EUSTRESS AT WORK: ACCENTUATING

THE POSITIVE

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Submitted to the Faculty of the
Graduate College of the
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in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF PHILOSOPHY
December, 2000

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ACKNOWLEDGEMENTS

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CHAPTER 1

INTRODUCTION

This dissertation proposes a new way to conceptualize and measure eustress. This introductory chapter begins with a presentation of the research problem. The theoretical background for the dissertation will then be presented, followed by an outline of the dissertation objectives. Finally, theoretical and practical implications of the study will be discussed.

The Research Problem

What is stress? The answer to this question is surprisingly complex because more than 40 definitions of stress can be found in the literature (Hoes, 1986). In the literature, the term "stress" has been popularly used to refer to a wide range of physiological changes, psychological states, and environmental pressures (Bieliauskas, 1982). Quick, Horn, and Quick (1987) offer the following definition: "Stress is the naturally occurring mind-body *response* to demanding and/or emergency *situations*, either of a chronic or episodic nature" (p. 19, emphasis added). The advantage of a definition like this is that it suggests a familiar stimulus-response framework. Leaving out the descriptive clauses, stress can be thought of as a process involving response to a situation. In its most basic terms, both the stimulus (i.e., stressor) and the response (i.e., the stress response) in the process we call stress are inherently neutral.

Why should we care about confusion over the conceptualization of stress? Probably the most important outcome variables associated with the study of stress are health and well-being (Quick et al., 1987; Ganster & Schaubroeck, 1991; Quick, Quick, Nelson, & Hurrell, 1997). Despite the variety of approaches to conceptualizing stress, the literature is generally in agreement that certain stressors can elicit responses in individuals that, over time, can have adverse impacts on their health. These physical or psychological stimuli to which the individual responds are commonly referred to as either *stressors* or *demands*. The negative response to stressors is commonly termed *distress*, and it is distress that is commonly studied for its relationship to

adverse health outcomes (Quick et al. 1997). Distress, as such, is negative and dysfunctional (i.e., bad stress).

Interestingly, some have suggested that there is also good stress, which Selye (1976a, 1976b) termed *eustress*. Quick et al. (1997) associate eustress with healthy, positive outcomes. Unfortunately, the positive response to stressors and the associated health benefits of these responses has received little attention in the literature. For example, Quick et al. (1997) define *preventive stress management* as "an organizational philosophy and set of principles that employs specific methods for promoting individual and organizational health while preventing individual and organizational distress" (p. 149). Like that of other stress researchers, the overwhelming focus of their approach is the *prevention* of the negative, that being distress. While they acknowledge the importance of promoting the positive (i.e., eustress), they offer little research or practical support for this position. Although their model incorporates eustress, they present a discussion of stress in which eustress, although conceptually distinct, is operationally merely the absence of distress.

Is this simplistic model of stress accurate, or is a more complex model of stress possible? In a more complex model of stress, eustress would be operationalized as well as conceptualized as more than just the absence of distress. A more complex model suggests that the presence/ absence of the positive as well as the presence/absence of the negative is necessary to fully appreciate the stress response.

Consider the metaphor of a bathtub to illustrate this point. As a minimum, we are concerned about two things when we settle in for a bath – the level of water in the tub and the temperature of water in the tub. Essentially two things determine the level of water in the bathtub – the flow of water into the bathtub and the flow of water out of the bathtub over time. Likewise, the *simultaneous* flow of *both* hot and cold water into the bathtub determine the temperature of the water in the tub. If we liken the study of stress to the study of water in the bathtub, our current

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approach is like studying a bathtub with a single water faucet – cold water – representing distress. We know a lot about the sources of cold water, and we can tell individuals how to either decrease the flow of cold water into or increase the flow of cold water out of their bathtubs. We also know quite a bit about the physiological, behavioral, and psychological consequences of sitting in a tub of cold water for a prolonged period of time. Our knowledge of cold water (distress) is important but does not present a complete understanding of the water (stress) in the bathtub. A more complete model of stress would acknowledge that the bathtub does indeed have two faucets – hot and cold – and both are necessary to get the level and temperature of the water just right for a comfortable bath.

The study of eustress presents an enormous opportunity to contribute to our knowledge of stress. The challenge then becomes conceptualizing and operationalizing eustress in terms that distinguish it from distress; examining how eustress and distress are related; and exploring their differential contributions to the health of individuals, in particular, their health related to work.

Theoretical Background

Edwards and Cooper (1988), in the most extensive review of the subject of eustress, suggest that eustress may improve health either directly through hormonal and biochemical changes or indirectly by facilitating effort and abilities directed toward coping with existing distress. They reviewed findings from a variety of sources, including anecdotal evidence, laboratory experiments, and studies of positive life events and job satisfaction. They found *suggestive*, but not conclusive, evidence for the direct effect of eustress on health. Little research has focused on the effects of eustress on coping with existing distress, so evidence of the indirect benefits of eustress is scant. They identified only a single study (Sales, 1969) demonstrating that eustress is associated with an *improvement* in physiological functioning rather than merely a reduction in physiological damage. Edwards and Cooper (1988) assert that a conclusive demonstration of the

effects of eustress on health requires attention to the methodological issues of measurement, design, and analysis.

Edwards and Cooper (1988) further suggest that the most general approach to the measurement of eustress involves the assessment of positive psychological states. They assert that a major issue in this approach is establishing the presence of positive psychological states, rather than merely the absence of negative states. They state that rather than representing opposite ends of a single continuum, positive (eustress) and negative (distress) states may represent two distinct constructs, which would require separate multivariate indices for their measurement. This more complete or holistic model of stress is presented in Figure 1.
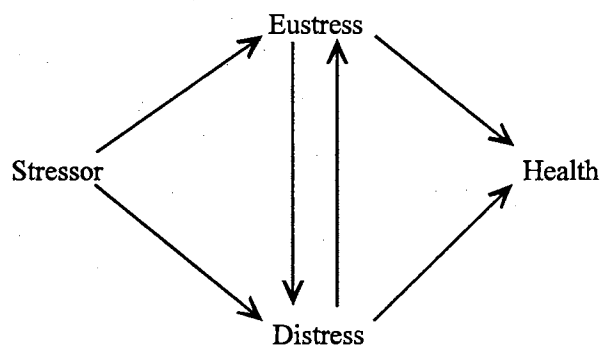
Figure 1: A Holistic Model of Stress

The challenge of the model presented in Figure 1 is explaining what starts the process. If there are separate and distinct patterns of response to a given stressor, what produces them? This study is grounded in the cognitive appraisal approach to stress in which the interpretation of stressors, rather than stressors per se, determine how individuals respond. According to this approach, two individuals with significantly different perceptions of the same stressor (or a single individual with differing interpretations at different times) would respond differently. Likewise, two individuals with similar perceptions of the same (or different) stressors would experience similar responses (Roseman, 1984).

The cognitive appraisal approach to the study of stress is most commonly associated with the work of Richard Lazarus (1966). The essence of this approach to understanding stress is that people can have different responses to stressors they encounter depending on whether they appraise a relevant stressor as positive or negative. Although Lazarus acknowledged the existence of positive responses, he, like the majority of stress researchers, focused almost exclusively on negative responses.

When a person encounters a stressor, she or he *evaluates* the encounter with respect to its significance for well-being. This evaluative process is the essence of cognitive appraisal. If a stressor is not appraised as irrelevant, Lazarus and Folkman (1984) assert that appraisals can be complex and mixed, depending on person factors and the situational context. They essentially describe two types of appraisals and associated response patterns: positive and stressful.

Positive appraisals "occur if the outcome of an encounter is construed as positive, that is, if it preserves or enhances well-being or promises to do so" (Lazarus & Folkman, 1984, p. 32). As indicators of positive appraisals, they suggest looking for the presence of positive or pleasurable psychological states.

Stressful appraisals can also be thought of as negative appraisals. Negative appraisals include harm/loss, threat, and challenge. In *harm/loss*, some damage to the person has already occurred (e.g., injury, illness, loss of a loved one, damage to self-esteem). *Threat* involves harms or losses that have not yet occurred but are anticipated. *Challenge* appraisals occur if the outcome of an encounter holds the potential for gain or growth. As indicators of challenge appraisals, they suggest looking for some of the same positive or pleasurable psychological states they identify as indicators of the positive response.

Lazarus and Folkman (1984) do not view challenge and threat as poles of a single continuum. They believe that challenge and threat responses can occur simultaneously, as the result of the same stressor, and should be considered as separate but related constructs. While threat is clearly

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a negative appraisal, challenge is better thought of as a positive appraisal (they share the same indicators).

As such, the reasoning they apply to the distinction between challenge and threat to the higher levels of positive and negative response can be extended. Accordingly, positive and negative responses can occur simultaneously, as a result of the same stressor, and should be considered separate but related constructs. Thus, for any given stressor, an individual can have *both* a degree of positive and a degree of negative response. This is consistent with Lazarus and Folkman's (1984) view that any psychophysiological theory of stress or emotion that views the response as unidimensional disequilibrium or arousal is untenable or at least grossly incomplete. They support this with research of emotions and autonomic nervous system activity (Elkman, Levenson, & Friesen, 1983) as well as research of hormonal response to arousing conditions (Mason, 1974; Frankenhauser et al., 1978).

It is important to note that the focus of this research is limited to the stress response, not the *process* of cognitive appraisal. As others have done (Folkins, 1970; Folkman & Lazarus, 1985; Nomikos, Opton, Averill, & Lazarus, 1968), this study will not attempt to either manipulate or assess appraisal directly. Cognitive appraisal is inferred and employed as the theoretical explanation for the separate positive and negative responses hypothesized in this holistic model of stress.

As shown in Figure 2, each separate response will have its associated indicators, will inform the other response, and will produce a differential effect on the ultimate outcome variable (e.g., health). As suggested by Edwards and Cooper (1988), the indicators of the positive response will be positive psychological states (e.g., positive affect and hope) and the indicators of the negative response will be negative psychological states (e.g., anxiety and hostility). Consistent with this holistic representation of stress, for the purposes of this study eustress and distress will be defined as follows.
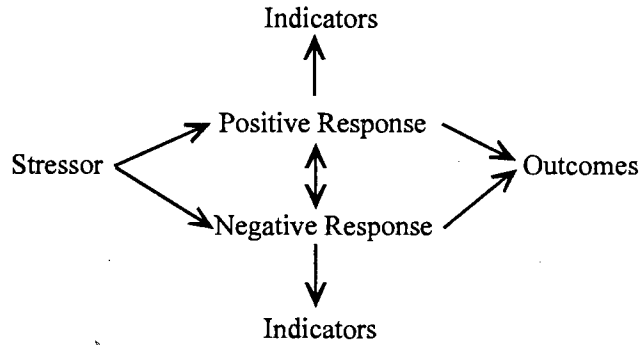
Figure 2: Positive and Negative Responses

Eustress: A positive response resulting from the evaluation of a particular entity or event (stressor) with a degree of favor.

Distress: A negative response resulting from the evaluation of a particular entity or event (stressor) with a degree of disfavor.

Dissertation Objectives

The purpose of this dissertation is to test the model presented in Figure 1. The objective of

this study is to attempt to answer the research questions that follow.

Research Question 1: For any given stressor, can an individual simultaneously have both positive and negative responses that are separate and distinct?

Research Question 2: What contribution do the separate responses make to an individual's perception of her or his health?

Theoretical and Practical Implications

Theoretically, this dissertation will show that as some have suggested (Edwards & Cooper,

1988; Lazarus & Folkman, 1984), eustress and distress represent separate and distinct constructs,

not merely opposite ends of a single continuum. The study will propose multivariate indicators

of both the positive psychological response (eustress) and the negative psychological response

(distress) to any given stressor. The study will demonstrate both the discriminant validity *among*

the positive/negative indicators as well as the discriminant validity *between* the higher order

constructs, eustress and distress, that they represent. The study will also demonstrate that an individual can experience eustress and distress *simultaneously* as the result of any given stressor and that eustress and distress make separate and distinct contributions to an individual's perception of her or his health.

As a result of making the first step toward demonstrating this holistic model of stress, researchers interested in understanding the full complexity of the stress response should be encouraged to conceptualize, measure, and account for both eustress and distress in future stress research. While this study focuses on psychological states as the sole indicators of eustress and distress, future research can explore multivariate behavioral and physiological indicators of each construct as well. This model will also benefit from future research that identifies specific stressors and modifying conditions that seem to enhance the eustress response.

This model of stress has implications for both individuals and organizations. For individuals, it suggests a focus on generating eustress in our lives, not just preventing distress. In the context of work, this may mean that in addition to established preventive *distress* management techniques, exposure to work stressors that contribute more strongly to the experience of eustress would be beneficial. While it is not presented in this research model, an individual's health may have a reciprocal effect on their experience of both eustress and distress (Keesler, Magee, & Nelson, 1996). This would suggest that individuals should pay increased attention to their health as a way to regulate (e.g., the bathtub metaphor) their experience of stress. Healthy individuals may be more prone to appreciate the positive aspects of the full range of stressors to which they are exposed at work and in life in general.

The organizational implication of this holistic model of stress is the suggestion that as managers interested in stress in our organizations, we should focus not just on the prevention of distress, but also the generation of eustress among individuals in our organizations. As suggested above, we could do this by focusing organizational interventions both on stressors and individual

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responses. Returning to the bathtub metaphor, if the hot water faucet represents the flow of positive experiences and eustressed individuals in organizations and the cold water faucet represents the flow of negative experiences and distressed individuals, this is informative about both the temperature and level of water (stress) in the bathtub (organization). To have a healthy organization (a tub full of comfortably warm water), managers must attempt to regulate the complex flow and level over time of both eustressed and distressed individuals in their organizations.

CHAPTER 2

LITERATURE REVIEW

The purpose of this chapter is to review the literature relevant to the research topic of psychobiological eustress. Because the field of psychobiological stress has overwhelmingly ignored the concept of eustress in favor of the concept of distress, a generalized review of the field will not be presented. As such, this chapter traces the development of the concept of eustress from its origins to its current state. At that point, the Holistic Stress Response model will be presented, which includes interpersonal trust as an antecedent and perception of health as a consequence of eustress and distress. Accordingly, the rational for the selection of the constructs in the model will be presented and the relationships between trust, eustress, distress, and health will be explored. This chapter concludes with a presentation of the research hypotheses.

The Concept of Eustress

The concept of eustress shares its origin with the concept of human stress. It is rare to find a stress study that even considers the concept of eustress; but when eustress is considered, it is almost always presented in its original conceptual form. Because this concept has received very little attention, it is underdeveloped. The literature review will present evidence, however, that represents advancement of the concept of eustress, even though the advancements were rarely identified with eustress by the researchers. Based on this evidence, a new definition of the constructs of eustress and distress will be suggested. These new definitions will facilitate a strategy for the assessment of eustress that has been suggested in the literature but never pursued.

Origins of the Concept of Eustress

Hans Selye (1976b), a medical doctor, incorporated the term eustress as an element of his theory of human stress. While Selye was the first to write extensively about stress in humans, the concept of stress can be traced back much further. The term *stress* has its origins in Latin as a

verb meaning "to injure, molest, or constrain" and has been in the English language a long time (Kahn & Byosiere, 1992). As long ago as the eighteenth century, the term stress was associated with a force or pressure exerted upon a material object or person. In physics, the term stress is used to describe an internal resisting force of a solid body in response to the application of an external force.

A few individuals made noteworthy contributions to our understanding of human stress prior to Hans Selye. Lovallo (1997) credits the physiologist Claude Bernard (1961/1865) with establishing the foundation of the modern human stress concept. Bernard (1961/1865) asserted that both the external environment and the internal environment determine the functions of complex living organisms. In his view, the maintenance of life is critically dependent on keeping the internal environment constant in the face of a changing external environment. Bernard was the first to suggest that physical challenges to the integrity of an organism provoke responses to counteract those threats.

Quick et al. (1997) begin their historical view of the stress concept with the Yerkes-Dodson Law (Yerkes & Dodson, 1908), which attempts to describe the relationship between stress and performance. This law can be illustrated graphically by visualizing stress on a horizontal axis and performance on a vertical axis. Stress in this sense is quantitative and represents a force or demand with which an individual is confronted. The relationship between stress and perfor-mance takes the shape of an inverted U. This law holds that we seem to do our best under some pressure or when there is a challenge to be met. For each performance activity and each person, a given amount of pressure will produce optimal performance. If individuals are pushed beyond the optimal point, performance declines and they gradually shut down.

The next major figure in the development of modern conceptualizations of stress is Walter Cannon. Cannon was concerned with the specific mechanisms of response to changes in an individual's external environment that provided optimal bodily function (Cannon, 1929). His

research focused on the sympathetic-adrenal system of the body, which is responsible for the production of the catecholamines adrenaline and noradrenaline. Cannon used the term *homeostasis* to describe the body's process of attempting to maintain internal stability in the face of environmental change. He posited that failure to meet challenges to the homeostasis of the body could result in tissue damage or death if not countered with adequate responses to return the internal environment to normal. Cannon's work looked at the effect of physical challenges as well as the effect on the person of psychologically meaningful stimuli (Cannon, 1935). He also identified the *fight or flight response* as the initial phase of the response to an external threat. This essentially states that when faced with a threat to survival, we must either fend off the threat or flee the dangerous situation in order to survive. A summary of the physiological changes that can be elicited by Cannon's fight or flight response is presented in Table 1.

Table 1: Summary of Physiological Changes That Can be Elicited by Cannon's Fight or Flight Response (From Allen, 1983)

1. Increased heart rate
2. Increased force of myocardial contraction
3. Increased cardiac stroke volume
4. Increased cardiac output
5. Vasodilation of deep muscle and coronary arteries
6. Vasoconstriction of superficial and abdominal arteries
7. Increased arterial blood pressure
8. Increased blood coagulation and decreased clotting time
9. Increased serum glucose
10. Increased respiration rate
11. Increased respiration depth
12. Increased oxygen consumption
13. Increased carbon dioxide production
14. Bronchodilation
15. Increased skeletal muscle strength
16. Pupillary dilation
17. Perspiration
18. Piloerection
19. Decreased gastric movement
20. Decreased intestinal peristalsis
21. Decreased abdominal blood flow
22. Sphincter contraction
23. Stimulation of adrenal medulla secretion

Hans Selye is widely credited as the first to note the existence of human stress, describe its

qualities, define the concept, and give the phenomenon a name. While Walter Cannon focused

his research on the sympathetic-adrenal system, Selye's research focused on the pituitary-adrenal

system and its production of cortisol. Selye clearly viewed stress as a **physiological response**

that is associated with the process of adaption. Selye's (1976) most widely accepted definition of

stress is: "Stress is the nonspecific response of the body to any demand, whether it is caused by,

or results in, pleasant or unpleasant conditions" (p. 76b). That stress can be associated with

pleasant and unpleasant experiences is illustrated in Figure 3. "Note that the physiological stress

level is lowest during indifference but never goes down to zero (that would be death). Pleasant as

well as unpleasant emotional arousal is accompanied by an increase in physiological stress (but

not necessarily distress) (Selye, 1974, p. 32). Selye's use of the term *distress* will be explained

shortly.
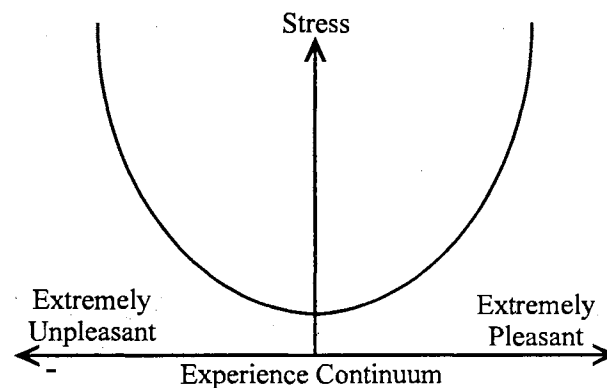
Figure 3: Relation Between Stress and Various Types of Life Experiences (Selye, 1974)

He clearly intended *stress* to refer to those altered physiological states, and he proposed

stressor as the term designating the variety of demands capable of evoking the stress response.

"All endogenous or exogenous agents that make such demands are called stressors. Distinguish-

ing between their widely differing specific effects and the common biological response that they

elicit is the key to a proper understanding of biologic stress" (Selye, 1976a, p. 14).

The use of the term "nonspecific" in his definition is important. From this perspective, the stress response is nonspecific both in cause and effect. Anything that changes conditions for the body, to which it must then adapt, produces stress. Inherent in this concept is the notion that the human body does not recognize the distinction between pleasant and unpleasant circumstances (i.e., pleasure and pain). Both change the circumstances under which the body must operate; therefore, both positive and negative stimuli produce an undifferentiated stress response in the body. Table 2 presents the range of positive and negative situations that might constitute a stressor. According to Selye's conceptualization of stress, all of these situations would produce nonspecific response. This stress response, in turn, has the potential to effect nearly every system of the human body.

Table 2: Situations That Might Constitute a Stressor (adapted from Toates, 1995)

	Short-Term Stimulation	Long-Term Stimulation
Unpleasant Conditions	Nonspecific Response	Nonspecific Response
Pleasant Conditions	Nonspecific Response	Nonspecific Response

While "stress" is the term Selye uses for the biologic response to a stressor, he uses the terms *distress* and *eustress* to denote the effects of the nonspecific response. The relationship between stressors, stress, eustress, and distress is shown in Figure 4. Selye (1976a) writes:

> *In everyday life we must distinguish two types of stress effects, namely, eustress (from the Greek eu or good – as in euphony, euphoria, eulogy) and distress (from the Latin dis or bad – as in dissonance, disease, dissatisfaction). Depending upon conditions, stress is associated with desirable or undesirable effects. In view of these conditions it is also quite obvious that there cannot be* different types of stress, *although the effects of stressors are almost invariably different.* (p. 15)

Eustress
(positive effects)

Stressor ⟶ Stress
(cause)   (nonspecific response)

Distress
(negative effects)
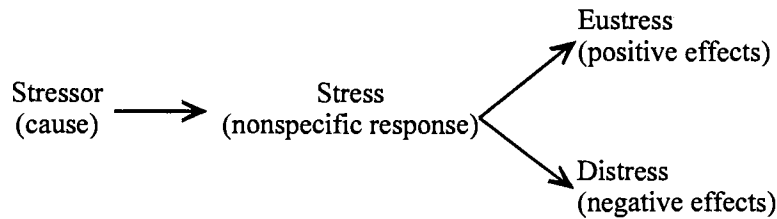
Figure 4: Selye's Concept of Stress

Yet Selye's own writings have been a source of confusion in the field. In the following passage representing his earlier thoughts on the issue, he intends to separate the response from its effects, but the terminology is much less clear. Selye (1976b) writes:

> *We must, however, differentiate within the general concept of stress between the unpleasant or harmful variety, called distress . . . and eustress. During both eustress and distress the body undergoes virtually the same nonspecific responses to the various positive or negative stimuli acting upon it. However, the fact that eustress causes much less damage than distress graphically demonstrates that it is "how you take it" that determines, ultimately, whether one can adapt successfully to change.* (p. 74)

In the above passage, he does not explicitly identify distress and eustress as stress effects. In fact, in one part of this passage he seems to use the terms eustress and distress to distinguish different types of stress; in another they are identified as causal agents. Along this same line Selye (1976c) has written: "When applied to everyday problems, this understanding should lead to choices most likely to provide us the pleasant eustress . . . involved in achieving fulfillment and victory, thereby avoiding the self-destructive distress of frustration and failure" (p. 13).

In a latter writing, Selye (1983) seems to add yet another twist to his concept by suggesting that there are four different varieties of stress (see Figure 5). Selye (1983) explains:

> *The stress of life has four basic variations, although in their most characteristic nonspecific manifestations they all depend on the same central phenomenon. Our goal should be to strike a balance between the equally destructive forces of hypo- and hyper-stress, to find as much eustress as possible, and to minimize distress. Clearly, we cannot run away timidly from every unpleasant experience; in order to achieve our purposes, we must often put up with unhappiness, at least for a time. Here faintheartedness would in the long run prove even more distressing by depriving us of the joy of ultimate success. Unnecessary or too much distress – all distress, in general, that does not hold promise of eustress – is what is to be avoided.* (p. 18)

Overstress
(hyperstress)

Good Stress ——— Stress ——— Bad Stress
(eustress)   (distress)

Understress
(hypostress)
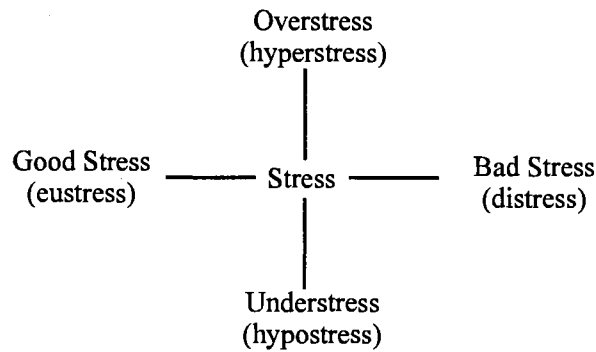
Figure 5: Selye's Four Basic Variations of Stress (Selye, 1983)

To demonstrate how influential Selye's concept of stress defined as a physiological response

has been, Quick et al. (1997) offer the following definition of the stress response: "The stress

response is the generalized,-patterned, unconscious mobilization of the body's natural energy

resources when confronted with a demand, or stressor" (p. 3). They define eustress as the

"healthy, positive, constructive outcome of stressful events and the stress response" (p. 4). When

elaborating on the stress response, they write:

> *The diverse organizational demands and stressors . . . lead to one common result: the*
> *stereotypical psychophysiological reaction known as the stress response. Each individual*
> *exhibits the same basic response, although the immediate and long-term consequences of*
> *the stress response vary greatly among individuals. The variance among individuals is*
> *influenced by a number of modifiers of the stress response. These modifiers affect*
> *whether the stress response is channeled into positive and constructive outcomes*
> *(eustress) or negative and destructive outcome (distress).* (p. 41)

Although Quick et al. (1997) identify eustress, their work represents little theoretical or

empirical advancement of the concept presented by Selye. For Quick et al. (1997) eustress is

essentially good health and high performance. In their model, the path to good health and high

performance is the application of preventive stress management principles and methods. When

they invoke the term "preventive stress," it is clear that they mean the prevention of distress.

