

2006

# Effects of trait anxiety and cognitive appraisals on emotional reactions to psychological and physical stressors

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Effects of Trait Anxiety and Cognitive Appraisals on Emotional Reactions to  
Psychological and Physical Stressors

by

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A dissertation submitted in partial fulfillment  
of the requirements for the degree of  
Doctor of Philosophy  
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Date of Approval:  
September 11, 2006

Keywords: stress reactions, psychological threat, physical danger, coping, model

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## Dedication

To Firas, for your unwavering resolve to help me navigate the rough seas of the past 33  
year.

## Acknowledgments

The mere idea of writing an acknowledgment section was daunting to me, for I have hundreds of humans and non-humans to thank for helping me get through this part of my journey. I am indebted to my advisor and mentor, Dr. Spielberg for his unwavering belief in me throughout my academic formative years. I thank my dissertation committee, Drs. Brannick, Kinder, Spector, and Rottenberg, for their academic and personal support, flexibility, and compassion.

I also thank Dr. Phares for gently pushing me to actualize the potential and pursue the dream; Dr. Brannick for teaching me how to critically think and making me critically think about teaching.

My gratitude goes out to my friends, colleagues, research assistants, and students. Thank you all for the positive energy.

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# Effects of Trait Anxiety and Cognitive Appraisals on Emotional Reactions to Psychological and Physical Stressors

Qutayba Abdullatif

## ABSTRACT

This study investigated the effects of individual differences in trait anxiety on cognitive appraisals and emotional reactions to stressful situations. Specifically, the effects of trait anxiety on the evaluation of psychological and physical threats to well-being were examined in relation to state-anxiety. To accomplish this goal, a proposed model consisting of elements from the Lazarus and Folkman Stress and Coping Model (1984) and Spielberger's State Trait distinctions is presented.

To our knowledge, this is the first proposed model to attempt to combine trait anxiety, primary and secondary appraisals, and state anxiety and to utilize path analytic models in assessing empirical and theoretical fit.

Results from mean comparisons indicate that participants reacted with higher elevations of S-anxiety in the psychological threat condition as compared to the physical threat condition. This finding is significant and unique since this is the first study that examines the differential effect of the type of stressor on the mediated path between T-anxiety and S-anxiety. Additional analyses indicated that T-Anxiety also influenced primary and secondary cognitive appraisals and participants with higher T-Anxiety demonstrated higher levels of primary appraisals and lower levels of secondary appraisals.



The most interesting findings are probably the different indices of empirical and theoretical fit across the two predictive regression-based path analytic models of state-trait distinction in psychological and physical threat conditions. In comparing the two models, it is interesting to note that T-Anxiety had a consistent (*and equal*) predictive influence on pre-task S-Anxiety ( $\beta=.413$ ,  $p<.05$ ,  $R^2= 17.1\%$ ).

Other interesting findings across the two models are related to the predictive effects of T-anxiety on primary and secondary appraisals in the psychological condition, and the lack of these effects in the physical threat condition. T-anxiety had a direct effect on post-task S-anxiety only in the psychological condition and not in the physical condition. Pre-task S-anxiety had a predictive value on post task S-anxiety in both threat conditions, had a predictive influence on primary appraisals only in the psychological threat condition, and did not have any influence on secondary appraisals.

## Chapter One

### Stress and Anxiety

Stressful situations occur on a daily basis. Whether chronic and enduring or short lived and acute, stressful situations have been found to be linked to numerous psychological and physical symptoms such as anxiety (Breslau, Davis, Peterson, & Schultz, 1997), depression (Brown, Harris, & Eales, 1996), and schizophrenia (Walker., Diforio, 1997). Stress has been associated with breast cancer and to a marked increase in the rate of cardiovascular disease in high stress individuals (McKenna, Zevon, Corn, & Rounds, 1999).

The field of psychology has been more interested in concepts associated with stress such as anxiety, emotional distress, and maladaptive behavior as compared with 'stress' per se (Aneshensel, 1996; Cofer & Appley, 1964). Of the many emotional reactions to stressful situations, anxiety is considered to be the most typically experienced. Anxiety symptoms occur when individuals perceive that the demands of a given situation exceed their abilities, skills, or resources (Friedman, Clark, & Gershon, 1992). Furthermore, anxiety symptoms occur more often in individuals who have undergone stressful life events. (Finlay-Jones & Brown, 1981).

Several personality and cognitive models have been proposed to explain stress-related anxious reactions in humans. Despite the meaningful theoretical frameworks that these models provide for explaining anxious reactions to stressful situations, there still are some major limitations. First, the current cognitive and personality models of stress

related anxiety remain separate and practically mutually exclusive and do not recognize the potential importance of the interactions of the cognitive and personality elements in reacting to stressful situations (Endler, Edwards, & Vitelli, 1991; Lazarus & Opton, 1966; Vinacour & Levin, 2004). To our knowledge, there have not been any studies that attempted to study the contribution and interactions of elements from both perspectives to the occurrence of anxious reactions to stressful situations per se (Verhaak, Smeenk, van Minnen, & Kraaimaata, 2004).

This study will investigate the effects of trait anxiety on cognitive evaluations (appraisals) and the intensity of anxiety as an emotional reaction to two stressful situations involving threat to self esteem and threat to physical well-being. In so doing, this study is assessing the fit and applicability of a stress anxiety model that incorporates elements from cognitive- and personality-based models of stress-related anxiety.

The literature on anxiety, cognitive and personality models of stress and anxiety, and the relevant concepts were reviewed in the following sections. In chapter 1, the concept of psychological stress, emotional reactions to stressful situations, the concept of anxiety, and a brief review of theoretical models for anxiety will all be presented. In chapter 2, cognitive conceptualizations of anxiety were presented briefly, emphasizing the Lazarus and Folkman (1984) Transactional Stress model and cognitive processes associated with anxiety reactions in stressful situations.

Chapter 3 will briefly review personality theories of anxiety, and will examine the implications of the State Trait distinction in research on the effects of cognitive appraisal on emotional reactions to stress. In chapter 4, the State Trait Process model (Spielberger, 1972) will be discussed as a precursor for the current proposed model. Chapter 5 will

contain an examination of the Cognition or Emotion Primacy debate as related to stress and anxiety. The proposed model that integrates the personality model with the cognitive appraisal model will then be proposed.

### *Evolution of the Concept of Stress*

The first time the term ‘Stress’ appeared in the psychological literature was in the index of *Psychological Abstracts* in 1944 (Lazarus and Folkman, 1984). The interest in the concept of stress grew rapidly ever since to the extent that the cover story of *Time Magazine* of June 6, 1983 declared our age to be the *Age of Stress*. Over the past sixty years, psychological stress emerged to be one of the most researched concepts in modern psychological, sociological, and psychiatric literature (Hobfoll, 1998). A literature search with PsychINFO using the term “stress” produced more than 80,000, and the number of articles on the topic of stress in *Psychological Abstracts* increased from a significant 130 articles per year in 1990 to a remarkable 900 in 1999 (Jones & Bright, 2001).

The term *Stress*, however, was used as early as the fourteenth century to denote hardship or affliction (Lumsden, 1981). It was defined for the first time in the physical sciences during the late years of the seventeenth century as the ratio of the physical force to the area over which the force acted (Hinkle, 1977). It was not until late nineteenth century that stress was perceived as a factor contributing to ill health, yet the conceptualization of stress related illness was not fully articulated until 1932 when Walter Cannon proposed that stress was a disturbance to the body under demanding physical conditions, and that the levels of such a disturbance or ‘stress’ could be measured.

Selye (1936) is credited with the first technical use of the term stress which he defined as a collection of bodily functions that were well-synchronized and served as defense mechanisms against aversive environmental stimuli. Selye (1936) called this reaction the General Adaptation Syndrome (GAS) and differentiated between environmental demands or 'stressors' and the specific reactions to these demands (i.e.: stress). Selye's (1936) conceptualization of stress is considered to be the foundation for more recent advancements and expansions in the concept of psychological stress (Hinkle, 1977).

Another major contribution to the concept of psychological stress was proposed by Harold Wolff in 1953. In his description of life stress and disease in the 1940's and 1950's, he regarded stress as a dynamic reaction of an organism that is experiencing environmental demands and aversive stimuli. Despite their shortcomings, the biological models of stress as conceptualized in Wolff's (1953) dynamic processes and Selye's (1936) orchestrated physiological response patterns gave rise to several important theoretical themes that influenced more recent conceptualizations of stress. First, stress signified an active state of reacting to environmental demands, as opposed to being considered passive as in the physical sciences. Second, the term stress offered a useful analogy to the concept of psychological coping in which individuals actively attempted to dealing with environmental stressors. Third, elements of stress such as available resources, costs and adversity, and challenge became crucial determinants of the conceptualization of the stress conceptualization. Fourth, the dynamic interaction between the organism and the environment drew attention to all components of the

interaction, including those that reside outside the organism (Hinkle, 1977; Jones & Bright, 2001; Lumsden, 1981).

The influence of biological models of stress affected the research focus on psychological stress during the fifties and sixties. Researchers began investigating the adaptation process of humans in reaction to stressful situations (Lazarus & Folkman, 1984; Pearlin & Schooler, 1978). Within Stimulus–Response (S-R) psychology, stress was defined as a process whereby stimuli required functional responses (reaction) from humans. Whether environmental or internal (e.g., hunger), stimuli were typified as affecting a large number of people, a small number of people or one person, or daily hassles (White, 1959).

Stimulus-response approaches failed, however, to offer a systematic and universal conceptualization of stress. There were no clearly defined markers of why specific stimuli were considered as stressors and what rendered certain responses stressful. Furthermore, S-R psychology did not take into consideration any individual differences in reactions to stress and did not differentiate between what was considered to be a normal, naturally-occurring adaptation reaction to stress and what qualified as excessively stressful and beyond normalcy (Jones & Bright, 2001; Lazarus and Folkman, 1984).

One of the most widely accepted and enduring conceptualization of stress was proposed in 1966 by Richard Lazarus who reviewed the literature on stress and formulated a theory based on *appraisal*. Initially discussed in his seminal book in 1966, and expanded and refined in more recent work (Lazarus & Folkman, 1984), Lazarus proposed that stress and its emotional consequences depended primarily on how

individuals evaluate (or appraise) their interactions with the environment (Lazarus, 1966 ; Lazarus & Folkman, 1984; Scheier, 1984; Schonpflug & Battmann, 1988). The Lazarus and Folkman (1984) Transactional Stress model will be discussed in a following chapter. In the next section, however, anxiety reactions to psychological stress were examined and the concept of anxiety will be briefly reviewed.

