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The relationship between traumatic occupational stressors, appraisal, coping, hardiness and psychological outcomes – the cognitive-behavioural model applied to rescue helicopter crews.

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Abstract

The present study used the cognitive-behavioural model of stress to investigate how traumatic events encountered during the performance of occupational roles affected an individual's health and well being. This study was conducted with rescue helicopter crews, a relatively unstudied group of emergency service personnel, but a particularly vital group in New Zealand where rough terrain and changeable weather mean land based crews can not always easily or quickly access certain incidents. This study also aimed to investigate the role cognitive hardiness may play in moderating the impacts of traumatic encounters.

Questionnaires assessed participant's primary appraisals and coping strategies, cognitive hardiness, general health and well-being, positive and negative affect and growth after a particular traumatic or stressful event encountered whilst carrying out their occupational duties.

Bivariate correlations suggest this population used unique strategies to cope with the events they encountered, particularly using techniques which aim to disengage ones self from the situation. These strategies tended to be adaptive for this population. Multiple regression analysis suggested that cognitive hardiness played a moderating role for some individuals but not for others. Future research is needed to test a variety of relationships tentatively established in the present study.

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Chapter One

THE IMPACTS AND IMPORTANCE OF OCCUPATIONAL STRESS

1.1 History and legal status of occupational stress

In most industrialized societies, the average employed person spends 30-40% of their waking time in occupational related roles (Schwartz, Pickering, & Landsbergis, 1996). Within the last decade occupational stress has become a more prominent issue in relation to occupational safety and health, consequently the World Health Organisation acknowledged this issue to be one of the top ten influences on physical and psychological health in the western world (Wilkinson & Marmot, 1998). Echoing this trend New Zealand has begun to recognise the importance of identifying and eliminating causes and symptoms of this problem in the workplace. The highlighting of stress as an issue in the workplace can be partially attributed to a number of incidents triggered by pressure in the workplace in the early 1990s (Walls & Darby, 2004). These shifts in perspective have led to changes in occupational safety and health legislation to now include work-related stress. The Health and Safety in Employment Act 1992 requires that both employers and employees ensure the safety of themselves and others whilst at work and that no action or inaction should cause harm to others whilst at work. In 2002 this act was amended to redefine the term harm to include "illness, injury or both and includes physical or mental harm cause by work-related stress" (Heath and Safety in Employment Act, 1992).

1.2 Costs and symptoms of stress in the workplace

Occupational stress can have major effects on both organisations and their employees. For individuals this stress can manifest itself in many ways including increases in blood pressure, difficulties sleeping and concentrating, variable mood states, slowed reactions, irritability, and aggression, to name just a few (O'Driscoll & Cooper, 2002). Often these symptoms do not only affect the well-being of the individual at work but spill over into other domains such as interactions with family and friends. The literature now suggests that chronic stress in organisational settings is becoming epidemic within industrialised societies and is the result of changes in organisational culture, towards valuing ability and competition over lifelong commitment. Regarding the present states of affairs within New Zealand it has been suggested that the changing nature of corporate culture today predisposes managers and corporate executives to stress and health problems (Wharton, 2002). Research conducted in New Zealand in the mid-1990's indicated that 65% of office workers considered their occupation to be the biggest source of stress in their lives. Forty-one percent of participants in the same study stated that their work stress had increased over the past three years (Sullivan, 1995).

Organisations suffer the costs of employees' occupational stress principally in the form of financial losses. Organisational factors such as increases in absenteeism, high staff turnover, decreases in performance at work, staff requesting illness/sick leave and increased accidents in the workplace can be manifestations of stress related problems (Moore, 2001).

Few statistics on the exact financial costs of work-related stress are kept in New Zealand; however US researchers estimate the cost to businesses of stress related health complaints at more than US$300 billion per year. Estimates suggest between 60 and 80% of injuries which occur in the workplace result from stress related issues (Wharton, 2002). Accurate and exact figures regarding the incidence of occupational stress can be difficult to ascertain due to the lack of any one accepted definition of the term. The following section will discuss a number of models which have defined stress and delineated its precursors and outcomes in different ways.

