested that various types of stress play a role in the pathogenesis of cancer, either by inhibiting tumor growth or weakening bodily defenses against tumors. Both these possibilities are consistent with Selye's theory (1956, 1974), described earlier. During the initial stages of defense against stress, tumors apparently failed to progress as rapidly as during the stage of exhaustion, Selye noted (1956).

He reported a large variety of neoplasms seemed to grow poorly in humans and animals subjected to severe stress, noting incomplete regression of cancer under the influence of ACTH, cortisone and other

hormones (1956, p. 304). But as the body's defenses reach the stage of exhaustion, continued stress would tend to have the opposite effect according to his theory.

Paradoxically, McDonald, et al., (1960) found rats were more susceptible to cancer immediately after the stress of surgery than four days later. They also concluded that impaired resistance to cancer from stress was unrelated to increased adrenal cortical secretion. This followed a series of adrenalectomies without influence on cancer susceptibility and the administration of the corticoid blocking agent amphenone, likewise with no effect. They were unable to conceptualize mechanisms involved in reduction of cancer immunity following stress, but did report:

Preliminary experiments suggest the thyroid and hypophysis are not involved significantly in this reaction, although hypothyroidism induced by propl-theouracil may have a favorable effect in neutralizing the decreased resistance (McDonald, et al., 1960, p. 4).

The phenomenon occurred so frequently in animals that the authors suspected its presence in some form in humans.

Riley (1975) found similar results in female mice exposed to oncogenic virus. By varying the levels of chronic stress, he manipulated the cancer incidence rate from seven percent in a protected environment to 92 percent with stress:

The data suggest that moderate chronic or intermittent stress may predispose such mice to an increased risk of mammary carcinoma, possible through a resultant compromise of their immunological competence of tumor surveillance system, and that adequate protected from physiological stress may reduce mammary tumor occurrence in mice (Riley, 1975, p. 465).

Rasmussen and Hildemann (1963) were unable to find any difference at all between stressed and unstressed mice inoculated with polyoma

virus at birth by intracardiac route. There was no significant difference in incidence, extent or location of tumors. LaBarba (1970) reviewed the literature concerning experiential and environmental factors and cancer in animals and found strong support for the idea that neoplastic diseases are influenced by such variables. After studying some 17 major articles dealing with the topic, he concluded that further research efforts were empirically justified despite an un-systematic approach to the problem at that time.

While some authors discussed the possible relationship between a specific, long-standing life stress of one type or another and cancer onset in humans, more abstract concepts were usually employed, such as the effects of chronic, severe personality maladjustment (Stephenson and Grace, 1954).

Integrative Attempts

Solomon and Moos (1954) proposed an admittedly speculative integration of psychological and physiological findings concerning several diseases, including cancer, and suggested personality variables could be related to alterations in immunological responsiveness.

Published reports linking psychological variables with four diseases were noted, as were the authors' tentative impressions of considerable similarity of both the variables and the diseases. Evidence was cited that all four--rheumatoid arthritis, ulcerative colitis, hyperthyroidism and disseminated lupus erythematosus--were related to immunological impairment. Both stresses and consequent adrenal hyperactivity were viewed as factors in disease pathogenesis with immunological impairment being both psychogenic and pathogenic.

Onset and rate of progression of cancer could exemplify the proposed complex relationships between emotional stress, personal characteristics, adrenal corticosteroid levels and immune system failure, they said (p. 670). Solomon, Levine and Kraft (1968) reported that immunological responsivity of adults appeared to be modified by early experiences such as infantile stimulation, while Solomon (1969) more specifically addressed the issue of psychology and cancer pathogenesis via immune system impairment.

CHAPTER IV

CONCEPTUALIZATION

Three major endeavors of this study were literature review, experimentation and examination of the usefulness and history of relevant concepts, the literature review and concept analysis being particularly highly interrelated. Experimental findings, expressed as quantitative differences between subject-group means, were less useful in re-conceptualization than expected. The experimental level was both too molecular and too focused for efforts viewed as different in terms of a molecular-molar continuum, with molar concepts associated with abstract terms of wide application.

"Abstract" was considered related to such other terms as process, boundarylessness, timelessness and universal similarity, while "concrete" was associated with boundaries, including definition in time, as well as tangibility, dualism and quantitateness. The term book could be considered concrete in its tangible nature (boundaries), dualistic in being either present or not present, and quantitative (12 books), as contrasted to abstractness in changing, energy, love and ego.

Use of the molecular-molar continuum and concrete-abstract conceptualizations were from the field of general semantics (Johnson, 1946, Korzybski, 1921). This area of study was found similar in usefulness to understanding conceptualization as statistics with analysis of quantitative data.

Many important, culture-wide ideas appeared to be too concrete for use here in that they involved static and discrete qualities, as in the case of "mind-body" and "cause and effect" relationships. The mind-body conceptualization was mentioned because of considerably more than historical perspective, in that it reflected major assumptions of contemporary culture. Psychiatrist-anthropologist Fabrega (1975) discussed this in regard to psychiatry:

The domain of psychiatry was initially outlined by and has since been continually nurtured in terms of the dualistic Cartesian model of man, a model heretofore useful as a starting point for an understanding of disease and behavior (p. 1512).

He urged that the model be "expanded to include new dimensions about disease (p. 1512)." Perhaps the next dimension is its being discarded.

Dualism was viewed in this study as a cultural myth, a group-endorsed view similar to a defense mechanism in its short-term usefulness and purposeful function. Like defenses, cultural myths posed an increasing burden with time. Reid and Finesinger (1956) discussed this quality in defense mechanisms:

But for this temporary negative "good," the threatened ego must pay what is in the long run too high a price, namely, continued ignorance of the most vital facts about its own motivations and values, with the inevitable result that the fool's paradise it lives in recurrently turns into a neurotic's hell (p. 1019).

Defenses warded off anxiety, and even though a temporary protection, their reduction of anxiety was a powerful reward. The human dualism myth may have reflected death anxiety, with more than one discrete human realm to copy with obvious decompensation of the body.

Dualism was replaced in this study with a tentative view of the person as a unitary dynamic system of ever-changing, interrelated

phenomena measured in terms of boundaryless levels and dimensions of abstraction. The past tense was often expressed here, in keeping with the view from general semantics (Johnson, 1947) of the usefulness of "changing."

Higher mathematics was considered abstract, in its universal qualities, and therefore useful in dealing with relatively non-discrete and non-static conceptual phenomena. Abstract concepts appeared to have considerable usefulness across many conceptual fields of study. Certain geometric relationships were applied to such diverse subjects as computer logic, characteristics of soap bubbles and planetary behavior, for instance.

