

THE DEVELOPMENT AND VALIDATION OF THE
PSYCHOLOGICAL HARDINESS SCALE

A Dissertation

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by

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This work is dedicated to my Grandmother,
Blanche Hockenberry,
for her strong support of my educational aspirations and
talents.

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CHAPTER I

INTRODUCTION

The relationship between stress and illness has been a subject of frequent speculation and investigation in both the popular and the professional press. While the popular press tends to focus on the positive correlation between these two variables, empirical investigation has begun to explore possible mediating forces in this relationship. This change in focus has come about due in part to the increased recognition that high levels of stress often coincide with increased opportunities and potential resources, and that the overall correlations between stress and illness are not particularly strong, ranging from .20 to .70 (Rabkin & Struening, 1976). Correlations between stress and psychological dysfunction generally fall below .30 (Holahan & Moos, 1986).

Chan (1977) raises the question as to why some individuals view a certain stressful situation as an opportunity for growth and self-actualization, while others

view the same situation with extreme apprehension and agitation. The suggestion here, as explicated by Aldwin and Revenson (1987), is that stress is probably less important to well-being than how one appraises and copes with it. Expanding on this line of thought, Rutter (1987) states that there has been a shift in focus from vulnerability to resilience, and from risk variables to negotiating risk situations.

A promising line of research in this area investigates the role of personality characteristics as mediating factors in the stress-illness relationship. Researchers have hypothesized that certain personality variables may promote stress resistance (McCranie, Lambert, & Lambert, 1987). One of the most interesting of these characteristics, hardiness, has been identified by Suzanne Kobasa and her colleagues at the University of Chicago. Kobasa and her colleagues contended that personal hardiness is a powerful stress/illness buffer. Specifically, hardiness is hypothesized as being associated with less psychological stress (and subsequent greater health) due to the fact that hardy individuals tend to view stress positively (as a challenge). Additionally, hardiness is hypothesized as contributing to the use of more effective coping strategies (Kobasa, 1982a).

These hypotheses were derived from their research on alienation, and the theoretical foundation for their conceptualization of hardiness lies in existential personality theory. Based on existential theory, the Kobasa group suggested that if one has experienced breadth and variety of events; has received support for exercising the cognitive capabilities of symbolization, imagination, and judgment; has received approval and admiration for being independent; and has role models who advocate hardiness and display it in their behavior, these hardy qualities can develop. Through these experiences, the belief develops that it is interesting and worthwhile to involve oneself in whatever is going on in one's life--one learns a sense of control or influence rather than powerlessness (Kobasa, 1982a). The Kobasa group postulated that these personality characteristics and developmental events serve as a foundation for personal hardiness.

Using the construct of hardiness as their frame of reference, the Kobasa group then investigated the ways in which individuals recognize and act on their environment. Once again integrating existential personality theory with empirical findings from social, developmental and personality research, Kobasa (1979) proposed that one's personality (especially the element of "hardiness") can serve as a source of positive resistance to stress-related

illness. Specifically, she conceptualized a hardy personality style composed of a constellation of three characteristics: commitment, control, and challenge (Kobasa, 1979). Kobasa and Maddi (1980), and Kobasa, Maddi and Zola (1982) have further proposed that these three characteristics predispose individuals to be intrinsically motivated.

Individuals with a high level of commitment have a generalized sense of purpose in life that allows them to identify with and find meaningful the events, things and persons in their environment. They are invested enough in themselves and their relationship to their particular social context that they do not easily give up under pressure. Furthermore, their relationship to self and the environment involves activeness and approach rather than passivity and avoidance (Kobasa, 1982). Committed individuals believe in the truth, importance, and value of who they are and what they do, thus they fully involve themselves in life. Commitment to self "provides an overall sense of purpose that mitigates the perceived threat of any given stressful life event in a specific life area" (Kobasa, 1982, p. 6). Such people also carry with them the knowledge that they can turn to others in stressful times, making effective use of social support (Kobasa, 1979a; Kobasa, 1979b; Kobasa, Maddi, & Courington, 1981; Kobasa, Maddi, & Kahn, 1982).

Persons with a high degree of control perceive themselves as having a definite influence in their world through the exercise of imagination, knowledge, skill, and choice. They believe that they can influence the occurrence or non-occurrence of events in their lives. Such individuals perceive stressful events as predictable consequences leading to positive outcomes. Their beliefs lead to actions that are aimed at transforming events into happenings that are consistent with their ongoing life plan (Kobasa, 1979; Kobasa, Maddi, & Kahn, 1982).

La Greca (1985) considers control to be the single most important factor of personality hardiness related to mitigating the effects of stress. This hypothesis is based on two effects of control: that individuals with a high sense of control cope significantly better with stress, and that they are more likely to engage in behavior that promotes health. He notes that the importance of control in mitigating stress-illness reactions is seen at times of extreme emotional trauma. A dramatic example of this relationship can be found in Engel (1977), who cites 275 cases of sudden death syndrome, relating such deaths to inadequate feelings of control in handling extreme trauma.

Individuals showing high levels of challenge can mitigate the stressfulness of events by their perception of such events. They see stressful events as changes which are

part of the normal pattern of life, and as opportunities to transform themselves and grow. Such events are viewed as stimulating challenges as opposed to trying circumstances (Kobasa, 1979, Kobasa, Maddi, & Kahn, 1982).

Thus, hardy individuals can be characterized as people who tend to find their experiences interesting and meaningful, are curious, believe that they can be influential, expect change to be the norm and believe it to be an important stimulus for development, make optimistic cognitive appraisals, hold things in perspective, and exhibit a willingness to take decisive action. Their personality style encourages transformational coping--a combination of cognition, emotion, and action aimed at not only survival but the enrichment of life through development (Kobasa, Maddi & Courington, 1981; Kobasa, Maddi & Puccetti, 1982). On the other hand, nonhardy persons find themselves and the environment boring, meaningless, and threatening. They feel powerless in the face of (what appear to be) overwhelming forces, believe life is best when it involves no changes, have no real conviction that development is either possible or important, are passive in their interactions with the environment when stressful things happen, and have little basis for optimistic cognitive appraisals or decisive actions that could transform stressful events. This personality style provides little or

no psychic protection, thus stressful events are more likely to have deleterious effects on both mental and physical health (Kobasa, Maddi, & Courington, 1981; Kobasa, Maddi, & Puccetti, 1982).

It appears that hardiness is a viable psychological construct, however; the measurement of hardiness is plagued with problems. Originally, hardiness was measured via a number of separate inventories and at least five different versions of this composite measure, consisting of 20, 36, 50, 71, and 90 items, have appeared in published research. In addition to the problems wrought by the number of derivations of this scale lies a more serious, conceptual and theoretical problem. There are conflicting findings in the literature regarding the validity of the three subdimensions of hardiness (commitment, control and challenge) and their relationships to various outcome variables and correlates of hardiness. Funk and Houston (1987) as well as Hull et al., (1987) suggest that different processes may underlie each of the three dimensions. Campbell et al. (1989) believe that the hardiness scales developed to date may not be "measuring as global a concept of hardiness as suggested by Kobasa's theoretical writing", but instead are measures of the three independent dimensions of commitment, control and challenge. Similarly, Richard Lazarus is noted in Fischman (1987) as stating that the

Kobasa measures are not actual measures of hardiness, since hardiness is only inferred from low scores on separate constructs. Lazarus suggests, similarly to Campbell et al., that the Kobasa measures do not prove the existence of hardiness.

As may be inferred, the conceptualization and measurement of hardiness is plagued with problems, in fact, Pollack (1989) notes that the hardiness scale is theoretically inadequate and psychometrically ambiguous. Clearly, a construct intended to be reflective of a unitary trait important to stress resistance was defined in terms of three other traits, all of which had already been proposed as important in stress resistance and/or mental health and functioning by other theorists and researchers (for example, control has been studied by Rotter, 1966; and Abramson, Seligman, & Teasdale, 1978, among numerous others). The law of scientific parsimony is violated when it takes three existing concepts to define one new concept. Also, Carver (1989), discusses the conceptual difficulties created when personality constructs are initially postulated to be multidimensional rather than unidimensional.

Thus, the purposes of the proposed research are as follows: 1) to develop a parsimonious new conceptualization and measure of the unidimensional construct of psychological hardiness; 2) to examine the psychometric characteristics of

the new measure, including its reliability, validity, and factor structure; 3) to investigate its comparative utility relative to the earlier measures of hardiness as a moderator of the stress-well-being relationship; 4) to investigate its relationships to other psychological characteristics potentially related to a healthy or stress-resistant personality; 5) to examine gender differences in levels, and consequences of hardiness; 6) investigate the separate and distinct contributions of hardiness in the relationship between stress and symptomology.

CHAPTER 11

LITERATURE REVIEW

Method

A review of the pertinent literature was conducted by utilizing the computer search systems PsychInfo and PsychLit on CD Rom, using "hardiness", "resilience" "resistance to stress" and "psychological endurance" as search cues. This computer search included all relevant psychological journals from 1979 (when Kobasa's seminal article appeared) to the present time, as well as earlier articles where appropriate. In addition, the most recent editions of selected journals (those in which hardiness articles have previously appeared) were reviewed by the researcher for relevant articles.

The Stress-Illness Relationship

A major focus of research in the behavioral and biomedical sciences concerns the relationship between stress and physical and psychological health. One of the pioneering approaches to conceptualizing the stress-illness relationship was the work of Holmes and Rahe (1967). Basing

their research on the idea that life events cause stress (Dohrenwend & Dohrenwend, 1974; Seyle, 1976), Holmes and Rahe examined the postulate that life events which cause change and require some form of readjustment (e.g., a new job, marriage, the death of a loved one, a geographic move) could increase the likelihood of illness. Wilding (1984) notes that "stress cannot only cause, but alter the course of disease. Animal and human studies have shown that stress triggers a number of biochemical changes in the body, all of which affect the ability to remain healthy" (p. 2). LaGreca (1985) explored the relationship between stress and survivorship, noting that if stress is not properly coped with it can result in severe pathological consequences to one's immune, cardiovascular, and central nervous systems.

In order to measure stress levels, numerous studies used checklists of life change events, and then related the total number of "Life Change Units" to indices of illness, for example, symptom checklists, hospitalization records, days missed from work. It was assumed that a given amount of stress was related to a given probability of becoming sick, and that the predictive equation was the same for all individuals. It is important for the present investigation to note that, while this early work focused on adult populations, Greenberg (1981) demonstrated a significant and positive association between life stress and illness in a

college student population, thus the findings in the stress-illness literature seem to be generalizable to a college-student population.

Two major assumptions of the Holmes/Rahe work that have been challenged are that: 1) a given environmental event has the same meaning or stress value to all individuals experiencing the event; and 2) that a given amount of stress will cause the same degree of stress response (e.g., in terms of illness or distress) across individuals. Alternative formulations assume the existence of individual differences or environmental conditions which may differentially influence an individual's responses to stress, in other words, the ideas of stress resistance versus stress proneness or vulnerability in place of a simple stress-illness relationship that is presumed to be applicable across individuals. Pollock (1986) states that the lack of explanation for individual responses to the same event is a major weakness in this line of research. She also notes that responses to the same stressor vary markedly, as do adaptational outcomes to stressful situations; and she identifies hardiness as a motivating factor in resolving stressful situations as well as to adapting to actual health problems (Pollock, 1989).

Representative of the first challenge, concerning the uniformity of meaning of a given life event, is the work of

Lazarus and his colleagues in the Berkeley Stress-Coping Project (1966; Lazarus, DeLongis, Folkman, & Gruen, 1985; Lazarus & Folkman, 1984). Lazarus emphasized the role of cognitive appraisals of potentially stressful situations; specifically, one's perceptions of a situation as representing a current or potential threat versus representing a challenge, will influence whether and to what degree a positive or negative appraisal of the situation will be made. The more negative the appraisal, the more likely it is that such an event will have a deleterious effect on one's health. The same stimulus configuration may be responded to (or appraised) very differently by different people--for example, a traffic jam or an insult may have a negative impact on some people but no effect on others (Lazarus et al., 1985). It is theorized, therefore, that no event can be identified as a stressor, nor can its severity be determined, independently of its cognitive appraisal by a particular individual.

A thorough literature review focusing on factors leading to resistance to stressful life events was conducted by Mespor (1985). It was noted that, based on the findings of numerous studies, stressful life events are related to the occurrence of illness; and, more importantly, that there are large differences between individuals in response to stressors.

A major approach to investigating the second assumption has been the search for moderators or "buffers" of the stress-illness relationship. This approach involves a search for individual or environmental variables which convey stress resistance versus stress proneness (Antonovsky, 1979). Specifically, Antonovsky suggested that the differences in individuals' reactions to stressful events are related to the presence or absence of "generalized resistance resources". Subsequently, researchers have focused much attention on investigations of characteristics which may potentially differentiate people who deteriorate physically and/or psychologically under stress from those who seem to be able to tolerate high levels of stress with little difficulty and/or a rapid recovery.

Numerous variables have been postulated to have moderating or buffering effects; they include environmental variables such as social support (e.g., Billings & Moos, 1981; Kobasa & Pucetti, 1983; Sarason, Sarason, & Shearin, 1986), behavioral variables such as health practices (Wlebe & McCallum, 1986), and personality variables including self-esteem (DeLongis, Folkman, & Lazarus, 1988) and hardiness (Kobasa, 1979). LaGreca (1985) postulates six key intervening factors that can moderate the impact of stress: a) childhood adaptation, b) personality hardiness,

c)expectation of stresses d)compartmentalization of stress,
e)social support and f)environment.

Moderators may serve their purpose by reducing vulnerability to stress and/or by providing the individual with greater coping skills. For example, social support could not only reduce initial vulnerability but could itself serve as a helpful coping resource under stressful conditions. Similarly, individuals having stress-resistant or hardy personalities may not only be less vulnerable initially but may cope more effectively with stressful situations. Thus, further understanding of characteristics and/or conditions which facilitate stress resistance and the mechanisms underlying such resistance are vital to those concerned with physical and psychological health.

Psychological Hardiness

One personality variable receiving attention as a stress buffer is that of psychological hardiness, introduced in 1979 by Suzanne Kobasa and her colleagues in Chicago, who began the Hardiness Institute. As described above, Kobasa defined hardiness using concepts from existential psychology, that is, the three "constituent traits" of commitment, challenge, and control.

The Hardiness Institute Research Findings

Investigations of hardiness hypothesize that, under stressful conditions, hardy individuals will have fewer stress-related illness than will non-hardy individuals. The foundational study in this area was conducted on middle and upper level 40-49-year-old white male executives working for a mid-Western utilities company (Kobasa, 1979a; Kobasa, 1979b; Kobasa, Maddi, & Puccetti, 1982). While these individuals had experienced equivalent levels of stress as measured by the Schedule of Recent Life Events Scale (Holms and Rahe, 1967), one group had fallen ill and the other group had not. Discriminant function analysis supported the hypothesis that those individuals in the high stress/low illness group showed higher levels of hardiness (as measured by levels of challenge, commitment, and control) than individuals in the high stress/high illness group. Furthermore, Kobasa, Maddi, & Puccetti (1982) noted an interaction effect such that the mediating effect of hardiness was greatest as stressful events increased. Kobasa, Maddi, and Kahn (1982) found similar results utilizing a prospective, longitudinal design. Specifically, the original subject pool completed questionnaires covering a period of five years. Measures of stressful life events, illness and hardiness were given on three occasions. The

findings of this study echo those found in the above investigations in that main effects revealed significant results for both hardiness and stress, and the significant interaction revealed the buffering effect of hardiness in the stress-illness relationship. Further, they found that these effects (for hardiness) are greatest when stressful events mount.

An additional investigation into this group of executives again utilized a prospective design (Kobasa, Maddi, & Courington, 1981). This study explored the mediating effects of hardiness and constitutional predisposition (as measured by reports of subjects' parents' illness) on the stress-illness relationship. Analyses of variance and covariance revealed significant main effects for all the independent variables (hardiness, stress and parents' illness), supporting the hypothesis that hardiness does have an effect on illness. However, none of the interactions proved significant, thus the hypothesis that hardiness serves as a stress-illness buffer was not supported. Constitutional predisposition did not correlate with personality hardiness, thus ruling out the possibility that hardiness is merely a psychological reflection of such a predisposition.

Further work by these researchers investigated the relationship between "Type A" behavior and hardiness (Kobasa, Maddi, & Zola, 1983). Correlational analyses revealed that these are independent constructs ($r = -0.01$). Furthermore, their results indicate that non-hardy, Type A individuals are more prone to stress related illness than any other group. Continuing their work examining the relationships between hardiness and other possible mediating factors in the stress-illness relationship, Kobasa and Puccetti (1983) investigated the simultaneous impact of hardiness, perceived social support, and social assets. The results of this study are similar to previously cited studies on hardiness; however, data did indicate a new finding in that perceived family support had a negative impact on health for non-hardy subjects. Kobasa and Puccetti hypothesize that for individuals low in hardiness, "family support may foster inappropriate handling of or coping with stressful life events" (p. 849), thus moving such individuals farther away from a successful resolution of the stressor.

Along these same lines, Kobasa, Maddi, Puccetti and Zola (1985) examined hardiness, exercise, and social support singularly and in combination. Results indicated that all of these independent factors had an effect on the stress-illness relationship, and furthermore, that the

effects were additive, in other words, subjects with two resistance resources were healthier than subjects with one, and subjects with three were healthier than subjects with two. Additionally, multiple regression analyses revealed that hardiness accounted for a greater percentage of the variance than either social support or exercise. Thus if one could have only one of the three resistance resources, the most powerful effects would be found with hardiness.

In summary, the Hardiness Institute researchers continue to investigate and support their original theoretical conceptualization of hardiness (as commitment, control, and challenge) as well as its direct and indirect effects on the stress-illness relationship, maintaining that hardiness serves to moderate the relationship between stress and illness. Clearly, the Hardiness Institute researchers have played a major role in developing and exploring this concept. Additionally, a substantial amount of work in this area has been performed by other researchers. A summary of these investigations follows.

Further Inquiries into Hardiness

Hardiness and Health. The link between the personality construct of hardiness and health is one of the most frequently researched areas in this field. The following studies will serve to illustrate the findings in this area.