1.3 Influential models of stress

1.3.1 Models of stress

Discussions of stress within the literature tend to lack an agreed upon definition of the term "occupational stress". Early conceptualisations of "stress" were derived from medical literature, suggesting that the process by which stress occurred was similar to catching a disease in that the individual must come into contact with a pathogen (or an environmental demand) which produced what was termed the 'fight or flight' response. The General Adaptation Syndrome (GAS), developed by Hans Selye, was one of the first articulate physiological models of the relationship between demands and outcomes. This model defined stress as "the non-specific response of the body to any demand" (Selye, 1974, p.14). GAS conceptualised stress as an environmental demand which resulted in a three stage process of alarm, resistance and exhaustion. Physical and psychological deficits were presumed to be the result of an

individual's resources being depleted or exhausted (Cohen, 2000). Eventually both psychology and medicine came to understand that contact with a demand was necessary but not sufficient to produce a reaction, the individual must also be vulnerable to its influence and numerous external and internal factors can affect this susceptibility (Lazarus & Folkman, 1984).

1.3.2 Psychodynamic models - Defence

Freud and a number of his psychodynamically oriented associates attempted to expand the definition of stress by directing their focus towards how psychological defence mechanisms fend off aversive feelings created by external stressors (Somerfield & McCrae, 2000). Defence mechanisms as conceived by psychodynamic theorists are unconscious, unintentional and cause psychological maladjustment (Cramer, 2000). Psychodynamic theories began to lose favour in the 1950s and 60s partially due to the difficulty of studying defence mechanisms believed to be unconscious and partially due to the resurgence of behaviourism and the goal of studying observable phenomena. A problem later recognised with psychodynamic theories was their emphasis on the maladaptive, deleterious outcomes which left little room for discussions and explanations of the adaptive and positive outcomes which sometimes occur after a stressful encounter.

1.4 Psychological models

Caplan and Lindemann (1964; 1944) were among the first proponents of the psychological perspective of stress as distinct from physiological and defence models. These authors were interested in investigating how life crises and extreme challenges impacted on a person's world. This early work paved the way for the evolution of new cognition based theories. Since then numerous models have been formulated which attempt to explain and define the characteristics necessary to produce a psychological and/or physiological stress response as a result of an environmental encounter. A number of theories which have been useful in attempting to understand the demand-outcome relationship and factors which influence this relationship will be briefly outlined below.

1.4.1 Conservation of Resources

One theory which attempts to explain the how a stressful interaction occurs is Hobfoll's (1989) Conservation of Resources Model. This theory suggests that stress occurs in one of three ways: as a result of a threat to a person's resources, when an individual's resources are actually lost or when a person is unsuccessful in an attempt to gain resources. "Resources" can be tangible or intangible and can include personal characteristics (e.g. courage or self-esteem), objects, life conditions (e.g. good working conditions, or good friendships), abilities, knowledge, skills or education. This model has been useful in explaining how relationships between work and home can create stress and which individual characteristics may affect the relationship between demands and stress

(Grandey & Cropanzano, 1999). It has been used by the New Zealand Department of Labour in its creation of the 'Bucket' model of stress depicted in Figure 1 (New Zealand Department of Labour, 1998). However this model tends to simplify the issue, suggesting that with adequate resources any individual should be able to cope with any potential demand. This model is also based on the assumption that all stressors are the same and will all be managed in the same manner, which is unlikely to be the case in reality.