The MMPI was considered a suitable medium for reflection of bodily processes, concepts varying in levels and dimensions of abstraction. Previous MMPI reports were encouraging. MMPI results had been discussed as abstract personality constructs such as repression-sensitization (Byrne, Barry and Nelson, 1963), as well as more molecular concepts such as MMPI reflections of vitamin B complex deficiency (Bustzkow, et al., 1947), hypersensitive reactions to immunization inoculations (Canter, 1974), internal organ functioning as related to stable and brittle adult diabetics (Fink, 1963), aging (Pearson, Swenson and Rome, 1965, gender (Webb, 1971) and length of time of recovery from infectious mononucleosis (Greenfield, 1964).

The view of the MMPI as capable of general bodily reflections was also consistent with a series of non-MMPI findings involving concepts of multiple levels and dimensions of abstraction. These included the relationship of measures of psychological defense and mean urinary 17-hydroxycorticosteroid excretion (Wolff, et al., 1964), of emotions and

immune system variables (Solomon, 1974), of hypnotically-induced repression, its disruption by skillful confrontations and ANS physiological reactivity (Reyher and Bash, 1970, Reyher, 1964), of lifting of repression during a ^{psycho}psychoanalysis and ongoing REM measurements (Greenberg and Pearlman, 1975) and of Raphe Cells and serotonin activity as blockage of daytime dreaming (Siegel and West, 1975).

Some major ^{psychological}psychological conceptualizations have been useful for prediction in what is termed a level of a dimension, with further usefulness found in application of the same concept to another level of the same dimension. For example, Reyher and Bash (1970) reported that the concept "good repressor" was useful in terms of assessment of subject fantasies and later in terms of related variations in their autonomic nervous system measures, two levels of the same dimension. But the repression concept, as measured by the MMPI scales, was not found useful in this study, a phenomenon conceptualized as the application of this concept to another dimension. While the concept repression had been useful in terms of psychological syndromes and related physiological activity, the failure here can be viewed as its attempted use in a second dimension, disease manifestation. This differed from the psychological term repression relative to its physiological brain reflections.

Like repression, the term cancer is also relatively state-oriented (boundaryless) and abstract, but conceptualized as from another dimension. The physiological measurements related to the concept repression were not significantly related to the concept cancer. The physiological changes useful in understanding cancer were not significantly helpful in understanding repression.

More useful applications of the MMPI in medicine may involve formulation of special scales based on characteristics of groups specific to disease processes, as opposed to scales conceptualized in terms of other dimensions, such as psychological syndromes. The result may be predictive successes with certain disease processes through some specially constructed MMPI scale unobliquely termed "L160," or some other nonpsychological label, after repeated failures with numerous of the psychological syndrome scales.

It may be useful to abandon "psychological syndromes" per se as related to clinical onset of these diseases, such as the hypothesis of over-controlled hostility as related to breast cancer, in favor of less dualistic concepts. The idea that psychological factors cause onset of one of the experimentally tested diseases, or cause changes in the course of the disease, was concrete, with both discrete and static connotations. Meyer (p. 1038) provided an interesting illustration with the Koch Bacillus. While it was known widely that this bacillus was the "cause" of tuberculosis, the actual clinical manifestation of the disease depended upon a variety of factors, he reported. Many people were repeatedly exposed to the bacillus without clinical onset, as predicted in the more-abstract immune system theory. The term "reflect" was seen as more useful than the idea of "cause and effect" in this dissertation.

Even the frequently used term "onset" was a problem, although improved (slightly) with "clinical onset," meaning detectable by a physician. For example, lung cancer has been diagnosed following a positive sputum or chest ray density and treated with radiation therapy prior to a pneumonectomy. In surgery, however, there has been a

consequent absence of any sign of the tumor, except perhaps some necrotic remnants. But, these patients had about the same survival rates as those who were not preoperatively treated and had tumor masses at the time of surgery. In the untreated group, the tumor reappeared with greater resistance to treatments, in most cases.

Such microscopic and submicroscopic regressions, with strengthened recoveries, appeared to be most usefully understood in abstract terms of considerable more flexibility than views of a cause-effect interactions of easily defined static states.

CHAPTER V

EXPERIMENTAL DESIGN AND RESULTS

This study was designed to consider the nature of relationships between MMPI characteristics of 177 medically healthy subjects and their medical status regarding manifestation of certain diseases during the decade following testing. The 110 male subjects involved were assigned to one of four groups, depending on manifestation of cancer, heart disease or hypertension, or continued good health. There were too few female subjects available for a heart disease group. The 67 female subjects were assigned to one of the remaining three categories. Differences at the $p = .05$ level (two-tailed) were found with four of the scales. Three of these--Si,HR and #CrIms Scales--involved female subjects and one--Wb Scale--male subjects. The Tukey procedure was used in post hoc analysis. Specific differences were found between four mean pairs. Three of these involved the female cancer group, which was indicated to be more socially withdrawn than the control group and less likely to endorse regressive test items than the hypertension group. Findings were discussed in terms of current theoretical issues.

Subjects

Women subjects tended to be healthier than men subjects, in general, with fewer N's for the female cancer and hypertension groups and too few female subjects to form a heart disease group. This left two

female disease groups and three male disease groups, along with their respective healthy control groups. The seven groups were matched for age at the time of testing (Table III).

All of the subjects completed an essentially negative general physical examination and took the MMPI during a single visit to a large midwestern medical clinic (Mayo Clinic) between June, 1962, and July, 1965. Subsequent medical status was determined by records of return visits to the clinic or responses to letters of inquiry. There were 110 male and 67 female subjects in all, selected from some 1,575 clinic patients known to have been in essentially good health at the time they took the MMPI 11 to 14 years prior to this study. The medical records of the 1,575 were manually reviewed over a six-month period to locate all patients who met the requirements for inclusion in the study, but few qualified. Required for experimental subjects was long-standing good-to-excellent health, followed by manifestation of one of three diseases in the case of male subjects, or one of two diseases in the case of females, during the 11-to-14 year period following MMPI administration. About 11 per cent of the 1,575 could be used as subjects. All were caucasian.

The MMPI was routinely administered to ambulatory adult out-patients who were free of incapacitating symptoms during the period June, 1962, to July 1965 (Swenson, Pearson and Osborne, 1973). Very few clinic consultations during this time involved the department of psychiatry and less than about three per cent of the 1,575 patients saw a psychiatrist. None were psychiatric inpatients when they took the MMPI.