Banks & Gannon (1988) investigated the influence of hardiness on the relationship between stressors and psychosomatic symptomatology. They administered questionnaires to 30 male and 58 female undergraduates on four occasions, with one-month intervals, using the following five scales as negative indicators: Alienation From Self and Alienation From Work Scales of the Alienation Test (Maddi, Kobasa, & Hoover, 1979); Rotter's (1966) Locus of Control Scale, the Powerlessness Scale of the Alienation Test (Maddi et al., 1979), the Security Scale of the California Life Goals Evaluation Schedule (Hahn, 1966). They found that hardy individuals tended to report fewer stressors and to report them as being less stressful in general than did non-hardy individuals. Furthermore, hardy subjects tended to report fewer symptoms than non-hardy subjects. Looking at their comparative results across time, they noted that hardiness scores proved to be stable, and that hardiness did indeed act as a stress-illness buffer.

Richard Contrada (1989) looked at Type A behavior, hardiness, and cardiovascular responses to stress, using 68 male undergraduates. He found that hardiness was related to lower blood pressure readings, and more specifically, that the challenge component of hardiness accounted for the majority of this relationship. Hardiness was measured using the following five questionnaires: Alienation from work and Alienation from self scales (Maddi, Kobasa, & Hoover, 1979), External locus of control scale (Rotter, Seeman & Liverant, 1962), Powerlessness Scale (Maddi et al., 1979), and the Security scale of the California Life Goals Evaluation Schedule (Hahn, 1966). A composite scale was determined according to Kobasa et al.'s guidelines (1982). Based on the findings of this study, Contrada hypothesized that hardiness provides an attribute that reduces the body's response to psychological stress.

Roth, Wiebe, Fillingim, & Shay (1989) looked at the stress-resistance effects of life events, fitness, hardiness, and health. These investigators surveyed 163 male and 210 female college undergraduates, using the same five scales as Contrada (1989). They found that hardiness was negatively correlated with illness. Through the use of structural equation analyses, the data suggested that hardiness may in fact affect health indirectly by influencing either the actual incidence or the subjective

Interpretation of stressful life events. Additionally, they found that the hardiness subcomponent of challenge was unrelated to any of the variables studied (including the other two hardiness components) and the commitment component was the hardiness component most strongly related to indices of health. This study speaks to the need to re-evaluate the conceptualization and measurement of hardiness.

Dillon and Totten (1989) investigated the relationship between psychological factors (hardiness and humor) and immunocompetence in breast-feeding mothers. Correlational analyses revealed that hardiness was directly related to coping humor and inversely related to health problems in both mothers and infants. Additionally, they found that hardiness and humor were positively correlated. A unique component to this study was their investigation of the relationship of hardiness in mothers to the health of their infants, finding better health scores in infants of hardy mothers. This could potentially point to the need for investigations into potential genetic links with hardiness, as well as the relationship between personal hardiness and positive, healthy interpersonal relationships. This study measured hardiness using the 50-item Personal Views Survey (Maddi, 1985).

The results of these studies indicate that hardiness does indeed have an affect on one's health, and that it serves some role in reducing the frequency and number of illness, especially in response to stressful events.

Hardiness and Chronic Illness. While the construct of hardiness was originally developed to distinguish between individuals who fell ill under stress from individuals who remained healthy, a number of studies have been conducted indicating that hardiness also distinguishes between individuals who are dealing with chronic illness, specifically that hardy individuals tend to remain healthier, relatively speaking, as compared to non-hardy individuals.

Pollack (1986) appears to be the first individual to have conducted such an investigation. She hypothesized that chronically ill individuals who display adaptive behavior (as regards their illness) have a different personality structure than individuals who have a chronic illness and maladaptive behavior, and that hardiness characterized this difference. This study is especially interesting in that it involved the development of a sample-specific hardiness scale, the Health-Related Hardiness Scale (HRHS) (Pollack, 1984). This measure was designed to be conceptually similar to the Kobasa scales, utilizing the components of challenge,

commitment and control. The major difference in this scale is that control was measured by items selected from the Multidimensional Health Locus of Control Scale (MHLC) (Wallston, Maides, & Wallston, 1978). Pollock found that hardiness was significantly related with physiological and psychosocial adaptation in insulin-dependent diabetic subjects. However, significant relationships were not found between hardiness and subjects diagnosed with rheumatoid arthritis nor with subjects diagnosed with hypertension. Pollock suggested that her results may be due to differential influences of the subcomponents of hardiness. Specifically, that the control dimension was important in the diabetes group and the arthritis group, in that the diabetic subjects felt some degree of controllability over their illness while the arthritis group did not. Further, the dimension of challenge was thought to be a positive factor in all the groups, although it may have contributed to the negative results for the hypertensive group. This study is unique in that it was the first investigation of hardiness in individuals who already had a health problem. Pollock concludes that hardiness has potential value in understanding differences between individuals in their adjustment to chronic illness.

Following this investigation, Pollock (1989) conducted another study, looking at factors that promoted physiological and psychosocial adaptation in 60 chronically ill adults. Once again, her sample contained individuals with diabetes, hypertension, or rheumatoid arthritis. She hypothesized that hardiness would have both direct and indirect effects on adaptation to chronic illness. In this investigation, she found that hardiness had significantly influenced role function in the diabetic and hypertensive groups, and that hardiness and adaptation were related in the diabetic group. Further, she found that psychosocial activities were influenced by the presence of hardiness, indicating indirect effects, such that those patients with higher levels of hardiness were more likely to engage in psychosocial activities, which were shown to have a positive effect on health (Pollack, 1989).

While Pollack failed to find any effects for hardiness with rheumatoid arthritis patients in either of her studies, a study by Okun, Zautra and Robinson (1988) did indicate that there was a relationship between these two variables. Specifically, they found that the control dimension of hardiness was significantly related to health. Hardiness was measured using the 50-item Personal Views Survey (The Hardiness Institute, Inc., 1985). Their results suggest that hardiness is related to self-reported health status, as

well as an objective measure of health (T-cell count). The differential results in these studies may be a measurement artifact, again pointing to the need for a new, re-conceptualized measure of hardiness.

Finally, an interesting study was conducted by Zich and Temoshok (1987), who studied perceptions of social support in men with AIDS and ARC and their relationships with distress and hardiness. Using the short form of the hardiness scale, they found a relationship between the subscales of commitment and control and social support. Most importantly for this review, these researchers conducted a regression analysis predicting levels of dysphoria, finding that hardiness accounted for the greatest proportion of the variance, and that social support ratings did not add significantly to this prediction.

These studies suggest that, even though hardiness was developed as a construct used to distinguish the frequency of stress-related illness in an otherwise healthy population, it has important implications for individuals who are already ill. These studies speak to the importance of taking hardiness into account in the treatment of individuals who are chronically ill.

Hardiness and Health Habits. A number of studies have investigated the relationship between hardiness and health habits, postulating that hardy individuals engage in a generally healthier lifestyle than non-hardy individuals; a lifestyle which, in turn, contributes to lower levels of symptomology. A case in point is Hannah (1988) who investigated the role of hardiness and health behavior, focusing on health concern as a moderator variable and measuring hardiness with the 20-item short form. He hypothesized that hardiness buffered the stress-illness relationship through its effect on health behavior, specifically that individuals high in hardiness were more likely to engage in a greater number of health-protective behaviors than those low in hardiness, and thus were less likely to fall ill under stress. The results revealed that health behavior overall was unrelated to hardiness, but the hardiness by health concern interaction was significant, indicating that, for individuals with high levels of health concern, hardiness was significantly related to health behavior. Hannah hypothesizes that these results may explain some of the discrepancies in the literature. Specifically, the results suggest that variables affecting health concern could affect the hardiness-health behavior relationship, and differences in health concern would in turn have differential effects on rate of illness. Thus, he

states that, under certain circumstances, hardiness may buffer the effects of stress, in part by increasing health-protective behaviors.

Along the same lines, Nagy and Nix (1989) administered a hardiness scale (the 36-item version), a preventive health behaviors inventory, and a health risk appraisal, to 211 college students. Correlational analyses indicated a significant relationship between hardiness and preventive health behaviors. The results of a multiple regression analysis indicated that the preventative health behavior appraisals explained modest amounts of the variance on hardiness, and indicated that hardiness and preventive health behavior are related and need further clarification. They hypothesize a number of influences in the relationship between hardiness and preventive health behavior. First, that hardiness may encourage positive coping, thus reducing negative health behaviors. Secondly, they hypothesize that the internal control characteristics of hardy personalities are also characteristics reflective of internal health locus of control, which in turn contributes to preventive health behavior.

Lastly, Nowack (1989) conducted a study that not only investigated health behavior, but also introduced his recently developed measure of hardiness, the Cognitive Hardiness Scale. This study looked at coping style,

cognitive hardiness, health status, and health habits. Nowack designed a new measure of "cognitive hardiness" specifically for this investigation. His scale consists of 30 items of attitudes and beliefs about work and life, based on Kobasa's three constructs of commitment, challenge and control. The author reports an internal consistency reliability alpha of .83 for his measure. Results of this study indicate that women reported lower levels of cognitive hardiness than men. Correlational analyses indicated that hardiness was significantly related to health habits. Using a stepwise multiple regression analyses, results suggest that cognitive hardiness, health habits, stress and intrusive negative thoughts all contributed significantly to predictions of psychological distress. This investigation indicated that cognitive hardiness significantly contributed to indicators of psychological distress, but not to physical illness. It may be hypothesized, however, that hardiness affects physical illness indirectly through the effects of psychological distress.

As evidenced above, numerous studies have provided substantial support for the idea that hardiness has an effect on health. The exact mechanism by which this occurs, however, is still up for debate. The above mentioned studies suggest that a possible mechanism is the effect hardiness has on one's general lifestyle, specifically that

hardiness tends to be associated with strong health-care habits.

Hardiness in Special Populations. While the foundational work in the hardiness literature was conducted using only white male executives, since then the construct has been tested with a number of different populations. Kuo and Tsai (1986), for example, conducted an interesting study investigating the relationship between social networking, hardiness and mental health in immigrants, with their hypothesis being that hardiness served as an important mediator in the strain of emigration/immigration. They presented a causal model of the stress-illness relationship, and concluded that the characteristic of hardiness can indeed reduce the stresses associated with migration. Interestingly, they also postulated, based on their data, that immigrants tended to be high in hardiness. Presumably, the individuals most prone to undertake the challenge of immigration tended to have an internal locus of control and high levels of hardiness. This study is methodologically intriguing in that they measured hardiness utilizing only three items from the Internal-External Locus of Control Scale, as opposed to any of the various derivations of the measures compiled by Kobasa and her colleagues. While the authors note that further studies need to incorporate

Kobasa's other two components of hardiness (commitment and challenge), they felt that measuring control alone represented an adequate estimation of the subjects' levels of hardiness. This methodological uniqueness is representative of the psychometric chaos in this body of literature, which will be discussed in detail below.

Hannah and Morrissey (1987) looked at correlates of psychological hardiness in a group of Canadian adolescents. This study used the 20-item version of the hardiness scale (Kobasa & Maddi, 1982), modifying it to make all the items appropriate for this age group. A regression analysis revealed that sex, age, grade in school, religion, and well-being were all significantly associated with differences in hardiness. They suggest that these results indicate that hardiness develops as a result of experience--success in school and in life presumably increasing one's sense of commitment, control, and challenge. Additionally, differences in hardiness due to religion were hypothesized to be related to the increased sense of personal control and responsibility in some religions as opposed to others.

Barling (1986) and Macewan and Barling (1988) conducted parallel investigations looking at inter-role conflict, marital adjustment, and hardiness; with the former study focusing solely on women and the latter on men. Barling (1986) administered questionnaires to a random

sample of 73 men in three diverse socio-economic areas. He found that hardiness did provide moderating effects on both inter-role conflict and marital adjustment. Interestingly, Macewan and Barling (1988) found conflicting results in their sample of women. Specifically, they found that hardiness did not serve as a moderator of the role conflict/marital adjustment relationship, thus conflict and maladjustment occurred irrespective of hardiness levels. The authors hypothesize gender differences in the hardiness construct, although it may be that the gender difference lies in some other variable that contributes to role conflict and marital adjustment in women. Both studies measured hardiness with the 20-item short form of the Kobasa scale.

An early criticism of the hardiness literature was that it was based on an extremely delimited subject sample. These studies illustrate how the originally restricted sample has been expanded considerably. It appears, based on the findings of these studies, that hardiness is indeed a concept that extends beyond a group of white male executives.

Hardiness and Other Personality Constructs. Hardiness has been investigated in relation to a number of different personality constructs. For example, Bartone, Ursano, Wright, and Ingraham (1989) looked at the effects of personality variables, including hardiness, on the health of assistance workers following a military air disaster. They found that hardiness was significantly related to measures of overall psychological well being and positive affect, and negatively related to depression and negative affect. Additionally, both hardiness and social supports modulated the effects of exposure on illness. Their conclusions state that perhaps individuals with high levels of personal hardiness can adjust more readily to the chaos and confusion of disaster situations, and that disaster helpers with high levels of hardiness may tend to regard their work as meaningful than individuals lower in hardiness. An interesting aspect of this study was the use of yet another modified measure of hardiness. Their contention was that the hardiness instruments designed by the Kobasa group were inappropriate with "blue-collar" workers, so they modified the scale, eliminating "long and awkward wordings" and the exclusive use of negative item indicators. This measure maintains the same theoretical foundation of the Kobasa instruments, measuring control, commitment and challenge, then using a composite score to represent hardiness.

A frequent topic of investigation is the relationship of hardiness to the personality style termed "Type A" behavior. An early investigation of this relationship was conducted by Howard, Cunningham, & Rechnittzer (1986), who performed a longitudinal study regarding whether hardiness served as a moderator of stress and health in Type A individuals. They measured hardiness using the second-order factor dependence/independence from the 16PF (Cattell et al., 1970). Their results indicate that dependence/independence was related to health, and they propose that dependence/independence is related to hardiness, therefore they propose that hardiness was related to health in their sample although the data do not suggest a causal relationship.

More recently, Nakano (1990) investigated the relationship between hardiness, Type A behavior, and physical symptoms in a group of Japanese male executives, utilizing the Jenkins Activity Survey Zyzanski & Jenkins, 1970), 16PF (Cattell et al., 1970), and Life Experiences Survey (Sarason et al., 1978) a measure of physical symptomology and depression adapted from the work of Langer (1962), and measuring hardiness using the dependence/independence subscale of the 16PF (Cattell et al., 1970). The results of an analysis of variance revealed significant main effects for hardiness on symptomology and depression,

and a significant interaction between hardiness and stress, indicating that under low stress levels, the hardy and nonhardy groups did not differ on symptomology. Their findings echo those of Kobasa (1979), whose study they replicated. This study also provided support for the use of hardiness in different populations, specifically studying residents of Tokyo.

Many of the researchers in this area believe that hardy individuals tend to make different attributions, especially regarding stressful situations, as compared to non-hardy individuals. For example, Hull, Van Treuren, and Prosser (1988) studied mediators of the hardiness/health relationship. They hypothesized that hardy individuals' tendency to perceive life events as positive and controllable is a healthy attributional style, which mediates the effects of stress. They thought that hardy subjects would be more likely to make internal, stable, global attributions for positive events and external, unstable, specific attributions for negative events. They measured hardiness using the short form of the Hardiness Scale (Kobasa & Maddi, 1982). The results for their attributional hypotheses were significant only when using the hardiness subcomponent of commitment. Similar but weaker effects were found for control and no effects were found for challenge or for the overall hardiness scores.

Additionally, they found no significant effects for hardiness on health, but suggested that attributions may mediate the effects of hardiness subcomponents (control, commitment and challenge) on health.

Along similar lines, Rhodewalt & Zone (1989) investigated differences in the appraisal of life change, depression, and illness in hardy versus nonhardy women, using the 20-item short form of the hardiness scale. Their findings indicate that nonhardy women have a higher proportion of undesirable experiences (subjectively evaluated) than do hardy women. Additionally, they found significant relationships between hardiness and depression and hardiness and illness. They propose an interesting hypothesis that nonhardiness is actually a correlate of the personality trait of negative affectivity, and that it is this construct, not hardiness itself, that differentiates individuals in relation to stress-related illness. Further, they suggest and that differences in the subjective appraisal of life events is perhaps the major determinant of the stress-buffering effects of hardiness found in the literature.

Additionally, some researchers have examined the relationship between hardiness and neuroticism. For example, Allred and Smith (1989) investigated cognitive and physiological responses to evaluative threat in hardy

subjects, hypothesizing that hardy individuals are resistant to stress-induced illness. This study is interesting in that they used both the 20 item short form and the 36 item abridged version of the hardiness scale, classifying subjects as hardy if they scored above the median on both measures. While these investigators found that hardy subjects reported more positive and fewer negative self-statements, they postulate that this is due to the confounding of hardiness and neuroticism. Their belief is that what has previously been categorized as low levels of hardiness is actually a representation of the more fundamental characterological construct of neuroticism. This thesis was tested by controlling for neuroticism (using the trait scale of the State-Trait Anxiety Inventory as a measure), resulting in the elimination of the main effects for hardiness. The authors conclude that this confound points to the importance of conceptual and methodological refinements in this area.

Parke and Rendall (1988), on the other hand, hypothesized that hardiness and neuroticism are different but related constructs. They studied the relationship between hardiness, extraversion and neuroticism, finding a positive relationship with extraversion and a negative relationship to neuroticism. Hardiness was measured using the Personal Views Survey. They found that extraversion and

neuroticism jointly account for a substantial proportion of the variance in hardiness scores. They hypothesize that the relationship between hardiness and extraversion reflects a common core of characteristics, particularly stability, flexibility, optimism, sociability, an enjoyment of novelty and challenge, and an active rather than passive orientation of life.

While most of the research on hardiness has focused on the variables of health and stress, and the effects of hardiness and stress on health, these studies indicate that hardiness is related to a number of additional variables, and that these relationships may have important implications for future conceptualizations of personality.