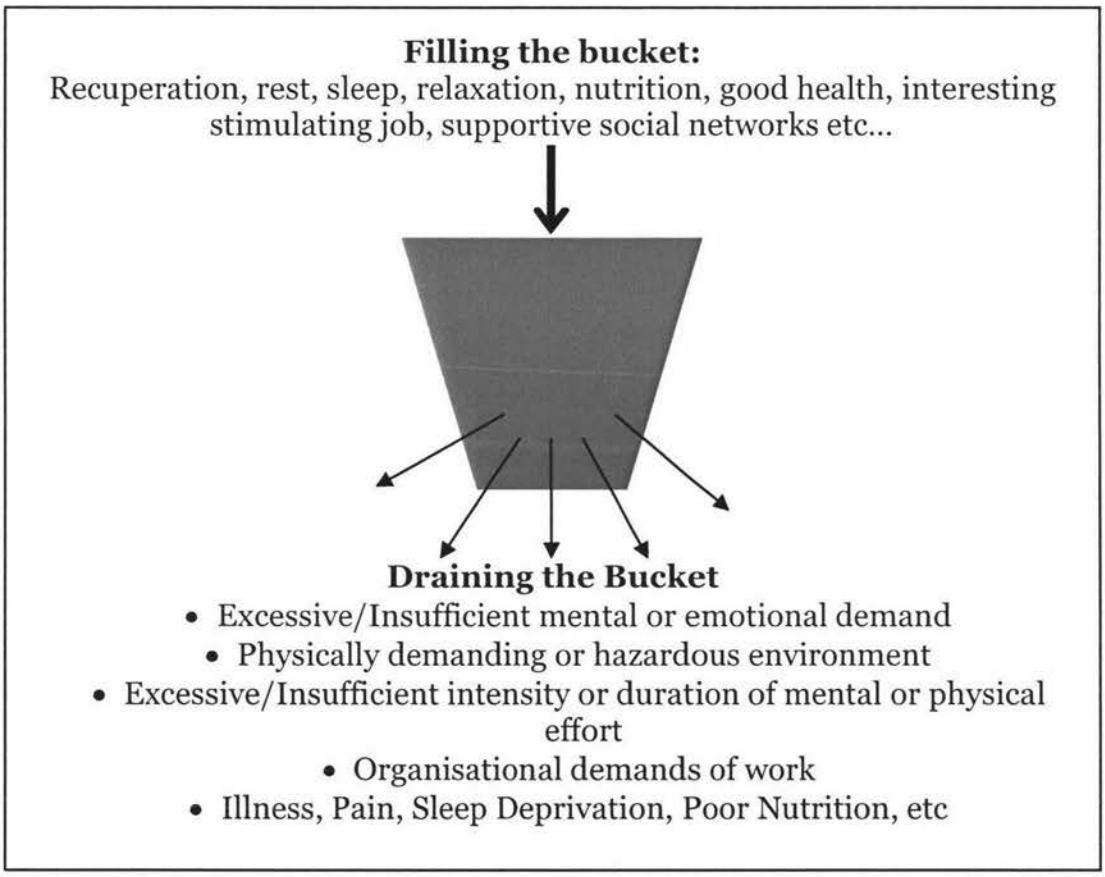

Figure 1. The Bucket model of Stress (New Zealand Department of Labour, 1998.)

1.4.2 Person-Environment Fit

Theories of Person-Environment Fit (P-E Fit) suggest that stress is the result of a lack of correspondence between an individual and their

environment. Models of P-E fit tend to emphasise congruence between the needs and values of an individual and the environmental supply of opportunities to fulfil these needs. These models also highlight the need for correspondence between the skills and abilities of an individual and the physical and intellectual demands of the environment (French, Caplan, & Van Harrison, 1982). Models of P-E fit have advanced our understanding of the processes by which stress occurs through environmental interactions however the model has been criticised for assuming that the relationship between a person and their environment is static and for the small amount of variance in stress levels which can be explained by fit. Models of P-E fit fail to conceptualise the manner in which both persons and the environment can change over time, they "do not provide information about whether and how a person copes (and) ... cannot reveal changes in stress-related phenomena ... as a specific encounter unfolds" (Folkman & Lazarus, 1985, p.151).

1.4.3 Demands-Control-Support model

The demands-control-support model is based on the assumption that stress arises when an individual encounters high environmental demands and has low control over the necessary resources to meet those demands (Karasek, 1979). Social support is included as a factor in this model as a 'buffer' against stress. This model has often been applied in the context of work-related demands. Job demands are psychologically strenuous encounters with the environment. The amount of control an individual possesses is termed 'decision latitude'. The demands-control-

support model suggests that stress results when decision latitude is low and job demands are high (Karasek & Theorell, 1990). An illustration of the relationship between decision latitude and demands is shown in Table 1. This model, despite reasonable empirical support, has been shown to have a number of flaws. Firstly, it implies that all individuals desire to have control over their work and it suggests that every person wants to make decisions, which is not always the case. Secondly, there is a large number of other variables which have been shown to affect the relationship between demands, decision latitude and stress, such as self-efficacy, self-esteem, and locus of control (Van Der Doef & Maes, 1999).