General Subject Criteria. A diagnosis of satisfactory general

examination or essentially negative general examination at the time of MMPI administration was the criterion for good health. Use of one of these diagnostic terms as opposed to the other was more a matter of the personal preference of the particular physician than difference in their meaning. Both indicated a complete medical examination had been conducted and was free of evidence of significant disease, but not necessarily of minor ailments such as common forms of arthritis, or such patient complaints as feeling low in energy. Other criteria for selecting subjects were:

- 1) A pretesting medical history free of chronic disease (such as tuberculosis, polio, or any of the three experimental group diseases). Childhood illnesses and such common ailments as flu were acceptable if without complications, as were slightly more serious conditions, such as a case of pneumonia which responded to treatment.

- 2) An age at the time of taking the MMPI of greater than or equal to 25, and less than or equal to 75.

- 3) An MMPI Q Scale (no answer-both answer) t score of less than or equal to 60.

- 4) An MMPI L Scale t score of less than or equal to 70.

- 5) An MMPI F Scale t score of less than or equal to 80.

Control Subject Criteria. In addition to the above criteria, healthy (control) subjects met the requirement of continued good to excellent health at least to January, 1970, as verified in all but three cases by an essentially negative general physical examination conducted in the clinic, and a likewise negative medical history obtained during the last examination. Three of the female control subjects had not been seen in the clinic since January, 1970, but they were

contacted by letter and reported remaining in excellent health to 1975 (Appendix A). They had all been in good health when last seen in the clinic.

Experimental Subject Criteria. Aside from the five general requirements listed above, the experimental subjects received a diagnosis in one of the three investigated disease categories during the approximate decade following MMPI administration. Heart disease was defined as myocardial infarction, angina or coronary artery disease. About two-thirds of these diagnoses were made during return visits to the clinic. The remaining were made by the patients' local physicians and reported in patient responses of follow-up letters. The female heart group was eliminated from the study when less than 10 subjects could be located. The male and female cancer groups comprised all patients who met the first five general requirements and were diagnosed in the years following MMPI administration as having some type of cancer other than skin cancer. Almost all of these diagnoses were made on return clinic visits, but a few were reported in responses to follow-up letters (Table IV).

The hypertension groups met the general subject requirements and included those who received a post-MMPI diagnosis of hypertension. About half of these diagnoses were made in the clinic and half elsewhere, as reported by the patients in response to follow-up letters.

Roughly 50 per cent of the total 1,575 patients returned to the clinic for additional consultation following the MMPI/negative examination combination. Some 700 letters were mailed from the clinic to patients whose charts contained insufficient information to include to patients whose charts contained insufficient information to include

them as a subject (Appendix A). Information concerning general health, particularly any medical or surgical treatment since the last clinic visit, was requested. On rare occasion a letter was sent to the patients' last known outside physician when the patient or relatives could not be reached. Responses to letters allowed the addition of some 35 subjects to those obtained solely on the basis of their clinic records. Table III shows mean subject ages and number of subjects in each group, and Table IV indicates composition of the cancer groups:

TABLE III
 AVERAGE SUBJECT AGES
 AT TIME OF TESTING

Group	Number of Subjects*	Mean Age
Females		
Cancer	16	52.8
Hypertension	16	55.4
Healthy Controls	<u>35</u>	<u>56.9</u>
Total Female Subjects	67	55.0
Males		
Cancer	24	57.5
Heart Disease	36	55.9
Hypertension	22	50.0
Healthy Controls	<u>28</u>	<u>55.7</u>
Total Male Subjects	110	54.8
Total Subjects	177	

*Scores from some MMPI special sales unavailable for a few subjects

TABLE IV
COMPOSITION OF CANCER GROUPS

<u>Subj.</u>	<u>Site</u>	<u>Diagnosis</u>	<u>Time Elapsed:</u> <u>MMPI to Ca. Dx.</u> <u>(In Years)</u>
Females			
1	Breast	Adenocarcinoma, grade 4	3.8
2	Breast	Adenocarcinoma, grade 4	4.5
3	Breast	Adenocarcinoma, grade 3	6.3
4	Breast	Carcinoma** *	*
5	Cervix	Squamous cell, grade 2	12.3
6	Cervix	Squamous cell, grade 4	.5
7	Ovary	Cystadenocarcinoma, grade 1	6.8
8	Ovary	Adenocarcinoma, papillary, grade 3	6.2
9	Stomach	Malignant Lymphoma of Stomach	4.5
10	Inguinal Node	Giant Follicular Lymphoma	.3
11	Multiple	Metastatic** *	*
12	Gallbladder	Adenocarcinoma, grade 2 (in situ)	1.3
13	Rectum	Adenocarcinoma, grade 2	1.5
14	Ureter	Metastatic*	5.5
15	Endometrium	Carcinoma*	6.0
16	Pancreas	Adenocarcinoma, metastatic	11.3
			(Mean = 5 years)
Males			
1	Lung	Large cell, undiff., grade 4	1.3

TABLE IV (Continued)

Males (Continued)

<u>Subj.</u>	<u>Site</u>	<u>Diagnosis</u>	<u>Time Elapsed:</u> <u>MMPI to Ca. Dx.</u> <u>(In Years)</u>
2	Lung	Small cell, grade 4	.7
3	Lung	Small cell, grade 4	.4
4	Lung	Carcinoma** *	*
5	Prostate	Carcinoma*	1.9
6	Prostate	Adenocarcinoma, grade 3	10.3
7	Prostate	Adenocarcinoma, grade 2	2.3
8	Prostate	Carcinoma**	.6
9	Prostate	Carcinoma** *	*
10	Prostate	Adenocarcinoma, grade 3	10.1
11	Prostate	Adenocarcinoma, grade 1	4.4
12	Colon	Adenocarcinoma, grade 2*	9.5
13	Colon	Adenocarcinoma, grade 1	.9
14	Colon	Adenocarcinoma*	3.3
15	Rectum	Adenocarcinoma, grade 1	4.3
16***	Stomach	Lymphoma, ulcerating	4.3
	(Same subject later diagnosed: adenocarcinoma of the colon)		(7.6)
17	Stomach	Adenocarcinoma, grade 3	5.8
18	Inguinal	Lymphocytic malignant lymphoma	7.9
19***	Kidney	Renal cell carcinoma, grade 1	6.9
	(Same subject later diagnosed: cancer of prostate)		(10.5)
20	Pancreas	Metastatic carcinoma*	5.9
21	Cecum	Adenocarcinoma, grade 2	10.1

TABLE IV (Continued)

Males (Continued)

<u>Subj.</u>	<u>Site</u>	<u>Diagnosis</u>	<u>Time Elapsed:</u> <u>MMPI to Ca. Dx.</u> <u>(In Years)</u>
22	Thyroid	Adenocarcinoma, grade 1	7.6
23	Bone	Osteogenic Sarcoma	4.2
24	Bone	Neoplasm** *	*

* denotes information unavailable, or less than usual information available. Detailed data concerning subsequent developments could not be obtained for a few patients who were away from the clinic.