Hardiness in the Workplace. A number of studies have investigated the influence of hardiness and various correlates of occupational performance. For example, Nowack and Hanson (1983) conducted an early investigation of the relationship between stress, personality characteristics, job performance, illness and burnout in a college student population. Their hypothesis was that hardiness would serve as a buffer in the stress-illness relationship. Utilizing a 10-month, retrospective study, stepwise multiple regression analyses, and a measure of hardiness that served as a precursor to Nowack's Cognitive Hardiness Scale, they found

a number of significant relationships for hardiness. Specifically, they found that hardiness was negatively related to emotional exhaustion and depersonalization (their measures of burnout), and was positively related to personal accomplishment and job performance. Additionally, they found that hardiness was significantly related to both frequency and severity of illness, accounting for approximately 35% of the variance.

Burnout is a frequent topic of investigation in the occupational literature, and the following studies focus more directly on the relationship between hardiness and burnout. McCranie, Lambert, and Lambert (1987) and Topf (1989) studied stress, hardiness and burnout, the former looking at hospital staff nurses and the latter at critical care nurses. These researchers hypothesized, as explicated by Topf (1989), that burnout is a negative health outcome of occupational stress, and that hardiness affects both stress and its subsequent effects. Both of these investigations found a significant relationship between hardiness and burnout, but neither results in a significant interaction between stress and hardiness. While McCranie, Lambert and Lambert (1987) also found a significant relationship between stress and burnout, Topf (1989) did not. This may be due to the fact that in Topf's study, stress was found to be related to hardiness, as she had hypothesized. She notes

that the small effect here is consistent with the general findings in the literature that individuals reporting high levels of hardiness report similar levels of stress as compared to low hardy individuals.

These studies, however, are difficult to compare due to the differences in methodology. Most pertinent to this discussion are the different hardiness measures these investigations employed. Topf utilized separate measures of commitment, control and challenge, resulting in subscores for each subdimension as well as a composite score based on all 59 items, whereas McCranie, Lambert and Lambert utilized the 36-item abridged hardiness scale (Kobasa et al, 1984).

Two studies addressed hardiness and burnout in teachers. Holt, Fine, and Tollefson (1987) and Pierce and Molloy (1990) looked at the relationship between hardiness, stress and burnout in teachers. They administered questionnaires to assess the level of each of the variables, the former using the Alienation Test (Maddi, Kobasa & Hoover, 1978) and the Internal-External Control Scale (Rotter, 1966) to measure hardiness and the latter using the 36-item version of the hardiness scale. Both studies found that higher levels of hardiness were associated with lower levels of burnout, even under higher levels of stress. Additionally, Pierce and Molloy (1990) found the hardiness sub-component of commitment to serve as the most significant

predictor of burnout, providing support for the Topf (1989) findings.

Based on research in a number of different populations, it seems clear that hardiness does influence behavior in the workplace. Burnout, an important variable in the occupational literature, shows a strong relationship with hardiness such that individuals who are higher in hardiness show lower rates of burnout, even under high stress conditions.

Measurement Issues

The most frequently used hardiness scale, the Personal Views Survey (The Hardiness Institute, 1985) has evolved over time as Kobasa et al. have gathered data on this construct. Originally, hardiness was measured via a number of separate inventories. The control dimension was measured through the Internal-External Locus of Control Scale (Lefcourt, 1973; Rotter, Seeman, & Liverant, 1962), the Powerlessness versus Personal control scale and the Nihilism versus Meaningfulness scale of the Alienation Test (Maddi, Kobasa, & Hoover, 1978), the Achievement scale and the Dominance scale of the Personality Research Form (Jackson, 1974; Wiggins, 1973), and the Leadership Orientation scale of the California Life Goals Evaluation Schedules (Hahn, 1966). The commitment dimension was

measured by the Alienation versus Commitment scores of the Alienation Test (Maddi et al. 1978) and the Role Consistency Test, adapted from the Gergen and Morse Self-Consistency Test (1967). The measurement of challenge also required the administration of several inventories. This subscale utilized the Preference for Interesting Experiences scale, and the Security Orientation scale of the Hahn (1966) test. Additionally, the Vegetativeness versus Vigoriveness and the Adventurousness versus Responsibility scales of the Alienation Test contributed to the challenge subscale. Finally, the Need for Cognitive Structure scale and the Need for Endurance scale of the Personality Research Form were also used to measure challenge.

As noted above, Kobasa's first attempt to assess hardiness was based on a study of Illinois Bell Telephone executives. These subjects responded to 19 personality measures related to the concepts of commitment, challenge, and control. Discriminant function analysis indicated that six scales significantly differentiated the groups-- Alienation from Self (an indicator of Commitment), Nihilism and External Locus of Control (Control Indicators), and Powerlessness, Vegetativeness, and Adventurousness (Indicators of Challenge). Since this was presumably an empirical approach to scale construction, the logical next step would have been to use these six as hardiness

Indicators. However, Kobasa's next series of studies (Kobasa, Maddi, & Courington, 1981; Kobasa et al., 1982; Kobasa, Maddi, & Zola, 1983; Kobasa & Puccetti, 1983) used only three of these (alienation from self, external locus of control, and powerlessness) and two additional scales which had not significantly differentiated the groups (i.e., Alienation from Work and Security). In fact, the only study using the six scales significant in the original discriminant analysis was that of Ganellen and Blaney (1984). They investigated the relationship between hardiness, social support and life stress, finding significant main effects for the commitment and challenge dimensions of hardiness, but not for the control dimension. Additionally, they failed to find a significant interaction effect between hardiness and stress, thus their results did not support hardiness as a moderating variable in the stress-illness relationship.

Additional work by the Kobasa group further confused the issue, in that every subsequent study seemed to use a new variation in the measurement of commitment, challenge, and control (Funk & Houston, 1987; Hull, Van Treuren, & Ulinelli, 1987). As noted earlier, at least five different versions, consisting of 20, 36, 50, 71, and 90 items, have appeared in published research. Hull et al. (1987) despair over the number of different hardiness measures, and call

for a stop to this practice. Furthermore, Kobasa et al. do not have cut-off scores for the hardiness scales, but instead use sample-specific norms, making generalization and comparison of results from one study to another virtually impossible.

Much of the research in this field has been conducted using an abridged Hardiness Scale consisting of 20 items (Rhodeswalt & Agustsdottir, 1984) or a 36-item refined version of the Hardiness Scale (Schlosser & Sheeley, 1985). Currently, the most frequently used measure of hardiness, the Personal Views Survey (Maddi, 1985) is a 50-item inventory. It is purported to have been constructed both conceptually and empirically, and reliability estimates are reported to be adequate, with coefficient alphas in the .90's for total hardiness score, and in the .70's for the three subscales (Maddi, 1985). Regarding the construct validity of the measure, it was stated that the "aim has been to produce a refined test that replicates our major findings regarding the stress-illness relationship" and "that this aim has been largely realized" (Maddi, 1985).

As mentioned earlier, conflicting findings abound in the literature regarding the validity of the three subdimensions of challenge, commitment, and control; and their relationships to various outcome variables and correlates of hardiness. Funk and Houston (1987) as well as

Hull et al., (1987) suggest that future research should focus on the subdimensions as separate entities, and not hardiness composite scores. Indicative of the problems with the subdimensions are the differing opinions about them in the literature. Based on the results of their own studies, different researchers profess the superiority of one or another of the variables. For example, Hull (1987) notes that commitment has been the dimension most consistently related as predicted to other variables. Similarly, Topf (1989) found that commitment (negatively measured using Alienation) was the strongest predictor. She also notes that five studies have found commitment to be predictive in the expected directions, while control has had its predicted effect in four studies and challenge in one (Topf, 1989). Other researchers, however, believe that control is the most important dimension of hardiness (LaGreca, 1985), and many believe that commitment and control together are significant predictors (Hull, Van Treuren, & Virnelli, 1987).

Parke and Rendall (1988) identify yet another criticism of the Hardiness Scale, that is, that there are limitations due to the wording of the questions, if the scale is to be used with subject groups other than employed, professional males. They cite examples of questions with such wording biases as exclusive references to "he/him", assumptions that respondents have a "spouse", as well as

references to "my job", "my work", and "my bosses". They conclude that the Personal Views Survey is "not well-suited to studies of stress and well-being in the general population" (p. 788).

In addition to all the instruments brought forth by the Kobasa group, numerous other scales have been used to measure hardiness in the literature. One such measure is the second-order factor dependence/independence, from the Sixteen Personality Factor Questionnaire (16PF) developed by Cattell et al (1970). It is noted that individuals with high independence scores are described as "internally autonomous", which is considered by these researchers to be consistent with Kobasa's concept of hardiness (Howard et al., 1986). Thus, this subscale has been translated by some researchers as an independent measure of hardiness.

Campbell, Amerikaner, Swank and Vincent (1989) looked at the relationship between the hardiness test and the personal orientation inventory. The Personal Orientation Inventory was developed in 1963 by Everett Shostrom based on Maslow's ideas of self-actualization (Knapp, 1976). Using the Personal Views Survey (The Hardiness Institute, 1985), these researchers found a significant relationship between hardiness and the Personal Orientation Inventory, with the challenge subscale correlating most strongly, and very little correlation between the POI and the commitment

subscale. They then suggest the use of the POI as a measure of hardiness.

Additionally, the Kobasa scales have been modified for use with particular groups. For example, Bartone, Ursano, Wright, and Ingraham (1989) chose 45 of the 76 available items from the Kobasa scales, and modified them for use with "blue collar" workers. Their contention was that the long, awkward wordings and the exclusive use of negative indicators were inappropriate with less educated subjects. They maintain the three subscales of commitment, challenge and control, as well as the composite score of hardiness, and report good reliability for the scale, with a Cronbach's alpha for the overall measure of .85.

In a similar vein, Pollock and Duffy (1990) developed a health-related hardiness scale for use with individuals with actual health problems. Using the three subdimensions of control, commitment and challenge, they developed a 34 item scale. As did Bartone, Ursano, Wright, and Ingraham (1989), they developed their scale eliminating the negative indicators, and measured hardiness using a composite score. This scale appears to be reliable, with a reliability coefficient of .91 for the total scale. Interestingly, the results of a principle factors analysis indicated two factors, which the researchers termed "commitment/challenge" and "control".

Along the same lines, Morrissey and Hannah (1987) modified the short version of the hardiness scale for use with adolescents, yielding similar psychometrics to the original version, although they discovered four factors, which they labelled control, challenge, commitment to school and commitment to self. They concluded that this modified version of the scale is reliable and valid for use with adolescent populations.

Nowack (1989) responded to the criticisms wrought on the Kobasa instruments, developing what he calls the Cognitive Hardiness Scale. His aim was "to explore alternative measures of hardiness that will not obscure the independent contribution of (hardiness') subcomponents" (p. 148). Based on the hardiness literature, he developed a 30-item scale designed to assess 1) commitment toward work, family, community, and life; 2) affective, emotional, and behavioral self-control; and 3) optimistic views of change, challenge, and threat. This scale is noted to have good psychometric properties (for example, internal consistency reliability is reported as .83) and has been used in a number of studies to date with favorable results (Nowack, personal communication, 1990). While this instrument does appear to be superior to the Kobasa instruments in that it was developed in direct response to some of the critiques of the earlier instruments, it fails to respond to what may be

the most important issue of all, the conceptualization of hardness as being composed of three different constructs.

One of the possible problems underlying the measurement difficulties evidenced by the plethora of instruments that have been developed is explicated by Carver (1989), who investigated the psychometric issues involved in exploring multifaceted personality constructs such as hardness. His thesis is that constructs with two or more dimensions unintentionally varied simultaneously are confounded. Carver believes this practice stems from two theoretical viewpoints: 1) an assumption that the components converge on one underlying quality (a latent variable) that each reflects imperfectly; and 2) an assumption that the whole is more than the sum of the parts, or a "synergy" among dimensions. He concludes that this practice can result in lost information when a latent variable is tested solely through a composite score, and therefore in such cases it is imperative that each component part be investigated separately. Additionally, in cases of "synergy" among dimensions, Carver cautions that such a theory can only be adequately tested through the examination of statistical interactions. While this practice is becoming more common due to the simplification of data analysis and relative ease in interpreting findings, the

result is greater ambiguity in explanation and possible misinterpretation.

An additional problem with the measurement of hardiness, mentioned briefly above, is that the domain of possible measures of control, commitment, and challenge was composed largely of "negative indicators". A negative indicator is one for which its presence is used to indicate the absence of the other, or vice versa. Thus, measures of alienation (from self and from work) were used as negative indicators of commitment. A measure of need for security was used as a negative indicator of challenge, and measures of powerlessness and external locus of control were used as negative indicators of control. If a construct can be measured directly, use of negative indicators simply increases the conceptual "distance" between the construct and its measure and, consequently, the likelihood of invalidity of the measure. In this case, since hardiness is measured with negative indicators, it may actually be measuring general maladjustment. Funk and Houston (1987) noted that the use of negative and indirect indicators of hardiness calls for assumptions that may be inaccurate. For example, low scores on security (used to measure challenge) may simply represent neutral feelings about security or other feelings that are actually unrelated to challenge, the actual construct of interest.

Third, the results of the discriminant analysis performed to statistically indicate the best measures of hardiness (at least empirically, in differentiating high stress/low illness from high stress/high illness groups) were essentially ignored in subsequent research by the Kobasa group.

Fourth, the number of different measures used, and the short "half-life" of any one measure, make it very difficult to compare findings across studies and prevent the compilation of a body of data regarding the psychometric properties of any of the proposed measures. Such constant change in the approach to operationalizing a construct sheds doubt on the clarity with which it has been conceptualized in the first place.

Fifth, Funk and Houston (1987) note that a factor analysis of the hardiness subscales failed to reproduce the three dimensions of hardiness. Furthermore, factor analyses do not indicate any general factor or second-order dimension that would warrant inferences that "hardiness" is being measured, and measures of challenge, commitment, and control related very differently to criterion variables. In the prediction of health outcomes, commitment and secondarily, control, usually have been related as predicted, while challenge has tended to have no or negative, as often as positive, relationships to health outcomes (Hull, Van

Treuren, & Virnelli, 1987). Consequently, it appears that the subscale of challenge does not seem to contribute to hardiness' proposed stress-illness mediating effects.

Finally, the actual effects of hardiness on health are clear neither theoretically nor empirically. In various writings, Kobasa has postulated hardiness as a buffer or moderator of stress (Kobasa & Puccetti, 1983) and as having both indirect and direct effects on illness outcomes (Kobasa, 1982). It appears then, that the original conceptualization and measurement of hardiness is flawed.

Methodological Issues

Nowack (1985) identifies a number of pertinent criticisms of the Kobasa et al. studies. Specifically, he notes that their work relies on a life-events definition and measure of stress, one which has received both conceptual and psychometric criticisms (e.g., Lazarus, 1981; Vinokur & Selzer, 1975; Hudgens et al., 1967). Secondly, Kobasa et al.'s work has relied on physical illness measures as the dependent variable. Nowack suggests that additional outcomes of stress need to be investigated as well. Lastly, Nowack states that "no behavioral or physiological concomitants of hardiness have been directly studied and established to date" (1985, p. 539). In support of the

effects of hardiness, however, Nowack's investigation (1985) indicates results similar to those reported above (e.g. hardiness served as a buffer in the stress-illness relationship).

Schmied and Lawler (1986) note an important shortcoming of the Kobasa et al. research--their studies are based almost entirely on a group of middle aged, married, white Protestant male executives working for a single large corporation in the mid-west. Schmied and Lawler attempted to extend this research to a different population, specifically working women. Correlational results indicated that hardiness did not serve as a stress-illness buffer in this population, leading the investigators to conclude that those personality characteristics comprising hardiness in males may not be the same characteristics that comprise hardiness in females. Subsequent studies, however, have successfully extended the application of hardiness to a number of different populations, as explicated above.

Hull, Van Treuren, and Virnelli (1987) delineate a number of important critiques of this research. These researchers note that whether hardiness has direct or indirect (buffering) effects is an important distinction that needs to be investigated empirically. They believe that, based on a review of the literature, the direct effects of hardiness on self-reported health are more

important than the indirect effects. They are also highly critical of Kobasa et al.'s definition of hardiness as comprised of control, commitment, and challenge, subsequently plagued by the methodological issues surrounding multi-component measures as described above.

Along similar lines, Funk and Houston (1987) indicate numerous problems within the hardiness research. First of all, they state that there is little evidence of hardiness' buffering effect in the stress-illness relationship. They also note that there appears to be frequent misuse of statistical techniques within this literature, especially in regard to the idea of hardiness as a moderator variable; as noted in Baron & Kenny (1986), this is a problem in the social sciences in general, but appears to be an especially pervasive problem in this particular body of literature.

Turning our attention to statistical errors, many if not most previous studies of hardiness as a stress buffer have incorrectly used analysis of variance designs--these designs are not appropriate if there are correlations between any of the independent variables, that is, among stress, social support, and hardiness (Funk & Houston, 1987), and there are almost always such correlations in the data. Funk and Houston suggest multiple regression designs as more appropriate because they take into account the effects of colinearity/multicollinearity among variables.

Even more appropriate, however, may be covariance structure modeling, which uses correlational data to test the plausibility of causal models. Because models of the stress-health relationship clearly imply causality, use of model testing procedures would appear to be the most appropriate evaluative method when the data are essentially correlational in nature.

Thus, research investigating psychological hardiness is plagued by serious conceptual and methodological problems. Although some might suggest abandoning the construct altogether, research continues to appear using one or more of the confusing array of hardiness measures (e.g., Nowack, 1986; Allred & Smith, 1989; Rhodewalt & Zane, 1989). This suggests that the concept has had an intuitive appeal or "face validity" to researchers interested in stress resistance. Further, many recent reviews of the construct conclude that although the measurement of hardiness presents many problems and has not been shown to be psychometrically sound, the concept itself has promise (e.g., Carson, 1988; Hull et al, 1987). Carson (1988) for example, suggests that a better research strategy for studying hardiness would focus on a simpler, more precisely measurable construct.