### *Emotional Reactions to Stress*

Stress has been an implicit framework from which interest and research in psychopathology stemmed. Research on psychological stress has been concerned with examining mental health outcomes, specifically emotional distress and maladaptive behavior associated with stress. Anxiety has been one of the most heavily researched reactions to stressful situations (Aneshensel, 1996). While it may seem that the fifties witnessed the beginnings of the interest in psychological stress, and especially its relation to anxiety, researchers have been interested in anxiety for a much longer time than stress (Spielberger, personal communication, September, 2005).

The origins of anxiety can be traced back to Darwin (1872/1965) who considered fear to be a product of evolution. He conceptualized a continuum of tension and anxiety, ranging from mild apprehension to an extreme “agony of fear”, which was shared by humans and animals. Freud (1924) distinguished three types of anxiety: objective or reality anxiety, neurotic anxiety, and moral anxiety. Objective anxiety was proportional in its intensity to the objective danger inherent in a particular situation. Neurotic anxiety referred to an emotional reaction that resulted from a conflict between id impulses that were unacceptable to the ego. Moral anxiety, or guilt, resulted from a conflict between the id and the super ego or conscience. The term anxiety was used in Freud’s formulation

of psychoanalytic concepts (1953), yet the conceptualization of conflict-induced anxiety serving as a cue of danger and triggering defense mechanisms, is closely related to the concept of stress.

In an early study on stress-related anxiety, Janis (1958) examined the influences of stress in patients undergoing surgical threat, and concluded that stress had a significant effect on levels of anxiety in these patients. The reinforcement-learning theory of Hull (1943) and Spence (1956) was one of the dominant formulations of stress in American psychology for many decades. In that formulation, anxiety was perceived as a classically conditioned response that led to pathological habits of anxiety reduction. Over a period of twenty years, and throughout the writings of many authors on the subject matter, it was obvious that the dominant view of anxiety is that it was a product of stress (May, 1950). Wars also influenced the research on stress and anxiety. World War II, the Korean War, and Vietnam War mobilized and popularized research and, consequently, theory on stress and anxiety. In their masterpiece *Men Under Stress*, Grinker and Spiegel (1945) established a landmark in terms of the earliest psychological applications of the concept of stress.

The literature on stress and anxiety is replete with personality and cognitive models and theoretical formulations aiming at explaining stress-related anxious reactions in humans. In the following section, the cognitive and personality theoretical orientations of stress and anxiety will be briefly reviewed.



### *Cognitive and Personality Theories of Stress and Anxiety*

Models explaining anxious reactions to stress can be divided into two major categories: those emphasizing personality dimensions and others with cognitive and information processing foci.

Personality theories stress that individuals experiencing anxious reactions to stressful situations generally score higher on Trait anxiety scales, experience and express higher levels of negative affect, are more neurotic, or are more sensitive to aversive stimuli (Clark, Watson & Mineka, 1994; Eysenck, 1970, 1998; Spielberger, 1966, 1979; Watson & Clark, 1984).

Cognitive theorists explain vulnerability to anxious reactions to stressful situations as stemming from selective attention to aversive internal and external stimuli and processing of aversive information (Foa & Kozak, 1986; Mogg & Bradley, 1999; Williams, Mathews, & MacLeod, 1996). Later cognitive theories proposed that biases in processing threatening information take place in the pre-attentive or the attentional levels. The former can be identified in non-clinical samples with attention tests such as the Stroop tasks, while the latter are most readily identified in clinical samples (Beck & Clark, 1997, Mathews & MacLeod, 1994; Mogg & Bradley, 1999)

One major goal of this study is, therefore, to offer an alternative model of stress and anxiety that incorporates elements of personality and cognitive theories. In the following two sections, cognitive and personality factors of stress and anxiety will be reviewed.

## Chapter Two

### Cognitive Theories of Stress and Anxiety

Cognitive elements in stress related anxiety have been well documented (Williams, Watts, MacLeod, & Mathews, 1997, Wenzel & Lystad, 2005). As compared to normal individuals, anxious individuals tend to pay attention to threatening stimuli more quickly (McNally, Riemann, & Kim, 1990; Mogg & Bradley, 1999), recall more threatening stimuli (Coles & Heimberg, 2002), attribute more threat to ambiguous situations (Butler & Mathews, 1983; MacLeod & Cohen, 1993), and catastrophize stimuli and judge them to be more negative (Butler & Mathews, 1983; Foa, Franklin, Perry, & Herbert, 1996; Stopa & Clark, 2000).

Several theories were proposed to explain and predict emotional reactions to stressful situations. Connectionist or network theories combine principles from behaviorism and psychoanalytic theories. Specifically, the laws of learning and Freud's free association techniques provide the theoretical framework of the earliest network theory proposed by Breurer and Freud (1895/1974). Freud argued that traumatic experiences, thoughts, or memories can form a "pathogenic nucleus" around which later memories can become attached. Therefore, activation of one memory node can spread energy in connected nucleus and nodes, thereby activating the emotion or the thought which takes form in dreams.

Later advances in the cognitive sciences led to the development of Bower's network theory of emotion, which is considered to be the most widely accepted (Bower, 1981; Bower & Cohen, 1982). Bower proposed that emotions, concepts, events and thoughts can be represented by nodes within a network. Activation within one network depends on strength of signal, proximity of nodes to each other, and elapsed time since last activation, and would trigger emotions, thoughts and behaviors previously represented within that network.

There were some major empirical and theoretical limitations to Bower's theory, which assumes specific cognitive tendencies to attend to, remember, and perceive specific stimuli were associated with all mood categories. However, evidence suggests that anxiety was closely associated with attention-related biases whereas depression may be related to memory biases (Williams et al, 1997).

A major theoretical problem relates to empirical evidence that information is stored systematically in a manner different than proposed by Bower's network theory. Anderson and his colleagues (1976) and Johnson-Laird, Hermann, and Chaffin (1984) provided evidence that information was stored differently than in a network of interconnected nodes, and that activation of one node did not necessarily activate the associated nodes. Since Bower's theory was developed primarily to represent associations between simple words, it was unable to represent complex concepts such as events, actions, and situations.

Appraisal theories of emotion presuppose that cognitive evaluation (appraisal) precedes, and to a large extent, determines the occurrence of emotional reactions. The term "appraisal" was first used in relation to emotion by Arnold (1960). The earliest of

the appraisal theories was that of Schachter and Singer (1962) who proposed that emotion involved an evaluation of physiological arousal. Whether the state of arousal had a positive or a negative meaning, and consequently the type of emotions experienced, depended on how individuals explained the arousal state. Recent evidence, however, suggested that the bodily arousal was not common to all emotions, and that differences exist between the types of physiological characteristics for different emotions (Ekman, 1992).

Despite the dissimilarities between the above-mentioned cognitive theories, they seem to share common basic premises. One of the most important premises shared by cognitive models of stress related anxiety is the appraisal of perceived threat in a stressful situation and evaluations of adaptive resources. This premise matches exactly with the concepts of primary and secondary appraisals conceptualized in Lazarus and Folkman's (1984) Transactional Stress model (reviewed in the next section) and materializes the immense importance of systematically incorporating the concept of appraisals into the State Trait process.

#### *The Lazarus and Folkman (1984) Transactional Stress Model*

In their transactional stress model, Lazarus and Folkman's (1984) emphasized and expanded on the notions of situation evaluation in terms of evaluation of threat and availability of skills and resources to cope with the stressful situation. Cognitive theorists have proposed that emotional reactivity to stressful situations resulted from cognitive appraisals of personal, social, and physical situations. Such situations are evaluated with respect to their impact on well being of the individual (Lazarus, 1991a , 1991b , 1991c ; Scheier, 1984; Schonpflug & Battmann, 1988; Smith & Lazarus, 1993 ). Cognitive

appraisals usually involve assessment of demands inherent in the situation and that are then contrasted to availability and adequacy of adequate resources for coping with such demands (Blascovich & Tomaka, 1996 ; Houston, 1987 ; Lazarus, 1993 ; Lazarus & Folkman, 1984 ; Mason, 1975 ; Menaghan, 1983 ).

The two types of cognitive appraisals are *Primary* and *secondary* appraisals. Demand appraisals or Primary Appraisals refer to assessment of the demand characteristics of the situation in terms of physical and/or psychological demands (e.g., “Is there a threat to my well-being?”). Resource appraisals or Secondary Appraisals involve assessments of personal resources required for dealing effectively with the situational demands, and the extent to which these are expected to function favorably to deal with the situation. Two types of secondary appraisals denote perceived control over the situation and perceived resourcefulness in dealing with the situation (e.g., “Do I have the skills to cope with the problem?”) (Lazarus & Folkman, 1984).

Demand Appraisals include three types: irrelevant, benign-positive, and stressful. Irrelevant appraisal is one that does not impact the well being of the individual and carries no implications. A benign-positive appraisal occurs when the outcome of a certain situation is construed as positive and bearing positive implication for the well being of the individual. This type is usually associated with pleasurable emotions such as love, joy, or peacefulness.

Stressful appraisals include *harm/loss*, *threat*, and *challenge*. When some damage to the person has *already* been sustained such as occurrence of some damage to self- or social-esteem, stress appraisals of harm/loss are generated. *Threat* appraisals are contingent on past harm/loss experiences, whereby individuals anticipate future harm/loss

in their threat appraisals. Hence, threat is always associated with harm/loss since any is construed as bearing negative implications for the future. In threat appraisals, negative feelings of fear, anxiety, and anger are common. Challenge appraisals focus mainly on potential for gain as outcomes of the situation. These usually relate to positive feelings of exhilaration, eagerness, and excitement. However, some authors have associated threat appraisals to situations where individuals perceive demands in excess of their resources or abilities, whereas challenge appraisals were related to situations that posed demands within a person's resources or abilities. Several studies have reported that threat and challenge appraisals affected and predicted affective, behavioral, and physiological responses in potentially stressful situations (Tomaka & Blascovich, 1994; Tomaka, Blascovich, Kelsey, & Leitten, 1993; Tomaka, Blascovich, Kibler, & Ernst, 1997). Threat appraisals have been associated with greater subjective stress and negative emotion as compared with challenge appraisals.