** denotes information from response to follow-up letter rather than clinic examination.

***denotes subject was given second cancer diagnosis.

Characteristics of Patient Population. Between 1962 and 1965, approximately 50,000 clinic patients took the MMPI during a wide variety of clinic consultations. This overall population was reported to be reasonably representative of the midwestern middle class as well as a reasonable sample of the larger population of literate medical patients seen by private physicians throughout the country (Swenson, Pearson and Osborne, 1973).

Of the 50,000 MMPI patients registered during 1962-65 who completed an MMPI, 24 per cent were from the immediate Rochester, Minnesota, area while 21 per cent listed their residence as elsewhere in Minnesota. Percentages for other states were: 9.6 per cent from Illinois; 8.9 per cent from Iowa; 6.2 per cent, Wisconsin; 3.7 per cent, Indiana; 2.9 per cent, Michigan; 2.2 per cent, South Dakota; 2.2 per cent, Nebraska; 1.5 per cent, Missouri; 1.4 per cent, North Dakota; and 1.0 per cent, Ohio (Swenson, Pearson and Osborne, 1973, p. 5).

The remainder were divided into sections of the country. About 0.1 per cent were from the New England states; the Middle Atlantic states included 1.2 per cent; South Atlantic, 1.8 per cent; East South Central states, 1.1 per cent; West South Central States, 2.5 per cent; Rocky Mountain States, 2.1 per cent and Pacific States, 2.0 per cent; Rocky Mountain States, 2.1 per cent and Pacific States, 2.0 per cent. There were 2.2 per cent listing residences as somewhere in Canada; about 1.0 per cent from Latin American and less than 0.5 per cent from all other countries combined. Almost all of the foreign patients were excluded from taking the MMPI unless English was their primary language (Swenson, Pearson and Osborne, 1973, p. 6).

During the 1962-1965 period, an average of 30 percent of all patients were hospitalized and 19 per cent of these went to surgery.

A large number of the hospitalized patients did not take the MMPI. Only 0.2 per cent of the 50,000 refused to take the MMPI, but three per cent did not return the test and about two per cent of the profiles had more than 120 Cannot Say items (Swenson, Pearson and Osborne, 1973). Some 95 percent of all patients asked to take the MMPI during the time period were willing and able to do so. It was not administered to people who were seriously ill or injured nor, of course, to children and infants.

A number misconceptions have circulated concerning the clinic's patients:

Some have assumed that the patient population would be hopelessly biased by disproportionate numbers of wealthy neurotics who come to this clinic from great distances seeking treatment of nonexistent organic disease. Others have presumed that the patient population is heavily loaded with patients who have unusual combinations of rare diseases and difficult diagnostic or treatment problems. It is true that these two groups were represented both in the general population and in the MMPI sample, but their numbers were small in relation to the total sample (Swenson, Pearson and Osborne, 1973, p. 6).

Materials

All 566 questions of the standard booklet form (Group Form A) of the Minnesota Multiphasic Personality Inventory (MMPI) were administered with test responses marked by each patient on a computer scored answer sheet. In cases where a follow-letter was sent to the patient's home requesting information concerning medical status, the same type of letter with a stamped return envelope was used for all patients (Appendix A).

Procedure

Some 1,575 medical charts at the clinic were manually reviewed over a six-month period by the author to locate patients who met the criteria for experimental or control subjects (see "Subjects"). All 1,575 had undergone a complete physical examination at the clinic during the period June, 1962, to July, 1965, and had taken the MMPI during the same clinic visit as part of a policy of routinely giving the test to general medical patients.

MMPI responses and patient information were recorded on master tapes. Information recorded included the patient's clinic number, date the test was taken, age at time of testing, raw scores and t scores for 18 MMPI scales, any critical items endorsed and all 566 responses. These were listed as either true, false, both true and false or no answer. All but five of the 23 MMPI scales used in this study had been prescored. The remaining scales (HR, RS, WR, OH and #CritItems) were manually scored from printouts with special stencils and verified by an independent scoring. If the two scores for a scale failed to match, the scale was rescored until a completely accurate score was obtained.

The scores for all 23 scales were punched into computer cards, using t scores whenever possible, and carefully verified for accuracy. Each card included an identifying subject and group code number. Twenty-three one-way analyses of variance, one for each MMPI scale, were computed separately for each sex. (On the basis of chance alone, about two significant findings at the $p = .05$ level would be expected because of the large number of separate comparisons, 46 in all.) Male and female subjects were studied separately because of previous

findings (Krasnoff, 1959) concerning possible confounding from mixing male and female scores.

MMPI scales were selected in large part on the basis of relevance to previous findings and theoretical formulations regarding psychological variables and experimentally tested diseases, with the following expectations derived from the literature and specified prior to data analysis:

- 1) Lie Scale means for the male and female cancer groups were predicted to be higher than their respective control group means, and the male hypertension Lie score mean was expected to exceed that of the male heart group.

The Lie Scale was designed to detect deliberately less-than-honest responding, but also measured rigidity, over-conventionality, lack of insight, and to some degree, repression and denial. All of these qualities have been associated with manifestation of cancer (Brown, 1966, LeShan and Worthington, 1965, and Aimex, 1972). The Lie Scale had an advantage compared to some of the more specific measures of these qualities, such as the WR and R-S Scales regarding repression, in its general tendency toward independence from clinical scales, in the high Lie Scores were often associated with suppression of clinical scales. Specific reports of the Lie Scale with cancer included Schonfield's (1973) report of females with breast cancer scoring higher on the Lie Scale than females with benign tumors, and Gay's (1970) finding that male cancer patients with high Lie scores had more rapidly progressing malignancies than cancer patients with lower Lie scores.

Dunbar (1968) found that heart and hypertensive patients differed in that cardiac disease involved consistent, primarily intellectual

striving for success which frequently led subjects to such stressful occupations as medical practice, law and business management. Hypertensive patients tended to be unable to realize such "success" despite strong achievement needs, and often adopted rigid, frustrating and unsophisticated lifestyles with chronic repression of rage, attributes considered within the realm of the Lie Scale.

