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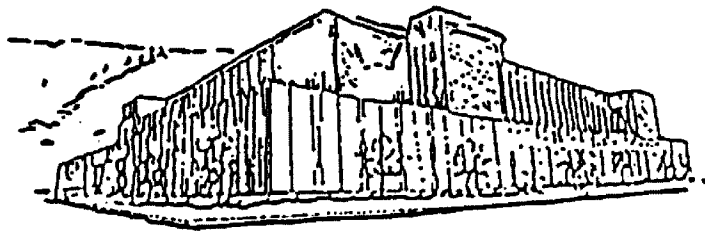
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**The Roles of Appraisal and Coping as Mediators
Between Hardiness and Self-reported Physical and Psychological
Health Outcomes**

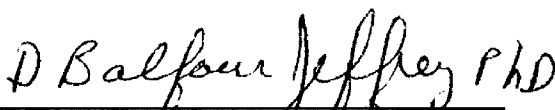
by

William M. Musser IV
B.A., University of Virginia, 1995


Presented in Partial Fulfillment of the Requirements
for the Degree of
Masters of Arts
The University of Montana

May 1999

Approved By:



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Chairperson of Thesis Committee



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Abstract

Musser, IV, William M., M.A., May 1999

Psychology

The Roles of Appraisal and Coping as Mediators Between Hardiness and Self-reported Physical and Psychological Health Outcomes

Director: D. Balfour Jeffrey, Ph.D. 

Factors that promote the maintenance of health in the face of stress have been discussed for many years. Kobasa (1979) put forth the Hardiness model of personality and health that hypothesized that persons high in characteristics of Control, Commitment, and Challenge would tend to remain healthier in the face of stressful life events than those low in such characteristics. This model has been used to study the stress-illness relationship as it is affected by mediating factors such as social supports, exercise, constitutional predisposition, and cognitive appraisal and coping processes. Conclusions regarding the stress-moderating effects and mediators of Hardiness have been inconsistent, due to measurement, methodological, statistical, and conceptual problems with Hardiness research. These identified criticisms yield clear implications for future research that the present study has tried to address. The present study utilized a prospective design that collected data from 221 participants over 8 weeks and used path analysis to examine the relationship between stressors, Hardiness, coping strategies, cognitive appraisal, and self-reported physical and psychological health outcomes. As hypothesized, Hardiness was negatively related to Physical Illness Symptoms and Psychological Distress, and positively related to Psychological Well-Being. The hypothesis examining Hardiness as a possible moderator variable of stressors on health outcomes was not tested due to the failure of the Modified Hassles Scale to measure the number of occurrences of stressors. Results concerning the hypothesized mediators of coping strategies and cognitive appraisal were mixed, as only the hypothetical Adaptive Coping latent variable seemed to mediate the Hardiness-health relationship. The hypothesis that the effects of Hardiness would remain significant after removing Neuroticism from it was not supported, supporting instead the contention that Hardiness is severely confounded with Neuroticism. Recommendations, precautions, and considerations for future research with Hardiness are identified and discussed.

Table of Contents

Abstract	ii
List of Figures	v
List of Tables	vi
Chapter	
1. Introduction	
Overview	1
Hardiness	2
Kobasa's Research	4
Moderating and Mediating Variables	9
Replications and Extensions	14
Criticisms of the Hardiness Model	18
Recent Research	23
Rationale and Hypotheses.	30
2. Method	42
Participants	42
Materials	43
Procedure	50
3. Results	54
4. Discussion	75
References	89
Appendices	
A. Demographic Questionnaire	95
B. Personal Views Survey-II	96
C. Trait Scale of the State-Trait Anxiety Inventory (Form Y)	99

D.	Modified Hassles Scale	100
E.	Stress Questionnaire	104
F.	Primary and Secondary Appraisal Questionnaire	105
G.	Revised Ways of Coping Questionnaire	106
H.	Recent Physical Symptom Checklist	109
I.	Mental Health Inventory	110
J.	Informed Consent Form	115
K.	Institutional Review Board Proposal	116
L.	Instructions Given at Time 1	124
M.	Instructions Given at Time 2	125
N.	Debriefing After the Study	126

List of Figures

1.	Moderator Model	33
2.	Mediator Model	34
3.	Path Model of Florian, Mikulincer, and Taubman (1995)	35
4.	Path Model of Hypothesis 1	36
5.	Path Model of Hypothesis 2	37
6.	Path Model of Hypothesis 3	38
7.	First Path Model of Hypothesis 4	39
8.	Second Path Model of Hypothesis 4	40
9.	Third Path Model of Hypothesis 4	41
10.	Initial Path Model with Hardiness as the Upstream Variable	66
11.	Initial Path Model with Hardiness Minus Neuroticism as the Upstream Variable	67
12.	Intermediate Model with Hardiness as the Upstream Variable	69
13.	Final Path Models- Alternative #1	70
14.	Final Path Models- Alternative #2	71
15.	Final Path Models- Alternative #3	72
16.	Final Path Models- Alternative #4	73
17.	Final Path Model for Main Effects of Hardiness	74

List of Tables

- 1. Mean, Standard Deviation, Minimum and Maximum Value for Manifest Variables and Demographic Variables 63**
- 2. Pearson Correlations Among Manifest Variables Measuring Latent Variables and Demographic Variables 64**
- 3. Key for Identifying Manifest Variables in Figure 10 and Figure 11 68**

The Roles of Appraisal and Coping as Mediators Between Hardiness and Self-reported Physical and Psychological Health Outcomes

Chapter 1

Introduction

Overview

The purpose of this study was to clarify the relationship between the Hardiness construct and the outcomes of self-reported physical and psychological health. First, the literature concerning the emergence of the Hardiness construct in the context of the stress-illness relationship will be reviewed. Secondly, the research concerning the relationship of Hardiness to other variables that may influence the stress-illness relationship will be addressed. Then several studies attempting to replicate and extend the findings concerning Hardiness will be summarized. Criticisms of the Hardiness model will then be discussed. Next, recent research and their implications for future research will be put forth. Finally, the hypotheses, methodology, results, and discussion of the study will be delineated.

The relationship between stress and the maintenance of health has been a topic of voluminous research in the past several decades, beginning with Holmes and Rahe (1967). Many studies have looked at the possibility of there being a causal relationship between the experience of stressful life events and the presence of psychological and physical symptoms of illness. However, correlations between stress and physical illness typically fall below 0.30 (Kobasa, 1979). In recent years, research has tried to focus on particular factors

that may influence or affect the presence of illness within an individual experiencing different environmental stressors. Some of these factors have been hypothesized to mediate the stress-illness relationship, while others have been hypothesized to moderate the stress-illness relationship. Mediating and moderating variables will be more closely defined and examined later in this paper. One such factor that has been the topic of recent research in this area is the hypothesized personality factor of Hardiness proposed by Kobasa's model in the 1970s.

Hardiness

Kobasa (1979) conducted a study that aimed at distinguishing between those highly stressed males who stayed healthy and those highly stressed males who exhibited illness in the face of stress. From this distinction between these two groups, Kobasa hoped to glean an understanding of any factors that seemed to influence the stress-illness relationship. Individual differences, such as constitutional predisposition, childhood experiences, social resources, and personality, had been hypothesized to affect the reactions to outside stressors. The variations within these factors were thought to influence how a particular person reacts to particular stressful life events. In this study, Kobasa chose to consider the effect of personality on the development of illness in the face of stressful life events. Kobasa proposed that individuals experiencing high levels of stress who do not fall ill are different from those individuals who experience high levels of stress and get sick because of differences in personality structures between the two groups.

This differentiating personality factor was called "Hardiness" by Kobasa,

and was based on existential personality theory (Kobasa & Maddi, 1977; Maddi, 1975). Hardy people were thought to have three characteristics: (1) the belief that they could actively control life events that they experience, (2) the ability to feel committed to their life activities, and (3) the expectancy of change as a challenge that encourages further development (Kobasa, 1979). The 3 subcomponents of Control, Commitment, and Challenge make up the personality construct of Hardiness.

According to Kobasa, persons high in Control will see themselves as having an influence over their life experiences rather than feeling helpless against external environmental forces. This stems from Averill's (1973) model, based on findings that some people are not weakened by stressful stimuli. This model hypothesizes that those individuals who experience high levels of stress and who have decisional control, cognitive control, and coping skills are still healthy individuals. This is in contrast to those highly stressed individuals who are sick and powerless, nihilistic, and low in motivation for achievement (Kobasa, 1979).

Those individuals with a high sense of Commitment perceive their environment with a sense of purpose and meaning that allows them to resist the effects of stressful life events. They are hypothesized to be involved with others, which serves as a resource against stressors (Antonovsky, 1974). They find themselves interpreting stressful events as interesting rather than threatening due to their commitment to themselves, their personal goals, values, and particular purpose in life. This sense of commitment was hypothesized to keep those individuals healthier in times of high stress than those lacking this sense of commitment.

The subcomponent of Challenge has to do with an individual's perception of change as challenging, rather than threatening, to the sense of self. Those changes that are required during one's lifetime are interpreted as aiding in the furthering of one's own personal development, rather than as threatening to it. Many changes during one's lifetime are inevitable, while others are unexpected and thus seemingly more threatening. But, unexpected changes are met by the healthy individual's extensive knowledge and repertoire of cognitive appraisal that reevaluates these changes as being less threatening, or by the individual's taking steps to mitigate the potential threat of the situation. The individual with a high level of Challenge has more cognitive flexibility that allows for more adaptive interpretation and activities that promote health in the face of high stress. These notions of Challenge fit with the concept of Primary Appraisal in Lazarus and Folkman's (1984) cognitive model of stress.

Kobasa's Research

In Kobasa's (1979) first study with Hardiness, the hypotheses were that those individuals who scored higher on the measures of Control, Commitment, and Challenge would remain significantly healthier than those individuals who scored lower on these measures. The subjects in this study were all male executives of a public telephone company. All 837 members of the subject pool were mailed self-report questionnaires that measured levels of stress and illness. From the questionnaires that were returned, 100 subjects were randomly selected from the high stress/ high illness group and 100 subjects were randomly selected from the high stress/ low illness group. These 200 subjects were then sent questionnaires measuring each of the three

subcomponents of Hardiness.

The high stress/ high illness group and high stress/ low illness group did not differ significantly with respect to demographic characteristics. Through discriminant function analysis, significant differences were found based on several measures of Control, Commitment, Challenge, and perception of personal stress. Kobasa took these results to suggest that personality could have something to do with staying healthy, and more specifically, that Hardiness could decrease the likelihood of physical illness in persons experiencing stressful life events. Kobasa noted the limitations of self-reported data and retrospective design, conceding that more objective and longitudinal designs are needed. Furthermore, it needed to be shown that the differences between the two groups were not due to the high stress/ high illness group's having experienced prior illnesses.

A second study conducted by Kobasa with the same population of male executives was intended to examine further the effects of Hardiness and constitutional predisposition on the stress-illness relationship (Kobasa, Maddi, & Courington, 1981). This study used both a retrospective and prospective design to strengthen possible causal inferences regarding the onset of illness. Data were collected for a period covering 5 years. At time 1, the authors measured subjects' stressful life events and physical illness symptoms for the preceding 3 years, and then measured the current level of Hardiness. Constitutional predisposition was measured using information gathered from the subjects' reports of the medical history of their parents; this made up the parents' illness "score," formed by adding the raw frequency of illnesses of the subjects' parents (Kobasa et al., 1981). At time 2, levels of stressful events and

physical illness symptoms for the year since time 1 were measured, and at time 3, those since time 2 were measured. Addressing the potential criticism of measuring illness from self-reports, 48 subjects had their previous year's self-reported major illnesses validated by records of medical examinations, with agreement between self-report and physician's diagnosis ranging from 82% to 93% (Kobasa et al., 1981). However, minor illnesses, such as a sore throat or common cold, could not be compared to such medical records.

Six scales that had distinguished between high stress/ high illness males and high stress/ low illness in the original study were used to measure the hypothesized subcomponents of the hardy personality, namely Commitment, Control, and Challenge. Commitment was measured using negative indicators from the Alienation from Self and Alienation from Work scales of the Alienation Test (Maddi, Kobasa, & Hoover, 1979). Challenge was measured using the negatively keyed Cognitive Structure scale of the Personality Research Form (Jackson, 1974, as cited in Kobasa et al., 1981) and the Security scale of the California Life Goals Evaluation Schedule (Hahn, 1966, as cited in Kobasa et al., 1981). Control was measured by the negatively keyed External Locus of Control scale (Rotter, Seeman, & Liverant, 1962) and the Powerlessness scale of the Alienation Test (Maddi et al., 1979). With respect to intercorrelations among the six scales measuring Hardiness, all intercorrelations except those involving cognitive structure were highly significant and in the expected direction, providing support for a unidimensional "hardy" personality construct. A principal-components factor analysis on the scales confirmed that the Cognitive Structure scale did not share common variance with the other scales, and so it was dropped from consideration. The

Security score of the remaining Challenge subcomponent was doubled to make up for the loss of the Cognitive Structure scale and added to the four scores of the Control and Commitment subcomponents to form a composite Hardiness score.

From the data collected, the mean illness score was calculated and its relationships to Hardiness, constitutional predisposition, and stressful life events were evaluated (Kobasa et al., 1981). Median splits were performed to produce high and low groups on each independent variable considered. Analyses of variance and covariance were utilized in examining relationships between groups. The dependent variable in the analysis of variance was the subjects' reported illnesses summed over times 2 and 3. The independent variables were the stressful life events, Hardiness composite score, and parents' illness "score" that were collected from time 1 or before. Main effects were found for stressful life events, Hardiness, and constitutional predisposition. In the analysis of covariance, the subjects' illness at the time of the first data collection was used as the covariate with the same independent and dependent variables. This controlled for prior illness, making the dependent variable the change in illness from time 1 to times 2 and 3 based on and including predictions from time 1. In this analysis of covariance, main effects for Hardiness and constitutional predisposition were found. No significant interactions were found in either the analysis of variance or the analysis of covariance. These results were interpreted as supporting the contention that the three subcomponents of Hardiness serve as "resistance resources," and that constitutional predisposition serves as a vulnerability factor for developing future illness and disease. The hardy personality and constitutional

predispositions were uncorrelated and independent of each other, and can thus be interpreted as not representing the same underlying construct or mechanism in their relationship with illness.

The lack of a significant main effect for stressful life events at time 1 on illness in the analysis of covariance suggests that such past events have a time-limited effect on the outcomes of prospective illness, whereas personality and constitutional characteristics appear to have a more enduring effect. Using a supplementary analysis of covariance identical to the one mentioned above, with the exception that the measures of stressful life events were taken from times 2 and 3 rather than time 1, a significant main effect for stressful life events on illness was found. This supported the conclusion that the effects of stressful life events on the outcome of illness are short-lived.

In the same prospective study with the same population, but reported in a later journal article, Kobasa, Maddi, and Kahn (1982a) tested the hypothesis that Hardiness decreases the effects of stressful life events in influencing physical illnesses. Again, increases in stressful life events were related to increases in reported physical illness symptoms. Furthermore, Hardiness decreased the likelihood of reporting illness symptoms. Also, it was reported that there was a significant predicted interaction between stress and Hardiness. Kobasa et al. (1982a) interpreted these results as demonstrating that Hardiness has its strongest health-promoting effect when one is experiencing stressful life events, and thus it functions as a "resistance resource" that moderates or buffers the effects of stressful life events in developing illness and disease. Kobasa noted that interactions of other potential resistance resources, such as social supports and health practices, with Hardiness should be studied.

In her next study concerning Hardiness, Kobasa took the findings from the first few studies to elaborate on the hypothesized Hardiness model, describing hardy individuals as being curious people who tend to find their life experiences interesting and meaningful (Kobasa, Maddi, & Puccetti, 1982b). The subcomponents of the hardy personality, those of Control, Challenge, and Commitment, are reflected in hardy individuals' optimistic cognitive appraisals, their incorporation of life changes into an overall life plan, and their ability to transform stressful forms into less stressful forms, which is called "transformational coping" (Kobasa et al., 1982b). In contrast, those low in Hardiness find their personal existence and external environment "boring, meaningless, and threatening" (Kobasa et al., 1982b). They do not like change, particularly unexpected change, they feel powerless, and they are more passive in their dealings with their life experiences. Because of their lack of optimistic cognitive appraisal of events, they do not transform stressful forms into less stressful forms, and hence do not have an adaptive mechanism in their personalities to mitigate the stress-illness relationship.

Moderating and Mediating Variables

The results obtained by Kobasa et al. (1982a) provided support for Hardiness being a moderator variable in the stress-illness relationship. Specifically, a moderator variable is a third variable "which partitions a focal independent variable into subgroups that establish its domains of maximal effectiveness in regard to a given dependent variable" (Baron & Kenny, 1986). Furthermore, Baron & Kenny (1986) state that a moderator variable can be either 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.”

The moderator variable hypothesis is supported if the interaction between the proposed moderator and the focal independent variable is significant on the dependent outcome variable (See Path C, Figure 1). The finding that there was a significant Hardiness by stress interaction on outcomes of illness symptoms by Kobasa et al. (1982a) supports the hypothesis that Hardiness serves as a moderator variable or buffer in the relationship between stressful life events and physical illness.

In contrast to moderator variables, but developed along similar lines, is the concept of the mediator variable. A mediator variable is a third variable “which represents the generative mechanism through which the focal independent variable is able to influence the dependent variable” (Baron & Kenny, 1986). A variable functions as a mediator variable to the extent that it accounts for the relation between the independent variable and the dependent outcome variable (Baron & Kenny, 1986). In contrast to moderator variables that explain the conditions of when certain effects will occur, mediator variables specify how or why such effects occur. Mediator variables address the internal (e.g., cognitive appraisal) and/or external (e.g., coping strategies) events that are directly affected by the independent variable, and which in turn directly affect the dependent variable. Mediation models can best be seen in a path diagram that depicts a chain of causal events (See Figure 2, Paths A and B).

Baron and Kenny (1986) stipulate that a variable may function as a mediator variable when it meets the three following conditions, namely that: 1) variations in levels of the independent variable significantly account for

variations in the proposed mediator (i.e., Path A, Figure 2), 2) variations in the proposed mediator significantly account for variations in the dependent variable (i.e., Path B), and 3) when paths A and B are controlled, a previously significant relation between the independent and dependent variables is no longer significant, with the strongest demonstration of a sole mediator when Path C is close to zero. If Path C is not zero, there may be multiple mediating variables.

The relationships between Hardiness and social supports, health practices, and coping strategies that were hypothetically involved in the stress-illness relationship were examined in later studies. Kobasa et al. (1982b) looked at the effects of Hardiness as a moderator and exercise as a mediator in preserving health. Hardiness was hypothesized to have an effect on health by directly affecting the stressful life events themselves. Optimistic cognitive appraisal should make these events less stressful to the hardy individual. Exercise should not alter the stressful life events themselves, but rather the psychological and physical strain produced in the individual. It could also be possible that hardy people exercise more, too. Therefore, Kobasa et al. (1982b) hypothesized that personality and exercise should be independent and have additive effects in preserving health (i.e., that in combination these two variables are more important in moderating or buffering the effects of stressful life events than either is alone). This study again used the same population and the same measuring instruments and scales as earlier studies. The results indicated that exercise and Hardiness were independent, with no real correlation between them ($r=0.009$). As hypothesized, stressful life events were significantly associated with increased illness, while both Hardiness and exercise decreased illness. Furthermore, both the two-way interactions involving

stressful life events by Hardiness and stressful life events by exercise were reported to be significant. These effects were also reported to be additive, with hardy individuals who exercised being the healthiest. This study was not prospective in design, and so possible prospective results can only be inferred from the data. But support for this inference comes from other studies involving Hardiness (Kobasa et al., 1981, 1982a) and exercise (Paffenberger & Hale, 1975).

Hardiness was then looked at along with the Type A personality (Kobasa, Maddi, & Zola, 1983). The people with the Type A personality are characterized by an excessive degree of impatience, time urgency, competitiveness, and hostility (Rosenman, 1978). Conceptually, according to each hypothesized model, these two personality types seem to differ on where their motivation comes from, with Type A persons being more extrinsically motivated in their pursuit of personal goals and hardy persons being more intrinsically motivated in pursuit of such personal goals. The hardy personality was therefore hypothesized to be independent of the both the Type A personality and its opposite, the Type B personality. Type B individuals are characterized by an easygoing, carefree lifestyle that does not exhibit an excessive degree of impatience, time urgency, competitiveness, and hostility. It was also hypothesized that those persons exhibiting Type A behavior in the absence of any intrinsic motivation, as in the case of low hardy people, would be most prone to developing illness in the face of stressful events. In this study, two types of stress were looked at, those stressful life events consistent with the previous studies and an added measure of work stress. The results yielded support for the first hypothesis, that Type A and Hardiness are independent.

Similar to previous studies, stressful life events were positively associated with illness, while Hardiness was negatively associated with illness. Regarding the second hypothesis, the results indicated that Type A individuals reported significantly more sickness when they were low in Hardiness as well as high in combined work and life stress, or high in work stress alone.

The moderating effects of Hardiness and social resources were studied as well. In one study, three types of social resources were studied (Kobasa & Puccetti, 1983). Social resources were defined as a person's subjectively perceived support from his/her supervisor at the workplace (i.e., boss support), a person's subjectively perceived support from his/her family within the home (i.e., family support), and a person's having certain social assets (e.g., occupation, marital status, education, etc.) that are typically valued by society (i.e., social assets). The goal of the study was to examine the possible direct and stress-buffering effects of both social resources and Hardiness on the outcome of illness, as well as the possible interactive combinations of each of the social resources with Hardiness. It was hypothesized that high hardy individuals and/or individuals high in one or more social resources would report fewer physical illness symptoms, especially in times of high stress. Secondly, those individuals high in Hardiness and low in all social resources were hypothesized to report fewer physical illness symptoms than those individuals who were low in Hardiness and high in one or more social resources. This last prediction would be consistent with Hardiness theory, where hardy individuals would access their limited social resources because of their personality, whereas those individuals low in Hardiness would retreat from their social resources and decrease their chances of successful coping.

The results supported the first hypothesis only with regard to Hardiness by itself and boss support in the face of many stressful events (Kobasa & Puccetti, 1983). Social resources were not significantly associated with healthy outcomes, and family support was significantly associated with illness for those individuals low in Hardiness, which was an unexpected finding. Kobasa interpreted these results by acknowledging that the nature of the stressful life events of the respondents was mostly due to work stress, and thus it is understandable that boss support would be most helpful in buffering this type of stress to be associated with less physical illness. Kobasa suggested that the finding concerning family support could be possibly due to low hardy individuals' engaging in inappropriate coping (e.g., emotional coping) with work stress by staying home and avoiding the work stress. The results only partially supported the second hypothesis, where high-Hardiness/low-family support individuals reported significantly less physical illness than low-Hardiness/high-family support individuals. This study's results hint at and could be accounted for by the different effects of "helpful" and "unhelpful" social supports on health outcomes which have since been revealed and addressed in the empirical literature (Pagel, Erdly, & Becker, 1987).

Replications and Extensions

Studies by other researchers aimed at replicating Kobasa's and her colleagues' (1979; 1981; 1982; 1982; 1983) research began in 1984. Rhodewalt and Agustsdottir (1984) conducted a study examining the relationship between Hardiness and Type A behavior in the context of the stress-illness relationship that focused on the possible differences between the

perception of life events and coping with those life events, which was suggested by Kobasa et al. (1982b). As hypothesized, they found that the Type B-hardy personality was the most stress resistant. Life events that were perceived as less than totally controllable produced greater levels of distress for Type A individuals regardless of their level of Hardiness. They also found that Hardiness was not associated with a greater likelihood of experiencing a particular life event. Consistent with the Hardiness model, high hardy individuals perceived a significantly higher percentage of life events as positive and completely controllable and a lower percentage of life events as moderately controllable. Type A and B subjects were said to be inclined to experience the same types of life events and perceive them in a similar way with respect to controllability. The findings suggested that hardy individuals perceive events and situations as more positive and less stressful, supporting the contention that Hardiness mitigates stress through cognitive appraisal.

Another study reexamined the relationship between the subcomponents of Hardiness and social support (Ganellan & Blaney, 1984). In contrast with the previous studies, the subjects in this study were undergraduate women and the outcome variable was psychological distress, rather than symptoms of physical illness. The results found that in contrast with the earlier study of these two resistance resources, social support and Hardiness were not independent, but in this study the social support inventories were measured as a composite rather than distinguishing between the different kinds of social resources as in the previous study (Kobasa & Puccetti, 1983) The three subcomponents of Hardiness were differentially related to social support, with Commitment and Challenge strongly correlated with social support and Control not. Social

support was found not to buffer the effects of life stress on psychological distress. Only one measure of the subcomponent of Commitment provided evidence for buffering the effects of life stress on psychological distress.

The effects of Hardiness, exercise, and social support as resistance resources were examined again in Kobasa's all male executive population in a later study (Kobasa, Maddi, Puccetti, & Zola, 1985). Hardiness was significantly correlated with social support, but the two were interpreted as not being identical concepts. Combinations of the 3 resistance resources decreased the likelihood of developing physical illness when confronting stressful life events both concurrently and prospectively. Individuals high in all 3 resistance resources were the least likely to develop illness, while individuals who were not high in any of the 3 resistance resources were most likely to develop illness. Hardiness was the most important resistance resource in protecting against stress, followed by exercise and social support, respectively.

Holahan and Moos (1985) tried to shed some further light on these resources by looking at the effects of personality, coping, and family support on the stress-illness relationship in a sample of families. Overall, they predicted that healthy people would take part in more approach and less avoidance coping than unhealthy people. Their findings also suggested gender differences involved in the maintenance of health. Stress resistance in men was more strongly associated with higher levels of self-confidence, while for women, it was more strongly associated with a greater amount of family support. Males reporting lower levels of psychosomatic symptoms engaged in significantly less avoidance coping. However, for females, the effects of avoidance coping only approached statistical significance. The findings for approach coping were not

significant in either males or females. The authors of this study suggested that Hardiness, which was not actually measured in this study, may mitigate stress less strongly for women.

Findings consistent with this proposed gender difference were seen in a study of Hardiness and Type A behavior and their effect on the stress-illness relationship in working women (Schmied & Lawler, 1986). These findings differed from previous studies of Hardiness and Type A behavior in many respects. There were no Hardiness main effects, nor any interactions between Hardiness, Type A behavior, and stress. Furthermore, Hardiness was significantly associated with certain demographic variables, in contrast with all other previous Hardiness studies (Ganellen & Blaney, 1984; Kobasa, 1979; Kobasa et al., 1981, 1982a, 1982b, 1983, 1985; Kobasa & Puccetti, 1983; Rhodewalt & Agustsdottir, 1984). Hardiness was also significantly correlated with stress: being less hardy was associated with actually experiencing more stressful life events, a finding contrasting with some earlier findings (Rhodewalt & Agustsdottir, 1984). There were no differences in Hardiness composition between high stress/high illness and high stress/low illness groups. These results support the contention that the Hardiness personality model may not generalize to females, although a previous study did find significant results with women when depression was the dependent variable rather than physical illness (Ganellan & Blaney, 1984).