They offer no recommendations for the promotion of eustress beyond the prevention of distress.

While their model incorporates eustress as a separate and distinct effect, eustress is essentially the

absence of distress. As distress is commonly associated with disease, this is consistent with their

conceptualization of health, which is "freedom from disease" (Quick et al., 1987, p. 20). In

contrast, others believe that "health is more than the absence of disease" (Sutherland and Cooper,

1990, p. 2).

While Quick et al. (1997) define eustress as the *effect* of the stress response being "channeled

into positive and constructive outcomes" (p. 41), they offer little specific guidance on how this is

supposed to occur. They seem to confuse the matter by suggesting that eustress results from the

regulation of the intensity and frequency of the stress response. Expanding on the Yerkes-

Dodson law presented earlier, they graphically represent eustress as the optimum level of

exposure to a stressor (stimulation) for an individual (see Figure 6). According to this concept,

maximum performance results when individuals are stressed at this optimum level. While

eustress was defined as an *effect*, it is represented in this case as a *quantity of stressor*. This

relationship between degree of demand and degree of effective performance has been found in

professors (Wilke, Gmelch, & Lovrich, 1985) as well as little league baseball players (McGrath,

1976). Milsum (1985) proposes a very similar concept in his model of the eustress system for

health and illness. Milsum (1985) states that "eustress implies a correct, right, or optimal level,

and therefore implicitly recognizes that this is a regulatory system in the same way as all the

other major homeostatic organ systems of our organism" (p. 185).

The quantitative approach described above is one way to distinguish eustress from distress.

Allen (1983) asserts that eustress and distress can also be differentiated by qualitative characteri-

stics. From this perspective, the same quantity of stress may serve as eustress or distress,

depending on how one interprets events triggering it. Interpreting Selye's work, he writes:

> *According to Selye, the critical difference is whether one interprets stressors as challenge*
> *or threat. He believes that if we consider life's stressors to be threats, then damaging*
> *results will occur. If, however, we look at the same events as challenges, they foster*
> *growth. Selye's personal strategy for stress management does not involve a reduction of*
> *stress. Rather, he views stressors as challenges – healthy, growth promoting*
> *opportunities.* (p. 14)
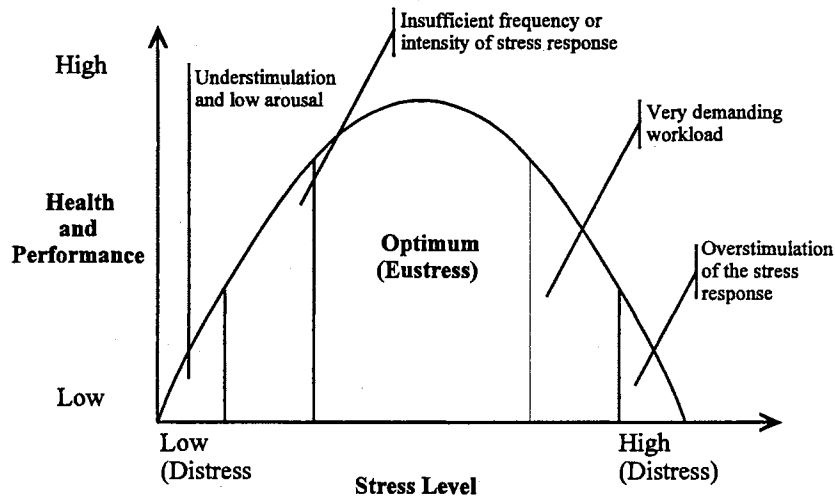
Figure 6: An Expanded Yerkes-Dodson Curve (adapted from Quick et al., 1997, p. 156)

This is indeed a compelling account, but it too is confusing. Recall that in Selye's concept of stress, stressors are directly associated with the stress response, which is nonspecific with respect to its cause and physiological manifestations. Selye seems to suggest that the mind differentiates between pleasant and unpleasant stressors but the body does not. If the individual can differentiate stressors as either threatening (negative) or challenging (positive), and eustress/ distress is determined by this evaluation of the stressor, then the relationship between stressors and eustress and distress cannot be mediated by a nonspecific physiological response. The stress response itself must be more complex than simple nonspecific physiological arousal.

Development of the Concept of Eustress

As evidenced by the work of Quick et al. (1997), little has been done to advance the concept of eustress beyond how it was originally presented by Hans Selye. Although Selye described eustress as the positive effect of the nonspecific physiological stress response, neither Selye nor anyone since who uses his framework has been able to adequately describe how this positive effect of the stress response occurs. Few will argue that Selye accurately described an aspect of how the endocrine system responds when confronted with a demand. Based on his research of

one biological subsystem, the definition of stress as a nonspecific response, with eustress and distress as effects of this response, was born and remains influential still today. This is problematic because it is difficult to explain how a nonspecific response fully mediates the relationship between nonspecific causes and specific effects.

A few researchers have noticed this problem and taken issue with Selye's definition of stress, suggesting that the stress response is more complex and more specific than Selye asserts. If this is true, then the concepts of eustress and distress as Selye presents them are also subject to reevaluation. A more holistic conceptualization of the stress response would expand to encompass knowledge of the human system beyond the endocrine subsystem. With a holistic representation of the stress response, it is possible to make qualitative assessments (i.e., good/bad, positive/negative, healthy/damaging) of the *response* that were previously reserved for the *effects* of the response. This would suggest the possibility of conceptualizing eustress and distress as positive and negative aspects of the stress response itself instead of positive and negative aspects of the effects of the stress response; consequently, this could resolve the conflict presented by Selye's definitions.

The literature provides both psychological and physiological support for a more holistic model of the stress response and subsequent redefinition of the concepts of eustress and distress. The psychological support will be presented first because it forms the basis for the research model that will ultimately be presented in this chapter. The physiological support will then be presented in considerable detail. While the level of detail presented for the physiological support may be more than some readers may desire, it is critical because the study of stress originated from this perspective and the basic assumptions still persist.

Psychological Support

Much of the early work that established the foundation for the medical perspective of stress was done through experimentation with animals. From this perspective, the stress response is

fundamentally similar between as well as within species. Lazarus (1966) took issue with the

medical perspective when establishing the basis for his approach to psychological stress. He

noted that the psychological structure of an animal that behaves primarily in accordance with

instinctual mechanisms must be thought of differently than that of humans, whose behavior

depends more on learning or high-level cognitive processes. While there are areas of overlap in

the kinds of motives that are assumed to be shared by all animals, some categories of motivation

and cognitive processes are unique to humans. Humans can distinguish among experiences that

harm, threaten, challenge, or nurture; and our sense of well-being is based on our ability to make

such evaluative perceptions. Humans reactions are produced by more varied stimuli than in

lower animals, and the reactions themselves are more variable than in lower animals. Because

humans are more cognitively complex than most animals, it is reasonable to expect the stress

response in humans to be more complex.

Lazarus (1966) posited that in humans, psychological processes intervene between the stress

stimuli and stress response. He utilized the term *threat* to express the condition of the person

when confronted with a stimulus that the person *appraises* as endangering important values and

goals. Lazarus (1966) posited the *response* to appraised threat can be psychological (e.g.,

affective disturbances), behavioral, and physiological. Elaborating on the concept of appraisal,

Lazarus (1966) writes:

> *For threat to occur, an evaluation must be made of the situation, to the effect that a harm*
> *is signified. The individual's knowledge and beliefs contribute to this. The appraisal of*
> *threat is not a simple perception of the elements of the situation, but a judgment, an*
> *inference in which the data are assimilated to a constellation of ideas and expectations.*
> *. . . The mechanism by which the interplay between the properties of the individual and*
> *those of the situation can be understood is the cognitive process of appraisal, a judgment*
> *about the meaning of future significance of a situation based not merely on the stimulus,*
> *but on the psychological makeup.* (p. 44)

In contrast to the medical perspective, Lazarus (1966) suggested that whether and how an

individual responds to the presence of a stimulus depends upon what the individual thinks and

believes about the stimulus and the situation in which it is presented. While Lazarus's (1966)

initial formulation of the concept of appraisal explicitly concerned threat and the resulting

adverse responses, he suggested that the appraisal/response relationship could be broader:

> *If some anticipated future state or condition is irrelevant to the individual's goals or values, it will not lead to threat appraisal, since the future condition will not harm the individual. If the future condition involves the realization of goals without thwarting of others, the cue indicating it will result in a **positively toned emotion**.* (p. 56, emphasis added)

Although the concept of appraisal was developed to explain the negative response of

psychological distress, the above passage suggests that individuals may also have positive

responses to situations or events. Lazarus (1966) did not elaborate on the positive response, and

he did not use the term "eustress" to identify this response; however, this positive psychological

response is consistent with the notion that eustress is "good stress" (Quick et al., 1997; Selye,

1976a). The fundamental difference is that the stress *response* is presented as multidimensional,

capable of psychological and behavioral manifestations as well as physiological manifestations.

As such, it is possible to conceive of eustress and distress as ways to describe multidimensional

positive and negative responses, as opposed to positive and negative effects of a stereotypical

physiological response.

Lazarus and Folkman (1984) extended the concept of appraisal and observe that appraisals

and their resulting responses can be complex and mixed. They presented what can be interpreted

as two basic categories of appraisal: positive and negative. Positive appraisals can occur if the

outcome of an encounter is construed as positive or favorable to an individual's well-being. They

suggested that pleasurable or positive emotional responses would be indicators of a degree of

positive appraisal. They noted, however, that totally positive appraisals should be rare. For most

situations and events, most people can always conceive that things are not totally perfect or that

something could change and the desirable state could be adversely affected.

The other category of appraisals is labeled *stress appraisals*, which can be interpreted as

negative appraisals (Lazarus and Folkman, 1984). They subcategorized negative appraisals as

those involving harm/loss, threat, and challenge. In *harm/loss*, some damage to the person has already occurred (e.g., injury, illness, loss of a loved one, damage to self-esteem). *Threat* involves harms or losses that have not yet occurred but are anticipated. *Challenge* appraisals occur if the outcome of an encounter holds the potential for gain or growth. As indicators of challenge appraisals, they suggested looking for some of the same positive or pleasurable psychological states they identify as indicators of the positive response. They suggested that "to be challenged means feeling positive about demanding encounters" (p. 34). Discussing the difference between challenge and threat appraisals, Lazarus and Folkman (1984) stated: "The main difference is that challenge appraisals focus on the potential for gain or growth inherent in an encounter and they are characterized by *pleasurable emotions* such as eagerness, excitement, and exhilaration, whereas threat centers on the potential harms and is characterized by *negative emotions* such as fear, anxiety, and anger" (p. 33, emphasis added).

Lazarus and Folkman (1984) did not view challenge and threat as poles of a single contin-uum. They believed that challenge and threat responses are not mutually exclusive and can occur simultaneously, as the result of the same stressor, and should be considered as separate but related constructs. Importantly, they stated that "it is possible that the psychological stress response to challenge is different from that in threat" (p. 34). While threat is clearly a negative appraisal, I think challenge is better thought of as a positive appraisal (they share the same indicators). Lazarus and Folkman (1984) as much as said the same thing by showing that the immediate psychological effects of appraisals are positive or negative feelings (see figure 10.4, p. 308).

When discussing separate components of appraisal, Lazarus (1993) again noted that the feelings or emotions that result from appraisal are essentially positive and negative. Lazarus (1993) contended that "stress cannot be considered in terms of a single dimension such as activation . . . such a recognition involves considering diverse emotional states, some negative,

some positive" (p. 5). He reminded readers that eustress is the good kind of stress, associated with positive feelings and healthy bodily states, while distress is bad stress, associated with negative feelings and disturbed bodily states.

As such, the reasoning Lazarus and Folkman (1984) apply to the distinction between challenge and threat can be extended to the higher levels of positive and negative appraisal. Following the reasoning on threat and challenge, positive and negative appraisals result in separate but related stress responses. Accordingly, positive and negative responses can occur simultaneously, as a result of the same stressor, and should be considered separate but related constructs. Thus, for any given stressor, an individual can have *both* a degree of positive and a degree of negative response.

Folkman and Lazarus's (1985) study of students in an undergraduate psychology course supports the conclusion stated above. They examined the students' emotions at three stages of a midterm exam: before the exam, before the grades were announced, and after the grades were announced. They inferred appraisals of threat or challenge and outcomes of benefit and harm by assessing emotions. They found clear support for the existence of both positive and negative emotions as a result of the encounter. They also found that the greater the ambiguity of the situation, the greater the probability that people would experience both positive and negative emotions at the same time. Conversely, when evaluating an outcome that has already transpired, people are likely to feel either positive or negative emotions. Positive and negative outcome emotions became increasingly negatively correlated as the encounter unfolded to its conclusion. Because most work situations involve a degree of ambiguity, we can expect individuals to experience both positive and negative responses at the same time.

Folkman's (1997) longitudinal study of caregivers of men with AIDS provides strong additional support for the contention that positive and negative responses can occur simulta-neously and as a result of the same stressor. She found that in addition to negative psychological

states, the caregivers also experienced positive psychological states in the midst of caregiving and bereavement. Her study found covariation around high mean levels of both negative and positive states; and with the exception of the weeks surrounding the death of the patient, the frequency of the caregivers' positive affect was never significantly lower than the frequency of their negative affect. If positive and negative psychological states can co-occur in the midst of enduring and profoundly demanding circumstances, then it is reasonable to expect them exhibit a degree of co-occurrence for any given stressor.

Please recall that the focus of this research is eustress, which was defined in Chapter 1 as a positive stress response. The concept of cognitive appraisal provides theoretical support for this definition, but cognitive appraisal will be neither manipulated nor directly assessed within the scope of this research. Appraisal has been operationalized as an evaluation of what was at stake in a stressful encounter (Folkman, Lazarus, Dunkel-Schetter, Delongis, & Gruen, 1986). Their scale revealed two factors that they labeled threats to self-esteem (e.g., losing the affection of someone important to you) and threats to a loved one's well-being (e.g., harm to a loved one's health or safety). This approach to appraisal was deemed inappropriate for the occupational psychology focus of my study, and development of a new appraisal scale was considered beyond the scope of this study. However, the independent variable selected for this research subsumes appraisal. In the next chapter, it will be shown that trust in the supervisor forms as the result of the subject's cognitive appraisal of the trustworthiness of the supervisor.

Additional research on motivation, emotion, and attitudes provides support for representing appraisal and response as characteristically positive or negative. Roseman, Spindel, and Jose (1990) categorized 16 different emotions as positive or negative and showed that subjects' appraisals of situational states differentiated among the emotions. Weiner (1986) employed the concept of cognitive appraisal in his attribution theory of motivation and emotion. He embraced the presumption that how we think (i.e., appraise a situation) influences how we feel. He defined

an emotion simply as a "complex syndrome or composite of many interacting factors. Emotions

are presumed "to 1) have positive or negative qualities of, 2) have a certain intensity that,

3) frequently are preceded by an appraisal of a situation, and 4) give rise to a variety of actions"

(p. 119). Weiner's (1986) attributional model of motivation and emotion (p. 162) indicates that a

motivational sequence is initiated by an outcome that the person interprets as positive or negative.

This is consistent with the finding that appraisals are more strongly related to emotional expe-

rience than are causal attributions (Roseman et al., 1990; Smith, Haynes, Lazarus, & Pope, 1993).

The psychology of attitudes also views the appraisal process in positive and negative terms.

Eagly and Chaiken (1993) described an attitude as:

> *A psychological tendency that is expressed by evaluating a particular entity with some*
> *degree of favor or disfavor. . . .Psychological tendency refers to a state that is internal to*
> *the person, and evaluating refers to all classes of evaluative responding, whether overt or*
> *covert, cognitive, affective, or behavioral. The psychological tendency can be regarded*
> *as a type of bias that predisposes the individual toward evaluative responses that are*
> *positive or negative. (pp. 1-2)*

The important point to take away from this definition is that an evaluative process produces

results that are characterized as positive and negative. It can also be observed that emotions from

this perspective are a type of affective evaluative response. Whether it is labeled as an emotion

or an attitude, researchers from several different perspectives seem to agree that a *response*

should be consistently qualified as positive or negative.

Lazarus and Folkman (1984) supported their view that appraisals and their resulting stress

responses are complex and mixed with evidence from research that challenged Selye's concept of

stress as nonspecific physiological response. They concluded that any psychophysical theory of

stress that views the response as unidimensional disequilibrium or arousal is untenable or at least

grossly incomplete. Aspects of the research they examined as well as additional research along

these same lines will be presented in the next section.

In summary, this psychological support provides an opportunity to reconceptualize eustress as

a positive response to a cognitively appraised stressor. The concept of stress as response to

appraisal is established and accepted as a valid explanation of degrees of negative responses, which have commonly been labeled distress. The Holistic Stress Response model in this study extends Lazarus and Folkman's (1984) thinking on the positive response to appraisal and provides it the label "eustress." This extension reflects the view that the stress response itself is multidimensional and can be categorized along the higher order dimensions of positive and negative. Cognitive appraisal explains why the response itself is not unidimensional and how the qualitative characteristics of the separate and specific responses arise. Selye's original labels "eustress" and "distress" are retained and applied as descriptors of the higher order dimensions of the stress response. In other words, eustress and distress are recast as descriptors of the stress response instead of the effect to a unidimensional response. The next section will provide additional support for this view.

Physiological Support

To appreciate the foundation of the psychological perspective of stress (Lazarus, 1966; Lazarus & Folkman, 1984), it is necessary to examine how researchers from the medical perspective of stress challenged the assumptions of its founder, Hans Selye (1976a). This section will present clear evidence that the physiological response to stress is more complex and specific than it has been presented by some researchers. All of the research presented in this section attributes the complexity of the stress response to cognitive appraisal of the stressor. Recall that cognitive appraisal was shown in the previous section to be primarily either positive or negative. Accordingly, the physiological research suggests that a more complex stress response can be qualitatively characterized along the primary dimensions of positive and negative. This sets the stage for identifying eustress and distress with the positive and negative affective, behavioral, and physiological manifestations of the stress response, not as effects of the stress response. This section is complex due to the terminology involved and is presented in detail in order to attempt to persuade those that still hold to Selye's (1976a) definition of stress.

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It will be useful at this point to review some common terms and concepts used in neuroendo-crine (i.e., medical) stress research. Most research on the endocrine (hormonal) effects of work stress has focused primarily on two major systems. Figure 7 provides a schematic representation of pathways from the brain to the adrenal systems involved in stress (Frankenhauser, 1986).

The first system is the sympathetic-adrenal system, studied by Walter Cannon, and relates to changes in the catecholamines or epinephrine and norepinephrine, also known as adrenaline and noradrenaline. Catecholamines have a major influence on a variety of bodily functions such as heart rate and blood pressure. A large number of environmental factors seem to be capable of provoking changes in catecholamines. They are easily perturbed and can change rapidly even with pleasurable stimuli. "Catecholamines may be viewed as hormones of vigilance, attention, or involvement. When individuals are *interacting* more intensely with their environment, either positively or negatively, there seems to be an increase in catecholamines" (Rose, 1987, p. 133).
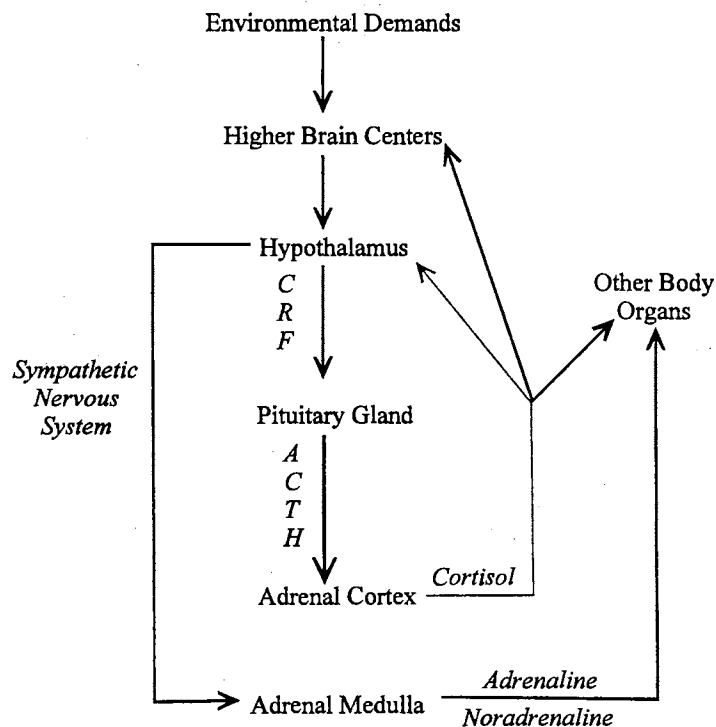
Figure 7: **Schematic Representation of Pathways from the Brain to the Adrenal Systems Involved in Stress** (adapted from Frankenhauser, 1986)

The second system involved in stress is the hypothalamic-pituitary-adrenal system studied by

Hans Selye, which produces cortisol. While the release of cortisol is not as easily stimulated as

catecholamines, cortisol has been found to be responsive to a variety of different environmental

challenges (Rose, 1987). While cortisol acts on a variety of the body's organs, its primary effect

is to increase the supply of glucose and fatty acids in the bloodstream. Cortisol can also have

harmful effects on the body's digestion, immune response, and muscular-skeletal system (Quick

et al., 1997).

Mason (1971) was among the first to take issue with Selye's concept of stress with his

specificity concept, emphasizing the susceptibility of several neuroendocrine systems to the

emotional component in different environmental conditions. He reviewed research that showed

that the pituitary-adrenal cortical system was actually very sensitive to psychological influences.

He asserted that there are extensive anatomical linkages that provide points of contact for neural

and psychological influences upon a variety of endocrine systems (Mason, 1968a). He proposed

that higher level psychological integrative mechanisms rather than lower level physiological or

biochemical mechanisms, as proposed by Selye, acted as the first mediator of the relationship

between environmental stimuli and the individual's response to stress (Mason, 1975).

Mason (1975) stated, "Of all the known responses of higher organisms, *emotional arousal is*

certainly one of the most ubiquitous or relatively "nonspecific" reactions common to a great

diversity of situations" (p. 25). Selye (1976a, p. 13) seemed to interpret this statement by Mason

to be an implicit explanation of the distinction between eustress and distress.

Mason also believed that the stress response was complex and could not be adequately

represented by lines of research that focused exclusively on one physiological system as Selye

had done. Mason (1968a) wrote:

> ... *different hormones are closely interdependent, often bearing antagonistic, synergistic,*
> *additive, or permissive relationships to each other, which suggests that the activity of any*
> *given metabolic process at any given moment must be a resultant of the over-all balance*
> *between cooperating and opposing hormonal influences playing upon it."* (p. 571)

Mason (1975) states:

We have not found evidence that any single hormone responds to all stimuli *in absolutely non-specific fashion, as implied by Selye's present definition of "stress" as occurring in response "to any demand." The picture emerging so far from our study of* multihormonal patterns, *in fact, is one suggesting that such patterns are organized in a rather* specific *or* selective *manner, depending upon the particular stimulus under study, and probably in relation to the complex* interdependencies *in hormonal actions at the metabolic level.* (p. 27)

In his review of Mason's (1975) work, Selye (1975) stood firm on his original conceptualiza-

tion of stress. He reasserted that he believes the stress syndrome is nonspecific in its causation,

but concedes that the same stressor can elicit different manifestations in different individuals.

