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Recent Life Events and Subsequent Reports of Illness in an Undergraduate Population: An Examination of Hardiness

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RECENT LIFE EVENTS AND SUBSEQUENT REPORTS OF ILLNESS IN AN UNDERGRADUATE POPULATION: AN EXAMINATION OF HARDINESS

by

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VITA

The author, Daniel James Bruining, is the son of Gerald Carl Bruining and Shirley Ann (Ferm) Bruining. He was born on September 16, 1957, in Muskegon, Michigan.

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CHAPTER I

INTRODUCTION

Correlational studies have consistently demonstrated a relationship between stressful life events and reports of illness. In a review of the stress and illness literature published prior to 1976, Rabkin and Streuning (1976) reported correlations ranging from .20 to .78 between stress and illness. The majority of these studies reported correlations below .30. While it is apparent that a relationship does exist between stress and illness, it is obvious that there are individuals who experience many events considered to be stressful and do not report falling ill while others experience very little stress and nevertheless suffer from many illnesses.

Recently, investigators have begun to examine the role of moderator variables in the stress and illness relationship. Using this strategy, subgroups are formed according to predictor-criterion measures and other variables are examined to determine if group differences exist among them. This procedure seeks to identify particular subgroups for whom the relationship between stress and illness is particu

larly strong. Studying the differences between identifiable groups might increase our understanding of resistance resources to illness. Although many factors have been identified as potential moderators, several have been systematically investigated. For example, Kobasa and Puccetti (1983) studied personality hardiness and social resources; Miller and Cooley (1981) examined sensation seeking, introversion/extroversion, and health locus of control; Johnson and Sarason (1978) focused on internal versus external locus of control; and Kobasa, Maddi, and Puccetti (1982) examined exercise and hardiness as possible moderator variables in the stress-illness relationship.

Kobasa (1979) introduced the composite of personality variables she termed hardiness. This construct has emerged as one of the most frequently examined moderator variables. Hardiness is conceptualized as consisting of three components: control, commitment, and challenge. In subsequent studies Kobasa and her coauthors (Kobasa, Maddi, & Courington, 1981; Kobasa, Maddi, & Kahn, 1982; Kobasa, Maddi, & Puccetti 1982; Kobasa, Maddi, & Zola, 1983; Kobasa & Puccetti, 1983) have provided a large amount of data supporting hardiness as a moderator variable in the stress-illness relationship. These studies have consistently demonstrated the stress buffering effects of hardiness. In comparing individuals who experience comparable levels of stress, those individuals who are shown to be high in hardi-

ness experience fewer symptoms of illness than those low in hardiness. All of these studies have been conducted with groups of adult male executives in the Midwest. There is a strong need to examine hardiness using different populations of individuals.

In the present study, a population of undergraduate males and females was studied in an effort to test the generalizability of Kobasa's work. The six components of the hardiness construct were examined to determine if they differentiate between individuals who get sick under stressful life events and those who do not. Those who do not experience symptoms of illness should possess a stronger commitment to self, an attitude of challenge toward the environment, and an internal locus of control.

CHAPTER II

REVIEW OF LITERATURE

The mind-body relationship has been controversial for centuries. Many scholars after Plato conceptualized the mind and body as separate entities. Although there was considerable disagreement about the nature of the interaction between these two entities, it was generally believed that a one-way effect existed in which the mind could influence the body but the body could not influence the mind. This one-way dualistic position was seriously challenged by Rene Descartes (1596-1650). Although he did not reject the basic dualist position, he differed in his definition of the interaction of the mind and body. The mind or soul had previously been considered to be the master of the body.

Descartes rejected this notion and proposed a more mutual interaction. This shift reflected the emerging mechanistic Zeitgeist which held tremendous implications for the development of psychology. Descartes considered the body to be like a machine and therefore subject to the same mechanical laws. This belief supported the notion that human behavior is predictable. This became the foundation for

subsequent developments in philosophy and eventually the discipline of psychology. Perhaps this idea is most clearly evident in modern behaviorism in which behavior is considered to be predictable and to result from a given input or stimulus.

Descartes viewed the mind as nonmaterial and therefore not subject to the properties of matter. He believed the two entities interacted at the site of the pineal gland in the brain. He recognized that the mind decides to move and this decision is then carried out by the mechanical body. In addition, the mind can be influenced by the body since the mind must interpret sensory data. Although the exact nature of this interaction was unclear, however, Descartes described it in mechanistic terms.

The shift in the conceptualization of the mind-body relationship occurred approximately three centuries ago. Although many other important historical developments occurred between Descartes' time and the present, the impact of his conceptualization that the mind and body interact in a mutual fashion continues to have great significance. This change was critical in setting the stage for current interest in the relationship between stress and illness.

Stress and Illness

Psychologists, physicians, and others have frequently wondered about the relationship between life events and

subsequent reports of physical illness and psychological dysfunction. In clinical psychology and psychiatry this interest has often manifested itself in theories concerning conversion reactions and psychosomatic illnesses. Peptic ulcers, migraine headaches, and asthma are disorders frequently considered to have significant psychological and environmental components in their etiology. More recently researchers have investigated the impact of psychological factors in the development and course of cancer, immunological disorders, and heart disease.

In addition to studies of specific clinic populations, others have investigated the relationship between stressful life events and health in the general population. In this research, the accumulation of life change events is investigated. High scores for life change or stress are thought to be related to the occurrence of a variety of symptoms and poorer general health. Studies of this kind typically request individuals to retrospectively indicate the number of events they have experienced during the recent past (usually six months to two years). They are also asked to check the number and type of illnesses they have experienced during the same period. In a review of such studies, Rabkin and Struening (1976) found that correlations between stress and illness typically range from .20 to .78 with the majority falling below .30. Although a consistent relationship is found between stress and illness, the strength of this

relationship is not particularly strong. Consequently our understanding of the relationship and the potential for treatment and disease prevention is limited.

In a straight correlational analysis, individual differences in the variability in both stress and illness scores are not typically taken into account. For example, there are many individuals who experience a great deal of stress and do not report experiencing symptoms or illnesses. These individuals appear to thrive on high levels of environmental challenge and change. There are others who report high levels of both stress and illness. In 1979 Kobasa published a pioneering study which investigated possible personality differences between individuals who get sick under high degrees of stress and those who do not. Personality variables were hypothesized to moderate the relationship between stress and illness. It was proposed that individuals who were particularly susceptible to the debilitating effects of stress might be identified through personality variables.

Moderator or mediating variables are considered to impact differentially on the predictor-criterion relationship for different subgroups of individuals. In Kobasa's initial study, she conceptualized the term hardiness to refer to a variable made up of control, commitment, and challenge as a significant moderator variable in the stress and illness relationship. Others have proposed and investi-

gated different moderator variables depending upon varying theoretical and empirical considerations. For example, Cooley and Keesey (1981) investigated sensation seeking, health locus of control, and the Myers-Briggs indicators; Ganellen and Blaney (1984) studied hardiness and social support; and Kobasa, Maddi, and Puccetti (1982) studied personality and exercise as possible moderator variables in the stress and illness relationship.

Investigations of moderator variables are relatively recent. Replication of previous studies, use of different populations, and methodological modifications based on problems encountered in previous work need to be undertaken. A review of the literature involving stress and illness and moderator variables will highlight many of these issues and offer a starting place for additional research.

Hardiness as a Moderator Variable

Kobasa's study in 1979 and her subsequent investigations undertaken with other authors (Kobasa, Maddi, & Courington, 1981; Kobasa, Maddi, & Kahn, 1982; Kobasa, Maddi, & Puccetti, 1982; Kobasa, Maddi, & Zola, 1983; Kobasa & Puccetti, 1983) have provided a large amount of data related to stress and illness. Central to all of these studies is the concept of hardiness.