		Job Demands	
		Low	High
Decision Latitude	Low	**"Passive" Job**	**"High Strain" Job**
	High	**"Low Strain" Job**	**"Active" Job**

Table 1. Relationship between Job Demands and Decision Latitude

1.4.4 Role Stressors

Kahn et al (Kahn, Wolfe, Quinn, Snoek, & Roesnthal, 1964) proposed the theory of role stress. A role is a set of behaviours which are expected of someone holding a particular position e.g. a mother or a Chief Executive Officer. An individual may occupy multiple different roles. Role stress can occur in one of three ways. Firstly, when the expected behaviours are not clearly defined there can be *role ambiguity*. Role

ambiguity creates stress for an individual due to the insecurity of not knowing what is expected of them to fulfil the role requirements. Secondly, *role conflict* is where the expected behaviours of two positions are incompatible. This can be seen in conflicts between work and family, where the behaviours expected of a parent at home may be at odds with the behaviours expected of an employee at work. Finally *role overload* is where the demands of a role exceed an individual's resources and abilities. Role theory is logically sound and can be helpful in identifying potential demands within the work field; however it tends to have practical limitations, including lack of regard for external environmental factors, such as social support or internal personal factors such as self-efficacy.

1.4.5 Schema Theory

Schema are mental representations of reality, they are a mental model of a person, role, situation or object. They help individuals organise and classify environmental information. Schema simplify the complex interactions between a person and their environment and provide a frame of reference for understanding these interactions (Janoff-Bulman, 1992). Individuals attempt to interpret new information in line with existing cognitive schema. However, when a person encounters information which cannot be assimilated the schema must adjust. Traumatic stress is the main focus of the present study and schema theory suggests this occurs when a traumatic event cannot be assimilated by existing schema and is stored in active memory. The encounter is replayed over and over in an individual's mind until the schema have adjusted enough to accommodate

the information. Schema theory is one of the most prominent theories as to how traumatic events affect individual's wellbeing and will therefore be more thoroughly examined and critiqued in chapter 3.

1.4.6 The Cognitive-Behavioural Model

Lazarus and Folkman in their seminal work "Psychological Stress and the Coping Process" (1966) composed what was to become one of the most influential models of chronic stress, the "cognitive-behavioural model of stress". This model proposes that it is an individual's appraisal of an environmental demand and their resources for dealing with that demand which mediate whether a stress reaction occurs (Lazarus & Folkman, 1984). The cognitive-behavioural model will be the basis for the present research. This model and its integral concepts will be discussed in full in chapter 3.

The cognitive-behavioural model distinguishes between "stressors" as antecedents and "stress" as a process or an outcome. Stress can be defined as "the interaction between a person and their (work) environment and is:

> *(i) The awareness of not being able to cope with the demands of one's environment, when*
>
> *(ii) This realisation is of concern to the person"*
>
> (Occupational Safety and Health, 1998, p.7)

1.5 Traumatic stress vs. chronic stress

Chronic occupational stress is an important field of research however, just as important and potentially detrimental to both the organisation and the individual, is traumatic occupational stress. Chronic stressors are "irritating, frustrating, distressing demands that to some degree characterize everyday transactions with the environment" (Kanner, Coyne, Schaefer, & Lazarus, 1981, p.2). Chronic stressors are not as intense as traumatic stressors however they generally occur over an extended period which can make them as difficult to manage as acute time-limited traumatic stressors. Traumatic events can create intense disruption of functioning, but the stressor itself is usually only present for a short period (Hobfoll, 1989). These events often involve a significant threat to a person's well-being or to the well-being of others.

