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Confirmatory factor analysis of the Coping Style Inventory in a college sample

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CONFIRMATORY FACTOR ANALYSIS OF THE COPING STYLE INVENTORY

IN A COLLEGE SAMPLE

by

Christopher Garth Bellah, M.A.

A Dissertation Presented in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy in Counseling Psychology

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We hereby recommend that the dissertation prepared under our supervision
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ABSTRACT

The present study conducted a confirmatory factor analysis of the Coping Style Inventory (CSI). A comprehensive review of the history of stress and coping research was provided, along with a presentation of suggestions for future research that have indicated a need for a melding of both theory-driven and empirically-driven methodology in coping assessment. Pursuant to this need, a pilot study was conducted to explore the factor structure and psychometric properties of the CSI (N = 560). Results of pilot work using a principle components extraction and a parallel analysis criterion for factor retention indicated that six primary factors were appropriate to retain for rotation to simple structure. Following factor extraction, an oblique rotation of the data matrix was performed. Results of exploratory factor analysis yielded a single stable solution, with each test item loading only on its intended factor. Additionally, a second-order components analysis of pilot data revealed the presence of a hierarchical structure in the data corresponding to a two-dimensional pattern, with each dimension consisting of three primary factors. Overall, the results of pilot work indicate the factor solution that emerged from the data was consistent with the theoretically derived scales of the CSI. The present study tested the assumptions of the hierarchical structure of the theoretical model through confirmatory factor analysis (N = 420) using structural equation modeling techniques. Results of analyses indicate that indices of model fit reflect a high degree of similarity between estimated and observed data matrices,
providing support for the rationally derived scales of the CSI. Presentation of the results of this study is followed by a general discussion of data analyses, implications of research findings, limitations of the study, and suggestions for future research.
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CHAPTER 1

INTRODUCTION

Currently, a great deal of research is underway as professionals in the fields of psychiatry and psychology collaborate in the work of updating and revising the latest edition of the Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) (APA, 1994). A prescribed area for research in the current volume is in the development of a sixth axis of diagnosis that reflects coping mechanisms related to the psychosocial stressors indicated on Axis IV (APA, 1994). It has been proposed that the sixth axis should be designed to enable the clinician to compare both the stressors thought to be etiologically associated with mental illness and the coping processes that affect its pathogenesis (Fauman, 1994).

As observed by the American Psychiatric Association (1994), a stressor is an event or stimulus that produces a psychological, emotional, or behavioral response in an individual. Likewise, psychological stress is popularly defined as a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding available resources and endangering an individual's well-being (Lazarus & Folkman, 1984). Additionally, stress has also been conceptualized as any result of mental or somatic demands placed on the body (Selye, 1976; Snyder & Dinoff,
1999), and it has been more broadly defined by Aldwin (1994) as a quality of experience that results in psychological or physiological distress. Therefore, a "stressor" refers to a stimulus, and "stress" refers to the psychological, emotional, or behavioral response to that stressor. Furthermore, coping with stress has been conceptualized as a process of executing cognitive strategies and behavioral interventions in response to distressing life events (Billings & Moos, 1981; Endler & Parker, 1990a; Folkman & Lazarus, 1988; McCrae, 1984). Similarly, proponents of the medical model popularly regard coping as an organism's efforts to regain a state of physiological homeostasis (Selye, 1956; Matlin, 1999). Moreover, coping strategies, such as planning and seeking social support, involve solving specific situational problems, while coping styles refer to general tendencies or characteristic approaches to managing stress (Terry, 1994), such as habitually monitoring one's environment for potential threats or being disposed towards "blunting" one's emotional reactivity to life stressors (Miller, 1987).

Although these definitions provide researchers with a common lore in discussion of stress and coping processes, the conceptual operationalization of each of these terms remains a matter of debate among researchers and clinicians alike. In fact, research in the area of coping style has particularly been ladened with a disconcertion among scholars regarding the lack of consensus in identifying the styles that exist, as well as the characteristics that comprise them. Given the call for research in the area of coping effectiveness in development of the sixth axis of diagnosis (Lazarus, 2000), it is becoming increasingly vital that researchers identify the features of coping styles that mediate the appraisal of stress and facilitate psychosocial adaptation.
In response to this need for research in coping styles, the present study provides a critical review of research leading to the conceptual development of the Coping Style Inventory (CSI). This instrument is designed to provide a means for measuring the coping processes that underlie four principal coping styles: sanguine, choleric, melancholic, and phlegmatic. Coined by Galen in approximately 250 A.D., these "temperaments" were originally conceived as coping styles, or characteristic approaches to managing stress (Lazarus & Launier, 1978) associated with illness, injury, and the often arduous regimens of ancient medical treatment. As originally conceived, those of sanguine temperament are prone to cope with stress by maintaining a positive countenance and seeking social support, while those of melancholic temperament typically become introspective and withdrawn. Likewise, those of choleric temperament were originally stated to cope with stress through vigilance and disinhibition, while those of phlegmatic temperament characteristically cope with patience and affable compliance with prescribed treatments (Kagen, Snidman, Arcus, & Reznick, 1994).

As an extension of the Hippocratic doctrine, which observed that individuals of different character often prove to have varying prognoses for the treatment of similar afflictions, Galen suggests that certain psychological factors may predispose individuals to being vulnerable to contracting certain illnesses or sustaining particular types of injury. Furthermore, Galen indicates that psychological factors should be considered along with heredity and the environment when prognosticating the efficacy of prescribed treatments.

Over the centuries, this basic model of temperament has been reformulated by some of psychology's most prominent scholars such as Kant, Wundt, and Eysenck
(Eysenck, 1981), however the scope of research in the area has often varied. Although originally conceived as stylistic approaches to coping with stress, the scope of Galen’s theory has broadened in more recent years to include the study of individual differences in personality (Eysenck & Eysenck, 1975; Eysenck, Eysenck, & Barrett, 1985). However, the present study seeks a return to the roots of coping theory in efforts to attend to the current need for a theory-driven method of indexing the underlying dimensions of coping processes (Snyder, 1999) that may facilitate the development of a sixth axis of diagnosis that represents coping with the psychosocial stressors identified on Axis IV.

The current study provides a contribution to research in coping style by returning to the roots of coping theory in the development of the Coping Style Inventory, which is designed to measure the four classic coping styles: sanguine, choleric, melancholic, and phlegmatic. Specifically, a confirmatory factor analysis of the CSI will be conducted to determine if the proposed theoretical model represents a fit to the data. This study begins with a formal statement of the problem germane to stress and coping research, followed by a justification for its investigation in the modern era. This study further presents an extensive review of the literature in stress and coping spanning roughly 2,500 years of research. Following a review of the literature, a pilot study is conducted that presents the exploratory factor analysis of the CSI. After pilot work, a formal statement of the hypotheses that specify relationships among coping factors is given, followed by a discussion of the methods of data collection and analysis. Finally, results of confirmatory factor analysis is presented, followed by a discussion of
relevant findings, limitations, implications, and suggestions for future research in stress and coping.

Statement of the Problem

The problem of the current study lies in the theoretical and empirical inadequacies of coping assessment that have led to a disjointed relationship between research and practice in counseling psychology. Coping assessment is a primary mechanism by which researchers test hypotheses about their populations of interest, and it is also a primary means for practitioners to test hypotheses about their clients. Therefore, coping assessment serves the field of stress and coping by providing a medium by which research and practice may be joined in reciprocating roles (Lazarus, 2000). However, a majority of contemporary coping assessments are empirically driven, which limits their practical utility due to a lack of theoretical interpretability. Likewise, most of the coping instruments in the literature are heavily reliant upon exploratory factor analytic techniques (EFA) in test construction and development. Thus, most of the available coping instruments are fraught with psychometric inadequacies due to the inherent limitations of exploratory factor analytic methodology. Resultantly, the abundant use, and often misuse, of exploratory factor analysis in test construction has prompted a profusion of data-driven instruments that are void of any empirical generalizability or theoretical interpretability, resulting in a disaffection among both researchers and practitioners in counseling psychology (Schwarzer & Schwarzer, 1996).

The present study addresses these issues by conducting a confirmatory factor analysis of the structural model of the CSI, which proposes a hierarchical data structure.
consisting of six primary factors that comprise two second-order dimensions of coping processes. Although exploratory pilot work provides support for these assumptions, there exists a veritable degree of doubt surrounding the integrity of these findings. As many of the conventionally used criteria for factor retention have been criticized as susceptible to overestimation and inappropriate for use, it remains questionable whether the proposed structural model of the CSI is an adequate representation of the data. Therefore, given the limitations of EFA, it is necessary to test the adequacy of the identified factor model by conducting a confirmatory factor analysis using structural equation modeling techniques. Specifically, the current study will address the following question: Does the proposed hierarchical structural model of the CSI provide a fit to the data? It is believed that pursuing an answer to this question is the first necessary step towards developing a useful model of coping assessment that may serve as a medium for joining research and practice in counseling psychology.

Justification for the Study

This study responds to the admonitions of scholars in current literature that call for a melding of theory and practical empiricism in the conceptualization and measurement of coping processes (Lazarus, 2000; Snyder, 1999). Currently, important changes are occurring in the field of stress and coping. From the late 1960's until the present day, there has been an exponential growth of interest in stress and coping research, with the number of publications on coping alone growing more than five-fold since 1982, resulting in nearly 23,000 publications in APA affiliated journals since 1967 (Coyne & Racioppo, 1999). Thus, coping is arguably the most widely studied topic in
all of contemporary psychology (Hobfoll, Schwarzer, & Chon, 1998; Somerfield & McCrae, 2000). Moreover, with coping mentioned as a suggested area for future research in the DSM-IV, it stands to reason that the rate of increase in studies of stress and coping will continue to grow as psychologists work towards the development of a sixth axis of diagnosis that reflects coping with the psychosocial stressors identified on Axis IV.

With the marked infusion of several studies being conducted from an ever-lengthening array of disciplines (i.e., health psychology, behavioral medicine, experimental psychology, applied psychology) it seems that research in the field of stress and coping has reached an impasse among diverse scientific perspectives. Some of the main questions being suggested for study by leaders of the field are also among the more fundamental, namely questions about the very nature of coping and how best to measure it (Coyne & Racioppo, 2000; Cramer, 2000; Lazarus, 2000). Notwithstanding that conceptual formulations of stress and coping may be traced back to fifth century B.C., it may be said that this field of study remains stagnated in the earliest stages of theoretical development. Roughly 2,500 years after the famed physician Hippocrates observed that individual differences exist in how patients cope with illness, there still remains a lack of consensus about what that really means. Developmentally, the field of stress and coping has gone through a number of significant paradigm shifts. There was a period of time when psychologists predominantly believed that coping is driven by environmental factors, such as Cannon, Selye, and other proponents of the general adaptation syndrome. Conversely, proponents of the psychodynamic tradition suggest that coping is driven by personal
factors such as ego strength and defense mechanisms. Likewise, more contemporary theorists suggest that coping is driven not by the environment or the individual, but by a transaction of the person and environment.

While these progressions in the science and study of coping may seem sensible and straightforward, they do not mimic the progression of coping as practiced in clinical settings. For example, practitioners in clinical settings often observe that coping processes for patients suffering from such acute stressors as bereavement and trauma tend to go through stages, suggesting that coping processes may be fundamentally developmental (Aldwin, 1994). Other studies have also recently been published questioning the very nature of coping processes, such as whether they are conscious or unconscious phenomena (Cramer, 2000; Tennen, et. al., 2000) and whether coping processes may even become stressors themselves (Snyder, 1999).

Recent reviews have concluded that the current state of the field of stress and coping may be characterized as having an abysmal gap between research and clinical practice (Coyne & Racioppo, 2000), as well as between theory and research (Tennen, Affleck, Armeli, & Carney, 2000). Moreover, coping assessment may be said to lie at the heart of this lack of consistency. Given that coping instruments may be conceived as empirical representations of theoretical assumptions, as well as indices of psychosocial adaptation, development of coping assessments may serve as an intervention in the joining of theory, research, and practice. Traditionally, the theoretical approach to test development has consisted of deriving mutually exclusive and collectively exhaustive sets of coping mechanisms, composing a taxonomy of indicators, and assessing their use in a variety of specific stressors. By contrast, the empirical approach has been to
observe the various coping responses to specific stressors and use statistical techniques to derive clusters or factors of general strategies (Amirkhan, 1990). Notwithstanding the wealth of information gleaned from each of these methodologies, the stark contrast in perspective and methodology has led to a lack of consensus across findings and a great deal of criticism among researchers of both philosophies of science. Essentially, the deductive approach inherently limits generalizability to a narrow range of stressors, and the inductive approach inherently limits its focus on a narrow range of coping processes. While this debate about the virtues of theory-driven vs. data-driven methodologies in science is centuries old (Leahey, 1992), it has been speculated that an answer to the dilemma lies in the joining of these two perspectives. This fusion might be achieved by focusing not on cognitive appraisals or behavioral stress responses, but on the underlying processes that determine both of these phenomena (Snyder, 1999).

The literature contains numerous studies that attempt to discover and delineate the components of effective coping strategies. However, many of the most frequently used coping scales suffer from a variety of conceptual and psychometric limitations that render their use virtually fruitless. Some of the most cited limitations of these contemporary coping scales are: non-replicated factor solutions, misuse of factor analytic techniques, poor internal consistency, poor construct validity, failure to distinguish between stylistic measures of coping and situation-specific coping measures, and failure to compare proposed factor solutions to competing models (Cohen, 1987; Krohne, 1988; Stone, Greenberg, Kennedy-Moore, & Newman, 1991). For the past twenty years, data-driven models of situational stress response have been predominant in the field, and these models of stress and coping have generally failed the test of
generalizability of their assumptions (Watson, David, & Suls, 1999). Therefore, the field of stress and coping has reached an impasse between theory and research, as a profusion of untestable theories and uninterpretable measures of coping processes have left the field barren of reliable and valid assessments of coping processes.

Of all that remains contested in the field of stress and coping, a few things have been conceded by most researchers and clinicians alike. For example, if not their nature, at least the operational definitions of stressor, stress, and coping have achieved a respite in contemporary literature, with stress being defined as the negative emotional and physiological process that occurs as individuals try to accommodate or adjust to environmental circumstances that disrupt, or threaten to disrupt, their daily functioning (Lazarus & Folkman, 1984; Taylor, 1995). Likewise, it is generally accepted that coping with stress may be conceptualized as a process of executing cognitive strategies and behavioral interventions in response to stressors or distressing life events (Billings & Moos, 1981; Endler & Parker, 1990a; Folkman & Lazarus, 1988; McCrae, 1984). Additionally, it is generally agreed among clinicians and researchers that individual differences exist between people and how they cope with stress. A wealth of evidence supporting this conclusion exists in the combat studies performed by the U.S. government during World War II that discovered some people feel urged to fight while others feel urged to flee when faced with the same stressors in combat (Lazarus & Folkman, 1984).

With a general agreement about the operational definitions of the constructs under study, along with a generally recognized conception that individual differences exist regarding vulnerability to stress and coping ability, recent studies have called for a
return to dispositional characteristics that serve as moderators of stress and coping (Lazarus, 2000; Snyder, 1999). Research in the past decade has demonstrated that coping behaviors and defense mechanisms are heavily influenced by dispositional characteristics of the individual, especially personality variables (Bolger, 1990; Costa, Somerfield, & McCrae, 1996; Somerfield & McCrae, 2000; Watson, David, & Suls, 1999). While these ideas may seem palatable and rather straightforward, there remains a void in the literature regarding what characteristics of individual coping processes are most appropriate for study. Although Somerfield and McCrae (2000) suggest that personality characteristics may interact with certain stressors (i.e., conscientiousness and medical compliance) and coping behaviors (i.e., anxiety and relaxation), most research of moderator variables has investigated situational characteristics rather than dispositional characteristics. A plethora of research has identified predictability, control, and support as key moderators of stress (Billings & Moos, 1984; Cohen & Wills, 1985; Folkman & Lazarus, 1985; Frankenhaeuser, 1986; Glass & Singer, 1972; House, 1981; Kaloupek & Stoupakis, 1985; Lazarus & Folkman, 1984; Schaefer, Coyne, & Lazarus, 1981; Snyder, 1999; Stern, McCants, & Pettine, 1982). While the moderating effects of predictability, control, and support are well documented and generally accepted in the professional literature, most of the research has focused on these constructs as characteristics of the environment, rather than of the individual. Although Kelly (1963) identified predicting and controlling the environment as the key motive for human behavior in his theory of the psychological readjustment to stress, very few studies have been conducted that investigate these constructs as characteristics of individuals. Therefore, given the call for research in development of a sixth axis of diagnosis, along
with recent calls for the investigation of clinically relevant coping processes and
dispositional moderators of stress, the current study presents a first step towards the
melding of theory, measurement, and practice that has been prescribed for future
research in the field of stress and coping (Lazarus, 2000).

**Literature Review**

**Sources of Stress**

Stress is the negative emotional and physiological process that occurs as
individuals try to accommodate or adjust to environmental circumstances that disrupt,
or threaten to disrupt, their daily functioning (Lazarus & Folkman, 1984; Taylor, 1995).
Therefore, stress is a byproduct of the transaction between the individual and the
"perceived stressors" in his or her environment that are believed to be threatening or
disruptive to his or her daily life. Moreover, coping with stress has been conceptualized
in the literature as a process of executing cognitive strategies and behavioral
interventions in response to stressors or distressing life events (Billings & Moos, 1981;
Endler & Parker, 1990a; Folkman & Lazarus, 1988; McCrae, 1984). Therefore, since
stressors are conceptualized as an intricate part of the operationalization of both stress
and coping processes, it may be profitable to present a depiction of what has come to be
recognized in the literature regarding the nature and effects of various types of stressors
that give rise to a call for stress and coping research. Among the various sources of
stress that have been studied throughout the history of psychology, a concerted review
of the literature may reveal six broad types of stressors that have been shown to exert stress reactions and precipitate coping processes: 1) conflict, 2) frustration and daily hassles, 3) tension, 4) change, 5) trauma and catastrophe, and 6) pressure.

**Conflict.** The motive to approach pleasure and avoid pain, or the "survival instinct," is a fundamental task of adaptation that all individuals confront in their personal evolution throughout the lifespan, and this concept transcends any particular school of thought or traditional perspective on the human condition (Millon, Davis, & Millon (1997). Conversely, whenever one is faced with a circumstance that requires approaching pain or avoiding pleasure, the individual's choices for action are in conflict with his or her natural instinct to approach pleasure and avoid pain. Thus, conflict refers to the simultaneous existence of incompatible demands, opportunities, needs or goals, which may be described in terms of two opposite tendencies of approach and avoidance (Lewin, 1935).

In his classic treatise on conflict, Lewin (1935) shows how different combinations of these tendencies create three basic types of conflict: approach/approach, avoidance/avoidance, and approach/avoidance. Approach/approach conflicts occur when a person is simultaneously attracted to two appealing goals, such as an entering freshman being forced to choose between attending two equally prestigious universities. The distress experienced in this type of conflict results from having to choose to avoid an appealing source of pleasure rather than pursue it. The reverse of this dilemma is the avoidance/avoidance conflict, in which a person is faced with two undesired or threatening possibilities, as in the classic case observed by
Hippocrates where patients want to avoid both sickness and arduous medical treatment. When facing this type of conflict, people are distressed by having to act against their survival instinct and approach pain. Often, people faced with this circumstance choose to escape the situation through procrastination or simply waiting for the situation to resolve itself. Finally, approach/avoidance conflicts occur when a person is both attracted to and repelled by the same goal, as in the common choice people make between companionship and personal independence when selecting whether or not to commit to an intimate relationship. In this case, personal distress results from the individual’s potential for pain regardless of the pleasure that he or she chooses to approach. Thus, conflict may be seen as a seminal source of stress that incites the individual to act against the motive to approach pleasure and avoid pain.

Tension. Clark Hull (1943) is often credited for identifying tension as a source of stress in is explication of the concepts of drive-reduction and motivation. Hull, like Plato before him (Plato, trans. 1993), observed that individuals strive to maintain a homeostasis, or balanced internal state, in the regulation of bodily needs, and a perceived deprivation of these needs leads to a state of imbalance or “tension” in the organism (Hull, 1943). Bodily sensations such as pain, hunger, thirst, and fatigue result in a state of tension that individuals are driven to reduce through instinctual or learned behavioral strategies. Additionally, other theorists have identified boredom as a source of tension that relates to an individual’s need for an optimum level of excitement or arousal (Brehm & Self, 1989). Thus, human functioning requires the satiation of various needs, and deprivation of these needs results in tension, which may be viewed as a
source of stress that signals emotional and physiological distress that individuals are motivated to reduce through coping efforts.