The relationships among stress, Hardiness, health practices, and illness were examined in a male and female undergraduate sample by Wiebe and McCallum (1986). Hardiness was found to have a direct effect on the outcome of self-reported physical illness and an indirect effect on the outcome of self-

reported physical illness through health practices. Findings did not support evidence for a stress-buffering effect on physical illness. These findings cast doubt on the assertion that Hardiness serves as a stress-resistance resource (Kobasa, 1979). However, this study examined prospective effects of Hardiness on the stress-illness relationship for a 3-month period, which is considerably shorter than the 2-year period examined in earlier prospective studies, which may factor into the lack of support for Hardiness' stress-buffering effects on physical illness (Kobasa et al., 1981, 1982a, 1982b, Kobasa & Puccetti, 1983).

Criticisms of the Hardiness Model

From these conflicting findings came the first real criticisms of the Hardiness model and the methodology of measuring the concept of Hardiness. The first such criticism came from Hull, Van Treuren, & Virnelli (1987). Hull et al.'s first criticism concerned that the first several studies finding that Hardiness main effects and Hardiness by stressful life event interactions were for self-reported physical illness and not actual illness (Kobasa et al., 1981; 1982a, 1982b; 1983; Kobasa & Puccetti, 1983). Kobasa had anticipated this criticism and addressed it by checking 48 subjects' self-reports against their medical records and finding 89% agreement between them (Kobasa et al., 1981). Hull et al. (1987) still saw this self-report of illness as a problem.

Secondly, Hull et al. criticized the fact that of the four significant main effects and interactive effects of Hardiness, stress, and illness, two studies analyzed the same data set (Kobasa et al., 1981; Kobasa et al. 1982a). Also, Hull et al. pointed out that the F value of the Hardiness by stress interaction reported to be significant in Kobasa et al. (1982a) did not achieve the

conventional level of significance of .05. Therefore, they argued that the direct effect of Hardiness on health existed, but the buffering effect of Hardiness as a moderator variable on stress was not demonstrated.

Hull et al. also brought the unity of the Hardiness construct into question, contending that only the 3 subcomponents should be looked at and measured rather than a composite of the Hardiness construct. They believed that nothing is gained in looking at the Hardiness construct as a unidimensional model rather than the individual subcomponents of Control, Commitment, and Challenge.

The way in which Hardiness was measured was also criticized (Hull et al., 1987; Funk & Houston, 1987). In the original study that resulted in the Hardiness construct, 19 personality scales were utilized to discriminate between high stress/high illness males and high stress/low illness males (Kobasa, 1979). In later research, 5 scales consisting of 71 items were used to measure Hardiness rather than seeing which measures made the important distinction between the two groups in the original study (Kobasa et al., 1981; 1982a; 1982b; 1983; Kobasa et al., 1985; Kobasa & Puccetti, 1983; Schmied & Lawler, 1986; Wiebe & McCallum, 1986). Rhodewalt and Agustsdottir (1984) used an abridged version of the Hardiness Scale that consisted of 20 items. Hull et al. obtained a refined 36-item Hardiness Scale for the purpose of their study. Both of these short and long versions of the Hardiness Scale were examined for factor loadings in several samples of undergraduates in the Hull et al. study. Three factors were identifiable, consistent with the Control, Commitment, and Challenge subcomponents of Hardiness. However, Hull et al. concluded that Commitment and Control, but not Challenge, had adequate

internal consistency within the Hardiness Scales, and only they were related to health outcomes, the composite Hardiness score, and each other. Therefore they concluded that perhaps Challenge should be removed from consideration in research with Hardiness. Hull et al. also concluded that no buffering effects were found for Commitment or Control.

Another study conducted within the same time period as Hull et al. (1987) again criticized the Hardiness Scale's psychometric properties and the methodology of several of the previous studies involving Hardiness (Funk & Houston, 1987). More specifically, Funk and Houston had 3 main criticisms, the first being that a positive concept such as Hardiness was being measured by 5 scales using negative indicators. These scales measured alienation from self, alienation from work, (need for) security, (feelings of) powerlessness, and external locus of control (Funk & Houston, 1987). Problems arise from this practice because high levels of the subcomponents of Hardiness are indexed by low scores on another characteristic. This implies that the subcomponent, taking for example Commitment, is identical to the converse of some other characteristic, such as alienation. This may not be the case. A second criticism of Funk & Houston (1987) was that the measurement of Hardiness in this manner may confound the concept of Hardiness with maladjustment. Many of the items from the Hardiness Scales corresponded strongly with similar items of maladjustment scales.

A third criticism of Funk & Houston (1987) addressed statistical considerations involved in analyzing the data in earlier studies. The use of analysis of variance or analysis of covariance with measured independent variables of Hardiness, stressful life events, and other possible resistance

resources was a problem because some studies had found significant correlations between them, bringing their treatment as independent factors into question (Ganellen & Blaney, 1984; Kobasa & Puccetti, 1983; Schmied & Lawler, 1986). Furthermore, the authors termed the categorization of continuous variables in Hardiness studies through median splits as “undesirable,” concluding that multiple regression analysis was preferred (Funk & Houston, 1987).

These issues were addressed in Funk and Houston’s study using both a retrospective and prospective design involving data gathered from a sample of male undergraduates. In contrast to earlier studies, stressful life events were measured by the Life Experiences Survey (LES; Sarason, Johnson, & Seigel, 1978, as cited in Funk & Houston, 1987) because it allowed for subjective ratings of each event’s impact on the student’s life and had specific items addressing college experiences. Hardiness was measured by the 5 scales of the original (long) version of the Hardiness Scale. Two measures of maladjustment, two measures of health status, and a measure of depression were used. Illnesses were recorded for a period of 8 weeks.

Results of a factor analysis of the Hardiness measure revealed two factors, which is inconsistent with the concept of Hardiness as previously defined. The overall composite Hardiness score correlated significantly with both measures of maladjustment. Maladjustment was measured by the College Maladjustment scale (Mt; Kleinmuntz, 1961) and the General Maladjustment scale (GM) of the Tennessee Self Concept Scale (TSCS; Fitts, 1964, as cited in Funk & Houston, 1987). Both maladjustment measures correlated significantly with the Powerlessness and Alienation From Work scales in each case.

Furthermore, Mt scores also correlated significantly with the Alienation From Self and External Locus of Control scales. These correlations between maladjustment and Hardiness were moderate, as were the correlations between the two measures of maladjustment with each other, indicating that this finding deserves further consideration.

Significant main effects for Hardiness on retrospective physical illness and depression outcomes were obtained using a 2 X 2 ANOVA. When maladjustment was controlled for, the main effect remained significant only on the retrospective outcome of depression. In the prospective analysis using ANOVA, Hardiness main effects were seen only on the outcome of depression both with and without control for maladjustment. Using multiple regression, no main effects for Hardiness on physical illness were found in either the retrospective or prospective design when controlling for maladjustment. However, in the prospective design using multiple regression, a main effect of Hardiness on depression with and without control for maladjustment was duplicated. This supported Funk & Houston's (1987) contention that the results of Hardiness research are somewhat a function of the particular statistical method used. Also, the overlap of maladjustment and lack of Hardiness demonstrated the need for further examination of this area.

Another study by Hull and his colleagues inquired into the confound of maladjustment, negative affectivity, or Neuroticism as it has come to be called, by looking at attributional style and Hardiness (Hull, Van Treuren, & Proppom, 1988). They found that those subjects scoring low on the subcomponent measurements of Commitment and Control had an "unhealthy" attributional style in which they made significantly more internal, stable, and global

attributions for negative events and more external, unstable, specific attributions for positive events than did subjects scoring high on Commitment and Control. Optimism, which is related to the hardy personality through positive cognitive appraisal, has also been shown to be inversely related to measures of Neuroticism (Smith, Pope, Rhodewalt, & Poulton, 1989). These studies again suggest the possibility of Hardiness mitigating the effects of stress through cognitive appraisal.

Recent Research

These criticisms sparked new research concerning the Hardiness conceptualization. The possible mediating effects (see earlier discussion of mediator variables) of cognitive appraisal of life changes on the stress-Hardiness-illness relationship in hardy and non-hardy working women was examined in accordance with the new criticisms and drawing from separate earlier findings (Rhodewalt & Agustsdottir, 1984; Rhodewalt & Zone, 1989; Schmied & Lawler, 1986). Rhodewalt & Zone (1989) tested two different mediation models of Hardiness on depression and illness outcomes. A simple mediation model would indicate that all the Hardiness effects come about through the effects of negative life events on depression and illness. An interactional mediation would indicate that the interaction between Hardiness and appraised negative life events affect depression and illness. Simple mediation would support the contention that Hardiness operates only through appraisal processes, while interactional mediation would support the argument that Hardiness affects depression and illness in other ways than through cognitive appraisal.

Consistent with Hardiness theory and previous findings, non-hardy women rated a significantly greater number of events as undesirable as well as uncontrollable, while there were no significant differences between hardy and nonhardy women for the number of events rated as desirable. Along similar lines, non-hardy women reported significantly greater amounts of undesirable and uncontrollable life change than hardy women. Using path analysis and regression models, the overall regression of Hardiness and undesirable life change on depression and illness was significant, supporting interactional mediation. These results suggest that Hardiness does indeed have stress-buffering effects beyond cognitive appraisal processes. The mediation analyses were rerun to address the issue of maladjustment as confounding the concept of Hardiness (Funk & Houston, 1987; Hull et al., 1988). The authors used the Beck Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) to measure depression or negative affectivity. When depression was controlled, neither Hardiness, undesirable life change, nor the interaction between them was significant in predicting illness. These results would be consistent with the finding that Hardiness in women appears to be associated with psychological health rather than physical health (Ganellen & Blaney, 1984; Schmied & Lawler, 1986).

Other studies tested moderator versus mediator effects of Hardiness (Roth, Wiebe, Fillingim, & Shay, 1989). As predicted, Hardiness was weakly related to health outcomes, with Commitment being the most important subcomponent associated with health, and Challenge unrelated. Regression analysis failed to support the hypotheses that Hardiness and exercise promoted health by moderating the negative effects of stressful life events. However, this

study used a retrospective design to gather data concerning stressful life events and illness reports for a 1-month period prior to the actual study from male and female undergraduate students. This length of time may not be sufficient to show any possible effects for stressful life events because of a floor effect, and with a retrospective design, the ability to make causal inferences is weakened (Kobasa et al., 1981). Roth et al. suggested that the stress-illness relationship is most likely mediated by the occurrence or interpretation of stressful life events, in line with recent findings (Rhodewalt & Zone, 1989).

Experimental manipulations that had psychological and physiological outcome measures to test the Hardiness model were done as well. One study looked at such outcomes for high and low hardy male undergraduates subjected to a challenging task under conditions of low and high evaluative threat (Allred & Smith, 1989). Hardy individuals were thought to have adaptive cognitive styles and a reduced level of physiological arousal that would make them resistant to the effects of stressful life events. Hardy subjects made significantly fewer negative self-statements and were marginally less aroused before the task, but these effects were removed when Neuroticism was controlled. However, hardy subjects made significantly more positive self-statements in the high evaluative threat condition than non-hardy subjects, and this effect remained when Neuroticism was controlled. Higher levels of systolic blood pressure were seen in hardy subjects, and this was interpreted as possibly stemming from active coping efforts that attempts to influence or control the stressor or stressful event, which have been shown to produce increases in systolic blood pressure and heart rate. Contrada (1989) found in contrast with Allred & Smith (1989) that Hardiness was associated with a significant

decrease in diastolic blood pressure responsiveness to a stressful task, and that the subcomponent of Hardiness that accounted most for this effect was Challenge. This was the first real finding that the subcomponent Challenge was related to any health outcome variable.

Wiebe (1991) studied the effects of an evaluative threat task that was manipulated to influence cognitive appraisals of the task in such a way as to be consistent with the Hardiness model on male and female undergraduates. Each hardy and non-hardy subject, determined by a 3-way split of the composite score, was assigned to a cognitive appraisal condition that was "high" or "low" for a subcomponent of Hardiness. Both psychological and physiological outcome data were gathered during this study. This experimental manipulation produced many significant results. The hardy subjects showed a higher frustration tolerance, a cognitive appraisal of the task as less threatening, and a response to the task with more positive affect and less negative affect than non-hardy subjects. The hardy men displayed lower heart rate elevations than non-hardy men during the task. No heart rate elevation differences were found in women. Looking at the effects of the manipulated cognitive appraisal conditions for the task showed that men in the hardy appraisal conditions showed lower levels of physiological arousal during the task than men in the low non-hardy appraisal conditions. Measurements of blood volume pulse, skin conductance response frequency, and skin conductance level were used to measure physiological arousal. In regards to women, these appraisal manipulations did not have any or had the opposite effect for women. Wiebe (1991) suggested that the converging of the effects for measured Hardiness and manipulated appraisals implies that Hardiness affects the cognitive appraisal of a stressful

event in a way that reduces the stressfulness of the event and alters the level of physiological arousal. However, this was clearly seen only in the manipulation of the Commitment appraisal condition. This study was the first to specifically examine and analyze gender effects in the literature concerning Hardiness.

Nowack (1989) had first called for the mediating effects of coping processes with Hardiness to be examined to see if they had additive or interactive effects with Hardiness on outcomes of health, both psychological and physical. Fairly recently, a study by Williams, Wiebe, and Smith (1992) that collected data from male and female undergraduates over a 1-month period addressed some of these issues. The authors found that increased use of problem-focused and support-seeking coping, and decreased use of avoidant coping (i.e., avoiding the problem) mediated the Hardiness-illness relationship in accordance with Baron and Kenny's (1986) criteria for mediating variables. Some Hardiness-coping relationships were in part independent of Neuroticism. However, the relationship of coping and Hardiness with the self-report of illness seemed to stem from the common influence of Neuroticism. Again, these Hardiness effects were seen most clearly in males.

In one of the two most recent critical reviews of the Hardiness literature, Funk (1992) called for further examination of the pathways by which Hardiness could have an effect on stress, and suggested that appropriate statistical techniques such as path analysis and regression models should be used in evaluating such pathways. Furthermore, Funk discussed the "third-generation" Hardiness scales that have come about to address previous criticisms of the scales (Funk & Houston, 1987; Hull et al., 1987). Both the 50-item Personal Views Survey (PVS; Hardiness Institute, 1985, as cited in Funk, 1992) and the

45-item Dispositional Resilience Scale (DRS; Bartone, Ursano, Wright, & Ingraham, 1989) were constructed to incorporate positively keyed items for Hardiness in the 2 scales. Funk concluded that the DRS, which has proportionally more positively keyed items, should be used in future Hardiness research. The amount of variance explained by Hardiness measured by an adaptation of the DRS after controlling for negative affectivity has been shown to be small but still significant (Maddi & Khoshaba, 1994).

Also, Funk addressed the issue of the unidimensionality versus the multidimensionality of Hardiness, of whether or not the subcomponents should be combined or not. Carver (1989) had argued that using a composite measure to tap a hypothesized multidimensional concept such as Hardiness simplifies data analysis and the evaluation and interpretation of the findings. Funk concluded that the subcomponents of the PVS have shown stronger relations between each other than earlier scales. Furthermore, Funk asserted that the ways in which hardy and non-hardy persons had been classified in previous research, mainly through median splits of the composite scores, had not been consistent with Hardiness theory. If hardy persons were hypothesized to be high in all 3 subcomponents, then a median split should be performed on each subcomponent scale, and those scoring above the medians in all 3 subcomponents should be classified as hardy, and those falling below the medians in all 3 should be classified as non-hardy. Funk concluded that the research concerning the buffering effects of Hardiness on the stress-illness relationship is inconsistent, and the confound of Neuroticism needs to be controlled in evaluating future Hardiness research.

Wiebe and Williams (1992) also wrote a review article concerning the

Hardiness literature from a “social psychophysiological perspective,” discussing the implications of the Hardiness literature on the Hardiness model. One topic of interest discussed in this article was that concerning the conceptualization and measurement of stress. Past typical stress measures in the Hardiness literature attempted to record stressful life events, which are major events that would have an impact on anyone’s life and which seem to occur infrequently. Furthermore, these stress measures typically have had appraisals of these events confounded with the occurrence of the event itself. Wiebe and Williams (1992) discussed the importance of measuring the presence of the actual stressor independent of the appraisal of the stressor in order to determine the possibility and effect of appraisal as a mediating variable in the relationship between Hardiness and health. The authors discuss the use of daily hassles as a possible measure of stressors, which are more pertinent to most individuals’ lives and occur more frequently than stressful life events. Possible gender differences in appraisal of certain objective stressors are also discussed. The importance of contextualizing situational information in evaluating the effectiveness of different coping strategies between hardy and non-hardy individuals is addressed by the authors as well.

Recent literature has shown some additional conflicting results. Bernard and Belinsky (1992) did not find any significant effects for Hardiness in the stress-illness relationship when controlling for Neuroticism or maladjustment. This retrospective and prospective design used both self-report and objective health center visits as outcome measures of physical illness. Other studies have examined the relationship between the Hardiness-measuring instrument, Neuroticism, and negative affectivity, indicating that both are correlated with

Hardiness but are distinct from it because a significant amount of variance can still be explained by Hardiness on such measures of symptoms of psychopathology when negative affectivity has been controlled (Maddi & Khoshaba, 1994; Wiebe, Williams, & Smith, 1990, as cited in Williams et al., 1992).

Another recent study examining subjects' appraisals and coping strategies on psychological health outcomes during a real-life stressful situation found significant differences attributable to certain Hardiness subcomponents using path analysis (Florian, Mikulincer, & Taubman, 1995). Some of these relationships remained significant when they controlled for Neuroticism. The best fitting model produced by the results of this study can be seen in Figure 3. The authors had originally hypothesized that appraisal would predict coping strategies within the model, which is congruent with cognitive model of stress espoused by Lazarus and Folkman (1984). However, the inclusion of the causal sequence from appraisal to coping strategies reduced the goodness of fit between the model and the data (Florian et al., 1995). Therefore the resulting model in Figure 3 analyzes appraisal and coping strategies concurrently and not sequentially.

Most studies in the Hardiness literature (e.g., Florian et al., 1995; Williams et al., 1992) have used the Ways of Coping Questionnaire-Revised (WOC-R; Folkman & Lazarus, 1985; Folkman et al., 1986) to empirically examine the relationships between Hardiness, coping strategies, and health outcomes. The eight subscales of the WOC-R have traditionally been subsumed under two main scales called Problem-focused and Emotion-focused coping. However, the different subscales have shown both positive and negative

relationships with health outcomes, indicating that some coping strategies encourage and facilitate health while others may encourage and facilitate illness. Based on these findings and on the rationale behind each subscale, the research in this area may be better served by rationally dividing these scales under the headings of Adaptive Coping and Maladaptive Coping to reflect their positive and negative relationships to health outcomes. Dividing the coping strategies in this way seems to facilitate examination of whether or not coping strategies mediate the Hardiness-health outcome relationship.

Rationale and Hypotheses

Most of the literature presented above is inconsistent concerning Hardiness' measurement, overall construct validity, and effect on the stress-illness relationship. More specifically, the instruments used to measure Hardiness and its subcomponents have had some difficulties regarding their intercorrelations, as well as with their internal consistencies. The most notable problem seems to be with Challenge. Furthermore, the hypothesized effects of Hardiness as a buffer or moderator variable of the occurrence of "stressful" life events (i.e., stressors) have not been adequately examined nor demonstrated in the literature. Furthermore, the hypothesized mediators of Hardiness in its relationship to outcomes of physical and psychological health have not been conclusively demonstrated either. Lastly, the confounding of Hardiness by maladjustment or Neuroticism needs to be addressed further.

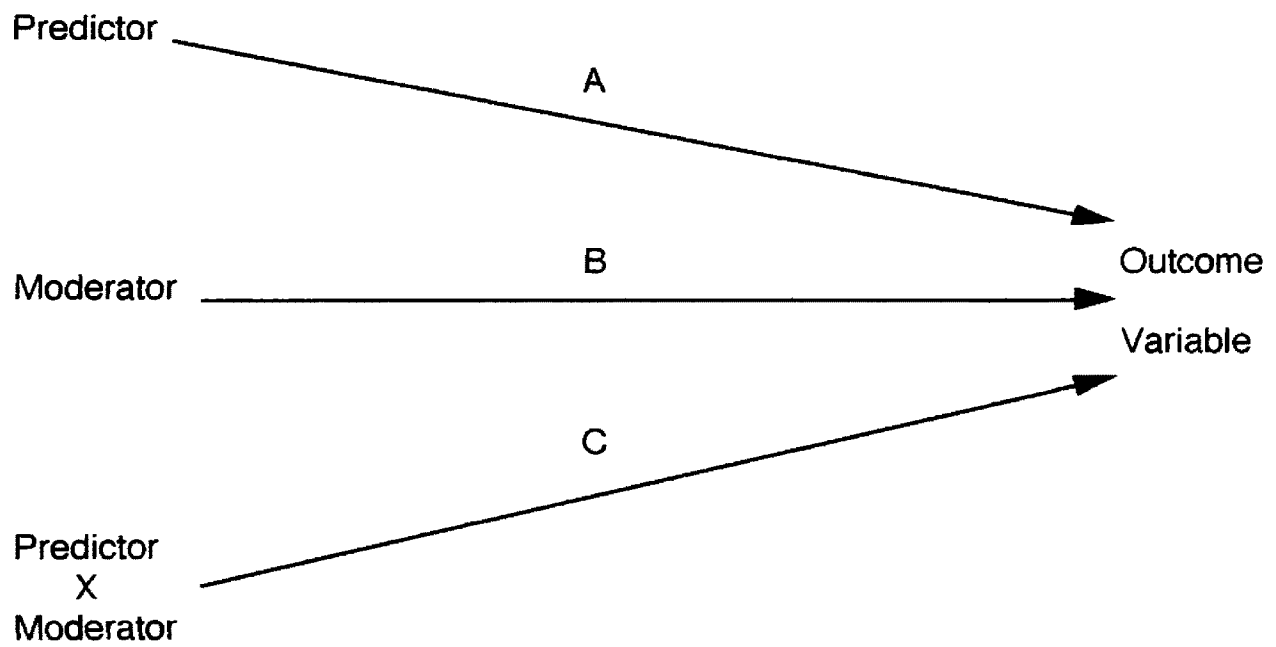
To address these matters, this study gathers data to construct and test a principle model that will look at the effects of Hardiness on prospective self-reported measurements of physical illness symptoms and psychological health. Furthermore, this principle model will include the relationship between

Hardiness and the hypothesized mediators of cognitive appraisal and coping strategies in predicting the self-reported physical and psychological health outcomes. The primary hypothesized model will be similar to Florian et al.'s (1995) hypothesized model, with the inclusion of a causal sequence between appraisal and coping strategies. Thus, I will first examine appraisal and coping strategies sequentially within their relationship to outcomes of physical illness symptoms and psychological health. Path analysis will be utilized to examine the hypothesized causal relationships between these variables and to compare alternative models of the relationships. Lastly, all these causal relationships will be tested while removing the common influence of Neuroticism from Hardiness.

The following are the hypotheses: 1) Hardiness will be negatively related to Physical Illness Symptoms and Psychological Distress, and positively related to symptoms of Psychological Well-Being (see Figure 4); 2) stressors will be buffered by Hardiness (as a moderator variable) on outcomes of Physical Illness Symptoms, Psychological Distress, and Psychological Well-Being (see Figure 5); 3) the effects of Hardiness will be mediated by decreased Threat Appraisal and Maladaptive Coping (i.e., avoidance, emotion-focused), as well as increased Adaptive Coping (i.e., approach, active, problem-focused) on outcomes of Physical Illness Symptoms, Psychological Distress, and Psychological Well-Being, (see Figure 6); and, 4) all of these relationships will remain substantially unchanged when the effects of Neuroticism are removed (see Figures 7, 8, 9).