Statement of the Problem

It appears that the personality construct of hardiness has a role in the relationship between stress and symptomology, however, additional research in this area is necessary in order to clarify what hardiness is and how it can best be measured. Methodological critiques delineate several new research directions. First, whether hardiness is actually an independent, unitary phenomenon or simply a compilation of three unrelated constructs is an issue that needs to be addressed. Additionally, the investigation of possible gender differences in this construct, and how it operates in the general population need to be determined empirically. Furthermore, a better understanding of the role of hardiness in the stress-illness relationship (e.g. direct or indirect effects) and the possible relationship of hardiness to other personality constructs that may also affect the stress-illness relationship needs to be investigated. By increasing understanding of this construct it may be possible to develop counseling interventions in order to increase clients' levels of hardiness.

It is postulated herein that although the trait of psychological hardiness exists and has utility for the understanding of stress resistance, the previous formulation

has been misdirected in taking an indirect and multivariate rather than direct and univariate approach to the conceptualization of hardiness. Instead of conceiving of and measuring it as a derivative trait, hardiness should be defined and measured directly, and variables and/or processes which contributed to the development and maintenance of a hardy personality could then be studied once the characteristic had been shown to be parsimoniously conceptualized and reliably measured. As such, hardiness will be redefined for this investigation as psychological endurance and resilience. Rutter (1987) describes resilience as, "the term used to describe the positive pole of individual differences in people's responses to stress and adversity" (p. 316). He goes on to describe resilience as focusing on individual differences in response to stress, leading some people to succumb to stress whereas others are able to overcome it. Russ and Douglas (1988) proposed the term "resilience" as "an initial and tentative attempt" to bridge the gap between the term hardiness and the psychodynamic concept of ego strength.

Hypotheses

It is hypothesized that 1) the new measure of hardiness will have superior psychometric properties as compared to the measures currently in use; 2) hardiness, parsimoniously defined and measured, will prove to have a reliable moderating effect in the stress-illness relationship; and that it will contribute a significant portion of the variance in this relationship, above and beyond what is contributed by stress; 3) hardiness will be related to the following psychological characteristics in the following ways: a) negative relationships will be found with depression, negative affectivity, physiological symptomology, and general psychological maladjustment; b) positive relationships will be found with self-esteem and internal locus of control.

CHAPTER III

METHOD

This chapter will describe the conduct of the investigation and the rationale for the data analysis.

Subjects and Procedure

Two hundred and ninety-five students (152 women and 143 men) enrolled in an introductory psychology course at a large midwestern university served as subjects for this investigation.

While predominantly composed of traditional college-aged individuals, the sample does represent some diversity in terms of age. Additionally, the gender balance achieved allowed for a thorough investigation of gender differences. Subjects received course credit for their participation and were considered to have volunteered for this study in that they had a variety of experiments from which to choose. Subjects were solicited by posting a sign-up sheet on the bulletin board outside Townshend Hall room 238. The sign-up sheet indicated the day, time and location of the experiment. These sign-up sheets were considered consent forms for the subjects' participation.

Subjects were tested in small groups under similar environmental conditions. Subjects were given a test packet containing the instruments described below and an NCS answer sheet. All subjects completed the instruments in under 50 minutes. Instructions were given verbally to all subjects, and subjects were given a written debriefing statement upon completing the instruments. A written transcript of the verbal instructions, a copy of the written instructions, and a copy of the debriefing statement can be found in Appendices A, B, and C, respectively.

Development of the Hardiness Scale

The new Hardiness scale was developed to reflect a more direct definition of the concept of hardiness; specifically, as resilience under stress, or the ability to withstand stressful experiences without becoming dysfunctional. Resilience refers simply to the ability to withstand stress in general, the ability to respond positively or "bounce back" from life's everyday challenges or "hassles".

In conjunction with established procedures for a construct-based approach to test construction (e.g. Nunally, 1978, Walsh & Betz, 1990, Wiggins, 1973), development of the measure consisted of the following steps: 1) developing a comprehensive and precise definition of the construct of interest--the definition

should be specific enough to have implications for the content of test items; 2) writing a pool of items larger than that needed for the final instrument; 3) subjecting the items to a preliminary examination by colleagues to correct ambiguously stated items or other problems in wording; 4) statistically analyzing the properties of the items based on the responses obtained in the development sample (Walsh & Betz, 1990). Lastly, the scale was refined by eliminating items with item-total correlations falling below .30, resulting in the final 40-item scale (see Appendix D for the 49-item scale and Appendix E for the final 40-item scale).

Reliability and validity. The internal consistency reliability, concurrent, construct, and criterion-related validity of the new measure were examined. The internal consistency--the degree to which each item on the test is measuring the same construct as each of the other items (Walsh & Betz, 1990)--was examined. As noted in the new conceptualization of hardness contained herein, unidimensionality (indicated by a high degree of internal consistency) was desired.

The first category of validity data collected was concurrent validity, that is, the relationship of the new and old measures of hardness. The Cognitive Hardiness Scale (Nowack, 1989) was utilized for this aspect of the investigation (See Appendix F). (It may be noted that it is not always desirable to show a strong

relationship between a new measure and existing measures, if the existing measures are being criticized theoretically, operationally, or both, as in the present proposal. However, it is "standard procedure" to include in initial validity studies other measures of the same construct, and that will be followed herein.)

The second category of validity investigated was construct validity. The concept of construct validity is used to investigate whether a test measures what it is purported to measure. Walsh and Betz (1990) note that construct validity occurs within a set of hypotheses about the construct in question, and involves three steps: 1) careful definition of the construct and postulation of hypotheses regarding the relationships between pertinent variables (as noted above); 2) the development of an instrument and an investigation of its reliability; 3) examination of the relationship of the instrument to other variables (as hypothesized). Angoff (1988) notes that construct validation is a process requiring many lines of evidence. The focus of this aspect of the study was on the third phase, with the investigation of the relationships between the new hardness measure and the following instruments, which are described below: 1) Rosenberg Self-Esteem Inventory (Appendix G); 2) Beck Depression Inventory (Appendix H); 3) Autonomy Scale (Appendix I).

The final type of validity to be studied was criterion-related validity. The concept of criterion-related validity is used to indicate the relationship of an instrument to some outcome variable (Walsh & Betz, 1990). Since it is postulated that hardiness serves to moderate the stress-illness relationship, measures of stress (Appendix J) and symptomology (Appendix K) were administered to assess this relationship.

Concurrent Validity Measure

Cognitive Hardiness Scale (Nowack, 1989). The Cognitive Hardiness Scale (Appendix F) was administered in order to investigate the concurrent validity of the Psychological Hardiness Scale. The Cognitive Hardiness Scale is a 30-item five point Likert scale (1=strongly agree, 2=agree, 3=neither agree nor disagree, 4=disagree, 5=strongly disagree) conceptually based on Kobasa's original tripartite hardiness model. Scores on this measure range from 30-150, with higher scores indicating greater levels of cognitive hardiness. This instrument utilizes an additive scoring method, with the following items reverse scored: 7-12, 15, 17, 20, 21, 23-29. The scale has shown adequate internal consistency reliability (alpha .83). The following is a sample item: "My involvement in non-work activities and hobbies provides me with a sense of meaning and purpose." This scale has

been validated in over 1,040 professional working adults (Nowack, personal communication, 1990).

Construct Validity Measures

Rosenberg Self Esteem Inventory (Rosenberg, 1965). This is a well-known 10-item four-point Likert scale (1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree) designed to measure "global self-esteem" (Appendix G). Scores on this measure range from 10-40, with higher scores indicating greater levels of self-esteem. This instrument utilizes an additive scoring method, with the following items reverse scored: 3, 5, 8-10. Internal consistency reliability coefficients range from .74 to .92; test-retest correlations from .63 to .91. Coefficients of Reproducibility are reported as .92 or more (Wylie, 1989). The following is a sample item: "I feel that I'm a person of worth, at least on an equal basis with others."

Beck Depression Inventory (BDI) Beck (1976).

The BDI (Appendix H) consists of 21 items measuring affective, cognitive, motivational, and physiological indicators of depression. This measure utilizes a four-point scoring system, with scores on each individual item ranging from 0-3.

The following is a sample item from the BDI:

- 0 I do not feel sad.
- 1 I feel sad.
- 2 I am sad all the time and I can't snap out of
 it.
- 3 I am so sad or unhappy that I can't stand it.

Scores on this measure range from 0-63, with higher scores indicating greater levels of depression. This instrument utilizes an additive scoring method. The BDI is psychometrically sound, with a reported test-retest reliability correlation coefficient of .90 (Beck, 1970). Additionally, Beck (1970) reports that item analysis demonstrated a positive correlation between each item and the total score for the instrument, with all correlations being significant at the .001 level. Internal consistency reliability is reported at .86, and the Spearman-Brown split-half reliability coefficient is .93. Concurrent validity studies of the BDI have yielded correlation coefficients ranging from .65 to .77 (Beck, 1970). While the BDI was developed for use in psychiatric populations, a study investigating the use of the BDI in a university setting resulted in the finding that it is a valid instrument for use in a college population (Blumberry, Oliver, & McClure, 1978). This scale has been shown to be sensitive to the stress associated with

outpatient medical disorders (Nielsen & Williams, 1980) and is often used as a measure of depression in life events studies (Derogatis, 1982).

Autonomy Scale (Beck, Epstein, & Harrison, 1983). Autonomy was assessed utilizing the Autonomous Achievement subscale of the Sociotropy-Autonomy Scale (Appendix I). This subscale consists of 12 items scored on a five-point Likert scale (1=strongly agree, 2=moderately agree, 3=aren't sure or neutral, 4=moderately disagree, 5=strongly disagree). Scores on this measure range from 12-60, and are determined additively, with lower scores indicating greater levels of autonomy. This scale was developed utilizing a sample of well-educated middle and upper-middle class outpatients at the University of Pennsylvania's Center for Cognitive Therapy. To facilitate comparisons between this instrument and the other instruments utilized, the entire scale was reverse scored such that higher scores indicated greater levels of autonomy. This test is reported to have an alpha coefficient of .82. The following is a sample item: "The possibility of being rejected by others for standing up for my rights would not stop me."

Criterion-Related Validity Measures

Brief Symptom Inventory. (Derogatis & Spencer, 1982)

The Brief Symptom Inventory (Appendix K) consists of 12 scales, 9 primary (symptom) dimensions, and three global indices of distress. It is a 53-item self-report symptom inventory designed to reflect the symptom patterns of psychiatric and medical patients as well as non-clinical samples. This test is designed as a modified checklist, for example, a sample item reads as follows: nervousness or shakiness inside. This test utilizes a five-point Likert scale (1 = not at all to 5 = extremely). Scores on this measure range from 53-260, with higher scores indicating greater levels of symptomology. This instrument utilizes an additive scoring method, and has a variety of subdimensions that may be scored, however, since this investigation required only a global index of symptomology, only the summed item totals were used. Internal consistency reliability estimates are acceptable, ranging from .71 to .83. The test-retest reliability ranges from .68 to .91 on the primary scales and above .80 on each of the three global scales. Excellent convergent validity (derived from a comparison of the BSI with its parent instrument, the SCL-90) is also reported, with correlations ranging from .92 to .99. Acceptable concurrent validity has been established by correlating scores on the BSI with scores on various subscales of the MMPI, with salient

correlations ranging from .30 to .72. Additionally, a factor analysis based on a 1,002 sample confirmed the a priori construction of the symptom dimensions (Derogatis & Melisaratos, 1983). This instrument has been normed and validated for use with college students (Cochran & Hale, 1985).

Life Stress Survey. This measure consisted of items from the Life Experiences Survey (LES; Sarason, Johnson, & Siegel, 1978) that would be most likely to be encountered by college students (Appendix J). This scale consisted of 25 items scored along a 5 point Likert scale (1=did not experience, 2=not at all stressful...5=extremely stressful). A sample item is as follows: "Death of a close family member". The LES has been judged as being appropriate for use with college students (Sarason, Johnson, & Siegel, 1978). Total scores, obtained using cumulative scoring, range from 25-125. Higher scores indicate greater levels of stress. Test-retest reliability correlations for total change scores are noted to be in the .60's (Sarason, Johnson, & Siegel, 1978).

Data Analysis

Descriptive Statistics. In order to investigate the hypotheses listed above, several statistical analyses were performed. Descriptive data were obtained for each instrument. Gender differences on these data were analyzed with t-tests. T-tests were also used to investigate the differences between groups differentiated on the basis of hardness scores.

Factor Analysis. The factor structure of the new Hardiness measure was examined utilizing the principle factors method of exploratory factor analysis. It has been noted that such an approach to scale construction incorporates the content-relevance of items achieved by rational test construction and the high correlation with a criterion (in this case, the hardness factor) derived from empirical test construction (Walsh & Betz, 1990).

Reliability. Internal consistency reliability was investigated using Cronbach's (1951) coefficient alpha. In order to estimate the proportion of true score variance (inter-item consistency), relative to the amount of observed score variance, Cronbach's alpha is reported to be appropriate for use with Likert-type scales.

Concurrent Validity. The first category of validity data examined was concurrent validity, that is, the relationship of the new measure of hardness to existing measures. Concurrent validity was investigated by examining Pearson product-moment correlations comparing the new measure with an existing hardness measure.

Construct Validity. Construct validity was examined using Pearson product-moment correlations. As hypothesized above, it was anticipated that the new hardness measure would have negative relationships with depression and symptomology, and positive relationships with self esteem and autonomy.

Criterion-Related Validity. The Pearson product-moment correlation coefficient was used to examine criterion-related validity. Additionally, since it was anticipated that there would be differences between high hardy and low hardy subjects on the criterion measures, group differences were examined using t-tests to compare the differences between the group means on the criterion measures. Statistics were calculated for men and women separately, as well as for the total group, in order to investigate any possible gender differences.

Hardiness as a Moderator Variable. The importance of hardiness as a moderating variable in the stress-illness relationship was investigated via multiple regression.

CHAPTER IV

RESULTS

This chapter will examine descriptive statistics for the sample and gender differences within the sample. It will also describe the psychometric properties of the Psychological Hardiness scale, its factor structure, reliability, validity, and comparative utility, and will examine hardiness as a moderator variable in the stress-illness relationship. It should be noted that, in order to control for experiment-wise error rate, the significance level for all analyses was set at $p < .01$.

Scale Development

Item-total correlations. As mentioned in the previous chapter, the new instrument was refined from an original pool of 49 items to the final 40-item instrument (See Appendix C). A minimum total criterion item-total correlation level of .23 is recommended for inclusion in a scale (Nunnally, 1978). Using a slightly more stringent criterion, all items with item-total correlations below .30 were dropped. This resulted in the elimination of nine items (numbers 4, 10, 12, 13, 16, 19, 21, 33, and 39). The

Item-total correlations for the 40 remaining items (see Appendix D) range from .31 to .72, with the majority ranging from .50 to .59. All of the item-total correlations are listed in Table 1.

Factor Structure. An exploratory factor analysis of the PHS was conducted using the principle factors method, which is noted by Tinsley and Tinsley (1987) as the preferred exploratory-descriptive method of factor extraction. Prior communality estimates were based on squared multiple correlations. (Squared multiple correlations provide the lower bound of the communality estimate in the population). The decision rule used to determine the number of factors in the PHS was a scree plot or discontinuity graph. This decision rule was chosen due to the fact that using eigenvalues alone to determine the number of factors is considered arbitrary (for example, a factor with an eigenvalue of 1.0 may be kept while one with an eigenvalue of .98 may be excluded, when in fact the difference between what was kept and what was not is actually miniscule). Additionally, utilizing eigenvalues to determine the number of factors can lead to over factoring. Using a scree plot, decisions are made based upon where the graph levels off, on the assumption that there should be one or more important factors explaining much of the variance,

and once such factors have been extracted, the remaining factors will fall much lower and will level off the graph. The scree plot (Figure 1) revealed one clear general factor, as hypothesized. Finally, due to the fact that only one factor was retained, no rotation was performed.

The factor loadings for the Hardiness Factor are found in Table 2. All of the loadings are moderately high, with correlations ranging from .21 to .73 and the majority falling between .50 to .69. Additionally, the factor analysis revealed an eigenvalue of 10.2 for the hardiness factor, thus accounting for 58% of the common variance and 25.5% of the total variance of the scale.

Table 1

Item-Total Pearson-Product Moment Correlations
for the Psychological Hardiness Scale

Item Number	Item-Total Correlation
1	.39
2	.54
3	.48
4	.14
5	.41
6	.50
7	.31
8	.54
9	.36
10	.29
11	.57
12	.23
13	.20
14	.54
15	.31
16	.19
17	.41
18	.49
19	.06
20	.57
21	.17
22	.39
23	.53
24	.65
25	.59

Table 1, Continued

Item Number	Item-Total Correlation
26	.38
27	.57
28	.52
29	.42
30	.58
31	.32
32	.49
33	.20
34	.63
35	.45
36	.70
37	.55
38	.55
39	.26
40	.60
41	.57
42	.51
43	.42
44	.51
45	.72
46	.51
47	.46
48	.31
49	.59

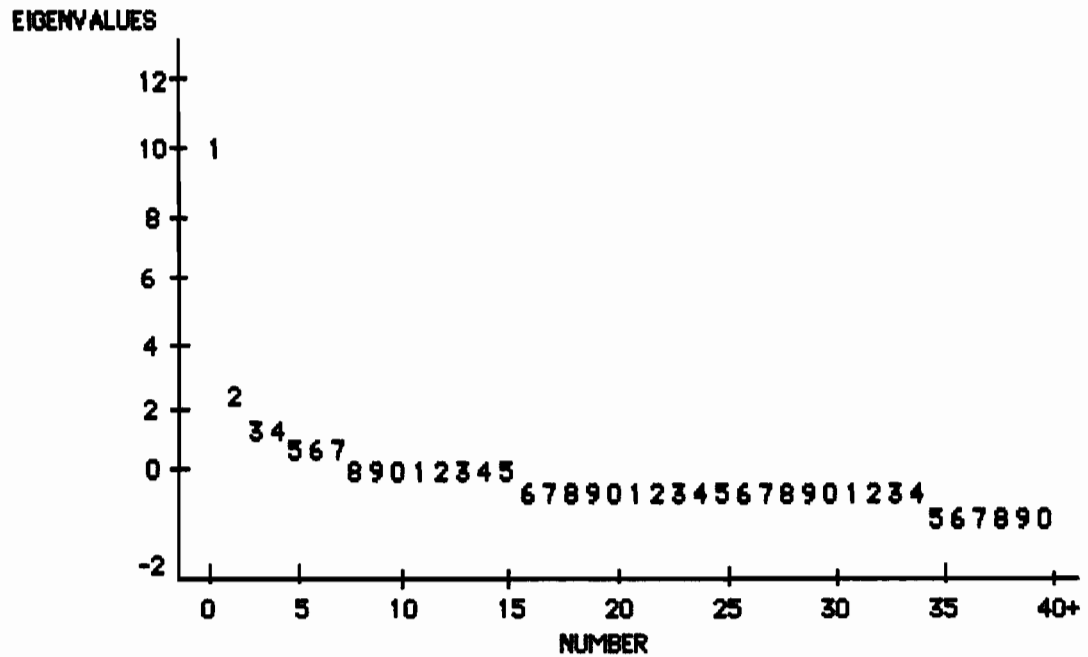


Figure 1
 Scree Plot of Eigenvalues for the
 Psychological Hardiness Scale

Table 2
 Loadings of Items on the General Factor of the
 Psychological Hardiness Scale

Item Number	Hardiness Factor
1	.40
2	.52
3	.48
5	.38
6	.52
7	.21
8	.52
9	.32
11	.56
14	.54
15	.26
17	.39
18	.47
20	.58
22	.39
23	.52
24	.67
25	.60
26	.36
27	.57
28	.55
29	.38
30	.61
31	.25
32	.50
34	.63
35	.43
36	.71
37	.58
38	.55
40	.62
41	.59
42	.53
43	.38
44	.48
45	.73
46	.50
47	.44
48	.24
49	.61

Descriptive Statistics

The Psychological Hardiness Scale (PHS) yielded a mean score of 175.3 with a standard deviation of 22.4 and a median score of 177. Although the potential range of this instrument is from 49 to 245, the range for the sample was 119 to 227. There is no comparative data for this instrument at this time. The Cognitive Hardiness Scale had a mean of 106.64 and a standard deviation of 14.30, with a median score of 108. The absolute range of this instrument is 30 to 150, while the sample's range was 54 to 146. The results for the Cognitive Hardiness Scale (CHS) reveal a higher mean than that reported in the literature (97.32) and a larger standard deviation than was reported (10.35).