Whereas Mason (1975) explained these differences as being due to psychological mechanisms,

Selye (1975) did not concur. For Selye (1975) these "conditioning factors" that can selectively

enhance or inhibit the stress *effect* (not the response) are either biological (e.g., age, sex, genetic

predisposition) or external (e.g., drugs, diet, treatment with certain hormones). According to

Selye, these conditioning factors selectively influence the reactivity of certain organs, resulting in

the possibility that the same stressor can elicit different manifestations in different individuals.

As such he continued to maintain that eustress is a specialized manifestation of a single stereo-

typed response as a result of these selective conditioning factors. Nevertheless, "it seems

increasingly likely that the response is not so universal as concluded by Selye" (Mason, 1968b, p.

800).

Frankenhauser (1979, 1983, 1986) provided additional support for the concept that different

psychological processes affect the physiological response pattern in different ways. Through a

series of experiments, she and her colleagues consistently found that two components of

psychological arousal determined cortisol and catecholamine responses. The psychological state

characterized by positive emotions was labeled "effort," and the psychological state characterized

by negative emotions was labeled "distress." Indicators of effort were variables labeled effort,

tenseness, and concentration, while indicators of distress were variables labeled boredom,

impatience, tiredness, and lack of interest (Lundberg & Frankenhauser, 1980). Frankenhauser (1979) notes the general resemblance of these two factors and the "cortisol factor" and "catechol-amine factor" reported by Ursin, Baade, and Levine (1978) in their study of parachute trainees.

A graphical representation of Frankenhauser's (1986) findings is presented in Figure 8. Effort (positive emotions) and distress (negative emotions) may be experienced either singularly or in combination, and they seem to be differentially associated with catecholamine and cortisol secretion. *Effort without distress* is a positive, joyous state that results from high job involvement and a high degree of personal control. It is accompanied by increased catacholamine secretion and the suppression of cortisol. *Effort with distress* is the state typical of the hassles of daily work life and is accompanied by an increase in both catecholamine and cortisol secretion. *Distress without effort* is a very negative psychological state that implies feeling helpless or losing control. It is generally accompanied by increased cortisol secretions, but catecholamines may be elevated also. Elsewhere, Frankenhauser (1991) described these three states as *activity paired with positive affect, activity paired with negative affect,* and *passivity paired with negative affect,* respectively.
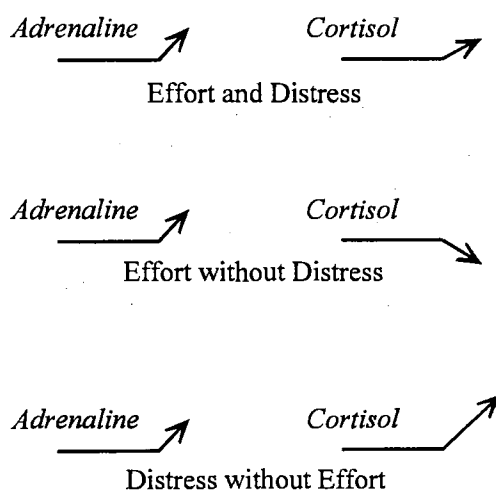
Figure 8: **Schematic Representation of Adrenal-Medullary and Adrenal-Cortical Responses to Effort and Distress** (adapted from Frankenhauser, 1986)

Frankenhauser (1983) asserted that these findings support the notion that psychologically different conditions produce a selective response. "In short, pituitary-adrenal activation was associated with the *negative* feelings of distress in the low control situation, and sympathetic-adrenal activation was associated with the *positive* feeling of effort in the high-control situation" (p. 94, emphasis added). Frankenhauser (1981) emphasized that "neurendocrine responses to the psychosocial environment are determined by the individual's cognitive appraisal of the situation and the emotional impact of the stimuli rather than by their objective characteristics" (p. 493). Thus, cognitive appraisal of the situation produces positive and negative emotions, as well as a differential physiological response.

Rose's (1987) longitudinal study of air traffic controllers (ATCs) provides a slightly different picture of how cognitive appraisals affect the stress response. Over a three-year period, the cortisol values of 201 men were measured every 20 minutes for five hours on three or more days and compared to both objective and subjective assessments of workload. While the increases in cortisol for all levels of workload were slight, the men who showed the highest increase in cortisol to increased work reported themselves as more satisfied and were regarded by peers as more competent. These high cortisol responders also showed less frequent illness than those with lower cortisol levels, who for any given level of work tended to have more minor health problems. Rose described the men whose cortisol increased in response to challenging work as *engaged* rather than stressed. Elsewhere, the happiness derived from engagement in mindful challenge has been termed "flow" (Csikszentmihalyi, 1990). In their review of Rose's study, Ganster and Schaubroek (1991) described the healthy state of physiological arousal experienced by the engaged workers as eustress.

Lovallo (1997) concurred that the effect of a stressor depends heavily on the way the person interprets the situation at hand. He contended that two situations that are equally physically demanding can have different consequences for the individual based on the interpretation of the

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situation and the accompanying emotions. To illustrate this point, two studies were conducted that called on human volunteers to perform tasks with nearly identical physical requirements but having substantial differences in their psychological components (Lovallo, Pincomb, & Wilson, 1986; Lovallo et al., 1985).

In one study, young adult men were asked to perform a simple psychomotor task to avoid two adverse stimuli, noise and electric shock (Lovallo et al., 1985). The task was a simple, variable-interval reaction-time task in which subjects pressed a response key whenever a red light in front of them came on. The shocks were brief and mild (harmless), yet enough to be unpleasant. The noise was brief and safe, but intense enough to produce a strong degree of startle. From the subject's point of view, the task involved anxiety, fear, and uncertainty about the timing and source of an aversive event. The subject also had to maintain continuous attention for the duration of the exercise (15 minutes).

The subjects reported the task as being activating (increased concentration, effort, interest, and tenseness) as well as unpleasant (less control and more impatience and irritation). The cardiovascular patterns of the subjects showed increased systolic and diastolic blood pressure. The subjective and cardiovascular changes were also accompanied by alterations in the neuroendocrine function. Both norepinephrine and cortisol levels increased significantly. Because the subjects were seated in a relaxed position for the entire study, their findings suggest that the rises in norepinephrine and cortisol resulted from responses related to negative emotions and not from elevated energy expenditure.

In the second study, subject were presented with a rewarding, nonaversive version of the same reaction time task (Lovallo et al., 1986). The major difference was that instead of noise or shock, subjects received a $.50 bonus for each rapid response they could perform. Subjects self-reported that the task was primarily activating and nonaversive. The subjects experienced the same pattern of cardiovascular and norepinephrine increases as with the aversive task; however,

the cortisol patterns were different. In this situation, there was no change in cortisol secretion from baseline. Figure 9 presents the differences in the hormonal responses between the two experiments. The lack of increase in cortisol was attributed to the nonaversive nature of the task. They interpreted these results as showing that activation of attentional and motor response centers in the brain can lead to substantial activation of cardiovascular function, even in the absence of significant muscular activity.

Both tasks prompted self-reports suggesting that the subjects were actively engaged in the effort of performing as well as possible regardless of the nature of the incentives. The cardiovascular changes, therefore, seem most closely related to the effortful aspect of the task. In contrast, the pattern of endocrine changes, especially the cortisol response, appears to be determined by the emotional component of a task.
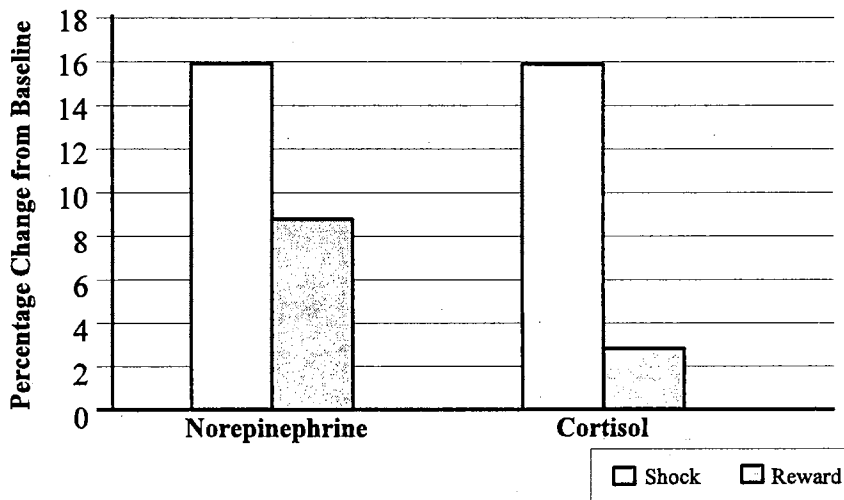
Figure 9: **Neuroendocrine Responses to Reaction Time Tasks Having Aversive or Monetary (Positive) Incentives** (adapted from Lovallo, 1997, p. 72)

Lovallo (1997) offered a neurophysiological explanation of responses based upon the appraisal of events (see Figure 10). The purpose of presenting this somewhat complex explanation is to provide further support for the notion that the stress response is complex as opposed to nonspecific. Although these mechanisms will not be explained with the same detail presented by

Lovallo (1997), the details that illustrate the body's potential to respond differentially based upon whether a stressor is perceived as positive or negative will be highlighted.

Information gathered by our senses is relayed through the thalamus, which acts as the initial gathering point for most incoming information. Raw sensory information is elaborated with stored information related to that sensory modality. In the prefrontal cortex, meaning or significance is attached to the information we receive. At this point, information from the various senses is integrated into a unified whole to provide an accurate picture of the external environment. Events receive meaning and significance based upon how they are appraised. The frontal cortex is at the beginning of the chain of events resulting in normal emotional responses and perhaps leading to physiological stress responses.

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┌─────────────────────────────────────────────────────┐
│ Sensory Intake & Interpretation of the Environment   │ ◄─┐
│ • Association Areas                                   │   │
│ • Prefrontal Cortex                                   │   │
│ • Hippocampus                                         │   │
└─────────────────────────────────────────────────────┘   │
         │                                                 │
         ▼                                                 │
┌──────────────────────────────────────────┐              │
│ Generation of Emotions Based on Appraisals │ ◄──────────┤
│ • Prefrontal Amygdala Activity             │            │
│ • Insula-Hippocampal Connection            │            │
└──────────────────────────────────────────┘            │
      ╱                          ╲                        │
     ▼                            ▼                        │
┌────────────────────────┐  ┌──────────────────────────────┐
│ Initiation of Autonomic│  │ Feedback to Cortex & Limbic    │
│ & Endocrine Responses  │  │ System (Brainstem)             │
│ • HACER (Hypothalamic  │─▶│ • Locus Ceruleus               │
│   Area Controlling     │  │ • Raphe Nuclei                 │
│   Emotional Responses) │  │ • Ventral Tegmental            │
│ • Paraventricular      │  │ • Nucleus                      │
│   Nucleus              │  └──────────────────────────────┘
└────────────────────────┘
         ╲
          ▼
┌──────────────────────────────┐
│ Autonomic & Endocrine Outflow │
│ • Nucleus of Solitary Tract   │
│ • Intermediolateral Cell Column│
│ • Pituitary                   │
│ • Adrenal Gland               │
└──────────────────────────────┘
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Figure 10: Major Steps in the Generation of Physiological Responses Based on Perceptions and Interpretations of Events (adapted from Lovallo, 1997, p. 82)

The next step involves the physiological formulation of emotions. Emotions formed in response to environmental events arise from a transaction between the prefrontal areas and the hippocampus and amygdala located in the temporal lobe of the brain. The hippocampus is involved in memory storage and in associating new information with prior experience. The amygdala enables us to have emotions in connection with present knowledge and to modify our actions based on those emotions and knowledge of the past. The amygdala is important for matching environmental appraisals with negative emotions such as disgust, fear, or anger.

The amygdala then sends signals to both the hypothalamus and the brainstem. The amygdala, therefore, is the focal point of transition between sensory input and appraisals of our environment on the one hand and our formulation of autonomic and endocrine responses on the other.

The brainstem response subsystem is important in organizing such things as cardiovascular reflexes and skeletal motor functions. Additionally, the brainstem feedback system serves to coordinate the level of arousal and behavioral state of the entire central nervous system in response to the commands of the amygdala or other lymbic systems. These subsystems coordinate the entire system whether the situation appraised calls for fight-flight, approach, avoidance, or sleep.

The hypothalamic area controlling emotional responses (HACER) coordinates the autonomic nervous system and endocrine aspect of the stress response. The HACER causes the pituitary to secrete corticotropin releasing factor (CRF). CRF then causes secretion of β endorphin and adrenocorticotropin (ACTH). ACTH in turn causes the adrenal cortex to secrete cortisol. Cortisol is one of the most commonly studied physiological indicators of distress. β endorphins may serve as transmitters or modulators in neuronal systems for the mediation of satisfaction or reward (Stein and Belluzzi, 1978). They have been associated with pleasurable or euphoric states, such as the "runner's high." As such, β endorphins may be a chemical indicator of eustress.

Lovallo (1987) presented two explanations for how appraisals and their associated emotions come to differ among persons. The first explanation arises from the increasing awareness that positive and negative emotions are served by different subsytems in the frontal and temporal lobes of the brain. Gray (1987, 1991) proposed two distinct frontal lobe systems responsible for the interpretation of incoming events and formulation of responses. One is associated with the septal area of the limbic system, often referred to as the pleasure center of the brain, which has connections to and from the amygdala and hippocampus. He posited that this pleasure center may assist in associating material in working memory with a positive or negative emotional valence. The second he termed the behavioral inhibition (withdrawal) system, which he believes plays a central role in anxiety. This system seems to organize autonomic and behavioral responses to stimuli appraised as aversive. Lane et al. (1997) provided support for this view in a study that confirmed that there are both common and unique components of the neural networks mediating pleasant and unpleasant emotion in healthy women. This study demonstrated physiologically that positive and negative emotions are separate and not merely opposite ends of a single dimension (Spiegel, 1999).

The second explanation for individual differences in appraisal is the notion that the frontal lobes may be asymmetric for the generation of emotions and that persons may differ in the degree to which they characteristically activate structures on one side or the other. Gray (1987, 1991) also suggested a behavioral approach system that responds to appetitive stimulation and is linked to positive emotions and motivates exploration and desirous behavior. Cacioppo and Berntson (1994) suggested that Gray's approach system originates primarily in the left hemisphere of the brain and that the withdrawal system originates primarily in the right hemisphere. As such, the right hemisphere of the brain differentially activates negative emotions associated with adverse events. The behavioral approach and inhibition systems can motivate behaviors and

physiological responses in conjunction with appraisal of events and their associated positive and negative emotions.

The research presented in this section provided evidence that the stress response is more complex and less specific than Selye (1976a) originally hypothesized. In general, researchers consistently found at least two differential physiological response patterns, which they explained resulted from a cognitive appraisal of the positive and negative aspects of a situation. The end of this section provided an explanation of the physiological mechanisms underlying the psychological process of appraisal.

Although the concept of eustress was rarely dealt with explicitly in either of the preceding sections, the research made it clear that a definition of eustress as a good or positive stress effect is subject to revision. The research evidence also supports the possibility of describing the complex stress response as qualitatively in terms of eustress (positive) and distress (negative), as well as providing a solid explanation of how the eustress response and distress response result from cognitive appraisal of the stressor. The following section presents the current state of the concept of eustress.

Current State of the Concept of Eustress

The concept of eustress remains underdeveloped. Although the opportunity to improve the current notion of eustress is evident, few efforts have been made to do so. There are a few empirical studies of bungee jumpers, rock climbers, and outdoor adventure participants that explicitly attempt to incorporate the concept of eustress (Bunting, Little, Tolson, & Jessup, 1986; Henning, Laschefski, & Opper, 1994; Priest, 1992). While it is encouraging to see empirical studies incorporate the term eustress, the conceptual development of eustress is limited. Although eustress has not been studied empirically in occupational health psychology, one important paper provided a theoretical review of the eustress that represents an advancement of the concept (Edwards and Cooper, 1988). This section will briefly review empirical findings

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from three studies outside of the field of occupational psychology, as well as the theoretical advancement within the field. This section will conclude with the presentation of the research model for this study.

One empirical study performed a factor analysis of the Dimensions of an Adventure Experience (DAE) survey on the responses of first- and second-year students engaged in a ropes course program. The DAE is a semantic differential of twenty-four bipolar adjectives concerned with perceptual changes in risk and competence that may occur from participating in adventure experiences. Adventures are defined as having uncertain outcomes, being a state of mind, involving intrinsic motivation, and a perception of free choice. Results showed that the DAE scale measuring risk formed three factors, which were labeled eustress, distress, and fear. The adjectives from the DAE that formed the eustress factor were excitement, challenge, stimulation, tension, and positivity; for distress, uncertainty, threat, and difficulty; and for fear, potential harm, exposure, danger, and hazard. The incremental value added by this study is that eustress was associated with positive states of mind and distress was associated with negative states of mind.

Another study of 12 novice bungee jumpers investigated both emotional and physiological changes induced by this acute psychological stressor (Hennig et al., 1994). They found that subjective ratings of anxiety increased prior to the jump and dropped significantly after the jump. Cortisol also increased after the jump and declined to baseline within the next hour. In contrast, self-report ratings of positive feelings (well-being, wakefulness, and euphoria) increased significantly after performing the jump and remained highly elevated for the next thirty minutes, while ratings of anxiety decreased. An increase of more than 200 percent in β-endorphin was observed after the jump. After the jump, positive feelings were significantly correlated with β-endorphin levels but not with cortisol levels. The researchers termed the positive feelings and elevated β-endorphin levels eustress.

Bunting et al. (1986) used the term eustress liberally, sometimes associating it with the stressor and other times associating it with the stress response. They studied twelve male students engaged in a series of three-hour rock climbing/rappelling session, which they defined as the eustress treatment. This is problematic because the stressor is physical as well as psychological, and the psychological perception of the stressor was not assessed. They administered the Spielberger Trait Anxiety Inventory (STAI) (Spielberger, Gorsuch, & Luskene, 1970) and also measured epinephrine, norepinephrine, and heart rate responses before and after two adventure sessions. Results showed that STAI did not correlate with changes in any of the physiological measures. They did find that perceived anxiety as measured by the STAI dropped during the adventure sessions, which they attributed "to the eustress experienced during these activities, rather than the subjects being aware of the unpleasant feelings that are normally associated with anxiety" (p. 19). They seem to suggest that eustress is a positive response, operationalized as essentially the absence of distress.

These three studies highlight the paucity of empirical research that incorporates the concept of eustress. None of the studies attempted to assess eustress directly, yet all of the studies labeled as eustress positive aspects of the psychological response in subjects. Also, none of the studies were grounded in occupational psychology. As such, the opportunity exists to develop the theory and measurement of eustress at work.

Edwards and Cooper (1988) correctly pointed out that while much research has focused on the impacts of negative psychological states, relatively little research has examined the effects of positive psychological states. They attributed this to the inadequate theoretical and methodological development of positive psychological states and their impact on important outcomes such as health. They associated eustress with positive psychological states and distress with negative psychological states. They concurred with the evidence that positive assessment of stressors produces a differential physiological response. They also suggested that positive and negative

psychological states may represent two distinct constructs, which would require separate indices for measurement. The basis for this assumption is the research into self-reported mood, which suggests that measures of positive and negative affect are often uncorrelated (Diener & Emmons, 1984; Watson & Tellegen, 1985). Watson, Pennebaker, and Folger (1987) suggested a two-factor model of stress (negative feelings) and satisfaction (positive feelings) based upon similar research of mood states.

Accordingly, Edwards and Cooper (1988) suggested that the measurement of eustress could involve the assessment of positive psychological states. Positive psychological states would include but not be limited to satisfaction, happiness, and positive affect. They also suggested that it is imperative to establish the presence of the positive psychological states, rather than merely establishing the absence of negative psychological states. Examples of negative psychological states are more numerous and include but are not limited to anxiety, hostility, and negative affect.

Folkman (1997) operationalized positive psychological states of mind with the six-item Positive States of Mind (PSOM) scale developed by Horowitz, Adler, and Kegeles (1988). The questions on this scale represent positive emotions by asking respondents how much trouble they have, if any, in having several states of mind (e.g., "Feeling able to attend to a task you want or need to do, without many distractions from within yourself," "Feeling of being able to stay at work until a task is finished," "do something new to solve a problem or express yourself creatively"). Negative states of mind were operationalized a depressive symptomatology as assessed with the 20-item Centers for Epidemiological Studies – Depression measure (CES-D) (Radloff, 1977). She also assessed positive and negative affect in her study. She found that both positive and negative psychological states occurred as a result of caregiving and bereavement of terminally ill patients. Folkman (1997) theoretically framed her study as one of distress and did not associate positive psychological states with eustress; consequently, the concept of eustress was not advanced theoretically in her study. Her study is important but could be extended by

expanding the operationalization of psychological states to include a multivariate assessment of work attitudes and not just emotions, as well as applying a theoretic framework that associates positive psychological states with eustress and negative states with distress.

While Edwards and Cooper (1988) suggested that eustress cannot be operationalized as simply the absence of distress, this remains a question that requires empirical justification. Accordingly, this review of the literature has reached a stage where the formal definitions of eustress and distress can be reintroduced and refined, the research questions can be reiterated, and the formal research model can be presented.

The Research Model: Holistic Stress Response

This review of the literature has provided support for the proposed definitions for eustress and distress presented in Chapter 1. Recall that eustress was defined as a positive response and distress as a negative response, both resulting from the individual's evaluation of a stressor. The first objective of this research, as previously stated in the research questions, is to show that for any given stressor, an individual can have both positive and negative responses that are separate and distinct. The second objective, after establishing the presence of separate responses, is to examine the differential effects of the responses on an outcome variable, the individual's perception of health.

Manifestations of the positive/negative response could be physiological, psychological, or behavioral. A full model of eustress and distress should incorporate indicators of all of these manifestations as well as a broad range of stressors, important outcome variables in addition to health (e.g., performance), and moderators of the response and the effects of the response. Such a model is beyond the scope of this research. Consistent with Edwards and Cooper (1988), this research will be limited to psychological states as manifestations of eustress and distress and for logistical reasons will examine a single stressor and a single outcome variable. Accordingly, the operational definitions of eustress and distress proposed by this study are as follows.

Eustress: A positive psychological response to a stressor, as indicated by the presence of positive psychological states.

Distress: A negative psychological response to a stressor, as indicated by the presence of negative psychological states.

Figure 2 presented the basic research model without identifying constructs specifically. The Holistic Stress Response model proposed by this study is now presented in Figure 11. The aspects of the model that require discussion in this chapter are those related to the hypothesized relationships between eustress, distress, the stressor (interpersonal trust), and the outcome perception of health. Discussion of the specific indicators of eustress and distress as well as demographic and instrumental variables will be presented in the next chapter. Eustress and distress are modeled as second-order latent variables, indicated by established positive and negative psychological states, themselves latent variables.
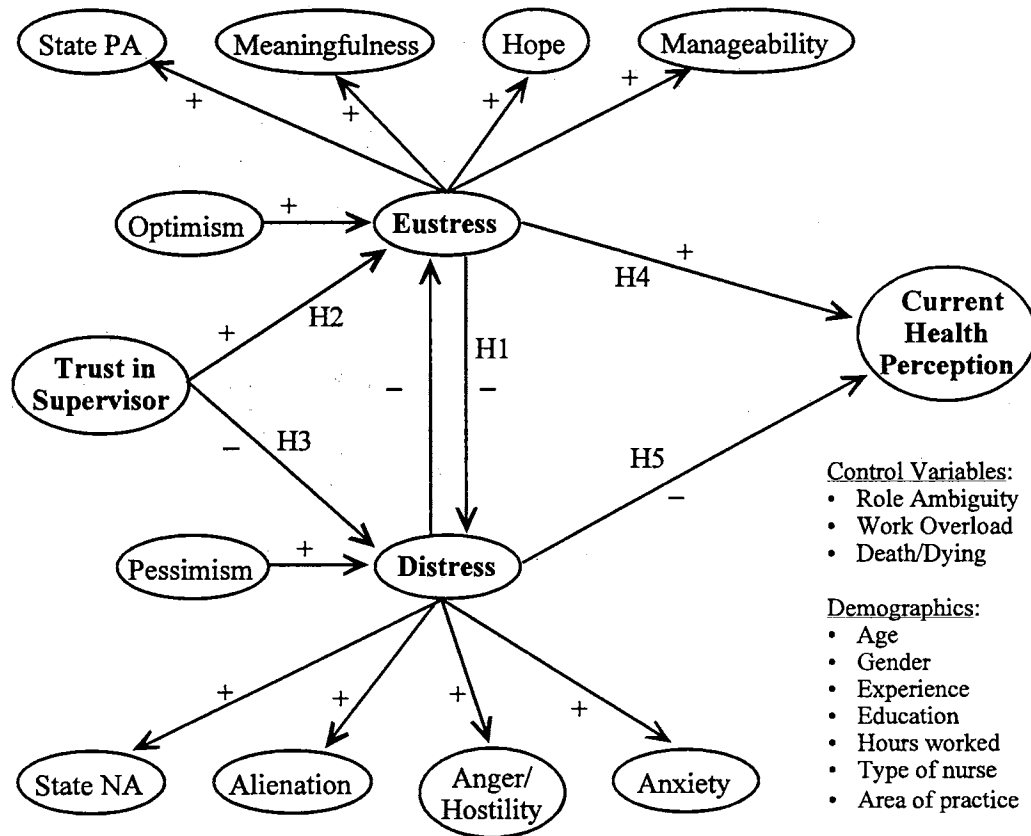
Figure 11: The Holistic Stress Response Model

The first hypothesis concerns the relationship between eustress and distress. Extending Lazarus and Folkman (1984), this study proposes that eustress and distress are separate constructs that can occur simultaneously in response to the same stressor. They also suggested that the response was complex and mixed, and this point was supported empirically with data from studies of the physiology of stress. Recall that the bathtub metaphor introduced in the first chapter of this study suggested that the simultaneous flow of both hot and cold water determine the level and temperature of the water in the bathtub. This study has presented a model in which the stress response (water in the bathtub) is determined by the simultaneous presence of both eustress and distress (hot and cold flows of water). The relationship between eustress and distress can be expected to be non-recursive, meaning that the separate responses reciprocally inform each other. Although this study will test a competing model in which the relationship between eustress and distress is recursive (not reciprocal), the literature presented in this chapter supports the following hypotheses.