2) Reyher's Weighted Repression Scale (WR) and Byrne's Repression-Sensitization Scale (R-S) were employed specifically as measures of repression, with all disease group means expected to be greater than their respective control group means on the WR Scale, and less than their respective control group means on the R-S Scale. (Greater levels of repression for the illness groups was predicted for both scales).

Increased levels of repression as related to onset of various illnesses was frequently discussed (Dunbar, 1968, Alexander, 1950, et al.), including the experimentally tested diseases, hypertension, heart disease and cancer. A number of writers associated repression with cancer in particular, including Bahnson (1959), Bahnson and Bahnson (1969), LeShan and Worthington (1956) and Gay (1970). The WR Scale, based on the concept of levels of repression with differing physiological concomitants was associated with various physiological reactions when repression was experimentally "broken" (Sommerschild and Reyher, 1973). Subjects with low R-S Scale scores, repressors, were found to have more organic diagnoses than those who scored higher on the scale, sensitizers, who were likely to have psychological rather than purely medical diagnoses (Schwartz, Krupp and Byrne, 1971). Bell and Byrne (in press) thought the R-S Scale might be related to manifestation of cancer, as well as to its more documented relationships with other

illnesses. The R-S scale appeared to have an advantage in the increased levels of behavior expression, in addition to lower levels of repression, related to the upper end of the scale.

3) Male and female cancer subjects were predicted to have lower scores than their respective controls on three strongly behaviorally-related scales, Hy, Pd and Ma, indicating less behavioral impulse expression in cancer subjects. The cancer subjects were also predicted to have higher scores on the Si Scale than their controls, an indication of increased social introversion in the cancer groups. Male heart subjects were predicted to have higher Ma scores than male cancer subjects, indicating a higher energy level in the coronary group.

Closely related to repression as a factor in disease manifestation was the concept of impaired ability to behaviorally express impulses, discussed by Bahnson and Bahnson (1959), Kissen (1967) Bacon, Renneker and Cutler (1952), Blumberg, West and Ellis (1954) and Gay (1970). Netzer (1964) reported female cancer subjects withdrew socially from contact with the outside world. Several writers reported increased activity and high achievement motivation as particularly related to heart patients (Dunbar, 1968, Dahlstrom, Welsh and Dahlstrom, 1975).

In all, the order within 22 mean pairs, involving seven MMPI scales, was specified on the basis of the previous literature. The 23 AOV comparisons for each sex were then made by computer on the basis of the punched card information.

Results

Four of the 46 AOV comparisons were significantly different, reaching the $p. = \leq .05$ level (two tailed tests). Only one of the

one-tailed comparisons, involving female cancer and control subjects and the Si Scale, was statistically significant. This comparison was significant at the $p. \leq .05$ level with a two-tailed test and did not reach the $p. = \leq .01$ level with a one-tailed test ($p. = \leq .02$).

The female diagnostic groups (cancer, hypertension and healthy control) were different when compared in terms of Si, HR and #CrIms scores (see Table V). The male diagnostic groups (cancer, heart disease, hypertension and healthy control) were different with the Wb Scale (Table VI).

The Tukey HSD procedure (Winer, 1971, p. 198) was applied to the four different comparisons, and one pair of means was determined to be the source of difference in each of three comparisons (all, $p. = \leq .05$), but contrary to the AOV finding, no difference was found in one comparison with the more-conservative Tukey method. Female cancer subjects scored higher on the Social Introversion (Si) Scale than female controls, whose mean was average for both the standard MMPI norms and clinic norms. Female hypertension subjects scored higher than female cancer subjects on the Haan Regression (HR) Scale. Norms were unavailable for this scale, as well as for the Number of Critical Items Scale (#CrIms) which was found to differentiate female means with the AOV, but only approached the $p. = \leq .05$ level in post hoc comparison. The cancer group mean (#CrIms) raw score was 1.86, with a healthy control mean of 2.23 and a hypertension mean of 3.25. Correlation Ratios (Winer, p. 113) were computed for each of the four significantly-different mean pairs as a measure of predictive ability. The four significant eta's were: Si, .306; HR, .304; Wb, .295 and #CrIms, .307. Results are listed in Tables V and VI:

TABLE V
RESULTS OF ONE-WAY AOV'S FOR
TWENTY-THREE MMPI SCALES
WITH FEMALE SUBJECTS

(Two-tailed comparisons with means as \bar{t} scores.)

Scale	p.	F Ratio	Cancer Group			Hypertension Group			Healthy Controls		
			N	X	SD	N	X	SD	N	X	SD
Q	.599	.517	16	47.813	6.242	16	45.875	4.897	35	46.486	5.549
Lie	.306	1.206	16	52.563	6.066	16	51.500	8.278	35	55.000	8.694
F	.683	.384	16	49.375	3.500	16	48.875	4.064	35	48.514	2.748
K	.145	1.994	16	58.938	7.750	16	56.438	7.367	35	60.943	7.538
Hs	.846	.167	16	51.375	9.061	16	52.938	9.037	35	52.171	6.138
D	.377	.990	16	55.063	8.394	16	52.000	9.987	35	51.543	7.686
Hy	.473	.757	16	52.250	9.074	16	55.625	9.135	35	53.800	6.370
Pd	.496	.709	16	47.750	11.886	16	48.500	9.107	35	50.886	8.731
MF	.927	.076	16	49.313	9.024	16	48.188	9.225	35	48.543	7.770
Pa	.238	1.466	16	50.688	7.087	16	53.000	6.356	35	54.086	6.432
Pt	.468	.769	16	50.125	7.482	16	50.313	6.395	35	52.371	7.240
Sc	.606	.504	16	49.313	7.534	16	50.813	10.206	35	51.543	5.565
Ma	.158	1.901	16	44.250	9.015	16	49.375	9.294	35	49.429	9.313
**Si	.043	3.317	16	55.625	8.861	16	50.500	7.024	35	50.257	6.368
A	.800	.223	14*	42.714	4.681	16	43.625	7.915	35	42.429	5.337
R	.105	2.342	14*	55.429	6.173	16	48.188	9.704	35	52.314	9.991
EgS	.879	.129	14*	55.571	5.734	16	55.500	9.041	35	54.571	7.535
Wb	.130	2.110	14*	41.286	6.799	16	45.500	8.149	35	41.543	6.161
R-S	.259	1.382	14*	26.071	8.914	16	30.438	11.910	35	24.886	11.499
OH	.737	.307	14*	15.071	3.100	16	14.625	2.630	35	15.286	2.739
**HR	.050	3.154	14*	6.429	2.065	16	8.750	2.646	35	7.514	2.650
WR	.307	1.203	14*	10.500	3.082	16	12.625	4.241	35	11.486	3.776
**CrImS	.047	3.221	14*	1.857	1.512	16	3.250	2.049	35	2.229	1.416

*Score was unavailable for all subjects **Statistically significant

TABLE VI
RESULTS OF ONE-WAY AOV'S FOR
TWENTY-THREE MMPI SCALES
WITH MALE SUBJECTS

(Two-Tailed comparisons with means as \bar{t} scores.)