The descriptive data for the construct validity measures is as follows. The mean score on the Rosenberg Self-Esteem Scale (RSES) was 31.84, with a standard deviation of 6.11 and a median score of 33. The potential range for this instrument is 10 to 40, which is the sample's range as well. The mean score for the Beck Depression Inventory (BDI) was 7.62, with a standard deviation of 7.25 and a median score of 6. The absolute range for this instrument is 0-63 and the range for the sample was 0-43. The mean score for the Autonomy Scale (AS) was 45.36 with a

standard deviation of 6.89 and a median score of 46. The potential range for this instrument is 12 to 60 and the sample's range was 24-60.

Examining the criterion validity instruments, the mean score for the Brief Symptom Inventory (BSI) was 95.46 with a standard deviation of 34.83 and a median score of 87. The absolute range for this instrument is 52 to 260 and the sample's range was 53 to 212. Finally, for the Stress Scale (SS), the mean score was 47.31 with a standard deviation of 13.08. The potential range for this instrument is 25 to 125 and the range for the sample was 26 to 96. The above statistical analyses indicated that scores for all of the instruments used in the sample were normally distributed.

Gender Differences

T-tests were conducted to examine potential gender differences between means on all the instruments (see Table 3). The results revealed significant differences between men and women on symptomology and depression, with women showing significantly higher scores on both measures. Correlations between all the variables were computed separately by gender (see Tables 4 and 5). Using Fisher's R-to-Z transformations, significant gender differences were found for the following relationships: psychological

hardiness and autonomy ($Z = 2.37$, $p < .01$), with women indicating a stronger relationship ($r = .52$ for women, $r = .29$ for men); depression and autonomy ($Z = 2.79$, $p < .001$), with women reporting a stronger negative relationship between these variables ($r = -.36$ for women, $r = -.04$ for men); cognitive hardiness and stress ($Z = 8.19$, $p < .0001$), once again, with women reporting a stronger negative relationship between the variables ($r = -.31$ for women, $r = -.09$ for men); and finally, stress and depression ($Z = 2.81$, $p < .001$), again with women indicating a stronger relationship ($r = .64$ for women, $r = .39$ for men).

Table 3

T-tests of the Significance of
Gender Differences on the Major Variables

	males		females		t
	mean	SD	mean	SD	
PSYCHOLOGICAL HARDINESS SCALE:	177.36	21.26	173.33	23.31	1.55
COGNITIVE HARDINESS SCALE:	106.24	12.77	107.03	15.64	-.48
BRIEF SYMPTOM INVENTORY:	90.25	32.09	100.35	36.66	-2.52*
BECK DEPRESSION INVENTORY:	6.14	6.16	9.02	7.92	-3.50**
ROSENBERG SELF-ESTEEM SCALE:	32.45	5.83	31.28	6.33	1.66
AUTONOMY SCALE :	45.83	6.46	44.94	7.26	1.11

Note: Female $n = 152$, Male $n = 143$

* = $p < .01$, ** = $p < .001$

TABLE 4

Pearson Correlation Coefficients for Women

	PHS	CHS	SS	RSES	BDI	BSI	AS
PHS	1.0	.78**	-.33**	.59**	-.59**	-.65**	.52**
CHS		1.0	-.31**	.55**	-.56**	-.59**	.47**
SS			1.0	-.36**	.64**	.60**	-.29*
RSES				1.0	-.55**	-.55**	.40**
BDI					1.0	.78**	-.36**
BSI						1.0	-.31**
AS							1.0

Note. $n = 152$

PHS = Psychological Hardiness Scale

CHS = Cognitive Hardiness Scale

SS = Stress Scale

RSES = Rosenberg Self-Esteem Scale

BDI = Beck Depression Inventory

BSI = Brief Symptom Inventory

AS = Autonomy Scale

* = $p < .01$; ** = $p < .001$

TABLE 5

Pearson Correlation Coefficients for Men

	PHS	CHS	SS	RSES	BDI	BSI	AS
PHS	1.0	.73*	-.29*	.52**	-.58**	-.62**	.29*
CHS		1.0	-.09	.50**	-.50**	-.48**	.24*
SS			1.0	-.20*	.39**	.44**	-.04
RSES				1.0	-.39**	-.40**	.17
BDI					1.0	.77**	-.04
BSI						1.0	-.14
AS							1.0

Note. $n = 143$

PHS = Psychological Hardiness Scale

CHS = Cognitive Hardiness Scale

SS = Stress Scale

RSES = Rosenberg Self-Esteem Scale

BDI = Beck Depression Inventory

BSI = Brief Symptom Inventory

AS = Autonomy Scale

* = $p < .01$; ** = $p < .001$

Internal consistency reliability. The internal consistency reliability of the new Psychological Hardiness Scale was calculated using Cronbach's alpha (Cronbach, 1951). The results of this analysis indicate that this instrument is highly reliable, with a coefficient alpha and standardized item alpha of .92. Additionally, internal consistency reliability analyses were conducted for each instrument utilized. This analysis revealed standardized item alphas as follows: Cognitive Hardiness Scale $\alpha = .86$; Rosenberg Self-Esteem Scale $\alpha = .91$, Beck Depression Inventory $\alpha = .89$, Brief Symptom Inventory $\alpha = .97$, Autonomy Scale $\alpha = .80$, Stress Scale $\alpha = .81$.

Validity. Correlations were computed among all of the instruments of interest (See Table 6). This data, examining the validity of the new instrument, will be described below.

Concurrent validity was assessed by the correlation between the Psychological Hardiness Scale and the Cognitive Hardiness Scale (Nowack, 1989). This analysis revealed a significant correlation of .75.

The examination of construct validity involved an investigation of the relationship between the new measure and related constructs. Specifically, correlations were computed between hardiness and the following variables: self-esteem, depression, and autonomy. The results revealed

significant relationships in the directions hypothesized. Moderately high positive relationships between hardiness and self-esteem ($r = .56$) and between hardiness and autonomy ($r = .42$) were found, and a moderately high negative relationship was indicated between hardiness and depression ($r = -.59$).

The examination of criterion-related validity involved an investigation of the relationship between the Psychological Hardiness Scale and the outcome variables. This aspect of the investigation involved computing correlations between hardiness and stress and between hardiness and symptomology. As hypothesized, hardiness showed a significant negative relationship with both stress ($r = -.32$) and illness ($r = -.64$).

TABLE 6

Pearson Correlation Coefficients
Describing the Relationships Among Variables

	PHS	CHS	RSES	BDI	BSI	SS	AS
PHS	1.0	.75	.56	-.59	-.64	-.32	.43
CHS		1.0	.52	-.52	-.53	-.21	.37
RSES			1.0	-.49	-.49	-.29	.31
BDI				1.0	.78	.54	-.24
BSI					1.0	.54	-.25
SS						1.0	-.18
AS							1.0

Note. PHS = Psychological Hardiness Scale
 CHS = Cognitive Hardiness Scale
 BSI = Brief Symptom Inventory
 BDI = Beck Depression Inventory
 RSES = Rosenberg Self-Esteem Scale
 BSI = Brief Symptom Inventory
 SS = Stress Scale
 AS = Autonomy Scale
 All correlations are significant at $p < .001$.

Hardiness as a Differentiating Variable

The ability of hardiness to distinguish between subjects on the criterion and outcome variables was considered important in order to investigate the utility of the construct, as well as to test the conceptual qualities of psychological hardiness as it has been re-defined. The sample was dichotomized on the basis of a median split on hardiness, similar to the sub-grouping procedure advocated by Barling (1986). T-tests of these two groups revealed significant differences on all measures, in the directions predicted (see Table 7). Specifically, subjects who were high in hardiness were found to be less depressed, had fewer symptoms and reported less stress, and were higher in autonomy and self-esteem, than subjects who were low in hardiness.

Additionally, t-tests were conducted comparing subjects who reported both high levels of hardiness and high levels of stress and subjects reporting low levels of hardiness and high levels of stress. The results of these analyses are reported in Table 8, and indicate significant differences between groups on every variable. Specifically, controlling for stress, subjects who were high in hardiness indicated lower levels of depression and symptomology and higher levels of self-esteem and autonomy.

Table 7

t-Tests of High Hardy Versus Low Hardy Subjects

Variable	Median	High Mean	Hardy SD	Low Mean	Hardy SD	t
ROSENBERG SELF-ESTEEM SCALE:	33	34.99	6.26	29.00	5.51	8.74**
AUTONOMY SCALE:	46	47.38	6.23	43.26	6.94	5.35**
BECK DEPRESSION INVENTORY:	6	4.79	5.14	10.59	7.94	-7.40**
STRESS SCALE:	46	44.54	11.82	50.22	13.75	-3.80*
BRIEF SYMPTOM INVENTORY:	87	79.42	21.75	112.28	37.97	-9.07**

Note. High Hardy $n = 151$, Low Hardy $n = 144$.

* = $p < .001$

** = $p < .0001$

Table 8

t-Tests of High Hardy/High Stress Versus
Low Hardy/High Stress Subjects

Variable	High Hardy/High Stress Mean	High Stress SD	Low Hardy/High Stress Mean	High Stress SD	t
ROSENBERG SELF-ESTEEM SCALE:	34.14	6.35	27.77	5.57	6.39**
AUTONOMY SCALE:	47.73	6.26	42.10	7.13	5.13**
BECK DEPRESSION INVENTORY:	6.92	5.82	13.14	8.19	-5.44**
BRIEF SYMPTOM INVENTORY:	89.38	25.10	124.08	37.12	-6.83**

Note: High Hardy/High Stress $n = 63$

Low Hardy/High Stress $n = 87$

** = $p < .0001$.

The Role of Hardiness in the Stress-Illness Relationship

A hierarchical regression analysis was conducted to test the hypothesis that hardiness accounted for variance beyond that accounted for by stress on the variable of symptomology. Regression analysis was used since all of the variables reflect continuous dimensions. Using a general linear models procedure and standardizing the data to make the parameter weights directly comparable, three sequential regression analyses were conducted using stress, stress and hardiness, and finally stress, hardiness and their interaction (Table 9), as independent variables and symptomology as the dependent variable. This allowed for the assessment of how much independent variance in symptomology was accounted for individually and collectively by stress and hardiness, as well as allowing for the assessment of any interaction effects. This also allowed for the variance in symptomology due to interactions between hardiness and stress to be assessed, which is important in order to assess whether hardiness served as a moderating variable between stress and symptomology.

Looking first at the variance in symptomology due to stress, the analysis reported in Table 9 revealed a significant multiple correlation of ($F = 119.97$, $p < .0001$, $R^2 = .29$). The second analysis added the variable of

hardiness in addition to stress. This analysis was also significant ($F = 168.49$, $p < .0001$, $R^2 = .54$). Finally, the third analysis included hardiness, stress, and their interaction, yielding a significant multiple correlation of ($F = 112.64$, $p < .0001$, $R^2 = .54$). It can be seen that the unique amount of variance accounted for by hardiness is .25; thus the analysis suggests that while both hardiness and stress account for a substantial amount of variance in symptomology, hardiness alone accounts for a significant percentage beyond what is accounted for by stress.

It was hypothesized that hardiness would serve as a moderator variable in the stress-illness relationship. Baron and Kenny (1986) define a moderator variable as "a variable that affects the direction and/or strength of the relationship between an independent or predictor variable and a dependent or criterion variable" (p. 1174). The test of this hypothesis is to be found in the interaction term in the regression analysis. As noted in the table, the interaction was non-significant, suggesting that hardiness actually has a direct effect in the relationship between stress and illness, rather than a moderating effect.

Table 9

Hierarchical Multiple Linear Regression Models
for the Prediction of Symptomology

Order of Entry	Predictor Variables	Beta	R ²	overall F	p	change in R ²	source F	p
1	Stress	.54	.29	119.97	.0001	.29	119.97	.0001
2	Hardiness & Stress	-.52 .37	.54	168.40	.0001	.25	154.26 77.73	.0001 .0001
3	Hardiness & Stress & Interaction	-.52 .36 -.04	.54	112.64	.0001	.001	150.75 69.25 .98	.0001 .0001 .32

Comparative Utility

It was hypothesized that the new measure of Psychological Hardiness would have better psychometric properties as compared to the Cognitive Hardiness Scale, and as such it would correlate more highly with the criterion variables and better distinguish between groups on the outcome variables. The results suggest some support for these hypotheses.

As noted above, the reliability for the Psychological Hardiness Scale was .92 (standardized item alpha). This compares favorably to the standardized item alpha of .86 for the Cognitive Hardiness Scale.

The Cognitive Hardiness scale is conceptualized as having three main factors (commitment, challenge, control). This conceptualization was investigated with a factor analysis using the principle factors method. Prior communality estimates were based on squared multiple correlations, in order to allow for a comparison between the two factor analyses. Once again, the decision rule used to determine the number of factors in the PHS was a scree plot or discontinuity graph. The scree plot (Figure 2), shows a somewhat similar pattern to the scree plot for the PHS, with one outstanding factor; however, the distinction between the

remaining factors is less clear. Specifically, a decision could be made to keep three factors (which is consistent with the three factors hypothesized in the conceptualization of the CHS) instead of only the most outstanding factor. This three factor solution is also indicated by the eigenvalues of the first three factors. An oblique rotation method (the Harris-Kaiser) was used instead of an orthogonal solution, because the CHS subscales are considered to be interrelated dimensions of hardness, and this method allows for the factors to correlate. The percentage of the common variance explained by the three principle factors (as the measure is hypothesized to have) is as follows: Factor I = 59%, Factor II = 16%, Factor III = 11%; and the percentage of the total variance explained is: Factor I=19.6%, Factor II=5.3%, Factor III=3.7%. The variance explained by each factor, ignoring the other factors is as follows: Factor I = 55%, Factor II = 36%, Factor III = 28%. The factor loadings are reported in Table 10. Finally, this analysis revealed moderate inter-factor correlations (see Table 11).

It may be noted that only two items loaded on Factor III, which indicates that this factor does not have a great deal of practical utility. The items loading on this factor read as follows: "I prefer to do things that are risky, exciting, and adventuresome rather than adhere to the same

comfortable routine and lifestyle" and "In general, I would prefer to have things well planned out in advance than deal with the unknown". Both of these items are similar to challenge items in the Kobasa Instruments, and they appear to be consistent with the theoretical conceptualization of the challenge subcomponent of hardiness; however, having only two pure items on this scale brings into question its utility. It appears that there is a problem, based on this factor solution, with a general lack of distinction between the factors. Specifically, it is difficult to interpret the factors based on the hypothesized subcomponents of control, commitment, and challenge, because the first two factors contain items from each of the three subscales.

The results of this factor analysis indicate that the Psychological Hardiness Scale compares favorably to the Cognitive Hardiness Scale. As described above, the factor analysis revealed one general factor (hardiness) for the PHS, which accounted for 58% of the common variance and 25.5% of the total variance of the scale.