H1: The relationship between the separate constructs of eustress and distress is non-recursive and negative in both directions.

Interpersonal Trust

Although interpersonal trust has not been studied within the context of stress, it is an ideal stressor for this study for several reasons. First, because trust has not previously been identified as an antecedent of distress, it has a greater opportunity to be accepted by readers of this study as simply a stressor, with no preconceived qualitative attributions. Trust enters this study neutral, with no previous empirical association with either eustress or distress. Second, trust results from appraisal, and there are aspects of this appraisal that individuals can perceive both with a degree of favor and a degree of disfavor or apprehension. As the aim of this study is to examine whether degrees of eustress and distress can results from the same stressor, trust is again a unique yet ideal stressor.

Quick et al. (1997) identified four major categories of stressors: physical stressors, task demands, role demands, and interpersonal demands. An interpersonal demand was chosen for this study, interpersonal trust, which has not previously been identified and studied as an interpersonal stressor. Interpersonal trust is defined as the willingness of a party to be vulnerable to the actions of another party (Mayer, Davis, & Schoorman, 1995, p. 712.) This is consistent with the description of interpersonal stressors at work as "concerned with the demands of the normal course of social, personal, and working relationships in the organization" (Quick et al., 1997, p. 34). Interpersonal stressors come from the demand of relationships at work, and interpersonal trust is established in the context of relationships.

Figure 12 graphically presents the Mayer et al. (1995) conceptualization of trust. The psychological state of trust forms in the individual as a result of the individual's *appraisal* of the trustworthiness of the other party in the relationship. Trustworthiness, thus, is a characteristic of the trustee, while trust is a characteristic of the trustor. Although others have suggested as many as 10 characteristics of trustworthiness (e.g., Butler, 1991), Mayer et al. (1995) contend that the three most common characteristics of trustworthiness are the trustee's ability, benevolence, and integrity. Ability is the domain-specific skills, competencies, and characteristics that enable the trustee to have influence with the trustor. Benevolence is the extent to which the trustee is believed to want to do good to the trustor, aside from an egocentric profit motive. Integrity is the extent to which the trustee adheres to a set of principles that the trustor finds acceptable.
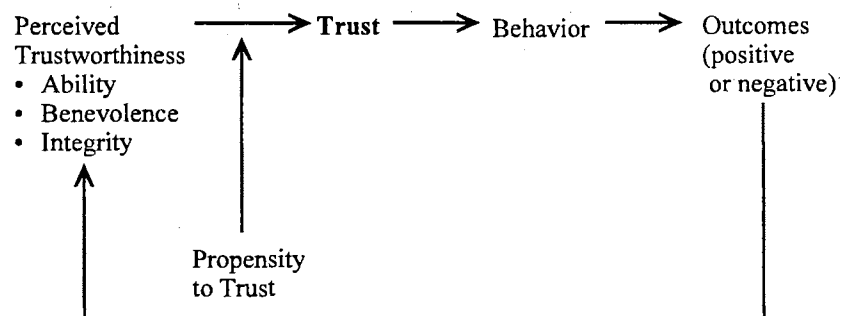
Figure 12: A Model of Interpersonal Trust (adapted from Mayer et al., 1995)

The psychological state of trust as a willingness to be vulnerable forms in the trustor as a result of the appraisal of trustworthiness in the trustee. This study focuses on the individual's trust in his/her supervisor. Trust in this relationship is salient because supervisors are in a unique position to be a source of stress for their employees (Quick et al., 1997). While it was noted previously that this study does not directly assess cognitive appraisal, the psychological state trust represents a subjective stressor that was formed through appraisal. In appraisal, "the person evaluates whether her or she has anything at stake in this encounter" (Folkman et al., 1986). Using this definition of trust as a stressor is entirely consistent with cognitive appraisal's relational approach to stress, where stress "cannot be defined as an environmental agent but represents a particular kind of relationship between a stimulus and a vulnerable person" (Lazarus & Folkman, 1986, p. 70). In fact, interpersonal trust is listed as one potential causal antecedent in illustrations of the system variables for the stress rubric (Lazarus, Delongis, Folkman, & Gruen, 1985; Lazarus & Folkman, 1986).

The Mayer et al. (1995) model limits its focus of the effect of trust to behavior. Within the stress theoretic framework presented in this chapter, behavior is a legitimate indicator of the degree of positive and negative response to a stressor. The stress theoretic framework incorporates interpersonal trust as a psychological stressor and extends the trust model to include the possibility of psychological, behavioral, and physiological indicators of the response. For the purposes of this study, hypothesis development should be guided by empirical studies that examined the relationship between trust operationalized as a psychological state within the trustor representing a willingness to be vulnerable and resulting positive and negative psychological states. Unfortunately, such studies do not exist.

Intuitively, a positive relationship between trust and eustress and a negative relationship between trust and distress should be expected. Trust increases as the trustor perceives that the trustee increasingly exhibits ability, benevolence, and integrity. The increased willingness to be

vulnerable reflects the positive assessment of the trustee and should be accompanied by both an increase in eustress and a decrease in distress. Lack of trust reflects a negative appraisal of the relationship with the trustee and should be accompanied by both a decrease in eustress and an increase in distress.

Support for this rationale comes from the study of relational schemas. A schema is a mental knowledge structure in which people organize and represent information about themselves and about others (Berscheid, 1994). A relational schema is based on the notion that people develop these cognitive structures representing regularities in patterns of interpersonal relatedness (Baldwin, 1992). Thus, relational schemas are the knowledge structures that organize the information developed through cognitive appraisals of relationships. "Relationships are, to a large degree, states of mind" (Anderson, 1993, p. 28).

Berscheid (1994) reviewed an array of theories and evidence on security and trust (e.g., Bowlby, 1982; Hazen & Shaver, 1987; Holmes, 1991) that suggests that expectations concerning whether care will be received from a relationship partner in response to a need may be an important component of most relational schemas. These theories share an assumption that attitudes of trust reflect people's abstract positive expectations that they can count on the other person in the relationship to care for them and be responsive to their needs. By contrast, insecure, avoidant, or ambivalent attitudes result from negative expectations about close relationships. Because relationship schemas are cognitive structures, they can evolve as appraisals evolve. While most of these theories recognize that an individual's early relationship schemas are important (e.g. an infant's inner working model regarding expectations of the caregiver's responsiveness to satisfying the infant's needs), Bersheid (1994) contends that "in healthy individuals such schemas are continuously revised and modified to reflect experience" (p. 102).

Trust in relational schemas can be represented as both positive and negative. Baldwin (1992) reviewed evidence that showed that the concept of vulnerability could mean different things to different people. When individuals who anticipated that interpersonal vulnerability leads to being hurt or abused by others were primed with the words *trust* and *openness*, they associated them with words and phrases such as *hurt* and *used*. They also found that individuals who linked interpersonal vulnerability with intimacy with others associated trust with *closeness* and *warmth*.

A study of the relationship between trustworthiness and breach of the psychological contract provides some confirmation of the positive and negative influences of trust (Robinson, 1996). Robinson (1996) found that employees with a low initial assessment of the employer's trust-worthiness experienced a greater decline in this perception following a breach of the psychologi-cal contract than did employees with a high initial assessment of their employer's trustworthiness. She concluded that high trustworthiness leads people to experience other aspects of the relation-ship in a positive light, while low trustworthiness leads individuals to interpret other events in the relationship in the most unfavorable light and thus confirm their prior appraisal.

The intuitive nature of the relationship between trust in the supervisor and eustress/distress is credible and supported by some evidence. Accordingly, these relationships are as follows.

H2: There is a positive relationship between trust in the supervisor and eustress.

H3: There is a negative relationship between trust in the supervisor and distress.

The next hypothesis for this study concerns the relationship between eustress and distress and health.

Perception of Health

Not all aspects of the stress process reflect actual response to the stressor. Some responses are clearly linked to the stressor and therefore constitute true responses. In this model, eustress and distress are the true responses directly linked to the stressor interpersonal trust. Other states associated with stress, such as well-being, illness, or fatigue, are more appropriately viewed as

products or effects of the stress response (Baum & Singer, 1987). Lazarus and Folkman (1986, see figure 2, p. 73) provided an illustration of the variables for the stress rubric in which interpersonal trust is a causal antecedent, affect (positive/negative response) is an immediate effect, and health and well-being are a long-term effects. Accordingly, an individual's perception of health was selected as an appropriate outcome variable of the stress response for this study.

The fact that distress is not healthy is well established: "Heart attack, stroke, cancer, peptic ulcer, asthma, diabetes, hypertension, headache, back pain, and arthritis are among the many diseases and symptoms that have been found to be caused or worsened by stressful events" (Quick et al., 1997, p. 77). Ganster and Schaubroeck (1991) reviewed the literature on work stress and found that although there is no convincing evidence that stressors associated with the job cause health effects, the indirect evidence strongly suggests a work stress effect. Recent evidence has confirmed that job strain (distress) is associated with increased report of medical symptoms and health damaging behavior in men (Weidner, Boughal, Connor, Peiper, & Mendell, 1997). The was no evidence to suggest that distress was associated with an improvement in health.

Not surprisingly, there is less evidence concerning the relationship between eustress and health. Edwards and Cooper (1988) speculated that eustress may improve health directly through physiological changes or indirectly by reducing existing distress. They reviewed findings from a variety of sources and found that the bulk of the evidence suggests a direct effect of eustress on health. They noted that this evidence is merely suggestive rather than conclusive and that only one study was able to demonstrate that eustress is associated with an improvement in physiological functioning rather than just a reduction in damage. There was no evidence to suggest that eustress was associated with a deterioration in health. Accordingly, the relationships between eustress and distress and health are as follows.

> **H4: There is a positive relationship between eustress and an individual's perception of health.**

H5: **There is a negative relationship between distress and an individual's perception of health.**

The final hypothesis is proposed in order to satisfy the rigor of the approach to modeling relationships between constructs employed in this study. Kelloway (1995) advises researches using structural equation models to theoretically develop every relationship in the model, including those thought to be zero. This satisfies James, Muliak, and Brett's (1982) condition number 10, which requires that unestimated parameters are confirmed to be zero. The one possible remaining relationship in this model would be a direct relationship between the stressor trust and the outcome variable health. In the research on stress and health, the relationship between stressors and long-term health outcomes is always represented as being fully mediated by the stress response. There is no theoretical support suggesting that the relationship between a stressor and a long-term health outcome is only partially mediated by the stress response. Accordingly, the relationship between trust in the supervisor and perception of health is as follows.

H6: **There is no direct relationship between trust in the supervisor and an individual's perception of health after accounting for eustress and distress.**

This chapter has presented the theoretical basis for a more holistic model of stress that includes both eustress and distress as separate responses to any given stressor. This model also provides the advantage of examining the differential affects of eustress and distress on an outcome variable, in this case an individual's perception of his/her health. The next chapter will review the research methodology employed to test these six hypotheses.

CHAPTER 3

RESEARCH METHODS

This purpose of this chapter is to discuss the research methods used to test the hypotheses concerning the structure and hypothesized relationships among variables in the research model. Following a brief discussion of the research settings and sample, details will be presented about how each of the constructs in the model are operationalized. The results of a pilot study of the survey instrument will then be presented. This chapter will conclude with a discussion of the procedures to collect and analyze data in the main study. (Note: This chapter reflects the anticipated plan, but will be revised to reflect what takes place in the main study.)

Research Settings

The research will be conducted at two separate hospitals in two cities in Oklahoma. A hospital in Tulsa will be referred to in this study as Site A, and a hospital in Enid will be referred to as Site B. Site A is an accredited General Medical Surgical Hospital with 550 beds. Site B is an accredited General Medical Surgical Hospital with 303 beds. Site A is managed by a non-profit corporation, and Site B is managed by a for-profit corporation. A third site, C, was included as a research site in the pilot study. Although discussions with the contact person at Site C were instrumental in the development of the researcher's knowledge of the research setting, this hospital will not be included in the main survey. Site C is an accredited General Medical Surgical Hospital with 897 beds and is operated on a non-profit basis by a religious organization. The positions held by the points of contact at the three sites were Chief Executive Officer, Vice-President of Patient Services, and Director of the Department of Education.

Telephone conversations and meetings with the points of contact (POC) at these hospitals had a major influence on the research design and survey construction of this research. All three hospitals had workforces that were considering unionization, which made the leadership sensitive

to the content of a survey of their workforce. They placed constraints on the types informants they would allow access to, which impacted the design of the study. All sites were only willing to allow nurses as informants but not the nurses' supervisors. An issue that consistently arose as their main concern was the length of the survey. All sites expressed a strong desire for a survey instrument that could be completed in around 15 minutes. This constraint heavily influenced decisions about selection of and alterations made to several of the scales in the study.

In the time period between the pretest and the main study, the sample workforce at Site A voted on unionization. Unionization was rejected by one vote, but the union planned to protest. Not long after this event, the contact person at Site A was removed from her position and the CEO of the hospital resigned.

Sample

The proposed sample for this study are registered (RN) or licensed practical (LPN) hospital nurses. These two types of nurses were selected based upon the recommendation of a POC, who suggested that nurses recognize the term "nurse" as referring to either an RN or an LPN. This distinction is consistent with most studies of stress in nurses.

The nursing profession has been recognized as being possibly the most stressful of all the health professions (Phillips, 1982). Hospital nursing staff are subject to stress that arises from the physical, psychological, and social aspects of the work environment (Gray-Toft & Anderson, 1981a). Some of the primary sources of stress for hospital nurses are work overload, dealing with death and dying patients, poor communication with colleagues, shift work, inadequate preparation, conflict with doctors or other supervisory personnel, uncertainty over authority, political and union issues, financial resources, and increasing bureaucracy (Tyler & Ellison, 1994). The effects of stress on nurses is not always presented as negative, with some maintaining that stress maintains alertness and ability to respond to pressure (Hay & Oken, 1972; Tyler & Cushway, 1992).

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Several models of stress for hospital nurses have incorporated the relationship between a nurse and her supervisor as an important source of stress (Gray-Toft & Anderson, 1985; Revicki & May, 1989). Nurses must exercise judgment and make critical decisions, sometimes under life-threatening circumstances. Relationships between nurses and their supervisors that are open and supportive can reduce the role ambiguity and increase the satisfaction experienced by nurses (Gray-Toft & Anderson, 1985). Although trust between a nurse and her supervisor has not previously been assessed, it appears to be a significant issue.

When considering health and nursing, the focus is usually on the service the nurse provides to the patient. Yet in order for the nurse to deliver the optimum service, the nurse must herself be healthy. The health of the health care provider can affect the quality of health care delivery (Cox & Leitter, 1992). Accordingly, the nurses' perception of their own health is a salient outcome variable.

Design

The design selected for this exploratory research is cross-sectional field research. The original design included the nurse supervisor as an informant for the stressor and other information about the work environment. None of the research sites agreed to allow access to the nurse supervisor; consequently, the subject is the single source of all information in this study. This increases the potential for problems associated with common method variance. While there is disagreement as to the prevalence of problems associated with common methods variance (e.g., Spector, 1987; Williams, Cote, & Buckley, 1989), an important issue is the potential for divergence between observed and true relationships among constructs. A meta-analysis found that while this common method bias was a cause for concern, it did not invalidate many research findings (Doty & Glick, 1998). Also, self-report data are less prone to problems with inflation when the data are factual, well known by the respondent, and verifiable (Crampton & Wagner,

1994; Podaskoff & Organ, 1986). The outcome variable, perception of health, is representative of this kind of objective variable, especially as evaluated by the nurses in this sample.

It was also not possible to incorporate true random sampling into the design. Due to concerns over unionization of its employees, none of the hospitals were willing to provide rosters of employees that would have facilitated random selection for inclusion in the study. The main sites were willing to allow distribution of surveys to all nurses present the day of the study – an acceptable compromise. It will be important to keep these limitations in mind when discussing the results of the research.

The following sections will present the indicators selected to operationalize the constructs presented in the model. All scales are non-proprietary, which eliminated from consideration many of the most popular measures used in stress research. With the exception of perception of health, measures were selected that did not contain the name of the construct being measured (e.g., trust, distress). All items are measured on a five-point Likert scale (at the request the contact person at Site C) unless noted otherwise. Scales were adapted to reflect the hospital setting. All measures, with the exception of the instrumental variables, are state measures. All attitudinal scales asked the respondent to consider the present time (right now) when responding. When individual scales were shortened to make the survey shorter, items with the strongest factor loadings on the original scale were generally retained. A summary of the survey items including their definitions, sources, item numbers in the attached survey, and reliabilities can be found in Table 3.

Table 3: Summary of Work and Health Survey

Survey Construct	Definition	Item Numbers	Source	Reported Reliability
Independent Variable				
Trust in supervisor	Willingness to be vulnerable to the actions of another party (supervisor)	Section F, Items 1, 3, 5, 7, 10, 13	Adapted from Mayer & Davis, 1999	.60
Dependent Variable				
Current Health Perception	Ones's self-perception of the current state of one's general health	Section D, Items 3, 5, 9, 13	Adapted from Ware, Davies-Avery, & Donald, 1978	.91
Eustress Indicators				
State PA	Positive (PA) transitory mood states	Section H, Items 1, 3, 5, 9, 10, 12, 14, 16, 17, 19	Watson, Clark, & Tellegen, 1988; PANAS	.85 – .89
Meaningfulness	Extent to which a situation (work) makes sense emotionally; problems and demands are worth investing energy in, worthy of commitment and engagement, and are welcome as challenges rather than as burdens one could do without	Section C, Items 1, 3, 5, 7	Artinian, 1997; Subscale of Situational Sense of Coherence Scale	.97
Manageability	The extent to which one perceives that resources are at one's disposal that are adequate to meet the demands posed by a situation (work)	Section C, Items 2, 4, 6, 8, 9	Artinian, 1997; Subscale of Situational Sense of Coherence Scale	.93
Hope	A cognitive set that is based on a reciprocally derived sense of successful agency (goal-directed determination) and pathways (planning to meet goals)	Section D, Items 1, 6, 8, 14, 18, 20	Snyder et al., 1996; State Hope Scale	.80
Distress Indicators				
State NA	Negative (NA) transitory mood state	Section H, Items 2, 4, 6, 7, 8, 11, 13, 15, 18, 20	Watson et al., 1988; PANAS	.85 – .89

Survey Construct	Definition	Item Numbers	Source	Reported Reliability
Job Alienation	One's generalized cognitive state of psychological separation from one's job, insofar as the job is perceived to lack the potential for satisfying one's salient needs and expectations of the job	Section G, Items 1-2	Kanungo, 1982	.70
Anxiety	Transitory sense of danger and threat of loss	Section E, Items 1-6	Beck et al., 1987; 6 of 12 items from the Anxiety Subscale of CCL	.90
Anger/Hostility	Dimension of neuroticism	Section B, Items 3, 5, 9	Derogatis et al., 1970; Subscale of Symptom of Distress Checklist (SCL)	Not reported

Other Variables

Survey Construct	Definition	Item Numbers	Source	Reported Reliability
Control Variable: Role Ambiguity	Defined in terms of the predictability of the outcomes of one's behavior and the existence of environmental guidelines to provide knowledge that one is behaving appropriately	Section D, Items 2, 10, 12, 15, 17	Rizzo, House, & Lirtzman, 1970	.79
Control Variables: Workload, Death and Dying	Two of the most common stressors for nurses	Section B, Items 1, 2, 6, 8 (workload); 4, 7, 10 (death/ dying)	Gray-Toft & Anderson, 1981b; Subscales of Nurse Stress Scale	.70
Instrumental Variables: Optimism/ Pessimism	A dispositional tendency to believe that one will generally experience good versus bad outcomes in life	Section A, Items 1, 3, 4, 6, 7, 9	Scheier & Carver, 1985; LOT	.76

Other variables included in the survey but not part of this dissertation.

Survey Construct	Definition	Item Numbers	Source	Reported Reliability
Frustration	Indication that an individual's (supervisor) efforts are ineffective	Section F, Items 2, 4, 6, 8, 9, 11, 12	Adapter from Spector, 1987	.88
Job Satisfaction	Overall measure of degree to which an employee is happy with the job	Section A, Items 2, 5, 8	Hackman & Oldman, 1975	.76
Social Esteem	Self-concept in a social setting	Section D, Items 4, 7, 11, 16, 19	Adapted from Heatherton & Polivy, 1991	.92

Positive Psychological States: Indicators of Eustress

Eustress reflects the extent to which cognitive appraisal of a situation or event is seen to either benefit an individual or enhance his/her well-being. The indicators of eustress should be positive psychological states, for example attitudes or emotions. Stable dispositional variables are not acceptable indicators of eustress, which must be subject to change according to changes in cognitive appraisal of stressors. Work attitudes are preferable for this study, and the measures should not overlap conceptually. The constructs selected for this study are positive affect (PA), hope, meaningfulness, and manageability. Other items could also be indicators of eustress (e.g., satisfaction, esteem, happiness) but were not selected.

Hope. Hope has been identified as a positive emotion reflecting a degree of expected benefit resulting from an evaluation of a particular situation (Lazarus, 1993; Smith et al., 1993). Hope was defined as a cognitive set that is based on a sense of successful goal-directed determination and planing to meet goals (Snyder et al., 1996). The state hope scale thus provides a snapshot of a person's goal-directed thinking. All six items of this new scale were retained for use in this study. This represents the first use of this measure in occupational psychology.

Meaningfulness and Manageability. These two constructs are part of a new scale developed by a nurse to measure situational sense of coherence (Artinian, 1997). Sense of coherence (SOC) was a term developed to denote factors that promote a healthy response to stressful situations (Antonovsky, 1987). It has traditionally been measured as a trait variable but was adapted by Artinian (1997) as a situational or state measure. Two of three subscales are included in this study. *Meaningfulness* is the extent to which one feels that life makes sense emotionally, that problems and demands are worth investing energy in, are worthy of commitment and engagement, and are challenges that are welcome. *Manageability* is the extent to which one perceives that resources at one's disposal are adequate to meet the demands posed by the

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situation. Both meaningfulness and manageability are measured with seven-point scales and contain four and five items, respectively.

Positive Affect. Positive affect (PA) is a state of pleasurable engagement and reflects the extent to which a person feels enthusiastic, active, and alert (Watson, Clark, & Tellegen, 1988). PA can be measured as a state or trait, with state PA capturing how one feels at given points in time, whereas the trait represents stable individual differences in the level of affect generally experienced (George & Brief, 1992; Watson & Pennbaker, 1989). State and trait PA are both conceptually and empirically distinct, and state PA is also a separate factor from negative affect (George & Brief, 1992). The ten items from the Positive and Negative Affect Schedule (PANAS) are included in this study to measure state PA (Watson et al., 1988).

Negative Psychological States: Indicators of Distress

In contrast to eustress, distress reflects the degree to which cognitive appraisal of a situation or event identifies the possibility for undesirable or harmful consequences to result. The indicators of distress are negative psychological states. The state measures employed in this study as indictors of distress are common in stress research. It was surprisingly difficult to identify measures of distress that were non-proprietary. The indicators selected for this study are negative affect (NA), job alienation, anger/hostility, and anxiety. As with the indicators of eustress, this set is not exhaustive of the types of possible indicators of distress.

Negative Affect (NA). In contrast to PA, NA is a general dimension of subjective distress and unpleasurable engagement (Watson et al., 1988). NA is a common variable in studies not just as an indicator of distress, but also because of the possibility that NA may affect the measurement of and substantive relationships between stressors and strains in general (Hurrell, Nelson, & Simmons, 1998). State NA was measured with the ten items from the PANAS scale (Watson et al., 1988).