Evidence for the interaction between primary and secondary appraisals has been inconclusive. Lazarus and Folkman (1984) proposed that “secondary appraisals of coping options and primary appraisals of what is at stake interact with each other in shaping the degree of stress and the strength and quality of the emotional response” (pp. 35). Other stress and anxiety models have also argued for this interactive view (Perkun, 1984, 1992). Although Folkman, Lazarus, Gruen, and DeLongis (1986) reported that, in predicting psychological adjustment, secondary appraisals failed to add incremental validity beyond the variance accounted for by primary appraisals, other studies have either reported independent effects of primary and secondary appraisals (Zohar & Dayan, 1999), or failed to provide support for the interaction view (Smith & Lazarus, 1991).

The relation between primary and secondary appraisals can be understood in terms of a ratio between the threat level of a situation and the available resources and skills that are needed to deal with the perceived threat. Hence, primary and secondary appraisals do not seem to operate independently to affect levels of anxiety. However, empirical support for this argument is required. While the interactive view of primary and secondary appraisals appears to approach the definition of cognitive appraisals discussed above more precisely, both views of interaction and independence are assessed.

The most widely used method for measuring primary and secondary appraisals is by subjective self-reports where respondents are instructed to appraise specific situations (Herbert & Cohen, 1996). The underlying assumption is that individuals are the best and most reliable source of information regarding their cognitive evaluations of a specific stressful situation. Adhering to the conceptual definitions of cognitive primary and secondary appraisals as specified by Lazarus (1966; Lazarus & Folkman, 1984), subjective self reports attempt to measure the “perceived” meaning of the situation according to the respondent (Monroe & Kelly, 1995).

Two subjective self-report approaches are commonly used to measure appraisals. First, multiple item appraisals scales were developed to assess cognitive evaluations of either a specific stressor or global life stressors facing the individual (Monroe & Kelley, 1995). The Stress Appraisal Measure (SAM; Peacock & Wong, 1990) is an example of this approach to measuring a specific stressor. It assesses three primary (Threat, challenge and centrality) and secondary (controllability by self, by others, and by anyone) characteristics of a specific stressor. Although this measure has good psychometric properties, there is evidence that it may be tapping other constructs as well, such as

psychological distress and mood (Herbert & Cohen, 1996). The Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983) is an example of a global measure that requires respondents to indicate how unpredictable, uncontrollable and over-loading their lives have been. This measure has also shown good psychometric qualities and has been used in laboratory and field research (Monroe & Kelley, 1995).

The second approach for the assessment of appraisals is to use single-item questions designed to assess primary and secondary appraisals of specific stressors. The administration of these questions usually follows immediately after the exposure to a situation which makes this method more suitable for experimental research in the laboratory (Herbert & Cohen, 1996). Using this approach, appraisals of control, and predictability were found to predict coping strategies such as seeking social support and relaxation (Schwartz & Stone, 1993).

Both approaches of assessing appraisals suffer from some psychometric and conceptual limitations. Despite their demonstrable psychometric properties in terms of internal consistency and test-retest reliability, the multiple-item appraisal scales were developed to measure appraisals of a small number of stressful situations. Therefore, it would be difficult to use these scales to assess reactions to novel stressful situations. In addition, these measures may be influenced by other factors such as appraisal antecedents, psychological outcomes, personality factors, cognitive styles, and current mood states (Cohen, Tyrrell, & Smith, 1993).

The single-item approach, while somewhat inferior in psychometric properties such as reliability, provides an excellent preliminary exploration of appraisals related to a particular stressor. This approach also allows researchers to formulate items to measure



primary and secondary appraisals fitting the theoretical framework of the study. Furthermore, this approach provides a very useful basis for construction of more comprehensive measures of primary and secondary appraisals (Herbert & Henton, 1996; Monroe & Kelley, 1995). For these reasons, the single-item approach was followed in this study to construct questions aimed at measuring primary and secondary appraisals.

### *Cognitive Appraisals and Anxiety Reactions*

The relationship between threat appraisals and anxiety is well established. According to cognitive models of emotion, anxiety is elicited primarily when evaluative processes of the situation detect threat that may imply potential harm/loss to the individual (Eysenck, 1992; Lazarus, 1991; Lazarus & Folkman, 1984; Sarason & Sarason, 1990). Threat appraisals are also accompanied by lower secondary appraisals relating to the perceptions of one's ability to deal with the threatening situation (Bandura, 1997; Lazarus, 1991, Lazarus, & Folkman, 1984; Morris, Davis, & Hutchings, 1981). Individuals who experience anxiety in stressful situations tend to anticipate negative outcomes that would pose threats to well-being (Rapee & Heimberg, 1997; Sarason & Sarason, 1990).

Challenge appraisals, as compared to threat appraisals, have been found to be associated with higher coping expectancies, lower subjective stress, and higher perceptions of effectiveness and resources for dealing with the stressful situation (Tomaka et al., 1997). Furthermore, challenge was found to correlate positively with positive emotions, such as hope and happiness (Smith & Ellsworth, 1985, 1987).

As mentioned previously, cognitive based conceptualizations of anxious reactions to stress in humans have co-existed with personality based theories. One major goal of

this study, as discussed above, is to provide an alternative model of anxiety reactions to stress that incorporates elements of personality and cognitive theories. It is beneficial, therefore, to discuss some of personality based factors as related to anxious reactions. In the following section, the State-Trait conceptualization of anxiety as related to stressful situations is described and discussed.

## Chapter Three

### Personality Traits and Emotional Reactions to Stress

Spielberger (1972) cited Lazarus's (1966) contention that "the term stress has been used to refer to both the dangerous stimulus situations (stressors) that produce anxiety reactions, and the cognitive, affective, behavioral, and physiological changes (stress reactions) produced by stressful stimuli". In addition, Spielberger (1972) defined threat as "an individual's perception of a situation as more or less dangerous or personally threatening to him or her" (pp. 5). He identified two factors affecting one's perception of threat in a stressful situation: level of perceived threat in the situation and whether or not one has the skills to deal with the situation. In addition to these contributions to the cognitive elements of stress and anxiety, Spielberger's most important contribution was the expansion and development of the state-trait distinction as related to anxiety.

The state-trait distinction in anxiety was first proposed by Cattell (1966; Cattell & Scheier, 1961) and later expanded and emphasized by Spielberger (1966, 1971, 1972, 1975, 1976). Spielberger (1972, p.39) defined state anxiety as "a transitory emotional state or condition of the organism that varies in intensity and fluctuates over time. This condition is characterized by subjective feelings of tension and apprehension, and activation of the autonomic nervous system. Level of A-State should be high in circumstances that are perceived by an individual to be threatening, irrespective of

objective danger; A-State intensity should be relatively low in nonstressful situations, or in circumstances in which existing danger is not perceived as threatening.”.

Trait anxiety was conceptualized as “relatively stable individual differences in anxiety proneness; that is, differences in the disposition to perceive a wide range of stimulus situations as dangerous or threatening, and in the tendency to respond to such threats with the A-State reactions. A-Trait may also be regarded as reflecting individual differences in the frequency with which A-States have been manifested in the past and in the probability that such states were experienced in the future. Persons who are high in A-Trait tend to perceive a larger number of situations as dangerous or threatening than persons who are low in A-Trait, and to respond to threatening situations with A-State elevations of greater intensity” (Spielberger, 1972, pp. 39).

#### *Measurement of State and Trait Anxiety*

The State Trait Anxiety Inventory (STAI-Form X, Spielberger et. al, 1970) was developed to provide a reliable and valid assessment of state and trait anxiety in clinical and research contexts. It consisted of 20 items assessing state anxiety as indicated by the intensity of anxiety feeling “right now”, and 20 items assessing trait anxiety by reporting the frequency of anxiety feelings “in general”. In the revision of the STAI, Spielberger and his colleagues (1980) administered the STAI-Form X to more than 400 students and conducted separate factor analyses for males and females. Overall, 30% of the STAI (Form X) items were replaced. The final set of items based on factor analyses and item remainder correlations were then included in the revised STAI (Form Y, Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983).

The validity and utility of the STAI (Form Y) was also supported in research with anxiety disorder patients, and yielded state and trait factors (Oei, Evans, & Crook, 1990). The item content of the STAI was also compared to diagnostic criteria and criterion-based symptoms of Generalized Anxiety Disorder as specified in the DSM-IV (APA, 1994). The STAI was found to meet 5 of 8 domains of Generalized Anxiety Disorder, supporting its applicability for clinical research (Okun, Stein, Bauman, & Silver, 1996). Today, the state trait distinction and Spielberger's State-Trait Anxiety Inventory (Spielberger, et al, 1970, 1983) continues to be the most used anxiety measure worldwide. The state trait distinction and both forms of the STAI have been used in more than 8,000 research studies in medicine, psychology, education, and other social sciences (Sesti, 2000).

While The STAI remains the most popular measure for assessment of state and trait anxiety, the State Trait Personality Inventory (Spielberger, 1979) was developed to measure state and trait anxiety, anger, depression and curiosity. The state scales assess the intensity of these emotional states at a particular moment; the trait scales measure how often each emotional state is generally experienced. The STPI Anxiety items were primarily derived from the STAI. In the current study, the STPI anxiety items of STPI were used to assess state and trait anxiety, each with 10 items compared to the 20 items in the state and trait scales of the STAI, yielding significant savings in time.

#### *State-Trait Anxiety and Stressful Situations*

Spielberger (1976) differentiated between threat as an individual's perception of how threatening a situation is, and stress as an "objective, consensually validated stimulus properties of a situation that is characterized by some degree of physical or

psychological danger...” (pp. 5). In other words, a stressor is considered to be threatening to an individual only to the extent that the individual perceives it to be. Furthermore, Spielberger (1976) contends that an increase in state Anxiety (A-state) is expected following a perception of a threatening experience (Spielberger, 1976). The relation, thus, between trait anxiety and state anxiety is influenced by evaluations of levels of threat attributed to the situation. A more recent, yet similar conceptualization of stress as related to evaluation of danger was proposed by Lazarus and Folkman (1984), whereby a cognitive appraisal was defined as “an evaluative process that determines why and to what extent a particular transaction or series of transactions between the person and the environment is stressful” (p. 19).

Over the last four decades, many studies have investigated the state trait distinction per se as well as its relation to stressful conditions (Manuck, Hinrichsen & Ross, 1975; Hinton, Rotheiler & Howard, 1991). Glanzman and Laux (1978) separated responders to the STAI based on their scores on the trait scale of the STAI (Spielberger, et al., 1970) into high and low groups. These high and low T-Anxiety groups were then exposed to stressors either denoting a threat of physical pain or a threat to self-esteem. Responders in the high trait anxiety group showed significantly higher state anxiety scores as compared to responders in the low-trait anxiety group in the self-esteem stressor but not the physical pain. Several studies have reported similar findings (Hodges, 1968; Hodges & Spielberger, 1966; Katkin, 1965, 1966; Rappaport & Katkin, 1972).