Figure 1

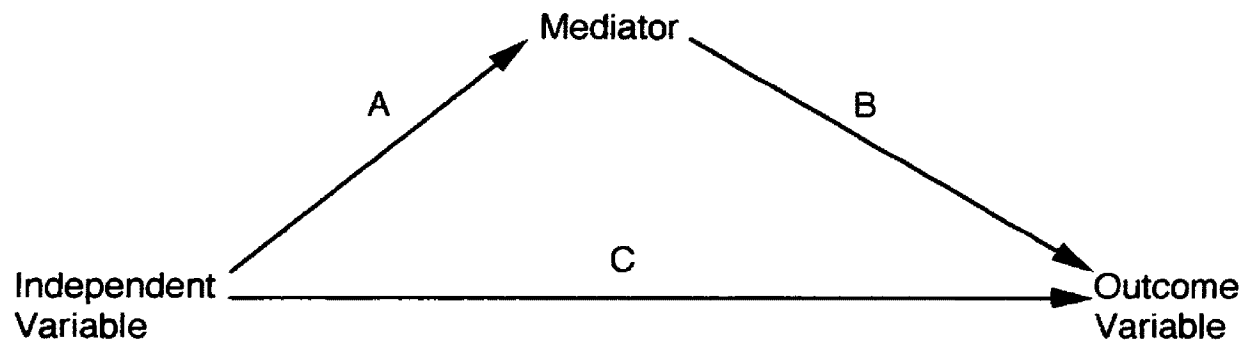
Moderator Model



(Baron & Kenny, 1986)

Figure 2

Mediator Model



(Baron & Kenny, 1986)

Figure 3

Path Model of Florian, Mikulincer, and Taubman (1995)
Hypothesized Mediators of Coping Strategies and Cognitive Appraisal

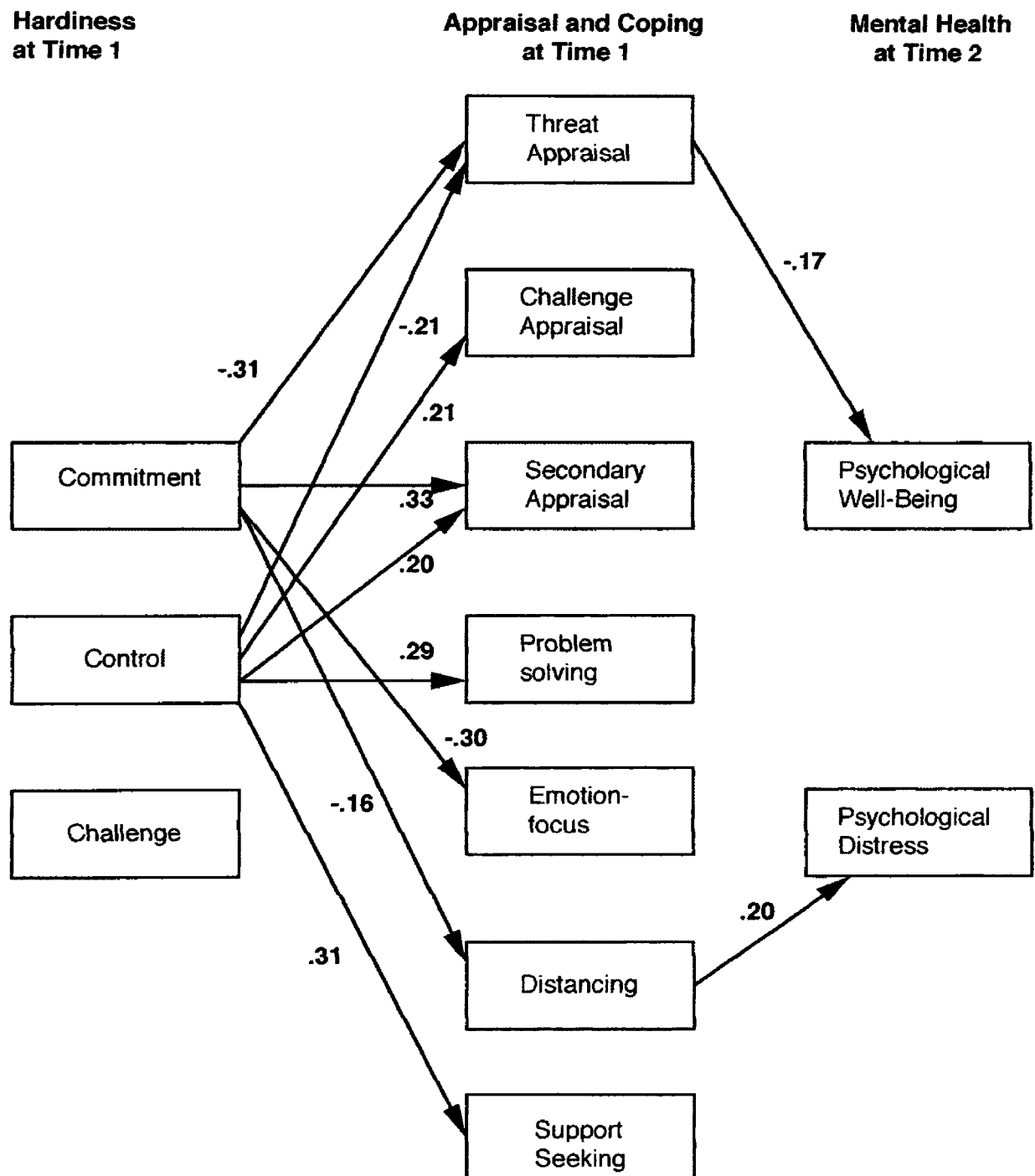


Figure 4

Path Model for Hypothesis 1
Main Effects of Hardiness

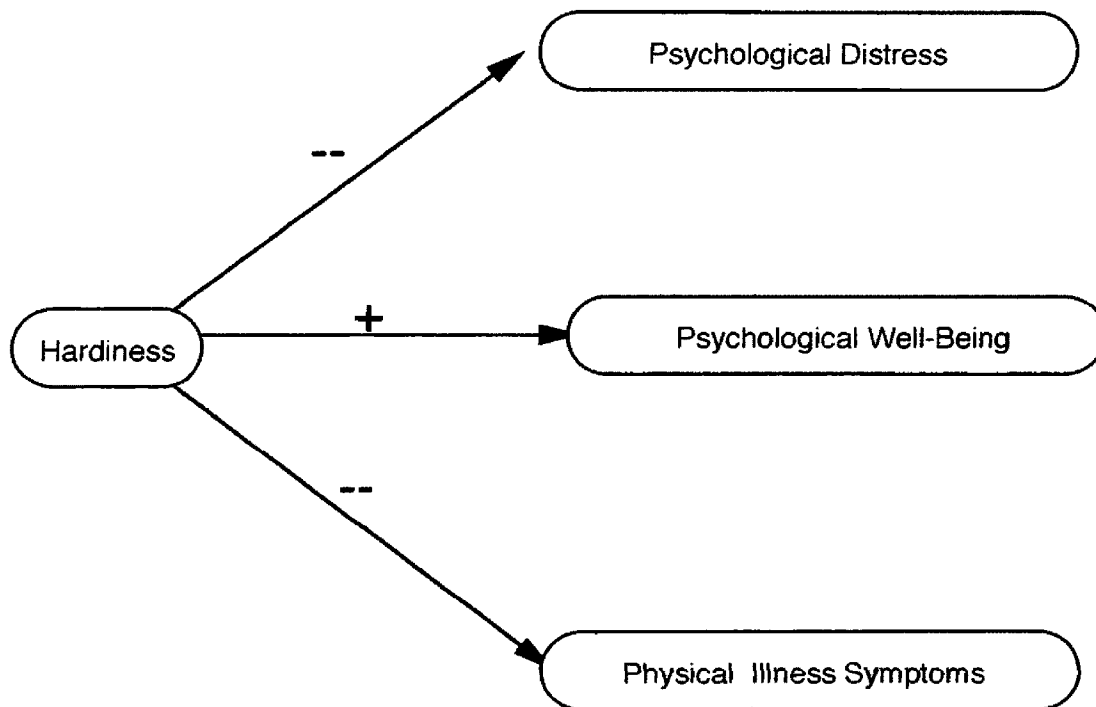


Figure 5

Path Model for Hypothesis 2:
Moderator Effects of Hardiness

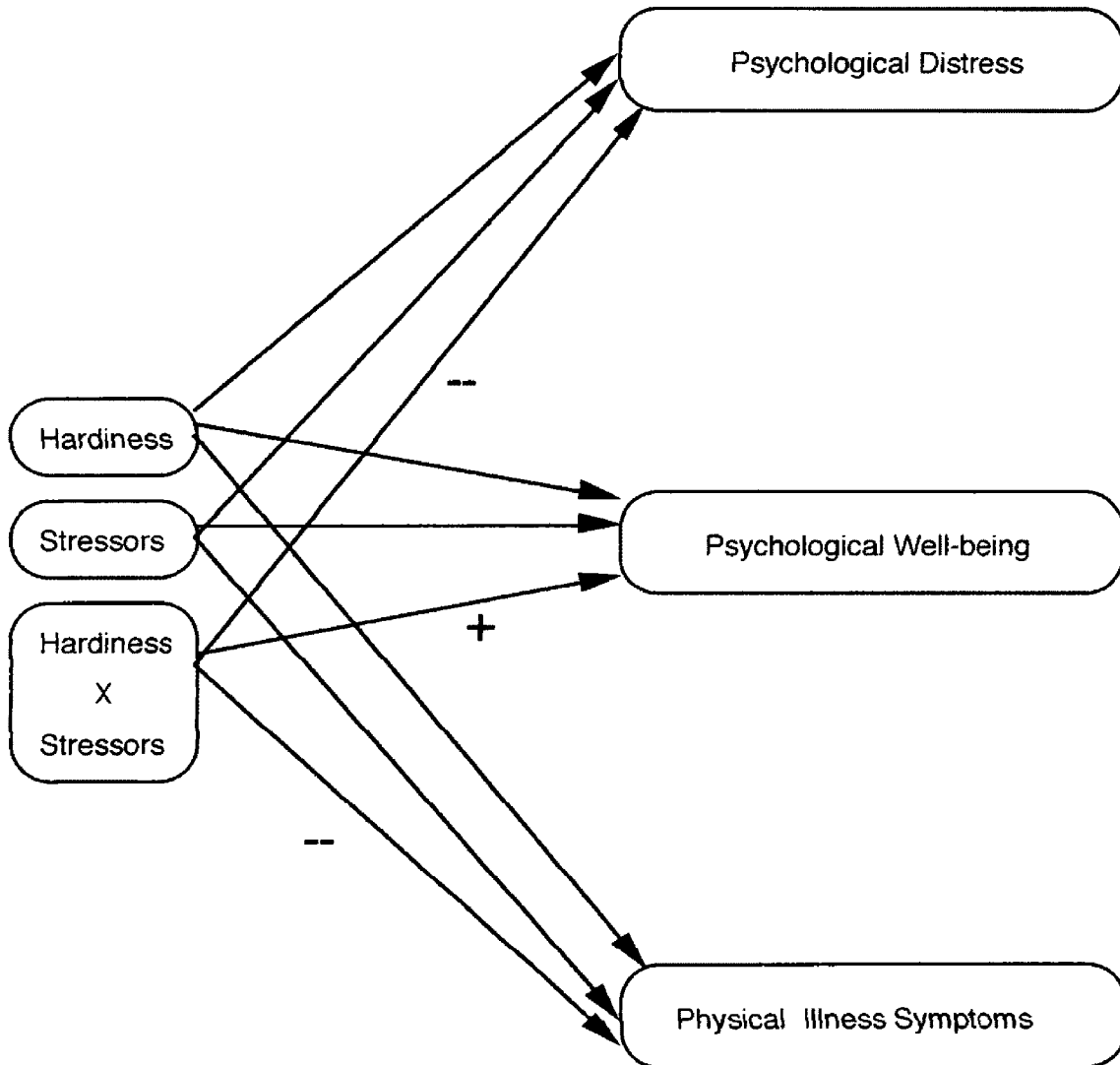


Figure 6
 Path Models for Hypothesis 3:
 Mediators of Coping Strategies and Cognitive Appraisal

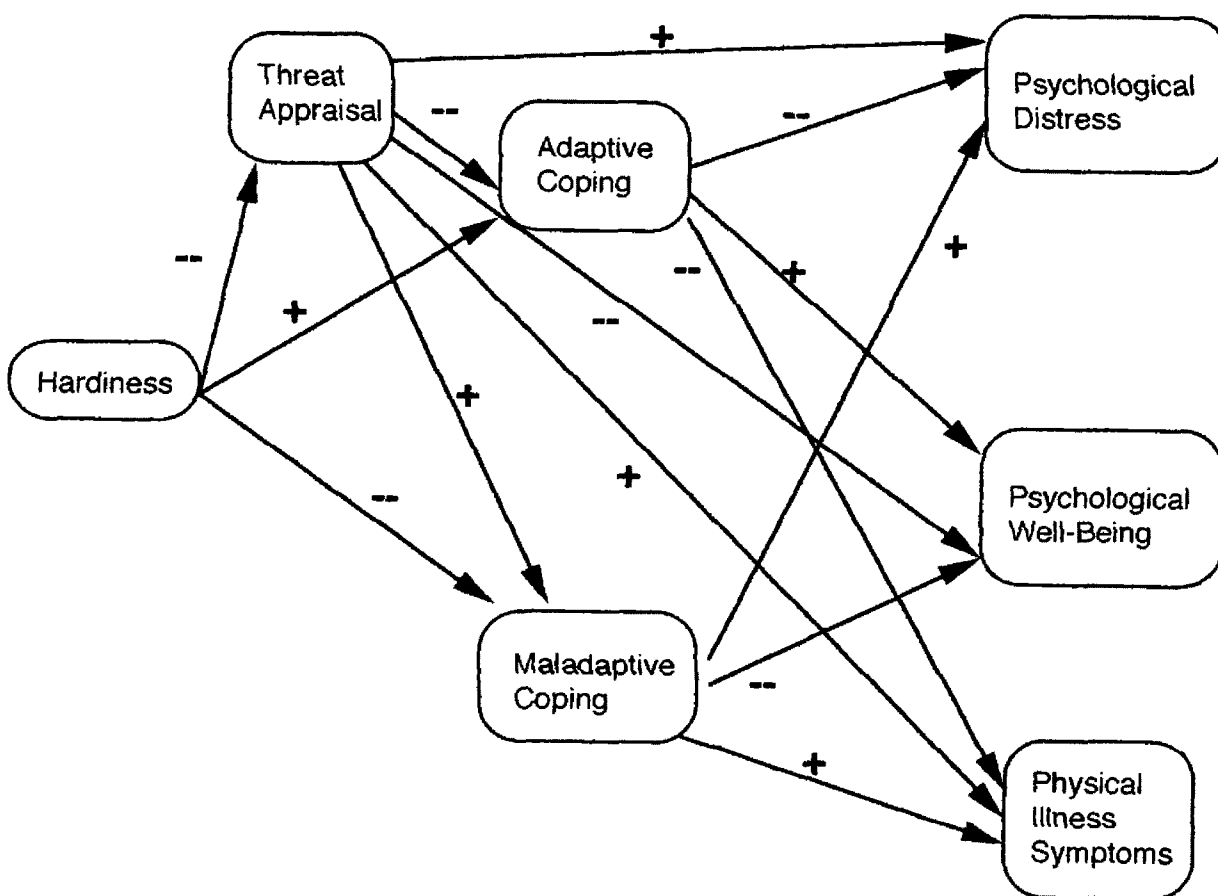


Figure 7

Path Models for Hypothesis 4:
Main Effects of Hardiness with Neuroticism Removed

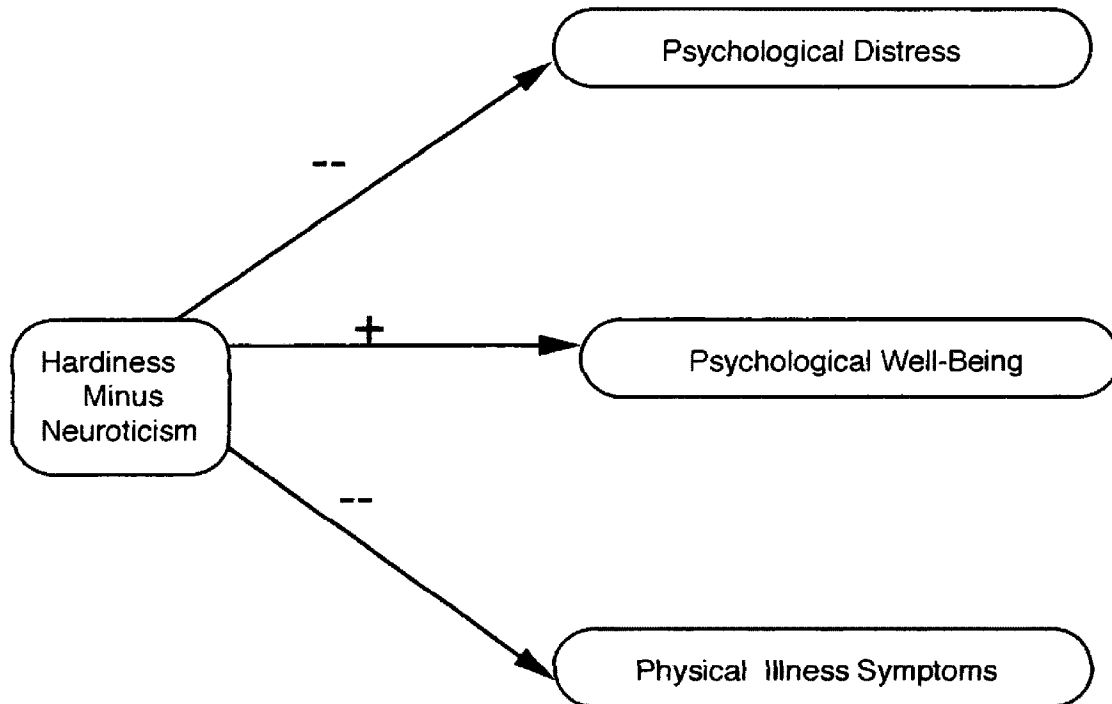


Figure 8

Path Models for Hypothesis 4:
Moderator Effects of Hardiness with Neuroticism Removed

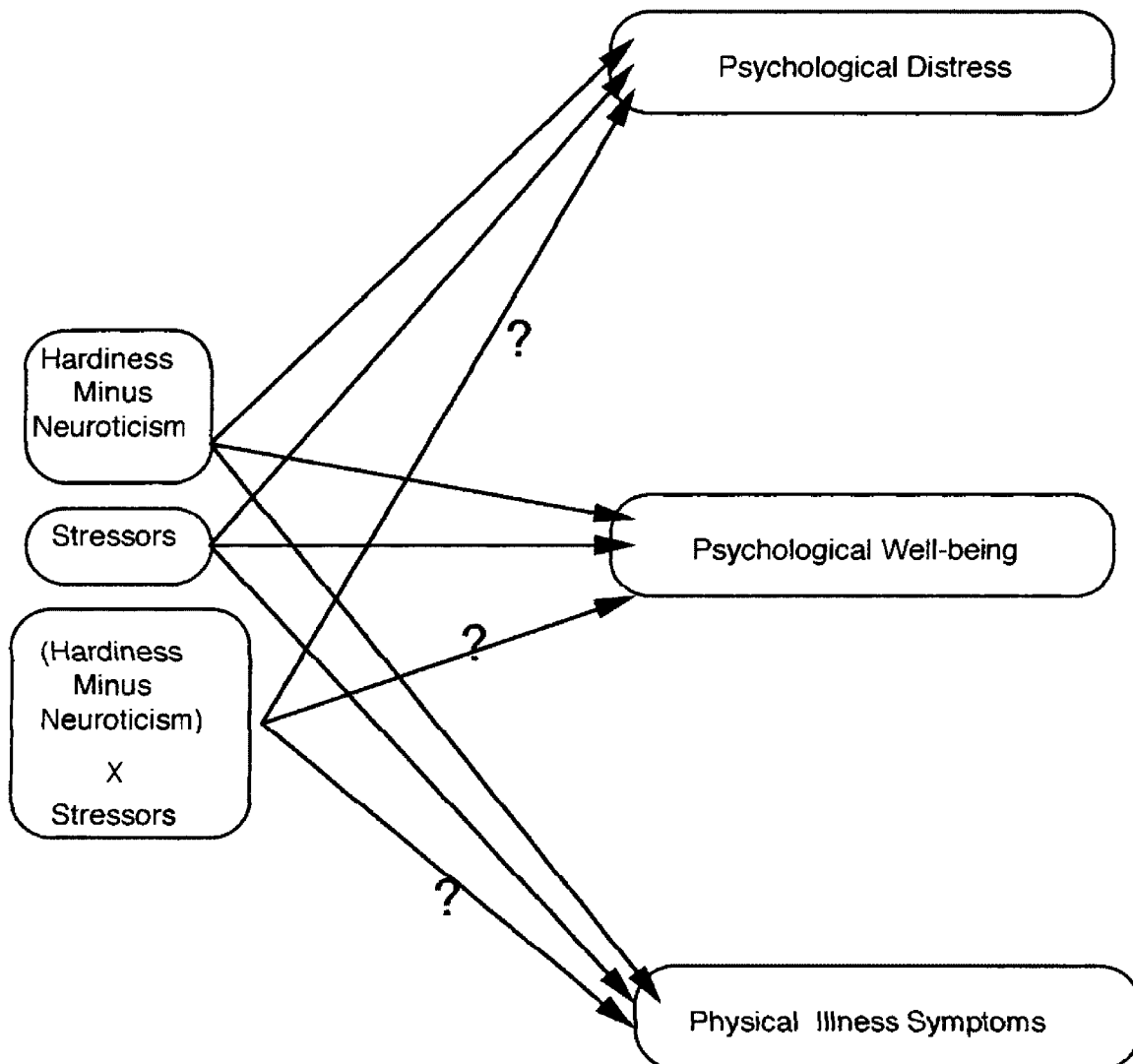
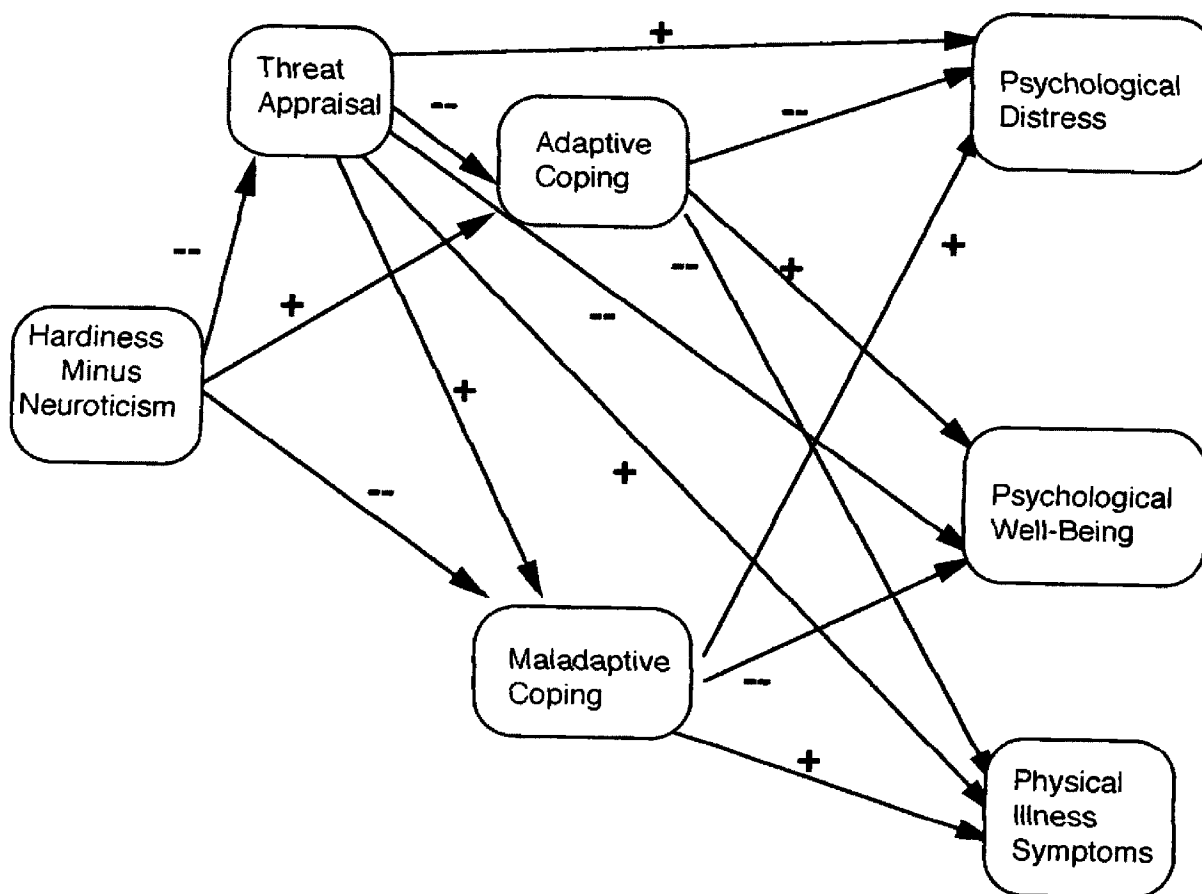


Figure 9

Path Models for Hypothesis 4:
Mediators of Coping Strategies and Cognitive Appraisal with Neuroticism
Removed



Chapter 2

Method

Participants

A total of 242 men and women initially began participating in this prospective study by completing the questionnaires at Time 1. All participants were undergraduates who were enrolled in the introductory psychology course at the University of Montana and received credit for their participation in this study. Of the 242 participants, 230 participants completed the study by handing in all necessary questionnaires during the course of the study and returning to complete the final questionnaires at Time 2. Thus the rate of attrition was only 5%. From this group of 230, the data of 9 participants was excluded as it was discovered that they systematically failed to complete either the Hardiness, appraisal, and coping measures properly (e.g., skipped all items on the back page of the Hardiness measure, skipped most or all items of appraisal and coping, circled all 1s for a particular measure, etc.), leaving a maximum total effective sample size of 221. Path analyses of the data were carried out by PRELIS 1.20 and LISREL 7.20, which employed listwise deletion of data with missing values to create an effective sample size that ranged from 181 to 221, depending upon the variables being analyzed.

A questionnaire gathering information concerning gender, age, and year in college was administered to the participants. The majority of the participants constituting the sample were predominately Caucasian and 148 (67%) of the participants were female, while 73 (33%) were male. The mean age of the participants was 20.9 years of age, with a range of 18 to 53 years of age. The mean year in college for the participants was 1.6 years. See Appendix A for the

demographic questionnaire.

Materials

Hardiness. Hardiness was measured by the third-generation Hardiness Scale known as the Personal Views Survey II (PVS-II; Hardiness Institute, 1994). The PVS-II has been adapted from the Personal Views Survey (PVS; Hardiness Institute, 1985, as cited in Funk, 1992) and the Dispositional Resilience Scale (DRS; Bartone et al., 1989). This measure was suggested by one of the authors of the original Hardiness scales (Maddi, personal communication, 4/9/97). The PVS-II purportedly addresses the problems regarding the measurement of the Challenge subcomponent. These problems seemed to stem from the use of items that had signified socioeconomic/insecurity for working adults but political conservatism/liberalism for undergraduates.

This self-report scale consists of 50-items that measure the 3 subscales of Control, Commitment, and Challenge to form a composite hardiness score. Each item is responded to by indicating responses on a scale ranging from complete disagreement (0) to complete agreement (3) with the item. The PVS-II indexes these scores positively (i.e., higher scores indicate higher hardiness), as opposed to the earlier hardiness measures that indexed the scores negatively. The PVS-II has been shown to correlate $-.93$ with the first generation hardiness scale, and $-.71$ when only the non-redundant items are used (Bartone et al., 1989).

The subscales measuring the 3 subcomponents correlate moderately with each other, as the intercorrelations between Challenge and Commitment, Challenge and Control, and Commitment and Control have been $.42$, $.43$, and

.68, respectively (Maddi & Khoshaba, 1994). Recent studies have obtained Cronbach's alphas of .84, .75, and .71 for the Control, Commitment, and Challenge scores and .88 for the Total Hardiness composite score (Bartone et al., 1989; Funk, 1992; Maddi, 1997; Maddi & Khoshaba, 1994), suggesting adequate internal consistency for at least the Total Hardiness composite score. Adequate stability has been demonstrated, with coefficients of .68 for Commitment, .73 for Control, .71 for Challenge, and .77 for Total Hardiness over an unspecified period of time (Maddi, 1997). See Appendix B for the Personal Views Scale-II.