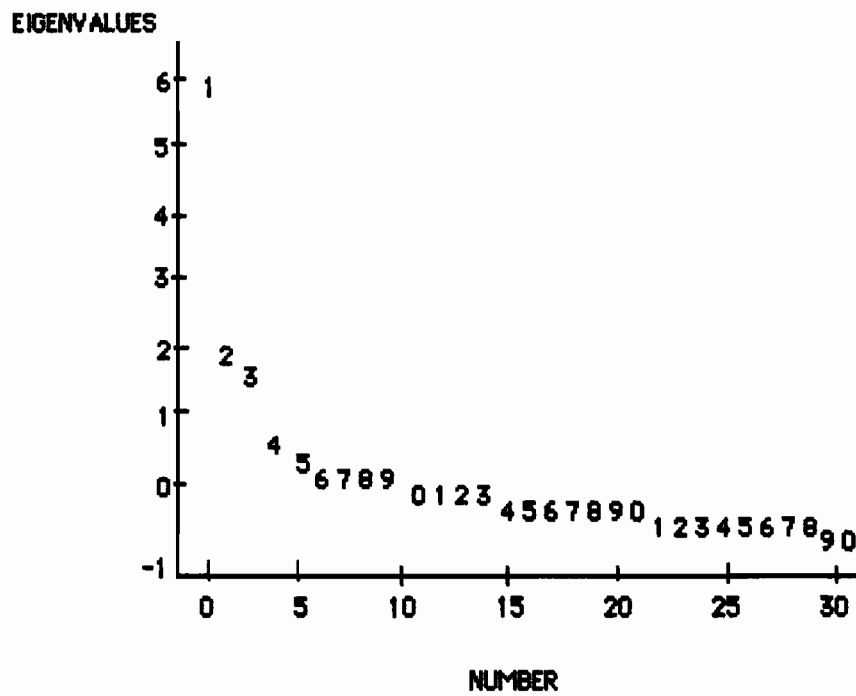


Figure 2
Scree Plot of Eigenvalues
for the Cognitive Hardiness Scale

Table 10

Rotated Factor Pattern of the
Cognitive Hardiness Scale

	Factor I	Factor II	Factor III
Item Number			
24	82*	3	-14
25	71*	4	-12
26	70*	8	-13
23	57*	6	-12
7	56*	-16	15
6	56*	6	- 2
27	55*	-10	15
28	50*	-13	11
21	48*	-27	24
15	42*	11	25
13	40*	2	-27
9	38*	11	15
12	34*	10	16
11	33*	20	26
17	24	7	14
20	19	9	14
18	10	62*	-12
5	- 5	55*	- 6
22	14	58*	-10
1	-21	45*	21

Table 10, Continued

	Factor I	Factor II	Factor III
Item Number			
19	35*	42*	- 2
3	- 8	42*	21
14	2	41*	- 8
30	- 5	38*	- 3
2	-20	31*	25
8	1	14	11
10	- 3	-24	68*
4	-19	32*	54*
29	27	-14	30
16	-13	15	22
Variance Accounted For:	55%	36%	28%

Note: Printed values are multiplied by 100 and rounded to the nearest integer.

* = values greater than 0.309.

Table 11
Inter-Factor Correlations

	Factor I	Factor II	Factor III
Factor I	1.00	.47	.47
Factor II		1.00	.30
Factor III			1.0

Note: Printed values are multiplied by 100 and rounded to the nearest integer.

Additionally, similar analyses (correlations, t-tests, regression) to those described above were conducted using the Cognitive Hardiness Scale and are described below. The results of these analyses parallel the results of those described for the Psychological Hardiness Scale, again indicating significance in the desired directions. While the differences between the two sets of results did not prove to be statistically significant, it seems important to note that the Psychological Hardiness Scale generally produced stronger results in the predicted directions.

The correlation matrix reported in Table 6 gave the intercorrelations for all the variables. To test for significant differences for the correlations between the PHS and the CHS on each variable, a Fisher's r -to- Z transformation was conducted (see Table 12). Similar relationships between the CHS and the PHS were discovered for each of the variables, and while the differences were not statistically significant, the the correlations are slightly higher for every variable using the PHS.

Table 12

Tested Differences Between Correlations Comparing the
 Psychological Hardiness Scale
 and the Cognitive Hardiness Scale

Variable	Correlations		Z Score
	Psychological Hardiness Scale	Cognitive Hardiness Scale	
AUTONOMY SCALE:	.43	.37	.88
STRESS SCALE:	-.32	-.21	-1.57
BRIEF SYMPTOM INVENTORY:	-.64	-.53	-1.34
ROSENBERG SELF-ESTEEM SCALE:	.56	.52	.70
BECK DEPRESSION INVENTORY:	-.59	-.52	1.24

Note: $n = 295$

Paralleling the analyses using the PHS, the ability of cognitive hardiness to distinguish between subjects on the criterion and outcome variables was considered important, for both further validation of the effects of hardiness as well as to allow for comparisons in results using the two different measures. T-tests of these high hardy versus low hardy subjects (differentiated using sample-specific median splits) revealed significant differences on all measures, in the directions predicted (see Table 13), paralleling the results reported for the PHS. Specifically, subjects who were high in hardiness were found to be less depressed, had fewer symptoms and reported less stress, and were higher in autonomy and self-esteem.

Additionally, t-tests were conducted comparing subjects who reported both high levels of hardiness and high levels of stress and subjects reporting low levels of hardiness and high levels of stress. The results of these analyses are reported in Table 14, and indicate significant differences between groups on every variable. Specifically, controlling for stress, subjects who were high in hardiness indicated lower levels of depression and symptomology and higher levels of self-esteem and autonomy.

Table 13

T-Tests of High Hardy Versus Low Hardy Subjects
using the Cognitive Hardiness Scale

Variable	Median	High Mean	Hardy SD	Low Mean	Hardy SD	t
ROSENBERG SELF-ESTEEM SCALE:	33	34.95	5.92	29.80	5.94	8.50**
AUTONOMY SCALE:	46	47.18	6.31	43.50	6.98	4.75**
BECK DEPRESSION INVENTORY:	6	5.01	4.40	10.32	8.54	-6.69**
STRESS SCALE:	46	45.57	11.43	49.12	14.43	-2.33*
BRIEF SYMPTOM INVENTORY	87	82.00	23.28	109.39	39.14	-7.27**

Note: High Hardy $n = 150$, Low Hardy $n = 145$.

* = $p < .05$

** = $p < .0001$

Table 14
T-Tests of High Hardy/High Stress Versus
Low Hardy/High Stress Subjects
Using the Cognitive Hardiness Scale

Variable	High Hardy/High Stress		Low Hardy/High Stress		t
	Mean	SD	Mean	SD	
ROSENBERG SELF-ESTEEM SCALE:	33.85	6.03	27.39	5.71	6.71**
AUTONOMY SCALE:	47.68	6.37	41.58	6.91	5.62**
BECK DEPRESSION INVENTORY:	6.59	4.55	14.06	8.58	-6.76**
BRIEF SYMPTOM INVENTORY:	91.00	25.68	126.14	37.42	-6.76**

Note: High Hardy/High Stress $n = 71$

Low Hardy/High Stress $n = 79$

** = $p < .0001$

Thus, the results for all the t-tests using the CHS are very similar to those found for the PHS, and the mean differences between scores on the two measures are not significantly different. The majority of t values, however, are larger using the PHS, suggesting that the PHS may be a more powerful differentiator of hardness levels.

The Role of Hardiness in the Stress-Illness Relationship

In order to compare the strength of the effect of cognitive hardiness in the stress-illness relationship to the effects found for psychological hardiness, as well as investigate the moderating effects of cognitive hardiness in the stress-illness relationship, a series of three hierarchical regression analyses identical to those reported above (on pp. 82-84) were conducted. As shown in Table 15, the variance in symptomology due to stress was significant ($F = 119.97$, $p < .0001$, $R^2 = .29$). The second analysis added the variable of cognitive hardiness in addition to stress. This analysis was also significant ($F = 132.87$, $p < .0001$, $R^2 = .48$). Finally, the third analysis included hardiness, stress, and their interaction, yielding a significant multiple correlation of ($F = 89.16$, $p < .0001$, $R^2 = .48$). It can be seen that the unique amount of variance accounted for by hardiness is .19; thus, as in the

results for the PHS, cognitive hardiness alone accounts for a significant percentage beyond what is accounted for by stress. The results of these analyses also failed to find a significant interaction between cognitive hardiness and stress, again indicating that hardiness actually has a direct effect in the relationship between stress and illness, rather than a moderating effect.

Once again, comparatively speaking, the use of the Psychological Hardiness Scale yielded larger regression effects than did the Cognitive Hardiness Scale. Specifically, the R^2 value for psychological hardiness is .54, with the variance accounted for being .25; while the R^2 value for cognitive hardiness is .48 and the variance accounted for by the CHS is .19.

Table 15

Hierarchical Multiple Linear Regression Models
for the Prediction of Symptomology
using the Cognitive Hardiness Scale

Order of Entry	Predictor Variables	Beta	R ²	overall F	p	change in R ²	source F	p
1	Stress	.54	.29	119.97	.0001	.29	119.97	.0001
2	Hardiness & Stress	-.44 .45	.48	132.87	.0001	.19	103.71 162.03	.0001 .0001
3	Hardiness & Stress & Interaction	-.44 .36 -.05	.48	89.16	.0001	.001	100.45 98.57 1.39	.0001 .0001 .24

CHAPTER V

DISCUSSION

This chapter focuses on a discussion and interpretation of the major findings as they relate to the purposes and hypotheses of the study. Additional findings, limitations of the study, implications derived from the results, and suggestions for further research are also explored.

The major purpose of this study was to develop and validate an instrument measuring psychological hardiness, based on a new, more parsimonious conceptualization of hardiness as psychological endurance and resilience. It was postulated that psychological hardiness exists and has utility for better understanding the relationship between stress and symptomology. Additionally, it was postulated that the previous formulation of hardiness has been misdirected in taking an indirect and multivariate rather than a direct and univariate approach to the conceptualization of this construct. Furthermore, this study intended to investigate whether individuals who reported high levels of hardiness could be distinguished from

individuals who reported low levels of hardness on certain variables of interest, and to investigate possible gender differences in the construct. Finally, the comparative utility of the Psychological Hardness Scale relative to a measure currently in use (the Cognitive Hardness Scale) was explored.

In order to investigate these research goals, the Psychological Hardness scale was developed utilizing a construct-based approach (Walsh & Betz, 1990). The psychometric properties (reliability, validity, and factor structure) of the scale were examined, and the utility of the construct was explored by administering the scale, as well as a number of additional measures, to a sample of 295 college students.

Analysis of Results by Hypotheses

Hypothesis 1: The Psychological Hardness Scale will have superior psychometric properties as compared to the Cognitive Hardness Scale.

The analyses exploring the psychometric properties of the PHS provided strong support for the new measure. Specifically, the results of the reliability analysis indicate that it is internally consistent and that it is a homogeneous, unidimensional measure of hardness, as hypothesized.

The results of the factor analysis indicate that the reconceptualization of psychological hardness resulted in a more parsimonious definition of the construct. In contrast to the three factor formulation of prior instruments, the new measure has one general factor, termed the hardness factor, indicating that the essence of the construct has been captured, as opposed to prior measures which indicated the presence of hardness based on levels of commitment, challenge and control, each independent constructs themselves. The hardness factor is defined (as mentioned above) as psychological endurance and resilience.

In regard to concurrent validity, the significant correlation between the new and the existing measure of hardness indicates that both measures are examining the same basic construct. While the correlation between the two instruments is significant, the correlation is not so high as to suggest that the measures are identical. In fact, the results of the combined analyses indicate that the new

measure of hardiness is more conceptually and psychometrically sound.

Additional correlational analyses of the data indicate a high level of construct validity. As hypothesized, hardiness shares a high positive relationship with self-esteem and with autonomy, and a high negative relationship with depression. Thus these psychological constructs are related, and hardiness, autonomy, and self-esteem are all likely factors of a "healthy personality". The relationship between hardiness and depression has been studied by a number of investigators, for example, Funk and Houston (1987), Ganellen and Blaney (1984), Kobasa et al. (1983), Kobasa and Puccetti (1983), and Nakano (1990) all reveal a strong negative relationship between the two variables. It would seem, then, that although hardy individuals do experience adversity, as suggested by findings indicating equivalent scores on stressful events measures for low and high hardy individuals, they are less likely to exhibit subsequent depressive symptoms.

Strong criterion validity was indicated by the results of a correlational analyses of hardiness and stress and hardiness and symptomology. The significant negative relationships here indicate further validity of the new measure. The hardiness literature is virtually unanimous in

the finding that subjects high in hardiness and subjects low in hardiness report significant differences on symptomology, see for example, Nakano (1990).

Messick (1988) notes that "the key validity issues are the interpretability, relevance, and utility of scores, the import or value implications of scores as a basis for action, and the functional worth of scores in terms of social consequences of their use" (p. 33). The above analyses strongly suggest that, using Messick's point of view, the Psychological Hardiness Scale is a valid instrument.

A series of parallel analyses were conducted using the Cognitive Hardiness Scale, in order to allow for a direct comparison of the two instruments in one study. While the differences between the two sets of results were not statistically significant, the findings using the Psychological Hardiness Scale are, at the very least, as good as those using the Cognitive Hardiness Scale. More importantly, all things being equal, a unidimensional measure is preferable to a dimensionally complex measure (Nunnally, 1978), and as such it would seem that the Psychological Hardiness Scale is preferable to existing measures of hardiness.

Hypothesis 2: Hardiness, parsimoniously defined and measured, will prove to have a reliable moderating effect on the stress-illness relationship; and it will contribute a significant portion of the variance in this relationship, above and beyond what is contributed by stress.

The results of the hierarchical regression analyses failed to indicate that hardiness has a moderating effect on the stress-illness relationship. These analyses did, however, suggest that hardiness accounts for a significant portion of the variance in symptomology beyond that accounted for by stress. Furthermore, controlling for stress levels, hardiness continued to account for a significant portion of the variance in symptomology. Thus, it would seem that hardiness has a direct effect on symptomology, as opposed to an indirect effect. Additionally, this effect appears to be quite large, and continues to be significant even under high levels of stress.

Interestingly, while the originators of the hardiness concept have persisted in contending that hardiness serves as a moderating or mediating variable (e.g., Kobasa, Maddi & Courington, 1981; Kobasa, Maddi, & Kahn, 1982; Kobasa, Maddi, Puccetti and Zola, 1985; Kobasa, Maddi, & Puccetti,

1982; Kobasa, Maddi, & Zola, 1983) numerous studies have failed to statistically substantiate this hypothesis. For example, Nakano (1990) Funk and Houston (1987), as well as Kobasa et al (1983) failed to report a significant hardiness x stress interaction. Topf's (1989) study also failed to support the stress-buffering effect of hardiness, leading her to question the validity of this hypothesis.

Considering the substantial number of similar findings in this regard, the moderating effects of hardiness may need to be re-conceptualized.

Typically, research here has been oriented toward the prediction of adaptive outcomes, such as physical or psychological symptomology. Contrada (1989) notes that more effort needs to be spent trying to identify the mechanisms that may mediate the effects of hardiness on health outcomes. He states that research suggesting that hardy individuals perceive stressful events as more positive and controllable may point to the mechanism by which hardiness mitigates the stress response, that is, by influencing how stress is appraised.

Obviously, there is a great deal of confusion regarding whether hardiness serves a moderating or a mediating role in the stress-illness relationship. A number of researchers voice concern that hardiness does not, in

fact, have a buffering or moderating effect in the stress-illness relationship, but instead has a direct effect on symptomology. (Contrada, 1989; Cohen and Edwards, 1989; Funk and Houston, 1987; Hull et al., 1987). Similarly, McCranie, Lambert, and Lambert (1987); Roth, Wiebe, Fillingim and Shay (1989); and Wiebe and McCallum (1986) all failed to find any moderating effects for hardiness on health, while they did find significant main effects for hardiness. In their study of stress resistance, Holahan & Moos (1986) found that resistance and life stress "affect distress in an independent and essentially additive manner rather than an interactional one" (p. 393).

Part of the confusion regarding the indirect effects of hardiness may stem from conceptual fuzziness of the difference between moderator and mediator variables. Baron and Kenny (1986) discuss the common error in the social psychological research of using these terms interchangeably. In an attempt to clarify the distinction between these variables, they offer definitions for each. They define a moderator as, "a qualitative or quantitative variable that affects the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable" (p. 1174); and a mediator as a variable meeting the following conditions, "a) variations

In levels of the independent variable significantly account for variations in the presumed mediator; b) variations in the mediator significantly account for variations in the dependent variable; and c) when a and b are controlled, a previously significant relation between the independent and dependent variables is no longer significant, with the strongest demonstration of mediation occurring when c is zero". (p. 1176).

Regarding the indirect effects of hardiness, Kobasa et al (1982) note that there may be a positive correlation between hardiness and positive health-promoting behaviors. They believe that hardy individuals are more likely to be conscientious in their personal care-taking. Additionally, they believe that the psychological resilience of the hardy individual is due, in part, to the particular coping styles associated with the dynamic combination of commitment, challenge and control (Kobasa et al., 1981). Thus, it may be that hardiness has an indirect effect in the stress-illness relationship, in that hardiness is related to health-promoting behaviors, which in turn reduce the incidence of illness during stressful times. In order to better understand this relationship, instruments measuring health-promoting behaviors may be necessary.

Hypothesis 3: Hardiness will be related to the following psychological characteristics in the following ways: a) negative relationships will be found with depression, negative affectivity, physiological symptomology, and general psychological maladjustment; b) positive relationships will be found with self-esteem, and internal locus of control.

The correlations between hardiness and the following construct validity variables: self-esteem, depression, and autonomy, lend support to hardiness as a construct and as a factor in the conceptualization of a healthy personality. The criterion validity variables of stress and symptomology lend further support, and provide evidence of the direct effect of hardiness on symptomology. Results found in the literature tend to report similar findings, for example, Funk and Houston (1987) reported similar correlations between hardiness and stress, hardiness and depression, and hardiness and symptomology; Ganellen & Blaney reported similar findings with stress and depression. Hull, Van Treuren & Virnelli (1987) found similar relationships with hardiness and depression and hardiness and self-esteem, and of course, Kobasa's original (1979) study found similar relations between hardiness and stress as well as hardiness

and health, and Nowack (1985; 1989) found a similar relationship with physical and psychological symptomology; Rhodewalt & Zone (1989) report similar relationships between hardiness and depression and hardiness and illness.

Additional Findings

Gender Differences. T-tests of gender differences revealed that women reported higher levels of depression and higher levels of symptomology. These results are consistent with the literature on women and depression (Strickland, 1984). The literature supports the finding of stronger relationships between stressful life events and illness in women, as noted in a review by Nespor (1985), as well as in Nowack (1989). Similarly, Holahan and Moos (1986) found that stress resistance in women was predictively related to emotional distress.