The state-trait distinction as related to stressful situation evaluation has spawned a plethora of studies (e.g.: Manuck, Hinrichsen & Ross, 1975; Hinton, Rotheiler & Howard, 1991). The mediational nature of stress and anxiety within the state-trait

distinction was extensively investigated. While some studies adhered to the conceptualization set forth by Spielberger (1966, 1972a, 1976), several crucial methodological and conceptual problems were evident. The first problem relates to a priori differential judgments on behalf of the experimenters about the nature of stressors presented to respondents. That is, despite the conceptualization of situation evaluation as a mediator between trait and state anxiety, many studies investigated fluctuations in state or trait anxiety under varying stress conditions *without* emphasizing the critical mediation nature of situation evaluation on behalf of the responders.

Wadsworth, Barker, and Baker (1976) explored the factor structure of the State Trait Anxiety Inventory (STAI, Spielberger, Gorsuch, & Lushene, 1970) under various stress conditions and they found one underlying factor of anxiety that accounted for 60% of the variance, but failed to replicate the state-trait distinction of anxiety. However, the stressors were assessed and evaluated by Wadsworth and his colleagues (1976) and *not by the respondents*. In addition, the principal axis component analysis that was used is suitable for variable reduction. Thus, the results were inconsistent with exploratory or confirmatory factor analyses.

Houston, Fox, and Forbes (1984) investigated the effect of trait anxiety on cognitive performance in children under high and low stressful conditions that were experimentally manipulated. Although higher levels of trait anxiety were associated with higher levels of state anxiety, no significant interactions were found in the evaluations of the effects of trait anxiety and stress in higher state anxiety levels. According to Spielberger (1972), a situation is either stressful or nonstressful as *perceived* by the individual. Since low and high stress situations were designed and rated by the

investigators, consequently the participants did not indicate how stressful they perceived the situations to be. It very well may be that participants differed in their perceptions of how stressful the situations were.

Bedell and Roitzsch (1976) also failed to allow participants to assess their perceived levels of stress in an investigation examining the effects of stress and trait anxiety in emotionally disturbed, normal, and delinquent children. Their results indicated that anxiety state increased as a function of stress, whereas trait anxiety was relatively stable and was not affected by differential levels of stress. Other studies have also failed to allow responders to evaluate their *perceptions* of the stressful situation (e.g., Millimet & Gardner, 1972). It is crucial, therefore, to allow the respondents to subjectively evaluate and rate the level of threat that they perceive to be associated with any given situation. This study will allow respondents to rate the level of threat (among others) they perceive in a situation.

The second methodological problem relates to the time sequencing of the trait, stress, and state relationships. Trait anxiety was conceptualized as a personality trait that is stable across time and stemming from previous experiences and/or early temperamental tendencies. Conceptually, trait anxiety usually precedes a current or a most recent evaluation of a stressful situation, which, in turn, may lead to an elevation in state anxiety. Situation evaluation, thus, occurs between individual differences in anxiety traits and current state anxiety. Hence, it is crucial that the evaluation of the stressful situation be consistent with the time sequence of the state anxiety being assessed.

In an investigation aimed at assessing the role of individual differences in trait anxiety as mediating the relationship between naturally occurring stressors and state



anxiety scores, Payne (1983) concluded that individuals having high trait anxiety scores did not show a higher correlation between life stress and state anxiety as compared to individuals with low trait scores. However, Payne (1983) administered the LES, a 57-item self-report measure assessing several stressful situations encountered by respondents during the *previous* year. Given that state anxiety refers to intensity of the most recent evaluation of anxiety, it can be argued that the stress score on the LES would correlate higher with trait anxiety than it would with state anxiety. Indeed, Payne's results indicated a higher and more significant correlation between stress scores and trait anxiety as compared to stress scores and state anxiety. It is clear that the crucial violation of the stated time sequencing in the conceptualization of state-trait anxiety distinction, and hence the conclusion made by Payne (1983) is open to question.

A better method is to follow the time sequencing proposed by Spielberger (1972, 1976), who proposed that trait anxiety influenced the level of perceived threat that responders attributed to a given stressful situation, which, in turn, affected the level of state anxiety that they experienced. This time sequencing of measurement was followed in this study, whereby levels of T-Anxiety were measured first, followed by primary and secondary appraisals and ending with measuring S-Anxiety levels. The following section introduces and discusses an earlier model of stress and anxiety that takes into consideration some of the elements discussed above.

#### *The State Trait Process Stress Model*

As previously noted, research on stress and anxiety has established the need for distinguishing between S-Anxiety as a transitory emotional state and T-Anxiety as relatively stable individual differences in anxiety proneness. Compared to individuals

scoring low on T-Anxiety, individuals high in T-Anxiety tend to perceive more situations as threatening, attribute more threat levels to specific situations, and more frequently experience higher levels of S-Anxiety. Spielberger (1985) proposed that differences in dispositions to experience anxiety (T-Anxiety) are activated by what individuals perceive to be threatening to their well being in stressful situations.

Spielberger (1985) outlined a state-trait-process model of anxiety based on Freud's (1936) danger-signal theory and Lazarus's (1966) conception of stress and coping.

In Spielberger's model, an A-State reaction may be initiated by internal stimuli such as thoughts or memories or external stressors. Depending on the level of threat attributed to the stressful stimulus, an S-Anxiety reaction would be evoked, irrespective of the objective nature of danger or threat. The intensity and duration of the emotional S-Anxiety reaction is directly proportional to the amount of threat that the individual perceives in the stimulus or stressful situation. Other factors such as previous experience with the stressor, coping skills, and feelings also affect the level of perceived threat attributed to the stimulus or situation (Spielberger, 1985).

Some of the elements from the State-Trait process model guided this study. Specifically, the influence T-Anxiety on appraisal processes and the evaluation of threats to well-being were incorporated into the proposed model. In addition, the relationship between the levels of threat attributed to a given stimulus or situation and the intensity and duration of S-Anxiety emotional reactions will also be included. In addition, the proposed model will expand and add to the State-Trait Process model selected elements from the Lazarus and Folkman (1984) transactional Stress model that combines the effects of personality and cognitive factors in a novel way.

## Chapter Four

### Rationale and Design of the Study

Spielberger (1976) conceptualized anxiety as a process that includes a series of variables, and had identified three major limitations in anxiety research in relation to perceptions of stressful situations. The first limitation is that theorists have typically limited their scope of studying anxiety to a subset of variables and events included in anxiety as a process. This limitation would invariably lead to neglecting other potent variables such as situation evaluations or types of stressors. The second relates to the difficulty of integrating different investigations due to the use of diverse components of the anxiety process. The third is the lack of universal definitions for describing all of the components of the anxiety process.

This study attempts to address the three limitations by: first, including cognitive, personality and emotional components which are considered to be crucial elements in examining stress related anxiety; second, combining different yet empirically correlated theoretical constructs that have, thus far, not been governed by an overarching theoretical framework; and third, adhering to the state-trait distinction of anxiety, and delineating primary and secondary appraisals in conceptualizing stress related anxiety. The proposed design of this study will facilitate establishing theoretical definitions of the meaning of the anxiety construct as related to stressful situations.

The overall goals of this study are to reconcile major elements of personality and cognitive theories of anxious reactions to stressful situations by incorporating elements from these theories into a unifying new model of anxious reactions to anxiety. The proposed model will offer a unique conceptualization of the processes involved, and will include elements from Spielberger's state trait anxiety distinction (1966, 1976) and Lazarus and Folkman's Transactional Stress model (1984). The design of the current study will also allow for a more comprehensive analysis of the anxiety process and will lend a significant increment to the knowledge base of understanding anxiety phenomenon in an integrative manner across stressful situations.

Trait anxiety (A-Trait) is conceptualized as a stable personality characteristic that differs among individuals high in trait anxiety who are expected to be more inclined to perceive situations as more threatening than individuals who are lower on this trait. The same individuals who are higher in trait anxiety would experience higher levels of state anxiety, as defined by higher intensities of experiencing anxiety. Spielberger (1976) proposed this conceptualization of state-trait anxiety was mediated by situation evaluation. Situation evaluation in this study is modeled on the basis of conceptualizations of primary and secondary appraisals by Lazarus and Folkman (1984).

This study specifically proposes the differential influence of trait anxiety on state anxiety depending on the type of threat inherent in the stressful situation. The specific aim of this study is to examine the differential influence of trait anxiety across the two types of threat (Psychological vs. Physical) on primary and secondary appraisals, and consequently on state anxiety levels. This will be accomplished by using a one-sample

within-subjects design, which allows comparisons of primary and secondary appraisals, and levels of pre- and post task anxiety.

*Hypotheses:*

In this study, it is predicted that:

1. levels of post-task state anxiety in the psychological threat condition will be significantly higher than levels of pre-task S-Anxiety;

2. levels of post-task state anxiety in the physical threat condition will be significantly higher than levels of pre-task S-Anxiety;

3. levels of post-task S-Anxiety in psychological threat condition will be significantly higher than those in physical threat condition;

4. levels of S-Anxiety will be significantly and positively correlated to T-Anxiety in the psychological threat condition, but not significantly correlated to T-Anxiety in the Physical threat condition;

5. primary appraisals will not be significantly correlated with secondary appraisals in either threat condition;

6. levels of primary appraisals and S-Anxiety in psychological threat condition will be higher than in the Physical threat condition;

7. levels of secondary appraisals of the psychological threat condition will be lower than in the physical threat condition;

*Proposed Models*

In addition to the above mentioned hypotheses, Model 1 (Appendix A) depicts a predicted model for Trait Anxiety, Pre- and post-task S-Anxiety, and primary and secondary appraisals. As can be seen in this figure, it is specifically predicted that:

- A. trait anxiety will have both a direct influence on Primary and Secondary appraisals, and pre- and post task S-Anxiety;
- B. trait anxiety will have an indirect influence on S-Anxiety post task as mediated Primary appraisals, secondary appraisals, and pre-task S-anxiety;
- C. trait anxiety will have an indirect influence on primary appraisals as mediated by S-Anxiety pre-task.;
- D. trait anxiety will have an indirect influence on secondary appraisals as mediated by Pre-task S-anxiety;
- E. primary appraisals will have a direct influence on S-Anxiety post task;
- F. secondary appraisals will have a direct influence on S-Anxiety post task;
- G. pre-task S-Anxiety will have a direct influence on S-Anxiety post task, primary appraisals, and secondary appraisals.
- H. Primary appraisals and secondary appraisals will not be correlated and will not have any influence on each other in any direction

## Chapter Five

### Method

Participants completed tasks that involved preparing and delivering a 2 minute speech in front of a video camera, and placing their hand in cold water. Measures of state and trait anxiety and cognitive and self appraisals were administered. This section describes the procedure for selecting participants, experimental tasks, measures, and procedure.