Neuroticism. Neuroticism was measured by the 20-item Trait scale of the State-Trait Anxiety Inventory (Form Y) (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). A review of the literature concerning neuroticism, negative affectivity, and maladjustment suggests that the Trait Scale of the STAI is a valid measure of neuroticism (Watson & Clark, 1984; Watson & Pennebaker, 1989). The test-retest coefficients for the Trait scale have ranged from .73 to .86 for college students over an unspecified period of time, and Cronbach's alpha has ranged from .90 to .92 (Spielberger et al., 1983), suggesting adequate stability and internal consistency. Previous hardiness studies concerned with controlling for neuroticism have utilized this measurement of neuroticism (Allred & Smith, 1989; Williams et al., 1992). See Appendix C for the Trait Scale of the STAI.

Stressors. A modification of the Hassles Scale (Kanner, Coyne, Schaefer, & Lazarus, 1981) was used to measure the frequency of occurrence of a participant's objective stressors. Twelve items from the College Adjustment Rating Scale (Zitgow, 1984) were included because of their relevance to

college students. There has been much debate concerning the measurement of environmental stressors by life event scores or daily hassles, which are more minor events in comparison to major life events. The Hassles Scale measures negative minor events, and have been shown to be related to outcomes of psychological symptoms (Kanner et al., 1981), and physical symptoms (DeLongis, Coyne, Dakof, Folkman, & Lazarus, 1982).

The original Hassles Scale contains 117 items related to work, family, friends, health, the environment, and chance occurrences. Permission to modify the Hassles Scale was given to the author by the creators of the Hassles Scale (Folkman, personal communication, 7/16/97; Kanner, personal communication, 7/28/97). The Hassles Scale was modified in order to construct an instrument measuring the frequency of occurrence of objective stressors, rather than participants' subjective ratings of stress. It is the intent of this study to measure the number and/or frequency of objective "stressors" encountered by the participants, rather than measure their subjective ratings of feeling "stressed." Furthermore, several items seemed to be redundant within the original Hassles Scale.

Therefore, the Hassles Scale was modified essentially in three major ways: 1) by having the participant indicate the frequency of the occurrence of the particular hassle rather than the occurrence or lack of occurrence and severity of the particular hassle, 2) certain hassles that appeared redundant and subsumed by another particular hassle were deleted, and 3) hassles that were worded in such a way as to be confounded with subjectively "feeling hassled or stressed" were reworded in such a way as to indicate the past occurrence of a hassle as an objective stressor in the given time period. Again, 12 items from

the College Adjustment Rating Scale will be added to the modified Hassles Scale to form a total of 99 items. The participant's rating of severity for each hassle was dropped as well. The modified Hassles Score is simply the sum of the number of times each hassle occurred over the past 8 weeks. The developers of the scales stated that the test-retest correlations for the original Hassles Frequency average .79 over a month-to-month basis spanning 9-months. See Appendix D for the modified Hassles Scale.

Cognitive Appraisal. The Stress Questionnaire (Folkman & Lazarus, 1985, 1986, 1988) is a self-report instrument measuring cognitive appraisal, coping strategies, and emotions used to deal with stressors. Certain items were taken from the Stress Questionnaire to measure Primary Appraisal. In responding, participants were asked to think of an interpersonal situation that has been the "most stressful" for them for the previous two weeks, and to fill out the questions of the Stress Questionnaire for this situation.

Primary Appraisal is measured by taking 13 items from the Stress Questionnaire that describe what might be at stake for the participant in the stressful encounter. A factor analysis revealed two factors of Primary Appraisal, Threats to Self-Esteem and Threats to a Loved One, and four additional items that did not load on either of these two factors (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986). Factor analyses have demonstrated that the Threats to Self-Esteem scale had a "mean" alpha of .78 and the Threats to Loved Ones scale had a "mean" alpha of .76. The remaining 4 items are looked at individually. As these factors of Primary Appraisal all measure the degree of Threat that the situation poses to the participant, Primary Appraisal will be labeled as the latent variable Threat Appraisal within this study. See Appendix

E and F for the Stress Questionnaire and Primary Appraisal Questionnaire.

Coping Strategies. The 66-item Ways of Coping Questionnaire-Revised (Folkman & Lazarus, 1985; Folkman et al., 1986) was used to measure coping strategies that were utilized for the same stressful interpersonal situation indicated in the Stress Questionnaire. The items represent a broad range of coping strategies that people use to deal with internal and external demands of a stressful encounter. Participants rated how often each strategy was used (from 0=not used to 3=used a great deal) to deal with each stressful encounter. Factor analyses performed by the developers of the checklist have yielded two different sets of eight coping scales each, depending on the composition of the sample being analyzed (Folkman & Lazarus, 1985; Folkman et al., 1986). Therefore, there is a set of eight scales to be utilized when analyzing a community sample, and another set of eight scales to be utilized when analyzing a student sample. There have been criticisms of the Ways of Coping Questionnaire-Revised concerning the number of scales and the items composing those scales as well as questions concerning the psychometric properties of the questionnaire (Parker, Endler, & Bagby, 1993).

For the purpose of this study, the eight scales based on the student sample were used. Concerning these scales, the developers gave estimates of alpha equal to .88 for Problem-focused Coping, .86 for Wishful Thinking, .74 for Detachment, .82 for Seeking Social Support, .70 for Focusing on the Positive, .76 for Self Blame, .59 for Tension Reduction, and .65 for Keep to Self (Folkman & Lazarus, 1985). The Problem-focused Coping, Seeking Social Support, Focusing on the Positive, and Tension Reduction scales typically represent what has been called problem-focused, active, or approach coping strategies,

and thus were grouped together to form what will be termed hypothetically Adaptive Coping within this study. The Wishful Thinking, Detachment, Self Blame, and Keep to Self scales typically represent avoidance or emotion-focused coping strategies, and therefore will be termed as hypothetically Maladaptive Coping within this study.

A mean score for coping was calculated for each of the eight scales, ranging from 0 to 3 to reflect how often each scale seemed to be used by each participant. Total coping was calculated by summing each of the scores of the eight scales and dividing by the number of items on all the scales. Relative scores of coping, which give better descriptions of intraindividual coping styles, were calculated by looking at the ratio of the mean scale score to the total sum of all mean scale scores and is expressed as a percentage (Vitaliano, Maiuro, Russo, & Becker, 1987). Each coping scale expressed as a percentage represents the frequency with which the participants engage in a particular coping style. This method has been used in the other studies concerned with hardiness and coping (Florian et al., 1995; Williams et al., 1992). Therefore, these ratio scores for each subscale were used as the manifest variables of Adaptive and Maladaptive Coping. See Appendix G for the Ways of Coping Questionnaire-Revised.

Self-Reported Illness. Physical illness symptoms were measured by the Recent Physical Symptom Checklist (RPSC). This checklist was used as the physical illness symptom outcome in the studies by Williams et al. (1992) and Smith et al. (1992). This checklist surveys 88 common physical illness symptoms. Participants indicated the occurrence of a symptom, simply by checking those symptoms that have occurred over the specified time period,

and rated the severity of the symptom on a 5-point scale. On each of the 4 Recent Physical Symptom Checklists handed in by the participant, each covering a period of 2 weeks for a total prospective period of 8 weeks, the total score for that time period (i.e., RPSC 1, RPSC 2, etc.) was calculated by summing the severity ratings for the symptoms. Therefore, each of the 4 RPSC scores was a manifest variable of Physical Illness Symptoms. See Appendix H for the Recent Physical Symptom Checklist.

Psychological Health. Psychological health in terms of Psychological Distress and Psychological Well-Being was measured by the Mental Health Inventory (MHI; Veit & Ware, 1983). This inventory consists of 46 items that confirm or deny on a 5- or 6-point response scale the relevance of the question to the person's life for the past 2 weeks (e.g., 1=all of the time to 5 or 6=none of the time). Eight of the 46 items are similar in content and form a measure of a Socially Desirable Response Set (SDRS). As this study did not intend to address the SDRS in its analysis, these 8 items were deleted in order to shorten the MHI questionnaire. Analyses of the MHI score have shown that an underlying mental health factor can be defined in terms of either a bipolar model containing two higher order factors, namely Psychological Distress and Psychological Well-Being, or six subscales labeled Anxiety, Depression, Loss of Behavioral/Emotional Control, General Positive Affect, Emotional Ties, and Life Satisfaction (Veit & Ware, 1983).

The developers gave estimates of alpha equal to .92 for Psychological Well-Being (14 items), .94 for Psychological Distress (24 items), .90 for Anxiety (9 items), .86 for Depression (4 items), .83 for Loss of Behavioral/Emotional Control (9 items), .92 for General Positive Affect (10 items), and .81 for

Emotional Ties (2 items). The sixth subscale is labeled Life Satisfaction and is composed of 1 item (Veit & Ware, 1983). Test-retest coefficients ranged from .56 to .64 for a 1-year period (Veit & Ware, 1983). Three more items of the MHI were deleted due to their explicit inquiry concerning depression and suicide, as recommended by the Institutional Review Board (IRB). Therefore the final version of the MHI administered to the participants consisted of 35 items. See Appendix I for this version of the Mental Health Inventory.

Procedure

IRB approval was obtained before this study took place, requiring a few minor modifications that did not substantially change the originally proposed study. The final IRB Proposal (see Appendix K) required modifications of the study concerning the Informed Consent Form, Instructions at Time 1 and 2, the Debriefing Form, the procedure outlined in IRB Proposal concerning distribution of experimental credits, and deletions of 3 items from the MHI, (see Appendices J, L,M,N, K, and I). For the first part of the study, approximately 100 participants at each administration convened to fill out questionnaires in a large classroom. These administrations comprised Time 1, which occurred separately over 3 consecutive days. At each of the administrations during Time 1, the principal investigator, who was present at all data collection times, read aloud the Informed Consent Form and Instructions for Time 1 (see Appendices J and L), and participants completed the brief demographic questionnaire, the Personal Views Survey-II, Trait Scale of the State-Trait Anxiety Inventory, the Primary and Secondary Appraisal questionnaire, and the Ways of Coping Questionnaire-Revised. The time allotted to complete these forms was one hour, which was

quite sufficient.

8 weeks later at Time 2, the participants returned again approximately 100 at each separate administration over 3 consecutive days to complete the modified Hassles Scale and Mental Health Inventory (MHI). Again, the principal investigator was present at each administration and read aloud the Instructions for Time 2 (see Appendix M). Between Time 1 and Time 2, occurring every 2 weeks, participants handed in their Recent Physical Symptom Checklists for the previous 2-week time period to the principal investigator and his research team. This occurred 4 times, to create the final time period of 8 weeks. Since this study involved a prospective design, the participants were informed that should they agree to take part in the study and complete the forms at Time 1, they are required to return at Time 2 to receive the full amount of 6 experimental credits. Otherwise, they would only receive 2 experimental credits for completing the questionnaires at Time 1. This procedure was necessary to minimize attrition.

The nature of the content of some of the physical symptoms of the Recent Physical Symptom Checklist revealed by the participants warranted sensitivity and confidentiality on the part of the principal investigator and the research team. Furthermore, the principal investigator was a Psychology 100 Instructor and realized that some of his students would choose to participate in this study. The complications of a possible dual-role conflict needed to be addressed and precautions taken beforehand. The principal investigator devised a method for data collection that minimized attrition and incomplete data, while maximizing confidentiality almost to the point of anonymity.

The following is the method used: at Time 1, a master list of all participants of the study was collected, along with the last five digits of their

student identification numbers (Social Security Numbers), and local phone numbers. The use of this list will be elaborated on later. Participants then handed in their Recent Physical Symptom Checklist biweekly in a sealed envelope with only the last five digits of their student identification numbers on the outside of the envelope. These envelopes remained sealed until the end of the data collection period of 8 weeks. Participants that did not hand in envelopes containing their Recent Physical Symptom Checklist at the designated time were phoned, simply by matching the missing five digit student identification numbers with the participants' names and phone numbers. There were no redundancies of participants' five digit identification numbers seen during the collection of data.

At the end of the data collection period, each five digit student identification number was assigned a new arbitrary subject number (i.e., 1-230). Then the actual participant's five digit student identification number was deleted, with the new subject number being the only number entered into the computerized data base. The other members of the research team then summed the physical illness symptoms of the Recent Physical Symptom Checklist to get the total scores for each new subject number, and then entered these scores into the data file, thus not allowing any student's name or identification number to be associated with any particular revealed symptom or to the data file. Therefore, the primary investigator did not have any of his students associated with any particular symptom either.

The use of the participants' last five digits of their student identification number for collection during the 8 weeks was chosen because it seemed easiest for each participant to remember over the full time period of 8 weeks,

rather than an arbitrarily assigned subject number. The logistics of handling 230 participants' packets and envelopes of data were foreseen to be complex, and having participants remember such a subject number would have been difficult, and if any participants should have forgotten their number, it would have severely complicated the data collection process for the principal investigator.

Both at the initial testing period as well as at the conclusion of the study, participants were given referrals to the Student Health Services, Counseling and Psychological Services, and the Clinical Psychology Center and their respective phone numbers, as well as the principal investigator's phone number, if for any reason they felt uncomfortable or that their health status needed to be addressed by a health professional. Also, at the conclusion of the study (Time 2), a Debriefing form that informed participants of the purpose of the study and how to contact the principal investigator for the results of the study was given to each participant. See Appendix N for the Debriefing After Study Form.

Chapter 3

Results

As stated previously, 230 participants completed all the necessary measurements at Time 1 and Time 2. Several days after the conclusion of the data collection, the raw data packets collected at Times 1 and 2 and the four sealed envelopes of the Recent Physical Illness Checklists (RPSCs) were sorted by the research team by using the last 5 digits of each participant's student identification number to produce a final, complete data packet for each of the 230 participants. The 5 digit numbers associated with each of these complete data packets were destroyed by using a permanent marker. After these numbers were destroyed, the complete packets were then randomly assigned a new subject number that would be associated with each data packet (i.e., 1-230). Again, this was done to assure that no data would be associated with a participant's last 5 digits of their subject number or their name. While this was being done, the 4 RPSCs for each participant were summed and the scores were placed on each of them.

At this time, it also became apparent by visual inspection that the modified Hassles Scale was inadequate for measuring the frequency and occurrence of stressors during the study, as the frequencies for some of the individual items ranged roughly from 0 to upwards of 10,000, providing an extremely skewed distribution that resisted transformation to anything approaching normality. Therefore, the Hassles Scale was not scored for the participants, and the hypotheses concerning the interaction between Stressors and Hardiness were dropped from further consideration.

Next, the demographic data items, all the raw data items for each questionnaire (i.e., MHI, STAI, PVS-II, Primary Appraisal, WOC-R), and the

scores of the 4 RPSCs for each participant were entered into computer data file by the three research assistants. In order to assure clean, accurate, and reliable data entry, each participant's row of data was examined and checked by the principal investigator and research assistants using the original complete raw data packet at a later time. Thus, data entry errors were easily identified and corrected. After all the item data was verified and/or corrected, the scales of each questionnaire were computer scored, and these scores were added to the data file.

The Hardiness (PVS-II) items had to be reentered and scored separately using the software provided by the Hardiness Institute. These items were checked with the Hardiness (PVS-II) items already in the original data file, and no data entry errors were found, and the scores for the Hardiness subscales of Challenge, Control, and Commitment were then added to the data file. In addition to calculating these subscale scores, Neuroticism was covaried out of these scores and the resulting residuals were also stored in the data file and labeled Challenge Minus Neuroticism, Control Minus Neuroticism, and Commitment Minus Neuroticism. These scores represented that respective component of Hardiness that is linearly independent of the effects of Neuroticism.

Of the data collected from the 230 participants, the data of 9 participants were excluded as it was discovered that these participants systematically failed to complete either the Hardiness (PVS-II), the Primary Appraisal, or the Ways of Coping-Revised measures properly (e.g., skipped all items on the back page of the PVS-II, skipped most or all items of Primary Appraisal and Ways of Coping-Revised, circled all 1s for a particular measure, etc.), leaving a maximum total

effective sample size of 221. The final data file was transferred to SPSS, and PRELIS 1.20 and LISREL 7.20 were used to begin analysis of the data.

Preliminary Analyses

Preliminary analysis of the data was carried out by PRELIS 1.20, which engaged in listwise deletion of data with missing values to create an effective sample size that ranged from 181 to 221, depending upon the variables being analyzed. The mean, standard deviation, minimum, and maximum values for each of the variables is given in Table 1.

The table of Pearson correlations between the variables is presented in Table 2. In looking at this table, there appear to be several interesting findings. The three Hardiness components of Challenge, Control, and Commitment are differentially intercorrelated. While they are all significantly intercorrelated at least at the .05 level, the correlation between Control and Commitment is higher ($r = .58, p < .01$) than the correlation between Challenge and the two other components ($r = .16$ for Control and $r = .16$ for Commitment; $p < .05$). Furthermore, Challenge does not seem to be as strongly related to the various scales for Coping, Psychological Distress, Psychological Well-Being, and Physical Illness Symptoms as Control and Commitment are. However, Challenge does seem to be more strongly related to several of the Appraisal scales.

Structural Analyses

The overall goodness of fit between the hypothesized mediational model of the latent variables presented in Figure 6 and the actual data collected in this study was analyzed by using the PC version of LISREL 7.20. The analysis was based on the Pearson correlations between the manifest variables presented in

Table 2. Many structural models were tested before arriving at the final few models that best fit the actual data. The starting point of the analyses will be presented and a progression of the results of various analyses and models will then follow, presented in varying detail. For the most part, each of these path models was separately tested using both Hardiness and its complement, Hardiness with Neuroticism removed (Hardiness Minus Neuroticism), as the upstream variables. Thus, the progression of the first half of the structural analyses occurred along two parallel but related lines of thought: with Hardiness as one upstream variable and Hardiness Minus Neuroticism as the other upstream variable.

The results of the first structural analyses can be seen in Figures 10 and 11 (see also Table 3). The results of these tested models produced low adjusted goodness of fit indices (AGFI=.679 for Hardiness; AGFI=.719 for Hardiness Minus Neuroticism) and indicated that serious problems were encountered during the iterative process of minimization (i.e., minimizing the differences between the expected and observed correlation matrices), as the solutions for the path values between the variables were inadmissible (i.e., Psi matrix was not positive definite for both models). There is an important difference between these models (Figures 10 and 11) and the hypothesized model (Figure 6): the direct paths or causal arrows between Hardiness and Physical Illness Symptoms, Psychological Distress, and Psychological Well-Being in Figures 10 and 11 are not present in Figure 6. This difference resulted from an error in the syntax command file regarding the parameter specifications of the Gamma matrix in the LISREL 7.20 program.

At the time of the analyses of the different models, the solution to this

error was not readily apparent; and the analyses continued with these paths within the models for several reasons. One reason was that these models served as the alternative models to the mediational models that were originally hypothesized, and they were going to be compared with the mediational models regardless. Secondly, the fact that these paths were present within the models did not nullify the analyses in any way, as changes within the models were based primarily on changing the measurement and/or structural models and examining the effects that such changes produced in the goodness of fit indices. Because the direct paths between Hardiness and Physical Illness Symptoms, Psychological Distress, and Psychological Well-Being were kept constant, any changes made based on these changes would likely be reproduced again when testing models without these paths. The primary researcher found out how to correct the error by consulting the LISREL 7.20 manual, which indicated the proper parameter specifications for the Gamma matrix which would remove these direct paths, and the analyses proceeded with these specifications in mind.

Hypotheses concerning what might increase the goodness of fit and remove the minimization problems and inadmissible path value solutions were generated upon further examination of the intercorrelations between the manifest variables (Table 2) and tested by trial and error analyses of the data using LISREL 7.20. It became evident that the removal of Challenge, Tension Reduction, Primary Appraisal 6, Seeking Social Support, and Self Blame as manifest variables of the measurement model of the latent variables consistently resulted in increases within the goodness of fit indices of the models (AGFI=.817 for Hardiness; AGFI=.816 for Hardiness Minus Neuroticism).

However, problems concerning the Psi and Theta Delta matrices not being positive definite were consistently present, again representing inadmissible path value solutions. Therefore, from this point forward, the analyses were predominately conducted on models that examined Hardiness as the upstream variable, while neglecting to examine similar models with Hardiness Minus Neuroticism because of the consistent problems with the Theta Delta matrix not being positive definite, most likely due to restricted variability and negative residuals.

The next models examined the effects of removing different combinations of the causal sequences between Threat Appraisal and Adaptive and Maladaptive Coping, while also removing the latent variables of Adaptive Coping, Maladaptive Coping, Psychological Distress, and Psychological Well-Being entirely, which yielded some enlightening results that suggested new path models to test. A model that collapsed Psychological Distress and Psychological Well-Being into a unitary latent variable of Psychological Health measured by the same six manifest variables resulted in a reduction in the goodness of fit index while still maintaining the same problem with the Psi matrix not being positive definite.

At this time the aforementioned error in the syntax command file was corrected, and the more recent models were then tested with correct parameter specifications of the Gamma matrix. Again, the models that had been tested without this correction were not reanalyzed for the reasons stated previously. Furthermore, the additional removal of Keep to Self and of the entire latent variables of Primary Appraisal and Psychological Well-Being substantially increased the goodness of fit of the models (AGFI=.901). However, the Psi

matrix was still not positive definite. This intermediate model can be seen in Figure 12. At this point, the next several models examined changes in the goodness of fit indices when different combinations of causal sequences (i.e., Gamma paths) between Hardiness and Physical Illness Symptoms and Psychological Distress were either added or removed, while at the same time either keeping constant, adding, or removing different combinations of the causal sequences (i.e., Beta paths) between Adaptive and Maladaptive Coping and Physical Illness Symptoms and Psychological Distress. A few of these resulting models had their AGFI=.910, but still had a problem with the Psi matrix not being positive definite.

Then further examination of the correlations between the manifest variables suggested that the consistent problem with the Psi matrix could possibly be solved by collapsing Adaptive and Maladaptive Coping into a unitary latent variable of Coping. When this was done, the resulting model had a reduced goodness of fit index (AGFI=.863) and admissible path value solutions. It was discovered through trial and error analyses that by simplifying the new Coping variable, which ultimately resulted in its equivalence to Adaptive Coping, as measured by the Problem-focused Coping scale and Focusing on the Positive, the adjusted goodness of fit index increased to its overall highest level of .928. When conducting similar analyses with solely Maladaptive Coping measured by Wishful Thinking and Detachment as the coping variable, the goodness of fit index was reduced (AGFI=.915). While using Adaptive Coping as the coping variable and keeping the measurement model constant, several alternative structural models were tested, resulting in several models with an equal, relative maximum adjusted goodness of fit index

of .928. Furthermore, these models were analyzed with the addition of Threat Appraisal, Psychological Well-Being, and/or creating Psychological Health again, all of which reduced the goodness of fit indices.

The models presented in Figures 13, 14, 15, and 16 are the resulting models with the highest goodness of fit indices attained during the structural analyses of this study (GFI=.959; AGFI=.928), and are pertinent to the third hypothesis regarding the hypothesized mediators of Hardiness' effects on outcomes of self-reported psychological and physical health. Each of these models, though different structurally, produced the same nonsignificant chi-square statistic ($\chi^2=49.16$; $df=38$; $p=.106$) and a root mean square residual of .035. In path analysis, nonsignificance of the chi-square statistic is desired as it means that there is not a significant difference between the observed correlation matrix and the expected correlation matrix, suggesting that the path model fits or can be constructed from the observed data. Within each of these models, the path values between the latent variables and their respective manifest variables, as well as between the latent variables themselves, represent the standardized solutions computed by LISREL 7.20 during minimization. The measurement model is the same for all the models depicted in Figures 13-16, and LISREL yielded path values from the latent variables to their respective manifest variables that ranged from .22 to .96. All of these path values but one were significant at the .01 level, with the exception being the loading of Adaptive Coping on Focusing on the Positive, which was significant at the .05 level.

Looking at the models individually, the model in Figure 13 produced a structural model that produced significant path values between the latent

variables that ranged from $-.74$ to $.82$ ($p < .01$). Furthermore, the structural models in Figures 14, 15, and 16 produced path values ranging from $-.74$ to $.82$ ($p < .01$), $-.60$ to $.82$ ($p < .01$), and $-.60$ to $.82$ ($p < .01$), respectively.

A result of these models also pertinent to the first hypothesis of this study concerning Hardiness' main effects on outcomes of self-reported psychological and physical health, is the resulting model shown in Figure 17. This model yielded path values within the measurement model that ranged from $.62$ to $.92$ ($p < .01$) and path values within the structural model that ranged from $-.58$ to $.63$ ($p < .01$).

Models pertaining to the fourth hypothesis regarding Hardiness' effects independent of Neuroticism were not presented in any of the above cited figures, as no admissible standardized solution was produced by LISREL 7.20. This was due to the Theta Delta matrix not being positive definite as a result of the significant reduction in variability of each Hardiness subscale that resulted from covarying Neuroticism out of each subscale. Therefore, every model with Hardiness Minus Neuroticism as the upstream variable failed to provide an admissible solution to the examination of the fit between the hypothesized models and the actual data collected by this study.