Scale	p.	F Ratio	Cancer Group			Heart Group			Hypertension Group		
			N	X	SD	N	X	SD	N	X	SD
Q	.894	.203	24	44.750	4.513	36	44.722	5.268	22	45.682	4.795
Lie	.097	2.161	24	49.875	7.479	36	50.139	6.699	22	46.500	5.325
F	.335	1.145	24	49.292	4.319	36	50.056	3.695	22	51.364	3.761
K	.421	.947	24	56.333	7.927	36	59.333	9.405	22	56.409	8.937
Hs	.467	.854	24	51.125	7.826	36	54.417	10.646	22	54.136	0.203
D	.938	.137	24	54.917	7.395	35	55.000	9.627	22	55.773	10.295
Hy	.436	.915	24	54.708	9.153	36	57.500	8.933	22	57.273	7.923
Pd	.162	1.745	24	50.458	8.086	36	55.944	10.823	22	51.591	10.464
MF	.410	.970	24	55.583	7.211	36	57.139	10.486	22	58.909	11.389
Pa	.445	.898	24	51.542	6.594	36	54.528	8.477	22	55.227	7.010
Pt	.543	.719	24	50.167	10.615	36	52.556	8.933	22	50.818	7.607
Sc	.403	.985	24	47.083	8.219	36	51.000	10.020	22	49.045	7.656
Ma	.568	.677	24	51.375	9.240	36	51.778	10.228	22	52.864	9.156
Si	.524	.752	24	51.125	7.146	36	48.944	8.529	22	47.636	8.693
A	.819	.309	23*	46.044	6.568	36	45.194	8.750	22	44.409	6.940
R	.929	.150	23*	51.826	8.250	36	52.000	7.657	22	51.000	7.740
EgS	.133	1.909	23*	53.826	7.457	36	55.306	10.042	22	58.000	5.944
**Wb	.024	3.286	23*	45.782	7.173	35*	46.400	9.201	22	50.727	6.212
R-S	.817	.311	23	28.870	13.291	36	25.556	16.047	22	27.818	13.665
OH	.449	.795	23	13.391	2.726	36	14.000	3.162	22	13.318	2.234
HR	.612	.606	23	7.000	2.468	36	6.667	3.439	22	7.273	2.374
WR	.235	1.440	23	14.478	3.907	36	13.611	3.759	22	15.046	3.331
#CrIms	.947	.122	23	2.348	1.641	36	2.056	2.976	22	2.364	1.620

TABLE VI (Continued)

(Scale)	Healthy Controls		
	N	X	SD
Q	28	44.857	4.874
Lie	28	51.643	8.782
F	28	51.321	6.617
K	28	59.214	9.142
Hs	28	55.286	10.808
D	28	56.357	11.209
Hy	28	58.643	8.770
Pd	28	52.464	9.815
MF	28	54.643	7.851
Pa	28	53.821	10.151
Pt	28	53.679	11.046
Sc	28	50.607	10.419
Ma	28	49.286	8.009
Si	28	49.357	7.494
A	28	44.071	8.321
R	28	52.679	11.176
EgS	28	52.679	7.464
Wb	28	43.964	7.084
R-S	28	25.714	15.842
OH	28	14.429	3.426
HR	28	7.607	2.657
WR	28	13.071	3.651
#CrImS	28	2.357	2.738

*Score was unavailable for all subjects

**Statistically significant

CHAPTER VI

SUMMARY, CONCLUSIONS AND DISCUSSION

Summary

MMPI scores of 177 healthy male and female adults were studied regarding whether they continued in good health or developed cancer, heart disease (males only) or hypertension during approximately one decade following test administration. Mean scores for 23 MMPI scales were computed for the four outcomes for males and three outcomes for females (there was an insufficient number of subjects for a female heart group). Twenty-three one-way analyses of variance were computed for each sex.

Means were different on four of the scales ($p. = \leq .05$, two-tailed test). Woman who developed cancer scored higher on the Si Scale, reflecting greater introversion than control females, whose group mean was average for both the standard MMPI norms, and clinic norms (Swenson, et al., 1973).

The female cancer group was different from the female hypertension group with the Haan Regression Scale (HR). There was some evidence the same two groups differed on the Number of Critical Items Scale (#CrImS) also, but the AOV indication of a significant difference here was not fully supported by the more conservative Tukey procedure. The female cancer group appeared to be less psychologically regressed than the female hypertension group.

Among the male subjects, the healthy controls scored lower than the hypertension group on Pearson's Worried Breadwinner Scale. The hypertension mean was almost identical with the clinic norms for the Wb scale, while the cancer and heart group Wb means were not significantly different from the hypertension of control means. Correlation Ratios (Winer, 1971, p. 113) for the four scale, were significant.

Two significant findings at the $p. = .05$ level would be expected solely on the basis of the number of one-way AOV's, a total 46 (23 for each sex).

The conceptualization of repression per se as a major factor in the later clinical onset of these disease processes was not useful with these results. Findings were discussed in terms of psychological and physiological measurements reflecting constantly changing processes involving multiple levels and the dimensions of abstraction (Chapter IV). Twelve conclusions were made on the basis of the results and literature review:

Conclusions

1. Some of the group differences with the four MMPI scales significantly reflected subject process variations related to later clinical manifestation of experimentally tested chronic disease.
2. There was a three-to-one, female-to-male ratio of significantly different AOV comparisons which was most likely related to random fluctuation, but the lack of gender similarity for the type of significantly different MMPI scale was probably related to differences between the male and female subjects.

3. Healthy women subjects, who at some later date had clinical cancer, indicated themselves to be more socially introverted as measured by the MMPI Si Scale than the otherwise similar female subjects who remained well. The latter group expressed mean Si Scale levels typical of the normal female standardization sample of Minnesota adults.

4. Two $p. = .05$ -level differences were expected solely on the basis of the number of separate AOV's involved (46--23 for each sex). The two statistical differences with the Hr and #CrImS MMPI Scales represented greater risk of Type I Error than Si Scale differences, if considered only on the basis of their individual probabilities.