The hardy personality is composed of three major factors: control, commitment, and challenge. Control is con-

ceptualized as the tendency to feel and act as if one can control or influence events and outcomes through personal action. Rotter (1966) suggested that individuals high in internal control perceive environment reinforcers as being under their personal control whereas individuals high in external control view reinforcement as resulting from luck, chance, fate, or through the efforts of powerful others. Internals actively engage the environment and view events as resulting from their own actions. Thus, when encountering new situations or environmental change, internally controlled individuals attempt to integrate these experiences into their existing world view. According to Averill's (1973) model of stress and responses to it, control allows one to develop a large repertoire of responses to stress. If one possess a varied number of responses and an ability to utilize them flexibly, the individual should adapt to changes more efficiently and become less vulnerable to the possible debilitating effects of stress.

Commitment is expressed as a readiness to actively involve oneself in whatever tasks one encounters. Persons high in commitment engage themselves in activies with a sense of meaningfulness and purpose. When stressful events are encountered, committed persons tend to perservere. They approach new challenges with a sense of their own values, priorities, and goals.

The challenge component refers to the tendency to per-

ceive new events and situations as a normal part of life and as opportunities for continued growth and development. Change is not viewed as a threat to security but as offering possibilities for stimulation. Individuals high in challenge tend to value and seek out novel experiences and have developed strategies and resources for mastering new situations. The concept of challenge is not necessarily considered to manifest itself in extreme forms of adventurousness or risk. It is viewed more as a propensity to continually seek out new situations which are integrated into the person's world view. Events which are viewed as stressful should be mitigated by the challenge component and rendered less threatening.

The personality variables of control, commitment, and challenge were hypothesized to buffer the impact of stressful life events on the occurrence of illness. In order to test this hypothesis, Kobasa (1979) undertook a study of male executives in a Midwestern utility company. She asked her initial subjects to complete retrospective stress and illness questionnaires for the previous three year period. She used a modified Schedule of Recent Life Events (Holmes & Rahe, 1967) as her measure of stressful life events and the Seriousness of Illness Survey (Wyler, Masuda, and Holmes, 1968) as her measure of illness.

After obtaining the retrospective data, Kobasa formed two groups, a high stress/high illness group and a high

stress/low illness group by crossing the two variables at their median splits. A set of 100 subjects from each group was randomly selected and instructed to complete a self-report questionnaire which contained the personality tests hypothesized to measure hardiness. These included the Alienation Test (Maddi, Kobasa, & Hoover, 1978), the Internal versus External Locus of Control Scale (Rotter, Seeman, & Liverant, 1962), several scales from the Personality Research Form (Jackson, 1974) and several scales from the California Life Goals Evaluation Schedules (Hahn, 1966). Discriminant function analysis was utilized to select the best combination of these variables for explaining the differences between groups. Five variables were found to contribute to this discriminant equation: a sense of commitment to self (as opposed to alienation), a sense of vigorousness (in contrast to vegatativeness), a sense of meaningfulness (as opposed to nihilism), an internal locus of control (versus an external locus of control), and the perception of personal stress. Those experiencing high stress and high illness reported that their lives were significantly more stressful than high stress/low illness individuals.

In this initial study of hardiness using a population of male executives, Kobasa determined that high stress/high illness individuals could be distinguished from high stress/low illness individuals. High stress/low illness

executives were found to be more in control, more committed, and had a greater orientation to challenge than high stress/high illness executives. To expand on this finding, Kobasa has collaborated with a series of authors on additional studies of hardiness.

Kobasa and Puccetti (1983) examined personality hardiness and social resources; Kobasa , Maddi, and Courington (1981) looked at hardiness and consitutional predisposition; Kobasa, Maddi, and Puccetti (1982) studied the moderating effects of hardiness and exercise; Kobasa, Maddi, and Kahn, (1982) conducted a prospective study of hardiness; and Kobasa, Maddi, and Zola (1983) studied Type A behavior and hardiness. Each of these studies has provided additional information about the role of hardiness in addition to data on interactions with other potential moderator variables.

In these studies, Kobasa and her coauthors modified the hardiness measure used in the initial study. They utilized six scales to form a composite measure of hardiness. The Alienation from Work scale and the Alienation from Self scale (Alienation Test, Maddi et al., 1979) were used to measure commitment. Control was measured by the Internal versus External Locus of Control Scale (Rotter et al., 1962) and the Powerlessness scale from the Alienation Test. The Security scale from the California Life Goals Evaluation Schedule (Hahn, 1966) and the Cognitive Structure scale from the Personality Research Form (Jackson, 1974) were used to

measure challenge.

In subsequent studies of the hardiness construct, these six scales have been utilized to determine a composite hardiness score. Intercorrelational analyses of these six scales has consistently shown (Kobasa et al., 1981; Kobasa, Maddi, & Kahn, 1982) substantial and significant correlations between the scales with the exception of cognitive structure. Using a principal-components factor analysis procedure, it was determined that the Cognitive Structure scale does not share common variance with the other scales. Because of this, it was dropped from subsequent analyses. In the 1982 study, the score for the remaining indicator of the challenge component, the Security scale, was doubled. This procedure was not repeated in other studies.

Although some of the details in these later studies varied, each of the investigations shared the basic methodology and data analysis procedures. In the study of personality and exercise as buffers in the stress-illness relationship (Kobasa, Maddi, & Kahn, 1982), an analysis of variance was completed with stressful events, hardiness, and exercise serving as independent variables and illness serving as the dependent variable. Each of the independent variables demonstrated a significant main effect with stressful life events increasing reports of illness and exercise and hardiness decreasing it. There was also a significant interaction between stressful events and hardi-

ness and between stressful events and exercise. These results support the hypothesis that individuals who are high in hardiness and high in exercise behavior are less prone to the debilitating effects of stress. In addition, subjects who do not exercise and are lower in hardiness tend to report more illness. It appears that hardiness and exercise are more effective buffers in combination than either is alone.

Kobasa and Puccetti (1983) studied the possible role of social resources and hardiness in stress resistance. They again determined the importance of both hardiness and stressful life events on the number of reported illnesses. Hardiness acted to decrease illness while stress acted to increase reports of illness. Boss support functioned to decrease illness but only for executives high in stress. Family support was demonstrated to impact on the stress-illness relationship only for executives low in hardiness. The results suggest that being low in hardiness while perceiving one's family as supportive increases illness scores. The authors suggest that family support may encourage executives low in hardiness to gain emotional support at home as a coping strategy rather than to actively confront and neutralize stressful situations. The third variable of social assets was found to be nonsignificant in moderating the stress-illness relationship.

Kobasa, Maddi, and Zola (1983) examined the role of

hardiness and the Type A personality in the stress-illness relationship. Both of these personality styles have received considerable attention in the literature with hardiness considered to be a resistance resource and Type A behavior to be a liability. Although the two personality styles appear to share some commonalities, the authors determined via a correlational analysis that Type A and hardiness are independent. Although Type A individuals and individuals high in hardiness may engage in similar activities, they appear to have different perspectives on their life and work. Hardy individuals are considered to be self-directed, content, and interested in their work whereas Type A individuals are considered to be driven by external demands, competitive, and impatient.

Using retrospective stress and illness data the authors conducted a three-way analysis of variance with Type A, hardiness, and stressful life events serving as independent variables with groups formed by dichotomizing each scale at the mean. Illness scores served as the dependent variable. Main effects were detemined for stressful life events and hardiness with high stress leading to more reports of illness and high hardiness serving to decrease the impact of stress on illness. There was no main effect for Type A. The interaction between stress, hardiness, and Type A approached but did not reach significance. Planned comparisons were performed between the high stress/high Type A/low

hardiness group and all other high stress groups combined. These results indicate that persons high in Type A are sickest when they are low in hardiness and under high stress.

In the study of personality and constitution as mediators in the stress-illness relationship (Kobasa, et al., 1981), the authors collected data both retrospectively and concurrently. Measures of illness and stress were collected retrospectively for the previous two year period at Time I. Hardiness data was also collected at this time. Follow-up data on stressful events and illness during each period was collected after one year (Time II) and again after another year (Time III).