Table 1
Mean, Standard Deviation, Minimum and Maximum Value for Manifest Variables and Demographic Variables (n=186)

Variable (Instrument)	Standard			
	Mean	Deviation	Minimum	Maximum
Challenge (PVS-II)	27.67	4.65	16	37
Control (PVS-II)	34.36	4.16	17	42
Commitment (PVS-II)	34.91	4.61	18	45
Neuroticism (STAI)	35.74	8.54	20	66
Challenge Minus Neuroticism	0.02	4.45	-11.78	9.05
Control Minus Neuroticism	-0.03	3.52	-10.81	8.27
Commitment Minus Neuroticism	-0.02	3.66	-10.48	8.47
Primary Appraisal 1 (Stress Questionnaire)	15.07	6.57	6	30
Primary Appraisal 2 (Stress Questionnaire)	7.35	4	3	15
Primary Appraisal 3 (Stress Questionnaire)	2.2	1.48	1	5
Primary Appraisal 4 (Stress Questionnaire)	1.97	1.44	1	5
Primary Appraisal 5 (Stress Questionnaire)	1.97	1.46	1	5
Primary Appraisal 6 (Stress Questionnaire)	2.64	1.54	1	5
Problem-focused Coping (WOC-R)	0.3	0.1	0.05	0.7
Seeking Social Support (WOC-R)	0.2	0.09	0	0.5
Focusing on the Positive (WOC-R)	0.1	0.06	0	0.33
Tension Reduction (WOC-R)	0.05	0.04	0	0.16
Wishful Thinking (WOC-R)	0.12	0.08	0	0.32
Detachment (WOC-R)	0.12	0.08	0	0.45
Self Blame (WOC-R)	0.06	0.05	0	0.25
Anxiety (MHI)	23.77	6.74	10	47
Depression (MHI)	7.61	2.69	3	15
Loss of Behavioral/Emotional Control (MHI)	16.21	5.2	7	35
General Positive Attitude (MHI)	37.76	7.94	20	54
Emotional Ties (MHI)	8.2	2.72	2	12
Life Satisfaction (MHI)	4.17	0.99	2	6
Recent Physical Symptoms Checklist 1	44.02	37.48	0	251
Recent Physical Symptoms Checklist 2	37.93	30.38	0	165
Recent Physical Symptoms Checklist 3	37.41	31.81	0	210
Recent Physical Symptoms Checklist 4	37.9	30.51	0	176
Age (Years)	20.94	4.92	18	53
Year in College	1.56	0.87	1	4
Gender (1= Male, 2=Female)	1.67	0.47	1	2

Table 2 Pearson Correlations Among Manifest Variables Measuring Latent Variables and Demographic Variables (n=186)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 Chall.	-															
2 Cont.	0.16 *	-														
3 Comm.	0.16 *	0.58 **	-													
4 Neurot.	-0.29 **	0.53 **	-0.61 **	-												
5 1 Minus 4	0.95 **	0	-0.03	0.02	-											
6 2 Minus 4	0.01	0.85 **	0.31 **	0.01	0.01	-										
7 3 Minus 4	-0.02	0.32 **	0.8 **	0.01	-0.03	0.37 **	-									
8 Prim. App. 1	-0.19 **	-0.17 *	0	0.18 *	-0.14	-0.08	0.13	-								
9 Prim. App. 2	-0.07	-0.06	0.05	0.02	-0.07	-0.06	0.07	0.4 **	-							
10 Prim. App. 3	-0.12	0.05	0.12	-0.05	-0.14	0.03	0.12	0.45 **	0.43 **	-						
11 Prim. App. 4	-0.02	-0.08	0.11	0.05	-0.01	-0.07	0.17 *	0.37 **	0.19 **	0.43 **	-					
12 Prim. App. 5	-0.17 *	0.06	0.08	0.04	-0.17 *	0.09	0.13	0.27 **	0.19 **	0.25 **	0.43 **	-				
13 Prim. App. 6	0.06	-0.09	-0.02	-0.02	0.06	-0.12	-0.04	0.22 **	0.07	0.28 **	0.12	-0.02	-			
14 Prob.-foc. Cop	0.01	0.32 **	0.17 *	-0.26 **	-0.07	0.22 **	0.01	-0.13	-0.07	0	-0.05	0.03	-0.02	-		
15 Sk. Soc. Supp.	0.14	0.23 **	0.23 **	-0.1	0.12	0.21 **	0.21 **	0.07	0.11	-0.02	0	0.01	0.08	-0.03	-	
16 Foc. Pos.	0.14	0.07	0.13	-0.15 *	0.1	-0.01	0.05	-0.08	0.1	-0.07	0	-0.05	-0.19 **	0.08	-0.08	-
17 Tens. Red.	-0.03	-0.02	0.11	0.01	-0.03	-0.02	0.15 *	0.08	-0.05	0.03	0.09	0.06	-0.06	-0.22 **	0.13	-0.05
18 Wish. Think.	-0.19 **	-0.17 *	-0.26 **	0.27 **	-0.12	-0.04	-0.13	0.16 *	0.17 *	0.1	-0.02	0.02	0.17 *	-0.42 **	-0.21 **	-0.33 **
19 Detach.	0.02	-0.27 **	-0.22 **	0.07	0.04	-0.27 **	-0.22 **	-0.07	-0.12	-0.06	-0.09	-0.18 *	0.02	-0.41 **	-0.47 **	-0.28 **
20 Self Blame	-0.14	-0.17 *	-0.1	0.19 **	-0.08	-0.08	0.01	0.25 **	-0.15 *	0.01	0.14	0.15	-0.15 *	-0.2	**	-0.26 **
21 Keep to Self	-0.01	-0.32 **	-0.2	0.18 **	0.05	-0.27 **	-0.11	0.05	-0.1	0.01	0.08	0.02	0.05	-0.4	**	-0.44 **
22 Anxiety	-0.24 **	-0.37 **	-0.4 **	0.59 **	-0.06	-0.08	-0.05	0.12	0.08	0.03	0.07	0.01	0.08	-0.2	**	-0.02
23 Depression	-0.09	-0.31 **	-0.4 **	0.54 **	0.08	-0.04	-0.1	0.13	0.13	0.04	0.05	0.01	0.05	-0.23 **	-0.05	-0.14 *
24 L. B./E. Cont.	0.18 *	-0.44 **	-0.45 **	0.62 **	0.01	-0.14	-0.1	0.14	0.11	0.04	0.09	0.04	0.08	-0.26 **	-0.01	-0.16 *
25 Gen. Pos. Att.	0.17 *	0.33 **	0.49 **	-0.64 **	-0.03	0	0.13	-0.11	0	0.01	-0.04	-0.05	-0.12	0.17 *	0.06	0.19 **
26 Emrot. Ties	0.02	0.29 **	0.41 **	-0.42 **	-0.11	0.08	0.19 **	0	0.1	-0.03	0.01	-0.08	-0.08	0.19 **	0.09	0.06
27 Life Sat.	0.08	0.24 **	0.4 **	-0.52 **	-0.08	-0.03	0.1	-0.04	0.05	0.02	-0.06	0.02	-0.07	0.12	0.02	0.16 *
28 RPSC 1	-0.12	-0.21 **	-0.23 **	0.29 **	-0.03	-0.07	-0.07	-0.01	0.01	-0.01	0.02	0.07	0.05	-0.11	-0.01	-0.08
29 RPSC 2	-0.13	-0.28 **	-0.27 **	0.33 **	-0.03	-0.12	-0.09	0.07	0.09	0.02	0.13	0.09	0.03	-0.08	-0.01	-0.04
30 RPSC 3	-0.1	-0.25 **	-0.26 **	0.28 **	-0.02	-0.12	-0.12	0.01	0.05	0.01	0.04	0.04	0.05	-0.05	-0.03	-0.06
31 RPSC 4	-0.10.	-0.32 **	-0.21 **	0.34 **	0.01	-0.17 *	0	0.12	0.11	0.01	0.12	0.17 *	0.05	-0.12	-0.03	-0.03
32 Age	0.05	0	0.04	0.05	0.07	0.04	0.09	0.11	-0.08	0.02	0.24 **	0.08	0.03	0.08	0.01	-0.04
33 Year	0.05	0.07	0.1	-0.11	0.02	0.02	0.04	-0.03	-0.03	0	0.12	0.08	-0.05	0.18 *	0.03	-0.02
34 Gender	0.11	-0.05	0.16 *	0.04	0.13	-0.03	0.23 **	-0.1	-0.03	-0.1	-0.06	-0.07	0.06	-0.17 *	0.21 **	0.05

* p < .05, 2-tailed
** p < .01, 2-tailed

Table 2 Continued Pearson Correlations Among Manifest Variables Measuring Latent Variables and Demographic Variables ($n=186$)

17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
-																	
-0.12	-																
0.11	0.06	-															
-0.04	-0.05	-0.05	-														
0.05	0.13	0.43 **	0.09	-													
0.12	0.21 **	0.08	0.11	0.04	-												
0.13	0.15 *	0.11	0.07	0.16 *	0.69 **	-											
0.17 *	0.2 **	0.1	0.05	0.11	0.73 **	0.82 **	-										
0.02	-0.21 *	-0.11	-0.05	-0.18 *	-0.64 **	-0.71 **	-0.67 **	-									
-0.07	0.01	-0.22 **	-0.06	-0.22 **	-0.31 **	-0.49 **	-0.45 **	0.5 **	-								
-0.02	-0.13	-0.07	0.03	-0.15 *	-0.51 **	-0.65 **	-0.62 **	0.7 **	0.49 **	-							
0.14	0.08	0.03	0.04	0.01	0.38 **	0.32 **	0.37 **	-0.16 *	-0.18 **	-0.15 *	-						
0.08	0.18 *	-0.1	0.1	-0.09	0.34 **	0.26 **	0.34 **	-0.2 **	-0.11	-0.12	0.68 **	-					
0.09	0.15 *	-0.03	0.04	-0.07	0.36 **	0.32 **	0.4 **	-0.2 **	-0.12	-0.17 *	0.72 **	0.68 **	-				
0.15 *	0.16 *	-0.1	0.1	-0.1	0.42 **	0.36 **	0.45 **	-0.23 **	-0.15 *	-0.23 **	0.64 **	0.66 **	0.74 **	-			
-0.04	-0.06	0	0.03	0	-0.02	-0.03	-0.04	-0.05	-0.11	-0.13	-0.13	-0.03	-0.13	0.01	-		
-0.03	-0.16 *	0.01	-0.06	-0.06	-0.09	-0.11	-0.09	0.06	0.08	-0.01	-0.02	-0.04	-0.09	-0.03	0.33 **	-	
0.06	0.04	-0.11	-0.04	-0.05	0.15 *	0.03	0.12	-0.06	0.2	-0.04	0.13	0.17 *	0.12	0.15 *	-0.06	-0.03	-

* $p < .05$, 2-tailed** $p < .01$, 2-tailed

Figure 10
Initial Path Model with Hardiness as the Upstream Variable

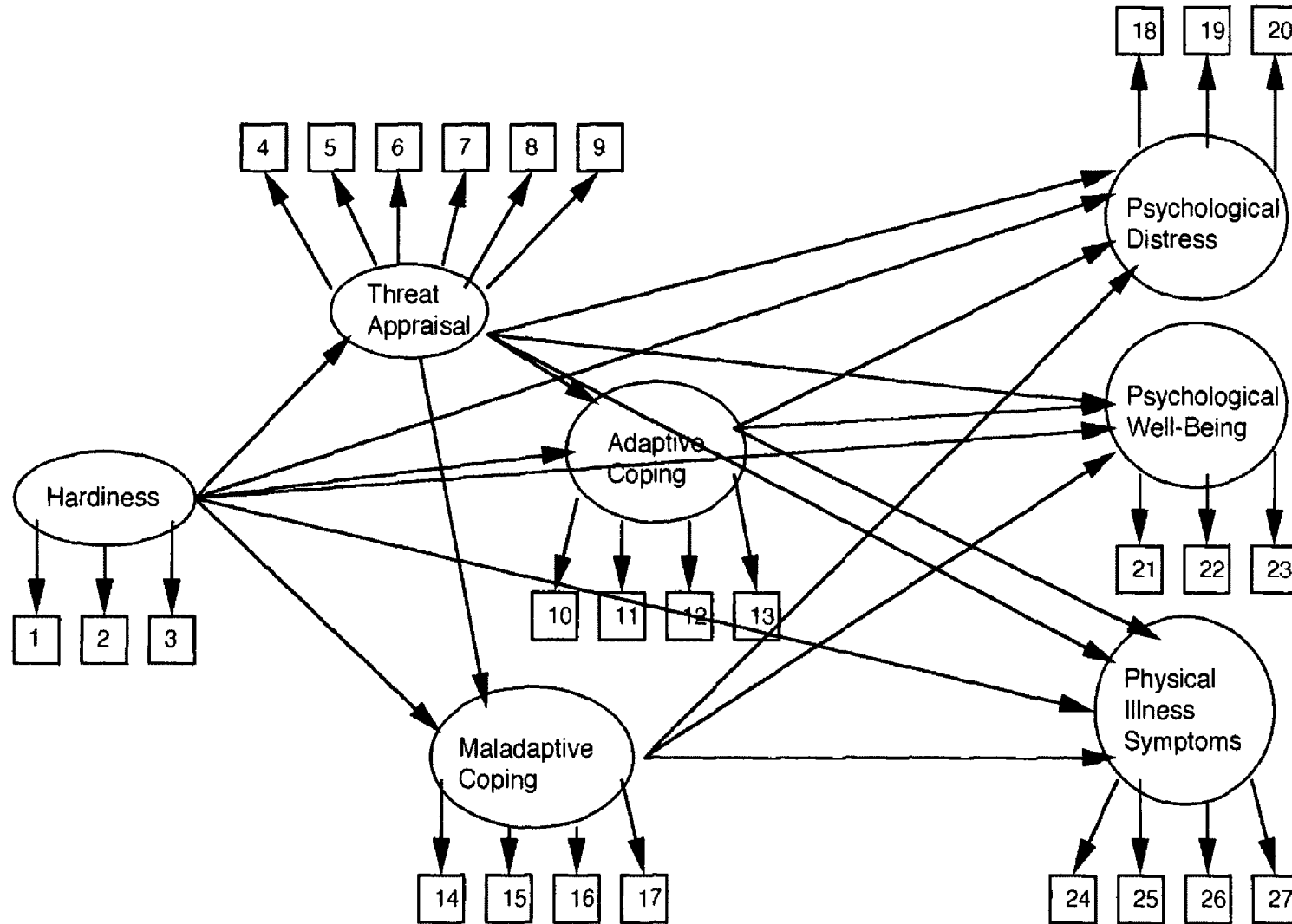


Figure 11
Initial Path Model with Hardiness Minus Neuroticism as the Upstream Variable

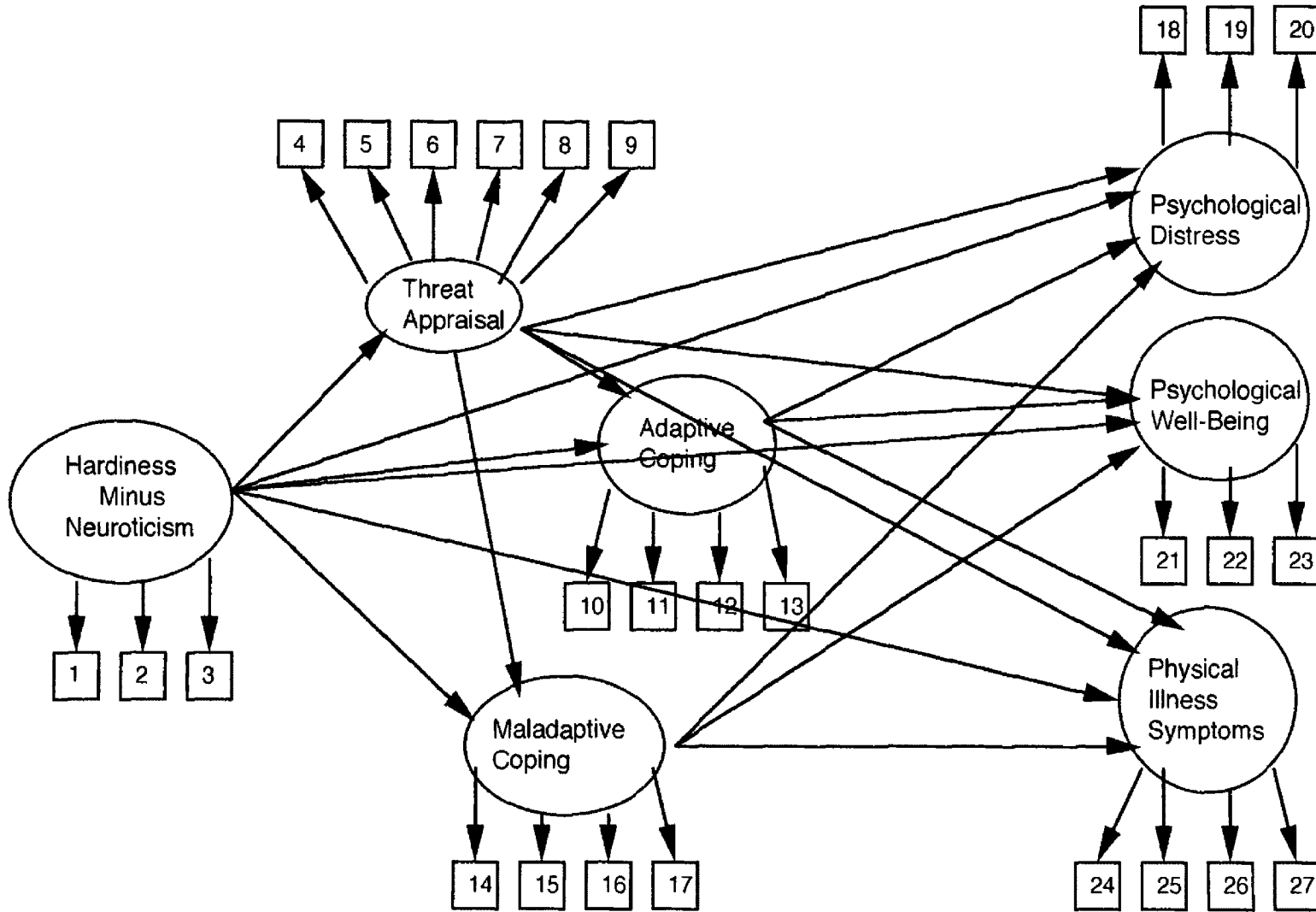


Table 3
Key for Identifying Manifest Variables in Figure 10 and Figure 11

<u>Figure 10</u>	<u>Figure 11</u>
1 Challenge	1 Challenge Minus Neuroticism
2 Control	2 Control Minus Neuroticism
3 Commitment	3 Commitment Minus Neuroticism
4 Primary Appraisal 1	4 Primary Appraisal 1
5 Primary Appraisal 2	5 Primary Appraisal 2
6 Primary Appraisal 3	6 Primary Appraisal 3
7 Primary Appraisal 4	7 Primary Appraisal 4
8 Primary Appraisal 5	8 Primary Appraisal 5
9 Primary Appraisal 6	9 Primary Appraisal 6
10 Problem-focused Coping	10 Problem-focused Coping
11 Seeking Social Support	11 Seeking Social Support
12 Focusing on the Positive	12 Focusing on the Positive
13 Tension Reduction	13 Tension Reduction
14 Wishful Thinking	14 Wishful Thinking
15 Detachment	15 Detachment
16 Self Blame	16 Self Blame
17 Keep to Self	17 Keep to Self
18 Anxiety	18 Anxiety
19 Depression	19 Depression
20 Loss of Behavioral/Emotional Control	20 Loss of Behavioral/Emotional Control
21 General Positive Attitude	21 General Positive Attitude
22 Emotional Ties	22 Emotional Ties
23 Life Satisfaction	23 Life Satisfaction
24 Recent Physical Symptoms Checklist 1	24 Recent Physical Symptoms Checklist 1
25 Recent Physical Symptoms Checklist 2	25 Recent Physical Symptoms Checklist 2
26 Recent Physical Symptoms Checklist 3	26 Recent Physical Symptoms Checklist 3
27 Recent Physical Symptoms Checklist 4	27 Recent Physical Symptoms Checklist 4

Figure 12
Intermediate Path Model with Hardiness as the Upstream Variable

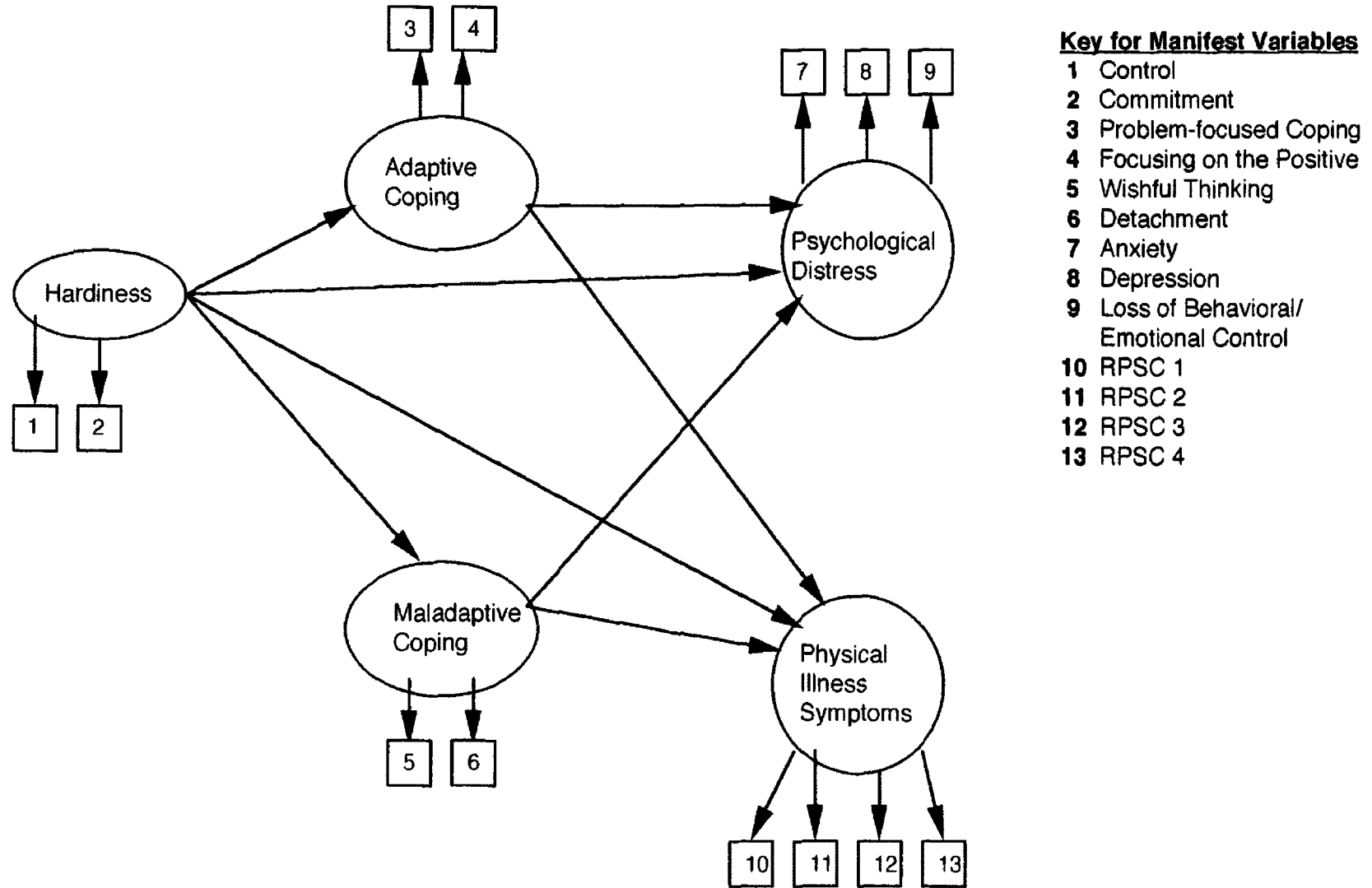
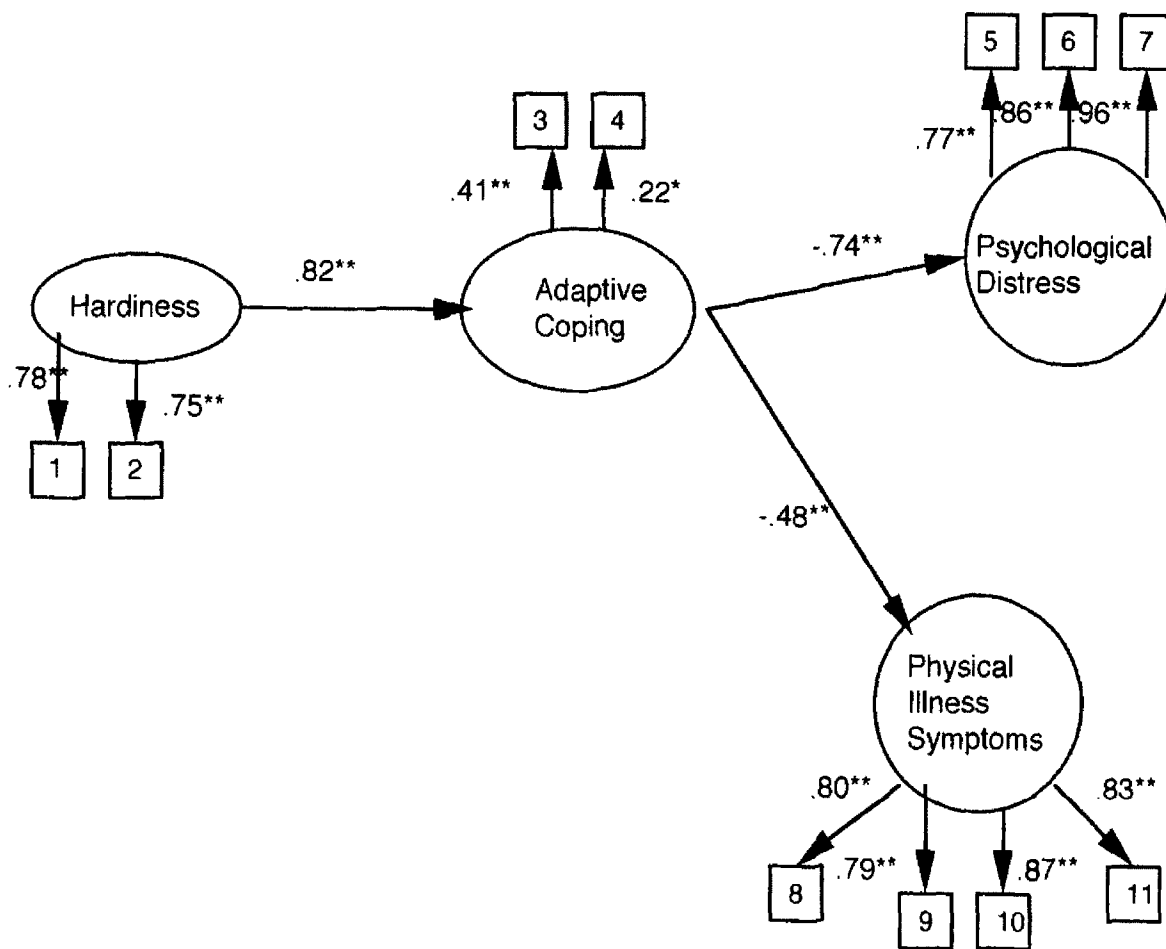


Figure 13
Final Path Models- Alternative #1



Key for Manifest Variables

- 1 Control
- 2 Commitment
- 3 Problem-focused Coping
- 4 Focusing on the Positive
- 5 Anxiety
- 6 Depression
- 7 Loss of Behavioral/ Emotional Control
- 8 RPSC 1
- 9 RPSC 2
- 10 RPSC 3
- 11 RPSC 4

Statistics

$n=200$
 Chi-square=49.16 ($df=38$; $p=.106$)
 Goodness of Fit Index = .959
 Adjusted Goodness of Fit Index = .928
 Root Mean Square Residual = .035
 $^*p < .05$, 1-tailed
 $^{**}p < .01$, 1-tailed