Alienation. Job alienation reflects one's separation from one's job, insofar as the job is perceived to lack the potential for satisfying one's salient needs and expectations of the job (Kanungo, 1982). Job alienation is a specific belief about the present job in contrast to work alienation, which refers to a general belief about work. Job alienation is a cognitive belief that is descriptive of a worker's relations to his/her present job and is determined by stimuli in his/her present work environment. The separation from the job reflected in job alienation is a psychological state indicative of a degree of negative response to stimuli in the work environment. Alienation is measured with a two-item graphic scale (Kanungo, 1982). While a two-item scale should be expected to be less reliable, this scale met with significant approval from hospital personnel from the research sites. They found that the graphical items provided some relief from the tediousness of a lengthy survey.

Anxiety. Anxiety is a transitory state that reflects feelings of danger or threat of loss as a result of cognitive appraisal. Beck, Brown, Steer, Eidelson, & Riskind (1987) developed 12 items for an anxiety subscale as part of their Cognition Checklist (CCL). Only six of the items were retained for use in this study in an attempt to address concerns about the length of the survey. The items retained were ones with the greatest factor loadings from the original subscale.

Anger/Hostility. Anger and hostility is a subscale of the original Symptom Distress Checklist (SCL) that was developed to assess self-reported neurotic symptoms. Three items from the four-item subscale were retained for this study. The item "I have impulses to beat, injure, or hurt someone" was determined inappropriate for a study of nurses. This scale was inadvertently omitted from the version of the survey that was prepared for the pilot study. The items are (1) I feel critical of others, (2) I feel easily annoyed or irritated, and (3) I have temper outbursts I could not control.

Trust

Trust in the supervisor was measured with Mayer and Davis' (1999) four-item trust scale. The scale was adjusted to reflect the relationship with the supervisor and the hospital context. The item "I would be comfortable giving top management (supervisor) a task or problem which was critical to me, even if I could not monitor their actions," was identified as confusing by hospital personnel and graduate students that reviewed the survey. The item was changed to read "I am comfortable discussing with my supervisor concerns I have about my ability to do my job." In an attempt to improve the scale's marginal reliability (.60), two items were added to the scale. These items were intended to reflect the willingness to be vulnerable when discussing the working relationship and suggestions for workplace improvements with the supervisor. Both of these issues would be reflective of a degree of trust between the nurse and the supervisor.

Perception of Health

An individual's current perception of his/her health was measured with four items from a ten-item subscale of the Health Perceptions Questionnaire (Ware et al., 1978). They report that general health ratings are valid measures of health status as they significantly correlated with a variety of other health measures (e.g., physician's assessment). Others have used a single-item version of this scale with nurses (How would you rate your overall health at the present time?) and found it acceptable (Pender, Walker, Sechrist, & Frank-Stromborg, 1990). Nurses are knowledgeable of health issues and tend to see their physicians more often, which enhances the validity of health perception. All ten items were included in initial versions of the survey, but a POC found the redundancy of the items annoying and asked for the scale to be shortened. The four most representative items were retained.

Instrumental Variables

Instrumental variables are needed in order to identify nonrecursive models (Bentler and Chou, 1987). Instrumental variables are variables that are theoretically and statistically related to only one of variables in the reciprocal relationship. Dispositional optimism and pessimism (Scheier & Carver, 1985) were theorized to be uniquely related to eustress and distress, respectively. Optimists expect things to go their way and generally believe that good rather than bad things will happen to them. Pessimists, on the other hand, anticipate bad outcomes. Six items from the Life Orientation Test (LOT) are used to assess optimism and pessimism (Scheier & Carver, 1985).

Control Variables

The most common causes of stress among nurses are included as control variables. Gray-Toft and Anderson (1981b) developed a 34-item nursing stress scale to measure death and dying, conflict with physicians, lack of support, conflict with other nurses, and workload. Workload and death and dying were found to be the most significant sources of stress (Gray-Toft & Anderson, 1981a). Three items from the death and dying subscale and four items from the workload subscale that had the best factor loadings (greater than .59) were included in this study.

Role ambiguity has also been found to be a significant source of stress for nurses (Revicki & May, 1989). Conversations with a hospital POC confirmed that confusion over expectations is a source of stress for nurses. Following Schaubroeck, Ganster, Sime, and Ditman (1993), items from Rizzo et al. (1970) were used to measure role ambiguity.

Demographic Variables

The demographic variables selected for this study are age, gender, experience, education, hours worked, type of nurse (RN or LPN), and area of practice (intensive care or other). While not an exhaustive list of possible relevant demographics, theses are the some of the most common

used in studies of nurse stress (Gray-Toft & Anderson, 1981a, 1981b, 1985; Revicki & May, 1989). A test for significant difference between the two hospitals on the independent and dependent variables will also be performed.

Pilot Study

A pilot study was conducted for the purpose of assessing the psychometric properties of the research instrument. All of the scales used in the survey were previously established and found to have acceptable psychometric properties, but some of the scales were altered for the purpose of this study. Most of the changes involved incorporating the hospital as the research setting. As such, the rigorous pretest procedures required for new scale development were not necessary and a single pretest was deemed sufficient.

Because the hospitals were concerned about the length of the test, the survey was administered to a convenient sample of 5 doctoral students in the College of Business Administration at Oklahoma State University in order to get an initial determination of the completion time of the survey. The completion time for these five individuals ranged from a low of 11 minutes to a high of 18 minutes. As the points of contact at the sample hospitals felt that a completion time of 15 minutes was acceptable, the instrument was determined to be ready for pretest.

The sample size for the pretest was 102 hospital nurses from two separate hospitals. At one hospital, 45 supervisory-level nurses that had gathered for a day of training were administered the survey, and all responded. They were given time during the meeting to complete the survey, and completed surveys were dropped in a collection box provided by the researcher. This hospital will also participate in the main study. The other 57 nurses were employees of a separate hospital that will not be participating in the main survey. These nurses were administered surveys by the hospital contact personnel during a training session held at the hospital. It is unclear how many surveys were actually distributed. Forty-three of the nurses deposited their completed surveys in

a sealed box provided by the researcher, and the remaining 14 returned surveys with a self-addressed stamped reply envelope that was attached to each survey.

As a general rule in factor analysis, the minimum sample size would be five times as many observations as there are variables to be analyzed, and the more acceptable range would be a ten-to-one ratio. This study uses 14 variables with a total of 72 indicators; consequently, the sample size is not large enough to submit all variables to a single factor analysis. It was not logistically possible to obtain the recommended sample size of 350 for this pretest. In order to meet the minimum ratio of five-to-one, constructs were organized into groups of 20 or fewer variables before being factor analyzed. The heuristic used in forming these groups was an attempt to subject related constructs to a single factor analysis. Thus, the control variables, negative psychological states, and positive psychological states excluding positive affect formed three of the factor analysis groups (the 10 items from the PA scale would put this group over the 20 variable guideline). The 10 items for positive affect were grouped with the independent variable trust and the dependent variable health perception to form the fourth group.

All groups of variables were subject to principal component factor analysis. Principal component factor analysis is the only factor analytic method available in SPSS 9.0; consequently, the decision to use this method instead of common factor analysis was a practical one. While there remains considerable debate over which factor model is the more appropriate, empirical research has demonstrated that in many instances the methods produce similar results (Hair, Anderson, Tatham, & Black, 1995). Two criteria were used to determine the number of factors to be extracted. The first method considered only factors having latent roots or eigenvalues greater than 1 as significant. The second method involved analysis of the scree test plots as well as the plot of the components in rotated space.

When interpreting the factors, a loading of .40 could be considered important and a loading of .50 or greater considered practically significant. With a sample size of 100, a factor loading of

.55 is statistically significant at the .05 significance level with a power of 80 percent (Hair et al., 1995). When the initial factor solution was not interpretable, the factors were rotated using the oblique method PROMAX. The oblique rotation method is appropriate when the goal of the factor analysis is to obtain several theoretically meaningful factors or constructs (Hair et al., 1995). Reliability analysis using Cronbach's alpha will be conducted after meaningful factors have been identified.

The first factor analysis included the variables for trust, PA, and health perception. Examination of latent roots and scree plots revealed three factors, and a PROMAX rotation produced interpretable factors. All the variables for PA and health perception produced significant factor loadings for their factor in the range from .64 to .86. Reliability analysis of these two scales revealed a Chronbach's alpha (α) of .92 for PA and .86 for health perception. Item loadings from .48 to .86 were produced for items on the trust scale (see Table 4). While three of the items had factor loadings below the preferred significance level, all six items of the scale produced an $\alpha = .75$. Alpha would only improve to .77 if the lowest item was deleted from the scale; consequently, all six items will be retained in the scale for use in the main study.

Table 4: Pretest of Trust Scale

Items of Trust Scale	Rotated Factor Loading
I am comfortable discussing with my supervisor concerns I have about our working relationship.	.86
I am comfortable discussing with my supervisor concerns I have about my ability to do my job.	.85
I am comfortable discussing with my supervisor my ideas for improvements in the workplace.	.77
If I had my way, I wouldn't let my supervisor have any influence over issues that are important to me.	.52
I really wish I had a good way to keep an eye on my supervisor.	.51
I would be willing to let my supervisor have complete control over my future in this hospital.	.48

The next factor analysis involved the variables negative affect (NA), anxiety, and alienation. Examination of the test criteria revealed five distinct factors, with items from the NA scale forming three distinct factors. Items from the anxiety scale loaded together on one factor with rotated factor loadings ranging from .61 to .85. Items from the alienation scale loaded together on another factor with loadings ranging from .83 to .85. Alpha for the resulting anxiety and alienation scales were .83 and .61, respectively. The low reliability estimate for the alienation scale may be attributed to the fact that it contains only two items.

The first factor produced by the NA scale contained the items afraid, scared, nervous, distressed, and jittery, with rotated factor loadings ranging from .57 to .87. The second factor produced by the NA scales contained the items hostile, irritable, and upset, with factor loadings from .57 to .89. The third factor produced by the NA scale contained the items ashamed and guilty, with factor loadings from .77 to .78. It is encouraging to note that none of the NA factors loaded strongly on either the anxiety or alienation scales.

Reliability analysis for all ten items of the NA scale reveals an alpha of .78. The three subscales produce alphas of .81, .70, and .58, respectively. Because even the best subscale produces only a small increase in reliability, all ten items will be retained as the NA factor in the main study. If the larger sample size of the main study continues to produce this factor structure, the first factor minus the term distressed may be a sufficient indicator of NA.

The third factor analysis involved the variables meaningfulness, manageability, and hope. Examination of the test criteria reveals a three factor solution, with all of the items loading on their intended construct. The alphas were as follows: hope, .80; meaningfulness, .79; and manageability, .60. When the ten items from the PA scale were added to this group and subject to a separate factor analysis (25 variables total), the PA scale held together and formed the first factor extracted. In this analysis, the first item of the hope scale formed a separate factor and the manageability scale produced two factors. When the meaningfulness and manageability scales

were subjected to a separate factor analysis together, the manageability scale produced two subscales. One of these subscales was associated with the ability to find solutions to challenges at work; the other was more associated with a feeling of being able to count on others at work. As both of the subscales were less reliable than the original scale, all items will be retained for the main study. Likewise, deletion of the first item of the hope scale would only improve the reliability from .798 to .803, so all the items of the hope scale will be also be retained for the main study.

The final factor analysis included the variables role ambiguity, death/dying, workload, pessimism, and optimism. Examination of the test criteria reveals the expected five factor solution, with one exception. The item for role ambiguity that states "I have clear, planned goals and objectives for my job" did not load with the other items on the role ambiguity factor. This item loaded on the optimism factor. In the survey, this item immediately follows an item for hope that reads "at the present time, I am energetically pursuing my goals." Because these two items overlap, the role ambiguity item will be eliminated from the main survey. Elimination of this one item from the role ambiguity scales increases its alpha nominally from .76 to .78. The reliabilities of the scales death/dying, workload, pessimism, and optimism are .76, .73, .85, and .70, respectively. The reliabilities for all the scales are reported in Table 5.

The point of contact at the main research site (the one with the largest potential sample size) also expressed a desire to change the name of the survey. The nurses at her hospital are considering unionization, so she was concerned about the impression that a "Nurse Attitude Survey" would convey. It was decided to change the name of the survey in the main study to "Work and Health Survey." A reviewer of the pretest results suggested changing from a five-point to a seven-point Likert response scale. The revised survey is included as Appendix 1.

Table 5: Summary of Pretest Reliabilities

Scale	Alpha	N of items	Item Means			
			Mean	Min.	Max.	Variance
Trust	.75	6	3.59	2.18	4.17	.50
Health Perception	.85	4	3.69	3.35	4.00	.08
Meaningfulness	.79	4	5.60	5.34	6.11	.13
Manageability	.60	5	4.90	4.25	5.59	.27
Hope	.80	6	3.90	3.68	4.15	.04
PA	.92	10	3.47	2.72	3.85	.11
NA	.78	10	1.46	1.11	1.94	.06
Anxiety	.83	6	1.56	1.37	2.03	.05
Alienation	.61	2	3.56	3.21	3.90	.24
Role Ambiguity	.78	5	3.89	3.68	4.14	.04
Death/Dying	.76	3	3.14	2.84	3.56	.14
Workload	.73	4	3.45	3.16	3.59	.04
Pessimism	.85	3	2.01	1.96	2.11	.01
Optimism	.70	3	3.82	3.77	3.86	.01

Data Collection Procedures

Two separate hospitals, Site A and Site B, have agreed to participate in the main research study to this point. Questionnaires will be distributed to nurses at work. Each of the sites has indicated that it will provide the nurses 15-20 minutes of work time to complete the surveys. The nurses who complete the surveys will return them to a collection box that will be provided to each of their departments. The questionnaires will be collected from these boxes, thereby eliminating handling of the surveys by hospital personnel. This procedure was employed successfully by Fox, Dwyer, and Ganster (1993). A true random sample was not possible due to unionization concerns; neither of the research sites was willing to provide a list of employees. Because surveys will be distributed to all nurses present at the time of the survey, selection biases should be minimized.

Site A as indicated that access to between 300 and 400 nurses is possible. Site B has indicated that around 200 nurses should be available to complete surveys at its hospital. Because the sites are allowing time for the nurses to complete the surveys as work, an 80 percent

completion rate is expected. Accordingly, a combined sample size of around 480 hospital nurses from the two hospitals is anticipated. This sample size would satisfy the five-to-one observation to variable recommended ratio for both exploratory factor analysis and structural equation modeling, the data analytic techniques that will be discussed in the next section.

Data Analysis Techniques

Once the data are collected, they will be input into SPSS for univariate analysis of the variables. The most important assumptions of the data analytic technique employed in this study, structural equation modeling (LISREL), are primarily conceptual. The statistical requirements are independent observations, random sampling of respondents, identical distributions, and linearity of all relationships (Bentler & Chou, 1987; Hair et al., 1995). LISREL is also sensitive to departures from multivariate normality in the data. Multivariate normality will be assessed through the use of univariate statistics, particularly the skewness and kurtosis of the data. The data will also be examined for missing data and outliers, and available strategies for these contingencies will be explored.

Identification of the model was also addressed. Eustress, distress, trust, and health each have at least four indicators, which helps to ensure identification of the model. Instrumental variables (optimism and pessimism) are included to facilitate identification of the nonrecursive portion of the model (Bentler & Chou, 1987).

The specified measurement model will be examined to confirm that it is congeneric before any structural relationships proposed by the study are examined. Confirmation of the congeneric measurement model will allow for assessment of convergent and discriminant validity, whereas confirmation of the structural model will allow assessment of the nomological validity of the model (Anderson & Gerbing, 1988; James et al., 1982). While assessing the measurement model, the discriminant validity of the indicators for eustress and distress must be demonstrated before establishing their convergence on the second order factors.

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Several absolute fit measures will be assessed: Chi-square, Goodness-of-fit index (GFI), and root mean square residual error of approximation (RMSEA). An incremental fit measure, the comparative fit index (CFI), will also be assessed to evaluate the fit of the measurement model. When the overall model is accepted, each of the constructs will be evaluated separately by (1) examining each indicator's loading for statistical significance and (2) assessing the construct's reliability and variance extracted.

The structural model will provide for hypothesis testing. The control variables will be included in the model with direct paths to the dependent variable. Hypotheses two through six will be tested by examining the significance and direction of the estimated coefficients produced by the structural model. Hypothesis one will be tested through a series of nested models in which zero, one, and two paths between eustress and distress are examined for their statistical significance. A series of chi square difference tests of these competing models will determine the most acceptable model for the relationship between eustress and distress.

Summary

This chapter detailed the research methods that will be employed to test the proposed research model. The sample of nurses should provide an ideal setting to examine the potential for trust in the supervisor to generate degrees of both eustress and distress. The pilot study was limited in its ability to assess the survey instrument; nevertheless, potential improvements were identified, and the instrument has sufficient reliability to justify its use in the main study.

CHAPTER 4

RESULTS

This chapter will describe the steps taken to test the proposed model and the series of relationships contained in the model presented in Hypotheses 1-6. The final model that is confirmed will provide support for the hypothesized relationships between trust, eustress, and health. The results will also provide valuable information about the efficacy of the positive and negative psychological states selected as indicators of eustress and distress. Finally, the results will provide suggestions for improvement of the current model and method of study.

Survey Response

Surveys were administered to a total of 450 RNs and LPNs in two separate hospitals. The response rates for each of the hospitals were 47 percent (47 out of 100) and 32 percent (111 out of 350), with an overall response rate of 35 percent (158 out of 450). Most of the respondents were female (92 percent) registered nurses (91 percent). Exactly half of the nurses practiced in intensive/critical care areas, while the other 50 percent practiced in other areas of the hospital. A total of 79 percent of respondents had practiced nursing for at least 6 years, and 39 percent had more than 15 years of nursing experience. Eight percent reported working 51 or more hours per week, 7 percent less than 20 hours per week, 44 percent between 31 to 40 hours per week, and 41 percent reported working between 41 to 50 hours per week. Due to the complexity of the model, the demographic data are presented for descriptive purposes only and will not enter into the current data analysis. A summary of the demographic data is presented in Table 6.

Item Analysis

Descriptive statistics for the manifest indicators in the model are presented in Table 7. Because the items would be combined into summated scales only for the purpose of assessing differences in responses between the two hospitals, analysis of data analytic assumptions was

	RN	LPN	Female	Male	Yes	No
What type of nurse are you?	91.8	8.2				
Gender			93.0	7.0		
Do you practice in an intensive care/ critical care area?					50.0	50.0

	< 25	25 - 34	35 - 44	45 - 54	55 - 64	65+
Age	3.2	19.6	38.0	31.6	7.6	0

	Diploma	Associate Degree		BS/ BSN	MS/ MSN	Other
What is the highest educational degree you have earned?	15.2	49.4		31.6	1.9	1.9

	< 1 year	1 - 2 years	3 - 5 years	6 - 10 years	11 - 15 years	15+ years
How long have you been a nurse?	4.4	11.4	14.6	17.1	13.3	39.2
How long have you been employed at this hospital?	15.8	17.7	20.3	15.2	11.4	19.6
How long have you been in your current nursing position?	22.8	22.2	19.6	13.9	8.9	12.7

	< 20	21 - 30	31 - 40	41 - 50	> 51	
Average number of hours worked per week as a nurse at this hospital	2.5	5.1	43.7	41.4	7.6	

Table 7: Descriptive Statistics for Manifest Indicators

Construct	Item (R = reverse scored)	Min	Max	Mean	Std.
Health (α = .87)	health1	1	7	5.31	1.41
	health2	1	7	4.34	1.55
	health3	1	7	4.82	1.64
	health4	1	7	5.04	1.63
Trust (α = .79)	trust1 (R)	1	7	4.78	1.85
	trust2	1	7	5.08	1.95
	trust3	1	7	2.61	1.67
	trust4 (R)	1	7	5.56	1.7
	trust5	1	7	4.96	1.91
	trust6	1	7	4.89	1.8
Hope (α = .84)	hope1	1	7	5.58	1.2
	hope2	1	7	4.73	1.56
	hope3	1	7	4.9	1.36
	hope4	1	7	5.41	1.25
	hope5	2	7	5.43	1.17
	hope6	1	7	5.16	1.36
Meaningfulness (α = .67)	meaning1 (R)	2	7	5.96	1.12
	meaning2	2	7	5.24	1.13
	meaning3 (R)	1	7	5.52	1.33
	meaning4	1	7	5.05	1.31
Manageability (α = .60)	manageability1	2	7	5.22	1.41
	manageability2	1	7	4.69	1.57
	manageability3	1	7	4.89	1.25
	manageability4	1	7	4.82	1.27
	manageability5	1	7	4.48	1.19
Positive Affect (α = .90)	PA1	1	5	3.85	0.85
	PA2	1	5	2.57	1.21
	PA3	1	5	3.52	1.00
	PA4	1	5	3.19	1.02
	PA5	1	5	3.57	1.12
	PA6	2	5	4.14	0.77
	PA7	1	5	2.87	1.17
	PA8	1	5	3.82	1.00
	PA9	1	5	4.03	0.83
	PA10	1	5	4.00	0.94

Construct	Item (R = reverse scored)	Min	Max	Mean	Std.
Anxiety (α = .82)	anxiety1	1	7	2.08	1.31
	anxiety2	1	7	1.82	1.21
	anxiety3	1	7	1.73	1.01
	anxiety4	1	6	1.85	1.10
	anxiety5	1	6	1.66	1.03
	anxiety6	1	6	2.37	1.36
Anger (α = .77)	anger1	1	7	3.61	1.43
	anger2	1	7	3.55	1.33
	anger3	1	7	1.85	1.12
Job Alienation (α = .71)	jobal1	1	7	4.04	1.15
	jobal2	1	7	3.42	1.31
Negative Affect (α = .80)	NA1	1	5	2.22	1.06
	NA2	1	5	1.79	0.96
	NA3	1	5	1.29	0.69
	NA4	1	5	1.45	0.80
	NA5	1	5	1.35	0.73
	NA6	1	5	1.78	0.92
	NA7	1	4	1.11	0.40
	NA8	1	5	1.58	0.86
	NA9	1	5	1.33	0.71
	NA10	1	4	1.32	0.66
Workload (α = .68)	work1	1	7	5.21	1.38
	work2	1	7	5.05	1.34
	work3	1	7	4.37	1.67
	work4	1	7	4.76	1.63
Death/Dying (α = .67)	death1	1	7	4.03	1.73
	death2	1	7	4.65	1.51
	death3	1	7	3.48	1.79
Role Ambiguity (α = .80)	RA1	1	7	3.33	1.48
	RA2	1	6	2.61	1.22
	RA3	1	6	2.08	1.05
	RA4	1	7	2.55	1.34
	RA5	1	7	2.15	1.10

performed at the item level. The exception to this is that coefficient alpha reliabilities (α) were

computed in SPSS 9.0 for each scale. When the results of the subsequent confirmatory factor

analysis (CFA) are presented, it will be important to remember that coefficient alpha under-

estimates reliability unless all of the factor loadings of a manifest indicator on its latent variable are equal (Kenny, 1979; McDonald, 1985). The coefficient alpha for the variable manageability was under desired standards at .60. Because the subsequent analysis will assess all the items for their factor loadings on the latent variable and the items will not be combined to form a scale, no attempts will be made to improve reliability by eliminating items. Examination of the individual items for manageability revealed that there was no single item that if eliminated would substantially improve alpha. The rest of the reliabilities were acceptable ($\alpha = .67$ to $\alpha = .90$) (Nunnally & Bernstein, 1994).

The 74 items employed as manifest indicators in the model were assessed for univariate normality. Most of the items exhibited acceptable levels of skewness and kurtosis; however, all of the indicators for NA, anxiety, and pessimism were skewed to the low end of the scale. The explanation for this result is that people may tend to underreport negative things about themselves. Although some of the items were skewed, all 74 items passed the Kologorov-Smirnov test (modified with the Lilliefors significance correction) for normality (Hair et al., 1995). When missing values were encountered in the data, they were replaced with the mean of the item in the sample using an option provided by SPSS 9.0. This strategy for replacing missing observations should have minimal effect in the structural equation modeling analysis. While some variables had no missing observations, several items in the NA and PA scale had as many as seven missing observations. Observations replaced with missing values represent 2.4 percent (276 of 11,692) of the total observations in the analysis. This was considered an acceptable alternative to eliminating either indicators or respondents from the data.

Combining Two Samples Into One

In order to ensure that the 158 responses between the two hospitals could be combined into a single sample for analysis, the major variables in the model were subjected to a MANOVA analysis with hospitals as the grouping variable. None of the MANOVA test statistics were

significant (e.g., Pillai's Trace = .034, F = .511, p = .881), which supports the conclusion that there is no significant difference between the two hospitals in the vector of means formed by the variables "health," "trust," "hope," "meaningfulness," "manageability," "PA," "NA," "anxiety," "anger/hostility," and "job alienation." Although the unequal cell sizes limit the power of the MANOVA, all 158 responses will be combined for the LISREL 8.30 analysis.