1.5.1 Trauma and traumatic events

Trauma can be defined as a stimulus or as a response. Stimulus definitions are "traumatic encounters". The Diagnostic and Statistical Manual Version IV-Text Revision (DSM IV-TR) for clinical psychology defines a traumatic encounter as "an event that involves actual or threatened death or serious injury, or other threat to one's personal integrity" and can include "learning about the unexpected or violent death, serious harm, or threat of death or injury experienced by a family member or other close associate" (American Psychiatric Association, 2000, p.463). Examples include combat, sexual and physical assault, severe car

accidents, terrorist attacks, natural disasters or witnessing death or serious injury by accidents or assault.

After an extensive search of the literature a precise definition of trauma as a response was not found, with most definitions being circular, stating that trauma is the outcome of a traumatic encounter (Brewin, Dalgleish, & Joseph, 1996). The Concise Oxford English dictionary defines trauma as "an emotional shock following a stressful event" (Oxford University Press, 2001, p.1526). The emotional shock of trauma may leave an individual feeling vulnerable, distressed, or out of control. Psychological trauma, by this definition, can occur after any potentially traumatic or stressful encounter.

1.5.2 Work-related trauma

The present study will define work-related trauma along similar lines to the Oxford English dictionary in an attempt to avoid circularity of argument. Work-related trauma will be defined as an "emotional shock following a stressful encounter experienced during performance of occupational roles". Work-related traumatic encounters entail experiencing "an event that involves actual or threatened death or serious injury, or other threat to one's personal integrity" (American Psychiatric Association, 2000, p.463) during or as a result of performance of routine occupational roles. Occupational trauma occurs most often through performance of routine occupational roles, for example a police officer may be required to attend a bank robbery where he witnesses an

individual being shot. The literature distinguishes between direct occupational trauma where an individual experiences or witnesses an event first-hand, and vicarious trauma, which can occur as a result of contact with primary victims and occurs occasionally with individuals in helping professions such as counsellors. Within the present study the focus is on direct experience of traumatic situations during the performance of occupational roles. Trauma and the potential outcomes will be discussed in more depth in chapter 2.

1.6 Positive and negative outcomes of stress and trauma

As a result of the initial 'pathological' perspective, most of the early psychological studies of stress focused on the negative outcomes of stressful encounters. These included physiological changes such as increases in the likelihood of heart disease and ulcers (Fox, Dwyer, & Ganster, 1993), behavioural changes such as increases in smoking or addictive behaviours, as well as psychological changes such as depression, displaced anger, and anxiety (Kahn & Byosiere, 1992). However, within the past decade or so a number of researchers have begun to acknowledge that there may be positive changes associated with stressful encounters and that all outcomes may not necessarily be negative (Lazarus & Folkman, 1984; Park, Cohen, & Murch, 1996). Research on this topic has generally supported this conjecture. In a study of homosexual men caring for partners diagnosed with AIDS, Folkman (1997) found that although negative psychological states did occur throughout the care-giving and bereavement process, these were often balanced by the occurrence of

positive psychological states. Research has suggested that growth and thriving can occur after a stressful encounter, however in line with the cognitive-behavioural model this growth and thriving is mediated by individuals' appraisal of an encounter and the coping resources utilised to deal with that encounter (Park & Fenster, 2004). The aim of the present study was to attempt to establish whether positive as well as negative psychological outcomes are associated with traumatic stress. Further discussion of the potential positive and negative outcomes of trauma will be undertaken in chapter 2.

1.7 The Emergency Services

Emergency service personnel are exposed to a variety of traumatic events including events which endanger their own and their co-workers safety, serious injuries to others, death, body handling, and mass casualty incidents (Beaton & Murphy, 1995; Beaton, Murphy, Johnson, Pike, & Corniel, 1999). In their work "*In the Line of Fire: Trauma in the Emergency Services*," Regehr and Bober (2005) reported that the top three most stressful experiences for any emergency responder were: fatal incidents involving children, the death of a colleague, and the death of a patient for whom they were responsible. Numerous studies have been conducted into the effects of chronic and traumatic stressors on emergency service personnel including police officers, fire-fighters, paramedics, military rescuers, and volunteers in events such as the terrorist attacks on September 11th 2001. The majority of conclusions drawn from these studies have stated that it is a combination of routine operational stressors

and high-impact traumatic events which create occupational stress for emergency service personnel (Violanti & Aron, 1995; Walker, 1997). The present study will focus on an overlooked group of emergency service providers, helicopter rescue personnel, in an attempt to understand the processes through which positive and negative outcomes occur after traumatic encounters with this population.