Figure 14
Final Path Models- Alternative #2

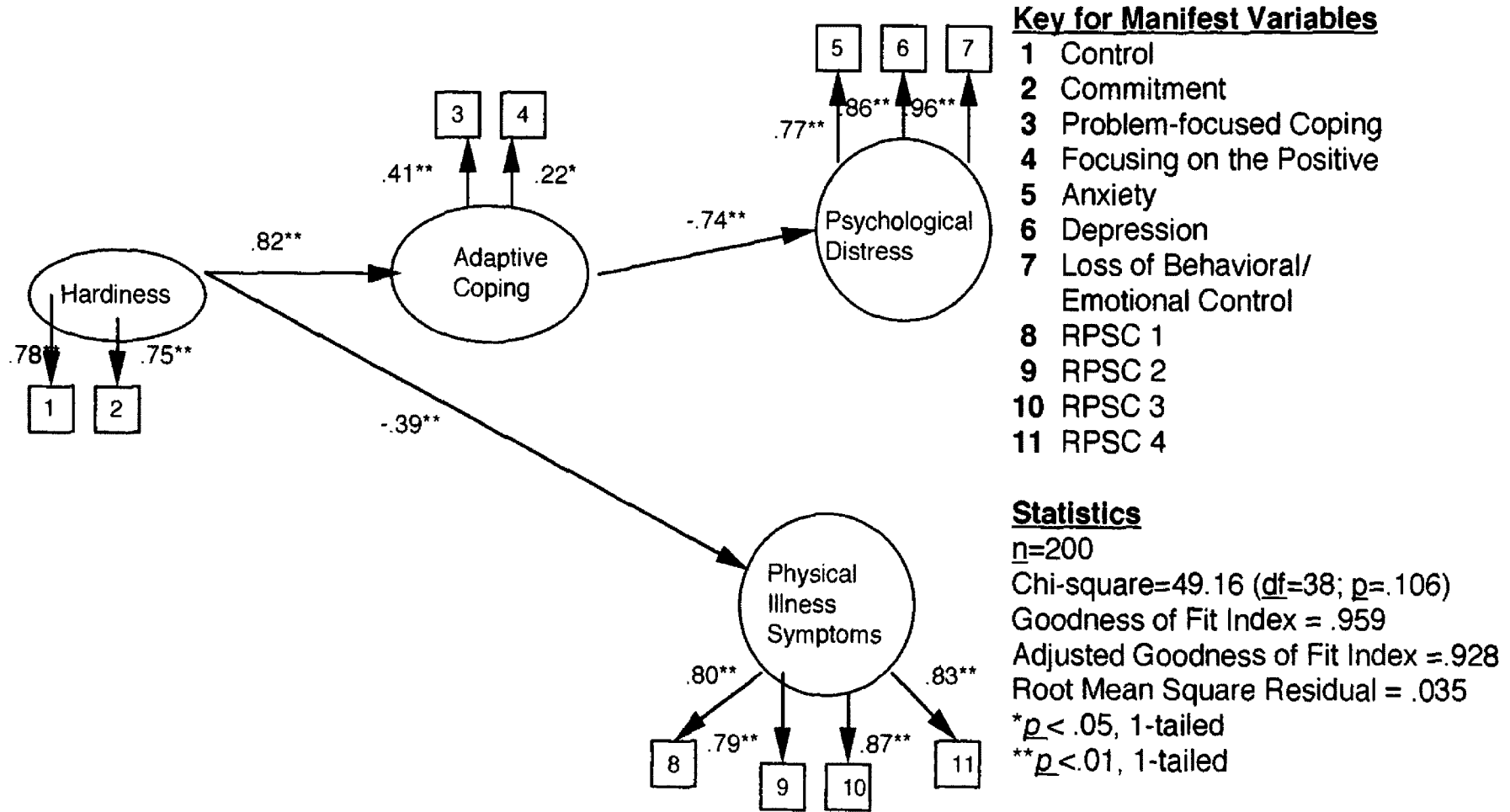


Figure 15
Final Path Models- Alternative #3

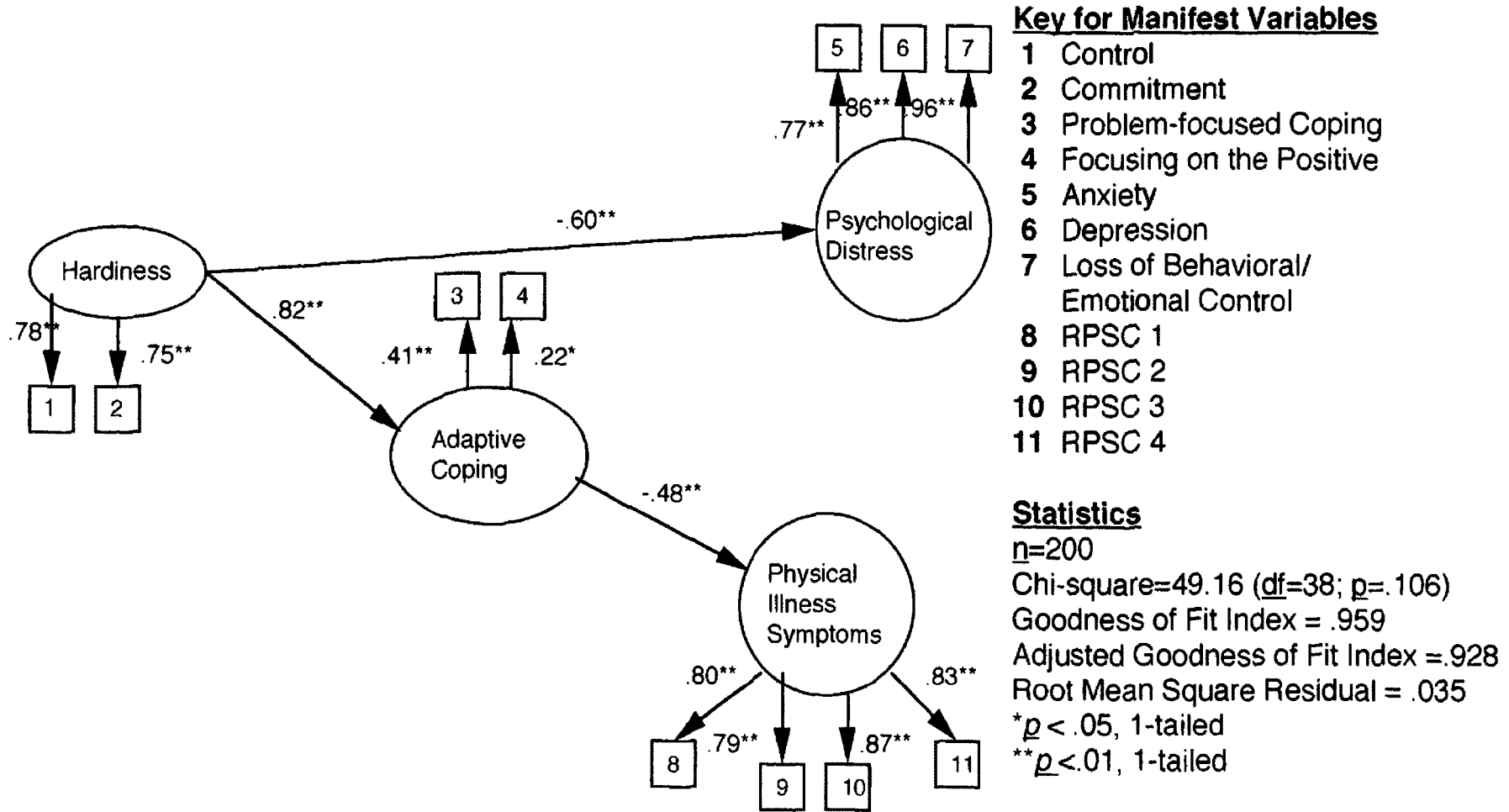


Figure 16
Final Path Models- Alternative #4

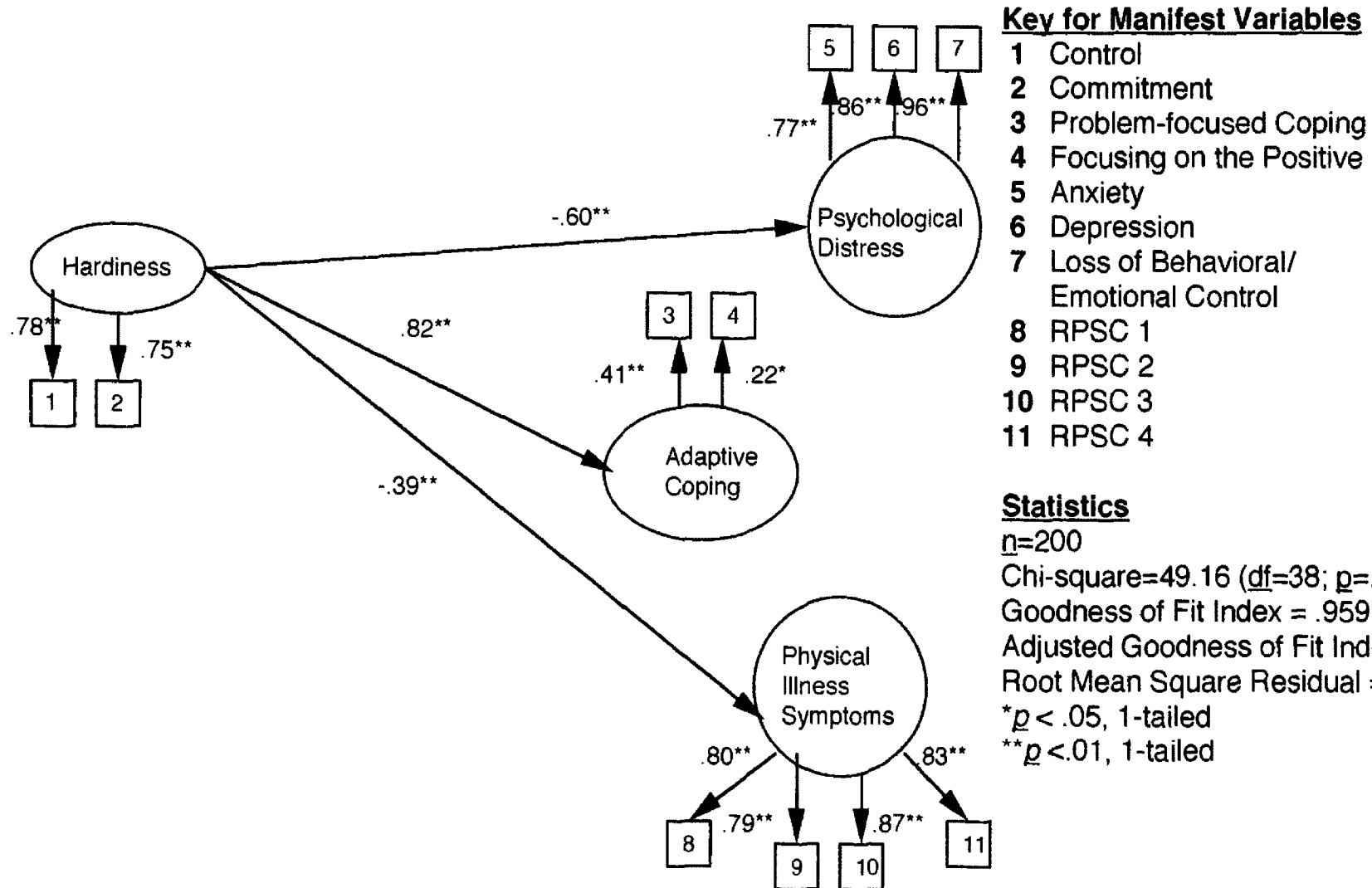
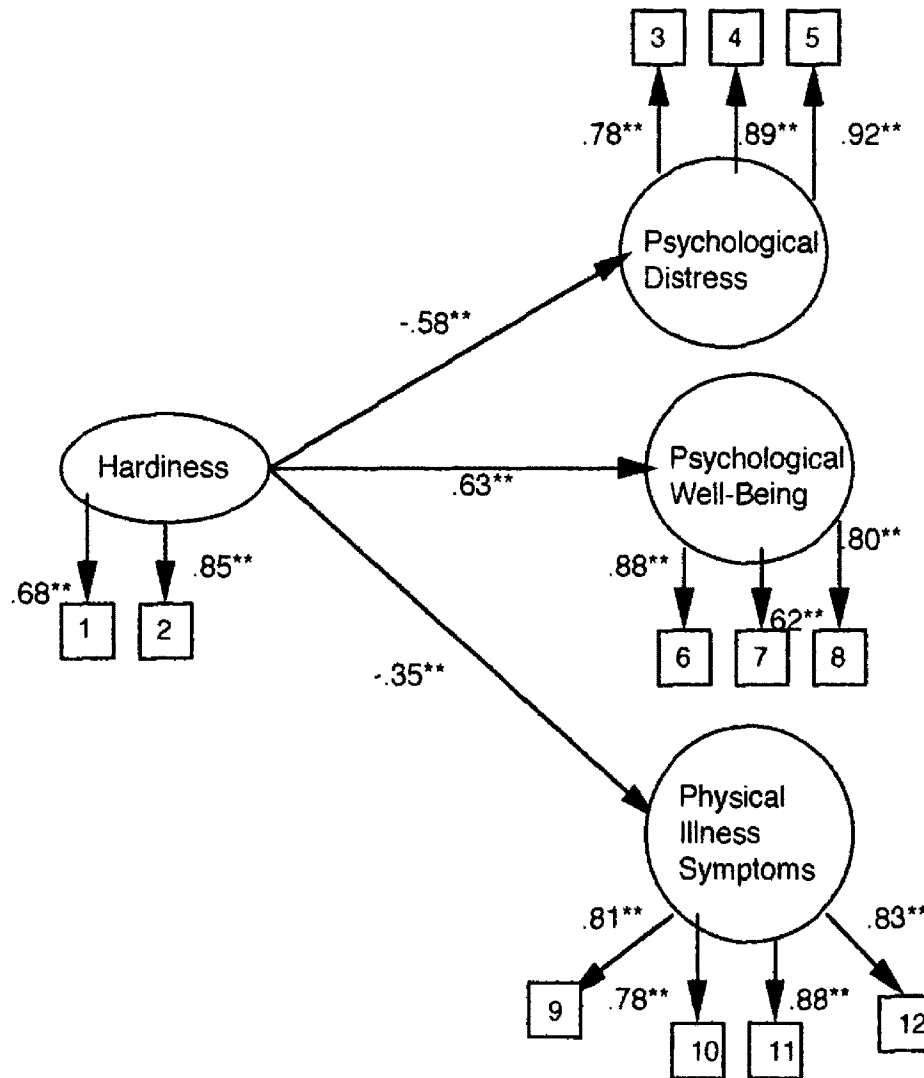


Figure 17

Final Path Model for Main Effects of Hardiness

**Key for Manifest Variables**

- 1 Control
- 2 Commitment
- 3 Anxiety
- 4 Depression
- 5 Loss of Behavioral/
Emotional Control
- 6 General Positive Attitude
- 7 Emotional Ties
- 8 Life Satisfaction
- 9 RPSC 1
- 10 RPSC 2
- 11 RPSC 3
- 12 RPSC 4

Statistics

$n=206$

Chi-square=83.41 (df=48; $p=.001$)

Goodness of Fit Index = .939

Adjusted Goodness of Fit Index = .901

Root Mean Square Residual = .039

* $p < .05$, 1-tailed

** $p < .01$, 1-tailed

Chapter 4

Discussion

The purpose of this study was to clarify the relationships between stressors, Hardiness, cognitive appraisal, coping strategies, Neuroticism, and the outcomes of self-reported physical and psychological health, while at the same time addressing many of the theoretical and methodological criticisms of such research. Specifically, this study utilized a prospective design to gather data that would be empirically examined by path analysis in order to test the hypothesized causal pathways between these latent variables. Using such a design and the method of path analysis to analyze the data addresses many of the concerns and criticisms raised in the past Hardiness literature, while at the same time being able to examine with sensitivity the plausibility of different causal models (Carver, 1989; Funk, 1992; Funk & Houston, 1987; Hull et al., 1987).

Findings concerning the concept of Hardiness as a latent variable composed of the three components Challenge, Commitment, and Control indicate that Challenge is not as strongly related to either Commitment or Control as Commitment and Control are to each other. This interpretation is based on the intercorrelations between the subcomponents, as well as the fact that the goodness of fit indices of the structural models increased when removing Challenge as a manifest variable of Hardiness. Such a finding is in accordance with past findings, particularly with undergraduate samples, that Challenge is unrelated to health outcomes and weakly related to the other Hardiness subcomponents. This study used the newest Hardiness instrument, the PVS-II, which still does not seem to have improved in its measurement of

the Challenge subcomponent. Therefore, the criticism that Challenge be removed from consideration with Hardiness-health research until it can be measured reliably and demonstrate its validity is still very much an appropriate one (Hull et al., 1987).

With respect to the intention of this study to clarify Hardiness' effect as a possible moderator variable or buffer of stressors, the modification of the Hassles Scale to measure stressors failed to provide data that could be statistically analyzed or interpreted. The purpose of this modified scale was to measure the number and/or frequency of objective stressors encountered by the participants, rather than measure their subjective ratings of feeling "stressed." Such a failure in the modified Hassles Scale did not allow the second hypothesis to be tested, thus in effect leaving the assertion that Hardiness serves as a buffer or resistance resource against the effects of stressors still relatively unclear.

Concerning the first hypothesis, the findings support previous findings that Hardiness is causally related to outcomes of self-reported physical and psychological health (see Figure 17). Again, structural models analyzing the relationship between Hardiness and Physical Illness Symptoms, Psychological Well-Being, and Psychological Distress indicated that removing the subcomponent of Challenge from the measurement model of Hardiness best illustrates the most plausible causal relationship between these latent variables. Hardiness, as measured by Commitment and Control, does have a main effect on health outcomes, indicating that the hardy personality does result in better physical and psychological health.

Although all the path values of the final model are significant (See Figure

17) , the results seem to indicate that there are stronger causal pathways between Hardiness and psychological health variables than between Hardiness and physical health. Hardiness seems to exert greater effects on Psychological Distress, with which it is negatively related, and Psychological Well-Being, with which it is positively related. Regarding physical health, Hardiness yields a weaker negative causal effect on the number of physical illness symptoms reported by participants. These findings are most likely due to the fact that the sample was 67% female. Past empirical studies with Hardiness that were conducted on all female samples have found a stronger relationship between Hardiness and psychological health variables, and a weaker or even nonsignificant relationship between Hardiness and physical health symptoms. With all male samples, out of which the original Hardiness literature emanated, the finding has usually been that Hardiness is more strongly related to physical health, while its relationship with psychological health is weaker. It is the intention of the primary researcher to examine the gender effects of this study's data in a future project, as it was beyond the scope of the current project at the present time.

With respect to the third hypothesis concerning cognitive appraisal and coping strategies as hypothesized mediators of the relationship between Hardiness and health, the results seem to be somewhat mixed and more difficult to interpret (see Figures 10-16). The findings indicate that cognitive appraisal, as measured by Threat Appraisal, does not mediate the effects of Hardiness on health outcomes. In testing the different models with Threat Appraisal within it, the path values loading onto and emanating from Threat Appraisal were quite small each time, and simply removing Threat Appraisal

from the models resulted in models that better fit the data. There seem to be several explanations for this, and a few will be discussed immediately, while others will be discussed later.

It is evident that the majority of the intercorrelations between the subcomponents of Hardiness and the manifest variables of Threat Appraisal (named Primary Appraisal 1-6; Table 2) are not significant, indicating a lack of relationship between them. However, it is interesting that the few significant correlations were between Challenge and Primary Appraisal 1 and 5, and Control and Primary Appraisal 1. It seems that removing Challenge from the measurement model of Hardiness helped to decrease or completely nullify the relationship between Hardiness and Threat Appraisal. Again, removing both Challenge and Threat Appraisal from the path models resulted in a substantial increase in the goodness of fit indices. The subcomponent of Challenge as originally hypothesized by Kobasa (1979; 1982a) does seem to be more closely aligned, but in the opposite direction, with Lazarus and Folkman's (1984) concept of Primary Appraisal, as it entails the appraisal of life events as challenging rather than as threatening, and hypothetically leads to "transformational coping" (Kobasa et al., 1982b).

Looking at the third hypothesis with respect to coping strategies as mediating the Hardiness-health relationship, the results are less clear for interpretation. The path models that obtained the best goodness of fit indices to the collected data contained the latent variable of Adaptive Coping strategies that were measured by the Problem-focused Scale and Focusing on the Positive Scale. Four separate path models, similar in their measurement models but each different structurally, produced the same goodness of fit

indices and the same, nonsignificant chi-square statistic (See Figures 13-16).

The first of these final four models suggests that the effects of Hardiness are mediated by increased Adaptive Coping and result in decreased Psychological Distress and Physical Illness Symptoms. The second model suggests that Adaptive Coping mediates the Hardiness-Psychological Distress relationship, but is not involved at all in the Hardiness-Physical Illness Symptoms relationship. However, the third model suggests that Adaptive Coping mediates the Hardiness-Physical Illness Symptoms relationship, but is not involved at all in the Hardiness-Psychological Distress relationship. Lastly, the fourth model suggests that Adaptive Coping is not a mediator of either of these relationships, but rather that Hardiness simply has main effects on Psychological Distress, Adaptive Coping, and Physical Illness Symptoms.

All in all, it seems that coping strategies can be looked at either as a mediator variable or simply as a downstream latent variable just like the health outcomes on which Hardiness exerts a main effect. However, upon closer examination, a more plausible, clearer interpretation seems to emerge from the synthesis of the results of the path models. The path models show that Hardiness exerts a stronger causal influence on Adaptive Coping than it does on Psychological Distress and Physical Illness Symptoms. Furthermore, when applicable in the final models, Adaptive Coping exerts a stronger causal influence on Psychological Distress and Physical Illness Symptoms than Hardiness does. These findings, when taken simultaneously, seem to suggest that coping strategies serve as mediators between Hardiness and health outcomes, as suggested by the model presented in Figure 13. However, the fact that the model presented in Figure 16 produced the exact same goodness of fit

indices as those models in Figures 13-15 is somewhat puzzling, but may hint at two plausible conclusions: 1) that coping strategies are weak mediators of the Hardiness-health relationship and/or 2) that there are other mediator variables besides coping strategies at work within the Hardiness-health relationship. In sum, as Adaptive Coping appears to mediate the Hardiness-health relationship, but Threat Appraisal does not, the third hypothesis has been partially but not fully supported.

This study's findings concerning the hypothesized mediators of cognitive appraisal and coping strategies are limited by its methodology concerning the measurement of stress, cognitive appraisal, and coping strategies. As stated previously, the participants completed the Stress Questionnaire in which they indicated an interpersonal situation that has been the "most stressful" for them for the previous two weeks, and filled out the questions regarding their cognitive appraisal and coping strategies for their particular situation. Thus, there undoubtedly was variability across the situations with regards as to what could be construed as "most stressful," as well as variability within the situations due to situational or contextual factors. Examples of these situations included disagreements with roommates, fights with boyfriends/girlfriends, trouble with the law, and dealing with the death of someone close. The lack of either a single or even multiple controlled "stressful" situations presented to each and every participant weakens the study somewhat.

Specifically, it appears that the Stress Questionnaire's Primary Appraisal does not properly measure cognitive appraisal of the potential stressor with regards to the degree of threat perceived because the questions occur after and pertain to an interpersonal event that has already been seemingly appraised as

the “most stressful” of the past two weeks. This could explain the findings within the path models that indicated that the latent variable of Threat Appraisal should be removed to produce a model that better fit the data. Furthermore, as has been raised by previous researchers concerning coping strategies, the extent to which these self-report coping questionnaires measure situation-specific coping strategies versus more generalized, pervasive, intraindividual coping styles or strategies has not been definitively nor adequately addressed. Coping strategies may change across different situations independent of the individual's level of Hardiness, and may be seen as more or less adaptive in the contexts of these different situations.

Again, it seems that if a single or even multiple controlled situations were specified for each and every participant, the criticisms regarding the measurement of cognitive appraisal and coping strategies would lessen considerably. This would allow the causal pathways between Hardiness and cognitive strategies, coping strategies, and health outcomes to be properly tested with cleaner data, and allow more accurate and decisive conclusions to be drawn from the results. This was done by Florian et al. (1995) who used the real-life stressful situation of a 4-month combat training camp, but the statistical analysis was somewhat different and they got mixed results. Studies of similar design should be utilized to properly test these hypothesized mediator variables.

With regards to the fourth and final hypothesis concerning Neuroticism's confounding of Hardiness, the results seem clearer than those concerning cognitive appraisal and coping strategies. The results do not support the fourth hypothesis, as covarying Neuroticism out of Hardiness causes its variability to

all but disappear, significantly reducing any of its causal effects on any of the other latent variables. As indicated upon examination of Table 1 and the inadmissible results of the path models with Hardiness Minus Neuroticism as the upstream variable, it seems as if there is very little if any variance left accounted for by Hardiness that is independent of Neuroticism.

This finding substantiates previous criticisms and empirical findings concerning the lack of a significant main effect of Hardiness on coping strategies, cognitive appraisal, and self-reported health outcomes that is independent of Neuroticism (Allred & Smith, 1989; Bernard & Belinsky, 1992; Funk, 1992; Funk & Houston, 1987; Hull et al., 1988; Rhodewalt & Zone, 1989; Smith et al., 1989; Williams et al., 1992). Fewer studies have found that Hardiness and negative affectivity or Neuroticism are correlated but distinct constructs and that Hardiness does have some effects that are independent of Neuroticism (Florian et al., 1995; Maddi & Khoshaba, 1994; Wiebe et al., 1990, as cited in Williams, et al., 1992; Williams et al., 1992).

A major purpose of this study was to clarify the measurement of Hardiness in relation to this criticism, and the fourth hypothesis was presented in such a way as to reflect these more recent findings concerning Hardiness' independence of Neuroticism. However, it seems to be the case that the Hardiness scales, and more specifically the newest one available used in the present study, the PVS-II, still inadvertently measure Neuroticism. This problem remains despite the authors' efforts to reduce the number of negative indicators of the Challenge, Control, and Commitment scales, which has been associated with measuring Neuroticism, and to index these scales positively.

Furthermore, the effects of Hardiness have typically only been on self-

reported health outcomes, such as those used in this study, while other studies utilizing more objective measurements as their health outcomes, such as prospective health center visits, have not found these main effects (e.g., Bernard & Belinsky, 1992). Research with such self-report physical health outcome measures is prone to be biased due to Neuroticism, as it has been strongly related to the self-report of somatic complaints rather than to organic disease or illness per se (Costa & McCrae, 1987; McCrae, 1990; Watson & Pennebaker, 1989). Therefore, it seems difficult to conclude whether individuals with lower levels of Hardiness actually experience more illness symptoms or if they just report more illness symptoms and somatic complaints (Funk, 1992). As Hardiness has been shown by the majority of the empirical literature to be confounded with Neuroticism, maladjustment, or negative affectivity, it seems as if its demonstrated effects on self-reported physical health outcome measures may not reflect such an effect on actual physical illness, disease, and symptoms as determined by health professionals.