In the initial analysis of variance, retrospective stressful life events and constitutional predisposition (defined by the frequency of parental illnesses thought to possess a consititutional component such as cancer and heart disease) tended to increase illness measured at Time II and III, whereas hardiness tended to decrease it. Using an analysis of covariance to control for the subjects' prior level of illness, hardiness was the only main effect which emerged. This finding calls into question the role of stressful life events in the etiology of illness. Although this finding supports the role of hardiness in serving as a resistance resource, it does not support the hypothesis that stressful life events result in an increase in illness.

The authors point out that their measurement intervals for follow-up illness reports of one year each may not have been frequent enough to demonstrate a prospective role of stressful life events in the etiology of illness. In addition, the time separating the stress data from the illness data was as great as four years.

In a further effort to understand the impact of stressful events, the authors performed another analysis of covariance using the stress and illness data collected concurrently (Time II and III). In this analysis, a significant main effect was attained for stressful events. This analysis supports the contention that stressful events have a relatively short-lived effect. This finding questions the practice of collecting retrospective stress data and prospective illness data using long follow-up periods. Future research designs should incorporate more frequent follow-up periods in an effort to increase our understanding of temporal relationship between stress and illness.

Kobasa, Maddi, and Kahn (1982) conducted a similar prospective study in an effort to better understand the possible prospective role of hardiness and its interaction with stress and subsequent health status. The authors evaluated the data using two analyses of covariance. In the first analysis, the dependent variable was the prospectively collected illness data (collected one and two years after the initial session) and the covariate was illness collected

retrospectively. The independent variables were the prospective stress scores and hardiness data collected during the initial session. The results of the analysis indicated that stress is associated with an increase in symptomatology while hardiness functions to decrease illness.

A second analysis of covariance was completed in an identical fashion with the exception of the stress data. In this analysis, the stress scores were retrospective for the previous three years collected at the time of the initial session. This modification incorporated a prospective status to the study. A main effect for stress did not emerge in this analysis. As in the previous analysis of covariance, hardiness produced a main effect and the interaction with hardiness and stress was significant. This pattern of results suggests that hardiness does function prospectively as a resistance resource; however, the prospective effect of stress on illness is less clear. As in the previous study, the time periods between retrospective stress data and prospective illness data may have been too long to detect a causal role for stress in the etiology of illness.

Research on recall of stressful events and illness (Funch & Marshall, 1984; Jenkins, Hurst, & Rose, 1979; Monroe, 1982) indicates that recall falls off rapidly during the first year after an event. Each of these studies found that event recall declines by approximately five percent

each month. The general recommendation is to use retrospective report periods of no greater than six months. Although this generalization seems reasonable, Jenkins et al., (1979) point out that highly important events such as the death of a spouse or a major financial change (e.g. bankruptcy) are likely to impact on functioning for a much longer period than relaively minor life change events. Brown and Harris (1982) recommend using a structured interview in an effort to attain a more reliable picture of an individual's level of stress. Considerable background information can be collected as well as specific dates of incidence. It appears that this technique may limit fall-off of event reporting. In addition, this approach might help to clarify the confound of individual differences in deciding if an experience should qualify as an event (e.g. argument with spouse).

Individual differences in recall ability and the salience of particular events may significantly confound the retrospective data. Monroe (1982) found that desirable events have greater fall-off rates than either undesirable or ambiguous events. Funch and Marshall's (1984) data suggest that event severity is related to reporting reliability with major change events remaining stable. They found that events of less importance tended to fall-off at twice the rate of major events. Kobasa and her coauthors have consistently used retrospective reporting periods of two or three years. Given these recent findings regarding fall-off

rates, it seems reasonable to incorporate a shorter period for retrospective reporting. In addition, the possibility of utilizing a structured interview procedure might be useful in clarifying specific information about experiences.

Despite the limitations discussed above, these studies demonstrate that hardiness appears to be a fairly robust constellation of personality factors which function as a resistance resource in the face of stressful events. In addition, other variables such as exercise, constitutional predisposition, and social support impact upon this relationship. It is possible that other factors such as health practices, coping techniques, and neurophysiological and immunological processes, also function as moderator variables. Their role in this relationship needs to be investigated in an effort to develop a clearer picture of the etiology of illness.

Research on Related Moderator Variables

Other investigators have studied personality concepts that appear similar to hardiness or its components. Johnson and Sarason (1978) studied the relationship between life change and psychiatric status using a population of undergraduates. Using the Rotter Locus of Control Scale (1962), they divided their 121 subjects into internal and external groups. They utilized the Life Experiences Survey (Sarason, Johnson, & Siegal, 1978) as a measure of life experiences.

This instrument yields scores for both positive and negative life change events. Using a partial correlation procedure between positive and negative life change events and measures of depression (Beck Depression Scale; Beck, 1967) and anxiety (State-Trait Anxiety Inventory; Spielberger, Gorsuch, & Lushene, 1970), they found the measures of depression and trait anxiety to be significantly correlated with the negative life change event scores but only for people who were external in control. The correlation between state anxiety and negative life change for this group was not significant nor were any of the correlations between positive life change scores. The internally controlled group demonstrated no significant correlations for positive or negative life change scores. Thus, this study supports the hypothesis that there is a correlation between negative events and measures of depression, with the relationship being strongest for those who are more externally controlled.

Smith, Johnson, and Sarason (1978) studied the relationship between positive and negative life change and psychological distress as a function of the concept of sensation seeking. The concept of sensation seeking appears to be akin to the challenge component in the hardiness literature. They hypothesized that low sensation seekers would have a low level of optimal stimulation and would be overwhelmed by more stressful or demanding situations

whereas high sensation seekers might actively seek out challenging situations and would have developed adequate coping resources to deal with them. The authors used the Life Experiences Survey (Sarason and Johnson, 1976) as a measure of life change, the Discomfort scale from the Psychological Screening Inventory (Lanyon, 1970) as a measure of psychological distress, and the Sensation-Seeking Scale (Zuckerman, Kolin, Price, and Zoob, 1964) as a measure of optimal stimulation. They completed separate 2x2 factorial analyses for positve, negative, and total life change distributions with sensation seeking as the other independent variable. Scores on the Discomfort scale were used as the dependent variable. No significant effects were found for the positive or total life change scores; however, the low sensation seeking/high negative events group demonstrated significantly higher scores on the Discomfort Scale than did the low sensation seeking/low negative events group. In addition, the investigators evaluated the role of sensation seeking as a moderator in the stress-disorder relationship and found a significant correlation between negative life change scores and discomfort scores only for low sensation seekers. These results support the notion that high sensation seekers appear to be more tolerant of negative life events than low sensation seekers.

Miller and Cooley (1981) and Cooley and Keesey (1981) studied the relationship between life stress and illness

using undergraduates as subjects. Both studies examined sensation seeking using the Sensation Seeking Scale (Zuckerman et al., 1964), the Myers-Briggs measure of Jungian attitudes and personality types (Myers-Briggs Type Indicator-Form F; Myers, 1962) and health locus of control using the Health Locus of Control Scale (Wallston, Wallston, Kaplan, & Maides, 1976) as moderator variables. The Health Locus of Control Scale is thought to be more specifically related to control over personal health than the more commonly utilized Internal Locus of Control Scale (Rotter, 1966). The Life Events Questionnaire II (Cooley, Miller, Keesey, Levenspiel, & Sisson, 1979) was used as a measure of life change events. Subjects were asked to complete this form for the previous two year period. The Report of Disorders II (Cooley et al., 1979) was used to measure the occurrence of disorder. The instructions were to complete this form for the previous twelve month period. Unlike the measures used in the two studies discussed previously (Smith et al., 1978; Johnson et al., 1978), this instrument measures physical disorder as well as psychological dysfunction. The studies differed in that Cooley and Keesey only utilized subjects who scored in the upper and lower quartiles for each variable whereas Miller and Cooley divided subjects into high and low groups at the mean. Correlational analyses were conducted after dividing subjects into subgroups based on a particular moderator variable. If a correlation

was higher for a particular group, it was assumed that the moderator variable was important in the relationship. The two subgroups were then compared to see if they differed significantly from each another.