A separate MANOVA was run to check for significant differences between ICU nurses and non-ICU nurses. There was no significant difference between the ICU and non-ICU nurses in the vector of means formed by the variables "health," "trust," "hope," "meaningfulness," "manage-ability," "PA," "NA," "anxiety," "anger/hostility," and "job alienation" (e.g., Pillai's Trace = .07, F = 1.25, p = .27).

Data Analysis Strategy

Both estimation methods and the tests of model fit in structural equation modeling (SEM) are based on the assumption of large samples. Because the overall response rate was smaller than expected, several modifications to the analysis strategy were warranted.

Assessing Model Fit

When assessing the fit of a model, the recommended strategy is to use more than one perspective (Kelloway, 1998; Loehlin, 1998). Among the many alternatives available, it is worthwhile to remember that "the quality of model fit should be assessed in the context of the substantive concerns motivating model construction" (Hayduk, 1987, p. 169). Because the most important objective of the present study was to examine the factor structure of eustress and distress, this objective could be accomplished through a comparison of competing nested models (e.g., one factor versus two factors). This is fortunate because the available techniques for assessing model fit do a better job of determining the model with the best fit, as opposed to

evaluating an isolated model in some absolute sense (Bollen & Long, 1993; Loehlin, 1998, p. 39).

A useful fit index for this study, the root mean square error of approximation (RMSEA), is one that is gaining recognition as one of the most informative criteria in SEM (Byrne, 1998; Kelloway, 1998; Loehlin, 1998). Because it is a population-based index, it is relatively insensitive to sample size. It also has an explicit adjustment for the complexity of the model. The developer of RMSEA considers values below .10 "good" and below .05 "very good" (Steiger, 1989, p. 81). LISREL 8.30 also reports a test of the hypothesis that RMSEA in the population is less than .05. If the acceptance of a model is to be meaningful, there must be a reasonable chance of rejecting it if it is false. Loehlin (1998) provides a power table for RMSEA that indicates that for a sample size of 144, the power to reject the hypothesis of poor fit (RMSEA > .10) given population RMSEA of .05 at the .05 significance level is .90 if the model has at least 40 degrees of freedom. The present model has a sample size of 158 and a minimum of 880 degrees of freedom.

A 90 percent confidence interval (CI) around the RMSEA value will also be reported. In contrast to point estimates of model fit, confidence intervals allow the researcher to assess the imprecision of the estimate. An acceptable value of RMSEA and a narrow confidence interval represents good precision of the RMSEA value reflecting model fit in the population. With a small sample size and a complex model, larger confidence intervals would be expected; consequently, small confidence intervals in the present model will be considered favorably (Byrne, 1998). Furthermore, if the upper limit of the 90 percent confidence interval for RMSEA lies below .10 (unacceptable fit), one can reject the hypothesis that the fit of the model in the population is that or worse and conclude that the present model fits acceptably in the population (Loehlin, 1998).

The Expected Cross Validation Index (ECVI) was used as a measure of comparative fit (Kelloway, 1998). ECVI represents an estimate of the F needed to compare the implied covariance matrix of the present solution with a new sample drawn from the population. The smaller the ECVI, the better the model is expected to cross-validate in a new sample. Although there are no standards to evaluate the value of ECVI, a 90 percent confidence interval is computed for this statistic. Thus, the researcher knows not only what kind of fit to expect on average in a new sample, but also has some idea of how precise that estimate is (Loehlin, 1998). Another measure of comparative fit employed in this study was the comparative fit index (CFI). The CFI compares the model to the worst fitting model, one that specifies no relationships between the variables composing the model. The values of CFI will range between 0 and 1, with values exceeding .90 indicating a good fit to the data. Because of the relatively small sample size and complexity of the present model, the CFI values obtained were not expected to indicate good fit (Kelloway, 1998).

A final measure of fit used in this study is a new measure developed specifically for higher-order models (Marsh & Hocevar, 1985). The index, called the target coefficient (T), is the ratio of the chi-square (χ^2) of the first-order model to the χ^2 of the more restrictive higher-order model. The idea is that the basic first-order model provides a target or optimum fit for the higher-order model because the fit of the higher-order model will never be better than the first-order measure-ment model. The target coefficient has an upper limit of 1, which would be possible if the relations among the first-order factors could be totally accounted for in terms of the higher-order factors. This index has the advantage of separating the lack of fit due to the second-order structure from lack of fit in the definition of the first-order factors. One limitation of this index is that T will generally be higher as the number of parameters in the higher-order model increases. Although the distributional properties of T are unknown, the highest T obtained by Marsh and Hocevar (1985) was .95 in a model with 1,379 degrees of freedom. A high of $T = .93$ was

obtained in a study with a model that contained two correlated higher-order factors (Avolio, Bass, & Jung, 1999) and a high of $T = .89$ in a study with three higher-order factors (Farmer, Maslyn, Fedor, & Goodman, 1997).

Order of Procedures

Covariance matrices were used for all LISREL analyses in this study, and the method of estimation was maximum likelihood. In order to conduct a first-order confirmatory factor analysis (CFA) of the proposed model, LISREL would have to estimate 214 free parameters. Because the total sample size was smaller than the number of estimated parameters, the parameter estimates may not be reliable. Although it was a departure from standard practice, preliminary attempts to make the model more parsimonious by ensuring that only the necessary variables are included in the final structural analysis were warranted. Complex models with several levels of analysis and a large number of measures should be constructed in layers, with the final model being an integration of theory and data (Gerbing, Hamilton, & Freeman, 1994).

One way to facilitate parsimony was to perform the second-order CFA first. Examination of the factor structure of eustress and distress will reveal whether higher-order factors are indeed present and, if so, how many. If the higher-order factors were not present, or if a model with a single higher-order factor was confirmed, the instrumental variables would not be necessary in the structural analysis. Additionally, if one or more second-order factors were confirmed, only the latent variables that loaded significantly would be included in the structural model as indicators of the higher-order factor(s). Because the first-order factors were only used as indicators of the second-order factors and all hypotheses in the model relate to the second-order factors, this was a reasonable approach to "theory trimming" (Kelloway, 1998). This initial second-order CFA would provide a direct test of the first and most important hypothesis in the study.

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Following the second-order CFA, relevant indicators of eustress and distress would be combined with the stressors and outcome variable and subjected to a first-order CFA to establish the measurement model before proceeding to the structural model. It is possible at this stage that the number of estimated parameters may still exceed the total sample size, but any improvement would be helpful.

Second-Order CFA

LISREL 8.30 was used to analyze a series of four models to determine the factor structure of the four positive and four negative psychological states used as indicators of eustress and distress. This provided an initial test of Hypothesis 1, which stated eustress and distress are separate constructs in a nonrecursive relationship. A description of the models as well as the fit statistics and results of the χ^2 difference model comparison test are presented in Table 8.

The first model was the measurement model for the eight latent variables of positive and negative psychological states and their 46 manifest indicators. All of the indicators loaded positively and significantly on their intended latent variables. Examination of both the RMSEA and ECVI statistics indicate that the model represented a good fit to the data. The CFI is relatively low at .74, but that was not unexpected with such a complex model.

Table 8: Results of the Second Order CFA

Model	Description
1	Measurement model with 8 latent variables
2	Two correlated higher-order factors with 8 latent variable indicators
3	Measurement model with 7 latent variables
4	Two correlated higher-order factors with 7 latent variable indicators
5	Unidimensional higher-order factor with 7 latent variable indicators

Model	χ^2	Df	RMSEA (90% CI)	ECVI (90% CI)	CFI	T	Compare	Significant Difference	Favor
1	1710.35	961	.076* (.07, .081)	13.16 (12.41, 13.95)	.74				
2	1766.34	982	.078* (.072, .083)	13.44 (12.67, 14.25)	.73	.968			
3	1589.63	881	.077* (.072, .083)	12.24 (11.52, 13.01)	.75				
4	1621.73	894	.078* (.073, .084)	12.42 (11.69, 13.21)	.74	.980			
5	1622.06	895	.078* (.073, .084)	12.39 (11.65, 13.17)	.74	.980	5 to 4	No**	5

* $p < .05$ (test of close fit – RMSEA $< .05$)
** The χ^2 difference between these two models is .33, with 3.84 representing a significant difference of $p < .05$.

The correlations among the eight latent variables, taken from the PHI matrix, are presented in Table 9. Examination of the correlations shows that the positive and negative psychological states related to each other as expected, with the exception of "job alienation," which did not perform at all as expected except for its relationship with PA. Part of the problem with "job alienation" may be that it was the only variable in the study with only two indicators, which would tend to reduce its reliability. The four positive indicators "hung together" relatively well, while the four negative indicators did not "hang together" as well.

The second model run was the hypothesized second-order factor structure of eustress and distress. The fit indices for this model (Table 8) were similar to the first model and indicated a good fit to the data. Comparing the χ^2 of model 2 to the χ^2 of model 1 ($T = .968$) also indicated very good model fit. The factor loadings of the latent variable indicators on their hypothesized second-order variables are presented in Table 9 as well. As hypothesized, two second-order factors were confirmed, with most of the indicators loading significant and in the expected

direction. Accordingly, the two second-order factors could be labeled "eustress" and "distress." The one exception to indicator performance was "job alienation," which did not load significantly on the second-order factor distress. Due to its poor performance, "job alienation" was dropped as an indicator in all subsequent analyses. Finally, examination of the PHI matrix indicated a significant correlation between the two second-order factors (-0.91), which suggested that a unidimensional second-order factor may fit the data better.

It must be noted at this point that the measurement model fit the data better than the model with higher-order factors. This was expected because even when a higher-order model is able to *theoretically* explain effectively the factor covariations, the *empirical* goodness-of-fit of the higher-order model can never be better than the corresponding first-order measurement model (March & Hocevar, 1985). Because the purpose of the study was to investigate the stress response as a second-order factor, the higher-order model was favored over the measurement model.

The third model represented a new measurement model with "job alienation" removed and seven latent variables remaining. This model was necessary to allow for computation of the T statistic. All of the indicators loaded positively and significantly on their intended latent variables. Examination of both the RMSEA and ECVI statistics indicated that the model represented a good fit to the data.

Table 9: Second-Order CFA Correlations Among Latent Variables and Factor Loadings on Hypothesized Second-Order Factors

	1	2	3	4	5	6	7	Factor Loadings (standardized)		
								Model 2	Model 3	Model 4
1. Meaningfulness								0.94*	1.02*	1.02*
2. Manageability	0.92*							0.94*	0.92*	0.92*
3. Hope	0.76*	0.66*						0.75*	0.74*	0.74*
4. PA	0.57*	0.45*	0.45*					0.55*	0.55*	0.55*
5. NA	-0.34*	-0.43*	-0.32*	0.08				0.42*	0.41*	-0.37*
6. Anger/Hostility	-0.50*	-0.51*	-0.21*	-0.31*	0.22*			0.49*	0.49*	-0.46*
7. Anxiety	-0.34*	-0.31*	-0.32*	-0.23*	0.26*	0.10		0.40*	0.39*	-0.36*
8. Job Alienation	-0.02	-0.02	-0.10	-0.34*	-0.04	-0.03	-0.05	-0.05		

$* p < .05$

Note: The correlations were obtained from the PHI matrix in Model 1, and the factor loadings of the latent variables indicators on their hypothesized second-order factor were obtained from the standardized GAMA matrix in Models 2 – 4.

It must be noted at this point that the first-order measurement model fits the data better than the model with higher-order factors. Examination of the fit statistics and factor loadings for this model again supported the hypothesized two-factor structure of eustress and distress. Comparing the χ^2 of Model 4 to the χ^2 of Model 3 produced a $T = .980$, another indication of good fit. Examination of the PHI matrix revealed that eustress and distress remained significantly correlated (-.92); consequently, a test of a unidimensional second-order factor structure was warranted.

The fifth model represented a unidimensional second-order factor with all seven positive and negative latent variables as indicators. For this model, RMSEA, CFI, and T remained the same, while ECVI was slightly worse. Because models 4 and 5 were nested, a difference test was performed as a basis for comparison. This test revealed a difference of .33, which is nonsignificant (3.84 at $p < .05$ with 1 degree of freedom). Because there was no significant difference between the models, the more parsimonious unidimensional second-order factor model (more degrees of freedom) was favored. As a result, Hypothesis 1, that eustress and distress are separate constructs in a nonrecursive relationship, could not be properly tested in the structural model and therefore could only be partially supported.

Further inspection of this single second-order factor showed that not surprisingly, the positive indicators loaded positively and the negative indicators changed direction and loaded negatively on this factor. The factor loadings of the positive indicators were also stronger than the factor loadings of the negative indicators. A reasonable conclusion is that this factor behaved as a positive factor because of the strength of the positive indicators relative to the negative indicators. In support of this conclusion, if the positive indicators were removed from the model one at a time, the factor loadings on both the positive and negative indicators changed direction when only one (any one) positive factor was left with the three negative indicators. Consequently, the labeling of this single second-order factor was problematic.

Because of the presence of the negative states as indicators, labeling this factor "eustress" is inconsistent with the proposed theory. A neutral labeling for this new factor (e.g., stress response) was not supported by the proposed theory, and the performance of this factor in any subsequent structural analyses would be difficult to interpret. Accordingly, this single second-order factor with both positive and negative indicators was not subjected to any further analysis.

One alternative at this point was to abandon the investigation of second-order factors of the stress response and to consider the seven latent variable indicators at the first-order level. This was undesirable for two reasons. A reasonable conclusion is that this factor behaves as a positive factor because of the strength of the positive indicators relative to the negative indicators, implying that this factor should be labeled "eustress." Unfortunately, if the positive indicators are removed from the model one at a time, the factor loadings on both the positive and negative indicators change direction when only one (any one) positive factor is left with the three negative indicators; consequently, the labeling of this single second-order factor as "eustress" is problematic.

Since the second-order CFA failed to support two distinct second-order factors of eustress and distress but instead favored a single second-order factor that behaved positively due to the relatively poor performance of the negative indicators, a reasonable compromise at this point was to simplify this second-order factor. If the negative indicators were removed from this factor, leaving only positive indicators, this factor could be interpreted – consistent with theory – as eustress.

Still, to remain consistent with Edwards and Cooper's (1988) recommendation that eustress should not be considered in isolation of distress, at least one first-order level indicator of distress must be retained for the structural analyses. Because NA has ten manifest indicators, if it was selected as this single indicator of distress the number of estimated parameters in the structural model would still exceed the sample size. If, however, either "anxiety" (six indicators) or "anger"

(three indicators) were selected to represent distress, then the number of estimated parameters would be less than the sample size. "Anger" was selected because it had the smallest number of indicators.

Although the decision to select "anger" instead of either "anxiety" or NA as a proxy for distress was a practical one, the selection of "anger" as a proxy remains consistent with the theoretical foundations of the model. Lazarus (1999) considers anger one of the core "nasty" emotions. Because high levels of experienced anger have been found to interfere with inter-personal relationships (Spielberger, 1991) and to be strongly related to self-reported health behaviors (Martin et al., 1999), the variable "anger" may have particular efficacy in a model that incorporates interpersonal trust and perceptions of health.

Figure 13 presents the revised model that was subjected to structural analyses. Although Hypothesis 1 was not fully supported, the remaining hypotheses proposed by the theory developed in this study were tested. In this model, "anger" acted as a proxy for, rather than an indicator of, distress. This measurement model had 145 estimated parameters, thereby stabilizing the parameter estimates relative to sample size.
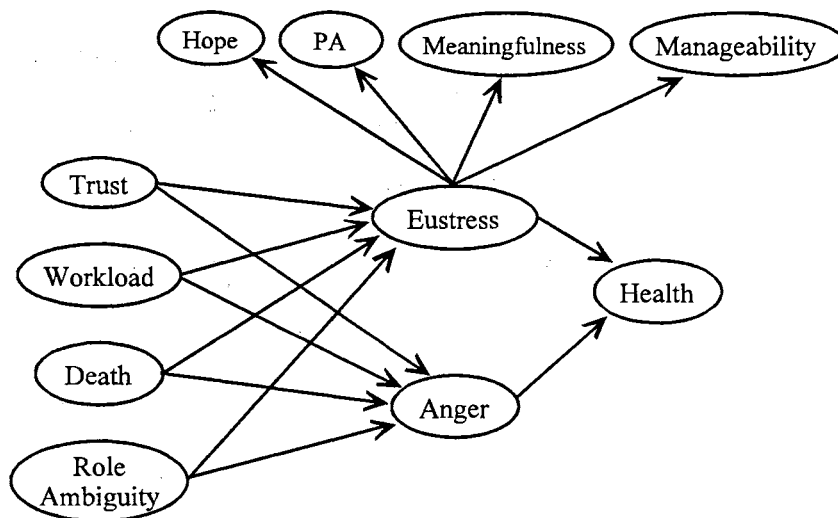
Figure 13: Model for Structural Analysis

Structural Analyses

A first-order CFA was conducted with the ten first-order latent variables of the revised model and their 44 manifest indicators. All of the indicators loaded positively and significantly on their intended latent variables. Examination of both the RMSEA (.058) and ECVI (12.87) statistics indicated that the model represented a good fit to the data. The CFI was again relatively low at .80, but that continued to be expected with such a complex model. As a basis for calculation of T, $\chi^2 = 1,808.77$ with 1,130 degrees of freedom.

The correlations of the ten latent variables, taken from the PHI matrix, are presented in Table 10. The four latent variables indicators of eustress continued to "hang together" well. The strongest correlation occurred between the variables "meaningfulness" and "manageability" (.90), and the next highest correlation was between "meaningfulness" and "hope" (.76); consequently, multicollinearity concerns were not warranted. The strongest correlation with the outcome variable "health" occurred with the variable "hope" (.52); and the stressor of interest, "trust," was most strongly correlated with "manageability" (.47). Two other stressors also found their strongest correlations with "manageability," "workload" (-.57) and "role ambiguity" (-.64). The directions of all the relationships were consistent with the hypotheses except for the variable "death." The direction of the relationship between "death" and the positive indicators was positive, and negative between "death" and "role ambiguity." The relationship between "death" and "hope" was both positive and significant.

Before analyzing the complete structural model, a second baseline model was run that incorporated the second-order factor "eustress" in order to obtain the zero-order correlations between "eustress" and the other first-order variables in the model. These correlations are also reported in Table 10. All four of the first-order indicators of "eustress" loaded positively and significantly on the second-order factor. "Eustress" was significantly correlated with all of the first-order variables, and all of the relationships were in the expected direction except the variable

"death," which is positive. "Eustress" was most strongly correlated with "role ambiguity" (-.70), "trust" (.60), and "health" (.54).

The complete structural model was submitted to LISREL 8.20 for analysis. In order to identify the variable "eustress," the latent variable indicator "manageability" was used as a reference variable (equation: manageability = 1*eustress). The effect of this was to fix the pattern coefficient of the variable "manageability" for its loading on the second-order factor "eustress" to 1.00. For identification purposes, the error variance of each of the exogenous variables ("role ambiguity," "trust," "workload," "death/dying") was set to 1.0. Fixing the loading of one of its manifest indicators to 1.0 identified each of the endogenous variables.

Table 10: Correlations Among Latent Variables Included in the Structural Model[a]

	1	2	3	4	5	6	7	8	9	Eustress[b]
1. Health										0.54*
2. Trust	0.07									0.60*
3. Hope	0.52*	0.23*								
4. PA	0.20*	0.24*	0.45*							
5. Meaningfulness	0.41*	0.33*	0.76*	0.57*						
6. Manageability	0.34*	0.47*	0.65*	0.45*	0.90*					
7. Anger	-0.06	-0.12	-0.21*	-0.30*	-0.48*	-0.49				-0.32*
8. Workload	0.03	-0.08	-0.09	-0.09	-0.23*	-0.57*	0.47*			-0.33*
9. Death	0.09	0.13	0.31*	0.06	0.13	0.10	0.05	0.21*		0.22*
10. Role Ambiguity	-0.28*	-0.26*	-0.60*	-0.36*	-0.56*	-0.64*	0.26*	0.34	-0.05	-0.70*

* $p < .05$
[a] Correlations from the ten first-order latent variables were obtained from the measurement model.
[b] Correlations with eustress were obtained from a second baseline model.

Three additional models were run that in turn used "hope," "meaningfulness," and "PA" as the reference variables for eustress. The results were the same regardless of which variable was used as a reference, establishing the stability of the results. Subsequent structural models used "manageability" as the reference variable. The SIMPLIS code for the structural model with "manageability" as the reference for eustress is presented in Table 11. The factors, associated items, and pattern coefficients for this model are presented in Table 12.

The analyses to this point confirmed the effectiveness of the measures used for the one second-order and ten first-order factors included in the final structural model. Evaluation of the subsequent structural models involved specifying the order and direction of hypothesized relationships between these variables in an attempt to confirm whether the significance and direction of these relationships was consistent with the proposed theory.

A series of competing structural models was run to test Hypotheses 2-6, and the results are presented in Table 13. Model 1 was the hypothesized structural model. Model 2 allowed the residual errors of "eustress" and "anger" to correlate, which tested the assumption that there are other common predictors of eustress and anger that were not included in the model. Model 3 added a direct path from "trust" to "health" in Model 2 in order to test Hypothesis 6 and confirm that the direct relationship between "trust" and "health" is nonsignificant.