The relationship among Hardiness, Neuroticism, and self-report psychological health outcomes seems less clear. Past findings of Hardiness' effect on such psychological health outcomes have been more positive than with physical health outcomes, as some findings have remained significant even when controlling for Neuroticism or maladjustment (Florian et al., 1995; Funk & Houston, 1987; Maddi & Khoshaba, 1994). The present study failed to produce models with admissible solutions when examining Hardiness Minus Neuroticism as the upstream latent variable and both physical and psychological health outcomes as the downstream latent variables, suggesting that Hardiness does not have any significant effects on these health variables

when Neuroticism is removed from it.

The findings of this study with the new Hardiness measure indicate that the previous criticisms concerning the measurement and composition of the personality construct Hardiness have not yet been solved. The Challenge subcomponent still does not seem to be as related to the other subcomponents of Control and Commitment as they are to one another. Also, the new PVS-II, as well as its predecessors, seems to have very little if nothing left of Hardiness and its effects that are independent of Neuroticism. Therefore, it seems as if any significant effect that Hardiness has on self-reported physical health outcomes is attributed to the effect that Neuroticism has on increased symptom reporting. The results of this study suggest that this seems to be the case for self-reported psychological health outcomes as well. Such a consistent finding brings the construct validity and utility of using and studying such a construct into question, when Hardiness seems to reflect simply the opposite of an earlier personality construct, namely Neuroticism.

It seems as if the fact that Hardiness is a positively-measured health-promoting personality construct, while Neuroticism is a negatively-measured illness-promoting personality construct, makes Hardiness a more appealing and attractive attribute to have as well as to study with health outcomes. However, the fact that Neuroticism has been around in the literature much longer than Hardiness, coupled with its consistent confounding of Hardiness, the principles of parsimony would seem to suggest that Hardiness might defer to and be subsumed under Neuroticism. Some studies have found effects of Hardiness that were independent of Neuroticism, such as on coping strategies and some measures of psychological health, but these are inconsistent

findings. More importantly, Hardiness was originally theorized to serve as a “resistance resource” to buffer the effects of stress that results in better physical health, and this consistently does not seem to be the case. The effects of Hardiness are consistently attributable to Neuroticism, and therefore Hardiness is most likely not causally related to better health outcomes per se. This study’s findings may be seen as helping to head Hardiness research in such a direction that is consistent with parsimony, namely, that it be curtailed. This suggestion is made somewhat with caution, as it is recognized that this study has its own methodological limitations, such as some of the measures and the sample on which it was conducted.

However, a very recent study aimed at examining the common variance of six health-related personality constructs- Hardiness, Ego-Strength, Self-Esteem, Self-Efficacy, Optimism, and Maladjustment- yielded some interesting results that have some implications concerning the issue of parsimony among these health-related constructs (Bernard, Hutchison, Lavin, & Pennington, 1996). Bernard et al. (1996) cautioned other health psychology researchers to closely examine the creation of new constructs and their measurements, as well as their convergent and discriminant validity, lest researchers be constantly “reinventing the wheel.” Specifically, Neuroticism seems to have been reinvented in “reverse” as Hardiness, and many other health-related personality constructs seem to have been reinvented and/or overlap with others as well.

A hierarchical factor model with a single, higher-order factor named Health Proneness that loaded onto two lower-order factors named Self-Confidence and Adjustment was created from these six scales and later tested against single and three-factor models in several diverse samples where it was

confirmed in each of them. For a specific example, Hardiness loaded highly on the Adjustment factor, which later was related negatively to the Neuroticism scale of the NEO Five-Factor Inventory (NEO-FFI; Costa & McCrae, 1989, as cited in Bernard et al., 1996). The authors acknowledge the independent development of each of these six constructs and scales, but discuss their relatedness and conclude that their covariance can be better accounted for by their latent hierarchical model of Health Proneness loading onto Self-Confidence and Adjustment, which may possibly account for more variance in health-related outcomes than the constructs' individual scales.

These six constructs and scales seem to have much variance in common and show little discriminant validity with one another, suggesting that they should be collapsed into a factor structure with either one or two factors. It seems as if further inquiry on the common variance of these health-related personality constructs should be pursued first and foremost before continuing forward along lines of research regarding any particular one of these constructs, such as with Hardiness. Research should replicate the factor structures and then examine the effects of these factors on more objective health outcomes.

It is acknowledged that the findings of the current study are limited by the college sample on which the data was collected, the fact that it was 67% female, and by the methodology and measurements used. The limitations regarding the methodology have been discussed previously. With regard to the composition of the sample, many of these findings support conclusions drawn from similar studies conducted with both similar and different samples. As stated previously, it is hoped that the effects and path models examined here will be examined separately for each gender in the near future to look for any potential

differences.

There are several conclusions and implications for further research with Hardiness. First, until a reliable and valid scale measuring Challenge is established in the literature, research with Hardiness should not rely solely on using the composite Hardiness score, but should use the Commitment and Control scales instead. Second, the hypothesized stress-moderating or stress-buffering effects of Hardiness on health outcomes have yet to be properly tested and/or demonstrated. This can be attributed more to the measurement difficulties concerning stress or stressors and physical health outcomes than to the already-mentioned measurement difficulties with Hardiness. Reliance on self-report physical health outcomes has many problems inherent in this type of research, and it is recommended that future research in these topics utilize or create more objective measures of physical health, perhaps dealing with more physiological outcomes, number of health center visits, or outcomes rated by a physician, in addition to the self-report measures.

Third, research looking at the mediators of Hardiness or any other health-related personality construct needs to also address design and measurement considerations. As stated previously, using controlled “stressful” situations may be the best design for examining the individual differences in the cognitive appraisal, coping strategies, or other possible mediators and the causal pathways between them, health-related personality constructs, and health outcomes. This may help to reduce the measurement problems typically associated with the stability and generalizability of appraisal and coping measurements.

Lastly, it seems as if Neuroticism’s confounding of Hardiness will

continue to be a problem indefinitely. This consistent finding, in addition to the continual problems with the Challenge scale, questions the construct validity and overall utility of the Hardiness personality construct. In fairness to the Hardiness scale, the construct, convergent, and discriminant validity of most health-related personality scales seems to be questioned as well, and this begs the question of what to do and where to go from here concerning these constructs. It seems that if health psychology is to adhere the principles of parsimony and science, then the examination of the common variance of such health-related personality constructs needs to continue forward first and foremost in order to result in the reduction in the number of such constructs. After such a reduction and clarification of these constructs, then research concerning the mediators and specific behaviors related with health and illness should proceed forward.

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DEMOGRAPHIC QUESTIONNAIRE

NAME:

PHONE NUMBER:

LAST FIVE DIGITS OF SOCIAL SECURITY NUMBER:

GENDER: M F

AGE:

EDUCATION: FRESHMAN SOPHOMORE JUNIOR SENIOR

All information you provide will be kept strictly confidential. Your name will not be associated with any of the data collected. Only a subject number will be associated with your data.

PERSONAL VIEWS SURVEY II

This questionnaire concerns attitudes toward oneself and the world that may influence your experience and actions. There are no right or wrong answers. What is important is that you record your current opinion accurately.

Please indicate how you feel about each item by circling a number from 0 to 3 in the space provided. A 0 indicates that you feel the statement is not at all true; a 3 means that you feel the item is completely true. As you will see, the items are worded very strongly; this is to help you decide the extent to which you agree or disagree.

0 = Not at all true
 1 = A little true
 2 = Quite a bit true
 3 = Completely true

1.	I often wake up eager to take up my life where it left off the day before	0	1	2	3
2.	I like a lot of variety in my work	0	1	2	3
3.	Most of the time, people listen carefully to what I have to say	0	1	2	3
4.	Planning ahead can help avoid most future problems	0	1	2	3
5.	What happens to me tomorrow depends on what I do today	0	1	2	3
6.	I feel uncomfortable if I have to make any changes in my everyday schedule	0	1	2	3
7.	No matter how hard I try, my efforts will accomplish nothing	0	1	2	3
8.	It's hard to imagine anyone getting excited about working	0	1	2	3
9.	The "tried and true" ways are always the best	0	1	2	3
10.	I feel that it's almost impossible to change my family's mind about something	0	1	2	3
11.	Most people who work for a living are just manipulated by their bosses	0	1	2	3
12.	New laws shouldn't be made if they hurt a person's income	0	1	2	3
13.	When you marry and have children you have lost your freedom of choice	0	1	2	3
14.	Trying your best at work really pays off in the end	0	1	2	3
15.	People who never change their minds usually have good judgment	0	1	2	3
16.	Most of what happens in life is just meant to happen	0	1	2	3

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0 = Not at all true
 1 = A little true
 2 = Quite a bit true
 3 = Completely true

17. It doesn't matter how hard you work at your job, since only the bosses profit by it	0	1	2	3
18. I don't like conversations when others are confused about what they mean to say	0	1	2	3
19. Trying hard doesn't pay, since things still don't turn out right	0	1	2	3
20. Daydreams are more exciting than reality for me	0	1	2	3
21. I won't answer a question until I'm really sure I understand it	0	1	2	3
22. When I make plans I'm certain I can make them work	0	1	2	3
23. I really look forward to my work	0	1	2	3
24. It doesn't bother me to shift to another task before I have finished the first	0	1	2	3
25. When performing a difficult task, I know when to seek help	0	1	2	3
26. It's exciting to learn something about myself	0	1	2	3
27. Changes in routine are interesting to me	0	1	2	3
28. It's very hard for me to change a friend's mind about something	0	1	2	3
29. Thinking of yourself as a free person just leads to frustration	0	1	2	3
30. It bothers me when my daily routine gets interrupted	0	1	2	3
31. When I make a mistake, there's very little I can do to make things right again	0	1	2	3
32. By working hard you can always achieve your goals	0	1	2	3
33. I respect rules because they guide me	0	1	2	3
34. It's best to handle most problems by just not thinking about them	0	1	2	3
35. Most good athletes and leaders are born, not made	0	1	2	3
36. I enjoy it when things are uncertain or unpredictable	0	1	2	3
37. People who do their best should get full support from society	0	1	2	3
38. Most of my life gets spent doing things that are worthwhile	0	1	2	3
39. Lots of times I don't really know my own mind	0	1	2	3
40. I have no use for theories that are not closely tied to the facts	0	1	2	3
41. Ordinary work is just too boring to be worth doing	0	1	2	3
42. If other people get angry at me, it's usually no fault of mine	0	1	2	3
43. Changes in routine bother me	0	1	2	3
44. It's hard to believe people who say their work helps society	0	1	2	3

0 = Not at all true
 1 = A little true
 2 = Quite a bit true
 3 = Completely true

45. I can't do much to prevent it if someone wants to hurt me	0	1	2	3
46. Most days, life is really interesting and exciting for me	0	1	2	3
47. People who believe in individuality are only kidding themselves	0	1	2	3
48. It's usually impossible for me to change things in my life	0	1	2	3
49. I want to be sure someone will take care of me when I get old	0	1	2	3
50. Politicians run our lives	0	1	2	3

**SELF-EVALUATION QUESTIONNAIRE
STAI FORM Y-2**

DIRECTIONS

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you *generally* feel.

	Almost Never	Some- times	Often	Almost Always
1. I feel pleasant.	1	2	3	4
2. I feel nervous and restless.	1	2	3	4
3. I feel satisfied with myself.	1	2	3	4
4. I wish I could be as happy as others seem to be.	1	2	3	4
5. I feel like a failure.	1	2	3	4
6. I feel rested.	1	2	3	4
7. I am "calm, cool, and collected."	1	2	3	4
8. I feel that difficulties are piling up so that I cannot overcome them.	1	2	3	4
9. I worry too much over something that really doesn't matter.	1	2	3	4
10. I am happy.	1	2	3	4
11. I have disturbing thoughts.	1	2	3	4
12. I lack self-confidence.	1	2	3	4
13. I feel secure.	1	2	3	4
14. I make decisions easily	1	2	3	4
15. I feel inadequate.	1	2	3	4
16. I am content.	1	2	3	4
17. Some unimportant thought runs through my mind and bothers me.	1	2	3	4
18. I take disappointments so keenly that I can't put them out of my mind.	1	2	3	4
19. I am a steady person.	1	2	3	4
20. I get in a state of tension or turmoil as I think over my recent concerns and interests.	1	2	3	4

THE MODIFIED HASSLES SCALE

Directions: To the best of your ability, please indicate the number of times that each event has occurred since February 24, 1998, when you filled out the first set of questionnaires. If an event did not occur for you in the past 8 weeks, enter 0. Please put forth your best effort to make and estimate for each item. Thank you.

1. Misplaced or lost something. _____
2. Had a disagreement or quarrel with neighbors. _____
3. Was committed to attend a social function. _____
4. Had to deal with an inconsiderate smoker. _____
5. Thought about your personal future. _____
6. Thought about death. _____
7. Had concerns for the health or well-being of a family member. _____
8. Didn't have enough money for necessities (e.g. food, clothing, housing, health care, taxes, insurance, etc.) when it was needed. _____
9. Owed money to someone. _____
10. Tried to get financial credit _____
11. Didn't have enough money for emergencies. _____
12. Someone owed you money. _____
13. Provided financial care for someone who does not live with you. _____
14. Tried to conserve water, heat, electricity, money, etc.. _____
15. Thought you smoke too much. _____
16. Thought you drink too much. _____
17. Experienced bad effects or side-effects of drugs or medications. _____
18. Thought you had too many responsibilities, too many things to do, or too many meetings. _____
19. Tried to decide about having children. _____
20. Had a non-family member live in your house. _____

21. Took care of a pet.	101
22. Prepared a meal.	_____
23. Was concerned about the meaning of life.	_____
24. Had trouble relaxing.	_____
25. Had trouble making a decision.	_____
26. Had disagreements or problems getting along with fellow workers.	_____
27. Had disagreements or problems with customers, clients or patients.	_____
28. Performed inside home maintenance (e.g. cleaning, redecorating, rebuilding, refurbishing, etc.).	_____
29. Concerned about job security.	_____
30. Concerned about retirement.	_____
31. Was laid-off or looking for work.	_____
32. Did not like current work duties or thought work was unchallenging.	_____
33. Was interrupted on an important project.	_____
34. Had unexpected company.	_____
35. Had too much time on your hands.	_____
36. Had to wait over 10 minutes for something or some service.	_____
37. Concerned about accidents.	_____
38. Experienced loneliness.	_____
39. Concerned about financial security.	_____
40. Made silly practical mistakes.	_____
41. Was unable to express yourself to someone.	_____
42. Visited a dentist or doctor for some sort of treatment.	_____
43. Concerned with your physical appearance.	_____
44. Experienced rejection of some kind.	_____
45. Experienced fertility difficulties.	_____
46. Experienced sexual problems.	_____
47. Concerned about your general health and well-being.	_____

48. Thought that you're not seeing enough people.	102
49. Thought that your friends or relatives are too far away.	_____
50. You purposely wasted time.	_____
51. Had to deal with auto maintenance, by yourself or through a mechanic.	_____
52. Had to take care of paperwork (e.g. paying bills, filling out forms).	_____
53. Thought about financing your or your children's education.	_____
54. Had disagreements or quarrels with employees.	_____
55. Experienced problems due to being a man or woman.	_____
56. Concerned about declining physical abilities.	_____
57. Concerned about bodily functions.	_____
58. Did not get enough rest or sleep.	_____
59. Had disagreements or problems with your parents or parents-in-law.	_____
60. Had disagreements or problems with your children.	_____
61. Had disagreements or problems with your lover, partner, or spouse.	_____
62. Had difficulty seeing or hearing.	_____
63. Concerned about meeting high standards.	_____
64. Trying to decide to change jobs or not.	_____
65. Had problems with divorce or separation.	_____
66. Had other legal matters or problems to deal with.	_____
67. Concerned with losing weight, or tried to lose weight.	_____
68. Watched television too much.	_____
69. Did not have enough personal energy.	_____
70. Concerned over inner conflicts or over what to do.	_____
71. Regretted past decisions.	_____
72. Experienced menstrual problems.	_____
73. Had nightmares.	_____
74. Concerned about getting ahead or moving up in life.	_____

75. Had disagreements or problems with your boss, supervisor, or employer.	103
76. Had disagreements or problems with your friends.	_____
77. Did not have enough time for the family.	_____
78. Had immediate transportation problems other than financial problems.	_____
79. Did not have enough money for immediate transportation.	_____
80. Did not have enough money for entertainment and recreation activities.	_____
81. Went shopping.	_____
82. Experienced prejudice and discrimination from others.	_____
83. Had property, investment, or tax problems.	_____
84. Did not have enough time for entertainment and recreation activities.	_____
85. Did yardwork or outside home maintenance.	_____
86. Concerned about news events.	_____
87. Experienced problems of your environment (e.g., quality of air, noise level, traffic, crime, etc.).	_____
88. Being suspended or placed on academic probation.	_____
89. Giving a class presentation.	_____
90. Received a "D" or "F" on a test.	_____
91. Experienced personal pressure to get good grades.	_____
92. Completed a research paper.	_____
93. Fell behind in class(es).	_____
94. Experienced pressure to get an "A" or "B" in a course from others.	_____
95. Failed to complete assignments.	_____
96. Studied for a test or quiz.	_____
97. Took a quiz or test in class.	_____
98. Experienced difficulty in making a vocational selection.	_____
99. Experienced peer pressure against getting good grades.	_____

STRESS QUESTIONNAIRE

Take a few moments to think about an interpersonal situation that has been the most stressful for you during the past two weeks. By stressful, we mean a situation that was difficult or troubling to you, either because it upset you or because it took considerable effort to deal with it. By interpersonal, we mean relating to or involving another person or other people.

Brief Description of the Situation: _____

APPENDIX F

PRIMARY APPRAISAL

Why was this situation stressful for you? (Please indicate how much each of the following reasons applies to this situation by circling the appropriate number.)

	Does not apply	Applies a little	Applies somewhat	Applies a lot	Applies a great deal
<u>IN THIS SITUATION THERE WAS (IS) THE POSSIBILITY OF:</u>					
a. Harm to a loved one's health safety or physical well-being.	1	2	3	4	5
b. Harm to a loved one's emotional well-being.	1	2	3	4	5
c. Harm to your own health, safety, or physical well-being.	1	2	3	4	5
d. A loved one having difficulty getting along in the world.	1	2	3	4	5
e. Not achieving an important goal at your job or in your work.	1	2	3	4	5
f. A strain on your financial resources.	1	2	3	4	5
g. Losing the affection of someone important to you.	1	2	3	4	5
h. Losing your self-respect.	1	2	3	4	5
i. Appearing to be an uncaring person.	1	2	3	4	5
j. Appearing unethical.	1	2	3	4	5
k. Losing the approval or respect of someone important to you.	1	2	3	4	5
l. Losing respect for someone else.	1	2	3	4	5
m. Appearing incompetent.	1	2	3	4	5

WAYS OF COPING-REVISED

Please read each item below and indicate, by circling the appropriate category, to what extent you used it in the situation you have just described. (Appendix E)

	Not used	Used some- what	Used quite a bit	Used a great deal
1. Just concentrated on what I had to do next-- the next step.	0	1	2	3
2. I tried to analyze the problem in order to understand it better.	0	1	2	3
3. Turned to work or substitute activity to take my mind off things.	0	1	2	3
4. I felt that time would make a difference-- the only thing to do was to wait.	0	1	2	3
5. Bargained or compromised to get something positive from the situation.	0	1	2	3
6. I did something which I didn't think would work, but at least I was doing something.	0	1	2	3
7. Tried to get the person responsible to change his or her mind.	0	1	2	3
8. Talked to someone to find out more about the situation.	0	1	2	3
9. Criticized or lectured myself.	0	1	2	3
10. Tried not to burn my bridges, but leave things open somewhat.	0	1	2	3
11. Hoped a miracle would happen.	0	1	2	3
12. Went along with fate; sometimes I just have bad luck.	0	1	2	3
13. Went on as if nothing had happened.	0	1	2	3
14. I tried to keep my feelings to myself.	0	1	2	3
15. Looked for the silver lining, so to speak; tried to look on the bright side of things.	0	1	2	3
16. Slept more than usual.	0	1	2	3
17. I expressed anger to the person(s) who caused the problem.	0	1	2	3
18. Accepted sympathy and understanding from someone.	0	1	2	3
19. I told myself things that helped me feel better.	0	1	2	3
20. I was inspired to do something creative.	0	1	2	3
21. Tried to forget the whole thing.	0	1	2	3
22. I got professional help.	0	1	2	3

	Not used	Used somewhat	Used quite a bit	Used a great deal
23. Changed or grew as a person in a good way.	0	1	2	3
24. I waited to see what would happen before doing anything.	0	1	2	3
25. I apologized or did something to make up.	0	1	2	3
26. I made a plan of action and followed it.	0	1	2	3
27. I accepted the next best thing to what I wanted.	0	1	2	3
28. I let my feelings out somehow.	0	1	2	3
29. Realized I brought the problem on myself.	0	1	2	3
30. I came out of the experience better than when I went in.	0	1	2	3
31. Talked to someone who could do something concrete about the problem.	0	1	2	3
32. Got away from it for a while; tried to rest or take a vacation.	0	1	2	3
33. Tried to make myself feel better by eating, drinking, smoking, using drugs or medication, etc.	0	1	2	3
34. Took a big chance or did something very risky.	0	1	2	3
35. I tried not to act too hastily or follow my first hunch.	0	1	2	3
36. Found new faith.	0	1	2	3
37. Maintained my pride and kept a stiff upper lip.	0	1	2	3
38. Rediscovered what is important in life.	0	1	2	3
39. Changed something so things would turn out all right.	0	1	2	3
40. Avoided being with people in general.	0	1	2	3
41. Didn't let it get to me; refused to think too much about it.	0	1	2	3
42. I asked a relative or friend I respected for advice.	0	1	2	3
43. Kept others from knowing how bad things were.	0	1	2	3
44. Made light of the situation; refused to get too serious about it.	0	1	2	3
45. Talked to someone about how I was feeling.	0	1	2	3
46. Stood my ground and fought for what I wanted.	0	1	2	3
47. Took it out on other people.	0	1	2	3

	Not used	Used somewhat	Used quite a bit	Used a great deal
48. Drew on my past experiences; I was in a similar situation before.	0	1	2	3
49. I knew what had to be done, so I doubled my efforts to make things work.	0	1	2	3
50. Refused to believe that it had happened.	0	1	2	3
51. I made a promise to myself that things would be different next time.	0	1	2	3
52. Came up with a couple of different solutions to the problem.	0	1	2	3
53. Accepted it, since nothing could be done.	0	1	2	3
54. I tried to keep my feelings from interfering with other things too much.	0	1	2	3
55. Wished that I could change what had happened or how I felt.	0	1	2	3
56. I changed something about myself.	0	1	2	3
57. I daydreamed or imagined a better time or place than the one I was in.	0	1	2	3
58. Wished that the situation would go away or somehow be over with.	0	1	2	3
59. Had fantasies or wishes about how things might turn out.	0	1	2	3
60. I prayed.	0	1	2	3
61. I prepared myself for the worst.	0	1	2	3
62. I went over in my mind what I would say or do.	0	1	2	3
63. I thought about how a person I admire would handle this situation and used that as a model.	0	1	2	3
64. I tried to see things from the other person's point of view.	0	1	2	3
65. I reminded myself how much worse things could be.	0	1	2	3
66. I jogged or exercised.	0	1	2	3

RECENT PHYSICAL SYMPTOM CHECKLIST

Based on the following scale of 0 to 5, please indicate how often you were bothered by the following physical symptoms within the past two weeks.