5. The same order of the subject group means occurred with both the HR and #CritItems Scales among female subjects: hypertension mean high, cancer mean low and healthy control mean insignificantly different ($p. = .028$ for any two successive occurrences of same ranking in three variables, from probability theory). Both scales are to some degree positively correlated with use of regressive logic, which added to the evidence from their statistical probabilities that they reflected female subject processes related to clinical onset of hypertension as opposed to onset of cancer.

6. Mean differences with the Wb Scale may have reflected male subject group differences related to continued good health as opposed to onset of hypertension.

7. Limiting this study to a maximum of four diagnostic categories left untested the possibility of significant relationships between the same MMPI variables and hundreds of other diagnostic outcomes excluded

because of insufficient N's, including the possibility that an MMPI measure found useful in this study could be related to so many diagnostic outcomes as to be of considerably less merit in the general population.

8. Some 150 to 200 MMPI measures were excluded from this study, leaving most of these measures untested with this type of design.

9. The conceptualization of increased repression and denial, as related to later clinical onset of these diseases, was not useful with these particular results.

10. At least 150 papers were published in world psychological and medical journals between 1925 and 1975 regarding the topic of psychological variables as related to onset or course of malignant processes. Less than 15 per cent of these reported the use of matched control subjects and two per cent or less involved the combined use of matched controls, objective measures and data collection prior to clinical onset of cancer.

11. Knowledge of the culturally unconscious aspects of language can be useful in theoretical-level study in a manner similar to that of currently well-accepted deferment to statistical tests in the examination of less abstract, more molecular data.

12. Recent research involving relationships among various psychological and physiological measures has occurred in a time of improving reliability, validity and specificity of available measuring techniques, with large accumulations of unstudied data. These accumulations have often involved data too vast and/or complex for practical study without computerized equipment. Rapid changes in conceptual schemes also have occurred. Brain activity, for instance, has

recently been conceptualized in such diverse ways as gender-correlated hemispheric dissimilarities, psychological age regression during altered states of consciousness, interrelationships of Raphe Cells of the lower brain, serotonin and dreaming in regard to the waking brain (an unusually integrative approach), and cell incorporation of components of viral genetic codes.

Discussion

Results largely were outside currently theoretical prediction with group means essentially the same in 46 comparisons involving 23 MMPI scales considered to measure phenomena of theoretical importance. Scales primarily were selected to represent conceptualizations which linked clinical onset of one or more of the experimental diseases to such constructs as depression, somatization, repression, denial, over-control of hostility, impulsiveness, ego strength, regression, projection, sex role identification, level of energy and social conformity. Six scales were employed because of their hypothesized sensitivity to repression: Lie, Hy, R (Welsh), R-S (Byrne, Barry and Nelson, 1963), WR (Reyher and Basch, 1970) and the number of critical items scale #CrImS.

The overall results were considered to reflect, in part, subject process differences related to later clinical onset of the experimental diseases primarily because of the statistical probabilities of the four significantly-different comparisons, with the assumed relative group similarity of major variables other than those experimentally manipulated. Four lesser factors were also involved in the decision, however: 1) Two of the four differentiating scales (Wb and Si) had

previously been found to be unusually age-related, while clinical onset of the diseases was highly related to aging, 2) The occurrence of the same group mean patterns for the HR and #CrImS Scales with female subject (in light of the assumed similarity of the two scales).

3) Scales employed were designed for other purposes, conceptualizing personality organization (Hs was the only exception), and would be expected to provide somewhat atypical results, 4) The author's unitary conceptualization of bodily phenomena included reflections in psychological measurements of such pre-disease processes.

Swenson (1961) found the most frequent high points on the MMPI for 95 nonpsychiatric subjects over the age of 59 were with the Si, Hs, D and Hy Scales, while Pearson, Swenson and Rome (1965) composed with Wb Scale on the basis of recurring item dissimilarities among age groups of medical patients. The scale has a curvilinear relationship with age, peaking in the 40's (Pearson, 1976). Both the Si Scale (significantly different with women subjects here) and the Wb Scale (significantly different with men subjects here) contain a number of face-valid items involving self-criticism and general maladjustment, including a sort of worried rumination and attitudes of general inferiority attitudes. The 70 Si items include many unique to the scale (26), which usually has been most highly correlated with the Pt Scale and least or slightly negatively correlated with the Hy Scale, among the 13 standard MMPI scales (Dahlstrom, Welsh and Dahlstrom, 1975). The Wb Scale, also relatively item-independent, has been correlated negatively with the K Scale, but very little has been published regarding it (Pearson, 1976).

Among subject groups, the female cancer group scored highest on

the Si Scale with the healthy control approximately average for the norm group of normal Minnesota adult women. With male subjects and the Wb Scale, the cancer and heart group means essentially were the same, the healthy control group mean was slightly lower and the hypertension mean, the highest, was about average for the clinic norms of male medical patients, a more complicated situation than with the Si Scale. A clue to possible conceptualization may be the healthy control mean being lowest, but despite this scale's correlation with age and the relationship with aging of numerous disease processes, almost nothing has been published since it was devised (Pearson, 1976).

The same result patterns of the Hr and #CrImS Scales for female subjects was thought related to subject qualities because of the relatively low probability of random occurrence ($p = .028$), on the basis of probability theory, the low (four item) overlap and both scales' assumed same-direction sensitivity to regressive thinking. This would tend to support the hypothesis of female cancer patients as less regressed prior to clinical onset.

Future Research

The usual sparsity of research employing matched controls, objective measures and data collection prior to clinical onset presented many opportunities for future experimental contributions. Studies hopefully will involve other MMPI measures, larger N 's, additional diagnostic groups or group composition refinements based on such criteria as more specific illness types or such factors as the time between psychological testing and clinical onset of disease. There was nothing of significance here regarding profiles of subjects found

to have cancer three months after testing as opposed to profiles followed by clinical onset in six years, for instance.

Unfortunately, it has often been very difficult to locate sufficient numbers of subjects with specific diagnoses who previously took an appropriate psychological test. The number of diagnostic labels encountered in the course of this study was vast. The most frequently applied in a large clinic often accounted for less than five per cent of the patients. Aside from this, there were a number of other research problems, such as subjects in excellent health being coded as presbyopia or obese (when only slightly overweight) in place of negative general examination, and patients grossly understating their intake of tobacco or liquor. It was almost impossible to control accurately, on the basis of patient reports, amount of tobacco smoked although there was evidence of merit in controlling for whether a person smoked (Carr, 1976). Such variables as nutrition and contact with disease-related substances such as carcinogens also were very difficult to measure. Occupational factors may have been better controlled in the female subjects in this study because of the high percentage of housewives. Three of the four significantly-different comparisons were with female subjects, which may or may not be important in this regard.