Additionally, the significantly different correlational relationship between hardiness and autonomy for men and women indicates that there is a stronger positive link between hardiness and autonomy, and a stronger negative link between depression and autonomy for women than for men. Thus, the results suggest that women are more likely to be highly autonomous if they are psychologically

hardy, whereas men are less likely to evidence this relationship--high levels of autonomy are not any more likely to be linked with hardiness than low levels of autonomy. Similarly, women are less likely to be depressed if they are autonomous, whereas autonomy and depression are essentially unrelated in men. It may be speculated that this gender difference is related to research indicating that women who are independent, and especially those women who show high levels of psychological androgyny, are more psychologically healthy (Bem, 1974); whereas for men, these characteristics are the cultural norm, and thus they are less likely to distinguish people on mental health variables. Additionally, it was found that there was a relationship between cognitive hardiness and stress for women but not for men, which seems consistent with the above hypotheses. Finally, there was a significantly stronger relationship between stress and depression for women than for men. There is much evidence to attest to higher rates of depression for women in general as compared to men (Matlin, 1987), and it seems based on these results that one precipitator of depression for women is stress.

Hardiness as a Distinguishing Variable. T-tests comparing subjects high in hardiness to subjects low in hardiness revealed significant differences on all variables, indicating that psychological hardiness does distinguish between individuals on the investigated variables. Specifically, individuals who reported high levels of hardiness were found to have higher self-esteem and higher levels of autonomy, and lower levels of depression and symptomology. Thus, it seems that hardiness may be an important factor in what might be thought of as a healthy personality. Additionally, t-tests were conducted comparing subjects who reported both high levels of hardiness and high levels of stress and subjects reporting low levels of hardiness and high levels of stress. The results of these analyses indicate that, controlling for stress, subjects who are high in hardiness are less depressed, have fewer symptoms, are more autonomous and have higher self esteem than subjects who are low in hardiness. This analysis clarifies the finding that even when hardy subjects reported high levels of stress, they still report fewer symptoms.

Limitations of the Study

While the findings of this investigation are quite promising, there are some limitations which should be noted.

Subjects. The subject pool does have some areas of concern. First, while 295 subjects is considered more than sufficient for a factor analysis of a 40 item measure using Cattell's four-to-one ratio (Rummel, 1970), there are others who argue strongly for a much larger ratio--with some researchers advocating up to a 20-to-one ratio. Thus, in order to be more confident in the results of the factor analysis, a confirmatory factor analysis using more subjects may be necessary. Furthermore, this investigation used college students as subjects, which brings up two additional limitations. First, this study should be replicated and expanded using a more heterogeneous group of subjects, in order to increase the generalizability of the results. Secondly, the cognitive hardness scale has been normed and validated on a population of working persons, which may constitute a very different population than the college students used in this investigation. While this is a concern, the reliability and validity data derived for this

Instrument in this particular study indicate that it is appropriate to use with a college population.

Questionnaires. As noted in the method chapter, two of the questionnaires utilized for this study were modified for use in this research project (the Stress Scale and the Autonomy Scale). The psychometric information available is favorable regarding the parent instruments, however, it does not pertain exactly to the instruments as used in this study. Reliability and validity data for the modified instruments was collected as a part of this study, and these analyses did indicate that these instruments were psychometrically sound and appropriate to use with this subject pool; however, additional studies investigating the Stress Scale and the Autonomy Scale may be necessary in order to better understand the psychometric properties of the modified versions of these scales.

Additionally, it would have been desirable to have compared the Psychological Hardiness Scale to both of the other measures of hardiness most frequently used in the literature (the Personal Views Survey and the Cognitive Hardiness Scale) however, due to logistical constraints, only one of those measures was utilized. The measure chosen (the Cognitive Hardiness Scale) is the most recently

developed measure and reports better psychometric properties than the original measure (the Personal Views Survey); however, the Personal Views Survey benefits from a greater amount of empirical investigation into its psychometric properties as well as a larger body of research using the PVS to investigate the construct of hardiness.

Finally, in regard to the administration of the questionnaires, it may have been ideal to have randomized the presentation order of the instruments to control for fatigue effects. Randomization was not utilized, however, due to the fact that the entire packet was able to be completed in a relatively short amount of time; and because instruments were administered in order of importance for the study, with the most important information being that for the Psychological Hardiness Scale.

Design. The present study involved correlational data analyses, thus no assessments of causality can be made. There are obvious implications regarding causality in the relationship between hardiness and symptomology, thus future investigations should address this omission. It would have been ideal to have utilized a sufficient number of instruments in order to allow for the analyses to include covariate structure modeling, a technique which would allow

for causal inferences as well as a more thorough understanding of the interrelationships between variables; however, logistical constraints prevented that from being possible in this investigation.

Theoretical and Practical Implications

The findings of this investigation suggest that a theoretical re-conceptualization of hardiness as psychological endurance and resilience provides a parsimonious definition of this construct, and results in a more psychometrically sound measure. The findings imply that hardiness is a viable psychological construct, and can be adequately measured.

Additionally, based upon the results of this study, the construct of psychological hardiness appears to be an important consideration in one's conceptualization of personality. With a better understanding of hardiness, it may be easier to influence people positively in counseling regarding their physical and emotional health. Individuals who are low in hardiness may be targeted for additional support and information regarding self-care. Furthermore, prospective studies may enable us to determine with which individuals we might best intervene in order to prevent

psychological and physical difficulties, as well as absenteeism at work and at school due to illness.

Furthermore, with a clearer understanding of the construct of hardiness, we might be better able to foster the development of this trait in both clinical and non-clinical populations. Intervention programs for individuals deficient in hardiness are currently being explored (Nespor, 1985). This may be especially important considering the high probability that individuals in our culture will be faced with extreme emotional trauma during their lifetimes. La Greca's (1985) research suggests that individuals who are high in hardiness are better able to survive such traumas, thus it seems important to consider possible interventions in order to increase hardiness and thus provide some primary prevention in terms of post-traumatic distress. Barling (1986) notes that the general aim of hardiness counseling involves interpreting in what ways alienation, powerlessness, threat and regressive coping affect the client's functioning, and how transformational coping, emphasizing perceived control, commitment and challenge would enhance psychological functioning.

Fischman (1987) describes a 15-week course taught by Salvatore Maddi, designed to teach individuals how to be "hardier". Fischman (1987) reports that this course, which

meets one hour a week and contains seven or eight individuals at a time, has resulted in most individuals doubling their hardiness scores, as well as reporting greater job satisfaction; decreased depression, anxiety, and obsessiveness; fewer headaches; lower blood pressure; and better sleep patterns. Fishman explains that the course focuses on three main topic areas: "situational reconstruction", "focusing", and "compensatory self-improvement". Situational reconstruction is described as a technique emphasizing problem-solving and promoting the idea of re-framing stressful situations into a broader perspective. Focusing is training in concentration, teaching people to notice various bodily sensations and trying to recall the circumstances under which they usually occur, in order to help people better understand the causes of their distress. Compensatory self-improvement is explained as learning how to find the positive aspects of unpleasant situations, and learning to accept the unchangeable. Fischman states that Maddi believes learned hardiness soon comes naturally, and become one's primary mode of operating in the world.

Along similar lines, Holt, Fine, & Tollefson (1987) and Pierce and Molloy (1990) suggest intervening to increase the hardiness of teachers in order to reduce the rate of

burnout in this highly stressful profession. Holahan & Moos (1986) relate the findings of the stress-resistance literature to primary prevention programs, noting that these findings offer a conceptual framework and a number of intervention strategies for mental health professionals. They emphasize the importance of increasing people's resistance in order to help them stay healthy under future stressful conditions. The primary prevention aspect of hardiness training is mentioned in Nagy and Nix (1989), who advocate increased understanding of hardiness in order to develop interventions to foster hardiness during the personality forming years. Ideally, promoting hardiness in children could increase the number of optimally functioning adults.

An interesting concept was posed by Beardslee (1989), linking self-understanding to resiliency. Beardslee conducted a number of case studies of individuals from non-clinical, clinical and medical populations who had displayed a resilient response to life stressors. His hypothesis was that the common link between these individuals was their level of self-understanding. This may pose additional implications for intervening in order to increase hardiness, through helping clients and other individuals improve and increase their level of self-understanding and awareness.

Similarly, Pollock (1986) notes the importance of increasing our understanding of human responses to chronic illness, so that we might better intervene in these populations and increase such individuals' adaptive responses to their illness. Lee (1983) proposes that the difference between individuals who remain relatively resilient and healthy, despite serious and chronic illness, and those who do not, is the quality of hardiness. She states that the "hardy client enters the health care system with endurance, strength, boldness, and the power to control" (p. 35). Lee's hypothesis has profound implications on the care and treatment of the chronically ill; specifically, it would seem fruitful to evaluate hardiness early on in patient care, subsequently working to increase hardiness in targeted individuals as well as treating patients in such a way as to maintain the highest levels of hardiness possible. Pollock (1989) notes that once (nurses) understand the effects of hardiness as well as how it promotes health and adaptation, the implications for nursing "will be limitless" (p. 53). She does caution, however, that it will be important to clarify our knowledge of the direct versus indirect effects of hardiness in order to most effectively help patients.

Along similar lines, Okun, Zautra, and Robinson (1988) suggest that studies of chronic disease patients may shed light on the precursors and consequences of hardiness. This idea stems from their research indicating that there are factors that are not associated with the etiology of a disease can affect the progression of the disease. Thus, differential studies of individuals with the same diagnosis may help us better understand hardiness and the role it plays in chronic illness. Okun, Zautra, & Robinson (1988) noted that hardiness correlated with subjects' percentage of T-cells, and suggested a link between hardiness and health, hypothesizing that hardiness can influence immune-system functioning. They state that "perhaps patients who lack a hardy personality style develop feelings of helplessness and hopelessness which, in turn, diminish the capability of their immune systems to respond to viruses" (p. 105), concluding that hardiness is important in understanding how people adapt to chronic and unpredictable illness. Similarly, La Greca (1985) speculates that individuals living with the AIDS virus "may help to trigger its active destruction (of the immune system) by not coping well with stress" (p. 24). Considering the profound devastation this illness has had and continues to have on our culture,

identifying ways to promote hardiness and subsequently slow down the effects of the virus seem especially important.

Suggestions for Future Research

In addition to further research addressing the limitations discussed above, the results of this study suggest some interesting possibilities in terms of future research. Kobasa and her colleagues have conducted a number of interesting prospective studies of hardiness and illness, and it would seem appropriate to conduct similar studies using the PHS. While an important aspect of this research was to develop a measure of hardiness that is more psychometrically sound than the Personal Views Survey, the pioneering work in this area by Kobasa and Maddi has been vital in the development of this construct, most especially in regards to the painstaking efforts of their foundational study of phone company managers. The long-term nature of this work, specifically tracking individuals over the course of seven years and examining the nature of the effect of hardiness on the stress-illness relationship over time, may be interesting to replicate using this new measure.

Another important consideration for future research is the development and understanding of the concept of a healthy personality. The results of this study suggest that hardiness plays a role in this construct. Campbell et al. (1989) concur, noting that hardiness and self-actualization involve a sense of seeing life as meaningful, and they believe as such that these constructs are related, and are components of mental health. In a recent article on wellness based on his Distinguished Contributions to Psychology in the Public Interest award address, Cowen (1991) lists four concepts he considers to have much potential in the promotion and understanding of wellness: competence, resilience, social system modification, and empowerment. This seems to speak to the significance of hardiness, in light of its re-definition as psychological endurance and resilience, in a wellness model.

Previous examinations of the hardiness-wellness connection have been hampered by the measurement issues explicated above. For example, as Funk and Houston (1987) note, hardiness as it has been measured (using negative indicators) may actually be tapping into general maladjustment or psychopathology, as opposed to wellness. Again, this would seem to point to the need to examine the relationship between hardiness (without a negative indicator

bias) and psychological health. Rhodewalt and Zone (1989) concur, stating that non-hardiness (as originally measured) is really simply a correlate of negative affectivity rather than resistance to stress.

Furthermore, while median splits of sample populations are common in determining the existence of various psychological characteristics, it would be advisable to gather sufficient data from various populations in order to establish norms for the existence of hardiness, so that the results between studies can be more easily compared, as well as to contribute to a more accurate understanding of hardiness.

Additionally, investigating the role of hardiness in different populations continues to be important; for example, Campbell et al (1989) emphasize the importance of expanding the reference base for this concept. While most of the early work done in this area focused on white male executives, this limited subject base has been expanded considerably. Specifically, hardiness has been investigated in such diverse populations as male Japanese executives (Makano), nursing mothers and their infants (Dillon & Totten, 1989), persons with AIDS and ARC (Zich & Temoshok, 1987), female nurses (McCrane, Lambert & Lambert, 1987), persons with chronic illness (Pollock, 1986a), Canadian

adolescents (Hannah & Morrissey, 1987), and British workers (Pierce & Molloy, 1990). Due to the number and variety of valuable implications for the increased understanding of hardiness, additional work with other populations would also seem appropriate; for example, expanding our knowledge of how hardiness plays a role in other cultures, with the elderly, in survivors of trauma, as well as in individuals dealing with various chronic and life-threatening illness.

Summary

In summary, the results of this study indicate that the Psychological Hardiness Scale is a psychometrically and theoretically sound instrument for measuring hardiness. Additionally, psychological hardiness is an important distinguishing variable between individuals, and as such it deserves attention in future conceptualizations of personality, as well as in primary prevention, growth-oriented and remedial interventions.

Appendix A
Transcript of Verbal Instructions to Subjects

"For this experiment, you will be answering a number of questions about yourself. All of your answers are anonymous and confidential, so please do not write your name on your answer sheet. The experiment packet you received contains 200 questions. Please read the instructions carefully for each new section in the packet, as you will notice that the answer keys change with each section. Please read the questions carefully and answer each question by filling in the corresponding bubble on your NCS sheet. When you have finished, please return your packet and your answer sheet. You may begin."

Appendix B
Instructions to Subjects

Directions: This questionnaire contains items regarding your attitudes towards yourself and life in general. Begin by filling in your sex and year in college on the NCS answer sheet. Sex is at the top middle of side 1 of the sheet, and immediately below it is "grade or educ"--fill in the circle corresponding to your year at OSU: freshman (1), sophomore (2), junior (3), senior (4), other (5). Also fill in your birthdate (below left). Please do not fill in your name, as your responses to this questionnaire are completely anonymous. Please read each statement carefully. Then decide how strongly you agree or disagree with each statement. Do not write on this form, only on the NCS answer sheet.

Appendix C

Debriefing Statement

The study in which you have just participated is an investigation into the development and validation of a measure of personal resilience, or resistance to stress. We are interested in the factors which result in individuals having different responses (such as getting sick or not) to life stress.

The first questionnaire that you took was a pool of potential items from which the new scale will be developed. The second questionnaire is a measure of this personality characteristics which is currently in use. The remaining questionnaires are measures of other personality characteristics which are related to this construct, and which will help us to better understand and define it.

Overall, we are interested in traits that contribute to a healthy personality. We believe resistance to stress is an important aspect of a healthy personality, and any research that we can do help our understanding of this is important.

If there are aspects of this study which have concerned you and about which you would like more information, you should contact Professor Nancy Betz, at 292-4166 (Department of

Psychology, Townshend Hall)). If you would like to explore with a counselor anything related to your own feelings about yourself, you may go to the Psychological Services Center in 141 Townshend Hall or to Counseling and Consultation Services which is located on the 4th floor of the Ohio Union. Their phone number is 292-5766 if you would like to get further information about how to make an appointment with a counselor.

We thank you for helping us in this experiment and we feel that our findings will be useful in understanding the relationship between stress and illness in college students.

Appendix D

Psychological Hardiness Scale--49 Item Version

Mark your answers on the NCS answer sheet, in the row of circles corresponding to each item number. Your response number indicates how closely each statement describes you and your feelings at the present time. There are no right or wrong answers. Please use the following key. Read each question carefully before you respond.

As you will see, many of the items are worded very strongly. This is to help you decide the extent to which you agree or disagree.

Please read all the items carefully. Be sure to answer all on the basis of the way you feel now. Don't spend too much time on any one item.

- 1 = If you STRONGLY DISAGREE
- 2 = If you MODERATELY DISAGREE
- 3 = If you AREN'T SURE OR ARE NEUTRAL
- 4 = If you MODERATELY AGREE
- 5 = If you STRONGLY AGREE

Strongly Disagree	Moderately Disagree	Aren't Sure or Neutral	Moderately Agree	Strongly Agree
1	2	3	4	5

1. It's hard for me to get my work done when I'm having trouble with my boyfriend/girlfriend.
2. I tend to "fall apart" pretty easily.
3. I stop doing my school work when I'm unhappy in love.
4. I find that I often get deeply involved in new tasks or projects.
5. I'm one of those people who just keeps going no matter what happens.
6. It's hard for me to keep at my work when the rest of my life is a mess.
7. I feel well connected with a community of people.
8. I tend to bounce back pretty quickly when life hands me a rotten deal.
9. I have very few personal goals in my life.
10. I believe I can achieve my goals through hard work and persistence.
11. Events in my personal life often interfere with my performance at work.
12. I tend to get sick more often than the average person.
13. I have a good sense of humor.

Strongly Disagree	Moderately Disagree	Aren't Sure or Neutral	Moderately Agree	Strongly Agree
1	2	3	4	5

14. I usually feel that no matter how bad I feel today, tomorrow will probably be better.
15. I enjoy taking tests.
16. When I am bothered by a problem, I have someone to turn to who will listen to me, give advice, etc.
17. I have some control over the events in my life; not everything happens in my life by chance.
18. I know that if I just keep putting one foot in front of the other I'll make it eventually.
19. I lead a very ordered, predictable life.
20. Sometimes I just feel like giving up.
21. I believe fate plays a big part in a person's life.
22. I know if I try things will turn out well.
23. I know what I want out of life but feel unable to get it.
24. Sometimes life is just too much for me.
25. It is hard for me to cope with more than 1 or 2 problems at a time.
26. I feel that I have some control over my destiny.
27. When faced with a difficult situation, I usually feel like I can handle it.

Strongly Disagree 1	Moderately Disagree 2	Aren't Sure or Neutral 3	Moderately Agree 4	Strongly Agree 5
<hr/>				
28.	It often takes me an extraordinarily long time to recover from some surprise, shock or sadness.			
29.	I am uncomfortable in new situations where I am not sure what is going to happen.			
30.	In general, I am an optimistic person.			
31.	I enjoy competing against others.			
32.	When a number of things have gone wrong, I can usually reverse the course of events.			
33.	I engage in some form of exercise on a regular basis.			
34.	I often find myself feeling sad.			
35.	I view difficult life events as challenging opportunities for personal growth.			
36.	When I experience a setback, it takes me a long time to feel good again.			
37.	I often find it hard to get things done when I'm upset.			
38.	When something interferes with my plans, I usually give up.			
39.	I have a strong network of friends.			
40.	If something goes wrong, I have a hard time forgetting about it and concentrating on present tasks.			
41.	I frequently feel overwhelmed by the things that happen in my life.			