0 = Not at all 1 = Slightly 2 = Somewhat 3 = Moderately 4 = Very 5 = Extremely

- | | |
|--------------------------------------|---|
| 1. ___ Dry eyes | 45. ___ Neckache |
| 2. ___ Burning eyes | 46. ___ Upper backache |
| 3. ___ Spots before your eyes | 47. ___ Middle Backache |
| 4. ___ Blurry vision | 48. ___ Lower Backache |
| 5. ___ Other vision problems | 49. ___ Swollen joints or limbs |
| 6. ___ Ear ache | 50. ___ Joint or muscle stiffness |
| 7. ___ Hearing loss | 51. ___ Joint pain |
| 8. ___ Ringing in the ears | 52. ___ Leg pain |
| 9. ___ Running ears or nose | 53. ___ Muscle cramping |
| 10. ___ Stuffy nose | 54. ___ Muscles twitches |
| 11. ___ Nose bleed | 55. ___ Excessive water retention |
| 12. ___ Chapped, dry or cracked lips | 56. ___ Breast tenderness |
| 13. ___ Dry mouth | 57. ___ Excessive menstrual cramping |
| 14. ___ Toothache | 58. ___ Vaginal itching or burning |
| 15. ___ Gum soreness or bleeding | 59. ___ Painful erection |
| 16. ___ Excessive hiccups | 60. ___ Painful intercourse |
| 17. ___ Sore throat | 61. ___ Difficulty maintaining erection |
| 18. ___ Loss of voice | 62. ___ Difficulty maintaining sexual arousal |
| 19. ___ Teeth grinding | 63. ___ Loss of sexual desire |
| 20. ___ Facial pain | 64. ___ Dry or itchy skin |
| 21. ___ Muscle ticks or twitches | 65. ___ Skin rash |
| 22. ___ Cold or fever sores | 66. ___ Blister |
| 23. ___ Excessive acne or blemishes | 67. ___ Fainting spell |
| 24. ___ Headache | 68. ___ Dizziness |
| 25. ___ Itchy or dry scalp | 69. ___ Fever |
| 26. ___ Excessive dandruff | 70. ___ Chills |
| 27. ___ Hair loss | 71. ___ Hot and cold flashes |
| 28. ___ Difficulty swallowing | 72. ___ Flu or virus |
| 29. ___ Choking episode | 73. ___ Cold |
| 30. ___ Loss of appetite | 74. ___ Coughing or sneezing spells |
| 31. ___ Excessive appetite | 75. ___ Excessive tiredness |
| 32. ___ Stomach ache | 76. ___ Excessive sleeping |
| 33. ___ Burning stomach pain | 77. ___ Restlessness |
| 34. ___ Nausea | 78. ___ Excessive perspiration |
| 35. ___ Vomiting | 79. ___ Shakiness |
| 36. ___ Heart burn | 80. ___ Shortness of breath |
| 37. ___ Chest pain | 81. ___ Numbness or tingling sensations |
| 38. ___ Intestinal cramps | 82. ___ Rapid or pounding heartbeats |
| 39. ___ Excessive gas | 83. ___ Rapid breathing |
| 40. ___ Constipation | 84. ___ Difficulty breathing |
| 41. ___ Diarrhea | 85. ___ Sweaty hands and palms |
| 42. ___ Rectal burning or pain | 86. ___ Difficulty remembering |
| 43. ___ Painful urination | 87. ___ Difficulty concentrating |
| 44. ___ Painful Bowel movement | 88. ___ Infection |

MENTAL HEALTH INVENTORY

1. How happy, satisfied, or pleased have you been with your personal life during the past month? (circle one)

1. Extremely happy, could not have been more satisfied or pleased
2. Very happy most of the time
3. Generally satisfied, pleased
4. Sometimes fairly satisfied
5. Generally dissatisfied, unhappy
6. Very dissatisfied, unhappy most of the time

2. How much of the time have you felt lonely during the past month? (circle one)

- | | |
|---------------------------|-------------------------|
| 1. All of the time | 4. Some of the time |
| 2. Most of the time | 5. A little of the time |
| 3. A good bit of the time | 6. None of the time |

3. How often did you become nervous or jumpy when faced with excitement or unexpected situations during the past month? (circle one)

- | | |
|-----------------|-----------------|
| 1. Always | 4. Sometimes |
| 2. Very often | 5. Almost never |
| 3. Fairly often | 6. Never |

4. During the past month, how much of the time have you felt that the future looks hopeful and promising? (circle one)

- | | |
|---------------------------|-------------------------|
| 1. All of the time | 4. Some of the time |
| 2. Most of the time | 5. A little of the time |
| 3. A good bit of the time | 6. None of the time |

5. How much of the time, during the past month, has your daily life been full of things that were interesting to you? (circle one)

- | | |
|---------------------------|-------------------------|
| 1. All of the time | 4. Some of the time |
| 2. Most of the time | 5. A little of the time |
| 3. A good bit of the time | 6. None of the time |

6. How much of the time, during the past month, did you feel relaxed and free of tension? (circle one)

- | | |
|---------------------------|-------------------------|
| 1. All of the time | 4. Some of the time |
| 2. Most of the time | 5. A little of the time |
| 3. A good bit of the time | 6. None of the time |

7. During the past month, how much of the time have you generally enjoyed the things you do? (circle one)

- | | |
|---------------------------|-------------------------|
| 1. All of the time | 4. Some of the time |
| 2. Most of the time | 5. A little of the time |
| 3. A good bit of the time | 6. None of the time |

8. During the past month, have you had any reason to wonder if you were losing your mind, or losing control over the way you act, talk, feel or of your memory? (circle one)

1. No, not at all
2. Maybe a little
3. Yes, but not enough to be concerned or worried about it
4. Yes, and I have been a little concerned
5. Yes, and I am quite concerned
6. Yes, and I am very much concerned about it

9. During the past month, how much of the time have you felt loved and wanted? (circle one)

- | | |
|---------------------------|-------------------------|
| 1. All of the time | 4. Some of the time |
| 2. Most of the time | 5. A little of the time |
| 3. A good bit of the time | 6. None of the time |

10. How much of the time, during the past month, have you been a very nervous person? (circle one)

- | | |
|---------------------------|-------------------------|
| 1. All of the time | 4. Some of the time |
| 2. Most of the time | 5. A little of the time |
| 3. A good bit of the time | 6. None of the time |

11. When you got up in the morning, this past month, about how often did you expect to have an interesting day? (circle one)

- | | |
|-----------------|-----------------|
| 1. Always | 4. Sometimes |
| 2. Very often | 5. Almost never |
| 3. Fairly often | 6. Never |

12. During the past month, how much of the time have you felt tense or "high-strung?" (circle one)

- | | |
|---------------------------|-------------------------|
| 1. All of the time | 4. Some of the time |
| 2. Most of the time | 5. A little of the time |
| 3. A good bit of the time | 6. None of the time |

13. During the past month, have you been in firm control of your behavior, thoughts, emotions, feelings? (circle one)

- | | |
|---------------------------|------------------------------------|
| 1. Yes, very definitely | 4. No, not too well |
| 2. Yes, for the most part | 5. No, and I am somewhat disturbed |
| 3. Yes, I guess so | 6. No, and I am very disturbed |

14. During the past month, how often did your hands shake when you tried to do something? (circle one)

- | | |
|-----------------|-----------------|
| 1. Always | 4. Sometimes |
| 2. Very often | 5. Almost never |
| 3. Fairly often | 6. Never |

15. During the past month, how often did you feel that you had nothing to look forward to?

- | | |
|-----------------|-----------------|
| 1. Always | 4. Sometimes |
| 2. Very often | 5. Almost never |
| 3. Fairly often | 6. Never |

16. How much of the time, during the past month, have you felt calm and peaceful? (circle one)

- | | |
|---------------------------|-------------------------|
| 1. All of the time | 4. Some of the time |
| 2. Most of the time | 5. A little of the time |
| 3. A good bit of the time | 6. None of the time |

17. How much of the time, during the past month, have you felt emotionally stable? (circle one)

- | | |
|---------------------------|-------------------------|
| 1. All of the time | 4. Some of the time |
| 2. Most of the time | 5. A little of the time |
| 3. A good bit of the time | 6. None of the time |

18. How much of the time, during the past month, have you felt downhearted and blue? (circle one)

- | | |
|---------------------------|-------------------------|
| 1. All of the time | 4. Some of the time |
| 2. Most of the time | 5. A little of the time |
| 3. A good bit of the time | 6. None of the time |

19. How often have you felt like crying, during the past month? (circle one)

- | | |
|-----------------|-----------------|
| 1. Always | 4. Sometimes |
| 2. Very often | 5. Almost never |
| 3. Fairly often | 6. Never |

20. How much of the time, during the past month, were you able to relax without difficulty? (circle one)

- | | |
|---------------------------|-------------------------|
| 1. All of the time | 4. Some of the time |
| 2. Most of the time | 5. A little of the time |
| 3. A good bit of the time | 6. None of the time |

21. During the past month, how much of the time did you feel that your love relationships, loving and being loved, were full and complete? (circle one)

- | | |
|---------------------------|-------------------------|
| 1. All of the time | 4. Some of the time |
| 2. Most of the time | 5. A little of the time |
| 3. A good bit of the time | 6. None of the time |

22. How often, during the past month, did you feel that nothing turned out for you the way you wanted it to? (circle one)

- | | |
|-----------------|-----------------|
| 1. Always | 4. Sometimes |
| 2. Very often | 5. Almost never |
| 3. Fairly often | 6. Never |

23. How much have you been bothered by nervousness, or your "nerves," this past month? (circle one)

1. Extremely so, to the point where I could not take care of things
2. Very much bothered
3. Bothered quite a bit by nerves
4. Bothered some, enough to notice
5. Bothered just a little bit by nerves
6. Not bothered at all by this

24. During the past month, how much of the time has living been a wonderful adventure for you? (circle one)

- | | |
|---------------------------|-------------------------|
| 1. All of the time | 4. Some of the time |
| 2. Most of the time | 5. A little of the time |
| 3. A good bit of the time | 6. None of the time |
-

25. How often, during the past month, have you felt so down in the dumps that nothing could cheer you up? (circle one)

- | | |
|-----------------|-----------------|
| 1. Always | 4. Sometimes |
| 2. Very often | 5. Almost never |
| 3. Fairly often | 6. Never |
-

26. During the past month, how much of the time have you felt restless, fidgety, or impatient? (circle one)

- | | |
|---------------------------|-------------------------|
| 1. All of the time | 4. Some of the time |
| 2. Most of the time | 5. A little of the time |
| 3. A good bit of the time | 6. None of the time |
-

27. During the past month, how much of the time have you been moody or brooded about things? (circle one)

- | | |
|---------------------------|-------------------------|
| 1. All of the time | 4. Some of the time |
| 2. Most of the time | 5. A little of the time |
| 3. A good bit of the time | 6. None of the time |
-

28. How much of the time, during the past month, have you felt cheerful, light-hearted? (circle one)

- | | |
|---------------------------|-------------------------|
| 1. All of the time | 4. Some of the time |
| 2. Most of the time | 5. A little of the time |
| 3. A good bit of the time | 6. None of the time |
-

29. During the past month, how often did you get rattled, upset, or flustered? (circle one)

- | | |
|-----------------|-----------------|
| 1. Always | 4. Sometimes |
| 2. Very often | 5. Almost never |
| 3. Fairly often | 6. Never |
-

30. During the past month, have you been anxious or worried? (circle one)

1. Yes, extremely so, to the point of being sick or almost sick
 2. Yes, very much so
 3. Yes, quite a bit
 4. Yes, some, enough to bother me
 5. Yes, a little bit
 6. No, not at all
-

31. During the past month, how much of the time were you a happy person? (circle one)

- | | |
|---------------------------|-------------------------|
| 1. All of the time | 4. Some of the time |
| 2. Most of the time | 5. A little of the time |
| 3. A good bit of the time | 6. None of the time |

32. How often during the past month did you find yourself having difficulty trying to calm down? (circle one)

- | | |
|-----------------|-----------------|
| 1. Always | 4. Sometimes |
| 2. Very often | 5. Almost never |
| 3. Fairly often | 6. Never |

33. During the past month, how much of the time have you been in low or very low spirits? (circle one)

- | | |
|---------------------------|-------------------------|
| 1. All of the time | 4. Some of the time |
| 2. Most of the time | 5. A little of the time |
| 3. A good bit of the time | 6. None of the time |

34. How often, during the past month, have you been waking up feeling fresh and rested? (circle one)

- | | |
|----------------------|---------------------------------|
| 1. Always, every day | 4. Some days, but not usually |
| 2. Almost every day | 5. Hardly ever |
| 3. Most days | 6. Never wake up feeling rested |

35. During the past month, have you been under or felt you were under any strain, stress, or pressure? (circle one)

- | | |
|--|----------------------------|
| 1. Yes, almost more than I could stand or bear | 4. Yes, some, about normal |
| 2. Yes, quite a bit of pressure | 5. Yes, a little bit |
| 3. Yes, some, more than usual | 6. No, not at all |

INFORMED CONSENT FORM

The Roles of Appraisal and Coping as Mediators Between Hardiness
and Self-reported Physical and Psychological Health Outcomes

Principal Investigator: William M. Musser IV
Under the direction of D. Balfour Jeffrey, Ph.D.
University of Montana

I understand that by signing my name below, I give my informed consent to participate in this study.

1. The procedures to be followed include the completion of several short questionnaires at the initial testing period, which will take approximately one hour. These questionnaires will ask for some personal background information, your attitudes towards the world, and about a stressful interpersonal event and the way you dealt with that event. Furthermore, you will be turning in a physical illness symptom checklist that takes approximately 10 minutes to complete every 2 weeks for 8 weeks total. At the end of the 8 week period, you will reconvene for one hour to complete the final 2 questionnaires about stressors and your general well-being, and then be debriefed.

2. Please try to answer each question to the best of your ability. Some of the questions may make you feel stressed or uncomfortable, in which case you may choose not to answer those stressful questions and may seek out the investigator or any of the resources referred to you on the instruction sheet.

3. It is important to be honest and straightforward, and be assured that all information that you provide will be kept strictly confidential. Your name will never be associated with the contents of your completed data, such as any specific symptom. Your name will only be associated with the last five digits of your student identification number in order to phone you in the event that you fail to complete the data collection process, such as forgetting to hand in your physical illness symptom checklist. Your data will remain sealed until the end of the last data collection, when the five digit number will be destroyed and a non-identifying subject number will be assigned in its place.

4. You will receive 6 experimental credits for your full participation in this study. You may refuse to participate or discontinue participation at any time. However, should you choose to discontinue any time after completing the initial questionnaires, you will receive only 2 credits.

5. Although we feel this study to be minimal risk, the University requires us to state that "in the event that you are injured as a result of this research you should individually seek appropriate medical treatment. If the injury is caused by the negligence of the University or any of its employees, you may be entitled to reimbursement or compensation pursuant to the Comprehensive State Insurance Plan established by the Department of Administration under the authority of M.C.A., Title 2, Chapter 9. In the event of a claim for such injury, further information may be obtained from the University's Claims Representative or University Legal Counsel."

I HAVE READ AND UNDERSTOOD THE ABOVE AND AGREE TO PARTICIPATE IN THIS STUDY.

Participant

Date

Experimenter

Date

Address

Phone

APPENDIX K

Institutional Review Board Proposal

The Roles of Appraisal and Coping as Mediators Between Hardiness and Self-reported Physical and Psychological Health Outcomes

Principal Investigator: William M. Musser IV
Under the direction of D. Balfour Jeffrey, Ph.D.

1. Purpose of the Research Project

The aim of the present study is to further examine coping strategies and cognitive appraisal as mediators of the relationship between hardiness and outcomes of self-reported physical and psychological health. Factors that promote the maintenance of health in the face of stress have been discussed for many years. Kobasa (1979) put forth the hardiness model of personality that hypothesized that persons high in characteristics of control, commitment, and challenge would tend to remain healthier in the face of stressful life events than those low in such characteristics. Influences of cognitive appraisal, coping processes, neuroticism, and gender on hardiness have recently been seen as well. Conclusions in the research literature regarding the stress-moderating and stress-mediating effects of hardiness have been inconsistent, due to measurement, methodological, statistical, and conceptual problems with hardiness research.

This study attempts to address these matters and clarify the role of hardiness in the stress-illness relationship by testing models that examine the effects of hardiness on prospective self-reported psychological and physical symptom measures of health. These models will include gender differences while also controlling for the influence of neuroticism on hardiness, an issue

which needs clarification. Furthermore, these models will include the relationship between hardiness and cognitive appraisal and coping strategies in predicting self-reported physical and psychological symptom measures of health, again taking into account differences in gender. The statistical method of path analysis will be utilized to strengthen the possibility of a causal relationship between these variables.

2. The Subjects

Subjects will be 300 male and female undergraduates enrolled in Introductory Psychology in the Spring semester of 1998. No minors will be utilized for this study. Subjects will receive six experimental credits for their participation.

3. Recruiting or Selecting Subjects

Subjects will voluntarily choose to participate in this study in order to receive experimental credit for Psychology 100. Students enrolled in Psychology 100 are required to either participate as a research subject in 8 credits worth of experiments, or to write an 8-10 page paper on a psychological topic approved by the instructor as a suitable alternative to active participation in research studies.

4. Where the study will take place

The study will take place in a large lecture hall, such as Chemistry 105, in which subjects can convene roughly 100 at a time. Permission to use the lecture hall or halls will be secured beforehand, of course.

5. The Activities the Subjects Will Perform

Subjects will simply complete pencil and paper questionnaires and checklists. For the first part of the study, 100 subjects at a time will be given the Informed Consent Form (see Appendix J), brief demographic questionnaire

(see Appendix A), the Personal Views Survey-II measuring Hardiness (see Appendix B), the Trait Scale of the State-Trait Anxiety Inventory measuring Neuroticism (see Appendix C), the Stress Questionnaire (see Appendix E), the Primary and Secondary Appraisal questionnaire measuring cognitive appraisal (see Appendix F), and the revised Ways of Coping Questionnaire measuring coping strategies (see Appendix G) to fill out in a large classroom at Time 1, which will span across 3 days. The principal investigator will read the standardized instructions and give the participants a written copy of the instructions (see Appendix L). He will be there for the full duration of testing should any questions or issues arise. The time allotted to complete these forms will be one hour, which should be quite sufficient.

Then 8 weeks later at Time 2, the subjects will return again 100 at a time over 3 days to complete the modified Hassles Scale measuring stressors (see Appendix D) and the Mental Health Inventory measuring psychological well-being and psychological distress (see Appendix I). Again, the principal investigator will read the standardized instructions (see Appendix M) and be there for the full duration of testing should any questions or issues arise. Subjects will be debriefed after the final data collection period at Time 2 (see Appendix N).

Between Time 1 and Time 2, occurring every 2 weeks, subjects will hand in their Recent Physical Symptoms Checklist measuring physical illness symptoms (see Appendix H) for the previous 2-week time period (this takes about 10 minutes). Participants will hand in their checklists 4 times on a specific day of the week every 2 weeks, to create the final time period of 8 weeks. Subjects will turn their Recent Physical Symptoms Checklists in a sealed

envelope with only their last five digits of their student identification number on the outside of the envelope. These envelopes will remain sealed until the end of the data collection period of 8 weeks.

The subjects may choose to discontinue participation at any time during the study. Since this study involves a prospective design, the subjects will be informed that should they agree to take part in the study and complete the forms at Time 1, if at any time after Time 1 they choose to discontinue participation, they will receive only 2 experimental credits rather than the full 6 credits. It is hoped that subjects will remain in the study in order to receive the full 6 credits, which will help decrease attrition. All the measures are included (see Appendices).

6. Benefits of the Research

The benefits of the research are that the results will add to the knowledge base and hardiness literature that will help clarify the relationships between stress, hardiness, neuroticism, cognitive appraisal, coping strategies, physical illness symptoms, psychological distress, psychological well-being, and gender. This study specifically aims to address many of the methodological and statistical criticisms of the earlier hardiness literature, and therefore the results should help in evaluating the current status and value of the hardiness construct in the literature, and hopefully lead to better prevention and treatment of stress.

7. The Risks and Discomforts

The potential risks and discomforts for the subjects participating in this study are minimal, and there are no violations of normal expectations involved in this study. The possible risks or discomforts that would be foreseeable are those of revealing confidential, personal information that may possibly be

slightly stressful or embarrassing in nature. Examples of this could be the recall of and divulging of occurrences of particular stressful situations and/or explicit physical or psychological symptoms of an embarrassing or sexual nature (see Appendices). There is no intention to use any of these questionnaires and checklists in this study to diagnose any physical or psychological illnesses, as they are insufficient for making any such diagnoses (see Appendices). All subjects will receive referrals for physical and mental health services, both at the beginning and the end of the study, so if at any time they have questions or concerns that they would like to discuss, they will be referred to a qualified health care provider. (see below).

8. Minimizing Deleterious Effects

The principal investigator, Will Musser, will be present at all data collection times for Time 1 and Time 2 to address any issues that may arise. If the subjects at any time have questions or concerns that they would like to discuss with a qualified health provider, the principal investigator will be prepared to speak with and/or accompany them to Student Health Services, Counseling and Psychological Services, or the Clinical Psychology Center. Subjects will also be given the phone numbers of the principal investigator, his supervisor, Dr. Balfour Jeffrey, Student Health Services, CAPS, and the CPC as referrals to contact in case of feeling discomfort at any time due to the data collection process. This information will be provided to each and every subject at both the beginning and the conclusion of the data collection periods, Time 1 and Time 2 (see Appendices L and N). See below about ensuring the confidentiality of the subjects.

9. How the Subject's Personal Privacy is to be Protected

The nature of the content of some of the physical symptoms of the Recent Physical Symptom Checklist revealed by the participants warrants sensitivity and confidentiality on the part of the principal investigator and the research team. Furthermore, the principal investigator, being a Psychology 100 Instructor, has realized that some of his students may choose to participate in this study, and the complications of a possible dual-role conflict need to be addressed and precautions taken beforehand. Acknowledging this, the primary investigator has devised a method for data collection that minimizes attrition and incomplete data, while maximizing confidentiality almost to the point of anonymity.

At Time 1, a master list of all participants of the study will be collected, along with the last five digits of their student identification numbers (Social Security Numbers), and local phone numbers. The use of this list will be elaborated on down below. Subjects will then hand in their Recent Physical Symptom Checklist biweekly in a sealed envelope with only the last five digits of their student identification numbers on the outside of the envelope. These envelopes will remain sealed until the end of the data collection period of 8 weeks. Subjects that do not hand in envelopes containing their Recent Physical Symptom Checklist at the designated time will be phoned, simply by matching the missing five digit student identification numbers with the subjects' names and phone numbers.

At the end of the data collection period, the master list with the five digit student identification numbers will be destroyed. Names of subjects will be kept only for recording purposes in order to ensure that subjects receive proper

experimental credit for participation in this study, and will not be associated with any data. Then each five digit student identification number will be assigned a new arbitrary subject number (i.e. 1-300) on all collected data questionnaires and checklists, and the new subject number will be the only number entered into the data base associated with the data. So no student's name or identification number will be associated with any particular data, such as a particular revealed physical symptom or stressor. Therefore, the primary investigator and research assistants will not have any students' names associated with any particular data or symptoms.

The use of the subjects' last five digits of their student identification number for collection during the 8 weeks was chosen because it seems easiest for each subject to remember over the full time period of 8 weeks, rather than an arbitrarily assigned subject number beforehand. The logistics of handling 300 subjects' packets and envelopes of data will be astounding, and having them remember such a subject number would be difficult, and if any subjects should forget their number, it would severely complicate the data collection process for the principal investigator. However, to reiterate, the deletion of the five digit student identification numbers will take place concurrently with the addition of the arbitrarily assigned subject numbers to the data immediately after it has been ascertained that all the data has been collected.

10. Written Informed Consent Form

A copy of the written informed consent form is attached (see Appendix I).

11. Waiver of Written Informed Consent

Not applicable.

I HAVE READ THE ABOVE AND AGREE THAT IT IS AN ACCURATE
REPRESENTATION OF THE PROCEDURES TO BE USED IN THIS STUDY

D. Balfour Jeffrey, Ph.D.
Chairperson of Thesis Committee

**INSTRUCTIONS GIVEN AT TIME 1
(READ ORALLY AND GIVEN IN WRITTEN FORM TO ALL PARTICIPANTS)**

Before you are several questionnaires that will ask you questions about your attitudes towards the world, a stressful interpersonal event, and the way you dealt with that event. They will take approximately one hour to complete. If answering a particular question makes you too uncomfortable, you may skip it, but please try to answer each question to the best of your ability. The questionnaires have different directions and instructions for each questionnaire. Please carefully read and follow the directions specific to that particular questionnaire that you are presently answering. Again, it is very important that you be honest and straightforward, and answer each question carefully.

Furthermore, you will be completing a recent physical symptom checklist every 2 weeks that takes 10 minutes to fill out, which will be turned in on Tuesday of every other week, over a period of 8 weeks. You will turn each checklist in a sealed envelope with only your last five digits of your student identification number on the outside of the envelope. Each checklist and envelope has the date that it is to be turned in to the experimenters marked on it. This is to help you remember when you are required to turn it in. **The dates are 3/10, 3/24, 4/7, and 4/21. These should be taken to my office, PhP 213, on the Tuesday that they are due, between the hours of 12 and 6pm.** If you cannot turn them in at those times, please slide them under the door of PhP 213. So 4 checklists, each covering a 2 week time period, will be turned in by you in a sealed envelope for a total time period of 8 weeks. Your Psych 100 instructor will also remind you when to turn these in. Please follow the directions carefully on the top of each recent physical symptom checklist.

At the end of the 8 weeks, you will reconvene to fill out another set of questionnaires that will take approximately one hour to complete. Look for the sign-up sheets for this date to be posted near mid-April. These questionnaires will ask you about stressors and your general well-being. You will receive 6 experimental credits for full participation in this study, which entails handing in all your checklists and returning to complete the final questionnaires the third week in April. You may refuse to participate or discontinue participation at any time. However, should you choose to discontinue, you will be entitled to only 2 experimental credits as opposed to the full 6 credits that you will receive upon completion of this study.

Please keep these instructions as a reference for the study. If at any point today or during the study you have any questions about the study or what you are supposed to be doing, you may contact me, the principal investigator, Will Musser, at 543-3121, or Dr. Balfour Jeffrey at 243-5664. Only a non-identifying subject number will be associated with the contents of your completed data, and not your name nor your last five digits of your student identification number. The data collected from all participants during the course of this study will remain anonymous. Your name will only be associated with the last five digits of your student identification number in order to phone you in the event that you fail to complete the data collection process, such as forgetting to hand in your physical illness symptom checklist. If at any time, you should have a concern for your physical and/or mental health, please contact:

Student Health Services	243-2122
Counseling and Psychological Services	243-4711
Clinical Psychological Center	243-4523

**INSTRUCTIONS GIVEN AT TIME 2
(READ ORALLY AND GIVEN IN WRITTEN FORM TO ALL PARTICIPANTS)**

Before you are several questionnaires that will ask you questions about stressors and your general well-being. They will take approximately one hour to complete. If answering a particular question makes you too uncomfortable, you may skip it, but please try to answer each question to the best of your ability. The questionnaires have different directions and instructions for each questionnaire. Please carefully read and follow the directions specific to that particular questionnaire that you are presently answering, as well as the particular question. Again, it is very important that you be honest and straightforward, and answer each question carefully.

Again, only an arbitrarily assigned subject number will be associated with the contents of your completed data and not your name nor your last five digits of your student identification number. If at any point today you have any questions about the study or about what you are supposed to be doing, please come up and ask me.

You will receive 6 experimental credits for completion of this study today. You may refuse to participate or discontinue participation at any time. However, should you choose to do so, you will not be entitled to only 2 experimental credits from this experiment. After completing the questionnaires, you will be given a debriefing form which you should read over. You may then choose to stay around to ask the principal investigator any questions you might have about the study, or leave if you do not have any questions.

DEBRIEFING AFTER STUDY

**The Roles of Appraisal and Coping as Mediators Between Hardiness
and Self-reported Physical and Psychological Health Outcomes**

**Principal Investigator: William M. Musser IV
Under the direction of D. Balfour Jeffrey, Ph.D.
University of Montana**

The purpose of this study is to study the relationships between stressors, hardiness, coping strategies, cognitive appraisal, and outcomes of physical and psychological health. The influence of neuroticism on these variables will also be examined. Hardiness is a personality variable emphasizing challenge, control, and commitment in life, and is hypothesized to buffer or reduce the effects of daily environmental stressors to promote better physical and psychological health. Neuroticism is a variable thought to promote poorer physical and psychological health outcomes. This study's aim is to see if the effects of hardiness on health are brought about through appraisal of stressors and coping strategies for dealing with those stressors. Cognitive appraisal examines how certain events are viewed or labeled by people, either as challenging or threatening, and coping looks at what behaviors are utilized for dealing with most events encountered in daily life. Also, the question of whether gender changes the effects of hardiness through differences in appraisal, coping, and health outcomes will be addressed. If you have any questions about the study, please contact the principal investigator, Will Musser, at 243-4521 or his supervisor, Dr. Balfour Jeffrey, at 243-5664. If you should have a concern for your physical and/or mental health, please contact:

Student Health Services	243-2122
Counseling and Psychological Services	243-4711
Clinical Psychological Center	243-4523

Thank you again for your participation in this study.