#### *Participants*

Participants were undergraduate university students enrolled in psychology courses at the University of South Florida, who will receive extra credit for taking part in this study. Potential participants were invited to take part in a study of “IQ, abstract thinking and physical endurance”, which will last approximately 25-35 minutes. A total of 60 students were recruited.

Participants were coordinated by the Psychology department Participant Pool website. Students enrolled in psychology courses select particular experiments according to brief descriptions of the studies that are provided on the website. These descriptions include brief outlines of the studies, the amount of time required for completion, the number of extra credit points assigned to each study, and available times and dates. Students sign up accordingly, and select the specific times and date during which they would like to participate. The experimenter will then contact registered participants to

remind them of the time and date, the duration of the study (35-45 minutes), and the 2 extra credit points they will receive upon completion of the study. An attempt was made to obtain nearly equal numbers of male and female participants.

### *Experimental Tasks*

The two tasks, which are described below, were presented sequentially in the same fixed order to all participants. Responding to each task will require 4 minutes. Measures of personality traits were administered at the beginning and after all the tasks have been completed. Measures of emotional states were administered before each task and immediately following the completion of each task. Measures of cognitive appraisals of each task were obtained after the completion of each task immediately following the administration of emotional state measures.

The first task is a *Public Speaking Task (PST)* in which participants will perform a 2-minute public speaking test, after a 2 minute preparation period. The participants are informed that their speech would be audio-recorded and evaluated by the experimental group for its adequacy of content, structure of argument and logical sequencing. The participants are informed that they would be informed of their performance on this task relative to other participants. This task and its variations have been used extensively in the literature and had shown excellent reliability and validity in eliciting elevated levels of stress and anxiety (Davis, Montgomery, & Wilson, 2002; Gonzalez-Bono, Moya-Albiol, Salvador, Carrillo, Ricarte, & Gomez-Amor, 2002)

The second task is a *Cold Pressor Task (CPT)* which involves immersing the non-dominant hand, up to the wrist, in cold water which is maintained at a temperature between 0° and 3° Celsius. A mercury thermometer is used to measure water



temperature. Participants are asked to keep their hand immersed in the cold water until they can no longer tolerate the pain. To ensure the safety of participants, an upper time limit of 2 min is used at which point the participants are asked to remove their hands from the cold water tank (Keogh & Herdenfeldt, 2002). This task has previously been found to produce physically stressful situations and to possess excellent reliability and validity (Chapman, Casey, Dubner, Foley, Gracely, & Reading, 1985; Keogh & Herdenfeldt, 2002; Edens & Gil, 1995).

### *Measures*

The measures used in this study were the 10-item state and trait anxiety scales from the State Trait Personality Inventory (STPI; Spielberger, 1979). State and trait items were administered at the beginning and end of the experimental session with standard instructions. The state anxiety items will also be administered immediately after the completion of each computer task with modified instructions to direct participants to respond with how they felt during the experimental tasks. Items designed to assess primary and secondary cognitive appraisals will also be administered after each experimental task. Each of these measures are described below.

The *State Trait Personality Inventory (STPI)* is a 80-item self-report questionnaire, consisting of eight 10-items scales for measuring state and trait anxiety, anger, depression and curiosity (Spielberger, 1979). The state items assess the intensity of emotional reactions that are experienced at a particular moment; the trait items assess the frequency of experiencing these emotional states. Participants respond to the STPI state and trait items, using 4-point Likert scales (State: 1=Not at all, 2=Somewhat,

3=Moderately so, 4=Very much so; Trait: 1=Almost Never, 2=Sometimes, 3=Often, 4=Almost Always).

In this study, only the STPI state and trait anxiety items were used. An alpha coefficients ranging from .88 to .92 for the trait anxiety scales and .91 to .94 for the state scales, indicate strong internal consistency (Spielberger, 1979). This pattern of internal consistency and coefficients reported is in keeping with the theoretical distinction between state and trait anxiety, which recognizes differences between transitory and temporary nature of anxiety as an emotional state and individual differences in anxiety as an enduring trait (Spielberger, 1972).

Primary and secondary appraisals regarding 2 types of stressful experimental conditions were assessed by 6 *Cognitive Appraisals Items*.. These items were constructed for the current study in keeping with the theoretical framework as proposed by Lazarus and Folkman (1984) regarding primary and secondary appraisals. The participant will respond to each appraisal item, using a 4-point Likert scale, ranging from “Not at all” to “Extremely so”. The single item approach, which was discussed earlier, was used to construct appraisal items in a manner similar to that used by Schwartz and Stone (1993), Chang (1998), and Ptacek, Smith, and Dodge (1994).

Three of the cognitive appraisal items will assess three primary appraisals: Physical threat, Psychological threat, and Personal stress. Three other items were used to assess the secondary cognitive appraisals: Personal control, Social support, and intellectual resources (Table 1).

### *Procedure*

The experimental sessions were conducted in a quiet room. On arrival, the participants were greeted by the experimenter. At the beginning of the experimental session, participants were informed of the nature of the experimental tasks, which will include demographic questions, completing one oral and one physical task, and responding to several questionnaires that inquire about their reactions to the tasks. Participants will then be asked to read and sign a consent form that contains brief descriptions of the tasks. The consent form will indicate that all information provided by the participant were kept confidential and that no identifying information were attached to that information. Participants will then be offered the opportunity to ask any questions they may have before proceeding.

After signing the consent form, participants were instructed to fill out specific demographic information (age, gender, year in college, major). Participants will then respond to the STPI trait anxiety scale to participants who were instructed to respond according to how they “*generally feel and think*”, followed by the STPI S-Anxiety scale to participants who were instructed to respond according how they are “*feeling right now*”.

The participants were then informed that they were performing an oral task that includes preparing and delivering a speech on a previous or current stressful situation. The following instructions were read to the participants: “In this task, you will have 2 minutes to prepare a 2-minute speech regarding a previous or current stressful situation where you were being evaluated by others. The situation could be in an academic or social context. The speech should describe the situation briefly, but should focus on how

stressful it was and more importantly how you managed to deal with it. The speech will be tape recorded, and will be evaluated according to its adequacy of content, structure of argument and logical sequencing. You will receive feedback on your performance in comparison with typical and other participants' performance ".

The participants will then be allowed a period of 2 minutes to prepare for their oral task. At the end of the preparation period, the experimenter will start the audio recording device, and will instruct the participants to speak in an audible and clear voice, so the recording would be clear for evaluation. After the participants are finished with their 2 minute oral task, the experimenter will inform the participants that while their performance in their recorded speech is being evaluated, they are to respond to the STPI S-Anxiety items and cognitive items according to how they felt *while they were delivering the speech*. The experimenter will then use earphones to review the recorded speech while the participant is filling out the measures. To ensure that all participants receive positive feedback, the evaluation criterion of the recorded speech is made very easy to meet and consists of the participants addressing, at least, one way that the situation was stressful and/or one way how they dealt with it. The participants were congratulated on their good performance and were invited to take a 3 minute relaxation period where they would be instructed to relax by sitting comfortably in their chairs and following simple relaxation techniques of breathing slowly and deeply. This task second task and the relaxation period will last 9-10 minutes.

After the relaxation period, participants will respond to the STPI S-A anxiety items by indicating how they are "*feeling right now*". The participants will then be informed that they will complete a second task that involves immersing the non-dominant

hand, up to the wrist, in cold water. A mercury thermometer indicating the water temperature (0° and 3° Celsius) was visible to participants is used to measure water temperature. Participants were asked to keep their hand immersed in the cold water until they can no longer tolerate the pain. To ensure the safety of participants, an upper time limit of 2 min is used at which point the participants are asked to remove their hands from the cold water tank.

The experimenter will ask participants again if they have any medical conditions that may prevent them from participating in this task. If the participants mention any medical conditions, the experimenter will stop the experiment, debrief the participants.

If the participant reports no medical conditions, then the experimenter will ask them to identify their non-dominant hand and place it, up to the wrist in the cold water. The Participants were reminded to keep their hands as long as possible, until they can no longer tolerate the pain. In case a participant keeps her/his hand in cold water for more than 2 minutes, the experimenter will ask the participants to remove their hand from the cold water.

On the completion of this task, the experimenter will instruct the participant to respond to the STPI state anxiety scales and cognitive appraisals items, according to how they felt *while their hands were immersed in cold water*. The participants will finally be instructed to respond to the STPI trait anxiety scale according to how they feel in *general*.

The time scheduled for the completion of the experiment were 25-35 minutes.. After the completion of the experimental session, the experimenter will debrief the participants and answer any additional questions.

## Chapter Six

### Results

The main goal of the present study is investigate the effects of individual differences in trait anxiety on cognitive appraisals and emotional reactions to stressful situations. It attempts to examine the effects of trait anxiety on cognitive evaluative perceptions of situations bearing perceived threat to self-esteem and physical well-being, in relation to levels of S-Anxiety. Specifically, the effects of trait anxiety on cognitive appraisals and anxiety emotional state were compared across two distinct types of threat: psychological and physical.

In the following sections, descriptive and inferential statistics for levels of Trait anxiety, S-Anxiety (pre- and post- task) and primary and secondary appraisals are presented. Mean comparisons will also be presented comparing levels of pre-task anxiety to levels of post-task anxiety for each condition, in addition to mean comparisons across threat conditions of levels of pre-task and post task-anxiety levels. Multiple regression analyses representing regression based path models are presented last.

The sample included 146 undergraduate students sampled from 26 undergraduate majors. The mean age was 20.84 (SD= 2.43). The sample consisted of 117 (80.1%) females and 29 males (19.9%) representing White (58.9%), Hispanic (15.1%), African American (17.8%), Asian American (4.8%), East Indian (1.4%), and Biracial/Multicultural (2.4%) participants.

For each threat condition (psychological and Physical), means, standard deviations, and Cronbach Alpha coefficients for levels of T-anxiety, pre- and post- task S-anxiety, primary appraisals, and secondary appraisals are reported in Table (1).