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APPENDIX A

FOLLOW-UP LETTER

Mayo Clinic

Rochester, Minnesota 55901
Telephone 507 282-2511

Department of Medical Statistics
and Epidemiology

We are conducting a follow-up study of many patients who have been seen at the Mayo Clinic. We are interested in knowing how you are getting along at this time. While you are under no obligation to reply, your willingness to complete and return this form will enable us to evaluate your progress and will aid us in the care of present and future patients with similar problems. Your reply will of course be treated confidentially. A stamped return envelope is enclosed for your convenience.

1. How is your general health? _____

2. Have you had any medical or surgical treatment since your last visit to the Mayo Clinic? _____ If so, please describe briefly _____

3. Please give us your address if different from the one above. _____

Any further comments you may wish to make may be written on the reverse side of this letter. Thank you for your cooperation.

Sincerely yours,



Leonard T. Kurland, M.D.

If for any reason the person to whom this letter is addressed cannot answer it, will a relative or friend kindly supply as much information as possible.

APPENDIX B

LIST OF MMPI SCALES

	<u>Symbol</u>	<u>Scale Name</u>	<u>Type</u>	
1.	Q	Question	Standard, Validity	
2.	Lie	Lie	"	"
3.	F	Validity	"	"
4.	K	K	"	"
5.	Hs	Hypochondriasis	Standard, Clinical	
6.	D	Depression	"	"
7.	Hy	Hysteria	"	"
8.	Pd	Psychopathic Deviate	"	"
9.	MF	Masculinity-Feminity	"	"
10.	Pa	Paranoia	"	"
11.	Pt	Psychasthenia	"	"
12.	Sc	Schizophrenia	"	"
13.	Ma	Hypomania	"	"
14.	Sc	Social Introversion	"	"
15.	A	A: First Factor Welsh Anxiety	Special Scale	
16.	R	R: Second Factor Welsh Repression	"	"
17.	EgS	Barron Ego Strength	"	"
18.	Wb	Worried Breadwinner	"	"
19.	R-S	Revised Repression-Sensitization Byrne, Barry and Nelson	"	"
20.	OH	Overcontrolled Hostility Megargee, Cook and Mendelsohn	"	"
*21.	HR	Haan Regression	"	"
*22.	WR	Reyher Weighted Repression	"	"
*23.	#CrImS	A critical items scale	"	"

Further information concerning scales one through twenty can be found in Dahlstrom, Welsh and Dahlstrom, 1975. *Items specified, Appendix C.

APPENDIX C

ITEMS COMPOSING THE HR, WR AND
CRITICAL ITEMS SCALES

HAAN REGRESSION SCALES (HR)

Items common to both men and women:	<u>True</u>	<u>False</u>
	4	36
	14	37
	62	55
	98	245
	212	294
	240	302
	249	379
	254	
	322	
	334	
	404	
	420	
	452	
	488	
	489	
	562	
Items for men only:	<u>True</u>	
	170	
	373	
Items for women only:	<u>True</u>	<u>False</u>
	84	207
		230
		262

(The number of base items is 23. The maximum total score possible for men is 25 and for women is 27.)

REYHER'S* WEIGHTED REPRESSION SCALE (WR)

<u>Weighted One</u>	<u>Weighted Two</u>	<u>Weighted Three</u>
217 T	359 T	148 F
345 T	96 T	6 T
349 T	358 T	18 T
346 T	413 T	73 T
329 F	53 T	72 T
285 F	33	43 T
22 T		
45 T		
11 F		
66 T		
64 T		

(Twenty-three items in all with a maximum total score of forty-one.)

*Reyher and Basch (1970).

CRITICAL ITEMS SCALE (#CrIme)

20. My sex life is satisfactory. (False)
37. I have never been in trouble because of my sex behavior. (False)
69. I am very strongly attracted by members of my own sex. (True)
74. I have often wished I were a girl. (or if you are a girl), have never been sorry that I am a girl. (True)
85. Sometimes I am strongly attracted by the personal articles of others such as shoes, gloves, etc., so that I want to handle or steal them though I have no use for them. (True)
133. I have never indulged in any unusual sex practices. (False)
179. I am worried about sex matters. (True)
297. I wish I were not bothered by thoughts about sex. (True)
302. I have never been in trouble because of my sex behavior. (False)
48. When I am with people I am bothered by hearing very queer things. (True)
184. I commonly hear voices without knowing where they come from. (True)
334. Peculiar odors come to me at times. (True)
350. I hear strange things when I am alone. (True)
27. Evil spirits possess me at times. (True)
121. I believe I am being plotted against. (True)
123. I believe I am being followed. (True)
151. Someone has been trying to poison me. (True)
158. There is something wrong with my mind. (True)
200. There are persons who are trying to steal my thoughts and ideas. (True)
202. I believe I am a condemned person. (True)
209. I believe my sins are unpardonable. (True)
275. Someone has control over my mind. (True)
291. At one or more times in my life I felt that someone was making me do things by hypnotizing me. (True)
293. Someone has been trying to influence my mind. (True)
323. I have had very strange and peculiar experiences. (True).
345. I often feel as if things were not real. (True)
349. I have strange and peculiar thoughts. (True)
44. Much of the time my head seems to hurt all over. (True)
114. Often I feel as if there were a tight band about my head. (True)
139. Sometimes I feel as if I must injure either myself or someone else. (True)
148. I have the wanderlust and am never happy unless I am roaming or traveling about. (True)
155. I have had periods in which I carried on activities without knowing later what I had been doing. (True)
182. I am afraid of losing my mind. (True)

- 205. At times it has been impossible for me to keep from stealing or shoplifting something. (True)
- 215. I have used alcohol excessively. (True)
- 251. I have had blank spells in which my activities were interrupted and I did not know what was going on around me. (True)
- 294. I have never been in trouble with the law. (False)
- 337. I feel anxiety about something or someone almost all the time. (True)
- 339. Most of the time I wish I were dead. (True)
- 354. I am afraid of using a knife or anything very sharp or pointed. (True)

(41 critical items).

VITA

John Wharton McCoy

Candidate for the Degree of

Doctor of Philosophy

THESIS: PSYCHOLOGICAL VARIABLES AND ONSET OF CANCER

Major Field: Psychology

Biographical:

Personal Data: Born in Paris, Texas, June 28, 1947, the son of Dr. and Mrs. Carl McCoy.

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