The results of the Cooley and Keesey study showed that low sensation seekers demonstrated a stronger relationship between stress and illness than did high sensation seekers but the differences between the subgroups did not reach statistical significance. In addition, the correlations for the low sensation seeking groups were actually slightly lower than for all subjects taken together. The authors suggest that the moderator variable may serve to identify a group which shows little relationship between stress and illness (high sensation seeking/high stress). This hypothesis is consistent with Kobasa's finding that hardy executives may seek out situations of high stimulation and are able to effectively cope with the inherent stress.

Cooley and Keesey's results did not support the idea that externally controlled individuals show a stronger relationship between stress and illness. Although this result is inconsistent with previous studies, the issue deserves more research since Cooley and Keesey used different measures of control and disorder. Several Myers-Briggs indicators were found to moderate the relationship between stress and illness; however, it is difficult to compare these personality constructs with those of Kobasa's. Kobasa's

emphasis on internal control, commitment to self, and challenge appear to be related to several Jungian personality constructs; however, an assessment of their similarity awaits future research.

The results of Miller and Cooley's study differ from those found by Cooley and Keesey on measures of sensation seeking and health locus of control. Miller and Cooley's results did not differentiate between high and low sensation seekers. Their findings on the health locus of control suggested that there is a stronger relationship between stress and illness in those relatively externally controlled than those internally controlled. It should be pointed out that the two studies did not formulate their groups using the same criteria. The mean split procedure used by Miller and Cooley may have been less sensitive to differences along this variable than examining the upper and lower quartiles as was done by Cooley and Keesey.

These two studies offer somewhat contradictory evidence for the moderating effects of locus of control and sensation seeking in the relationship between stress and illness. Because these studies are not directly comparable with each other or with similar studies, more research is required to ascertain the nature of a possible moderator function for these variables.

Using a population of undergraduate females, Ganellen and Blaney (1984) studied the moderating impact of hardiness

and social support on the stress-illness relationship. They used the Levenson Locus of Control Scale (Levenson, 1974) to measure internal versus external locus of control and the Alienation Test (Maddi, et al., 1979) as a the measure of hardiness. Kobasa used the Alienation Test in her initial study of hardiness; however, she utilized only some of the scales in subsequent analyses. In addition, Kobasa incorporated other tests in her composite hardiness measure which were not included in the present study. Ganellen and Blaney used a measure of psychological distress (the Beck Depression Inventory, Beck, 1967) rather than a general physical health questionnaire. They used their own Social Perception Questionnaire to assess social support and the Life Experiences Survey (Sarason, et al., 1978) served as the measure of life stress.

The authors performed a series of three-way analyses of variance with stressful life event scores, social support, and the various subscales of the Alienation Test serving as independent variables. The scores on the Beck Depression Inventory were used as the dependent variable. Significant main effects were determined for stressful life events, social support, and the Alienation from Self and Vegetativeness subscales from the Alienation Test. The Alienation from Self subscale is conceptualized to represent commitment whereas the Vegetativeness subscale is thought to assess the challenge component of hardiness. The other subscales from

the Alienation Test and the measure of control did not produce main effects. This suggests that persons scoring low in life events, high in social support, and low on the Alienation from Self and Vegetativeness subscales are least likely to be depressed. Alienation from Self and life stress produced the only significant interaction in these analyses which supports the idea that this dimension of hardiness serves to moderate the stress-illness relationship.

Although these findings failed to replicate several of Kobasa's results, there were several fundamental differences in the procedure which may have impacted upon this. Ganellen and Blaney used undergraduate females rather than older male executives; they utilized different measures to represent hardiness; they analyzed each of the subscales from the Alienation Test separately and did not incorporate a composite hardiness assessment; and they utilized different measures of stressful life events and disorder. These discrepancies require further research in an effort to clarify the importance of these variables in the stress-illness relationship.

Suls and Fletcher (1985) studied the moderating effect of a variable they identified as self-attention. This variable appears to be related to commitment to the self as studied in the hardiness literature. It is conceptualized as a propensity to maintain awareness of one's psychological and somatic reactions to events and stressful occurrences.

In addition, this may be accompanied by a tendency to actively utilize coping strategies in an effort to neutralize the nature of the stressful event. They state that persons low in self-attention may not accurately monitor cues resulting from stressful events. This failure to take corrective action may result in lowered immunity and a greater susceptability to illness. They postulate that the long-term consequences of not adopting such strategies may lead to debilitating physical and psychological dysfunction due to a breakdown in the homeostatic nature of stress regulation.

A prospective design was utilized in which subjects were asked to complete an illness questionnaire at Time I for the previous four week period (a modified form of the Seriousness of Illness Rating Scale, Wyler et al., 1968) and a measure of stressful life events for the same period (Life Event Scale, Wildman, 1978). This instrument also allows subjects to rate each event according to their perceptions of its controllability and desirability. The Self-Consciousness Scale (Fenigstein, Scheier, & Buss, 1975) was also administered and assesses an individual's self-attentional style. A follow-up session occurred after eight weeks (Time II). During this session, subjects were asked to complete the measure of stressful life events and the illness questionnaire for the previous eight weeks.

Using a hierarchical panel analysis procedure, the

authors determined that high stress at Time I is predictive of illness at Time II; however, this relationship was only found to be significant for those individuals low in private self-consciousness. There was no significant association between events at Time I and illness at Time II for the group high in private self-consciousness. The statistical procedure utilized also functions to control for previous illness. Their correlational analysis indicates that there is a temporal relationship between stressful events and symptoms of illness. To the extent that self-attention allows one to interpret events as having personal relevance and meaning, it appears to resemble the hardiness component of commitment to the self. In addition, this perception may be accompanied by a propensity to actively encounter the situation in an effort to render it less threatening and disruptive.

The authors were also interested in assessing the differences between the controllability and desirability of events and their impact on the stress and illness relationship. In a previous study (Suls & Mullen, 1981), it was reported that only undesirable uncontrollable events and undesirable events of uncertain control produced significant correlations between stress and illness. In addition, undesirable events of uncertain control were more highly correlated with illness than undesirable events which were uncontrollable. They interpreted this finding as support for the

notion that the ability to discriminate controllable situations from uncontrollable ones has adaptive significance regardless of the desirability of the event. It was hypothesized that ambiguous situations often result in increased anxiety due to a lack of information concerning the duration, potential severity, and extent of personal responsibility for the event.

In a study of psychological adjustment in hemophilia, Bruhn, Hampton, and Chandler (1971) found that marginally severe hemophiliacs are more externally controlled (measured by the Rotter Locus of Control Scale, 1966) and less extroverted (assessed by the Maudsley Personality Inventory, Eysenck, 1959) than either mild or severe groups of hemophiliacs. Both mild and severe hemophiliacs can predict the extent of a bleeding episode and seek any necessary medical attention whereas marginally severe individuals typically cannot predict the outcome of any particular episode. Abramson and Sackheim (1977) suggested that an inability to assess situations and discriminate control may play a major role in the etiology and maintenance of depressive disorders. These clinical studies support the hypothesis that marginal and ambiguous status promotes a reliance on external cues to regulate behavior. Suls and Mullen argue that this inability to assign causation may result in increased incidence and severity of health problems.

In the more recent study (Suls & Fletcher, 1985), the

authors essentially replicated the findings concerning ambiguity of control; however, they also found a significant correlation between desirable uncontrollable events and illness. This finding suggests that uncontrollability of life events may be more important than the positive or negative outcome involved. Although the authors did not include a measure of locus of control, it would be interesting to investigate the relationship between an individual's locus of control score and his or her tendency to assess events as either controllable, ambiguous, or uncontrollable.