Table 1

*Means, standard deviations, and alpha coefficients for Trait anxiety (pre- and post-tasks), S-Anxiety (pre- and post- task) and primary and secondary appraisals (for both psychological and physical tasks)*

| Scale                                  | Mean         | SD          | Alpha      |
|--|--------------|-------------|------------|
| Trait Anxiety Pre-tasks                | <b>18.47</b> | <b>4.82</b> | <b>.85</b> |
| Psychological task                     |              |             |            |
| S-Anxiety Pre-Psychological task       | <b>16.42</b> | <b>4.87</b> | <b>.86</b> |
| Primary Appraisal-Psychological task   | <b>4.47</b>  | <b>1.51</b> | .61        |
| Secondary Appraisal-Psychological task | <b>9.26</b>  | <b>2.12</b> | .75        |
| S-Anxiety Post-Psychological task      | <b>21.88</b> | <b>6.06</b> | <b>.91</b> |
| Physical task                          |              |             |            |
| S-Anxiety Pre-Physical task            | <b>15.27</b> | <b>4.06</b> | <b>.84</b> |
| Primary Appraisal-Physical task        | <b>4.07</b>  | <b>1.33</b> | .58        |
| Secondary Appraisal-Physical task      | <b>10.03</b> | <b>1.97</b> | .69        |
| S-Anxiety Post-Physical task           | <b>16.98</b> | <b>5.00</b> | <b>.86</b> |
| Trait Anxiety Post-tasks               | <b>17.86</b> | <b>5.09</b> | <b>.87</b> |

Levels of S-anxiety pre- and post psychological task were higher than S-anxiety in pre and post-physical task, respectively, indicating that participants experienced and expressed higher levels of anxiety in the psychological threat condition as compared to the Physical Threat condition. Primary appraisals of Psychological task were also higher than Primary appraisals of Physical task, which means that participants perceived higher levels of threat in the psychological threat condition. However, with regards to secondary appraisals, participants demonstrated lower levels in the psychological threat condition as compare to the physical threat condition.

Results also suggest high levels of internal consistency for scales were found, as indicated by Cronbach Alpha coefficients. Test-retest reliability of Trait anxiety (pre

tasks and post tasks) indicated high levels of stability of trait anxiety in participants ( $r = .86, p < .005$ ), which is consistent with the conceptual definition of trait anxiety as a stable personality trait.

#### *Correlation Matrix*

Pearson Product Moment Correlations were calculated to assess the strength and significance of the correlations between the majority of variables: age, Trait Anxiety Pre-tasks ; S-Anxiety Pre-Psychological task; Primary Appraisal-Psychological task; Secondary Appraisal-Psychological task; S-Anxiety Post-Psychological task; S-Anxiety Pre-Physical task; Primary Appraisal-Physical task; Secondary Appraisal-Physical task; and Anxiety Post-Physical task. The correlation matrix is presented in Table 3.

#### *Psychological Task*

Trait anxiety was significantly and positively correlated with pre- and post S-Anxiety levels, and Primary appraisal, but was *not* correlated significantly with Secondary appraisals. There was a negative yet *significant* correlation between Primary and secondary appraisals. S-anxiety post task was significantly and positively correlated with primary appraisals, yet negatively and significantly correlate with secondary appraisals.

#### *Physical Task*

In this condition, T-anxiety was significantly correlated only with S-anxiety Pre-physical task (positively correlated). No other significant correlations were found between trait anxiety and any other variables in this condition. S-anxiety post task was found to be significantly and positively correlated with S-anxiety pre task, primary



appraisals, and significantly and negatively with secondary appraisals. Primary and secondary appraisals were negatively and significantly correlated.

Table 2

*Pearson Product Moment Correlations of correlations between Trait anxiety (pre-tasks), Pre- and post task S-Anxiety (for both psychological and physical tasks) and primary and secondary appraisals (of both psychological and physical tasks).*

|  | Trait<br>Anxiety<br>Pre-tasks | 2.                          | 3.                          | 4.                          | 5.                         | 6.                         | 7.                          | 8.                          |
|--|-------------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|
| <b>2. S-Anxiety Pre-<br/>Psychological task</b>      | <b>.413</b><br><b>.000</b>    |                             |                             |                             |                            |                            |                             |                             |
| <b>3. Primary Appraisal-<br/>Psychological task</b>  | <b>.298</b><br><b>.000</b>    | <b>.175</b><br><b>.035</b>  |                             |                             |                            |                            |                             |                             |
| <b>4 Secondary Appraisal-<br/>Psychological task</b> | -.154<br>.064                 | <b>-.172</b><br><b>.038</b> | <b>-.380</b><br><b>.000</b> |                             |                            |                            |                             |                             |
| <b>5. S-Anxiety Post-<br/>Psychological task</b>     | <b>.355</b><br><b>.000</b>    | <b>.310</b><br><b>.000</b>  | <b>.643</b><br><b>.000</b>  | <b>-.530</b><br><b>.000</b> |                            |                            |                             |                             |
| <b>6. S-Anxiety Pre-<br/>Physical task</b>           | <b>.377</b><br><b>.000</b>    | <b>.392</b><br><b>.000</b>  | <b>.383</b><br><b>.000</b>  | <b>-.424</b><br><b>.000</b> | <b>.612</b><br><b>.000</b> |                            |                             |                             |
| <b>7. Primary Appraisal-<br/>Physical task</b>       | .024<br>.774                  | .027<br>.742                | .148<br>.075                | .001<br>.991                | .121<br>.147               | .053<br>.528               |                             |                             |
| <b>8. Secondary Appraisal-<br/>Physical task</b>     | -.017<br>.836                 | -.094<br>.257               | -.108<br>.193               | <b>.425</b><br><b>.000</b>  | -.162<br>.051              | -.145<br>.080              | <b>-.321</b><br><b>.000</b> |                             |
| <b>9. S-Anxiety Post-<br/>Physical task</b>          | .063<br>.448                  | <b>.165</b><br><b>.047</b>  | .137<br>.100                | -.084<br>.314               | <b>.217</b><br><b>.008</b> | <b>.225</b><br><b>.006</b> | <b>.563</b><br><b>.000</b>  | <b>-.426</b><br><b>.000</b> |

*Note.* correlations coefficients in bold indicate significance at  $p < .001$ .

Collectively, the pattern of correlations presented in table 3 provides support for of hypothesis 1 (“*levels of post task S-Anxiety are significantly and positively correlated to T-Anxiety in the psychological threat condition, but not significantly correlated to T-Anxiety in the Physical threat condition*”). Support was also found for hypothesis 3 (“*primary appraisals will be significantly and positively correlated with post-task S-Anxiety in both conditions*”) and hypothesis 4 (“*primary appraisals will be significantly and positively correlated with post-task S-Anxiety in both conditions*”). Hypothesis 3

*(primary appraisals will not be significantly correlated to secondary appraisals in either threat condition)* was not supported.

#### *Mean Comparisons*

Comparisons across gender: Independent Sample T-tests were conducted to assess for any significant differences between males and females. Females demonstrated significantly higher levels of pre-task S-Anxiety in the Psychological condition as compared to males ( $t = 2.204$ ,  $P < .05$ ). No other significant differences between males and females were found.

#### *Paired Sample t-Tests*

Several mean comparisons of post task S-Anxiety (in both conditions), primary appraisals, and secondary appraisals are presented in table 4. The results for the paired sample t-tests in the table provide support for five hypotheses (“5. *levels of post-task S-anxiety in the psychological threat condition will be significantly higher than levels of pre-task S-Anxiety*; 6. *levels of post-task S-anxiety in the physical threat condition will be significantly higher than levels of pre-task A-Anxiety*; 7. *levels of post-task S-anxiety in psychological threat condition will be significantly higher than those in physical threat condition*; 8. *levels of primary appraisals and S-Anxiety in psychological threat condition will be significantly higher than in the Physical threat condition*; 9. *levels of secondary appraisals of the psychological threat condition will be significantly lower than in the physical threat condition*”).

These results provide initial predictive evidence related to several connected elements in the proposed model of this study. First, there are apparent significant elevations in S-anxiety when measured immediately before and after the execution of

either a psychological or a physical task and evaluating the levels of threats associated with each task. Second, these elevations in S-Anxiety levels are higher in conditions perceived as psychologically threatening as opposed to conditions evaluated by participants to be physically threatening. Third, primary appraisals of psychological threats are higher than those of physical threats within the same sample of participants, whereas levels of secondary appraisals are higher in physical threat conditions for the same sample.

Table 3

*Paired sample T-tests within and across both tasks for post- task S-anxiety levels and primary and secondary appraisals*

|   | <b>Mean Diff</b> | <b>SD</b> | <b>SE mean</b> | <b>t</b>        | <b>Sig</b>    |
|---|------------------|-----------|----------------|-----------------|---------------|
| <b>Pre-task S-Anxiety (Psychological) – Post-task S-Anxiety (Psychological)</b> | - 5.47           | 6.50      | .54            | <b>- 10.17*</b> | <b>.000*</b>  |
| <b>Pre-task S-Anxiety (Physical) – Post-task S-Anxiety (Physical)</b>           | -1.71            | 5.70      | .47            | <b>- 3.63*</b>  | <b>.000*</b>  |
| <b>Pre-task S-Anxiety (Psychological)- Pre-task S-Anxiety (Physical)</b>        | 1.15             | 4.98      | .41            | <b>2.79*</b>    | <b>.000*</b>  |
| <b>Post-task S-Anxiety (Psychological) – Post-task S-Anxiety (Physical)</b>     | 4.90             | 6.97      | .58            | <b>8.50*</b>    | <b>.000</b>   |
| <b>Primary Appraisals (Psychological) – Primary Appraisals (Physical)</b>       | .40              | 1.86      | .15            | <b>2.62**</b>   | <b>.010**</b> |
| <b>Secondary Appraisals (Psychological) –Secondary Appraisals (Physical)</b>    | - .77            | 2.19      | .18            | <b>- 4.22*</b>  | <b>.000</b>   |

*Note.* df = 145 for all t-tests; \*: significance at p<.001; \*\*: significant at p<.05.

### *Repeated Measures ANOVA*

Each participant responded 2 times to the S-Anxiety items in each of the experimental conditions yielding four means for S-Anxiety. Repeated measures ANOVA with orthogonal post hoc tests (Swain & Jones, 1996) were conducted to assess for significant differences among the means. Mauchly's test of sphericity indicated that the assumption of sphericity was violated ( $\chi^2(5) = 40.58, p < .05$ ). Therefore, degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ( $\epsilon = .87$ ). Results indicated that the four S-Anxiety means differed significantly ( $F(2.6, 378.6) = 70.46, p < .05$ ).