Change. Holmes & Rahe (1967) posited in their landmark research on social readjustment to change that most people have a strong preference for continuity and predictability in their lives, and change of any kind causes stress because it forces people to adapt to new circumstances. Thus, change is a source of stress, as it is inherently disruptive to daily functioning and obviates certainty of well-being. Using interviews and ratings of both men and women of various ages, socio-economic status, and marital status, Holmes and Rahe identified forty-three events that were rated as stressful and developed the Social Readjustment Rating Scale (SRRS) to index stress levels of individuals (Holmes & Rahe, 1967). In their formulation of social readjustment, so-called “positive” events such as weddings and graduations are rated along with such life changes as divorce, jail, and loss of a job to reflect the notion that significant life changes, whether perceived as positive or negative, require adaptation to new life circumstances and are therefore sources of stress that impinge upon psychosocial functioning and require social readjustment. Use of indexing life changes as a measure of stress has been fruitful, as numerous studies have shown that individuals who score high on the SRRS and other life-change scales are more likely to suffer from physical and mental illnesses than those with lower scores (DeBenedittis, Lornenzetti, & Pieri, 1990; Dohrenwend & Dohrenwend, 1978; Monroe, Thase, & Simons, 1992).
**Hassles and Frustration.** Frustration is a stress-reaction that occurs when a person is prevented from reaching a goal due to an obstacle or mitigating circumstance such as delays, losses, failure, discrimination, and a lack of accessibility to necessary resources (Morris, 1990). Richard Lazarus (1981) points out that daily hassles, such as petty annoyances and irritations, comprise one of the most common sources of stress. Hassles, such as cigarette smoke, noisy neighbors, waiting in lines, overcrowded conditions, and other “microstressors” cause stress by serving as impediments to one’s efforts to attain goals and meet his or her needs, which results in distressing appraisals of well-being and a thwarting of functional adaptation. Furthermore, daily hassles and irritations have been shown to have accumulating and deleterious effects on the human condition and contribute more to illness than do major life events (DeLongis, Coyne, Dakof, Folkman, & Lazarus, 1982; Weinberger, Hiner, & Tierney, 1987; Kohn, Lafreniere, & Gurevich, 1991). In their study of the effects of daily hassles, Lazarus and colleagues classify hassles according to eight types including: 1) household hassles, 2) health hassles, 3) time hassles, 4) inner-concern hassles, 5) environmental hassles, 6) financial-responsibility hassles, 7) work hassles, and 8) future-security hassles (Lazarus, DeLongis, Folkman, & Gruen, 1985). Research in this area has led to a discovery that over time, chronicity of routine hassles may lead to a condition often referred to as burnout, or gradual mental stress, that is characterized by an increasingly intense pattern of physical, psychological, and behavioral dysfunction (McKnight & Glass, 1995; Sauter, Murphy, & Hurrell, 1990). Research has shown that individuals suffering from burnout, such as those responsible for the care of aging parents, are likely to develop stress-related illnesses themselves (Lepore, 1995; Taylor, Repetti, & Seeman, 1997) and
often describe themselves as drained, jaded, apathetic, and without motivation (Kohn, P. M., Lafreniere, K., & Gurevich, 1991; Cordes & Dougherty, 1993).

**Trauma and Catastrophe.** Traumatic events such as war, rape, car accidents, and natural disasters like tornados and earthquakes are among the more obvious and well-documented sources of stress and are often identified as activating agents for the onset of psychological disorders such as acute stress disorder and posttraumatic stress disorder (Rubonis & Bickman, 1991). Traumatic events and catastrophes are regarded as sources of stress because they are often perceived as threats to well-being that lead to stress reactions such as anxiety and fear. Many researchers have investigated the stress-reactions of individuals who have suffered major disabilities due to injurious accidents (Bulman & Wortman, 1977; Elliott, Witty, Herrick, & Hoffman, 1991; Schultz & Decker, 1985), rape (Atkeson, Calhoun, Resick, & Ellis, 1982; Feldman-Summers, Gordon, & Meagher, 1979; Kilpatrick, Resick, & Veronen, 1981), hospitalization (Christensen, Benotsch, Lawton, & Weibe, 1995; Kaloupek & Stoupakis, 1985; Kaloupek, White, & Wong, 1984; Miller, Roussi, Caputo, & Kruus, 1995), and natural disasters (Baum, 1988; Baum, Fleming, & Singer, 1983). Results of these studies indicate that the stressful effects of traumatic and catastrophic events is quite variable depending upon a number of moderator variables such as frequency, duration, and intensity of the experience, as well as the fortitude and resourcefulness of the victims themselves.
Pressure. Pressure occurs when people feel forced to speed up, intensify, or shift the direction of their behavior, or when individuals feel compelled to meet a higher standard of performance (Morris, 1990). Pressure is seen as a source of stress because increasing demands are often associated with increasing needs for resources to meet these demands. Thus, individuals who feel pressured often experience trepidation and fear that a depletion of personal resources will disable them in their efforts to meet their needs for well-being.

Perhaps the most often cited example of pressure in the literature is performance anxiety (Hembree, 1988) as illustrated by the Yerkes-Dodson law (Yerkes & Dodson, 1908). In their classic study of arousal and performance, Yerkes and Dodson discovered what would later be referred to as eustress. Arousal may be said to range from sleep or stupor to panic or frenzy (Lefrancois, 2000). They observed that the relationship between arousal and performance is a parabolic function, where moderate levels of arousal are associated with optimum performance and both low and high levels of arousal are associated with increasingly low levels of performance (Yerkes & Dodson, 1908). Additionally, they discovered that the more difficult or complex the task to be performed, the lower the optimum level of arousal for performing it. Therefore, feeling pressured to perform well at difficult or complex tasks results in performance anxiety that actually prevents individuals from performing their best. Conversely, facing either trivial or impossible tasks has been found to be associated with either understimulation and boredom or low expectations, which also interfere with optimal performance (Yerkes & Dodson, 1908). Pressure and the other types of stressors listed above have been identified as not just sources of stress, but as activating agents for the many stress-
related illnesses whose epidemiology is on the rise in the United States. Given that stressors are conceived as the antigens of mental and physical health, it is becoming increasingly important to recognize the deleterious effects that prolonged stress-reactions have on the human condition.

**Epidemiology of Stress-Related Illness**

As early as a century ago, the major causes of death in the United States were infectious diseases such as pneumonia, tuberculosis, diphtheria, and typhoid fever, which have their etiology in environmental antigens and community health conditions. However, since the beginning of the 20th century, patterns of illness and mortality in the United States have changed dramatically. In 1900, three of the four leading causes of death were pneumonia, influenza, and tuberculosis; by 1988, three of the leading causes of death were heart disease, stroke, and cancer (U.S. Bureau of Census, 1994). While technology and medical advances have turned once fatal diseases like smallpox into rare and manageable illnesses, the changes in the causes of death has led to the investigation of how behaviors and lifestyles are impacting health (Brannon & Feist, 1992). In fact, although non-contagious diseases are responsible for most deaths in the United States, deaths due to infectious diseases have increased fifty-eight percent from 1980 to 1992 (Davis & Pallidano, 1997). Upon examination of these changing patterns of death and disability, it has been observed that compared with acute infectious diseases, chronic infectious diseases develop more slowly and are more heavily influenced by psychological, lifestyle, and environmental factors (Taylor, 1995). In fact, it was reported in 1990 by the United States Department of Health and Human Services...
(USDHHS) that psychological and behavioral factors such as hypertension, smoking, drinking, diet, and stress are direct causes in as much as fifty percent of deaths in the United States (USDHHS, 1990). In today’s society, people are being stricken by health problems that result from these factors at an alarming rate, as stress and unhealthy coping behaviors continue to replace diseases like polio and tuberculosis as leading health risks among Americans.

One example of how stress and ineffective coping are plaguing our nation’s health is in the incidence of coronary heart disease. Stress is known to be an important factor in the development of coronary heart disease, which is among the leading causes of death and disability in the United States (Kringlen, 1981; U.S. Bureau of Census, 1994). Also, studies in psychoneuroimmunology have shown that interactions between stress and the immune system have deleterious effects on the nervous and endocrine systems. At the onset of the biological stress response, heart rate, respiration, and blood pressure increase, sweat glands open, epinephrine and corticosteroids are secreted in the bloodstream, digestion is slowed, excretion is dampened, and blood is diverted away from internal organs and toward skeletal muscles. These autonomic physiological responses to stressors, while adaptive in response to acute stressors, become stressors themselves after prolonged arousal (Brannon & Feist, 1992). It has been shown that prolonged secretion of stress-related hormones promotes deterioration of body tissues such as blood vessels and the heart, which effectually lowers the body’s defenses against the pathogens that cause disease (Cohen, Tyrrell, & Smith, 1991; Sapolsky, 1996; Shapiro, 1996). These and other health problems, such as peptic ulcers, lung cancer, liver disease, and many others have been linked to the experience of
psychological stress and the physiological consequences of ineffectual coping behaviors such as smoking and drinking.

With these changes in American mortality, there have been many speculations made by those in the social sciences about the epidemiology of stress and stress-related illnesses. In fact, the burgeoning fields of health psychology and behavioral medicine are devoted to the study of psychological and behavioral factors that promote health and wellness, as well as how to prevent and treat illness and disability (Gatchel, Baum, & Krantz, 1989). A finding that has been surfacing more and more in the literature is one observed by the American Psychological Association, which suggests that a vast majority of Americans are experiencing greater amounts of stress in their daily lives. Moreover, behavioral changes commonly made in efforts to adapt to this mounting stress have led to lifestyles characterized by fast food, smoking, and drinking, which have deleterious effects on both psychological and physical health (McGuire, 1999).

Juxtaposed with the escalating incidence of stress-related illnesses, there has been a virtual explosion of stress-related mental illness in contemporary America. It has long been established that the experience of both acute and chronic stress may be either etiologically primary or pathogenically secondary to a variety of mental illnesses including mood, anxiety, and adjustment disorders, thus stress may play the role of both cause and effect in the onset and course of mental illness (Maxmen & Ward, 1994). These ideas are echoed in Rosenthal's (1970) now classic work in formulation of the diathesis-stress model, which purports that mental illness is caused by the interaction of genetic predisposition and an activating stressor. Current data reflecting the prevalence of mental health cases suffering these stress-related mental illnesses suggest they are on
the rise in contemporary America. For example, the Center for Disease Control and Prevention reports that there are 4.7 million office visits for depression per year and 4.3 million annual office visits for anxiety (Vital and Health Statistics, 1996). With over ten million Americans prescribed Prozac and an excess of 81 million psychiatric consultations per year, it might be said that an epidemic of stress-related mental illness is rising in the United States (NIMH, 1999). In 1999, the World Health Organization (WHO) reported that more than 19 million adult Americans age 18 and over suffer from a mood disorder (i.e. major depression, bipolar disorder, dysthymia) each year. Other epidemiological studies by the WHO have shown that the prevalence of anxiety is also on the rise in the United States, with more than 16 million adults ages 18 to 54 suffering from anxiety disorders. Among these Americans, approximately 2.3% suffer obsessive-compulsive disorder (3.3 million), 3.6% suffer post-traumatic stress disorder (5.2 million), and over 7 million Americans suffer from other anxiety disorders such as panic disorder and social phobia (WHO, 1999).

While the epidemiology of stress-related mental illness is staggering in the United States, the "Global Burden of Disease" study conducted by the World Health Organization, Harvard University, and the World Bank (1996) recently showed that mental illness accounts for four out of the ten leading causes of disability in established market economies worldwide, with the United States alone spending $148 billion of its gross national product to combat mental illness. This study further showed that the financial burden of major depression was second only to heart disease in worldwide market economies, with schizophrenia, bipolar disorder, and obsessive-compulsive disorder rounding out the top ten health concerns worldwide.
Secondary indicators of stress-related mental illness have also been reported by affiliates of the World Health Organization. For example, the National Center for Health Statistics (NCHS) researched the prevalence of divorce and alcoholism in the United States. It was reported by NCHS in 1990 that 20.9% of married women age 15 and above ultimately get divorced. Reports by the NCHS in 1997 also show that 18,824 alcohol-induced deaths occur each year, along with 24,765 deaths occurring each year due to cirrhosis and chronic liver disease. Suicide, another secondary indicator of stress-related mental illness, was researched by the National Institute of Mental Health. Results of their efforts showed that in 1996, approximately 31,000 people died from suicide in the United States, and it was discovered that suicide is the third leading cause of death among individuals 15 to 24 years of age (NIMH, 1996).

**Current State of Stress and Coping Theory**

As fields like health psychology, sport psychology, behavioral medicine, and psychoneuroimmunology have begun to draw from branches of both physical and social science, a great number of models of stress and coping have emerged that offer utility in both theory and practice. However, a concerted review of this literature reveals that modern conceptualizations of the factors affecting stress and coping echo ideologies that can be found in many of the philosophies of humankind’s first scholars. Nevertheless, progress in the area of stress and coping has been stymied by a paucity of theoreticians who pay homage to these lessons of the past, and this predilection has led to a dearth of research that follows a progressive lineage of ideas. The resulting state of affairs has left the area of stress and coping in a pre-paradigmatic stage of scientific...
development (Kuhn, 1996), as the field remains fragmented and void of any unifying body of research. For example, there remains a dissolution between those of psychodynamic and behavioral traditions regarding whether coping processes are conscious or unconscious phenomena. Likewise, scholars of the cognitive and transactional ideologies continue to debate the role that personality variables like neuroticism and extroversion may play in influencing coping processes. In fact, although the conceptualization of stress offered by the transactional model is perhaps the most widely cited and accepted in the literature, there continues to be a great deal of debate in the literature regarding the very nature and definition of stress itself. Currently, there are literally dozens of definitions of what stress is, hundreds of theories as to what causes it, and perhaps thousands of beliefs about how to best cope with it. Some of these approaches target the biological aspects of stress, some on the intrapsychic factors involved, and a precious few approach the problem of stress from a multidimensional viewpoint (Philipchalk & McConnell, 1994).

Current State of Stress and Coping Assessment

Apart from the disjointed state of stress and coping theory, research in the area of stress and coping assessment is equally divided. For example, instruments designed to measure stress itself are virtually non-existent, as the most popularly used assessments are designed to measure stressors, rather than stress reactions themselves. For instance, indices of “stress” such as the Social Readjustment Rating Scale (Holmes & Rae, 1967), the Daily Stress Inventory (Brantley & Jones, 1989), the Parenting Stress Index (Abidin, 1995), and the Stress Index for Parents of Adolescents (Sheras, Abidin,
& Konold, 1998) each derive scores by quantifying the incidence of psychosocial stressors, or the activating agents of stress rather than indicators of stress itself such as anxiety, fear, and dread. Although the utility of these instruments may be called into question for validity reasons, the utility of coping instruments may be called into question primarily for psychometric reasons.

Widespread interest in the area of coping assessment first began during World War II, when the military became concerned with the effects of stress on soldiers' functioning during combat (Lazarus & Folkman, 1984). In their landmark work entitled *Men Under Stress*, Grinker & Spiegel (1945) wrote about individual differences in coping with the stress of combat, showing that ineffective coping can lead to an increased vulnerability to casualty and weaken a soldier's ability to perform duties effectively. They observed that soldiers often become immobilized or panicked during critical moments under fire or on bombing missions, and tours of duty under these conditions often lead to neurotic or psychotic breakdowns (Grinker & Spiegel, 1945). This finding led to a series of field experiments during the 1950's, and by the 1960's the first of a line of coping instruments was published to aid the assessment of coping skills (Lazarus, 1966, Lazarus & Folkman, 1984). However, many of these early measures met with a variety of methodological difficulties including poor validity and reliability.

Notwithstanding the methodological difficulties of their predecessors, contemporary factor analytic models of coping have achieved a rising popularity in their attempts to describe and measure the underlying dimensions of coping processes. A substantial amount of research has appeared recently that involves the construction of self-report measures of coping. However, these efforts have mostly centered around
measuring specific coping behaviors in specific stressful situations (Endler & Parker, 1990a, 1990b, 1994; Parker & Endler, 1992; Parker, Endler, & Bagby, 1993). Furthermore, many of the most frequently used coping measures also suffer from a variety of weaknesses including: poor reliability, poor validity, misuse of factor analytic techniques, and a failure to distinguish between stylistic measures of coping and situation-specific coping measures (Endler & Parker, 1994). Therefore, like the disjointed state of research in the area of stress and coping theory, the literature in stress and coping assessment is rife with instruments that possess questionable validity and inadequate psychometric properties, thereby limiting their utility in research and practice.

**Philosophical Underpinnings of Stress and Coping**

The literature contains a great number of studies that profess to identify the components of coping strategies. In fact, the study of stress and the processes by which individuals cope with negative life events has been a classic issue in research that can be found in the earliest of theoretical conceptions (Strachey, 1962). Theoretical compositions of stress and coping in the social sciences are as dated as fourth century B.C. In the Republic, Plato relates what is perhaps one of the world's first treatises on stress and coping. Relating the governing of oneself to the processes involved in governing a republic of people, Plato suggests that a successfully governed group of people is merely a composition of successfully self-governed individuals, and that a parallel exists between the health of nations and the health of the people who comprise them (Plato, trans. 1993). Furthermore, Plato describes this health as the satisfaction of
needs and the effective regulation of resources available to meet those needs, and the effectiveness of this regulation is evidenced by the degree of balance between the demands of the republic, or individual, and the supply of resources that are needed (Plato, trans. 1993). Successfully governing the principles of supply and demand in the achievement of a balance between these forces was viewed by Plato to be the hallmark of not only the health of nations, but the psychological health of individuals as well. According to Plato, the principles that regulate this balance are threefold, each contributing a different impact on the degree of balance.

Plato described wisdom as being the first quality that enables the individual to achieve balance between personal resources and the demands of life. He defined wisdom as "thinking knowledgeably and resourcefully about the whole, not just some aspect of it" (Plato, trans. 1993, p. 318). The second principle governing the balance that Plato described is courage, which he defined as "the ability to retain under all circumstances a true and lawful notion about what is and is not to be feared" (Plato, trans. 1993, p. 318). Finally, Plato described self-discipline as a state of being one's own master, which is achieved when "the better, virtuous elements of a person's mind are in control of the worse, or avaricious parts" (Plato, trans. 1993, p. 318). Throughout the Republic, Plato treats each of these traits of humankind separately as the cornerstones of both personal well-being and societal prosperity. Characteristically, individuals who possess these faculties and exercise them in the maintenance of a balanced life are said to be living a virtuous, moral lifestyle.

Moreover, this morality was espoused by Plato's student Aristotle, who wrote extensively about the efforts of individuals to manage or "cope" with the demands of
life. In the *Ethics* (Aristotle, trans. 1971), Aristotle discusses what is popularly known as the "golden mean," which refers to the virtuosity of self-regulation and the achievement of balance in one's life. According to Aristotle, when the demands of life are in excess of one's personal resources, the resulting state of affairs is perceived as psychological distress. Likewise, when one's resources are in excess of one's needs, poor self-regulation results in gluttony, waste, and excessive indulgence that ultimately lead to stressors of their own. However, the wise, courageous, and disciplined individual is one who lives a balanced lifestyle that leads to health and prosperity.

As influential as the works of these founding fathers of academia have been, the virtues of balance and the factors impacting this equilibrium were dated ideas even in their day. In fact, it was in sixth century B.C. when Pythagoras first presented the notion that health depends on the harmonious blending of bodily elements, and it was he who first proposed that illness is the result of a disruption in the body's equilibrium (Hergenhahn, 1997). A generation later, Empedocles, a disciple of Pythagoras, further espoused the teachings of his mentor and suggested that the forces effecting the balance of the body's elements are one of attraction (love) and one of separation (strife) (Hergenhahn, 1997). These two forces of human nature were thought to govern the degrees of exigency and excess that affect the thoughts, feelings, and behaviors of the human condition. Later, Hippocrates rounded out the fifth century B.C. by reformulating Empedocles' theory into a medical model for treating illness that is heralded even today. As he became known as the "Father of Medicine" (Hergenhahn, 1997, p. 33), Hippocrates was able to provide empirical evidence that physical and
psychological distress result from a teetering in the balance of human functioning.

Speaking to this point, Hippocrates stated:

"Men ought to know that from the brain, and from the brain only arise our pleasures, joys, laughter and jests, as well as our sorrows, pains, griefs, and tears. Through it, in particular, we think, see, hear, and distinguish the ugly from the beautiful, the bad from the good, the pleasant from the unpleasant. It is the same thing which makes us mad or delirious, inspires us with dread and fear, whether by night or by day, brings sleeplessness, inopportune mistakes, aimless anxieties, absentmindedness, and acts that are contrary to habit. These things that we suffer all come from the brain, when it is not healthy, but becomes abnormally hot, cold, moist, or dry, or suffers any other unnatural affection to which it is not accustomed (Jones, 1923, pp. 319)."

This treatise on the intermingling of psychological factors and both physical and mental health spawned a number of ancient scholars to embrace the burgeoning field of study that has become psychology. The legacy of Pythagoras was immensely influential in the formulation of Platonic doctrine (Hergenhahn, 1997), and it was these historic beginnings that sired many of the basic assumptions of modern-day theory in stress and coping.

**Stress and Coping in the 19th Century**

Throughout psychology's historical development from philosophy to science, the basic principles noted above have been revisited a number of times by prominent theorists in their attempts to better understand the human condition and its aspects of psychological health. For centuries, theorists have examined the effects of biological and environmental stressors on psychological health, and ideas regarding the processes of coping with these stressors are as dated as the world's first textbook. However, in
spite of nearly 2,500 years of study and research, the state of the human condition remains very vulnerable to the stressors of life.