In discussing the results of their investigation, Suls and Fletcher indicated that their follow-up period of eight weeks was shorter than that usually employed in prospective studies. This difference highlights a growing controversy in the literature on stress and illness. The exact role of stressful events in the etiology of various acute and chronic illnesses is unknown. It is plausible that both major and minor stressful life events differ significantly according to their impact on various disease processes. For example, acute stresses often result in acute disorders such as migraine headaches. At a different level, extended periods of too little sleep may leave one vulnerable to flu and cold viruses. At still another level, chronic poverty, fear of violent crime, and inadequate nutrition are examples of stresses that may contribute to more debilitating and life-threatening diseases such as cancer and heart disease.

The authors noted that most of the illnesses reported by their subjects were related to the gastrointestional tract or the respiratory system and were relatively short-lived and mild. It is unlikely that more serious conditions and conditions with a gradual period of onset (e.g. high blood pressure, multiple sclerosis, etc.) would manifest themselves during an eight week follow-up period. The development of conditions such as these would require a long-term longitudinal study in order to examine the etiological factors. In addition, many of the more serious disorders can be studied from the date of presentation or diagnosis; however, this may be quite different from the actual date of onset. On the other hand, longer follow-up periods might obscure the relationship of relatively acute stressors to minor somatic complaints such as headaches and indigestion. This difficulty might be partially addressed by conducting longerterm studies with frequent examination periods. These issues present both theoretical and methodological difficulties for investigators studying the relationship between stress and illness.

Statement of Problem and Hypotheses

Hardiness has emerged as a promising moderator variable in understanding the relationship between stress and illness. Using a population of exclusively male, middle-aged, executives, Kobasa and her various coauthors have consis-

tently demonstrated the importance of the personality variables of control, commitment, and challenge as resistance resources. There is a need to establish the generalizability of these findings with other populations. This study sought to advance our knowledge of the hardiness construct by utilizing an undergraduate population of males and females.

Retrospective stress and illness data were collected at Time I for the previous six month period. The hardiness measures were also be completed at this time. Three weeks after the initial experiemental session (Time II) and again after a second three week period (Time III), illness data were collected. The retrospective stress and prospective illness scores served as independent variables. Four groups were formed by crossing the upper and lower thirds of both distributions (high stress/high illness, high stress/low illness, low stress/high illness, and low stress/low illness.) The dependent variables were the individual components of hardiness as well as the composite hardiness values.

Hypothesis 1. The composite hardiness measure differentiates between individuals who get sick under comparable levels of stress and those who do not. High illness subjects are significantly less hardy than are low illness subjects.

Hypothesis 2. Those who do not experience symptoms of

illness when under stress possess an internal locus of control. The Powerlessness scale from the Alienation Test (Maddi et al., 1979) and the Internal versus External Locus of Control Scale (Rotter et al., 1962) are the two scales used to measure this component of hardiness and differentiate between the high and low illness groups.

Hypothesis 3. The Alienation from Self scale and the Alienation from Work scale from the Alienation Test (Maddi et al., 1979) measure the commitment to self component of hardiness and differentiate between high and low illness groups.

Hypothesis 4. The two measures of challenge, the Cognitive Structure scale from the Personality Research Form (Jackson, 1974) and the Security scale from the California Life Goals Evaluation Schedule (Hahn, 1966), comprise the third component of hardiness and differentiate between the high and low illness groups.

The interest in the relationship between stress and illness is part of a growing trend to examine issues pertinent to health and psychology. Integral to these investigations is the focus on behavioral aspects of illness. There has been a growing emphasis on the modification of behavior related to medical pathology, however, there has been a lack of reliable and valid assessment tools to aid in identification of appropriate patients. Turkat and Pettegrew (1983) introduced the Illness Behavior Inventory

as a potential screening tool for clinical practice. Using both healthy and chronically ill populations, the authors determined that the Illness Behavior Inventory correlated significantly with various medical outcomes, differentiated patients classified as either high or low in illness behavior, and successfully predicted treatment outcomes and other measures of illness behavior.

The Illness Behavior Inventory was utilized in this study as a more refined measure of the effect of illness on behavior. In addition, it served as a consistency check for the other self-report illness measure. Individuals scoring high on the Seriousness of Illness Scale are also expected to score higher on these illness behavior measures. Data from the three scales of the Illness Behavior Inventory were examined to see if they differentiate between the various stress and illness groups.

Hypothesis 5. The high stress/high illness group will endorse more total, social, and work illness behavior items than the high stress/low illness group.

CHAPTER III

METHOD

Subjects

Subjects were drawn from students enrolled in Psychology 101 at Loyola University during the fall semester of 1985. Successful participation in this project generated three research credits for each participant. Two hundred and twenty-five subjects completed one of the initial experimental sessions. Of these, 212 subjects (94.22%) completed questionnaires for the two follow-up periods. Nine subjects were dropped after completion of the experiment when it was clear that they had not accurately followed the instructions. Thus, 203 subjects (90.22%) were included in the final sample.

Retrospective stress as measured by the Psychiatric Epidemiology Research Interview Life Events Scale (PERI: Dohrenwend, Krasnoff, Askenasy, & Dohrenwend, 1978) and prospective illness scores as measured by the Seriousness of Illness Rating Scale-modified (Wyler et al., 1968) were calculated for each of the 203 subjects. Initial data analysis indicated a significant difference between means

for males and females on the follow-up Seriousness of Illness Rating Scale-modified, $t(1,201)=3.03$, $p=.003$. Females scored significantly higher on the illness measure ($M=1795.69$, $SD=1261.93$) than the males ($M=1236.73$, $SD=1274.56$). The group difference on the measure of stressful life events was not significant, $t(1,201)=.56$, $p=.58$. Because of this, separate distributions were formed based on sex. Four groups for each sex were formed according to their scores on the stress and illness measures. Those falling in the upper and lower thirds on these measures were crossed to form the groups. The four groups were high stress/high illness, high stress/low illness, low stress/high illness, and low stress/low illness. The male and female groups were then combined. The groups were as follows: high stress/high illness had 9 males and 22 females (total N=31); high stress/low illness had 5 males and 10 females (total N=15); low stress/high illness had 7 males and 7 females (total N=14); and low stress/low illness had 10 males and 20 females (total N=30). There was a total of 90 subjects in the four groups.

The ages of these subjects ranged from 17 to 28 with the majority being 18 (60.0%). White subjects comprised 76.7% of the sample followed by 8.9% Hispanic, and 4.4% Filipino. Blacks, Orientals, and Indians each made up 3.3% of the sample. Only one of the subjects was married. Most of them were freshmen (78.9%), 15.9% were sophomores, and

5.6% were juniors. Most of the subjects came from middle class families; 41.4% of the subjects indicated that the yearly income of their family of origin exceeded $40,000; 18.9% made between $30,000 and $40,000; 20.0% made between $20,000 and $30,000; 15.6% between $10,000 and $20,000; and the remaining 4.4% made less than $10,000.

Materials

During the initial experimental session (Time I), subjects were asked to complete a general consent form and several self-report questionnaires.

Demographic Data Questionnaire. Demographic information was collected using a brief twelve question form. Subjects were asked to indicate basic personal data such as age, sex, and ethnic background. In addition, they were asked to respond to several family of origin questions such as family income, parents' marital status, and the number years spent at their current home address.

Measure of Stressful Life Events. As a measure of stressful life events, a modified form of the PERI Life Events Scale (Dohrenwend et al., 1978) was used. This scale was selected over the Social Readjustment Rating Scale (Holmes & Rahe, 1967) used by Kobasa because of its increased comprehensiveness, clarity of event descriptions, and improved sampling and construction procedures utilized in its development. Subjects were be instructed to complete the form for the previous six month period. In addition to

an event desirability rating (desirable, can't say, undesirable), subjects were asked to evaluate their perception of the controllability (controllable, can't say, uncontrollable) of each event experienced as suggested by Suls and Mullen (1981).