1.7.1 Rescue Helicopters and their Crews

"The first hour after an accident or serious illness is critical. Every time the rescue helicopter is called out it gives a better chance of living and a better chance of returning to a quality life" (Welcome to the Search and Rescue Website, 2006). The rescue helicopters throughout New Zealand play a vital role in providing specialist medical care in situations where rapid responses are vital. Not only do they provide emergency medical services, they also take part in inter-hospital transfers, winch rescues in situations where landing is not possible, search and rescue missions for people lost at sea or in the bush, delivery of important tools to police or fire-fighters, and many other tasks that involve preservation of life or property (Wellington Westpac Trust Rescue Helicopter, 2006). Given that the individuals who man the rescue helicopters play such a vital role in saving lives it is important to attempt to understand how the events they witness and experience affect their psychological functioning.

1.8 The aims of the present study

The cognitive-behavioural model has been used to investigate how traumatic stressors, primary appraisal and coping influence psychological outcomes with university students and alumni (Armeli, Gunthert, & Cohen, 2001). The present study will attempt to apply the cognitive-behavioural model of stress to traumatic work-related stressors with rescue helicopter crews in an attempt to understand how primary appraisals, coping and cognitive hardiness influence psychological well-being.

The purpose of this research is to establish whether the cognitive-behavioural model can be applied to traumatic occupational stress as well as chronic stress. Specifically this research aims to investigate the appraisal and coping processes which the rescue crews utilise during traumatic events and how differences in coping processes and cognitive hardiness affect outcomes of these demands. This study will examine work related traumatic encounters, primary appraisal and coping processes and both positive and negative psychological outcomes. It will also investigate the moderating effect of cognitive hardiness to establish whether higher levels of cognitive hardiness are related to more positive psychological outcomes.

1.9 Overview of the following chapters

The topic of chapter 2 will be the prevalence and consequences of traumatic encounters. This chapter will also review the potential positive outcomes of traumatic occupational stressors and will look at what Posttraumatic Growth (PTG) is and its occurrence after a traumatic encounter. Chapter 3 will discuss in more depth schema theory in the context of traumatic events and will attempt to highlight a number of areas where this model in incomplete in its explanations of how stress occurs. It will then introduce the cognitive-behavioural model of stress formulated by Lazarus and Folkman and discuss the important concepts and the hypothesised relationships between demands, appraisal, coping and outcomes. It will conclude by attempting to justify the use of the cognitive-behavioural model as the theoretical basis for study. The topic of chapter 4 will be individual difference variables which can affect the relationships between demands and outcomes. This chapter will focus on cognitive hardiness and the hypothesised moderating effect this can have on the demand-outcome relationship. The remaining chapters will discuss the aims and hypotheses, the methods, and results of the present study and will finally wrap up with a discussion and conclusions on the present research and findings.

Chapter Two

TRAUMA, TRAUMATIC STRESS & POSTTRAUMATIC GROWTH

2.1 Prevalence of traumatic encounters

The definition of a traumatic encounter in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) (American Psychiatric Association, 2000) has been refined numerous times over the last two decades. This lack of conceptual clarity has meant that estimates of exposure to traumatic encounters in the general population have been difficult to establish. One study suggested that under the 2000 definition, the prevalence of exposure to trauma increased from 70 to 90% of the population having experienced some form of traumatic encounter (Breslau & Kessler, 2001). These figures suggest that traumatic encounters are not uncommon but incidence rates vary across different subgroups within the general population.

Men tend to be at an elevated risk for general exposure to traumatic events compared with women although certain traumatic events are more likely to be experienced by the different sexes. Women are more likely to be exposed to rape or sexual assault whereas men are more likely to be exposed to serious accidents or physical violence (Norris, 1992; Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993; Stein, Walker, Hazen, & Forde, 1997).