In the modern era, European theorists expanded upon the philosophy of the Grecian doctrine and reformulated the tripartite mind of Plato in the conception of psychoanalysis. Beginning with Sigmund Freud, psychological stress was conceived as a state of imbalance between the id, ego, and superego. According to Freud, the imbalance, or intra-psychic conflict between these forces is experienced as psychological distress, and the manifestation of defense mechanisms are described as efforts to cope with the stress resulting from the tension of imbalance.

As one looks closely at Freud's operationalization of his tripartite mind, striking similarities can be found between these qualities of mind and the features proposed by Plato. In the Republic (Plato, trans. 1993), Plato cautions that courage taken to extreme becomes hedonistic and avaricious, while its opposite becomes inhibitous and deprecatung to oneself. Likewise, self-discipline, or self-mastery, taken to extreme becomes obsessively controlling and Spartan, while its opposite extreme becomes very indulging and Epicurean. Lastly, it is the quality of wisdom in Platonic view that regulates a balance between the forces of courage and discipline in the attainment of an equilibrium that is healthy and adaptive for the individual and society.

It can be seen from this lineage of thought that the psychoanalytic reformulation of the tripartite mind offered psychology a developmental breakthrough in the application of ancient philosophical ideology regarding psychological stress and coping. The corresponding likeness of Plato's courage, self-discipline, and wisdom to Freud's id, ego, and superego is remarkable, and the substrata of balance in the Platonic and
Aristotelian doctrines is revisited by Freudian psychoanalysis in the treatment of coping mechanisms and their efforts to resolve the imbalance of intra-psychic conflicts. In each of these cases, stress is conceptualized as a perceived imbalance between demands and resources. Psychoanalytic theory gave a great contribution to our understanding of the stress that results from conflicting demands, in which the satisfaction of one need necessitates the deprivation of another. Similarly, in his discussion of intra-psychic conflict, Plato writes, "It follows that when the whole mind accepts leadership of the philosophical (wise) part, and there's no internal conflict, then each part can do its own job and be moral" (Plato, trans. 1993, p. 336).

Stress and Coping in the Early 20th Century

After the founding of psychoanalysis, many disciples of Freud continued in the European tradition and formulated a number of psychodynamic expositions of neuroses. At this point in history, the term "coping" was commonly used in reference to the mechanisms of defense against the imbalance of intra-psychic conflict in Freudian doctrine. However, the term "stress" has its etymology in use of the term "distress," which means anxiety or suffering, and was commonly used in the literature near the turn of the 20th century in reference to various forms of neuroses (American Heritage Dictionary, 1985). During this time, several landmark works in the scientific literature contributed to our understanding of the human condition and its efforts to cope with stress.

Perhaps the first of these neo-Freudians was Sigmund Freud's daughter, Anna Freud. She made a significant contribution to our understanding of stress and coping
with the publication of *The Ego and the Mechanisms of Defense* (1895). In this text, Anna Freud (1895) discusses a distinction between personal and interpersonal stressors, as well as nine methods of coping that relieve the tension that results from the imbalance these stressors impose upon the human condition. In the vernacular of everyday language, common phrases such as "rationalizing" and "being in denial" largely stem from Anna Freud's exposition on the coping mechanisms people choose in efforts to minimize the tension and frustration associated with a perceived inability to satisfy competing demands. Further expansion of these concepts has led to an evolving explication of ego strength, which is essentially regarded as frustration tolerance and one's degree of sensitivity to the uncomfortable imbalance of intra-psychic conflict. Defense mechanisms are conceptualized as methods of coping that enable the individual to regain a sense of control over oneself and others in stressful situations. This sense of control, or "self-mastery" as Plato once called it, was a focal point in many of the early psychodynamic formulations of stress and coping.

In her exposition of the complimentary relationship between stress and coping, Anna Freud cites her contemporary Wilhelm Reich in discussing what he referred to as the economic function of character armor. According to Reich (1933), individuals tend to prefer certain coping mechanisms over others, and habitual use of these become part of one's character and manifest as dispositional, or characteristic approaches to stress management. These characteristic approaches to stress management become part of one's personality and serve to shield the individual against stressors that he or she is particularly vulnerable to. Therefore, this shielding or "arming" aids the individual in
maintaining a balance between coping resources and the demands of personal and interpersonal stressors (Reich, 1933).

In addition to Anna Freud and Wilhelm Reich, many other prominent neo-Freudian theorists made significant contributions to the conceptual development of stress and coping. Two theorists in particular expanded the idea of a dispositional approach to stress. One of these theorists, Karen Horney (1937), wrote in The Neurotic Personality of Our Time of the characteristics that comprise ineffective coping and the effects of resulting stress. More specifically, Horney writes of the efficacious function that support serves in minimizing the impact of life's stressors. Keeping in line with Anna Freud's observation that a distinction exists between personal and interpersonal coping, Horney describes support of both oneself and others in terms that parallel the Platonic view of wisdom and the role it plays in valuing the whole self, rather than certain aspects of the self. Taking this perspective, problems may be generally perceived as small and insignificant relative to the grander scheme of life. Conversely, valuing certain aspects of the self at the expense of others narrows one's perspective of life, and problems in that area become that much more salient and distressing (Horney, 1937).

Another prominent neo-Freudian theorist that made significant contributions to the early stress and coping literature is Eric Fromm. In his text The Anatomy of Human Destructiveness, Fromm (1973) writes extensively of a disposition to be indulgent to personal stressors and malevolent towards interpersonal stressors, which results in boundaries between the self and others that protects the self against interpersonal stressors. However, Fromm (1973) indicates that these same boundaries also serve as
barriers to gleaning the social support often needed when efforting to cope with personal stressors. Thus, this dispositional or stylistic approach to stress management is polarized towards the management of interpersonal stressors and is consistent with Plato's characterization of the person who has a positive imbalance of courage. Furthermore, Reich (1933) referred to an "armoring" of this sort in his description of the phallic-narcissistic character and the penchant of this type towards taking an offensive posture when pressured by troubling life circumstances.

The Platonic views of stress and coping have been revisited and reformulated throughout antiquity. The negative effects of stress on the human condition and the dynamics of stress reduction have been central figures throughout history. In fact, the forces that govern the balance between the demands of life stressors and the resources for coping have been revisited in some aspect or another by nearly every major influential work in the field of psychology. However, as many influential European theorists began to flee to America during WWII, the popularity of psychology as a field of study began to rise in the West, and a paradigm shift began to occur. During this time, the development of the field of psychological study began to take on the characteristics of what was to become known as behaviorism. As the theory-driven models of psychological health gave way to more data-driven, empirically verifiable models, a consonant shift occurred in the literature concerning stress and coping. During this time, researchers began to focus on the influence that environmental factors have on the onset and reduction of stress. Likewise, abstract explanations of intrapsychic dynamics were laid aside in favor of more concrete explanations of learned coping behaviors in efforts to facilitate objectivity in empirical observation. Eventually,
traditional conceptualizations of dispositional coping styles were laid aside in favor of a study that targeted more situation specific coping strategies. This shift from unobservable to observable aspects of stress and coping, along with a burgeoning zeitgeist of factor analysis, enabled research in stress and coping to become a more mature and narrowed scope of study.

**Stress and Coping in the 1950's-1960's**

During the 1950's and 1960's, the nascent emphasis on observable aspects of stress and coping led to the development of two widely studied models of adaptational processes, the general adaptation syndrome (Selye, 1956, 1976) and the transactional model of stress and coping (Lazarus, 1966). Given the zeitgeist of direct observation in empirical research, these models each posit a premium on objectivity in measurement of their theoretical assumptions. Thus, data collected by the United States military during WWII and the Korean Conflict spawned a number of studies on stress and coping processes, and results of these studies spurred a widespread interest in the development of stress models and assessments of coping (Lazarus & Folkman, 1984).

**General Adaptation Syndrome.** The first body of research that brought stress theory into the modern era was begun by Hans Selye. Heavily influenced by Cannon (1939), who propagated similarly as Plato (Plato, trans. 1993) the notion that humans are motivated to maintain an internal homeostasis or psychological balance, Selye devised a model that was to become known as the general adaptation syndrome
(GAS) (Brannon & Feist, 1992). In his pioneering work *The Stress of Life*, Selye (1956, 1976) outlined the classic three-stage model of responses to environmental stressors.

The first of these stages, the alarm stage, is equivalent to the well-known "fight or flight" response first coined by Canon (1920) and is thought to be triggered involuntarily by the automatic nervous system in response to aversive perceptual stimuli (Selye, 1956). The classic example of the “fight or flight” response is the instinctual and automatic startle response that may be observed when individuals are unexpectedly presented with a loud noise (Selye, 1956). During this stage, the sympathetic nervous system is activated, causing a release of adrenaline, corticosteroids, and endogenous opiates into the bloodstream, along with an increase in heart rate, blood pressure, and respiration. This alarm phase also signals an activation of the sweat glands, a decrease in digestion, and blood is diverted away from internal organs and toward the skeletal muscles. These processes prepare the mind and body for optimal performance in response to environmental stressors.

If the perceived stressor is not resolved, humans and animals enter the resistance stage, where levels of the endocrine and sympathetic nervous systems are lower than in the alarm reaction but still higher than normal. Chronic stressors can maintain this heightened state of arousal for extended periods of time, ultimately suppressing the body's immune system and making the organism vulnerable to pathogens. Finally, if the stressor has not been adequately resolved, individuals may pass into the exhaustion stage, where the parasympathetic nervous system takes over and returns the circulatory, nervous, and endocrine systems to normal levels. Continued stress in the exhaustion
stage can lead to what Selye (1956) referred to as diseases of adaptation, such as allergies, ulcers, heart disease, and sometimes death. In Selye's (1976) view, like Plato before him (Plato, trans. 1993), these three stages of the GAS reflect the body's efforts to maintain an equilibrium of comfort and efficiency in daily functioning.

John Mason, a long-time critic of Selye, agreed with the Roman philosopher Epictetus, who stated over 2,000 years ago that "men are disturbed not by things, but by the views which they take of things" (Hergenhahn, 1997). According to Mason (1975), emotional stimuli are among the most potent and prevalent stimuli capable of increasing pituitary-adrenal cortical activity. He believed that it is not the mere exposure of environmental stimuli that cause the general adaptation syndrome, but the emotional consequences of this exposure. This theoretical reformulation of the GAS helped to explain individual differences in the stress responses to the same stressor. For example, it had been observed throughout history that while an entire platoon of men may be exposed to the same combat situation, some men falter under the pressure while some rise to valor. Given the uniform, real-world stressors of combat, variability in adaptation has been thought to be caused by the emotional reactions to stress, rather that the passive experience of it. Combat studies, which provided directly observable stressors and coping responses, facilitated hypothesis testing and were heralded by behaviorists for their objectivity and focus on environmental stimuli and coping behaviors. Thus, the notion of cognitive appraisal and the role it plays in coping with stress became the cornerstone of developing ideas pioneered by Richard Lazarus that view stress and coping processes as dependent upon the transaction between personal factors and situational factors.
**Transactional Model of Stress and Coping.** First conceived as the transactional model, Lazarus (1966) ultimately supplanted his contemporaries' emphasis on physiology, behavior, and emotion with a cognitive model of stress and coping. The transactional model purports that stress is not due to merely environmental stressors or human susceptibility, but an interaction or transaction of personal and environmental factors (Lazarus, 1966, 1981; Lazarus, Averill, & Opton, 1970; Lazarus & Cohen, 1977; Lazarus & Folkman, 1984; Lazarus, Kanner, & Folkman, 1980; Lazarus & Launier, 1978). According to Lazarus and Folkman (1984), psychological stress is a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding available resources and endangering an individual's well-being. They further state that two critical processes, appraisal and coping, mediate the person-environment relationship. Cognitive appraisal is an evaluative process that determines why and to what extent a particular transaction or series of transactions between the person and environment is stressful. This model proposes that a distinction should be made between what is called primary and secondary appraisal. Primary appraisal processes occur whenever an individual determines if a stressor is irrelevant, benign-positive, or stressful. When an encounter with the environment bears no implication for a person's well-being, it is deemed irrelevant. Furthermore, an encounter with the environment is considered benign-positive whenever the outcome is construed to be supportive or preserving of well-being. However, stressful appraisals, which include harm or loss, threat, and challenge, are those that call to action a secondary appraisal of available resources for coping with stressful situations that are thought to jeopardize well-being. Along these lines, Lazarus and Folkman (1984) identify two general types
of coping, problem-focused and emotion-focused. They discuss problem-focused coping as comprising those strategies that mean to manage the stressor itself, while emotion-focused coping entails those strategies that are meant to manage the emotional distress that often accompanies stressful circumstances. Finally, the authors suggest that a reappraisal occurs, which evaluates the status of current stressors after coping efforts have been made. These tenets of the transactional model of stress and coping rose in popularity throughout the 1960’s and have been predominant in the literature ever since.

Furthermore, by the late 1960’s, decades of theorizing about stress and coping processes ultimately led researchers to devise ways of testing their theoretical assumptions psychometrically. For example, the “Coping Scale,” perhaps the first of the rationally derived coping instruments, was designed as an attempt to develop a relatively structured, easily scorable scale with which to assess coping strategies (Sidle, Moos, Adams, & Cady, 1969). This instrument uses both open-ended (free response) and closed-ended (rating) sections. Several stories representing different problem situations are presented, and subjects are asked to rate on a seven-point scale (1, very unlikely; 7, very likely) each of ten strategies in terms of how likely he or she would be to use it in each of the narrative situations. Although this scale was used in various correlational studies by the authors, no psychometric properties of the Coping Scale were reported, and the length of time required to complete the scale rendered it unwieldy and difficult in use for research (Sidle et. al, 1969). Thus, the 1960’s were highlighted by areas of research that were perhaps before their time, as this decade’s birth of the transactional model and coping assessment may be seen as prophetic of research in the 1970’s on person-environment fit (Edwards, Nafziger, & Holland, 1974;
Stress and Coping in the 1970's and 1980's

Research in the area of stress and coping during the 1970's mainly focused on investigating the ways that coping with stress affects psychological, physical, and social well-being (Andrews & Tennant, 1978; Antonovsky, 1979; Brown & Harris, 1978; Cassel, 1976; Cohen & Lazarus, 1979; Janis & Mann, 1977; Moos, 1977). It was during this time that a body of research was mounting that pointed to personality as a moderator in the appraisal of stress and coping. Evidence suggested that personality type and psychological hardiness are characteristics that may explain some of the variability among individuals in the ability to withstand stressful situations for extended periods of time without suffering stress-related illness.

In 1975, a classic study found that individuals whose personality may be characterized as hard-driving, competitive, impatient, time-conscious, and temperamental were significantly more likely to suffer coronary heart disease than their easygoing, relaxed counterparts (Rosenman, Brand, Jenkins, Friedman, Strau, & Wurm, 1975). The hard-driving personality, labeled "Type A," and the easy-going personality "Type B," were originally identified by Meyer Friedman and Ray Rosenman (1959). Later research in the area identified a certain number of quintessential traits that make-up the Type A personality such as anger, cynicism, and hostility (Friedman & Booth-Kewley, 1987; Matthews, 1988). These personality traits have been linked to several high-risk behaviors for coronary heart disease such as consuming more fatty foods,
alcohol, and nicotine. These individuals also tend to sleep and exercise less than Type B personalities, and they are less likely to comply with health advice from doctors (Siegler, 1994). It has also been shown that in tense social situations, Type A's tend to react with greater increases in pulse rate, blood pressure, and adrenaline, which accelerates the build-up of fatty plaques on the artery walls, causing a hardening of the arteries (Blascovich & Katkin, 1993; Harbin, 1989; Krantz & Manuk, 1984; Suls & Wan, 1993).

Although personality type has been shown to impact one's susceptibility to coronary heart disease, this impact seems to be moderated by another aspect of personality called hardiness. Several studies have discovered that Type A individuals who show psychological hardiness are more resistant to illness, including coronary heart disease, than Type A individuals who do not exhibit hardiness (Booth-Kewley & Friedman, 1987; Friedman & Booth-Kewley, 1987; Kobasa, Maddi, & Zola, 1983; Krantz, Contrada, Hill, & Friedler, 1988; Rhodewalt & Agustsdottir, 1984). In the late 70's, Kobasa (1979) described the hardy personality as one that possesses three distinguishing characteristics: (a) the belief that they can control or influence the events of their experience, (b) an ability to feel deeply involved in or committed to the activities of their lives, and (c) the anticipation of change as an exciting challenge to further development. It has been shown that these three characteristics of the hardy personality lead to adaptive interpretations of stressful events (Kobasa, 1984). Over the years, research has shown that the "hardy" personality is more resilient to stress than non-hardy persons. One reason hardy people are resilient to stress may be because they perceive themselves as consciously choosing to face it, and they typically interpret
stressors as making life more interesting. Also, actively taking control of the events in their lives allows hardy people to minimize the amount of stress they experience from day to day (Maddi & Kobasa, 1984). Additionally, evidence suggests that psychological hardiness helps individuals overcome stress by providing buffers between themselves and life stressors (Kobasa & Pucetti, 1983). Therefore, research in the area of stress and coping during the 1970's saw a resurgence of interest in the effects of personality that were popularized during the 19th century and first postulated as early as Hippocrates over 2,500 years ago.

During the 1980's, another shift in the focus of research in the professional literature began to take hold, as research on the role that personality plays as a moderator of stress began to give way to a focus on coping assessment and test construction. At this point in history, personality variables that predispose individuals to stress-related illness had been identified, and the deleterious effects of stress on psychological and physical health was well-documented. However, notwithstanding the vast popularity of Lazarus' theoretical work throughout the mid 1960's and 70's, there had been few empirical studies that focused on coping assessment prior to the 1980's. It was also during this time that use of the personal computer was becoming widespread in academia, and this use of personal computers facilitated the forging of a whole new era in which advanced multivariate statistical analyses like factor analysis were no longer confined to a small circle of mathematicians. The advent of the personal computer fostered a new generation of research in which advanced statistical methodology was coupled with previously untestable theoretical formulations of stress and coping in the generation of a vast number of assessment instruments. Research using these
assessments contributed to the discovery and delineation of the coping processes that have been shown to be instrumental in managing stress and preventing stress-related illness. However, many of the first assessments that were developed during the 1980's are inadequate by modern-day standards.

At this point in time, two distinct approaches to coping assessment had been undertaken by researchers in the field. The first of these approaches conceptualized coping in terms of ego defenses, which act to stabilize internal tension or maintain intrapsychic homeostasis (Folkman & Lazarus, 1980). Instruments of this kind, like Byrne's (1964) Repression-Sensitization scale and Gleser & Ihileich's (1969) Defense Mechanisms Inventory, first gained popularity during the 70's and were psychodynamic in orientation. Eventually, these two ego-defense measures of the 60's led to two other ego-defense measures during the 1980's, the Defense Style Questionnaire (DSQ) (Bond & Vaillant, 1986) and a 30-item questionnaire by Morris and Engle (1981) designed to measure six defense mechanisms: intellectualization, rationalization, isolation, denial, resignation, and preoccupation with self. While a fairly reliable and valid scoring system has been devised for the DSQ (Andrews, Pollock, & Stewart, 1989), no psychometric information is available for the Morris and Engle questionnaire. Also, given the subjective nature of interpreting assessment data resulting from subjective interpretation, these questionnaires have been criticized as lacking in a number of key areas. Most notably, critics of psychodynamic instruments have disparaged the poor inter-rater reliability of reported data interpretation. Likewise, concerns have been made regarding the confounding of results inherent in self-report measures of defensiveness,
as well-defended people are likely to be defensive about their defenses (Folkman & Lazarus, 1980; Morrissey, 1977; Vaillant, 1971).

The second approach to coping assessment, which had gained a sizable popularity by the 1980's, was a situation-oriented perspective. This approach to coping assessment examined the effects of interpersonal and environmental factors in coping processes. Rather than focusing on the dynamics and efficacy of various coping dispositions, situation-oriented approaches focus on deciphering the coping strategies effective in attenuating the effects of specific stressors and circumstances (Endler & Parker, 1989; Fleischman, 1984; Miller, Brody, & Summerton, 1988). Billings and Moos (1981) produced a study that is perhaps the most widely cited effort to classify situation-specific coping responses. They asked subjects to rate either true or false to 19 items indicating how they reacted to a recent stressful event. Analysis of the data revealed three clusters of coping behaviors: active-behavioral coping, active-cognitive coping, and avoidance. These clusters are similar to the data structure identified by Pearlin and Schooler (1978), who found 17 coping behaviors that can be classified into three general clusters: (1) responses that change the situation, (2) responses that change the meaning of the appraisal of the stress, and (3) responses aimed at controlling distressful feelings. After these analyses, Billings and Moos (1984) revised their questionnaire, adding 12 items and changing from a binary scale to a four-point Likert format. This revised version focused on three factors or coping strategies: appraisal-focused, problem-focused, and emotion-focused. Although the addition of items and the change in item-response format were meant to correct for a restriction in range on the
first version of the test, measures of internal consistency among the three factors still ranged from a low $r_{\alpha} = .41$ to $r_{\alpha} = .66$ (Billings & Moos, 1984).