Post hoc analyses using contrast method and Bonferroni Adjustment revealed that post-task S-Anxiety in the psychological condition was the highest among the 4 means, followed by post-task S-Anxiety in the physical condition (Table 5). This finding indicated that participants experienced the highest levels of S-Anxiety following the task of the 2-minute speech. Pre-task S-Anxiety in the psychological condition was not significantly different than pre-task S-Anxiety in the physical condition. Within each of the conditions, post-task S-Anxiety levels were significantly higher than pre-task S-Anxiety.

### *Model Prediction and Testing*

To test for our proposed model, a regression-based path analytic model was conducted using simultaneous multiple regression analyses. The method of variable entry used was stepwise, which allowed predictor variables to be entered one at a time, and then deleted once they do not contribute to the regression when considered in combination with other predictors. Using LISREL 8.72 for a maximum of 250 iterations,

the solution converged and produced differential path diagrams for each of the stressful conditions. Figures 1 and 2 show predicted model for the psychological threat and physical threat conditions, respectively. In each of these figures, only significant regression paths were reported. The values for each path indicate *significant* standardized Beta path coefficients, and the percentage of variance of the predicted variable that is accounted for by the respective predictor.

.As can be seen in figure 2 for the *Predicted model for psychological threat*, T-Anxiety had a direct effect on Primary appraisals ( $\beta=.298$ ,  $p<.05$ ,  $R^2= 8.9\%$ ), pre- task S-Anxiety ( $\beta=.413$ ,  $p<.05$ ,  $R^2= 17.1\%$ ), and post task S-Anxiety ( $\beta=.355$ ,  $p<.05$ ,  $R^2= 12.6\%$ ). Trait anxiety did not have a direct predictive effect on secondary appraisals, and hence hypothesis A was partially supported. Trait anxiety had a significant indirect influence on S-Anxiety post task as mediated Primary appraisals, and through pre-task S-anxiety, but not through secondary appraisals, which represents partial support for hypothesis B. Hypothesis C was supported as results indicated that T-anxiety had an indirect influence on primary appraisals as mediated by pre-task S-anxiety. Hypothesis D was not supported given that trait anxiety did not have an indirect influence on secondary appraisals as mediated by Pre-task S-anxiety. Hypotheses E and F were supported as demonstrated by primary appraisals having a direct influence on S-Anxiety post task, and secondary appraisals will have a direct influence on S-Anxiety post task, respectively. Partial evidence was available for hypothesis G as pre-task S-Anxiety had a direct influence on S-Anxiety post task, primary appraisals, but not secondary appraisals. Counter evidence was found for hypothesis H where primary appraisals and secondary appraisals were actually found to have a bidirectional predictive path.

As depicted in figure 3, the *Predicted model for physical threat* condition had less significant predictive paths than in the psychological threat model. As can be seen in figure 3, trait anxiety had a direct influence only on pre-task S-Anxiety. It did not have any direct influence on primary appraisals, secondary appraisals, or post-task S-Anxiety. Trait anxiety also had an indirect effect on S-anxiety post task through pre task S-anxiety. Primary and secondary appraisals also showed direct predictive values for post-task S-Anxiety. Primary and secondary appraisals were also found to have a bidirectional predictive path (similar to the finding in the psychological threat model).

## Chapter Seven

### Discussion

This study investigated the effects of individual differences in trait anxiety on cognitive appraisals and emotional reactions to stressful situations. Specifically, this study attempted at examining the effects of trait anxiety on cognitive evaluative perceptions of situations bearing perceived psychological or physical threat to well-being, in relation to levels of S-Anxiety. To accomplish this goal, a proposed model consisting of elements from Lazarus and Folkman Stress and Coping Model (1984) and Spielberger's State Trait distinctions is presented. To our knowledge, this is the first proposed model to attempt combine trait anxiety, primary and secondary appraisals, and state anxiety and to utilize path analytic models in assessing empirical and theoretical fit.

This study represents a pioneer attempt at examining the empirical fit of the theoretical framework proposed by Spielberger 30 years ago (Spielberger, 1976). In specifying the "Trait anxiety → situation evaluation → State anxiety" relationship, he emphasized the importance of cognitive perceptive evaluations of stressful situations in specifying the amount of stress inherent in a situation. He theorized that individuals who are high on trait anxiety (defined as tendency to perceive more situations as more threatening to self esteem or psychological well being), tend to react with higher levels of S-Anxiety to situations that they deem to include stress or threat to one's self esteem (psychological threat).

While the state trait distinction was modeled and examined in thousands of studies, to our knowledge, there has not been a study that aimed at examining or modeling the state trait connection as mediated by the evaluative process, let alone using a within-sample design that included psychological threat or physical threat conditions.

A parallel research school was started by Richard Lazarus in the sixties. Lazarus and his colleagues (Lazarus & Folkman, 1984), defined a cognitive appraisal as a process that is evaluative in nature and depends on attributing a certain level of stress to any given situation.

From the standpoint of this study, Spielberger's State Trait distinction and Lazarus' cognitive evaluative appraisals represent complimentary and yet unexplored elements of one model that may explain the interaction of personality, environmental, cognitive and emotional elements in explaining anxiety as a process that included a series of variables (Spielberger 1976).

This study also addressed three major limitations in previous stress-anxiety studies: a) including cognitive, personality, and emotional elements to address the stress-anxiety relationship from several angles; b) combining different yet complimentary elements to produce an overarching theoretical framework against which the empirical fit of the proposed model will be tested; and c) adhering to conceptualizations of state and trait anxiety as emotional states and personality traits, respectively.

The results in this study are very interesting. Although the design of the study was simple, support was found for many hypotheses. On the descriptive level, alpha coefficients were high for each of the subscales of the STPI, which indicated impressive levels of internal consistency in these scales. It is noteworthy that the alpha coefficients



for primary and secondary appraisals were also very impressive, especially for a 3 item scale that was developed for this study. These results provide further empirical justification, to the use of the single item approach to measurement of cognitive appraisals in this study.

Results from mean comparisons section indicate that participants reacted with higher elevations of S-anxiety in the psychological threat condition as compared to the physical threat condition. This finding is significant and unique since this is the first study that examines the differential effect of the type of stressor on the mediated path between T-anxiety and S-anxiety.

The most interesting findings are probably the different indices of empirical and theoretical fit across the two predictive regression-based path analytic models of state-trait distinction in psychological and physical threat conditions. In comparing the two models, it is interesting to note that t-anxiety had a consistent (*and equal*) predictive influence on pre-task S-Anxiety ( $\beta=.413$ ,  $p<.05$ ,  $R^2= 17.1\%$ ).

Other interesting findings across the two models are related to the predictive effects of T-anxiety on primary and secondary appraisals in the psychological condition, and the lack of these effects in the physical threat condition. T-anxiety had a direct effect on post-task S-anxiety only in the psychological condition and not in the physical condition.

Pre-task S-anxiety had a predictive value on post task S-anxiety in both threat conditions, had a predictive influence on primary appraisals only in the psychological threat condition, and did not have any influence on secondary appraisals.

Of the variables explaining the variance in post-task S-anxiety, primary appraisals explained the most variance in psychological and physical threat (41.4% and 31.2%, respectively). Secondary appraisals explained 23.8% of post-task S-anxiety (psychological threat) and 17.6% (physical threat).

Taken together, these results indicate some interesting tentative trends: the importance of primary and secondary appraisals in mediating the relation between T-anxiety and S-anxiety; the importance of differentiating between the types of stress associated with a specific stressful situation; and the importance and compatibility of personality, cognitive and emotional elements in the conceptualization and evaluation of stressful situations.

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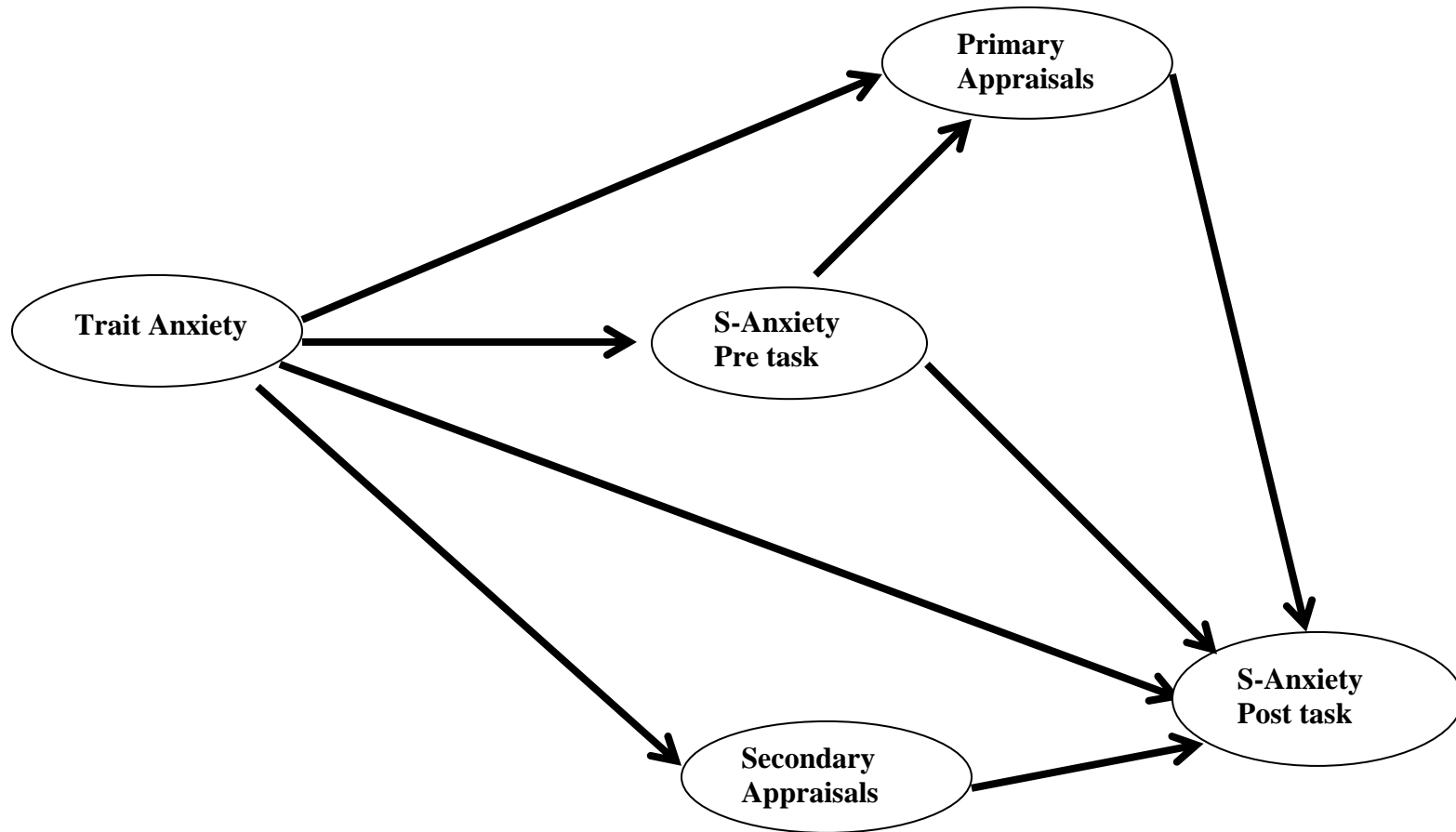
## Appendices