Strongly Disagree 1	Moderately Disagree 2	Aren't Sure or Neutral 3	Moderately Agree 4	Strongly Agree 5
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42. When bad things happen in my life, I just keep going because I know things will get better soon.
43. I don't like to take risks.
44. I enjoy a challenge.
45. When things aren't going my way, I often feel hopeless.
46. Stressful situations frequently make me ill.
47. The statement "When the going gets tough, the tough get going" describes me pretty well.
48. I regularly engage in activities I enjoy.
49. I think I take failures and setbacks harder than a lot of people I know.

Appendix E
Psychological Hardiness Scale

Mark your answers on the NCS answer sheet, in the row of circles corresponding to each item number. Your response number indicates how closely each statement describes you and your feelings at the present time. There are no right or wrong answers. Please use the following key. Read each question carefully before you respond.

As you will see, many of the items are worded very strongly. This is to help you decide the extent to which you agree or disagree.

Please read all the items carefully. Be sure to answer all on the basis of the way you feel now. Don't spend too much time on any one item.

- 1 = If you STRONGLY DISAGREE
- 2 = If you MODERATELY DISAGREE
- 3 = If you AREN'T SURE OR ARE NEUTRAL
- 4 = If you MODERATELY AGREE
- 5 = If you STRONGLY AGREE

Strongly Disagree 1	Moderately Disagree 2	Aren't Sure or Neutral 3	Moderately Agree 4	Strongly Agree 5
<hr/>				
1.	It's hard for me to get my work done when I'm having trouble with my boyfriend/girlfriend.			
2.	I tend to "fall apart" pretty easily.			
3.	I stop doing my school work when I'm unhappy in love.			
4.	I'm one of those people who just keeps going no matter what happens.			
5.	It's hard for me to keep at my work when the rest of my life is a mess.			
6.	I feel well connected with a community of people.			
7.	I tend to bounce back pretty quickly when life hands me a rotten deal.			
8.	I have very few personal goals in my life.			
9.	Events in my personal life often interfere with my performance at work.			
10.	I usually feel that no matter how bad I feel today, tomorrow will probably be better.			
11.	I enjoy taking tests.			
12.	I have some control over the events in my life; not everything happens in my life by chance.			
13.	I know that if I just keep putting one foot in front of the other I'll make it eventually.			

Strongly Disagree 1	Moderately Disagree 2	Aren't Sure or Neutral 3	Moderately Agree 4	Strongly Agree 5
<hr/>				
14. Sometimes I just feel like giving up.				
15. I know if I try things will turn out well.				
16. I know what I want out of life but feel unable to get it.				
17. Sometimes life is just too much for me.				
18. It is hard for me to cope with more than 1 or 2 problems at a time.				
19. I feel that I have some control over my destiny.				
20. When faced with a difficult situation, I usually feel like I can handle it.				
21. It often takes me an extraordinarily long time to recover from some surprise, shock or sadness.				
22. I am uncomfortable in new situations where I am not sure what is going to happen.				
23. In general, I am an optimistic person.				
24. I enjoy competing against others.				
25. When a number of things have gone wrong, I can usually reverse the course of events.				
26. I often find myself feeling sad.				
27. I view difficult life events as challenging opportunities for personal growth.				

Strongly Disagree	Moderately Disagree	Aren't Sure or Neutral	Moderately Agree	Strongly Agree
1	2	3	4	5

28. When I experience a setback, it takes me a long time to feel good again.
29. I often find it hard to get things done when I'm upset.
30. When something interferes with my plans, I usually give up.
31. If something goes wrong, I have a hard time forgetting about it and concentrating on present tasks.
32. I frequently feel overwhelmed by the things that happen in my life.
33. When bad things happen in my life, I just keep going because I know things will get better soon.
34. I don't like to take risks.
35. I enjoy a challenge.
36. When things aren't going my way, I often feel hopeless.
37. Stressful situations frequently make me ill.
38. The statement "When the going gets tough, the tough get going" describes me pretty well.
39. I regularly engage in activities I enjoy.
40. I think I take failures and setbacks harder than a lot of people I know.

Appendix F

Cognitive Hardiness Scale

This part consists of some more items that you may agree or disagree with. Please indicate how you feel about each one by filling in the corresponding bubble on your NCS answer sheet. Please read all the items carefully and be sure to answer all on the basis of the way you feel now. As you get ready to begin this section, please notice that these questions have a different answer key than you had in part one. Make sure you mark your answers accordingly.

- 1 = If you STRONGLY AGREE
2 = If you AGREE
3 = If you NEITHER AGREE NOR DISAGREE
4 = If you DISAGREE
5 = If you STRONGLY DISAGREE

Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
1	2	3	4	5

1. My involvement in non-work activities and hobbies provides me with a sense of meaning and purpose.
2. By taking an active part in political and social affairs, people can strongly influence world events and politics.
3. When all else appears bleak, I can always turn to my family and friends for help and support.

Strongly Agree 1	Agree 2	Neither Agree nor Disagree 3	Disagree 4	Strongly Disagree 5
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4. I prefer to do things that are risky, exciting, and adventuresome rather than adhere to the same comfortable routine and lifestyle.
5. Becoming a success is mostly a matter of working hard; luck plays little or no role.
6. There are relatively few areas about myself in which I feel insecure, highly self-conscious, or lacking in confidence.
7. In general, I tend to be a bit critical, pessimistic, and cynical about most things in work and life.
8. It would take very little change in my present circumstances at work to cause me to leave my present organization.
9. I do not feel satisfied with my current involvement in the day-to-day activities and well-being of my family and friends.
10. In general, I would prefer to have things well planned out in advance rather than deal with the unknown.
11. Most of life is wasted in meaningless activity.
12. I often feel awkward, uncomfortable, or insecure interacting with others socially.
13. I rarely find myself saying out loud or thinking that I'm not good enough or capable of accomplishing something.

Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
1	2	3	4	5

14. I am committed to my job and work activities that I am currently pursuing.
15. I tend to view most work and life changes, disappointment, and setbacks as threatening, harmful, or stressful rather than challenging.
16. Just for variety's sake, I often explore new and different routes to places that I travel to regularly (e.g., home, work).
17. Others will act according to their own self-interests no matter what I attempt to say or do to influence them.
18. If I get a chance to see how others have done something or get the opportunity to be taught what to do, I know that I can be successful at most anything.
19. I expect some things to go wrong now and then, but there is no doubt in my mind that I can effectively cope with just about anything that comes my way.
20. Most of the things that I am involved in (e.g., work, community, relationships) are not very challenging, stimulating, and rewarding overall.
21. I am likely to get frustrated and upset if my plans do not unfold exactly as I hoped or things can not get done in the way I really wanted.

Strongly Agree 1	Agree 2	Neither Agree nor Disagree 3	Disagree 4	Strongly Disagree 5
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22. There is a direct relationship between how hard I work and the success and respect that I will have.
23. I don't feel that I have accomplished much lately that is really important or meaningful with respect to my future goals and objectives in life.
24. I often think that I am inadequate, incompetent, or less important than others with whom I work and that I know.
25. Many times I feel that I have little or no control and influence over things that happen to me.
26. If anything else changes or goes wrong in my life right now, I feel that I might not be able to effectively cope with it.
27. When change occurs at work or home I often find myself thinking that the worst is going to happen.
28. At the moment, things at work and at home are fairly predictable and any more changes would just be too much to handle.
29. You can't really trust that many people because most individuals are looking for ways to improve their welfare and happiness at your expense.
30. Most of the meaning in life comes from internal, rather than external, definitions of success, achievement, and self-satisfaction.

Appendix G
Rosenberg Self-Esteem Scale

Again, please describe how strongly you agree or disagree with each statement below. Mark your answers with the number 1, 2, 3, or 4 on your NCS sheet. This number indicates how closely each statement describes you and your feelings at the present time. There are no right or wrong answers. Once again, as you get ready to begin this section, **please notice that these questions have a different answer key than you had in the previous section. Make sure you mark your answers accordingly.**

Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4
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1. I feel that I'm a person of worth, at least on an equal basis with others.
2. I feel that I have a number of good qualities.
3. All in all, I am inclined to feel that I am a failure.
4. I am able to do things as well as most other people.
5. I feel I do not have much to be proud of.
6. I take a positive attitude toward myself.
7. On the whole, I am satisfied with myself.
8. I wish I could have more respect for myself.
9. I certainly feel useless at times.
10. At times I think I am no good at all.

Appendix H
Beck Depression Inventory

This part consists of 21 groups of statements. After reading each group of statements carefully, fill in your NCS answer sheet with the number (1, 2, 3, or 4) for each question which **best** describes the way you have been feeling the past week, including today. Be sure to read all the statements in each group before making your choice.

1. 1 I do not feel sad.
 2 I feel sad.
 3 I am sad all the time and I can't snap out of it.
 4 I am so sad or unhappy that I can't stand it.

2. 1 I am not particularly discouraged about the future.
 2 I feel discouraged about the future.
 3 I feel I have nothing to look forward to.
 4 I feel that the future is hopeless and that things cannot improve.

3. 1 I do not feel like a failure.
 2 I feel I have failed more than the average person.
 3 As I look back on my life, all I can see is a lot of failures.
 4 I feel I am a complete failure as a person.

4. 1 I get as much satisfaction out of things as I used to.
 2 I don't enjoy things the way I used to.
 3 I don't get real satisfaction out of anything anymore.
 4 I am dissatisfied or bored with everything.

5. 1 I don't feel particularly guilty.
2 I feel guilty a good part of the time.
3 I feel quite guilty a most of the time.
4 I feel guilty all of the time.
6. 1 I don't feel I am being punished.
2 I feel I may be punished.
3 I expect to be punished.
4 I feel I am being punished.
7. 1 I don't feel disappointed in myself
2 I am disappointed in myself
3 I am disgusted with myself
4 I hate myself
8. 1 I don't feel I am any worse than anybody else.
2 I am critical of myself for my weaknesses or mistakes.
3 I blame myself all the time for my faults.
4 I blame myself for everything bad that happens.
9. 1 I don't have any thoughts of killing myself.
2 I have thoughts of killing myself, but I would not carry them out.
3 I would like to kill myself.
4 I would kill myself if I had the chance.
10. 1 I don't cry any more than usual.
2 I cry more now than I used to.
3 I cry all the time now.
4 I used to be able to cry, but now I can't cry even though I want to.
11. 1 I am no more irritated now than I ever am.
2 I get annoyed or irritated more easily than I used to.
3 I feel irritated all the time now.
4 I don't get irritated at all by the things that used to irritate me.

12. 1 I have not lost interest in other people.
2 I am less interested in other people than I used to be.
3 I have lost most of my interest in other people.
4 I have lost all my interest in other people.
13. 1 I make decisions about as well as I ever could.
2 I put off making decisions more than I used to.
3 I have greater difficulty in making decisions than before.
4 I can't make decisions at all anymore.
14. 1 I don't feel I look any worse than I used to.
2 I am worried that I am looking old or unattractive.
3 I feel that there are permanent changes in my appearance that make me look unattractive.
4 I believe that I look ugly.
15. 1 I can work about as well as before.
2 It takes an extra effort to get started at doing something.
3 I have to push myself very hard to do anything.
4 I can't do any work at all.
16. 1 I can sleep as well as usual.
2 I don't sleep as well as I used to.
3 I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.
4 I wake up several hours earlier than I used to and cannot get back to sleep.
17. 1 I don't get more tired than usual.
2 I get tired more easily than I used to.
3 I get tired from doing almost anything.
4 I am too tired to do anything.

18. 1 My appetite is no worse than usual.
2 My appetite is not as good as it used to be.
3 My appetite is much worse now.
4 I have no appetite at all anymore.
19. 1 I haven't lost much weight, if any, lately.
2 I have lost more than 5 pounds.
3 I have lost more than 10 pounds.
4 I have lost more than 15 pounds.
20. 1 I am no more worried about my health than usual.
2 I am worried about physical problems such as aches and pains; or upset stomach; or constipation.
3 I am very worried about physical problems and it's hard to think of much else.
4 I am so worried about my physical problems that I cannot think about anything else.
21. 1 I have not noticed any recent change in my interest in sex.
2 I am less interested in sex than I used to be.
3 I am much less interested in sex now
4 I have lost interest in sex completely.

Appendix I

Autonomy Scale

Please read all the items carefully. Be sure to answer all on the basis of the way you feel now. Don't spend too much time on any one item. As you get ready to begin this final section, **please notice that these questions have a different answer key than you had previously. Make sure you mark your answers accordingly.** Use the following scale to indicate your answer on your NCS answer sheet:

- 1 = If you STRONGLY AGREE
- 2 = If you MODERATELY AGREE
- 3 = If you AREN'T SURE OR ARE NEUTRAL
- 4 = If you MODERATELY DISAGREE
- 5 = If you STRONGLY DISAGREE

Strongly Agree	Moderately Agree	Aren't Sure or Neutral	Moderately Disagree	Strongly Disagree
1	2	3	4	5

1. The possibility of being rejected by others for standing up for my rights would not stop me.
2. When I achieve a goal I get more satisfaction from reaching the goal than from any praise I might get.
3. It is more important to meet your own objectives on a task than to meet another person's objectives.
4. It is more important that I know I've done a good job than having others know it.

Strongly Agree 1	Moderately Agree 2	Aren't Sure or Neutral 3	Moderately Disagree 4	Strongly Disagree 5
<hr/>				
5. If I think I am right about something, I feel comfortable expressing myself even if others don't like it.				
6. I prize being a unique individual more than being a member of a group.				
7. If a goal is important to me, I will pursue it even if it may make other people uncomfortable.				
8. I enjoy accomplishing things more than being given credit for them.				
9. I set my own standards and goals for myself rather than accepting those of other people.				
10. It is more important to get a job done than to worry about people's reactions.				
11. I am not influenced by others in what I decide to do.				
12. It is important to me to be free and independent.				

Appendix J

Stress Inventory

Stressful events are defined as situations that are upsetting to you. The following is a list of events that may happen to college students. For those events you have experienced within the past 12 months, we would like you to think about the event and decide how stressful it was. Use your own experience to make your decision. A particular event might be more stressful to some people than others. Try to think how stressful the event was for you. If you have NOT experienced a particular event, indicate that by marking the 1 spot on your NCS sheet. If you have experienced the event, use numbers 2-5, depending on how stressful this event was for you. Use the following scale to indicate your response on your NCS answer sheet:

Did not Experience	Not at All Stressful			Extremely Stressful
1	2	3	4	5

1. Major change in sleeping habits
2. Death of close family member
3. Major change in eating habits
4. Death of close friend
5. Outstanding personal achievement
6. Minor law violations
7. Changed work situation
8. New job
9. Serious illness/injury of close family member

Did not Experience	Not at All Stressful			Extremely Stressful
1	2	3	4	5

10. Major change in usual type and/or amount of recreation.
11. Being fired from your job.
12. Major personal illness or injury.
13. Major change in social activities.
14. Major change in living conditions of family.
15. Serious injury or illness or close friend.
16. Breaking up with boyfriend/girlfriend.
17. Leaving home for the first time.
18. Academic probation.
19. Being dismissed from dormitory or other residence.
20. Failing an important exam.
21. Changing a major.
22. Failing a course.
23. Dropping a course.
24. Joining a fraternity/sorority.
25. Financial problems concerning school

Appendix K
Brief Symptom Inventory

Directions: Please read each statement below and then fill in the number which most closely indicates how much each statement applies to you and how you feel at the present time. There are no right or wrong answers. Once again, **please notice that these questions have a different answer key than you had in the previous section. Make sure you mark your answers accordingly.** Please use the following scale to indicate your answer:

Not at All				Extremely
1	2	3	4	5

1. Nervousness or shakiness inside.
2. Faintness or dizziness.
3. The idea that someone else can control your thoughts.
4. Feeling others are to blame for most of your troubles.
5. Trouble remembering things.
6. Feeling easily annoyed or irritated.
7. Pains in heart or chest.
8. Feeling afraid in open spaces.
9. Thoughts of ending your life.

Not at All				Extremely
1	2	3	4	5
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10. Feeling that most people cannot be trusted.				
11. Poor appetite.				
12. Suddenly scared for no reason.				
13. Temper outbursts that you could not control.				
14. Feeling lonely even when you are with people.				
15. Feeling blocked in getting things done.				
16. Feeling lonely.				
17. Feeling blue.				
18. Feeling no interest in things.				
19. Feeling fearful.				
20. Your feelings being easily hurt.				
21. Feeling that people are unfriendly or dislike you.				
22. Feeling inferior to others.				
23. Nausea or upset stomach.				
24. Feeling that you are watched or talked about by others.				
25. Trouble falling asleep.				
26. Having to check and double-check what you do.				
27. Difficulty making decisions.				

Not at All				Extremely
1	2	3	4	5
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28. Feeling afraid to travel on buses, subways or trains.				
29. Trouble getting your breath.				
30. Hot or cold spells.				
31. Having to avoid certain things, places or activities because they frighten you.				
32. Your mind going blank.				
33. Numbness or tingling in parts of your body.				
34. The idea that something is wrong with your mind.				
35. Feeling hopeless about the future.				
36. Trouble concentrating.				
37. Feeling weak in parts of your body.				
38. Feeling tense or keyed up.				
39. Thoughts of death or dying.				
40. Having urges to beat, injure or harm someone.				
41. Having urges to break or smash things.				
42. Feeling very self-conscious with others.				
43. Feeling uneasy in crowds.				
44. Never feeling close to another person.				
45. Spells of terror or panic.				

Not at All				Extremely
1	2	3	4	5

46. Getting into frequent arguments.
47. Feeling nervous when you are alone.
48. Others not giving you proper credit for your achievements.
49. Feeling so restless you could not sit still.
50. Feelings of worthlessness.
51. Feeling that people will take advantage of you if you let them.
52. Feelings of guilt.
53. The idea that something is wrong with your mind.

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