Another situation-specific coping instrument, the Life Events and Coping Inventory (LECI), was developed by Dise-Lewis (1988) to measure five general coping strategies: aggression, stress-recognition, distraction, self-destruction, and endurance. The authors derived these scales using a principle components analysis and oblique rotation of data collected from 502 adolescents. Although the derived factors yielded low to moderate measures of internal consistency (alpha coefficients ranging from 0.62 to 0.86), the authors failed to report the factor structure, and it remains unclear whether any items cross-load on more than one factor (Parker & Endler, 1992).

In 1989, Feifel and Strack developed the 21-item Life Situations Inventory (LSI) for measuring coping behaviors in five specific conflict situations: decision-making, defeat in competition, frustration, conflict with authority, and general disagreement with a peer. The items were designed to comprise three broad domains of coping behaviors: problem-solving, avoidance, and resignation. Moreover, the LSI has been shown to possess low to moderate reliability (alphas ranging from 0.75 to 0.82); however, the factor structure and construct validity have not been examined (Parker & Endler, 1992).

Another instrument devised in 1989, the COPE, was created by Carver, Scheier, and Weintraub and has become one of the most widely used in contemporary research. This 52-item instrument consists of five scales assessing problem-focused coping, five scales assessing emotion-focused coping, and three scales measuring behavioral-disengagement, mental-disengagement, and venting of emotions (Carver, Scheier, & Weintraub, 1989). Notwithstanding this instrument's popularity, its psychometric...
properties and the method of its construction have led researchers to call its utility in question. As observed by Parker and Endler (1992), the authors did not report the number of items used in the initial factor analyses during scale construction. Additionally, the 13 factors selected for rotation were determined by selecting factors that have eigenvalues greater than 1.0, which is a method well known for over-estimating the number of factors appropriate for retention (Walkey & McCormick, 1985). After oblique rotation, the instrument consisted of 11 correlated subscales. Despite the fact that 11 factors emerged after rotation of the data, the COPE authors chose to retain 13 as was hypothesized. In addition to inexplicably retaining the additional factors, the authors also retained several items of questionable value. Nine of the fifty-two items have principle factor loadings less than 0.40, with five items loading less than their stated criterion of 0.30 (0.29, 0.28, 0.23, 0.23, 0.19). Reliability estimates of these subscales produced low to high coefficients, with internal consistency estimates ranging from 0.45 to 0.92 and six of the thirteen subscales producing alphas below 0.70 (Carver et. al., 1989). Given poor test construction and low to moderate overall reliability, results yielded from use of the COPE should be interpreted with caution (Parker & Endler, 1992).

Although each of these instruments has made contributions to the ever-growing body of coping research, there has likely been no more extensively cited instrument than the Ways of Coping Checklist (WCC) (Folkman & Lazarus, 1980) and its revised version, the Ways of Coping Questionnaire (WCQ) (Folkman & Lazarus, 1988). The WCC consists of 68 items reflecting a broad range of coping strategies that an individual might use in a specific stressful episode. Items were selected by theoretical
rationalization (Lazarus, 1966; Lazarus & Launier, 1978) and compiling suggested areas in the literature. In all, seven domains of strategies are represented, which include: defensive coping, information-seeking, problem-solving, palliation, inhibition of action, direct action, and magical thinking. The items that comprise each of these strategies were grouped into two overarching types of coping, problem-focused coping and emotion-focused coping. (Folkman & Lazarus, 1980). However, the authors reported very little of their factor analytic methodology or results of the data structure, and estimates of internal consistency were at best low to moderate (Tennen & Herzberger, 1985). Subsequently, several attempts to replicate the proposed two-factor solution of the WCC failed, indicating an unstable factor solution (Aldwin, Folkman, Schaefer, Coyne, & Lazarus, 1980; Aldwin & Revenson, 1987; Coyne, Aldwin, & Lazarus, 1981; Folkman & Lazarus, 1985; Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986; Parkes, 1984; Scheier, Weintraub, & Carver, 1986). After publication of the WCC in 1980, Folkman and Lazarus (1985, 1986) made efforts to correct for a number of psychometric limitations of the WCC and eventually published a revised version called the WCQ (1988). Revisions that were made included adding and deleting items, as well as changing from a dichotomous (true/false) response set to a four-point Likert format. However, factor analytic studies of the items used in constructing the WCQ failed to find support for the proposed data structure. In fact, Tennen and Herzberger (1985) suggested that people using the WCQ should conduct factor analyses of their own samples and use the results to determine subscales for the items. Additionally, Parker, Endler & Bagby (1993) conducted a study in which six different factor structures of the WCQ were tested, and all six of the models were shown to be poor.
representations of the data. Therefore, the general consensus in the literature suggests that although Folkman and Lazarus's work in stress and coping stimulates considerable theoretical interest, their coping measures have probably been used more often than is justified by the psychometric properties of their scales (Parker & Endler, 1992).

In the midst of this disparity between the considerable theoretical interest in the transactional model and the utility of its measure, Miller (1987) posited that a conception of the personal variables was missing from the transactional model's operationalization of the appraisal of stressful situations. Thus, Miller (1987) sought to improve the transactional model by adding the concept of personal coping styles of monitoring and blunting to the existing model's emphasis on problem-focused and emotion-focused coping strategies. Thus, monitors were described as having a dispositional tendency to seek information and act with vigilance under duress, while blunters were described as stylistically efforting to distract themselves and procrastinate problem-solving behavior when under duress (Miller, Brody, & Summerton, 1988).

In efforts to measure these assumptions, Miller devised the Miller Behavioral Style Scale (MBSS) (Miller, 1980, 1987; Miller & Managan, 1983). This 32-item self-report instrument asks respondents to imagine four specific stressful situations and respond to eight yes/no response format questions that reflect different ways of reacting to the situations. These coping responses were rationally derived and designed to be indicators of two broad coping styles: information-seekers (monitors) and information-distracters (blunters) (Parker & Endler, 1992). Although preliminary test-retest reliability estimates were favorable ($r_{xx} = 0.72$ and $r_{xx} = 0.75$), internal consistency measures have not been reported, and there are currently no published studies that...
examine the MBSS's factor structure (Parker & Endler, 1992). Notwithstanding the corresponding concepts between monitoring/blunting styles and problem/emotion-focused strategies, this approach to conceiving coping styles received a great deal of criticism, particularly for its lack of discriminability between high-blunters vs. low-monitors and low-blunters vs. high-monitors. In fact, research showed that it could be questioned whether these contrasting styles were simply the opposing poles of a single dimension of coping processes (Miller et. al., 1988).

**Contemporary Research in Stress and Coping**

By the end of the 1980's, researchers in the field of stress and coping remained generally dissatisfied with both the ego-defense and situation-oriented perspectives in the assessment of coping processes. The instability of factor structures and associated psychometric limitations which plagued existing measures of coping had contributed more questions than answers regarding the nature of coping with stress. However, the early 1990's saw the birth of a new sophistication in factor analytic techniques, as many statistical software packages improved and standards for empirical research began to rise. Perhaps the most noteworthy change in coping research was the inclusion of avoidance as a third domain of coping strategies. Previously, virtually all factor analytically derived measures of coping proposed a two factor solution reflecting both problem-focused and emotion-focused dimensions of coping. However, three instruments created in the early 1990's found an improvement in the stability of their factor structures when a third factor of avoidance was interpreted in the solution.
The first of these instruments, The Coping Strategy Indicator (Amirkhan, 1990), was created using items from the Ways of Coping Checklist (Folkman & Lazarus, 1980), the Coping Scale (Sidle et al., 1969), and the author's own previous research in coping. This compilation of 161 items was then factor analyzed in three stages using three independent community samples. In each phase of the analyses, three distinct factors emerged from the data reflecting the following strategies: problem-solving, seeking social support, and avoidance. Using principle components analysis (PCA), the item pool was reduced at each stage to improve parsimony and minimize redundancy in the model. Different from previous test construction methods which used oblique rotation, the author used an orthogonal rotation (varimax) to rotate the data to simple structure. Ultimately, 128 items had been eliminated from the analyses, resulting in a three factor solution with each scale containing 11 items. In a fourth stage of test construction, a composite sample (N = 458) was analyzed to determine estimates of internal consistency. Cronbach's alpha coefficient indicated a high internal reliability for all three of the scales: social support (.93), problem solving (.89), and avoidance (.84).

In the same year that Amirkhan (1990) published the Coping Strategy Indicator, another factor analytically derived measure of coping strategies was published called the Multidimensional Coping Inventory (MCI) (Endler & Parker, 1990b). Like Amirkhan, Endler and Parker factor analyzed a pool of rationally derived items (N = 70) using principal components extraction and varimax rotation to simple structure. Also like Amirkhan, the authors retained three factors in the analyses and labeled them as follows: task-oriented coping, emotion-oriented coping, and avoidance-oriented
coping. Ultimately, 44 items were retained in the solution. Reliability estimates of the three scales ranged from moderate (.76 for males on emotion-oriented coping) to high (.91 for females on task-oriented coping) (Endler & Parker, 1990b).

In efforts to improve the MCI, Endler and Parker (1994) conducted another study in which the authors added 22 items to the MCI and analyzed a heterogeneous sample of 394 college undergraduates and 284 adults. Calling this new version the Coping Inventory for Stressful Situations (CISS), the authors again used principal components extraction and varimax rotation to simple structure. Three statistically independent factors emerged from the data that were consistent with previous findings: task-oriented coping, emotion-oriented coping, and avoidance-oriented coping. In addition to these analyses, Endler and Parker factor analyzed the 16 items of the "avoidance" factor separately, and this procedure yielded two factors which were labeled distraction and social diversion. This procedure was followed by also factoring the other two dimensions separately. A single factor was retained in each case. These methods did in fact produce an improvement in reliability estimates. Alpha coefficients for the task, emotion, and avoidance subscales were 0.90, 0.87, and 0.85 for males, respectfully, and 0.90, 0.88, and 0.83 for females, respectfully (Parker & Endler, 1992). Although these procedures improved the reliability of the scales, the factor analytic methodology is rather suspect. Regrettably, the authors failed to report the extraction and rotation methods used in deriving the two avoidance subscales. They also failed to report the loading criterion used, and most notably, a rationale for conducting the additional analyses is also absent. No mention is made of any second-order factor analyses, as is warranted given the nature of their data (Kerlinger, 1973; Kline, 1998).
Thus, evidence would seem to suggest that the CISS data best fits a four factor solution. However, no research has been conducted to address this question, therefore conclusions about the factor structure of the CISS should be made with caution.

By the mid 1990’s, nearly a century of scientific study had culminated to a lag in empirical research. The century began with psychodynamic models of stress and coping. These models were heralded for their theoretical value, but they were often disparaged for basing formulations on untestable assumptions and a paucity of empirical evidence. However, by the end of the 20th century, research in the field had shifted to the opposite extreme. The 1980’s and early 1990’s saw a an influx of factor analytic models of stress and coping which were almost exclusively data-driven and void of any theoretical explanation. This state of affairs resulted in a general discontent among researchers, and a return to the roots of studying stress and coping has been called for in the literature (Snyder, 1999). The need exists for a theoretical model of stress and coping that is integrative, parsimonious, and generalizable. The need also exists for a measure of coping style that is based on theory and that transcends the psychometric limitations of earlier scales. Therefore, the CSI has been designed to address these issues and provide a theoretically driven and psychometrically sound assessment of coping style.

**Conceptual Rationale of the CSI**

As observed by Lazarus (1981, 2000), a great weakness in traditional research on coping is the absence of appropriate assessment methods for the description and interpretation of coping processes. Before we can speak knowledgeably about coping
styles, we must be able to assess the ongoing processes underlying the characteristic approaches to coping with stress. Pursuant to these goals, a concerted review of the stress and coping literature has revealed three coping processes that underlie four basic temperaments or coping styles. Specifically, predictability, control, and support have been identified as central processes that underlie four basic coping styles: Sanguine, Choleric, Melancholic, and Phlegmatic.

**Confidence and Control.** Predictability and control have been shown to be key moderators in the appraisal of stress. It has long been observed that stress is often greater when stressors are unpredictable or uncontrollable (Frankenhaeuser, 1986; Glass & Singer, 1972; Lazarus & Folkman, 1984; Stern, McCants, & Pettine, 1982), and ambiguity has been shown to increase the level of distress in stressful situations (Billings & Moos, 1984; Kaloupek & Stoupakis, 1985; Snyder, 1999). In their investigation of the underlying processes involved in primary appraisal of stressful situations, Folkman and Lazarus (1985) found that perceived predictability and controllability are determinants in distinguishing appraisals of threat, harm or loss, challenge, and benefit. Specifically, they found that situations perceived to be low in both predictability and control incite appraisals of threat. Likewise, situations perceived to be low in predictability but high in control are typically appraised as challenging, and situations perceived to be high in predictability and low in control are appraised as harm or loss. Moreover, situations perceived to be high in both predictability and controllability are most often appraised as beneficial or benign positive (Folkman &
Lazarus, 1984). This type of stress is usually perceived as opportunities for personal growth.

The relationship between predictability and controllability in the moderation of stress has been shown in animal research as well. In a landmark study by Weiss (1972), it was discovered that rats who were given warning and control of electric shocks developed significantly fewer ulcers than rats who were given no warning or control over electric shocks. Another interesting study on the moderating effects of predictability revealed that wives of American men missing in action during the Vietnam War showed poorer emotional and physical health than wives who knew their husbands had been killed or were being held as prisoners of war (Hunter, 1979). Likewise, it has been found that men and women whose spouses had died suddenly displayed more immediate anxiety and depression than those who had been warned of their spouse's pending death and were thus able to predict the appraisal of loss (Parkes & Weiss, 1983). More recent studies have shown that simply believing that a stressor is controllable can reduce its impact (Thompson, Sobolow-Shubin, Galbraith, Schwankovksy, & Cruzen, 1993), and perceiving a lack of control can lead to feelings of helplessness and hopelessness that are associated with depression and many other mental disorders (Seligman, 1990). Over time, a plethora of studies that have followed this line of investigation have corroborated these findings, and issues of predictability and control have become central figures in stress and coping research (Snyder, 1999).

A great deal of the empirical support of the relationship between predictability, control, and stress has been driven by earlier theorizing of these constructs. For example, Kelly (1963) stated that an individual's primary motive is to predict and
control the situations in his or her life, and the appraisal or interpretation of life events is impacted by one's perceived ability to predict and control the elements of circumstance. Whenever a person's belief systems are unable to accommodate the demands of life, the resulting disorganization and perceived lack of control is experienced as stress. As described by Kelly (1963), the psychological readjustment to stress is a coping process that is healthily achieved by the organization of belief systems that construe the world in a manner that maximizes the perceived ability to predict and control the events in one's life.

**Support.** In addition to predictability and control, the availability of support has consistently been shown to have a significant impact on coping with both acute and chronic stressors (Cohen & Wills, 1985; House, 1981; Schaefer, Coyne, & Lazarus, 1981; Snyder, 1999). A great deal of research points to the power of social support in moderating vulnerability to stress (Snyder, 1999), and it has been shown that people who are part of a supportive social network experience lower levels of stress and are better equipped to cope with environmental stressors (Pierce, Sarason, & Sarson, 1996). When people have other people they can turn to, they are better able to handle job stressors, unemployment, marital disruption, serious illness, and other catastrophes, as well as the everyday problems of living (Gottlieb, 1981; Pilisuk & Parks, 1986).

Lack of a social support system clearly increases one's vulnerability to disease and death (Berkman & Syme, 1979), as an overwhelming amount of evidence has shown that social support has therapeutic effects on both physical and psychological functioning (Brannon & Feist, 1992; Taylor, 1995; Wills, 1990). One review of the
literature concluded that the positive relationship between social support and health is on par with the negative relationship to the health of such well-established risk factors as physical inactivity, smoking, and high blood pressure (House, Landis, & Umberson, 1988). In another review of eighty-one studies, Uchino, Cacioppo, & Kiecolt-Glaser (1996) concluded that in times of stress, social support lowers blood pressure, lessens the secretion of stress hormones, and strengthens immune responses. Four kinds of social support have been identified as useful means of coping with stress: emotional support, instrumental aid, provision of information, and feedback on appraisal (Bolger & Eckenrode, 1991; Croyle & Hunt, 1991; Hatchett, Friend, Symister, & Wadhwa, 1997; Hobfoll, 1996; House, 1981; Mendolia & Kleck, 1993; Pierce, Sarason, & Sarson, 1996; Ryan & Solky, 1996; Taylor, Buunk, & Aspinwall, 1990). However, when a social network is not supportive, well intentioned friends or relatives can sometimes be annoying, irritating, or overly involved and can become additional sources of stress (Pagel, Erdly, & Becker, 1987).

**Temperament.** As previously noted, approximately 2,500 years ago, the physician Hippocrates observed that individual differences exist between people of the same afflictions in the approaches they take to coping with both the stressors of illness and the arduous regimens of medical treatment. In his teachings, “the father of medicine” instructed his students to consider the temperaments of their patients when formulating a prognoses for their recovery, as people of certain temperaments were more likely than others to be compliant with recommended strategies for coping with illness or injury. Consequently, Hippocrates may be among the first scholars in recorded
history to recognize that psychological factors have an impact on physiological functioning and that characteristic approaches to coping with stress may have moderating effects on the efficacy of medical treatment.

In the third century A.D., Galen advanced the ideas of Hippocrates in his landmark work *Human Faculties*, in which he classified the characters of humans into four types of temperament: sanguine, melancholic, choleric, and phlegmatic (Eysenck, 1981; Kagen et. al., 1994). Where Galen likened these temperaments to the body humors of Hippocratic doctrine, the German philosopher Immanuel Kant is responsible for popularizing this model among academicians and scientists (Eysenck, 1981). He provided a detailed description of the temperaments in behavioral terms and subdivided them into temperaments of feeling (melancholic and sanguine) and temperaments of activity (phlegmatic and choleric). Sanguines were described as being sociable, optimistic, and carefree. By contrast, melancholics were described as withdrawn, pessimistic, and anxious. Furthermore, phlegmatics were characterized as composed, affable, and steadfast, while cholericis were described as egocentric, irascible, and contentious. Moreover, Kant also presented the temperaments into categories of weakness (melancholic and choleric) and categories of strength (sanguine and phlegmatic) (Ruch, 1992). In his treatise *Anthropologie*, Immanuel Kant proposed that there are four temperaments that may be conceived of as independent categorical typologies (Eysenck, 1970).

In 1903, Wilhelm Wundt modified the Galen-Kant four-category model of temperament, shifting from a categorical to a dimensional system of typology. He organized temperament according to two bipolar dimensions of strength of emotion and
rate of change of emotions that orthogonally form the basis for classification of the
four temperaments (Ruch, 1992). The choleric and melancholic types are considered to
be inclined to strong emotions, while the sanguine and phlegmatic temperaments are
thought to be predisposed towards having emotions of lesser intensity. Likewise, in the
sanguine and choleric temperaments there is a higher rate of change of emotion than in
the melancholic and phlegmatic temperaments (Ruch, 1992). As reviewed by Eysenck
(1970), the development of the Galen-Kant-Wundt model from a categorical to a
dimensional typology has spurred dozens of reformulations throughout antiquity.

In contemporary research, the Galen-Kant-Wundt model has been adopted by
Hans Eysenck and colleagues in advancement of the three-factor model of personality
(Eysenck, 1967). Whereas Kant divided the temperaments into categories of feeling and
activity and Wundt described them in terms of strength of emotion and rate of change in
emotion, Eysenck divided the temperaments according to domains of intrapersonal and
interpersonal characteristics of self regulation (Kagen et. al., 1994). Building upon the
dimensional system of Wundt, Eysenck's organization of personality centers around
two basic bipolar factors: introversion-extroversion and neuroticism-stability. In
combination, these factors produce four dispositional types that correspond highly with
the four temperaments (Merenda, 1987). According to Eysenck's model, sanguines are
described as emotionally stable extroverts. By contrast, melancholics are characterized
as being neurotic introverts. Conversely, phlegmatics are characterized as emotionally
stable introverts and cholerics are neurotic extroverts. Together with the factor
psychoticism, extroversion and neuroticism make-up the three-factor model of
personality, or the "PEN" system, that serves as the theoretical rationale underpinning
the interpretation of the Eysenck Personality Questionnaire-Revised (EPQ-R) (Eysenck, Eysenck, & Barrett, 1985), which has received extensive use in modern-era personality research.

In recognition of the moderating effects that dispositions have on coping processes, Lazarus (1966) attempts to describe the means by which dispositions influence coping efforts. Specifically, Lazarus suggests that during the primary appraisal of threat, harm, loss, or challenge, dispositions provide the framework for critically evaluating the stressful situations and the salience of their meaning. Furthermore, the moderating effects that dispositions have on coping processes has also been noted by other researchers, who have observed that during secondary appraisal, given that primary appraisals of stress have occurred, personality dispositions engender a prescribed set of strategies that are deemed appropriate (Lazarus & Launier, 1978). Therefore, personality dispositions influence coping processes of self-management and may serve as buffering effects on stressful events (Kobasa, Maddi, & Kahn, 1982; Snyder, 1999). With the propagation of these ideas, the literature in stress and coping has returned to its ancient roots in its focus on stylistic or characteristic approaches to managing stress.