Measures of Hardiness. Hardiness was assessed in the manner delineated by Kobasa (Kobasa et al, 1982; Kobasa et al., 1983). The Alienation from Work and Alienation from Self scales from the Alienation Test (Maddi et al., 1979), are used to assess commitment and are measured negatively. Each of these scales consists of nine questions which assess an individual's degree of commitment to themselves and their occupational roles. Four responses are possible ranging from "Not at all true" to "Completely true." High scores on these scales indicate a sense of alienation and meaninglessness as opposed to commitment and involvement. The security scale from the California Life Goals Evaluation Schedule (Hahn, 1966), is a negative indicator of challenge. Individuals who score high on this scale are thought to perceive change as threatening. The scale consists of fifteen items and the subjects are asked to respond to each item on a five point scale ranging from "strongly agree" to "strongly disagree." The cognitive structure scale form the Personality Research Form (Jackson, 1974) is the other scale representing the challenge dimension of hardiness. This scale is measured negatively with high scores reflecting

inflexibility and intolerance of ambiguity. Subjects are asked to respond to 16 true/false questions such as, "I can feel comfortable even when I have a number of unanswered questions in mind" and "I don't like to go into a situation without knowing what I can expect from it."

Control was measured negatively using the External Locus of Control Scale (Rotter et al., 1962) and the Powerlessness scale from the Alienation Test (Maddi et al., 1979). The External Locus of Control Scale consists of 29 forced choice questions. High scores reflect an attitude that events and reinforcements are under external rather than internal control. The Powerlessness scale from the Alienation Test consists of 15 questions. Subjects are instructed to answer each question according to a four point scale ranging from "Not at all true" to "Completely true". High scores are thought to reflect the perception that stressful events are unexpected and overwhelming.

Illness Measure. Symptoms of illness were assessed using a modified version of the Seriousness of Illness Rating Scale (Wyler, Masuda, & Holmes, 1968). Several symptom ratings and their assigned seriousness weights were added to the form based on the findings of Garrity, Marx, and Somes (1978). These problems were found to occur with considerable frequency among college students and were not subsumable under the symptoms of the original survey. In addition, several problems not considered by Garrity et al.,

(1978) were added to this questionnaire. Ten nonmedical subjects were presented with the already modified Seriousness of Illness Rating Scale and were instructed to place them according to severity within the list. These illnesses and their mean seriousness weights consisted of: Trouble sleeping/ insomnia, 108; nausea and vomiting, 128; athlete's foot 40; bladder infection 149; yeast infection, 112; herpes, 482; and persistent coughing, 148. The final questionnaire consisted of 140 items. For each symptom subjects were asked to indicate if they had experienced it zero, one, or more than one time during the previous six months for the retrospective analysis and during the previous three week period for the two follow-up sessions.

Although this measure of illness is comprehensive and the individual items are clearly defined, in the scoring process it was discovered that a large number of subjects (16%) indicated having experienced one or more incidents of chest pain within the past six months. This symptom is assigned a seriousness weight of 609 points. Data from the National Center for Health Statistics for 1978 indicates that 107 (males) and 34 (females) under 65 per 1000 deaths were attributable to ischemic heart disease. Although this high score appropriately reflects the seriousness of this symptom, it is unlikely that individuals studied in this investigation were suffering from angina (chest pain) related to myocardial ischemia. Wolf (1983) reported that the

chest discomfort of angina may be mimicked by excessive anxiety states. Assuming that the chest pain reported by subjects in this study is not indicative of true cardiac pathology, a seriousness weight of 150 was assigned to this symptom.

Illness Behavior Measure. General illness behavior was evaluated using the Illness Behavior Inventory (Turkat & Pettegrew, 1983) which has been shown to differentiate individuals high and low on illness behavior. This inventory consists of 20 true/false questions. This scale produces three scales: a measure of social illness behavior, a measure of work-related illness behavior, and a total score. High scores are thought to reflect a tendency to externalize illness behavior.

Follow-up Measures. At Time II and Time III, subjects were instructed to complete another Seriousness of Illness Rating Scale for the respective three week follow-up periods. In addition, they were asked to indicate the number of visits to health professionals during these periods and the number of classes that were missed as a result of illness.

Procedure

Subjects completed the initial experimental session in groups of 10 to 30 people. At the start of each testing session, the investigator offered a brief rationale for the project as well as instructions for completing the packets and the follow-up procedures. In an effort not to unduly

bias the subjects, the project was introduced as a study of the relationship between environment and health. Each section of the packet included detailed instructions and the investigator was available throughout the sessions to respond to questions. Subjects were given a consent form containing a brief statement about the project. They were informed that they were not required to participate and that, while successful completion of the project was encouraged, they were free to terminate at any point. The subjects were presented with the material discussed in the materials section in that order. An unlimited amount of time was given to complete the packet; however, almost all subjects were finished within 50 minutes. Subject anonymity was protected by using coded questionnaires. Only the investigator had access to the coding key which was destroyed upon completion of the study.

After the initial session, subjects were asked to record their symptoms of illness during two subsequent three week periods. In addition, they were asked to record the number of days on which a particular symptom occurred, the number of classes missed due to illness, and the number of contacts with health professionals for treatment of these symptoms . After the end of the first three week period (Time II), the subjects were instructed to return their forms to the investigator and receive a new one. After the second three week period (Time III), subjects returned their

packets and participation was complete.

CHAPTER IV

RESULTS

Design

Four group of subjects were formed from the original sample of 203 subjects by crossing the upper and lower thirds of the retrospective stress data collected at Time I and the prospective illness data summed from Time II and Time III. The resulting 2x2 factorial design consisted of four groups: high stress/high illness, high stress/low illness, low stress/high illness, and low stress/low illness. Ninety subjects were included in the final data analyses.

Stress, Illness, and Hardiness

To test the hypotheses concerning group differences in hardiness, a multiple analysis of variance test (MANOVA) was completed using the individual variables making up the hardiness composite as dependent variables. The independent variables were the retrospective stress scores (high and low stress) and the prospective illness scores (high and low illness).

The results of this analysis demonstrated a main effect

for hardiness, $F(6,81)=2.65$, $p=.021$, indicating that high illness subjects scored significantly lower on hardiness measures than low illness subjects. Three measures significantly contribute to this finding: the Internal versus External Locus of Control Scale, $F(1,86)=8.54$, $p=.004$; the Alienation from Self scale, $F(1,86)=5.92$, $p=.017$; and the Powerlessness scale, $F(1,86)=5.95$, $p=.017$. The Internal versus External Locus of Control Scale and the Powerlessness scale are the two scales thought to assess the control component of hardiness. The pattern of results on these scales indicated that high illness subjects feel less internal control than low illness subjects; that is, high illness subjects scored higher on the external dimension of control ($M=11.95$, $SD=3.71$) than the low illness group ($M=10.19$, $SD=3.46$). They also scored higher on powerlessness ($M=12.11$, $SD=7.12$) than did low illness subjects ($M=8.30$, $SD=5.06$). The Alienation from Self scale is considered to represent a commitment to oneself in decision making and goal setting. Again, high illness subjects scored significantly higher on this scale ($M=5.93$, $SD=4.76$) than low illness subjects ($M=3.63$, $SD=2.29$). The analysis of the other measure of commitment, the Alienation from Work scale, yielded no significant effects, $F(1,86)=0.62$, $p=.43$. Likewise, analyses done on the two measures of challenge, the Cognitive Structure scale and the Security scale, yielded no significant results, $F(1,86)=0.24$, $p=.63$ and $F(1,86)=0.25$,

p=.62, respectively.

A composite hardiness score was determined for each individual by computing z scores for the six measures and summing them across scales. A 2x2 factorial analysis of variance (ANOVA) was completed using subjects' prospective illness scores and retrospective stress scores as independent variables and the composite hardiness measure as the dependent variable. The results of this analysis parallel those of the MANOVA in demonstrating a main effect for illness, $F(1,86)=7.15$, $p=.009$, and no significant effects for the main effect of stress $F(1,86)=.002$, $p=.96$, or the stress-illness interaction $F(1,86)=2.93$, $p=.09$. This finding again suggests that low illness scores tend to be associated with high hardiness scores.