Table 11: SIMPLIS Code for Structural Model

```
observed variables:
HEALTH1 HEALTH2 HEALTH3 HEALTH4
TRUST1 TRUST2 TRUST3 TRUST4 TRUST5 TRUST6
WORK1 WORK2 WORK3 WORK4
DEATH1 DEATH2 DEATH3
RA1 RA2 RA3 RA4 RA5
MEAN1 MEAN2 MEAN3 MEAN4
MANAG1 MANAG2 MANAG3 MANAG4 MANAG5
HOPE1 HOPE2 HOPE3 HOPE4 HOPE5 HOPE6
ANGER1 ANGER2 ANGER3
POSA1 POSA2 POSA3 POSA4 POSA5 POSA6 POSA7 POSA8 POSA9 POSA10
SPSS-DATA from file c:\spssdata\discov8.sav
sample size: 158
latent variables:  Eustress Trust Health Mean Manag Hope Pa
Anger Roleam Work Death
equation: RA1 = Roleam
equation: RA2 = Roleam
equation: RA3 = Roleam
equation: RA4 = Roleam
equation: RA5 = Roleam
set the error variance of Roleam to 1.0
equation: WORK1 = Work
equation: WORK2 = Work
equation: WORK3 = Work
equation: WORK4 = Work
set the error variance of Work to 1.0
equation: DEATH1 = Death
equation: DEATH2 = Death
equation: DEATH3 = Death
set the error variance of Death to 1.0
equation: TRUST6 = Trust
equation: TRUST5 = Trust
equation: TRUST4 = Trust
equation: TRUST3 = Trust
equation: TRUST2 = Trust
equation: TRUST1 = Trust
set the error variance of Trust to 1.0
equation: HEALTH4 = Health
equation: HEALTH3 = Health
equation: HEALTH2 = Health
equation: HEALTH1 = 1*Health
equation: MEAN1 = Mean
equation: MEAN2 = 1*Mean
equation: MEAN3 = Mean
equation: MEAN4 = Mean
equation: MANAG1 = Manag
equation: MANAG2 = 1*Manag
equation: MANAG3 = Manag
```

equation: MANAG4 = Manag
equation: MANAG5 = Manag
equation: HOPE1 = 1*Hope
equation: HOPE2 = Hope
equation: HOPE3 = Hope
equation: HOPE4 = Hope
equation: HOPE5 = Hope
equation: HOPE6 = Hope
equation: POSA1 = 1*Pa
equation: POSA2 = Pa
equation: POSA3 = Pa
equation: POSA4 = Pa
equation: POSA5 = Pa
equation: POSA6 = Pa
equation: POSA7 = Pa
equation: POSA8 = Pa
equation: POSA9 = Pa
equation: POSA10 = Pa
equation: ANGER3 = 1*Anger
equation: ANGER2 = Anger
equation: ANGER1 = Anger
equation: Health = Eustress Anger
equation: Eustress Anger = Trust Work Roleam Death
equation: Manag = 1*Eustress
equation: Hope = Eustress
equation: Pa = Eustress
equation: Mean = Eustress
iterations = 2000
admissibility check = off
lisrel output: sc ss
path diagram
end of problem

Table 12: Factors, Associated Items, and Pattern Coefficients for the Structural Model

[1] TE = THETA EPSILON matrix, TC = THETA DELTA Matrix, PS = PSI matrix
[2] All of the first-order factor loadings are significant at $p < .05$.
(R) = Reverse scored
* $p < .05$
** fixed

Factor/Item		Completely Standardized Pattern Coefficients		Completely Standardized Residuals[1]	
		First order[2]	Second order	TE	PS
Eustress					0.47**
Hope (α = .84)			0.82*		0.33*
	definitely false (1) – definitely true (7)				
H1	If I should find myself in a jam, I could think of many ways to get out of it.	0.58		0.66	
H2	At the present time, I am energetically pursuing my goals.	0.62		0.62	
H3	There are lots of ways around any problem that I am facing now.	0.62		0.62	
H4	Right now, I see myself as being pretty successful.	0.69		0.52	
H5	I can think of many ways to reach my current goals.	0.81		0.34	
H6	At this time, I am meeting the goals I have set for myself.	0.76		0.42	
Meaningfulness (α = .67)			0.94*		0.12
ME1 (R)	Do you have the feeling that you don't really care about what goes on around you: ((very seldom (1) – very often (7))	0.53		0.72	
ME2	At work you have: ((no clear goals or purpose (1) – very clear goals and purpose (7))	0.58		0.67	
ME3 (R)	When you think about your present situation at work, you very often: ((feel how good it is to be alive (1) – ask yourself why you exist at all (7))	0.65		0.57	
ME4	How often do you have feelings that there's little meaning in the things you do in your daily work activities: ((always have this feeling (1) – never have this feeling (7))	0.54		0.71	

Factor/Item		Completely Standardized Pattern Coefficients		Completely Standardized Residuals[1]	
		First order[2]	Second order	TE	PS
Eustress					
Manageability (α = .60)			0.92*		0.15
MA1	When you think of the challenges you are facing at work, do you feel that: ((you can find a solution (1) – there is no solution (7))	0.53		0.71	
MA2	At work, do you have the feeling that you are being treated unfairly: ((very often (1) – very seldom or never (7))	0.46		0.79	
MA3	People you count on at work often disappoint you: ((never happens (1) – always happens (7))	0.36		0.87	
MA4	At work, if you have to do something that depends upon the cooperation of others, do you have the feeling that it: ((surely won't get done (1) – surely will get done (7))	0.57		0.67	
MA5	When you think about problems you are currently having at work, do you tend to: ((keep worrying about it (1) – say "ok", that's that, I have to live with it (7))	0.41		0.83	
Positive Affect (PA) (α = .90)			0.55*		0.70*
	Very slightly or not at all (1) – extremely (5)				
PA1	Interested	0.74		0.45	
PA2	Excited	0.69		0.53	
PA3	Strong	0.56		0.68	
PA4	Enthusiastic	0.81		0.35	
PA5	Proud	0.74		0.45	
PA6	Alert	0.62		0.62	
PA7	Inspired	0.79		0.38	
PA8	Determined	0.61		0.63	
PA9	Attentive	0.66		0.57	
PA10	Active	0.62		0.61	
Health (α = .87)					
			0.50*		0.76*
	definitely false (1) – definitely true (7)				
HEALTH1	According to the doctors I've seen, my health is now excellent.	0.78		0.39	
HEALTH2	I feel better now than I ever have before.	0.63		0.61	
HEALTH3	I'm as healthy as anybody I know.	0.86		0.26	
HEALTH4	My health is excellent.	0.91		0.17	

Factor/Item		Completely Standardized Pattern Coefficients		Completely Standardized Residuals[1]	
		First order[2]	Second order	TE	T
Trust (α = .79)					
	strongly disagree (1) – strongly agree (7)				
TRUST1 (R)	If I had my way, I wouldn't let my supervisor have any influence over issues that are important to me.	0.48			0.77
TRUST2	I am comfortable discussing with my supervisor my ideas for improvement in the workplace.	0.72			0.48
TRUST3	I would be willing to let my supervisor have complete control over my future in this hospital.	0.29			0.92
TRUST4 (R)	I really wish I had a good way to keep an eye on my supervisor.	0.48			0.77
TRUST5	I am comfortable discussing with my supervisor concerns I have about our working relationship.	0.82			0.32
TRUST6	I am comfortable discussing with my supervisor concerns I have about my ability to do my job.	0.81			0.35
Role Ambiguity (α = .80)					
	definitely false (1) – definitely true (7)				
RA1	I feel certain about how much authority I have.	0.43			0.81
RA2	I know I have allocated my work time properly.	0.52			0.73
RA3	I know what my responsibilities are.	0.77			0.40
RA4	I know exactly what is expected of me at work.	0.92			0.15
RA5	I understand what needs to be done at work.	0.8			0.36
Workload (α = .68)					
	never (1) – very frequently (7)				
WORK1	Too many non-nursing tasks are required, such as clerical work.	0.34			0.88
WORK2	I don't have enough time to provide emotional support to a patient.	0.51			0.74
WORK3	I don't have enough time to complete all of my nursing tasks.	0.7			0.51
WORK4	There is not enough staff to adequately cover the unit.	0.77			0.39

Factor/Item		Completely Standardized Pattern Coefficients			Completely Standardized Residuals[1]	
		First order[2]	Second order	PS	TE	TD
Death (α = .67)						
	never (1) – very frequently (7)					
DEATH1	I witness the death of a patient.	0.77				0.41
DEATH2	I observe a patient suffering.	0.56				0.69
DEATH3	I listen to a patient talking about his/her approaching death.	0.59				0.65
Anger (α = .77)			0.13	0.78**		
	never (1) – very frequently (7)					
ANGER1	I feel critical of others	0.61			0.62	
ANGER2	I feel easily annoyed or irritated	1.03			-0.07	
ANGER3	I have temper outbursts I cannot control	0.57			0.67	

Table 13: Results of the Structural Analysis

Model 1: Completely Standardized Factor Loadings: Tests of Hypothesized Relationships

	Eustress	Anger	Trust	Health	Fit Statistics
Meaningfulness	0.94*				$\chi^2 = 1{,}875.59^*$
Manageability	0.92*				df = 1,155
Hope	0.82*				
PA	0.55*				RMSEA = .060*
Eustress			0.17*	0.50*	(.055, .065)
Anger			-0.08	0.13	ECVI = 13.07
Workload	-0.14	0.43*			(12.36, 13.84)
Role Ambiguity	-0.57*	0.08			CFI = .79
Death	0.20*	-0.06			$T = .964$

Model 2: Completely Standardized Factor Loadings: Residual Errors of Eustress and Anger Allowed to Correlate

	Eustress	Anger	Trust	Health	Fit Statistics
Meaningfulness	0.95*				$\chi^2 = 1{,}864.77^*$
Manageability	0.92*				df = 1,154
Hope	0.80*				
PA	0.56*				RMSEA = .060*
Eustress			0.17*	0.53*	ECVI = 13.02
Anger			-0.07	0.18	CFI = .79
Workload	-0.10	0.44*			$T = .970$
Role Ambiguity	-0.58*	0.08			
Death	0.19*	-0.03			

Model 3: Completely Standardized Factor Loadings: Test of Paths Hypothesized to be Zero

	Eustress	Anger	Trust	Health	Fit Statistics
Meaningfulness	0.95*				$\chi^2 = 1{,}862.86^*$
Manageability	0.92*				df = 1,153
Hope	0.80*				
PA	0.56*				RMSEA = .060*
Eustress			0.19*	0.60*	ECVI = 13.01
Anger			-0.06	0.19	CFI = .79
Trust				-0.13	$T = .971$
Workload	-0.10	0.44*			
Role Ambiguity	-0.57*	0.09			
Death	0.19*	-0.03			

Inspection of the fit indices for Model 1 indicated that the Model provided a reasonably good fit to the data. The value RMSEA of .06 was significant and fell within a relatively tight 90 percent confidence interval (.055 - .065). The ECVI value of 13.07 was good and fell within its 90 percent confidence interval, and the CFI value of .79 was as good as any of the models evaluated so far. The ratio of χ^2 degrees of freedom was an acceptable 1.62, and $T = .964$.

All of the latent variable indicators of eustress loaded positively and significantly on the second-order factor. Hypothesis 2 stated that the relationship between "trust" and "eustress" would be positive and significant, and Hypothesis 3 stated that the relationship between "trust" and "anger" (distress) would be negative and significant. Inspection of the factor loadings showed that the relationship between "trust" and "eustress" was positive and significant, providing support for Hypothesis 2. The relationship between "trust" and "anger" was negative and nonsignificant, so Hypothesis 3 is not supported. Hypothesis 4 stated that the relationship between "eustress" and "health" would be positive and significant, while Hypothesis 5 stated that the relationship between "distress" and "health" would be negative and significant. The relationship between "eustress" and "health" was positive and significant, providing support for Hypothesis 4. Hypothesis 5 was not supported because the relationship between "anger" and "health" was not significant and was unexpectedly positive. It is unclear why the direction of the relationship between "health" and "anger" changed in the structural model, because the zero-order correlation between these two variables, while still non-significant, was negative as expected.

Model 2 allowed the residual errors of "eustress" and "anger" to correlate to test the assumption that there might be other common predictors of eustress and anger not included in the model. The correlation between the residuals of "eustress" and "anger" was significant (-.23). All of the conclusions about substantive relationships between variables supported by Model 1 remained unchanged in this model. The fit statistics were nearly identical with Model 1, with a slight

improvement of T to .97. A χ^2 difference test between Models 2 and 1 (10.82, 1df) favors the more complex Model 2 that allows the residual errors of eustress and anger to correlate.

The presence of correlated residuals between "eustress" and "anger" suggested that there are other significant common predictors of these variables (i.e., stressors) that were not included in the present model. Because of the strength of the relationship between eustress and health, it is unlikely that the inclusion of additional stressors as control variables would affect the significance of this relationship. Yet because the relationship between "trust" and "eustress" was marginally significant ($t = 1.96$), the inclusion of additional stressors might affect the significance of this relationship.

The final hypothesis is a test that satisfies James et al.'s (1982) condition number 10, which requires that constrained parameters are confirmed to be zero. In this study, the only theoretically significant path hypothesized to be zero was between "trust" and "health." To test Hypothesis 6, Model 3 was evaluated including an extra path between "trust" and "health." The results of this model are also found in Table 13. The path between "trust" and "health" was negative and not significant, and there was no change in the significant paths from Model 1. Although it was not hypothesized, the direction of the relationship between "trust" and "health" would have been reasonably expected to be positive. Interestingly, the strength of the positive relationship between eustress and health actually increased in this model. While the fit statistics between Models 2 and 3 were nearly identical, a χ^2 difference test between the two models (1.91, 1df) favored the more parsimonious Model 2, thereby providing additional support for Hypothesis 6, which confirms a nonsignificant direct relationship between trust and health. A summary of the results of the hypotheses tests is presented in Table 14.

Table 14: Summary of Hypotheses Tests

H1:	The relationship between the separate constructs of eustress and distress is nonrecursive and negative in both directions.	**Partially Supported**: A two-factor second-order model was confirmed but did not fit the data as well as a one-factor model. The hypothesized nonrecursive relationship could not be tested
H2:	There is a positive relationship between trust in the supervisor and eustress.	**Supported**
H3:	There is a negative relationship between trust in the supervisor and distress.	**Not Supported**: The single variable "anger" served as a proxy for distress.
H4:	There is a positive relationship between eustress and an individual's perception of health.	**Supported**
H5:	There is a negative relationship between distress and an individual's perception of health.	**Not Supported**: The relationship between "anger" and "health" was nonsignificant.
H6:	There is no direct relationship between trust in the supervisor and an individual's perception of health after accounting for eustress and distress.	**Supported**

CHAPTER 5

CONCLUSION AND IMPLICATIONS

Summary Discussion of Results

This dissertation demonstrated that the positive stress response may best be represented by a higher-order construct, eustress, and also demonstrated the effectiveness of several established first-order variables as indicators of this second-order construct. Although the theoretical justification for a similar higher-order construct for distress was provided, the empirical justification for this construct was not established in this study. The positive psychological states used as indicators of eustress in this study were much more effective in establishing this construct than the negative psychological states were at establishing distress. As a result, the full two-factor model of eustress and distress could not be tested. Although the hypothesized relationship between eustress and distress could not be tested, the other substantive relationships in the model were tested by using the first-order variable "anger" as a proxy for distress while retaining the second-order structure of eustress.

It was demonstrated that trust in the supervisor was a legitimate interpersonal demand in this sample of hospital nurses in that it was sufficient to elicit a significant response even in the presence of other significant stressors. Trust in the supervisor was positively related to eustress, but the negative relationship between trust and the single indicator for distress was not significant. As expected, the willingness to be vulnerable was related to an aspect of engagement in work represented by the positive psychological states used to represent eustress. The willingness to be vulnerable related a negative but nonsignificant level of anger and hostility in this sample of nurses. Because this study was unable to demonstrate that the interpersonal demand represented by trust produces a significant negative stress response while simultaneously producing a positive stress response, trust as a stressor may be less neutral than anticipated.

Another important finding of this study was the strong positive relationship between eustress and the perception of health in this sample of nurses. The only indicator other than the four positive psychological states and eustress that had a significant zero-order correlation with health was "role ambiguity" (-.28). The variable "anger" had significant zero-order correlations with eustress (-.32) and the stressors "workload" (.47) and "role ambiguity" (.26). Contrary to expectations, the relationship between anger (distress) and health in the structural model was not significant. Although a strong positive relationship of .43 between "workload" and "anger" was confirmed in the structural model, this distress response was not strong enough in this sample of nurses to elicit a significant effect in their perception of health. Finally, the direct relationship between "trust" and "health" was confirmed to be nonsignificant.

While all the zero-order correlations between health and the four indicators of eustress were significant, none was high enough to elicit concerns about multicollinearity. The strongest zero-order correlation with health occurred with the variable "eustress" (.54) and its indicator "hope" (.52), and the weakest occurred with the variable "positive affect" (.20). "Role ambiguity" had a strong zero-order correlation with both eustress (-.70) and its indicator "hope" (-.60), and this stressor was significantly correlated with every other variable in the study except the stressors "death" and "workload." This finding suggests a potential specific link between role ambiguity and health through the eustress of hope. While the focus of this study was on the relationship between trust and eustress, these findings suggest that to promote eustress, supervisory efforts may be more effectively directed at clarifying roles for employees than in building trust.

Although not part of the formal hypotheses, the relationships between the stressors used as controls and eustress and anger are also interesting. The expected direction of the relationship between these stressors should be negative for "eustress" and positive for "anger." The variable "workload" performed in the directions expected but was only significant with "anger." This variable was more a measure of how effectively the individual could focus on the essential tasks

at work than a measure of the amount of workload. "Role ambiguity" also performed in the expected directions, but was only significant with "eustress." Contrary to expectations, the variable "death/dying" had a significant, positive relationship with "eustress" and a nonsignificant, negative relationship with "anger." When the nurses in this study were faced with the demand of dealing with death/dying in their patients, they apparently became significantly more engaged in their work.

Contributions to Research

The modeling of eustress and distress as second-order variables using established positive and negative psychological states as indicators had not been previously attempted. The primary explanation for this is the state of theory development concerning the concept of eustress and its relationship to distress. This study advanced the theory of both eustress and distress and operationalized an approach to the assessment of eustress previously suggested by Edwards and Cooper (1988).

The theory of eustress was advanced by developing support for the hypothesis that eustress is a psychological state that represents a degree of positive *response* to any given demand. This is a break from the common approach in the literature to view eustress and distress as opposite ends of a continuum and to treat eustress as simply the absence of distress. The theory presented here supports a view that eustress and distress are separate positive and negative constructs representing the response to a demand, and exposure to any work demand should simultaneously produce an independent degree of both eustress and distress.

The contrast between the view presented in this dissertation and the more common view is captured in a very recent article by Folkman and Moskowitz (2000). As this study does, they accept the fact that positive and negative affect can co-occur during a stressful period of time. In contrast to the theory presented here, they suggest that positive and negative responses are produced by different events (stressors). In contrast to this study, the effects of the positive

response are viewed as a coping strategy, a way to adapt to distress and its negative effects. While it is encouraging to see attention given to the effects of positive psychological states, this approach simply reinforces the prevailing primacy of distress and the associated psychology of pathology. A legitimate positive psychology will shift from an exclusive focus on pathology to the independent and direct effects of positive psychological states on important indicators of well-being as well as disease (Seligman & Csikszentmihalyi, 2000). The theory of eustress presented in this dissertation thus makes a legitimate contribution to the advancement of a positive psychology.

The importance of studying eustress lies in its relationship to health. Similar to stress, health has also been viewed as a unidimensional construct representing the absence of the negative, that being disease. Separating the positive and negative stress responses and examining their independent effects on health presented a more holistic model of stress in this study. The relationship between eustress and health had been suggested but not often assessed in the literature. For example, a recent review of the literature stated that "positive emotional states *may* promote healthy perceptions, beliefs, and physical well-being itself" (Salovey, Rothman, Detweiler, & Steward, 2000, p. 110, emphasis added). This study provided a much-needed contribution to the literature by demonstrating a significant relationship between a multiple indicator assessment of positive states and healthy perceptions in a sample of relative experts on health.

This study limited its definition of the stress response to psychological states. Theoretically, any positive psychological state could serve as an indicator of a degree of positive response. The positive psychological states used in this study as indicators of eustress were selected for their ability to represent an aspect of engagement in work, which the literature suggested was an important characteristic of the eustress response. Engaged workers should be enthusiastically involved in and pleasurably occupied by the demands of the work at hand.

The positive psychological states examined in this study appear to be good indicators of eustress in this sample of nurses. "Meaningfulness," "manageability," "hope," and "positive affect" were all significantly correlated with each other, but not so much as to warrant concerns about multicollinearity. Each of theses indicators also loaded significantly on the second-order factor eustress. Accordingly, they may be good indicators of the state of active engagement in work commonly associated with eustress. With the exception of positive affect, each of these indicators makes its debut in the work stress literature in this study. The indicator with the strongest factor loading on eustress was "meaningfulness," which was defined as the extent to which one feels that work makes sense emotionally, that problems and demands are worth investing energy in, are worthy of commitment and *engagement*, and are challenges that are welcome.

The state of active engagement represented by eustress was most negatively associated with "role ambiguity." This suggests that future research on eustress in hospital nurses should continue to account for the effect of role ambiguity, especially if indicators of engagement are used as in this study. Even if the effect of role ambiguity is not of interest, it should be included in any study of eustress in nurses as a control variable.

An extension to our knowledge of trust also emerged from this study. This was the first study to suggest that trust in the supervisor was a significant interpersonal demand that could elicit a stress response in an individual. The significant relationship between trust and the positive stress response demonstrated in this study contributes additional justification for the importance of studying trust in the workplace. Trust in the supervisor, senior management, and coworkers probably represents significant interpersonal demands that merit additional consideration, especially in studies of eustress. Because the findings also suggested that significant predictors of eustress and anger were not included in the model, the efficacy of trust as a stressor requires verification.

This study also provided an additional test of the Mayer and Davis (1999) trust scale developed to measure trust as an attitude rather than as trustworthiness (an attribution). This is an important new scale that has yet to gain widespread acceptance. With slight modifications to reflect the sample of nurses in this study, the scale performed adequately. "Trust" exhibited a significant positive zero-order correlation with all of the positive indicators. The strongest correlation was with the variable "manageability" (.47), which operationalized the extent to which the nurses in the sample perceived that resources at their disposal were adequate to meet the demands of their work. "Trust" was significantly correlated with only one stressor, "role ambiguity" (-.26). Because of the strength of the relationship between "role ambiguity" and "eustress," the relationship of trust to these variables warrants continued consideration.

The holistic model of stress presented in this study is an important departure from established models of stress. The development of a model of stress that incorporates eustress is important because there may be little incremental understanding we can gain from the simplistic model of stress, distress, and disease. The comprehensive hypothesized holistic model of eustress and distress as second-order constructs in a reciprocal relationship was strongly suggested by the data but not confirmed. Two separate higher-order factors were confirmed as hypothesized, but the two-factor model failed a significance test against a unidimensional model. The higher-order factor "eustress" was incorporated in the structural model, and it behaved exactly as hypothesized.

There is every reason to believe that the holistic model of stress proposed by this study will be confirmed in future studies that are able to incorporate better indicators of distress (e.g., burn-out, psychosomatic symptoms) and overcome the sample size limitations of the present study. When these limitations are overcome and eustress and distress can be modeled in a reciprocal relationship as hypothesized, it is possible that the correlation of the residual errors between these factors that was found in this model will become nonsignificant. This is another way to say that

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"missing stressors" suggested by the correlated error terms may be the effect that eustress and distress have on each other.

There are several benefits to modeling the stress response as two separate higher-order factors. First, it is the most convincing way to demonstrate the hypothesized existence of two separate but correlated stress responses. A theoretical case for the existence of eustress could be established by examination of positive psychological states in comparison to negative psychological states and health, but the empirical case can only begin to be established with the use of higher-order factor models. A strong case for the eustress and distress will be established if future studies continue to establish the existence of underlying factors that *cause* a variety of positive and negative responses.

Second, since there is no established scale to measure eustress, the use of established positive psychological states as indicators of a higher-order factor is a practical way to establish the empirical validity of eustress and examine its behavior in relation to other variables. Any future study that incorporates this approach will be faced with the same issues of sample size and model complexity that proved challenging in this study, and structural equation modeling will continue to be the most effective data analytic approach. Yet once a set of positive psychological states has been consistently demonstrated to be the result of a higher-order factor, these states can be examined individually as proxies of eustress. At that point, the more common data analytic strategies should attract more researchers to the concept of eustress, thereby expanding knowledge of its theoretical and practical applications.

Contributions to Practice

For health care administrators recognizing that healthy workers are more productive workers, this study suggested that workers can have a positive response to even the most demanding work environments, and this positive response is significantly related to employee health. The nursing profession is a demanding profession by nature, but there were characteristics about this sample

of nurses that suggested possibly greater than normal demands. All of the nurses in this sample worked in hospitals that faced the threat of unionization by nurses. This suggests the possibility of a strong degree of dissatisfaction with and hostility toward the working conditions and management relations from the nurses in these hospitals. Approximately half of the nurses in this sample worked more than 40 hours per week. Half of the sample of nurses in this study worked in critical or intensive care units – environments more demanding than most workers will ever encounter.

Despite the demands of their work situation, the nurses reported a high degree of eustress as indicated by the positive psychological states hope, meaningfulness, manageability, and positive affect. The nurses in this study remained actively engaged in their work, and this positive response to the demands they faced showed a significant relationship to their own well-being. The stressor "workload," which indicated the individual's ability focus on the essential aspects of their work, found its only positive association with "anger" (.43). This suggests that the inability to focus on the essential tasks of the job made the nurses angry about their situation, but it did not detract from their active and pleasurable engagement in this most demanding work.

In this sample of nurses, the stressor with the strongest negative relationship to eustress was "role ambiguity" (-.57). While this study did not present a case for *eustressor* management, hospital administrators and other managers should not overlook the negative effect of role ambiguity. Consideration of the indicators of eustress used in this study results in more specific recommendations for action.

For example, consider the variable "hope." The ability to generate hope among an organiza-tion's members may be particularly important during radical change efforts, which the nurse in this sample were probably facing. When people believe that their actions will lead to positive results, they may be more willing to accept difficult and uncertain challenges. Health care administrators can generate hope by establishing goals that are meaningful to all members,

allocating the organizational resources necessary for individuals to excel at their jobs and

maintaining a frequent and inspirational dialogue with their constituents (Huy, 1999).

An example of an organizational resource that may be important for generating hope is

information. In this study, "role ambiguity" had a significant negative zero-order correlation with

"hope" (-.26), which suggests that efforts to decrease role ambiguity should have a positive effect

on hope. Role ambiguity is the confusion a person experiences related to not understanding what

is expected, not knowing how to perform or change to meet new expectations, or not knowing the

consequences of failing to meet expectations (Nelson & Quick, 2000). Relationships between

nurses and their supervisors that are open and supportive can reduce role ambiguity and increase

the satisfaction experienced by nurses (Gray-Toft & Anderson, 1985). Health care administrators

who are easily accessible, actively share information regarding current as well as evolving

expectations with their constituents, and encourage their management staff to do the same should

establish a solid foundation for the generation of hope by lessening role ambiguity.

In addition to lessening role ambiguity, this type of open and supportive relationship with

subordinates would also facilitate the development of trust. Supervisors who listen to and share

information with subordinates may be more likely than those who don't to have their subordi-

nates make a favorable attribution concerning their benevolence toward them. This attribution is

essential in order for an attitude of trust to develop within a subordinate toward a supervisor. As

demonstrated in this study, trust in the supervisor appears to play a significant role in the

development of eustress.

While this may be one of the first studies to examine the role of eustress at work, the state of

active engagement in work represented by this construct merits additional consideration from

both health care administrators and other managers. Health care administrators should recognize

that the interpretation of and response to work demands could be positive as well as negative.

Accordingly, administrators and employees alike would benefit from programs designed to

identify and encourage engagement, or eustress, at work. In this sense, we would be moving

from a model of *preventive* distress management to one of *generative* eustress management.