In sum, research has shown that predictability, controllability and support may be identified as underlying processes of coping styles. Given the specification of these constructs, it may now be feasible to measure them and examine the contributions they make to the description and interpretation of coping processes. However, it is essential to the development of reliable and valid instruments to refine and improve an instrument’s representation of a construct (Smith & McCarthy, 1995). Thus, a review of
the studies that have contributed to the scale development of the CSI is appropriate in efforts to explicate its representation of confidence, control, and support as characteristics of personal and interpersonal domains of coping processes.

Review of Studies Conducted in Development of the CSI

As observed by Smith and McCarthy (1995), a good measure will generate a predictable convergent and discriminant correlational pattern, and examination of this pattern is a fundamental aspect of both initial and later stages of scale development (Clark & Watson, 1995). Therefore, a review of the research contributing to scale development of the CSI will be presented, including studies that examine the construct and criterion validity of proposed scales.

Coping Style and Hardiness. Building on the pioneering work of Kobasa (1979), Bellah & Milford (1998) investigated the facets of coping styles as they relate to dispositional resilience to stress by investigating the relationship between coping competence and hardiness. The relation between the six-factors of dispositional coping style and hardiness was examined using a stepwise regression analysis with scores on the Hardiness Scale serving as the criterion. Findings from this study indicate the factor of self-confidence accounts for the majority of unique variance in hardiness scores. Additionally, all of the factors of coping style were significantly associated with hardiness. This suggests that a person who is disposed towards resilience to stress can be characterized as having a coping style that features core beliefs in confidence,
control, and support in terms of both self and others. Along with self-confidence, the hardy personality may also possess a coping style that features a sense of self-support, self-control, interpersonal influence, and confidence in others. These factors combine to predict individual differences in dispositional resilience to stress. Findings from this study also suggest that dispositional resilience to stress is more strongly associated with personal coping processes than interpersonal coping processes, and beliefs about the support of others may not significantly add to the explanation of variability in hardiness scores.

Coping Style and the Five Factor Model of Personality. Expanding on these findings of support for the proposition that personality variables may serve as moderator variables in coping processes, a follow-up study was conducted by Bellah, Milford, Velarde, & Peevy (1998c) which examines the relation between coping competence and the five factor model of personality. The results of this study revealed that Neuroticism is the best predictor of dispositional coping competence. Given its inverse relationship with coping ability, evidence suggests that individuals who are emotionally stable and well adjusted tend to have relatively better coping ability than those who are dispositionally prone to psychological distress. Furthermore, given a lack of multicollinearity among facet scales, analyses of the facet scales were warranted and reveal that the best predictor of coping competence is invulnerability to stress. According to Costa & McCrae (1992), individuals who score high in vulnerability feel unable to cope with stress and often become dependent, hopeless, or panicked when facing crisis. Not surprisingly, individuals who show high coping ability were also

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characterized as having a great deal of confidence, possessing a high degree of frustration tolerance, a low degree of bitterness, and slowness to anger (Costa & McCrae, 1992).

**Coping Style and Temperament.** The role of personality variables serving as moderators in coping processes has also been examined using the classic typology of temperament (Bellah, Milford, Velarde, & Peevy, 1998a). In contemporary research, the Galen-Kant-Wundt model has been adopted by Hans Eysenck in advancement of the three-factor model of personality (Eysenck, 1967, Eysenck, Eysenck, & Barrett, 1985). Building upon the dimensional system of Wundt, Eysenck’s organization of personality centers around two basic bipolar factors: Introversion-Extroversion and Neuroticism-Stability. In combination, these factors produce four dispositional types that correspond highly with the four temperaments: Choleric, Melancholic, Sanguine, and Melancholic (Merenda, 1987). Extroverts, relative to introverts, are thought to possess a higher ability to cope with others. Correspondingly, individuals who are emotionally stable are purported to have a relatively high ability to cope with personal stress than individuals high in Neuroticism (Bellah, Milford, & Kelly, 1998). Therefore, Bellah et. al. (1998a) surmised that individual coping styles might be typed along dimensions of personal coping competence (PC) and interpersonal coping competence (IC) in semblance with the four classic temperaments. Results of this study support these hypotheses, finding that individuals who are Sanguine in temperament tend to be high in both PC and IC, and individuals low in both PC and IC correspond with those Melancholic in temperament. Additionally, the disposition to be high in PC and low in IC was found to
be consistent with Phlegmatics, and Cholerics were shown to be significantly low in personal coping competence and high in ability to cope with others. These findings offer further support to the supposition that personality variables may serve as moderators in coping processes.

Coping Style and Psychoticism. Although the classic four temperaments were shown to correspond with certain coping styles, this correspondence could only be conceived using two of the three factors of personality as prescribed by Eysenck (Eysenck, 1967, 1981). Therefore, the effects of Psychoticism on coping processes was also investigated by regressing psychoticism against a discriminant function of the six-factors of dispositional coping style (Bellah, Milford, Velarde, & Peevy, 1998b). Theoretically, individuals high in Psychoticism (i.e. impulsive, risk-taking, tough-minded, aggressive, manipulative, hostile) have an intrapersonal style of self-management that is characterized by a predisposition towards having a low frustration tolerance and a frailty in self-control when feeling threatened or challenged by stressful situations. Likewise, individuals high in Psychoticism theoretically have an interpersonal coping style that may be described as cold, cruel, and critical of others in their management of stressful circumstances. They also tend to possess a guarded mistrust and rejection of others for the sake of self. Conversely, individuals low in Psychoticism (i.e. controlled, careful, tender-minded, passive, empathetic, gentle) theoretically have an intrapersonal coping style that is dispositionally composed and self-controlled when under duress. They also have an interpersonal style of self-management that is empathetic, trusting, and supportive of others. Therefore, it was
reasoned that individuals high in Psychoticism may be discriminated from those who are low in Psychoticism along a dimension according to their traits of dispositional coping style. Findings of this study support the hypotheses, suggesting that individuals who are high in Psychoticism tend to appraise stressful situations impulsively, are suspicious of others, and evaluate others disapprovingly when facing life's contingencies. These results are corroborated by Costa & McCrae (1995) in their observation that the Impulsive-Controlled subscale of Psychoticism is inversely related to Conscientiousness. Likewise, Agreeableness was found to be inversely related to the Psychoticism subscales Manipulative-Empathetic and Tough-Minded-Tender-Minded. This evidence is consistent with the present findings and supports the notion that Psychoticism subsumes both personal and interpersonal traits, and these aspects of personality directly influence coping processes and may serve as buffering effects on stressful events.

**Coping Style and Depression.** In addition to the effects of personality variables and their role as moderators in coping processes, Bellah & Milford (1998) examined mood as an outcome measure of coping competence. A preponderance of the research on coping has found that coping styles are predictive of depression (Billings & Moos, 1984; Kleinke, 1988). Studies have also shown that problem solving and affective-regulation styles of coping have been associated with less severe dysfunction, whereas emotional-discharge and avoidance styles of coping are more closely associated with severe depression. Therefore, the manner of appraising stressors and the particular coping strategies used to handle stressors are believed to play a pivotal role in
depression (Billings & Moos, 1984). Based on these findings, Bellah & Milford (1998) hypothesized that coping competence is significantly and inversely related to depression. In all, the pattern of correlations between the CSI and the BDI-II converged in theoretically predicted ways. As hypothesized, the full-scale measure of overall coping competence was significantly and inversely correlated with depression. Both index scores were also significantly and inversely related to depression, with personal coping competence correlating higher than interpersonal coping competence. Results indicate that, as expected, scores on the CSI full-scale and index scales are related to BDI-II composite scores, showing significant and inverse correlations with depression. These findings lend support to the assumption that individual differences among the traits of dispositional coping style can be used to identify risk factors for clinical depression. Individuals whose coping styles are low in confidence, control, and support of self and others show high correlations with depression. Specifically, personal coping competence was shown to be more strongly related to depression than interpersonal coping competence. These results indicate that individuals who: 1) lack trust in their ability to predict distressing life events, 2) lack a perceived ability to influence others, and 3) have a low sense of self support tend to be dispositionally vulnerable to the effects of stressful situations and prone to depression.

**Coping Style and Dispositional Forgiveness.** Having examined the effects of Psychoticism as a moderator in coping processes, Bellah & Milford (1998) followed-up with a comparative study, which investigated the relation between dispositional forgiveness and coping style. In this study, the scales known as
Forgiveness of Self (FOS) and Forgiveness of Others (FOO), developed by Mauger, Freeman, McBride, Perry, Grove, & McKinney, (1992), were compared to indices of the CSI to examine the distinction between personal and interpersonal coping competence. Results of these analyses indicate the pattern of correlations between the CSI and the FOS and FOO scales converged in theoretically predicted ways. As predicted, FOS correlated higher with PC than with IC. The second hypothesis was also supported, with FOO correlating higher with IC than with PC. As expected, forgiveness of self correlated higher with personal coping processes than with interpersonal coping processes. Results indicate that individuals high in PC tend to be self-confident, self-supportive, and are generally assertive. In addition, forgiveness of others correlated higher with interpersonal coping competence than with personal coping competence. Individuals high in IC tend to be more supportive of others, believe in their ability to predict the actions of others, and are generally composed in their everyday responses to daily hassles and stressors. Therefore, results indicated that individuals high in IC tend to be forgiving of others when they have been wronged. Additionally, they are not inclined to be impulsive in their reactions toward others and may stop to consider the stressful situation before acting upon it.

Coping Style and Psychological Distress. In addition to the effects of personality variables on coping processes, coping styles have been examined by comparing coping processes with psychological distress using the Personality Assessment Screener (PAS) (Bellah & Milford, 1998). The PAS is a 22-item, self-administered questionnaire designed to provide a screening for clinical problems as
measured by its parent instrument the Personality Assessment Inventory (PAI) (Morey, 1997). The PAS measures distinct clinical problems that may be classified in either personal or interpersonal domains of personality traits. In this study, theoretically relevant personal and interpersonal traits measured by the PAS were compared to CSI scales of confidence, control, and support for both self and others. It was expected that PAS and CSI scales would converge and diverge in theoretically meaningful ways. Specifically, three comparisons were made in these analyses: 1) self-confidence vs. other-confidence, 2) self-control vs. other-control, and 3) self-support vs. other-support. In the first comparison, the PAS scale negative-affect was expected to inversely converge with self-confidence and diverge with other-confidence. In the second comparison, hostile-control was expected to converge with other-control, while acting-out was expected to converge inversely with self-control. Lastly, the PAS scale alienation was expected to be inversely related to support, converging with self-support and diverging with other-support.

In each case, the pattern of correlations between the CSI and the PAS converged and diverged in theoretically predicted ways. In the first comparison, the relation between negative affect and indices of confidence were examined. According to Morey (1997), high scorers in negative-affect experience personal distress, unhappiness, and apprehension. Conceptually, this scale is inwardly directed, and the indicators of negative-affect, especially apprehension, is suggestive of a lack of self-confidence. Furthermore, acting-out, as measured by the PAS, is indicative of behavioral problems associated with impulsivity and sensation seeking, while hostile-control refers to an interpersonal style characterized by needs for control of others (Morey, 1997).
Conceptually, CSI self-control scores were expected to converge inversely with impulsivity and sensation seeking, while the indicators of hostile-control were predicted to be positively related to the CSI scale other-control. As in the first comparison, evidence is in support of these assumptions and suggests an adequate discrimination between CSI indices of control.

Likewise, at least a moderate discrimination was found between CSI indices of support. As defined by Morey (1997), individuals who score high in alienation endorse failures of supportive relationships and a distrust of or disinterest in such relationships. As indicated by the CSI, individuals low in self-support are vulnerable to the evaluations and criticisms of others. They are often characterized as hypersensitive and defensive, often alienating themselves from the very people they mean to impress. In contrast to self-support, individuals low in other-support take solace in the solitude of alienating others, devalue the opinions of others, and experience their isolation as minimally distressing. Therefore, the psychological distress of social alienation was expected to be more strongly associated with a lack of self-support than other-support. This pattern of relationships is consistent with the data and supports the distinction between self-support and other-support as measured by the CSI.

Coping Style and Attribution Style. In a study examining the distinction between personal and interpersonal coping processes, Bellah & Milford (1999) investigated the impact that coping styles have on the attributions people make in efforts to cope with negative events in affiliation with others. The fundamental attribution error has been described as the tendency to disregard or overly discount
situational factors in favor of internal, dispositional factors when making inferences about the causes of behavior (Heider, 1958; Jones, 1979; Kimble, 1994; Ross, 1977). This phenomenon in attributional processes may generate overconfidence about impressions of other people and lead to underestimates of the extent to which another person’s behavior is due to external causes, thereby underestimating how much the behavior of that person may vary across situations (Gilbert & Malone, 1995). The fundamental attribution error has generated over four decades of research that has made tremendous gains in revealing how individuals explain and predict the behaviors of self and others. Research has shown that the tendency to attribute behavior to internal, dispositional causes is less pronounced when individuals are explaining their own behavior as when explaining the behavior of others. This addendum to the fundamental attribution error has been termed the actor/observer bias (Jellison & Green, 1981; Jones & Nisbett, 1971, 1972; Monson & Snyder, 1977; Nisbett, Caputo, Legant, & Maracek, 1973; Reeder, 1982; Safer, 1980; Watson, 1982). Specifically, people tend to explain their own behavior in situational terms, while explaining the behavior of others in terms of dispositional or internal causes (Jones & Nisbett, 1971; Plous, 1993).

As hypothesized, the findings of this study revealed that individuals whose coping styles are high in personal coping competence and low in interpersonal coping competence are more likely to make external causal attributions for self and internal causal attributions for others when coping with a perceived negative event in affiliation with others. Therefore, evidence suggests that a distinction exists between personal and interpersonal coping processes and indicates that individuals who are prone to blame
themselves while venerating others when making causal attributions for negative interpersonal experiences may be a dispositionally vulnerable to interpersonal stressors.

Coping Style and Social Desirability. In an effort to examine the implications of coping processes in applied settings, Bellah, Buboltz, Milford, & Velarde (2000) investigated the coping processes underlying social desirability among inmates in a prison setting. In their approach to treating inmates, prisons throughout the nation are increasingly stepping away from the "punitive" philosophy of traditional penitentiaries and are moving toward a philosophy of "rehabilitation" being championed primarily by more contemporary correctional centers. Along with this paradigm shift comes a surging interest in psychological functioning of inmates, particularly with respect to both effectively assimilating the prison culture and remediating maladaptive behaviors for reassimilation into society. Universally regarded as an egregiously stressful environment, prison life often poses a great deal of challenges to adaptive functioning for inmates who already have difficulties adapting to less restrictive environments such as home, work, and society itself. Therefore, the psychosocial stressors that impinge upon the efficacy of "corrective" measures and interventions to maladaptive behaviors among inmates must necessarily be conceptualized within a framework that affords an understanding of the coping styles inmates use in their efforts to manage emotional distress.

Among the many coping styles employed by inmates, one of the most commonly observed coping styles might be referred to as social ingratiation. These inmates may often be observed attempting to align themselves with security personnel.
or status groups among inmates in efforts to achieve a social support system or a network for soliciting privileges and services. With this in mind, Bellah et. al. (2000) hypothesized that social desirability among inmates may be attributed to an interaction between personal and interpersonal coping competence, with inmates high in social desirability scoring low in personal coping competence and high in interpersonal coping competence. Findings support this hypothesis, suggesting that inmates low in personal coping competence and high in interpersonal coping competence are significantly more likely to exhibit social desirability and seek social support in efforts to cope with the stress of adapting to a prison environment.

In all, each of the aforementioned studies lend support to the rationally derived scales of the CSI. Research examining the convergence and discriminant correlational patterns of the scales with relevant indices such as negative affect, hostile-control, alienation, and depression indicate the rationally derived scales converge and diverge in theoretically predicted ways. Additionally, support was found for the convergence of the prescribed coping styles with the four classic temperaments, as well as a distinction between personal and interpersonal coping processes. Therefore, preliminary analyses are in support of the construct and criterion validity of the rationally derived scales of the CSI and suggest the scales are appropriate for further analyses.

**Pilot Study: Development of the Coping Style Inventory (CSI)**

At the turn of the 21st century, research in stress and coping has come full circle. In the January 2000 issue of the *American Psychologist*, George E. Vaillant called for a future course in coping research in his suggestion that the Defensive Functioning Scale
DFS) proposed for future research in the Diagnostic and Statistical Manual of Mental Disorders IV be used as a mechanism for indexing positive psychological processes, rather than limiting ourselves to the “negative” identification of psychosocial stressors on Axis IV. In this landmark article on the future of coping research, Vaillant’s chief complaint is that the field of psychology has no known method of indexing the ability to cope with stress. According to Vaillant (2000), the Global Assessment of Functioning (GAF) currently in use by most psychologists in Axis V is the closest we have to a metric for coping ability. Although he concurs with the American Psychiatric Association’s plea for development in the area of coping (1994), Vaillant indicates that widespread use of the DFS is stymied by its inherent dependence on subjectivity, difficulty in its empirical verification, and lack of any developed method for assessing its psychometric properties (Vaillant, 2000). In response to this need for a metric of coping competence to complete the picture of multiaxial diagnosis and case formulation, a series of procedures was conducted in the development of the CSI. First, a sample of items was generated, then preliminary item analyses were conducted, followed by an exploratory factor analysis and an examination of the psychometric properties of the instrument.

Development of the Item Sample

The first phase of developing the questionnaire was to generate a sample of items that reflect the underlying processes of predictability, control, and support as they relate to the four identified temperaments or coping styles. Specifically, it was reasoned
that predictability, control, and support may be conceptualized as both intrapersonal and interpersonal coping processes. As an extension of Wundt’s (1903) and Eysenck’s (1967) dimensional typology, it was postulated that the two bipolar dimensions of intrapersonal and interpersonal coping processes might produce four dispositional coping styles that correspond with the four classic temperaments. Therefore, items were constructed to reflect predictability, control, and support of both self and others, resulting in a six-factor model. As a matter of convenience, the label “confidence” was used to represent predictability, while the labels “control” and “support” were retained to represent their respective factors. Therefore, intrapersonal coping processes were identified by self-confidence, self-control, and self-support, and interpersonal coping processes were identified as other-confidence, other-control, and other-support.

In the initial stage, 60 items were obtained from the Coping Beliefs Inventory (Milford, 1996), a prototype of the CSI. Each scale originally consisted of ten items. The factor self-confidence was indicated by reverse-scored items that reflect thoughts of worry, such as “I am a person who worries a lot” and “I worry about things that never happen.” It was reasoned that worry, representing a distressing uncertainty, may contraindicate a sense of predictability that might be referred to as assurance or confidence. The factor self-control was designed to represent behaviors associated with a personal sense of control, such as, “I control what happens in a group” and the reversed item “I am a cautious and quiet person around others.” Additionally, the factor self-support is indicated by items that reflect a sense of personal resourcefulness to solve problems, such as “I am as smart as most people I know” and “I do see myself as
a likeable and capable person.” These three factors of self-confidence, self-control, and self-support comprise the intrapersonal dimension of coping processes.

The interpersonal dimension of coping processes include the factors other-confidence, other-control, and other-support. Other-confidence is indicated by items that reflect interpersonal trust, such as “I can trust most people I know” and the reversed item “If you treat me nice you want something.” As a counterpart to the intrapersonal processes of self-control, the factor other-control was designed to represent adaptive behaviors associated with adjusting to others being in control, such as, “I work hard and try to do things right” and the reversed item “I put off getting things done on time.” Finally, the factor other-support is indicated by items that reflect a tendency to be supportive of others, such as, “I praise and encourage others” and “I think about others’ needs and wants.”

Preliminary Item Analysis. In a sample of college undergraduates (N = 417), an exploratory factor analysis was conducted on the 60 items using principal axis extraction (common factors) and varimax rotation to simple structure. There were several criteria used for item analysis as proposed by Nunnally and Bernstein (1994). Specifically, items were removed from analysis: 1) if their communality estimates were less than .20, 2) if their factor loadings were less than .37, 3) if an item loaded sufficiently (within one-one hundredths of a point) on two or more factors, 4) if deleting the item improved reliability of its scale (within one-one hundredths of a point), 5) or if an item’s correlation with any items on its scale was non-significant at p > .01.
Following these analyses, 20 items were removed, including: six items due to insufficient communality estimates, seven items due to insufficient factor loadings, four items to improve scale reliability (as estimated by Cronbach’s alpha), two items due to insufficient inter-item correlations, and one item due to a cross-loading on two factors. Overall, 40 items of the original 60 were retained for further analyses in the development of the CSI. Following data reduction in item analysis of the instrument, additional data was collected on 143 subjects for the purpose of conducting exploratory factor analyses to identify the underlying structure of the data and standardize the instrument. These 143 subjects were added to the original 417 in efforts to maximize the observation-to-variable ratio as prescribed by Nunnally and Bernstein (1994).