Appendix A: Primary and Secondary Cognitive Appraisal Items

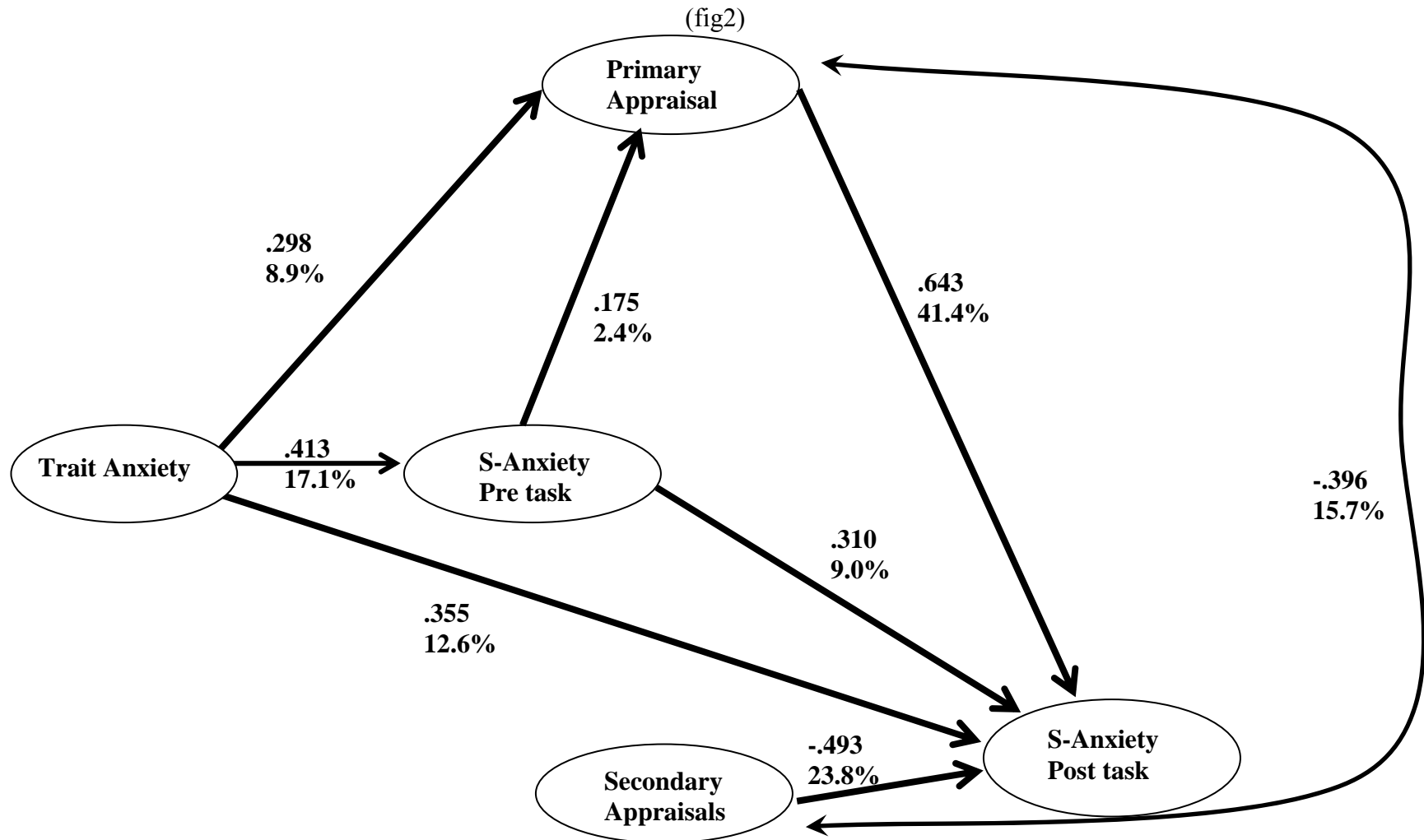
| Type of cognitive appraisal   | Item used   |
|---|---|
| <p>Primary Appraisal:</p> <p>Physical threat</p> <p>Psychological threat</p> <p>Personal stress</p>     | <p>“This situation would be threatening for me, e.g., causing negative consequences to my physical well being”</p> <p>“This situation would be threatening, e.g., causing negative consequences to my self-esteem”</p> <p>“This situation would cause me personal stress”</p> |
| <p>Secondary Appraisal:</p> <p>Personal control</p> <p>Social support</p> <p>Intellectual resources</p> | <p>“I have physical or psychological control in this situation”</p> <p>“I have social support to help me deal with this situation”</p> <p>“I am smart enough to deal with the situation”</p>  |



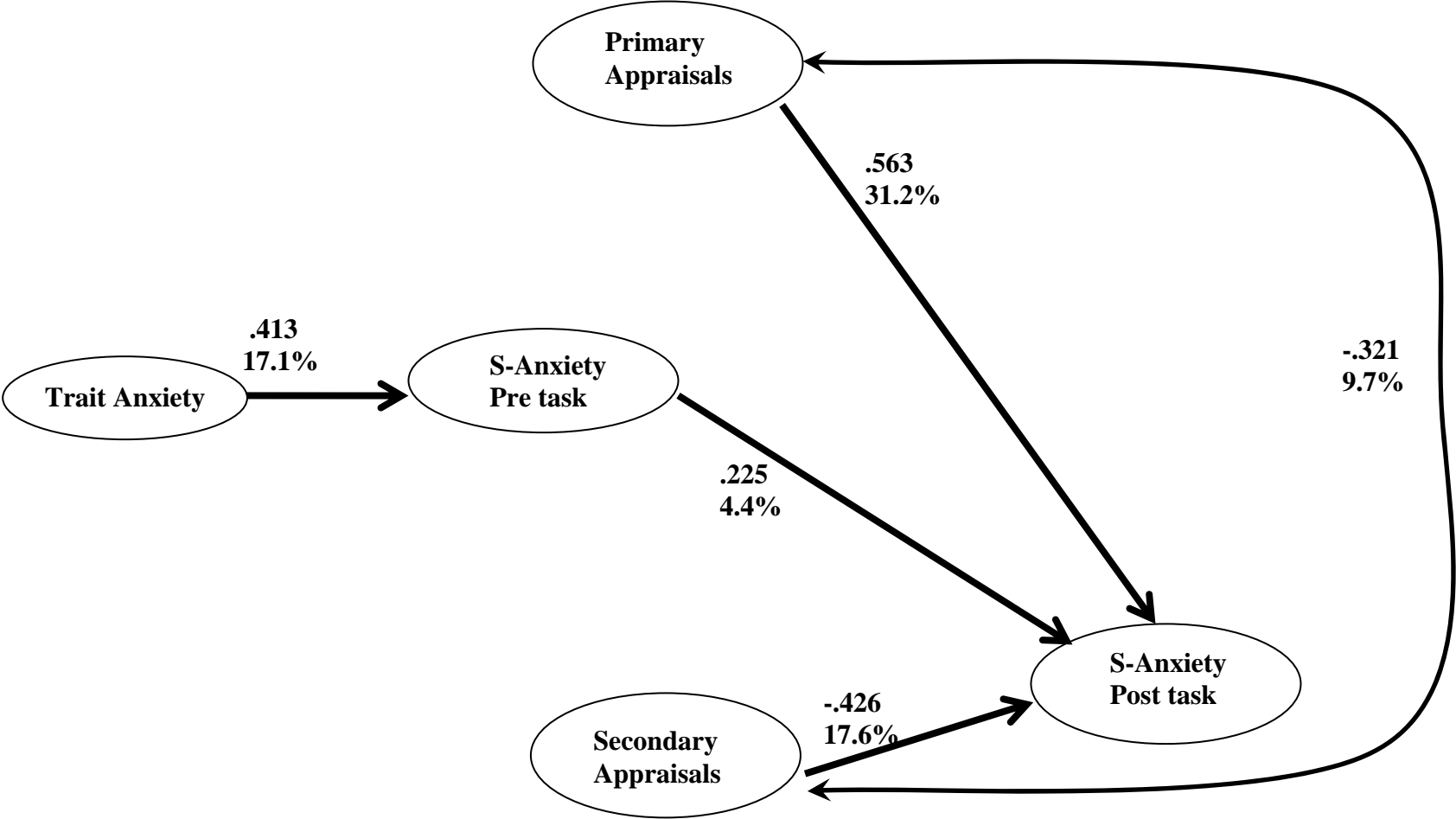
Appendix B: Proposed Model for T-Anxiety, Primary and Secondary Cognitive Appraisals, and S-Anxiety (fig1)



Appendix C: Model for Psychological Threat Condition: T-Anxiety, Primary and Secondary Cognitive Appraisals, and S-Anxiety



Appendix D: Model for Physical Threat Condition: T-Anxiety, Primary and Secondary Cognitive Appraisals, and S-Anxiety (fig3)



### About the Author

Qutayba Abdullatif received his BA and MA Degrees in Psychology from the American University of Beirut in 1998 and 2000, respectively. He joined the Clinical Psychology Ph.D. program at the University of South Florida in 2001. He received his second MA Degree in Clinical Psychology in 2004 and completed an APA-accredited pre-doctoral internship at the University of California, San Diego. He was awarded his Ph.D. Degree in Clinical Psychology in 2007. During his tenure as a graduate student and a pre-doctoral intern, Qutayba was actively involved in multiple research, clinical, teaching and administrative positions within the field of Psychology. His 8,000 mile journey landed him in Southern California, where he still resides, enjoying perfect sunny days that make him fall in love with life all over again.