To further examine hardiness as a mediating variable under high stress conditions, t tests were used to examine differences between the high stress/high illness group and the high stress/ low illness group on the composite hardiness score and on the individual subtest scores. The results of these tests are presented in Table 1. Significant group differences were found on the composite hardiness score, $t(1,43)=4.00$; $p<.01$, the Internal versus External Locus of Control Scale, $t(1,43)=2.42$, $p=.02$; and the Alienation from Self scale, $t(1,43)=2.33$, $p=.025$. As can be seen from the means in Table 1, these results are consistent with the general ANOVA results in that high illness subjects

Table 1

Differences Between High Stress/High Illness (N=30) and High Stress/Low Illness Subjects (N=15)

Variable	High stress/ low illness		High stress/ high illness		t Value
	M	SD	M	SD	
Internal/External	8.80	3.67	11.56	3.60	2.42*
Cognitive Structure	9.93	2.28	11.07	2.20	1.61
Alienation/Work	5.00	3.12	6.03	4.48	0.80
Alienation/Self	3.73	2.40	6.33	5.10	2.33*
Powerlessness	9.20	3.93	12.40	7.60	1.86
Security	31.87	6.12	34.20	6.76	1.13
Hardiness	-1.72	1.64	1.39	0.65	4.00**

df=(1,43)
*$p<.05$.
**$p<.01$.

reported greater alienation from self and more external control and were generally less hardy than low illness subjects. Hardiness seemed important in differentiating high and low illness independent of stress level and was not more important at high stress levels. In fact, at high stress levels only the composite and two of the subtest measures were important in differentiating high and low illness subjects.

As expected, hardiness appeared to be an important construct in differentiating high illness and low illness subjects. These results are not totally consistent with the first four hypotheses in that only three of the six hardiness measures plus the composite score differentiated high and low illness subjects.

Hypothesis 1. The composite hardiness measure differentiated between high and low illness groups. Individuals high in hardiness tended to report lower illness scores that did subjects low in hardiness.

Hypothesis 2. Both measures of control were found to differentiate high and low illness subjects. This particular component of hardiness appears to be very important as a variable for this group of subjects.

Hypothesis 3. The Alienation from Self scale differentiated between the two groups; however, the Alienation from Work scale did not. Thus, only one of the measures comprising the commitment component of hardiness

was significant.

Hypothesis 4. Neither of the two measures of challenge were found to differentiate between the high and low illness subjects.

Illness Behavior.

Hypothesis 5. Using retrospective stress data and prospective illness data, three 2x2 factorial ANOVAs were carried out with the three scores from the Illness Behavior Inventory serving as dependent variables. A significant main effect was determined for illness for the Social Illness Behavior scores, $F(1,86)=7.83, p=.006$, with high illness subjects scoring higher on this scale ($M=3.14$, $SD=2.49$) than low illness subjects ($M=1.83$, $SD=1.51$). This suggests that individuals who report high levels of illness also tend to demonstrate behavior concerning their illnesses when interacting with others. For example, frequently complaining about one's health in social situations or bringing up the topic of illness occurs more frequently in this group. There were no significant effects for stress or the interaction of stress and illness. The Total Illness Behavior score also showed a significant main effect for illness, $F(1,86)=4.23$, $p=.043$, with high illness subjects reporting more general illness behavior ($M=8.32$, $SD=3.72$) than low illness subjects ($M=6.48$, $SD=2.95$). There were no significant effects for stress or the interaction of stress and illness. The Work Illness Behavior score did not produce

any significant effects. This indicates that neither stress, illness, nor the interaction of the two are involved in one's tendency to curtail work behavior due to illness.

As a further test of illness behavior, two groups of subjects were formed by splitting illness scores at the median. When comparisons were made via *t* tests, high illness individuals reported missing a significantly greater number of classes due to illness, $F(1,88)=3.15, p=.003$, and made significantly more visits to health professionals for treatment of their symptoms, $F(1,88)=2.28$, $p=.027$, during the two follow-up periods combined. Thus, high illness subjects reported missing more classes ($M=3.64$, $SD=6.46$) than low illness subjects ($M=.52$, $SD=1.1$).

In general, the illness behavior findings indicate that subjects who report more illnesses also report more illness-related behavior, thus supporting the validity of the Seriousness of Illness Rating Scale.

CHAPTER V

DISCUSSION

Hardiness, Stress, and Illness

This study examined the construct of hardiness as a moderator in the stress-illness relationship. Six variables emerged from Kobasa's initial study (1979) as representing the hardiness components of control, challenge. and commitment. In this study, group differences on these six variables were analyzed using a MANOVA. An ANOVA was performed on the hardiness composite. In both procedures, a significant main effect for illness was determined. This suggests that individuals who report high levels of general illness tend to be lower in personality hardiness. Stress levels do not appear to be related to hardiness. In addition, no significant interaction was determined for stress and illness.

Although the composite hardiness measure produced a significant main effect for illness, when the six individual variables were assessed in the MANOVA, only three of the scales emerged as significant. Locus of control, alienation from self, and powerlessness were the variables found to

contribute most to the MANOVA. Locus of control and powerlessness measure control, and alienation from self is one of the scales representing the commitment dimension of hardiness. The other scale thought to measure commitment, the Alienation from Work scale, did not produce significant results. The Security and Cognitive Structure scales reflect the challenge component and did not produce significant results in this analysis.

This pattern of results differs somewhat from Kobasa's initial findings. She determined that each dimension of hardiness as well as the composite hardiness measure served to differentiate high stress/high illness executives from high stress/low illness executives. Several fundamental methodological differences may have contributed to the lack of congruence between the present findings and and those of Kobasa's and will be discussed below.

First, this study introduced several modifications to the measures used to assess both the independent and dependent variables related to the hardiness construct. In all of Kobasa's studies related to the hardiness construct, a modified version of the Schedule of Recent Life Events (Holmes & Rahe, 1967) was used. In the present study, the Psychiatric Epidemiology Research Interview (PERI) Life Events Scale (Dohrenwend et al., 1978) was utilized. This instrument appears to be a more comprehensive measure of stressful life events. In addition, the descriptive clarity

of the individual events is superior to that of other measures (Monroe, 1982).

Data were collected retrospectively on this measure for the six-month period prior to the initial session. This is in contrast to much of the previous work which has examined a longer retrospective period for stressful events. For example, in her 1979 study Kobasa used a retrospective period of three years. Research has demonstrated (Funch & Marshall, 1984; Monroe, 1982; Jenkins, Hurst, & Rose, 1979) that periods of longer than six months are subject to considerable fall-off in event recall. Utilizing a smaller period of retrospective reporting may have increased the likelihood that the stress data were more sensitive and accurate than if a longer period of recall had been used.

Although both retrospective and prospective illness data were collected in the present study, groups were formed based on the prospective scores. Many previous studies have followed a purely retrospective design. These studies offer no opportunities for examining causation. In addition, a major problem is introduced in the possibility of biased recall. For example, ill individuals may attempt to explain away their disorders in terms of increased levels of preceding stress. This has been referred to as the phenomenon of effort after meaning, whereby ill people tend to seek and identify reasons for their illness (Creed, 1985). Prospective data collected at frequent intervals (every three

weeks) may have partially controlled this phenomenon and increased the sensitivity of the illness measure. Although utilizing prospective illness data partially serves to address this problem, others have suggested (Monroe, 1982, Depue & Monroe, 1986) that researchers need to control for prior levels of disorder when prospectively examining the relationship between stress and illness.

Six different scales were used to determine a composite hardiness score in this study. In addition, each scale was examined individually to test whether or not it differentiated among subjects in the four groups. Although Kobasa and her coauthors initially used these six scales, in later studies, they eliminated the Cognitive Structure scale from the hardiness composite when it was determined, through a principal components factor analysis, that it did not share common variance with the other scales. A principal components factor analysis was also performed in the present study. Paralleling the results of Kobasa, Maddi, and Puccetti, (1982), the Cognitive Structure scale did not share common variance with the other scales. This suggests that this scale may not be appropriate to include in future studies of hardiness.