**Participants**

A standardization sample (N = 560) of undergraduate students enrolled in general psychology courses served as participants in this study. The sample contained 245 males (44%) and 315 females (56%). The mean age was 20 and ages ranged from 16 to 50 years with a standard deviation of 4.16 years. A substantial portion of the data pertaining to race was missing (34%). However, the racial composition among the 370 subjects who chose to respond to the ethnic question was as follows: 280 Caucasian (76%), 65 African-American (18%), 12 Mexican-American (3%), and 13 classified as “Other” (3%).
Materials and Procedure

Each subject confidentially completed the Coping Style Inventory (CSI). Only items that loaded .40 or higher were retained in the analysis. Subjects were asked to voluntarily participate in a study examining the psychometric properties of the CSI. Respondents each confidentially completed the CSI. All questionnaires were pre-coded to preserve the anonymity of respondents. Participants were given a debriefing and provided the opportunity to ask questions about the research.

Criteria for Factor Retention. Although the use of EFA in test construction is appropriate for determining the number and content of factors that best represent data matrices, EFA does not provide indices for determining how accurately the identified solution represents the pattern of observed scores. Therefore, EFA has proven to be appropriate for use in identifying scales of items, but EFA does not allow test developers to determine how well the scales actually predict observed scores. Additionally, many of the conventional methods used in EFA for determining the appropriate number of factors to retain for further analyses have been criticized in the literature. Specifically, five primary methods of determining the number of factors to retain in EFA have been criticized for being susceptible to overestimation: 1) eigenanalysis (Guttman, 1954; Kaiser, 1970), 2) proportion of variance explained by the factor model, 3) the chi-square statistic (Bartlett, 1950), 4) scree analysis (Cattell, 1966), and 5) parallel analysis (Horn, 1965).
Kaiser-Guttman Rule. Although perhaps the most widely used criterion of factor retention, the Kaiser-Guttman rule (Guttman, 1954; Kaiser, 1970), which states that components with an eigenvalue of 1.0 or over should be retained in factor analyses (Zwick & Velicer, 1986), has been shown to overestimate the number of factors in stable solutions. As explained by Nunnally and Bernstein (1994), the more variables there are, the less variance a factor needs to account for to reach an eigenvalue of 1.0. For example, a factor with an eigenvalue of 1.0 accounts for ten percent of the variance when there are ten variables but only five percent of the variance when there are twenty variables. Therefore, Cliff (1988) and Gorsuch, (1983) have called the Kaiser-Guttman criteria in question, saying it is not recommended since it tends to overestimate the number of common factors (Nunnally & Bernstein, 1994).

Percent of Variance Explained. Along with eigenanalysis, the percent of variance that a factor solution accounts for has traditionally been used as an index of factor retention. Since each successive factor extracted in the solution incrementally accounts for less variance, ultimately the addition of factors to the solution will yield negligible gains in variance accounted for by the factor structure. However, one limitation of using the percent of variance accounted for as an index of the adequacy of a factor structure’s fit with the data is that the proportion of variance accounted for increases as the number of factors increases. This occurs for the same reason that all multiple correlations are biased with respect to number of predictors, and this phenomenon has been shown to be true even when the additional factors are...
meaningless (Nunnally & Bernstein, 1994). Therefore, like the Kaiser-Guttman criterion, factor extraction based on the proportion of variance explained by a solution may inherently possess an upward bias in suggesting the number of factors to be retained in analyses.

**Bartlett Statistic.** In addition to the aforementioned criteria for basing the retention of factors, the extraction method Maximum Likelihood provides a statistical test for examining the adequacy of fit between the estimated model and the actually observed data in the factor solution (Bartlett, 1950). The statistical test, usually computed as a chi-square, reflects the significance of a model's departure from the data matrix. While significance testing is an attractive feature of this measure of extraction, basing judgments about the retention of factors on this criterion may be problematic. Floyd and Widaman (1995) observed that statistical tests, like the chi-square, have a primary problem with their dependence on sample size. Specifically, Floyd and Widaman (1995) indicate that with sample sizes large in degrees of freedom, a statistical test will frequently suggest too many factors, rejecting substantively adequate factor models because of essentially trivial levels of residual covariation. Therefore, like eigenanalysis and examination of the proportion of variance explained by a factor solution, use of the chi-square statistic may overestimate the number of factors in a solution.
**Scree Curve Analysis.** Moreover, examination of a scree plot may facilitate the judgment of how many factors to retain for future analyses. The scree plot provides a graphical representation of eigenvalues for the unrotated factor matrix on a coordinate plane and the slope of the line connecting them. The cutoff for retaining factors is determined at the point along the line where the slope approaches zero, which indicates the point at which deleting a given factor would no longer result in discarding a significant amount of explainable variance in the model. Therefore, scree curve analysis is akin to the percent of variance explained criterion, inasmuch as both methods may be used to determine the number of factors that contribute a veritable amount of variance in the solution. However, studies have shown that use of the scree criterion often results in the retention of factors with eigenvalues considerably less than 1.0, which results in factors that account for less variance than a single item (Floyd & Widaman, 1995). Therefore, given the subjectivity of this method of factor retention, it has been recommended that use of the scree plot should be made with caution.

**Parallel Analysis.** One of these methods, parallel analysis (Horn, 1965), has been heralded for its utility in objectifying scree curve analysis (Floyd & Widaman, 1995) and has been found to be a conservative and unbiased estimate of the number of factors to retain in future analyses relative to other conventional methods (Allen & Hubbard, 1986; Horn, 1965; Lautenschlager, Lance, & Flaherty, 1989; Longman, Cota, Holden, & Fekken, 1989; Montanelli & Humphreys, 1976; Nunnally & Bernstein, 1995; Zwick & Velicer, 1986). Use of parallel analysis involves superimposing a scree
plot over a graph of the unrotated eigenvalues generated from a sample of random uncorrelated variables. This method allows the researcher to contrast the observed unrotated eigenvalues with those that are estimated to occur by chance, thereby identifying the number of factors with eigenvalues greater than would be expected to be found at random. Although this method of determining the appropriate number of factors has been reviewed as more accurate than the Kaiser-Guttman, Cattell, Bartlett, and percentage of variance explained criteria (Zwick & Velicer, 1986), some have observed that this method may be too dependent on chance (Harshman & Reddon, 1983) and may tend to overestimate the number of factors to be retained for rotation (Zwick & Velicer, 1986). Therefore, although EFA is useful for determining the best picture of the data, one must follow up exploratory techniques with confirmatory factor analysis in order to determine how closely that picture represents the true relationships among the variables.

Pilot Results: First-Order Exploratory Factor Analysis

Factor Extraction. The first step in exploratory factor analysis (EFA) is to determine the number of factors to retain for rotation. Although there are a number of conventional criteria available for use in selecting the appropriate number of factors to extract from the data (Bartlett, 1950; Cattell, 1966; Kaiser, 1960), each of these methods have been criticized in the literature as inappropriate criteria for factor retention, particularly due to their susceptibility to overestimation of the number of factors to be extracted for rotation to simple structure (Hair et. al, 1995; Tabachnick &
Fidell, 1996; Nunnally & Bernstein, 1995). Therefore, psychometricians have historically been faced with the daunting task of subjectively interpreting scree plots and arbitrarily determining the composition of factor structures based on flawed criteria, having only the arduous process of replication to rely upon when attempting to evaluate the supportive or disconfirming evidence of proposed factor solutions. However, a number of authors (Allen & Hubbard, 1986; Lautenschlager, Lance, & Flaherty, 1989; Longman, Cota, Holden, & Fekken, 1989; Montanelli & Humphreys, 1976) have worked to combat this problem by deriving a series of equations for predicting the eigenvalues of components in randomized data. Accounting for intervening variables such as sample size and the number of variables in the factor solution, these equations allow the researcher to calculate the eigenvalues of factors that would be predicted by chance in their analyses. Therefore, the number of components to be retained in the analyses may be determined by examining a plot of the observed, unrotated eigenvalues superimposed upon a plot of the eigenvalues of components estimated to occur by chance in the solution. Theoretically, these lines should run parallel to each other in a descending slope until a point of intersection, with the eigenvalues of the observed solution being greater than those of the estimated solution prior to the point of their crossing. Specifically, the point at which the graphical representation of the observed and predicted eigenvalues break parallel is the “parallel criterion” that determines the point at which subsequent components account for less variance in the solution than would be expected by chance (Nunnally & Bernstein, 1995). Therefore, observed eigenvalues greater in magnitude than their estimated counterparts are prescribed for
retention in further analyses (Nunnally & Bernstein, 1995; Zwick & Velicer, 1986).

The preferred formula for deriving the estimated eigenvalues in random data is as follows:

$$\log_e (\lambda_i) = a_i \log_e (n_i) + b_i \log_e (p_i) + c_i \{ \log_e (n_i) \log_e (p_i) \} + d_i$$

where $\log_e$ is the natural logarithm, $a$, $b$, $c$, and $d$, are regression coefficients, $i$ is the ordinal position of the eigenvalue, $n$ is the sample size, and $p$ is the number of variables (Longman, Cota, Holden, & Fekken, 1989). This equation represents a reformulation of previous equations by Horn (1965), Montanelli & Humphreys (1976), and Allen & Hubbard (1986) that offers improved multiple regression coefficients for predicting mean criterion eigenvalues (Longman et. al, 1989) without relying upon estimated eigenvalues in making predictions of latent roots for subsequent factors (Lautenschlager et. al., 1989). Results of these analyses are depicted in Figure 1. As indicated by the graph, results show that the point of intersection between predicted and observed eigenvalues in these analyses is achieved at the seventh component, indicating that components number one through six account for more variance in the factor solution than would be expected by chance and are therefore appropriate to retain for rotation to simple structure (Nunnally & Bernstein, 1995).
FIGURE 1: Parallel Analysis
Factor Rotation. Having determined that six factors are appropriate to retain for rotation to simple structure, the second step in EFA is to determine the appropriate method of rotation. Orthogonal rotation is a favorite among many statisticians because it places the axes at 90 degrees from one another, which sets the correlations of the factors equal to zero and provides the easiest interpretation of the data structure. However, it was reasoned that direct oblimin (oblique) rotation is most appropriate for use in the present study, as this method allows, but does not force, the factors to be correlated. Results of EFA indicate that each of the items loaded on its intended factor, with loading ranging from .41 to .88. As indicated by the squared multiple correlations (SMC) of estimated factor scores, all six factors were well defined by the variables. The SMCs ranged from .76 to .83 and revealed a high degree of internal consistency among the factors. Additionally, examination of the component correlation matrix revealed that correlations between components range from $r = -0.103$ to $r = 0.337$, indicating that there exists at least a low to moderate covariation between factors. Results of EFA using principle components extraction and direct oblimin (oblique) rotation are presented in Table 1.
TABLE 1

Pilot Study: Principle Components Extraction with Oblimin Rotation

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<td>0.05</td>
<td>0.04</td>
<td>0.48</td>
</tr>
</tbody>
</table>
Pilot Results: Second-Order Factor Analysis

Given the correlations present between components in the solution, additional examination of the data for the presence of higher-order factors was warranted. Therefore, the six scales were analyzed using principal components factor extraction and direct oblimin rotation. Given that the parallel analysis criterion is designed for use in retaining linear combinations of weighted variables, it may be inappropriate for use in second-order factor analysis, which involves the retention of linear combinations of weighted factors. Likewise, Bartlett's chi square statistic is inappropriate for use in principle components analysis, as it is computed using the generalized least squares method of Maximum Likelihood factor extraction. Therefore, given the subjectivity of scree curve analysis and the percentage of variance explained criterion, the Kaiser-Guttman rule was selected for use in determining the number of second-order factors to be retained for rotation to simple structure. Based on this criterion, two second-order factors were retained in the analysis due to the third factor failing to obtain an eigenvalue equal to or greater than 1.0. The factor loadings ranged from .58 to .90, with each of the six primary factors loading as predicted on the superordinate dimensions. The second-order factors were labeled Personal Coping Competence (PC) and Interpersonal Coping Competence (IC). Results of these analyses are presented in Table 2.
## TABLE 2

### Pilot Study: PC Second-Order Factor Analysis with Oblimin Rotation

<table>
<thead>
<tr>
<th>Scale</th>
<th>Personal Coping Competence (PC)</th>
<th>Interpersonal Coping Competence (IC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Confidence</td>
<td>.74</td>
<td>-.03</td>
</tr>
<tr>
<td>Self-Support</td>
<td>.73</td>
<td>.21</td>
</tr>
<tr>
<td>Self-Control</td>
<td>.72</td>
<td>0.07</td>
</tr>
<tr>
<td>Other-Support</td>
<td>-.26</td>
<td>.95</td>
</tr>
<tr>
<td>Other-Confidence</td>
<td>.21</td>
<td>.64</td>
</tr>
<tr>
<td>Other-Control</td>
<td>.29</td>
<td>.54</td>
</tr>
</tbody>
</table>

### Pilot Conclusion

Overall, item-level exploratory factor analyses provided support for the rationally derived scales and indicate at least a moderate degree of stability in the solution. It is noteworthy that each test item loaded only on its intended factor, with a loading magnitude of at least .40. Additionally, second-order components analysis revealed the presence of a hierarchical structure in the data corresponding to a two-dimensional pattern, with each dimension consisting of three primary factors. In total, the factor solution that emerged from the data was consistent with the theoretically derived scales of the CSI.
Hypotheses

In pilot work, first-order and second-order exploratory factor analyses of the CSI identified a hierarchical structure to the data. Specifically, the structural model indicated by preliminary analyses consists of two overarching domains of coping processes, namely personal coping competence and interpersonal coping competence. Therefore, preliminary results suggest that the 40 items under analysis only load on their intended scales and may be reduced to six primary factors, which comprise two domains of coping processes. Based on pilot work, personal coping competence (PC) is a linear combination of three weighted primary factors: self-confidence, self-control, and self-support. Likewise, evidence suggests that interpersonal coping competence (IC) is a linear combination of the weighted primary factors: other-confidence, other-control, and other-support. Therefore, within each of the domains, the primary factors of confidence, control, and support are thought to covary. While congruence in the relative magnitude of each primary between domains is merely descriptive of idiosyncratic characteristics in coping style, the degree of differentiation both between and within domains is indicative of individual strengths and weaknesses in coping competence. Although exploratory analyses support the hierarchical six-factor model, these analyses do not provide for an examination of the adequacy of model fit. In order to achieve an estimation of the degree to which the structural model accurately predicts observed data, the model must be tested using confirmatory factor analytic techniques. Given the defining features of the structural model of the CSI, four hypotheses will be examined in the present study.
**Hypothesis 1**

The first-order factor solution will fit a six-factor model comprised of self-confidence, self-control, self-support, other-confidence, other-control, and other-support, with items loading on their respective factors. A number of theoretical studies have identified these factors as key attributes of coping styles (Bellah & Milford, 1998; Bellah & Milford, 1999; Bellah, et. al., 2000; Bellah, Milford, & Kelly, 1998; Bellah, et. al., 1998a; Bellah, et. al., 1998b; Bellah, et. al., 1998c; Folkman & Lazarus 1980; Folkman & Lazarus, 1985; Folkman & Lazarus, 1986; Folkman & Lazarus, 1988; Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986; Kobasa, Maddi, & Kahn, 1982; Lazarus, 1966; Lazarus, 1981; Lazarus, DeLongis, Folkman, & Gruen, 1985; Lazarus & Folkman, 1984; Lazarus & Launier, 1978). Results of exploratory factor analysis (Bellah, 1999) support the findings of these studies, indicating the primary factor structure best fits a six factor model. Parallel analysis criterion for factor extraction revealed that factors number one through six possess sums of squared multiple correlations that are greater in magnitude than would be expected to occur by chance. Therefore, based on these preliminary analyses, it is hypothesized that the structural model specified with six first-order factors will provide a fit to the data.

**Hypothesis 2**

The second-order factor solution will fit a two-factor model comprised of personal coping competence and interpersonal coping competence. Many theorists have suggested that psychosocial adjustment comprises both intrapersonal and interpersonal
realms of life (Bellah & Milford, 1998; Bellah & Milford, 1999; Bellah et. al., 2000; Eysenck, 1970; Eysenck, 1981; Ruch, 1992; Eysenck, 1967; Eysenck & Barrett, 1985; Kagen et. al., 1994; Merenda, 1987). Results of second-order principle components analyses in pilot work provided support for the proposed hierarchical structure model, with each of two domains consisting of its respective personal or interpersonal primary factors. Therefore, it is hypothesized that the structural model consisting of two superordinate domains that each comprise three primary factors will provide a fit to the data.

Hypothesis 3

Personal coping competence will be comprised of the related primary factors: self-confidence, self-control, and self-support. These characteristics have been identified as coping resources by some of the preeminent scholars in field of stress and coping (Billings & Moos, 1984; Frankenhaeuser, 1986; Glass & Singer, 1972; Hunter, 1979; Kaloupek & Stoupakis, 1985; Lazarus & Folkman, 1984; Parkes & Weiss, 1983; Seligman, 1990; Stern, McCants, & Pettine, 1982; Thompson, Sobolow-Shubin, Galbraith, Schwankovksy, & Cruzen, 1993; Weiss, 1972). Additionally, pilot work provided empirical support for these ideas, revealing that the primary factors self-confidence, self-control, and self-support each load on a single superordinate domain labeled personal coping competence. Therefore, it is hypothesized that these observed factors will covary and be exogenous causal indicators of personal coping competence.
Hypothesis 4

Interpersonal coping competence will be comprised of the related primary factors: other-confidence, other-control, and other-support. Juxtaposed with the aforementioned pilot analyses of personal coping competence, pilot work indicated the factors other-confidence, other-control, and other-support each load on a single superordinate factor labeled interpersonal coping competence. These results also reflect the findings of a preponderance of theoretical work in coping and social functioning (Berkman & Syme, 1979; Bolger & Eckenrode, 1991; Brannon & Feist, 1992; Cohen & Wills, 1985; Croyle & Hunt, 1991; Gottlieb, 1981; Hatchett, Friend, Symister, & Wadhwa, 1997; Hobfoll, 1996; House, 1981; House, Landis, & Umberson, 1988; Mendolia & Kleck, 1993; Pagel, Erdly, & Becker, 1987; Pierce, Sarason, & Sarson, 1996; Pilisuk & Parks, 1986; Ryan & Solky, 1996; Schaefer, Coyne, & Lazarus, 1981; Taylor, 1995; Taylor, Buunk, & Aspinwall, 1990; Uchino, Cacioppo, & Kiecolt-Glaser, 1996; Wills, 1990). Thus, it is hypothesized that these observed factors will covary and be exogenous indicators of interpersonal coping competence.

Summary

The preceding introduction began with a prologue to the inception of the field of stress and coping research. This prologue was followed by a statement of the current problem under study, namely, whether the structural model of the Coping Style Inventory provides a fit to the data. A justification for researching this problem was then made on the basis of recent calls in the literature for a melding of theory-driven
and data-driven methodology in the derivation of interpretable and psychometrically stable models of coping that facilitate the generalization of findings and new approaches to case formulations in multiaxial diagnostic assessments. In this introduction, justification for the study preceded a review of the stress and coping literature spanning over 2,500 years of research, and this review led to the presentation of a pilot study, which introduced the conceptual development of the Coping Style Inventory (CSI). The processes involved in the development of the Coping Style Inventory were presented, along with an examination of its exploratory factor structure. Following pilot work, the introduction ended with a formal statement of the hypotheses under study. The following chapters include an explication of the methodology, results, and findings.
CHAPTER TWO

METHOD

Participants

A sample of undergraduate students (N = 420) enrolled in general psychology courses served as participants in this study. The sample contained 172 males (42%) and 240 females (58%). The mean age was 20.07 and ages ranged from 17 to 47 (SD = 3.03). The racial composition among the 381 subjects who chose to respond to the ethnic question was as follows: 303 Caucasian (72.1%), 58 African-American (13.8%), 7 Mexican-American (1.7%), 5 Asian (1.2%), and 8 classified as “Other” (1.9%). It is noteworthy that a substantial portion of the demographic data was missing. Specifically, there were 8 missing data points pertaining to sex (1.9%), 41 missing data points pertaining to age (9.76%), and 39 missing data points pertaining to race (9.3%).

Instrument

The Coping Style Inventory (CSI) (Milford, 1999) is a 40-item instrument that may be group administered, with the following instructions appearing on the first page.
of the test booklet: “Read each statement listed below. Blacken out the letter choice that best describes how true each statement is for you. There are no right or wrong answers, just your best opinions.” All 40 items have a 5-point Likert-type scale format that ranges from (1) "never true" to (5) "always true." Seventeen of the items are reverse scored to control for response set biases.