An initial step in this effort might be to identify which aspects of the work employees find

most engaging, and then more importantly identify *why* individuals find the work pleasurable and

what administrators could do to enhance the positive aspects of the work experience. As a

specific example with respect to meaningfulness, why do they feel that work makes sense

emotionally, that problems and demands are worth investing energy in, are worthy of commit-

ment and *engagement*, and are challenges that are welcome? By doing so, administrators would

be demonstrating that their *employees* are worth investing energy in, are worthy of commitment

and engagement from managers, and that the challenges of improving the employee's work

experience are welcome. Administrators should also explore opportunities to improve policies,

procedures, and the physical work environment in an effort to enhance the employee's exposure

to work that they find engaging and to eliminate potential impediments to eustress.

Managers should not overlook the strong positive relationship between eustress and health

demonstrated by this study. This may be particularly important in a sample of health care

workers because the health of the health care worker can directly impact the delivery of care. In

order for the nurse to deliver the optimum service, she must herself be healthy. Because nurses

provide the majority of the care for hospital patients and the perception of how they are treated

while in the hospital is as important to patients as the technical quality of the care, nurses that

respond positively to the demands of the job can have a substantial impact on the image of a

hospital within the community.

Additionally, the health care worker plays a particularly important role in inspiring hope in

others. By raising a patient's level of hope, the health care professional's positive expectations

can have a concrete impact on the health of the patient. "The positive mood experience that

comes from a renewal of hope, particularly among those who are struggling with illness, reaps health benefits that cannot be underemphasized" (Salovey et al., 2000, p. 115.).

Limitations

The most important limitations of this study were sample size, fit of the model, performance of the indicators of distress, and design of the study. While adequate for simpler models involving more standard data analysis techniques, the resulting sample size of 158 imposed several restrictions on the analysis of the data and must be strongly considered in any interpretation of the results. The comprehensive hypothesized model prior to theory trimming was very complex, containing more estimated parameters than observations, which tends to make LISREL models unstable. A sample size of at least 225 was required to conduct a CFA containing all the variables in the comprehensive hypothesized model. The "theory trimming" accomplished by the first CFA conducted in this study represented a necessary compromise in order to obtain a model that could be subjected to subsequent LISREL analysis.

Although the model subjected to LISREL structural analysis estimated fewer parameters than the sample size, the resulting fit indices suggest that sample size also had a significant impact on model fit. Although RMSEA, ECVI, and T all indicated acceptable fit of the final structural model, the CFI indicated a substantial lack of fit. This measure of fit is sensitive to both small sample size and model complexity, and both of these were significant factors in this study. Examination of the modification indices for the final model also indicated that some of the manifest indicators might have been significantly correlated, which would also contribute to problems with fit. These conditions are not entirely unexpected in a complex model with many variables, even using established measures. The lack of parsimonious model fit is the primary reason why the results of this study must be interpreted with caution.

The weak performance of the indicators of distress employed in this study may be an important reason why the hypothesized second-order factor of distress that was confirmed along

with eustress in the first CFA lost its significance in a test against a unidimensional model. Although significantly correlated with other variables in the model, the four negative psychological states did not correlate well with each other; and job alienation was only significantly correlated with PA. Because most of the best indicators of distress are proprietary, which is why they were not selected for use in this study, with the exception of NA, these indicators all represented something of a compromise in the initial design of the study. While the use of multiple proprietary indicators of negative psychological states in studies with large sample sizes may discourage replication, it may be the only way to persuasively establish the second-order factor structure of distress.

In addition to the indicators of distress, the design of the study had several other shortcomings that have been previously acknowledged but merit further consideration. Care has been taken when discussing the results of the study not to imply the demonstration of causal links among the significant constructs. Because of the lack of true random sampling, cross-sectional design, and the use of a single informant, the best that can be said is that in *this sample* of nurses, there appears to be several significant *relationships* among the variables. This is an acceptable limitation, because the establishment of causal inferences was never a goal of this somewhat exploratory study.

Although the *stressors* employed in this study were specific to nurses, the theory of eustress, distress, and their relationship to health are legitimate in all populations of workers. Considerations of sample size and design not withstanding, the generic nature of the theory of stress response and the strong positive relationship between eustress and health suggest that this specific finding may be generalizeable in samples other than nurses.

Finally, the significance of the correlated residual error terms of eustress and anger suggests that important common predictors of eustress and anger were not hypothesized and included in the model. The most significant effect of this limitation is that the addition of an additional

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significant stressor in this model might have had an effect on the marginally significant relationship between trust and eustress. This "missing stressor" may have been the reciprocal relationship between eustress and distress, which was hypothesized but could not be tested.

Directions for Future Research

Future studies of eustress would benefit by developing the theory for additional psychological indicators of eustress and including additional indicators of distress (e.g., burnout) and significant outcome variables (e.g., performance). Once the hypothesized two-factor structure of eustress and distress is demonstrated, additional behavioral and physiological indicators of eustress and distress should be proposed and tested.

The differences and similarities between the engagement of eustress and familiar concepts such as satisfaction, involvement, and self-efficacy will also require empirical examination. Although it is never a requirement to demonstrate that distress is not simply dissatisfaction, it should be anticipated that there might be some that are skeptical that eustress does not differ significantly from job satisfaction. If the variable "hope: is retained as an indicator of eustress, it would be beneficial to include "self-efficacy" in the design of the study in order to differentiate these two goal-directed attitudes. The state of active engagement represented by eustress will also require differentiation from the concept of involvement from the literature on job design. Because initial studies should continue to focus on the stress *response*, this stimulus-centered research should be reserved to later studies. Before moving forward to identify the antecedents of eustress, it must first be persuasively established that this construct is indeed separate and distinct from distress. Better data collection methods (e.g., multiple informants) and additional dependent variables (e.g., performance) would also be necessary to begin to demonstrate that eustress is indeed a distinct construct.

Conclusions about the relationship between the stress response and health may be best established through studies using a longitudinal design and exploring the potential nonrecursive

relationships that may be present (e.g., between stress and health; between eustress and distress). In addition to modeling the positive and negative aspects of the stress response, future studies should also attempt to incorporate models of health that simultaneously include the presence of well-being as well as the absence of disease. The truly holistic model of the stress response will include multiple psychological, behavioral, and physiological indicators of eustress and distress, indicators of well-being and disease, additional outcome variables that capture the results of behavior (e.g., performance), nonrecursive relationships and accompanying instrumental variables, and individual difference variables as potential modifiers.

Finally, to complement the well-developed model of distress prevention (Quick et al., 2000), a model of eustress generation guided by research results will need to be developed to inform practicing managers how to recognize and facilitate the positive stress response in their employees. The wealth of accumulated knowledge on distress will shorten the time required to develop the understanding of eustress required to develop such a model. The temptation will be to take what we know about distress and assume that the eustress response will be the exact opposite. This would reduce eustress to the polar opposite, or absence of distress, and would be entirely inconsistent with the theory presented in this dissertation.

Several recent studies of the happy-productive worker hypothesis provide additional support for the need to develop a model of eustress generation. One study found that a pleasantness-based measure of dispositional affect predicted rated job performance, although the same was not true of positive affect in this study (Wright & Staw, 1999). A second set of studies found that psychological well-being was predictive of job performance for 47 human service workers (Wright & Cropanzano, 2000). Unfortunately, psychological well-being was operationalized as the absence of the negative (e.g., how often have you felt depressed or very unhappy), again supporting the prevailing primacy of distress as other recent studies attempting to shift to a positive psychology do as well (Folkman & Moskowitz, 2000).

Conclusion

This study provided a much-needed investigation of the positive stress response, eustress, and its relationship to distress, trust, and health. Exploring the concept of eustress presents a unique opportunity to bring fresh insight to both stress research and management practice. The nature, causes and consequences of eustress at work, as well as the complex interactions potentially present in this holistic model, should keep both researchers and managers engaged in pleasurable discovery for some time to come.

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Oklahoma State University
College of Business Administration

Work and Health
Survey

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Department of Management

Dear Nursing Staff Member:

In order to understand better the contribution of an individual's work attitudes to their well-being, I am conducting a research study. The ultimate benefit of this research is to learn more about what contributes to the health of the health care provider. This effort is part of my dissertation research.

I would sincerely appreciate your contribution to this research by answering as honestly as possible the questions in this booklet. I hope you will take the time now to complete this survey, seal it in the attached envelope, and return it to me by depositing it in the collection box I have provided. The questions should take approximately 10-20 minutes to answer. If you have any questions about the survey, I can be reached at (405) 744-8664 (work) or (405) 744-3055 (home).

While I am earnestly hoping for your help, you are under no obligation to participate in this study. You will find a statement of informed consent at the back of this booklet for your review.

The survey responses will be tabulated and provided to the management of your hospital in aggregate form. No individual responses will be identified. Be assured that your individual responses are completely anonymous. Your conscientious attention to this survey will help us learn more about how to have a positive impact on the practice of nursing. Thank you *very much* for taking the time to complete this survey.

Sincerely,

Bret L. Simmons
Department of Management
College of Business Administration

There are no correct or incorrect answers. Be sure to answer all the questions, but don't spend too much time on any one item.

SECTION A. Using the scale shown below, please indicate the extent to which you agree with each of the items.

		Strongly Disagree						Strongly Agree
1.	I'm always optimistic about my future.	1	2	3	4	5	6	7
2.	Generally speaking, I am very satisfied with this job.	1	2	3	4	5	6	7
3.	If something can go wrong for me, it will.	1	2	3	4	5	6	7
4.	I always look on the bright side of things.	1	2	3	4	5	6	7
5.	I frequently think of quitting this job.	1	2	3	4	5	6	7
6.	I hardly ever expect things to go my way.	1	2	3	4	5	6	7
7.	Things never work out the way I want them to.	1	2	3	4	5	6	7
8.	I am generally satisfied with the kind of work I do in this job.	1	2	3	4	5	6	7
9.	I'm a believer in the idea that "every cloud has a silver lining."	1	2	3	4	5	6	7

SECTION B. Using the scale shown below, please indicate how often you experience these situations in your present work unit.

		Never						Very Frequently
1.	Too many non-nursing tasks are required, such as clerical work.	1	2	3	4	5	6	7
2.	I don't have enough time to provide emotional support to a patient.	1	2	3	4	5	6	7
3.	I feel critical of others.	1	2	3	4	5	6	7
4.	I witness the death of a patient.	1	2	3	4	5	6	7
5.	I feel easily annoyed or irritated.	1	2	3	4	5	6	7
6.	I don't have enough time to complete all of my nursing tasks.	1	2	3	4	5	6	7
7.	I observe a patient suffering.	1	2	3	4	5	6	7
8.	There is not enough staff to adequately cover the unit.	1	2	3	4	5	6	7
9.	I have temper outbursts I cannot control.	1	2	3	4	5	6	7
10.	I listen to a patient talking about his/her approaching death.	1	2	3	4	5	6	7

SECTION C. The following are nine questions relating to various aspects of your situation at work. Please mark the number that expresses your answer, with numbers 1 and 7 being the extreme answers.

1. Do you have the feeling that you don't really care about what goes on around you:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Very seldom or never   Very often

2. When you think of the challenges you are facing at work, do you feel that:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

You can find a solution   There is no solution

3. At work you have:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

No clear goals or purpose   Very clear goals and purpose

4. At work, do you have the feeling that you are being treated unfairly:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Very often   Very seldom or never

5. When you think about your present situation at work, you very often:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Feel how good it is to be alive   Ask yourself why you exist at all

6. People you count on at work often disappoint you:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Never happens   Always happens

7. How often do you have feelings that there's little meaning in the things you do in your daily work activities:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Always have this feeling   Never have this feeling

8. At work, if you have to do something that depends upon the cooperation of others, do you have the feeling that it:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Surely won't get done   Surely will get done

9. When you think about problems you are currently having at work, do you tend to:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Keep worrying about it   Say "ok", that's that, I have to live with it.

SECTION D. Using the scale shown below, please select the number that best describes *how you think about yourself right now*. Please take a few moments to focus on yourself and what is going on in your life at this moment. Once you have this "here and now" mindset, go ahead and answer each item according to the following scale.

		Definitely False					Definitely True	
1.	If I should find myself in a jam, I could think of many ways to get out of it.	1	2	3	4	5	6	7
2.	I feel certain about how much authority I have.	1	2	3	4	5	6	7
3.	According to the doctors I've seen, my health is now excellent.	1	2	3	4	5	6	7
4.	I am worried about whether I am regarded as a success or failure.	1	2	3	4	5	6	7
5.	I feel better now than I ever have before.	1	2	3	4	5	6	7
6.	At the present time, I am energetically pursuing my goals.	1	2	3	4	5	6	7
7.	I feel self-conscious.	1	2	3	4	5	6	7
8.	There are lots of ways around any problem that I am facing now.	1	2	3	4	5	6	7
9.	I'm as healthy as anybody I know.	1	2	3	4	5	6	7
10.	I know I have allocated my work time properly.	1	2	3	4	5	6	7
11.	I am worried about what other people think of me.	1	2	3	4	5	6	7
12.	I know what my responsibilities are.	1	2	3	4	5	6	7
13.	My health is excellent.	1	2	3	4	5	6	7
14.	Right now, I see myself as being pretty successful.	1	2	3	4	5	6	7
15.	I know exactly what is expected of me at work.	1	2	3	4	5	6	7
16.	I am worried about looking foolish.	1	2	3	4	5	6	7
17.	I understand what needs to be done at work.	1	2	3	4	5	6	7
18.	I can think of many ways to reach my current goals.	1	2	3	4	5	6	7
19.	I feel concerned about the impression I am making.	1	2	3	4	5	6	7
20.	At this time, I am meeting the goals I have set for myself.	1	2	3	4	5	6	7

SECTION E. Using the scale shown below, please select the number that best describes how often each thought typically occurs to you while you are working.

		Never					Always	
1.	I am going to be injured	1	2	3	4	5	6	7
2.	What if no one reaches me in time to help?	1	2	3	4	5	6	7
3.	I'm going to have an accident.	1	2	3	4	5	6	7
4.	There's something wrong with me.	1	2	3	4	5	6	7
5.	Something awful is going to happen to me.	1	2	3	4	5	6	7
6.	Something will happen to someone I care about.	1	2	3	4	5	6	7

SECTION F. Think about your supervisor in your present job. For each statement, circle the number that best describes how much you agree or disagree with each statement.

		Strongly Disagree					Strongly Agree	
1.	If I had my way, I wouldn't let my supervisor have any influence over issues that are important to me.	1	2	3	4	5	6	7
2.	My supervisor can't get the approvals she/he needs in efforts to be creative.	1	2	3	4	5	6	7
3.	I am comfortable discussing with my supervisor my ideas for improvement in the workplace.	1	2	3	4	5	6	7
4.	My supervisor is held accountable for things that are not her/his fault.	1	2	3	4	5	6	7
5.	I would be willing to let my supervisor have complete control over my future in this hospital.	1	2	3	4	5	6	7
6.	My supervisor does not have the authority she/he needs to make needed improvements	1	2	3	4	5	6	7
7.	I really wish I had a good way to keep an eye on my supervisor.	1	2	3	4	5	6	7
8.	My supervisor does not trust me.	1	2	3	4	5	6	7
9.	My supervisor feels my performance is worse than it is.	1	2	3	4	5	6	7
10.	I am comfortable discussing with my supervisor concerns I have about our working relationship.	1	2	3	4	5	6	7
11.	My supervisor does not have the resources she/he requires to make needed improvements.	1	2	3	4	5	6	7
12.	My supervisor always seems to be looking over my shoulder.	1	2	3	4	5	6	7
13.	I am comfortable discussing with my supervisor concerns I have about my ability to do my job.	1	2	3	4	5	6	7

SECTION G

1. Below are seven boxes, each containing two circles. One circle represents your present job and the other circle represents yourself. The circles overlap in various degrees. At one extreme, (box 7) the two circles are separate, representing you being separate from your present job. At the other extreme (box 1) the two circles are totally overlapping, representing you being totally immersed in your present job. Select the box which most accurately depicts your relationship to your present job and circle the appropriate number
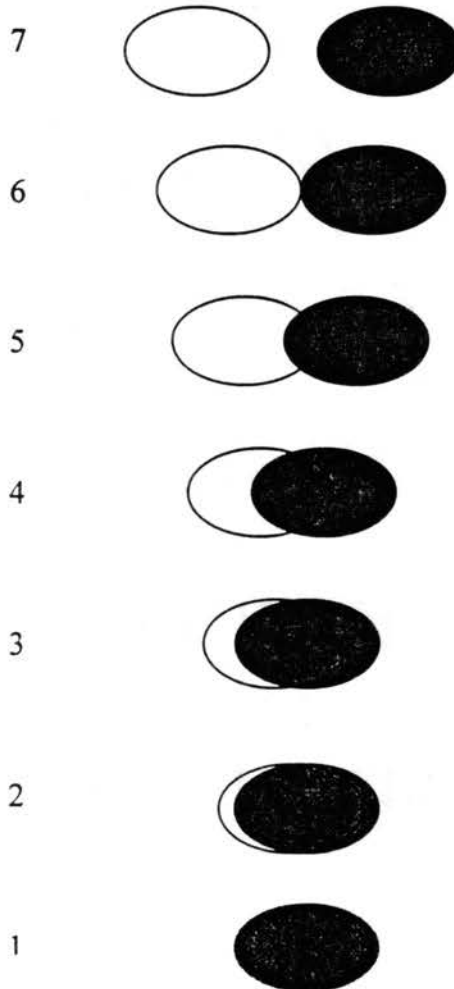
2. Below are seven diagrams. In each diagram, there is a person, representing yourself and a desk, representing your present job. The figures are placed at different distances from each other, depicting how close or far one is from one's job. Distance in the diagram does not represent physical distance from the job. Instead, being close to one's job implies that the job is central to one's life and being far from one's job implies that the job is not central to one's life. In your opinion, how far are you from your present job? Circle the appropriate number.
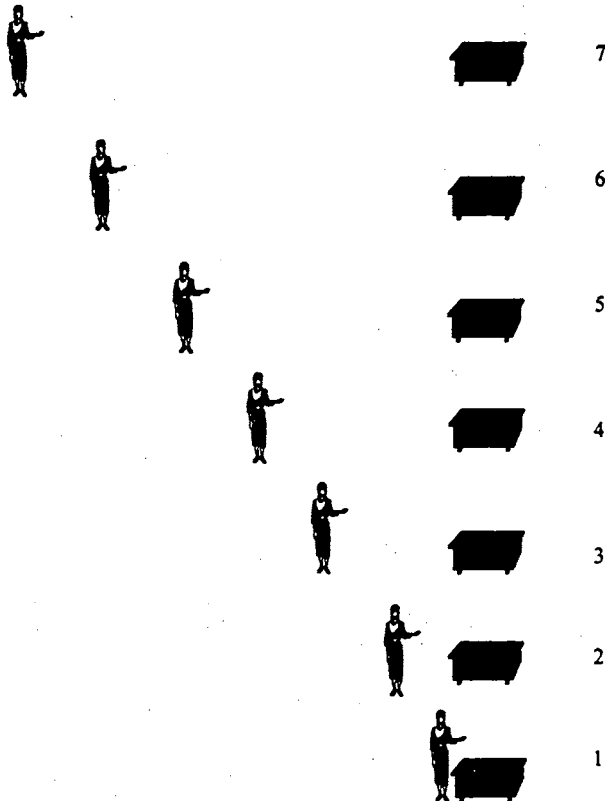
SECTION H. This scale consists of a number of words that describe different feelings and emotions you may have at work. Read each item and then mark the appropriate answer in the space next to the word. Indicate to what extent you feel this way right now, that is, at the present moment.

1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	extremely

1.	Interested	_____	11.	Irritable	_____
2.	Distressed	_____	12.	Alert	_____
3.	Excited	_____	13.	Ashamed	_____
4.	Upset	_____	14.	Inspired	_____
5.	Strong	_____	15.	Nervous	_____
6.	Guilty	_____	16.	Determined	_____
7.	Scared	_____	17.	Attentive	_____
8.	Hostile	_____	18.	Jittery	_____
9.	Enthusiastic	_____	19.	Active	_____
10.	Proud	_____	20.	Afraid	_____

SECTION I. Please answer the following questions by placing a check (√) on the line in front of the answer chosen.

1. What type of nurse are you?

____ Registered Nurse
____ Licensed Practical Nurse

2. Gender:

____ Female
____ Male

3. Age:

____ Less than 25 years
____ 25 to 34
____ 35 to 44
____ 45 to 54
____ 55 to 64
____ 65 +

4. Do you practice in an intensive care/critical care area?

____ Yes
____ No

5. What is the highest educational degree you have earned?

___ Diploma
___ Associate Degree
___ BS/BSN
___ MS/MSN
___ Ed.D
___ Ph.D.
___ Other (please specify_____)

6. How long have you been a nurse?

___ Less than 1 year
___ 1 to 2 years
___ 3 to 5 years
___ 6 to 10 years
___ 11 to 15 years
___ more than 15 years

7. How long have you been employed at this hospital?

___ Less than 1 year
___ 1 to 2 years
___ 3 to 5 years
___ 6 to 10 years
___ 11 to 15 years
___ more than 15 years

8. How long have you been in your current nursing position?

___ Less than 1 year
___ 1 to 2 years
___ 3 to 5 years
___ 6 to 10 years
___ 11 to 15 years
___ more than 15 years

9. Average number of hours worked per week as a nurse at this hospital:

___ Less than 20
___ 21 to 30
___ 31 to 40
___ 41 to 50
___ 51 or more

10. In the past *six months*, how many days have you been absent from work for reasons related to <u>your health</u> (e.g you were sick or needed to see a doctor)?

Number of days absent: _____

You are finished! THANK YOU for your time.

<u>Instructions for returning the survey</u>:
- **Please fold your completed survey in half lengthwise, place it inside the attached envelope, and seal the envelope.**
- **Write the word "HOPE" across the seal (so we can ensure your views remain confidential) and place the envelope containing your completed survey in the box <u>I have provided</u> labeled "Work and Health Surveys".**

STATEMENT OF INFORMED CONSENT

You are under no obligation to participate in this study. Your completing and returning the survey will be taken as evidence of your willingness to participate and your consent to have the information used for the purposes of the study.

To ensure confidentiality, only averages and other descriptive statistics will be reported in any publication. Bret Simmons will securely store the completed surveys for a period of at least one-year, after which they may be destroyed by shredding. Summaries of the data and descriptive statistics will be stored on his home computer indefinitely. Bret Simmons will approve all requests for access to the data for research purposes only. This is done as part of an investigation entitled "Eustress at Work: Accentuate the Positive."

Participation is voluntary, and there is no penalty for refusal to participate. You are free to withdraw your consent and participation in this study at any time without penalty. You are not obligated to contact anyone if you decide not to participate.

You may contact Bret Simmons at (405) 744-8664 or Dr. Debra Nelson at (405) 744-5202 if you have any questions. You may also contact Gay Clarkson, IRB Executive Secretary, 203 Whitehurst, Oklahoma State University, Stillwater, OK 74078, telephone number: (405) 744-5700.

As a final step to ensure your complete anonymity, you will not be asked to provide your signature certifying that you have read and understood the above statement of informed consent.

DATE: 12-07-98   **IRB #: BU-99-011**

Proposal Title: TRUST, EUSTRESS, AND HEALTH AT WORK

Principal Investigator(s): Debra L. Nelson, Bret L. Simmons

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

The Principal Investigator(s) may wish to use the term "anonymous" rather than confidential since there are no definite identifiers collected. The inclusion of the informed consent statement at the end of the questionnaire is very good.

Signature: Date: December 7, 1998

Carol Olson, Director of University Research Compliance
cc: Bret L. Simmons

VITA

Bret L. Simmons

Candidate for the Degree of

Doctor of Philosophy

Thesis: EUSTRESS AT WORK: ACCENTUATING THE POSITIVE

Major Field: Business Administration

Biographical:

Personal Data: Born in Wichita, Kansas, on June 24, 1961, the son of Henry L. and Alyce Rae Simmons.

Education: Graduated from East Central High School, Tulsa, Oklahoma in May 1979. Received an Associate of Applied Science degree in Logistics from the Community College of the Air Force in 1988; a Bachelor of Science degree in Management from Park College, Parkville, Missouri, in 1992; and a Masters in International Management degree from Whitworth College, Spokane, Washington, in 1994. Completed the requirements for the Doctor of Philosophy degree in Business Administration at Oklahoma State University in December, 2000.

Experience: Began work for McDonald's Corporation at the age of 16 and worked a variety of jobs for the corporation for the next 9½ years, holding the position of unit manager for the last three of those years. Joined the United States Air Force (USAF) in 1987 and served as a Communications Systems Program Manager. Left the USAF in 1994 as a Staff Sergeant, having served tours of duty in South Korea and Spokane, Washington. Created and served in the position of Federal Sales Manager for Telect, Inc. in Spokane, Washington from December 1994 until July of 1995. Began work on a doctoral degree at Oklahoma State University in August of 1995, working part time teaching classes in management until July of 1999. Currently hold the position of Assistant Professor of Business Administration in the School of Management, University of Alaska Fairbanks, since August of 1999.

Professional Memberships: Academy of Management, American Psychological Association, Western Academy of Management, Institute for Operations Research and the Management Sciences.