Kobasa (1979) determined that each dimension of hardiness as well as the composite hardiness measure differentiated high stress/high illness subjects from high stress/ low illness subjects. In this study however, the challenge

dimension did not contribute to the moderating influence of hardiness in the stress-illness relationship. This aspect of hardiness appears to be related to sensation seeking as studied by Smith et al., 1978. Their finding that high sensation seekers appear to be more tolerant of negative life events than low sensation seekers, indicates that the quality of the life change event may be related to the impact of stress on hardiness. Individuals who experience high levels of stress associated with negative life changes may appear as less hardy. The distinction between positive and negative life change events was not analyzed in the present study. This factor may need to be considered in future research.

The composite hardiness measure and two subscales, the Alienation from Self scale and the Internal versus External Locus of Control Scale, were the only variables which differentiated (via *t* tests) the high stress/high illness subjects from the high stress/low illness subjects. High stress/low illness subjects are, at least in some ways, more in control and more committed than high stress/high illness subjects. Given that the two scales measuring challenge and one of the scales representing commitment and control were not significant, it is important to consider that information may be lost in examining hardiness solely as a composite of the three dimensions of control, commitment, and challenge.

A second major difference between Kobasa's work and the present study concerns the formation of the subject groups. This study split the independent variables at the thirds of the distribution rather than at the median. This may have served to create more discrepant groups. Larger group differences should provide a more sensitive index for exmaining the relationship between stress and illness as moderated by hardiness.

Kobasa only examined high stress subjects and her statistical analyses did not include low stress individuals. Kobasa (1979) compared individuals who had experienced comparable levels of stressful life events. She formed two groups based on illness scores which resulted in a high stress/high illness group and a high stress/low illness group. In the present study, comparisons included individuals low in stress and either high or low in illness.

This study examined a population of undergraduate males and females whereas Kobasa included only middle-aged, male executives. Because the challenge component of hardiness was the only dimension which did not significantly differentiate groups in the MANOVA or the t tests, it is possible that the scales measuring challenge tap issues closely related to development. Many major life change events are related to occupation (beginning new job, promotion), finances (taking out a mortgage), and interpersonal relationships (marriage, childbirth, and divorce). In contrast,

most life change events experienced by undergraduates tend to reflect long-standing expectations. For example, the decision to enter college and move out of the house are two relatively major life change events; however, they are typically viewed as positive and within the control of the individual. Kobasa conceptualized challenge as a propensity to view change as offering incentives to growth and flexibility. Given the relatively limited opportunities adolescents have had for experiencing major change, it is conceivable that an orientation to challenge as opposed to threat may not have solidified.

Despite these differences, it is notable that a strong relationship emerged between hardiness and illness. This suggests that high levels of hardiness may serve to promote health. Stress does not appear to impact upon personality hardiness. Thus, levels of stressful life events do not seem to influence the aspects of personality included in the hardiness construct. It is difficult to compare this result with Kobasa's as she did not examine differences between high and low stress individuals in relationship to hardiness. It is possible that individuals under high levels of stress may experience a sense of alienation, powerlessness, and a fear of challenge; however, this hypothesis is not supported by the present data.

Illness Behavior

Turkat and Pettegrew (1983) determined that scores on

the Illness Behavior Inventory successfully differentiated high illness from low illness individuals. This finding was partially replicated in the present study. Only the Social Illness Behavior Scale and the Total Illness Behavior Scale differentiated high and low illness groups, whereas the Work Illness Behavior Scale did not. This finding may not be too surprising given that the majority of college undergraduates typically do not have a long history of work experience from which to respond to work-related questions. Although several of the work-related questions are general enough to apply to school situations, for example, "I work fewer hours when I am ill," others are more specifically related to employment situations, "I avoid certain aspects of my job when I am ill." Differing expectations between school and work situations make questions such as this more difficult to answer.

It also appears that individuals who report high levels of illness tend to miss more classes and utilize medical professionals more frequently than do individuals low in illness. Data from the Illness Behavior Inventory and the questions regarding the specific behaviors associated with illness, indicate that individuals who report higher levels of illness behave differently with regard to illness behavior than do individuals low in illness. This indicates that the Illness Behavior Inventory may serve as a useful tool for behavioral treatment studies with patients who exhibit

excessive or inappropriate illness behavior. It may also serve to identify and predict illness behavior in various populations thus serving as an important measure in behavioral medicine research.

Limitations of the Present Research and Directions for Future Study

This study suffers from the faults inherent in any investigations which rely solely on self-report questionnaires. Scores of stressful life events and illness represent fairly gross estimates of the degree to which individuals actually experience them. Although the measures utilized in this study are comprehensive and clearly worded, each item is still subject to considerable subjective interpretation. For example, items such as persistent coughing, dizziness, and depression are difficult to define. A medical professional may not recognize a symptom such as persistent coughing unless the episode has lasted for several days. Nonprofessionals may call a ten minute coughing spell persistent coughing. Regarding life change events, there is a large subjective component involved in items such as "Experienced a significant success at work" or "Had problems in school or a training program." One way of clarifying these issues would be to conduct individual interviews with each participant. For the illness questions, this would ideally involve a trained medical professional who could evaluate the nature and severity of the symptoms.

The present study did not examine the potential relationships between stress-disorder interactions. Are specific disorders related to specific types of stressors? In addition, the role of the reciprocal nature of the stress-illness relationship and the role stress plays in maintaining illness were not evaluated in this study. The issue of the temporal nature of stress and illness also requires a different approach. For example, stress may significantly impact on the development of such disorders as high blood pressure and cancer; however, global measures of stress and illness are not sensitive to these more serious disorders. It is difficult to say when a disorder such as this first manifests itself. Many of these questions are more globally related to the role stress plays in the precipitation and maintenance of disorder. Longitudinal studies and prospective studies incorporating frequent follow-up interviews may clarify some of these issues.

Future studies should focus on the more refined aspects of the stress-illness relationship. Hardiness may continue to be an imporatant moderator variable in this relationship. In addition, investigators should begin to examine the developmental process of hardiness. Moderator variables have been demonstrated to be important factors in the stress-illness relationship with adults. Similar studies could be conducted with children. Studies such as the one conducted by Bruhn et al., (1971) using a population of

hemophiliacs as well as studies of physically healthy children could provide important knowledge about the relationship between stress, illness, and hardiness.

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APPENDIX

DEMOGRAPHIC QUESTIONNAIRE

Project PERI

The following questionnaire contains several questions about your general background. Please answer each question as accurately as posible.

1. Birthdate:

2. Age:

3. Sex: a. Male b. Female

4. Number of brothers:
   sisters:
   your birth order:

5. Ethnic Background

6. Marital status: a. single b. married c divorced
   d. separated e. widowed

7. Parents' information: a. married b. divorced
   c. separated d. widowed

8. Approximate family income: a. <10,000 b. 10,000-20,000
   c. 20,000-30,000 d. 30,000-40,000 e. >40,000

9. The number of years you have lived at your present HOME address: a. <1 year b. 1 - 5 years c. 5 - 10 years d. >10 years

10. The number of times you have moved in the last five years: a. 0 b. 1 c. 2 d. 3 e. >4

11. The population of where you spent most of your life:
    a. rural/farm b. <5,000 c. 5,000-50,000
    d. 50,000-500,000 e. >500,000

12 Status at Loyola: a. Freshman b. Sophomore c. Junior
   d. Senior e. other

APPROVAL SHEET

The thesis submitted by Daniel James Bruining has been read and approved by the following committee:

Patricia A. Rupert, Ph.D. Director
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The final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the thesis is now given final approval by the Committee with reference to content and form.

The thesis is therefore accepted in partial fulfillment of the requirements for the degree of Master of Arts.

July 10, 1986
Date

Patricia A. Rupert
Director's Signature