Item means and standard deviations from pilot work are presented in Table 3. Subscales were derived using aggregate sums of scale marker items based on a unit weighting of items loading on each factor. Review of the component correlation matrix revealed that the correlations between components ranged from $r = .01$ to $r = .30$, and review of the correlation matrix of derived scales revealed that the Pearson product moment correlation coefficients ranged from .02 to .44. None of these correlations matched or exceeded the reliabilities of the respective subscales, therefore evidence suggests there is adequate discriminability between measures (Peterson, Semmel, Von Baeyer, Abramson, Metalsky, & Seligman, 1982). Notably, even a correlation of $r = .17$ between the derived scales self-confidence and self-control was shown to be statistically significant ($p < .01$). It is possible that the large sample size artificially inflated the test of significance, therefore the inter-correlations should be interpreted with caution.
**TABLE 3**

**Subscale Item Means and Standard Deviations**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Item 1 Mean/Std Dev</th>
<th>Item 2 Mean/Std Dev</th>
<th>Item 3 Mean/Std Dev</th>
<th>Item 4 Mean/Std Dev</th>
<th>Item 5 Mean/Std Dev</th>
<th>Item 6 Mean/Std Dev</th>
<th>Item 7 Mean/Std Dev</th>
<th>Item 8 Mean/Std Dev</th>
<th>Item 9 Mean/Std Dev</th>
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<td>Self Control</td>
<td>3.6 / 1.0</td>
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<td>2.7 / .90</td>
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<tr>
<td>Self Support</td>
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<td>4.1 / .70</td>
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<td>Other Confidence</td>
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<td>3.8 / .78</td>
<td>3.3 / .85</td>
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<td>4.2 / .78</td>
<td>4.1 / .86</td>
<td>4.2 / .73</td>
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<td>4.2 / .84</td>
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<tr>
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<td>4.2 / 1.0</td>
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</table>
The internal consistency of composite, index scores, and subscales were estimated using Cronbach's (1951) coefficient alpha. The overall reliability of the CSI was high $r_\alpha = .90$ (Lord & Novick, 1968), with personal coping competence having a reliability of $r_\alpha = .85$ and interpersonal coping competence having a reliability of $r_\alpha = .88$. Furthermore, reliabilities of the subscales reflect at least a moderately high degree of internal consistency among measures. Reliability estimates for the six subscales were as follows: self-confidence ($r_\alpha = .83$), self-control ($r_\alpha = .79$), self-support ($r_\alpha = .81$), other-confidence ($r_\alpha = .84$), other-control ($r_\alpha = .82$) and other-support ($r_\alpha = .83$). The means of the six subscales ranged from other-control at 16.0 ($s = 3.7$) to other support having an average score of 35.0 ($s = 5.0$), with self-confidence having a mean score of 20 ($s = 4.9$), self-control having a mean score of 28 ($s = 4.1$), self-support having a mean score of 20 ($s = 2.9$), and other-confidence having a mean score of 28 ($s = 4.9$). Moreover, the mean score for personal coping competence was 56.0 ($s = 8.6$); the mean score for interpersonal coping competence was 90.0 ($s = 10.6$), and the mean score for the composite was 146.0 ($s = 15.9$). Likewise, correlations between the six primary factors were low to moderate, ranging from $r = .02$ (other-support and self-confidence) to $r = .44$ (other-support and other-confidence). Additionally, the standard errors of measurement for each of the subscales were low, reflecting a high degree of stability among subscale scores. The standard errors of measurement of the six subscales were as follows: self-confidence (1.99), self-control (1.70), self-support (1.26), other-confidence (1.96), other-control (1.75), other-support (2.06), personal coping competence (3.32), interpersonal coping competence (3.66), and the coping composite (5.04).
As previously reviewed, a number of studies have been conducted that examine the validity of the rationally derived scales of the CSI. In one study conducted by Bellah, Milford, Velarde, & Peevy (1998a), the convergent and discriminant validity of the CSI was examined using the Eysenck Personality Questionnaire (Eysenck, Eysenck, & Barrett, 1985) to determine if the theoretically derived coping styles correspond with their respective temperaments. Results indicate that group means among temperaments are significantly different with respect to PC and IC, with each temperament corresponding with its intended coping style. Additionally, construct validity studies using the CSI have shown an inverse relation between coping competence and depression, as well as between coping competence and psychological distress (Bellah & Milford, 1998). Discriminant validity of the CSI has also been examined by regressing psychoticism against a discriminant function of the six-factors of dispositional coping style (Bellah, Milford, Velarde, & Peevy, 1998b). Results of this study showed that individuals high in psychoticism may be discriminated from those low in psychoticism by a linear combination of coping characteristics that reflect guardedness, non-compliance, and rejection of others.

Criterion validity studies of the CSI have shown that individuals high in coping competence tend to be low in neuroticism and vulnerability to stress (Bellah, Milford, Velarde, & Peevy, 1998c). Moreover, examination of the criterion validity of the CSI indicates that individuals high in coping competence are also high in hardiness, as well as forgiveness of both self and others (Bellah & Milford, 1998). Additionally, research examining the distinction between personal and interpersonal coping processes have shown that that individuals whose coping styles are characterized as being high in PC
and low in IC tend to cope with perceived negative interpersonal events by making external causal attributions for self and internal causal attributions for others (Bellah & Milford, 1999). Conversely, research findings have suggested that inmates whose coping styles are low in PC and high in IC are likely to exhibit a desire for social acceptance and seek social support in efforts to cope with the stress associated with adjusting to incarceration (Bellah, Buboltz, Milford, & Velarde, 2000). Overall, validity studies of the CSI lend support to the convergent, discriminant, construct, and criterion validity of the rationally derived scales.

Procedures

Participants were administered an informed consent form prior to data collection. After obtaining informed consent, packets containing the CSI and pre-coded answer sheets were distributed to participants. Answer sheets were pre-coded to preserve anonymity of responses. Names of participants only appear on the consent forms and were not used in any way for data analyses or interpretation. Participation in this study was voluntary and held strictly confidential.

Data Analysis

Data analyses was conducted using several statistical methods. First, descriptive statistics including means and standard deviations was calculated for each scale. Likewise, measures of the psychometric properties of the CSI was presented, including measures of internal consistency and intercorrelations of CSI scales. Second, a
confirmatory factor analysis using structural equation modeling techniques was performed to determine the adequacy of the model's fit to the data. Structural equation modeling procedures tested the hypotheses by providing a variety of indices that measure the properties of factor solutions. These measures are designed to compare the predicted matrix of the structural model with the residual matrix in determining the adequacy of model fit. The goodness-of-fit between predicted and residual matrices was determined by the adequacy of three conditions in the solution: 1) overall model fit, 2) comparative fit to a base model, and 3) model parsimony. The goodness-of-fit index (GFI), which represents the degree of similarity between the squared residuals of estimated scores and the actual data, was used to measure the degree of similarity between observed and estimated matrices.

The second property of the structural model that was examined is the incremental fit between the proposed model and the null model, which represents the absence of error variance in the structural equation. The adjusted goodness-of-fit index (AGFI) was used to assess the degree of incremental fit. As an extension of the GFI, the AGFI represents the GFI after adjustment by the ratio of degrees of freedom for the proposed model to the degrees of freedom for the null model. Finally, the parsimony of model fit, or the estimated degree of fit per degree of freedom used (Hair, Anderson, Tatham, & Black, 1995), was estimated using the Akaike information criterion (AIC). Therefore, structural equation modeling techniques will be used in performing a confirmatory factor analysis to determine the degree to which the factor model is able to predict the observed data. A high degree of fit between predicted and observed data
evinced support of the hypothesized hierarchical structure of the Coping Style Inventory.
CHAPTER 3

RESULTS

The following section will present the results of data analyses. First, descriptive statistics of the sample will be discussed, including scale means, standard deviations, and correlations. Next, an overview of structural equation modeling will be presented, followed by a discussion of the specification and identification of the structural model. Finally, estimation of the structural model will be presented, including indices that represent the goodness of fit and parsimony of the model.

Descriptive Statistics of Sample

Descriptive statistics depicting means and standard deviations are presented in Table 4, and scale correlations are depicted in Table 5. As depicted in Table 4, means of the primary factors ranged from self-control (16.14) to other-support (34.60), with standard deviations ranging from self-support (2.36) to self-confidence (4.38). Additionally, reliabilities of the primary factors ranged from $r_a = .70$ (self-support) to $r_a = .82$ (other-confidence). Table 5 presents the Pearson product moment correlations between derived scales, with correlations between the extracted components presented in parentheses. Results indicate that the derived scale intercorrelations range from $r =$
.03 (other-support and self-confidence) to \( r = .41 \) (self-support and other-control) and the component correlations range from .01 (other-support and self-confidence) to -.31 (other-confidence and other-support). It is noteworthy that overall, these estimates are lower than those observed in pilot work, possibly due to unknown influences of error that cause a restriction in range of observed scores.

Additionally, item loadings for each subscale were tested using a principle components analysis with direct oblimin rotation to determine if the items load on their intended factors in the present sample. Results indicate that each item sufficiently loads on its intended subscale, with loadings ranging from .40 to .79. Furthermore, results of item-level components analysis reveals the absence of any cross-loading items, as no secondary factor loading exceeds a value of .40 and range from .00 to -.35. Reliability estimates of the scales were observed as follows: self-confidence (\( r_a = .81 \)), self-control (\( r_a = .76 \)), self-support (\( r_a = .70 \)), other-confidence (\( r_a = .82 \)), other-control (\( r_a = .75 \)), other-support (\( r_a = .80 \)), PC (\( r_a = .80 \)), IC (\( r_a = .83 \)), composite (\( r_a = .86 \)).
TABLE 4

Subscale Means, Standard Deviations, and Reliability

<table>
<thead>
<tr>
<th>Scale</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Reliability (alpha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coping Competence</td>
<td>141.43</td>
<td>12.81</td>
<td>.86</td>
</tr>
<tr>
<td>Personal Coping Competence</td>
<td>54.28</td>
<td>6.95</td>
<td>.80</td>
</tr>
<tr>
<td>Interpersonal Coping Competence</td>
<td>87.15</td>
<td>8.73</td>
<td>.83</td>
</tr>
<tr>
<td>Self-Confidence</td>
<td>18.36</td>
<td>4.38</td>
<td>.81</td>
</tr>
<tr>
<td>Self-Control</td>
<td>16.14</td>
<td>3.13</td>
<td>.76</td>
</tr>
<tr>
<td>Self-Support</td>
<td>19.78</td>
<td>2.36</td>
<td>.70</td>
</tr>
<tr>
<td>Other-Confidence</td>
<td>26.50</td>
<td>4.23</td>
<td>.82</td>
</tr>
<tr>
<td>Other-Control</td>
<td>26.05</td>
<td>3.71</td>
<td>.75</td>
</tr>
<tr>
<td>Other-Support</td>
<td>34.60</td>
<td>4.37</td>
<td>.80</td>
</tr>
</tbody>
</table>
TABLE 5

Correlations of the CSI Subscales

<table>
<thead>
<tr>
<th>Subscales</th>
<th>Self-Confidence</th>
<th>Self-Control</th>
<th>Self-Support</th>
<th>Other-Confidence</th>
<th>Other-Control</th>
<th>Other-Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Confidence</td>
<td>(.06)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Control</td>
<td>.17**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Support</td>
<td>(-.14)</td>
<td>(.15)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confidence</td>
<td>(-.24)</td>
<td>(.03)</td>
<td>(.07)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other-Confidence</td>
<td>.33**</td>
<td>.10*</td>
<td>.16**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other-Control</td>
<td>.12*</td>
<td>.19**</td>
<td>.41**</td>
<td>.11*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other-Support</td>
<td>(.01)</td>
<td>(.02)</td>
<td>(.15)</td>
<td>(.31)</td>
<td>(.17)</td>
<td></td>
</tr>
</tbody>
</table>

Note. Coefficients in parentheses represent component correlations. Free-standing coefficients represent correlations of derived scales.

* p < .05. ** p < .01.
Structural Equation Modeling

Structural equation modeling (SEM) encompasses an entire family of statistical analyses known by many names, among them covariance structure analysis, latent variable analysis, path analysis, and often Lisrel analysis in reference to one of the more popular statistical software packages used to perform the analyses (Hair et. al, 1995). The power of SEM lies in its versatility, as this family of statistical techniques enables the researcher to investigate questions about variables that are metric or non-metric, observed or unobserved, dependent or independent, experimental or correlational, or even all of the above. The practicality of investigating certain research questions often requires researchers to refine their hypotheses to accommodate dependence techniques (e.g. regression and analysis of variance) or interdependence techniques (e.g., factor analysis and cluster analysis) traditionally used in data analyses. However, the utility and versatility of SEM allows researchers to answer multiple questions and hypotheses and investigate multiple relationships among several variables in a single statistical procedure. Perhaps the most distinguishing characteristics of SEM are its capability to estimate multiple and interrelated dependence relationships and to represent unobserved constructs in these relationships while accounting for measurement error in the estimation process (Hair et. al., 1995).

These features of SEM in particular make this family of statistical techniques ideal for use in confirmatory factor analysis, as proposed factor models may be specified and compared to observed data in determining the adequacy of fit between theoretically predicted data structures and actually observed data structures. Given that
SEM accommodates a broad base of data types and statistical methodology, it is critical that the researcher utilize a definable modeling strategy in adherence to the spirit of the scientific method in appropriating replication and generalizability of results. Therefore, the following analyses will follow a three-stage process of confirmatory factor analysis recommended by Kline (1998) that includes: 1) specification of the measurement model, 2) identification of the measurement model, and 3) estimation of the measurement model.

In the first stage of these analyses, the parameters defining the relations between observed and latent variables in the proposed model were specified based on results of pilot work that determined the appropriateness of each factor’s inclusion in the structural model. Stemming from pilot work, it is proposed that the data fits a structural model comprising six primary factors and two higher-order domains. In the identification stage of analysis, the specified structural model is examined for its adherence to the multivariate assumptions of SEM, namely that the specified model satisfies the caveat that it be possible to derive a unique estimate of every model parameter (Kline, 1998). Lastly, estimation of the measurement model will be performed using maximum likelihood methodology, which utilizes a least-squares criterion for predicting the best estimates of parameter values in the structural model. The values of these parameter estimates will then be evaluated for their representation of the model’s fit to the observed data structure.
Specification of the Measurement Model

The initial step in confirmatory factor analysis (CFA) is model specification, which involves the derivation of the number of factors that underlie the data, as well as which measured variables should load on each of the factors (Floyd & Widaman, 1995). As observed in pilot work, results of parallel analysis indicate that six factors is the appropriate number to be selected for retention in analyses of the factor structure. Thus, given the proposed hierarchical structure of the data, the measurement model may be specified as consisting of six exogenous manifest variables and three endogenous latent factors. Furthermore, in specifying the relationships between and among the variables, the proposed model specifies that 1) three manifest variables serve as covariate indicators of the latent factor labeled personal coping competence, 2) three manifest variables serve as covariate indicators of the latent factor labeled interpersonal coping competence, and 3) each second-order domain serves as exogenous causal indicators of the composite index labeled coping competence.

Identification of the Measurement Model

As observed by Kline (1998), any CFA measurement model must meet two necessary conditions in order to be identified: 1) the number of free parameters must be less than or equal to the number of observations, and 2) every factor must have a scale. According to Kline (1998), the number of observations may be calculated by the following equation:
where \( v \) is the number of observed variables. Given that there are a total of six observed primary factors serving as manifest variables or indicators, results of this calculation reveal that these analyses have a total of 21 distinct sample moments, or \( 6(6+1)/2 = 21 \). Likewise, the total number of parameters to be estimated equals the total number of variances and covariances of the latent factors and of the measurement errors plus the factor loadings. Given that there are three latent unobserved factors, three corresponding error terms, and a total of six primary factor loadings, there is a sum of 12 parameters to be estimated in the analyses. Therefore, since the total number of distinct sample moments exceeds the number of parameters to be estimated by a total of nine degrees of freedom, results indicate that the proposed model satisfies the first criterion for statistical identification. Additionally, the second criterion for identifying the model, that every latent variable must have a scale, is also satisfied by each latent variable being directly or indirectly associated with at least three indicators or primary factors (Kline, 1998).

**Estimation of the Measurement Model**

The estimation of measurement models in structural equation modeling is performed by interpreting a variety of indices that measure the properties of factor solutions by comparing the predicted and residual matrices of the model. The goodness-of-fit between predicted and residual matrices is determined by the adequacy of three conditions in the solution: 1) overall model fit, 2) comparative fit to a base model, and
model parsimony. Although a variety of indices are available that measure these properties, only the chi-square is a statistical test. However, relative comparisons between estimated and observed matrices offer additional information that can be used in conjunction with more traditional maximum likelihood methodology in the estimation of population parameters.

The goodness-of-fit index (GFI) was used to measure the degree of similarity between observed and estimated matrices. The GFI ranges from 0 (poor fit) to 1 (perfect fit). Specifically, the GFI represents the degree of similarity between the squared residuals of estimated scores and the actual data. Analyses indicated a GFI value of .91 in the present sample, which is considered high and indicative of a good fit between predicted and observed scores (Mulaik, James, Van Alstine, Bennett, Lind, & Stilwell, 1989).

The second property of the structural model that was examined was the incremental fit between the proposed model and the null model. In this case, the null model represents the absence of error variance in the structural equation. The adjusted goodness-of-fit index (AGFI) was used to assess the degree of incremental fit. As an extension of the GFI, the AGFI represents the GFI after adjustment by the ratio of degrees of freedom for the proposed model to the degrees of freedom for the null model. Like the GFI, AGFI ranges from 0-1, with zero representing independence and 1 representing a perfect model fit. The AGFI for the sample was .78, indicating at least a moderate fit between proposed and null models (Mulaik et. al., 1989).

Finally, the parsimony of model fit was estimated using the Akaike information criterion (AIC). Parsimony is defined as achieving a higher degree of fit per degree of
freedom used (Hair et. al, 1995). The AIC provides an estimate of model parsimony for three separate matrices: 1) the proposed model, 2) a saturated model representing the maximum number of model parameters allowable for just-identification (i.e. the model has equal numbers of observations and parameters), and 3) an independence or “null” model that represents a general factor related to each indicator with no measurement error. AIC values for the saturated model (AIC = 42.0), the independence model (AIC = 329.88), and the proposed model (AIC = 158.464) indicate the proposed model has a 41% better fit with the saturated model than does the independence model, indicating the measurement model proposes an adequate number of estimated parameters in minimizing the difference between observed and predicted covariances/correlations.

Overall, attempts to fit the CSI data to the six-factor model were successful. Factor loadings among the manifest variables of PC ranged from .34 (self-support) to .61 (self-confidence), with self-control obtaining a factor loading of .45. Likewise, factor loadings among the manifest variables of IC ranged from .42 (other-control) to .50 (other-support), with other-confidence obtaining a factor loading of .48. Moreover, the latent variables attained regression estimates of .62 (PC) and .78 (IC) in their relation to the endogenous composite. It is noteworthy that the squared multiple correlations between the second-order factors and their composite was high ($R^2 = .991$). Likewise, the squared multiple correlations between the primaries of both PC ($R^2 = .976$) and IC ($R^2 = .985$) were also high, indicating the presence of a strong internal consistency within the higher-order dimensions and empirical support for the convergent and divergent validity of the proposed theoretical model. A depiction of the specified path diagram and standardized regression weights is presented in Figure 2.
FIGURE 2: Path Diagram of the Coping Style Inventory
CHAPTER 4

DISCUSSION

The purpose of the current study has been to determine if the proposed hierarchical model of the CSI provides a good fit to the data. Although EFA provides a mechanism for determining the factor solution that best represents the data, EFA does not provide any indices that depict how good the fit actually is between predicted and observed data matrices. Additionally, conventional criteria for determining the number of factors to extract for rotation to simple structure have been criticized for being susceptible to overestimation. Therefore, given these inherent limitations of EFA, performing a CFA is a necessary step in scale development, as only CFA provides the means for measuring the goodness of fit between proposed relationships among rationally derived scales and the natural occurrence of observed data structures. Thus, the present study built upon EFA findings in pilot work in conducting a confirmatory factor analysis of the CSI.

Hypotheses

Specifically, four hypotheses were tested using CFA: 1) the first-order factor solution fits a six-factor model that is comprised of self-confidence, self-control, self-
support, other-confidence, other-control, and other-support with each item loading on its intended scale; 2) the second-order factor solution fits a two-factor model comprised of personal coping competence and interpersonal coping competence; 3) personal coping competence is comprised of the related primary factors: self-confidence, self-control, and self-support, and 4) interpersonal coping competence is comprised of the related primary factors: other-confidence, other-control, and other-support.

**Hypothesis 1**

Commensurate with previous theoretical findings (Bellah & Milford, 1998; Bellah & Milford, 1999; Bellah, et. al., 2000; Bellah, Milford, & Kelly, 1998; Bellah, et. al., 1998a; Bellah, et. al., 1998b; Bellah, et. al., 1998c; Folkman & Lazarus 1980; Folkman & Lazarus, 1985; Folkman & Lazarus, 1986; Folkman & Lazarus, 1988; Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986; Kobasa, Maddi, & Kahn, 1982; Lazarus, 1966; Lazarus, 1981; Lazarus, DeLongis, Folkman, & Gruen, 1985; Lazarus & Folkman, 1984; Lazarus & Launier, 1978), data results are in support of the hypothesis that the first-order factor solution fits a six-factor model comprising self-confidence, self-control, self-support, other-confidence, other-control, and other-support. Estimates of the Akaike Information Criterion (AIC) indicate the proposed model has a 41% better fit with the saturated model than does the independence model. Therefore, the proposed model specifies an adequate number of estimated parameters in minimizing the difference between observed and predicted covariances/correlations. Thus, evidence is in support of the hypothesis that the first-order factor solution fits a six-factor model. Likewise, results of item-level principle components analyses indicate
that each item sufficiently loads on its intended scale, with loadings ranging from .40 to .79. Furthermore, results of item-level components analysis reveal the absence of any cross-loading items, as no secondary factor loading exceeds a value of .40 and range from .00 to -.35. Thus, results of data analyses are in support of the first hypothesis.

**Hypothesis 2**

Data results are also in support of the second hypothesis, indicating that the second-order factor solution fits a two factor model comprising the domains labeled personal coping competence and interpersonal coping competence. These results echo the findings of previous research using the CSI (Bellah & Milford, 1998; Bellah & Milford, 1999; Bellah et. al., 2000) as well as the postulates of theoreticians in both temperament and coping style (Eysenck, 1970; Eysenck, 1981; Ruch, 1992; Eysenck, 1967; Eysenck & Barrett, 1985; Kagen et. al., 1994; Merenda, 1987). Overall, the AGFI for the sample was .78 and the GFI for the sample was .91, indicating that evidence is in support of the hypothesis that the variance of the endogenous second-order domains of personal coping competence and interpersonal coping competence is adequately explained by the linear combinations of their respective factors. Therefore, data analyses support the interpretation that a distinction exists between personal and interpersonal coping processes.
Hypothesis 3

Data results support the third hypothesis, indicating that the primary factors self-confidence, self-control, and self-support covary and serve as manifest variables of personal coping competence. These intrapersonal coping processes have been fundamental constructs in some of the most influential theoretical models in the field of stress and coping (Billings & Moos, 1984; Frankenhaeuser, 1986; Glass & Singer, 1972; Hunter, 1979; Kaloupek & Stoupakis, 1985; Lazarus & Folkman, 1984; Parkes & Weiss, 1983; Seligman, 1990; Stern, McCants, & Pettine, 1982; Thompson, Sobolow-Shubin, Galbraith, Schwankovksy, & Cruzen, 1993; Weiss, 1972). In correspondence with theoretical findings from the literature, results indicate that the standardized regression weights range from self-confidence ($R = .34$) to self-support ($R = .61$), with self-control loading on personal coping competence with a weight of $R = .45$. Thus, with an overall squared multiple correlation of $R^2 = .98$, evidence suggests that the primary factors of self-confidence, self-control, and self-support contribute a variable degree of explanatory value in specification of the second-order domain labeled personal coping competence.

Hypothesis 4

Additionally, results of data analyses are in support of the fourth hypothesis, indicating that the primary factors other-confidence, other-control, and other-support serve as exogenous manifest variables in the specification of interpersonal coping competence. Thus, results of data analyses are consistent with theoretical findings in the
literature that postulate a covariance among these constructs (Berkman & Syme, 1979; Bolger & Eckenrode, 1991; Brannon & Feist, 1992; Cohen & Wills, 1985; Croyle & Hunt, 1991; Gottlieb, 1981; Hatchett, Friend, Symister, & Wadhwa, 1997; Hobfoll, 1996; House, 1981; House, Landis, & Umberson, 1988; Mendolia & Kleck, 1993; Pagel, Erdly, & Becker, 1987; Pierce, Sarason, & Sarson, 1996; Pilisuk & Parks, 1986; Ryan & Solky, 1996; Schaefer, Coyne, & Lazarus, 1981; Taylor, 1995; Taylor, Buunk, & Aspinwall, 1990; Uchino, Cacioppo, & Kiecolt-Glaser, 1996; Wills, 1990). Results indicate that the regression weights for these subscales ranged from other-control (R = .42) to other-support (R = .50), with other-confidence achieving a regression weight of R = .48 and the overall squared multiple correlation estimated to be R² = .99. Therefore, evidence is in support of the hypothesis that other-confidence, other-control, and other-support may be interpreted as adequate indicators in specification of the second-order domain labeled interpersonal coping competence.

Hence, results of confirmatory factor analysis are in support of all four of the hypotheses under study, with the endogenous composite achieving a squared multiple correlation of R² = .99 and the model achieving an estimated goodness of fit of GFI = .91. However, in spite of the corroborating evidence in support of the proposed model, parametric statistical analysis is an invariably imperfect science and is suspect to the influence of error and methodological limitations.

Implications

Given support for the proposed structural model of the CSI, it may be reasonable to surmise that the CSI is suitable for use in measuring personal and interpersonal
coping processes. Additionally, with a plethora of studies in the literature identifying confidence, control, and support as characteristics that lead to functional psychosocial adjustment, it may be said that these characteristics of coping demarcate the features of coping styles that lead to competent stress management or coping competence. Evidence suggests that individuals who score high in coping competence as measured by the CSI also score lowest in a host of indicators of poor coping including: depression (Bellah & Milford, 1998), psychological distress (Bellah & Milford, 1998), psychoticism (Bellah, Milford, Velarde, & Peevy, 1998b), melancholia (Bellah, Milford, Velarde, & Peevy, 1998a), as well as neuroticism and vulnerability to stress (Bellah, Milford, Velarde, & Peevy (1998c). Furthermore, research has shown that individuals whose coping styles are characterized as being high in PC and low in IC have a tendency to make external causal attributions for self and internal causal attributions for others when coping with a perceived negative event in affiliation with others (Bellah & Milford, 1999). Conversely, research findings indicate that individuals whose coping styles are low in PC and high in IC are more likely to exhibit social desirability and seek social support in efforts to cope with the stress associated with adjusting to a prison environment (Bellah, Buboltz, Milford, & Velarde, 2000). In addition to these findings, individuals who score high in coping competence as measured by the CSI have also been found to be high in hardiness, as well as forgiving of both self and others (Bellah & Milford, 1998). Therefore, research findings suggest that the scales of the CSI may provide the first steps towards bridging the gap between practice, research, and theory in counseling psychology and an indexing of coping ability that has been called for in recent literature (Lazarus, 2000).
Implications for the Practice of Counseling Psychology

The findings of this study lend credence to the supposition that the CSI may be a practical tool for psychologists to use in applied settings, particularly in case formulations and treatment planning. In these times of ever-changing standards of care and interaction with third-party agencies such as health maintenance organizations, psychologists are increasingly being required to substantiate diagnoses and quantify treatment plans. Prognosticating outcome of prescribed treatment in efforts to secure reimbursement for psychological services has become an intricate aspect of applied psychology in recent years, and yet there remains a dearth of measures that enable the clinician to objectify the prognostication of treatment.

A poignant example of the need for making objective prognoses may be found in the processes involved in certifying reimbursement for Medicaid clients. Medicaid requires that psychotherapy follow a documented plan of treatment that progresses through sequential steps and leads to a predicted remission of psychopathology. Moreover, the standardized format for treatment plans requires that psychologists indicate the psychosocial stressors on Axis IV as problem areas, as well as the related therapeutic interventions proposed for reimbursement. Finally, the Medicaid-approved format for treatment plans requires psychologists to indicate the criteria for discharge of services, typically a nominal increase in the Global Assessment of Functioning index reflected on Axis V. Thus, to secure monetary reimbursement for psychological services, psychologists working in applied settings are required to formulate a treatment plan that includes: 1) a delineation of the client’s presenting problems or psychosocial stressors, 2) treatment interventions prescribed to facilitate coping with these stressors,
and 3) a prognostication of the expected level of functioning prior to the termination of psychological services. Consequently, the certification for reimbursement for psychological services is, in effect, dependent upon the psychologist matching identified stressors with the coping strategies prescribed to give the best prognosis for functional psychosocial adaptation. Therefore, the dilemma for practitioners working in applied settings is twofold: 1) an inability to objectively substantiate the appropriateness of treatment modalities, and 2) an inability to objectively predict the efficacy of prescribed treatments.

Contemporaneously, the field of psychological testing is rife with reliable and valid assessments of intelligence, personality, and psychopathology that aid in formulating diagnoses of mental illness. However, there exists a persisting disparity between the availability of these traditionally “clinical” tools of practice and those that are designed for use in “counseling” and other treatment-oriented aspects of professional practice. Screening instruments (e.g. the Beck Depression Inventory) are commonly used in both inpatient and outpatient settings as outcome measures, but screening instruments have little value for use in predicting a priori what the effectiveness of treatment will likely be for any particular client. Likewise, while clinical interviews are effective means for identifying specific psychosocial stressors and clinical testing is effective for determining the type and degree of stress-related mental illness, there remains a distinct void in the field for determining the appropriateness of available treatments that improve coping with identified stressors and improve psychosocial functioning. Thus, psychologists are often armed with an abundance of assessment data that may be used in conjunction with interview data when
formulating diagnoses and determining the current level of functioning of their clients. However, psychologists all too often find themselves faced with recommending modalities of treatment and prognosticating the efficacy of prescribed treatments without the support of objective and reliable assessment data. Consequently, agencies of third-party payment for psychological services have begun to more closely scrutinize certification requests for reimbursement and have increasingly begun to deny payment for psychological services.

This phenomenon has resulted in a need for counseling psychologists to bridge the gap between research and practice in the generation of objective coping instruments that facilitate the prescription and prognostication of various treatment modalities. Overall, the coping instruments that are presently available are inadequate for use in clinical settings, as most have been criticized for use in research settings. Even so, virtually all of the coping assessments that have been developed are designed to indicate the frequency and type of coping behaviors thought to be elicited by the environmental factors of predictability and controllability of specific stressful events. Given that the conceptualizations of these instruments are inherently dependent upon features of the environment, they provide little utility for use in applied settings that focus on the diagnosis and treatment of persons and the psychosocial adjustment to the environment. Therefore, although contemporary designs of coping assessment have led to a veritable number of scholastically appealing avenues for research, they have not made much contribution to the field of applied counseling psychology. The resulting gap between research and practice has stagnated both the research of applied psychology and the application of research.
Implications for Theory and Research in Counseling Psychology

A critical review of this disparity points to the need for a unifying theory that might bridge the gap between research and practice. Although the transactional model of stress and coping has been immensely popular in the literature for nearly forty years, the instruments that have been designed to test its assumptions have failed to actually measure the “transaction.” Given that coping processes have been theorized to be dependent upon the transaction between person and environmental factors, the testing of these theoretical assumptions has been limited to measuring the predictability and controllability of events and their environmental circumstances. This resulting omission of the person in the advancement of coping theory has left the field void of any unifying conceptualization of the characteristics that lead to coping ability. The provision of such a theory might provide the connection needed for the advancement of both research and practice, as researchers would be able to add characteristics of the person to the study of person-environment fit, and practitioners would be able to prognosticate individual differences in coping competence. Given that the results of this study are in support of the hierarchical structure of the CSI, it may be suggested that the CSI provides a first step towards the joining of research and practice by offering a theoretically derived measure of coping styles.

Although the field of stress and coping is currently in need of a mechanism for studying coping styles, it is perhaps ironic that the theoretical conceptualization of coping style is at the heart of the field’s very inception. The ancient physician Hippocrates noted that individual differences exist in the characteristic approaches people take in efforts to cope with the stressors of illness and injury, and he was perhaps
the first to note that these characteristic approaches impact the prognoses of prescribed treatments for the remission of symptomology. It is striking that hundreds of centuries since the Hippocratic doctrine, practitioners in the helping profession are still struggling with the issues of prognosticating the appropriateness and efficacy of prescribed treatments.

It is also striking that the field of stress and coping is lagging behind many other fields of psychological study, despite its ancient beginnings and multiple theoretical formulations throughout antiquity that stem from some of psychology's most famed theorists (e.g. Galen, Immanuel Kant, Wilhelm Wundt, Hans Eysenck). For example, developmental psychology has long studied the characteristics of various parenting styles (e.g. authoritarian, authoritative, permissive). Likewise, social psychology can boast of an abundance of research comparing and contrasting the features of attribution styles (e.g. optimistic vs. pessimistic) and communication styles (e.g. open vs. closed). Additionally, career psychology has a long history of research in leadership and managerial styles (e.g. micro- vs. macro-management). Each of these fields of study has benefited from the unifying formulations of their respective "styles," as work in these areas have led to a number of important empirical findings.

For example, research in the area of attribution styles has overwhelmingly supported the postulate that "optimistic" explanatory styles lead to functional psychosocial adaptation, while "pessimistic" explanatory styles lead to anxiety and depression. Likewise, "open" communication styles have been shown to be more effective than "closed" communication styles in the development and preservation of marital relationships. Furthermore, research in parenting styles has also been fruitful in
identifying the "authoritative" style as the most effective compromise between the extremes of the "authoritarian" and "permissive" styles in rearing children. Given these examples, it stands to reason that combining the Galen-Kant-Wundt-Eysenck theoretical model with contemporary factor analytic techniques in the derivation of the CSI might offer a mechanism for comparing the features of coping styles and determining which are more efficacious for psychosocial adaptation. Therefore, providing a theoretically driven assessment of coping styles may prove to be a valuable companion to the assessment of coping strategies and provide a first step towards filling the gap between theory and research of coping processes.

Findings from studies of coping styles may also facilitate the practice of counseling psychology by enabling the practitioner to empirically support treatment decisions. For example, prescribed treatments for mental illness are likely to have better prognoses for clients who score high in coping competence than those who score low in coping competence. Likewise, the prescription of group therapy may prove to be more appropriate for individuals who score high in interpersonal coping competence than those who score low in interpersonal coping competence. Moreover, individual strengths and weaknesses among the features of coping styles may enable the practitioner to more readily point to coping resources and areas for needed intervention when formulating treatment plans. Thus, the CSI may contribute to the field of stress and coping by: 1) providing theory with the operationalization of coping styles that is a needed companion to work in coping strategies, 2) providing research with a reliable tool for comparing and contrasting the features of coping styles, and 3) providing practitioners with an objective index of coping competence that may be used in
prognosticating the appropriateness and efficacy of prescribed therapeutic treatments for mental illness.

Limitations

Although results of data analyses may be interpreted as evidentiary to an affirmation of the proposed model's fit to the data, these are only estimates and imperfect representations of the data. While the parameter constraints placed on each of the factors indicate a proposed "perfect" relation between primary and second-order factors (i.e., $R = 1.0$), the observed factor loadings of each scale on their respective endogenous domain only ranged from .34 to .61 for PC and .42 to .50 for IC, indicating a much less than perfect relation between first-order and second-order factors. Therefore, although the overall match between the predicted and observed data structure is estimated to lie within an acceptable range of fit, the degree of fit between predicted and observed data matrices is not perfect and is susceptible to the influence of error. Given that the proposed model is recursive, evidence does not suggest the results of these analyses are affected by systematic error variance, as the error terms do not covary. Nonetheless, error variance is an inevitable part of any factor solution, as there are no perfect measures of constructs that by definition are not directly observable phenomena within the domain of sample space (Nunnally & Bernstein, 1994).

Another limitation of this study is its failure to replicate many of the psychometric properties that were found in the pilot study. For example, the overall reliability of the CSI as estimated by Cronbach's alpha in the pilot study was $\alpha = .90$, while the sample used for confirmatory factor analysis observed an overall reliability
measure of $r_a = .86$. Additionally, the internal consistency of PC in the present sample is estimated at $r_a = .80$, compared to $r_a = .85$ in the pilot study. Likewise, the reliability estimate of IC was also lower in the present sample ($r_a = .83$) than in pilot work ($r_a = .88$). Moreover, with the exception the scale other-control, each of the means and standard deviations for the subscales is lower in the present sample than in the pilot sample.

A related limitation to this study lies in a possible instability among subscales. Although it has been suggested that a minimum of five items is typically needed to achieve a stable subscale (Hair et. al., 1995; Nunnally & Bernstein, 1994), others have prescribed that a minimum of seven items is needed for reliable estimates of subscale scores (Costa & McCrae, 1992). Therefore, it may be reasoned that the disparity of measures between samples might be attributable to instability among subscales that may be due to three of the six scales containing fewer than seven items. As it is well documented that the reliability of a scale typically increases as the number of items increases (Nunnally & Bernstein, 1994), it is possible that lengthening the CSI would produce an improvement in the reliability and stability of scaled scores.

Prescribed Areas for Future Research

A number of limitations of this study incite a need for further development of the CSI. In particular, both the current study and pilot work made use of a college student sample, therefore results of these analyses may only be generalizable to a single population of college undergraduates. Thus, a need exists for future research in standardization of the CSI in other settings such as community and psychiatric
populations. Additionally, there may be a regional bias inherent in the data, as both factor analytic studies and every construct and criterion validity study of the CSI drew sampling from the southern region of the United States. Therefore additional studies are warranted that not only sample from different populations, but from different geographical regions as well. Moreover, since a veritable percentage of demographic data was missing in both the present and pilot samples, additional studies may be needed to compare factor solutions by sex and race in efforts to determine the impact these variables have on the psychometric properties of the CSI scales. Furthermore, prescriptions for future research may include a series of studies examining the use of the CSI in treatment planning and as an outcome measure for psychotherapy. As observed by Vaillant (2000), the field of psychology has no known method of indexing the ability to cope with stress, and Lazarus (2000) indicates that this topic is perhaps one of the most vexing issues of research and theory on coping. Therefore, use of the CSI in applied settings is a suggested area for future research as the field of psychology continues to move towards recognizing coping with the psychosocial stressors in multiaxial diagnosis.

Conclusions that may be drawn from this study suggest that confidence, control, and support are characteristics of individuals that positively covary within personal and interpersonal domains, and individual differences among these characteristics may define the features of stylistic approaches to coping with stress. Rather than asking respondents to answer questions about specific stressors, the CSI requests that respondents answer questions about themselves irrespective of any specific problems or life stressors. In so doing, the CSI purports to measure characteristics of individuals,
rather than characteristics of transient life circumstances. This approach may prove to be more fruitful than the effortful task of deciphering unconscious defense mechanisms or asking people to rate their behaviors in response to past stressors, as both of these methods of measuring coping processes are inherently fraught with confounds that impinge upon the empirical work of validating and generalizing results. Additionally, combining a lineage of theoretical formulation with modern-day structural equation modeling techniques in the psychometric development of the CSI may provide a first step towards the integration of theory, research, and practice that has been called for in recent literature (Lazarus, 2000).
APPENDIX A

LIST OF CSI ITEMS
1. I am a person who worries a lot  
2. I like to stay to myself rather than be around others  
3. I do see myself as a likeable and capable person  
4. I know most people cannot be trusted  
5. I put off getting things done on time  
6. I feel bad if I hurt somebody’s feelings  
7. I worry about things that never happen  
8. I do most of the talking in a group  
9. I will succeed in most things I do  
10. I can trust most people I know  
11. I try hard to keep from making mistakes  
12. I show others that I care for them  
13. I think a lot about bad things in my past  
14. I am a cautious and quiet person around others  
15. I am as smart as most people I know  
16. I fail to believe other’s promises to me  
17. I fail to finish many hard jobs or tasks I start  
18. I forgive others who hurt my feelings  
19. I easily lose sleep over worry  
20. I am more of a leader than a follower  
21. I am confident in most things I do  
22. I know most people will treat me fair  
23. I get things done right and on time  
24. I put other’s wants before my own  
25. I have a hard time making everyday decisions  
26. I control what happens in a group  
27. I am able to make many good things happen for me  
28. I refuse to believe a lot others tell me  
29. I do my best at most things I do  
30. I think about other’s needs and wants  
31. I worry about my future  
32. I find most people are honest with me  
33. I work hard and try to do things right  
34. I am a very agreeable person  
35. If you treat me nice you want something  
36. I give up easily if a job or task takes a lot of effort  
37. I praise and encourage others  
38. I refuse to trust others with a secret  
39. I please others and make them happy  
40. I say things to hurt other’s feelings
HUMAN SUBJECTS CONSENT FORM

The following is a brief summary of the project in which you are asked to participate. Please read this information before signing the statement below.

TITLE OF PROJECT: Examining the psychometric properties of the Coping Style Inventory.

PURPOSE OF STUDY/PROJECT: To determine the psychometric properties of the Coping Style Inventory.

PROCEDURE: Upon signing the consent form, subjects will be given the Coping Style Inventory to complete. Data will be analyzed to determine the psychometric properties of the instrument.

INSTRUMENTS: The instrument used to collect data for this study is the Coping Style Inventory. All information will be held confidential.

RISKS/ALTERNATIVE TREATMENTS: There are no risks associated with participation in this study; participation is voluntary.

BENEFITS/COMPENSATION: None

I, ________________________________, attest with my signature that I have read and understood the following description of the study, "An examination of the psychometric properties of the Coping Style Inventory", and its purposes and methods. I understand that my participation in this research is strictly voluntary and my participation or refusal to participate in this study will not affect my relationship with Louisiana Tech University or my grades in any way. I may withdraw from the study at any time or omit items. Further, I understand that the results will be freely available to me upon request. I understand that the results of my survey will be anonymous and confidential, accessible only to the principal investigators, myself, or a legally appointed representative. I have not been requested to waive nor do I waive any of my rights related to participating in this study.

Signature of Participant or Guardian Date

CONTACT INFORMATION: The principal experimenters listed below may be reached to answer questions about the research, subjects' rights, or related matters:

Judy Johnson 257-4315
Walter Buboltz 257-4315
Garth Bellah 257-4315

The Human Subjects Committee of Louisiana Tech University may also be contacted if a problem cannot be discussed with the experimenters:

Dr. Mary Livingston (257-4315)  Dr. Terry McConathy (257-2924)
REFERENCES


presented at the annual meeting of the Classification Society of North America, Philadelphia.


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