Another factor which influences the incidence of traumatic exposure is age. Norris (1992) reported that older people were less likely to have experienced a traumatic encounter within the past year and also, counter-intuitively, were less likely to have experienced a traumatic encounter during the course of their lifetime than younger people. This same study also found that older people were less likely to develop extreme symptoms of stress after a traumatic encounter than younger people. Certain types of traumatic encounters have been found to be associated with different age groups. Individuals under the age of 20 are more likely to have been exposed to violent assaults, whereas the sudden and unexpected death of a loved one is most often experienced by those in the 41-45 age bracket (Breslau, 2002).

Socio-economic status, race, and number of years at high school have also been associated with increases in exposure to traumatic events. Individuals who are in a low socio-economic bracket are more likely to have been exposed to a traumatic encounter than those who are more financially able. Race has also shown a correlation with trauma exposure. Black Americans, Puerto Ricans and other ethnic minorities were more likely to have experienced trauma than Whites in America. Finally, college dropouts were more likely to have been exposed to trauma than individuals who stayed in high school for longer (Breslau, 2002; Norris, 1992).

In New Zealand the statistics are slightly different. Flett et al. (Flett, Kazantzis, Long, MacDonald, & Millar, 2002) reported that in a sample of 1500 (536 men & 961 women) community residing residents, 51% reported having experienced a traumatic event. This study also found that women were more likely than men to have been exposed to a traumatic encounter of any kind and Europeans were more likely than Maori to have experienced a traumatic event during their lives. This study also suggested that type of trauma experienced differed with age. Younger adults (18-39) reported higher exposure to accident related trauma, whereas middle-aged (40-59) and older adults (60+) reported more exposure to trauma related to crime and hazards.

2.2 Consequences of traumatic stressors

The outcomes of an individual's encounter with a traumatic event are contingent on numerous factors. Carver (1998) lists four consequences which can occur after a traumatic experience.

1. The individual never recovers and continues to succumb to the memory of the stress, eventually being overcome by it.
2. The individual manages to get through the event but has long lasting psychosocial deficits due to the experience.
3. The individual returns to pre-event levels of functioning either gradually or rapidly.
4. The individual surpasses previous levels of functioning due to experiencing the event.

Traumatic encounters can lead to symptoms of stress such as depression, anxiety, withdrawal, drug and alcohol use, general psychiatric disturbances and Posttraumatic Stress Disorder (PTSD). However these events can also result in positive outcomes, such as psychological growth and reevaluation of life goals.

Posttraumatic Stress Disorder is characterised by re-experiencing the event, heightened arousal and avoidance of potential reminders and situations. Studies suggest that the prevalence of PTSD after traumatic events is approximately 5-6% for men and 10-14% for women (Breslau, 2002). Individual differences tend to influence whether individuals exposed to a traumatic event develop PTSD. Biological vulnerabilities, previous mental health problems, family environment, social support and a variety of other factors have been linked to development of PTSD after trauma (Regehr, Hemsworth, & Hill, 2001).

Evidence is beginning to suggest that there may be a cumulative effect of emergency service personnel's repeated exposure to potentially traumatic events (Beaton & Murphy, 1995). However the literature indicates that the prevalence of PTSD in emergency service populations is only slightly higher than the prevalence in the general population. Protective factors such as resilience and hardiness, training, openness to experience and the "rescue personality" have been posited to be the reason for the slight variation between the rescue and general populations (Beaton et al., 1999; Wagner, 2005). Findings have tentatively supported

a number of these conjectures however generalizations between emergency personnel subgroups can be difficult. The experiences of firefighters for example are likely to be distinct from the experiences of other subgroups of emergency personnel e.g. police or ambulance officers, due to the specialised skills and specific context within which these personnel operate. It is therefore important to understand the relationships among potentially traumatic encounters and psychological outcomes in all emergency subgroups and not to generalise between them.

2.3 Positive outcomes of traumatic stressors

Within the last decade or so it has come to be recognised that encountering a stressful situation does not necessarily result in maladaptive psychological outcomes and symptoms of stress. Lazarus and Folkman (1984) stated that stress is not "inherently maladaptive and deleterious ... major stress can cause people to draw upon adaptive resources they never thought they had" (p.181). In their discussion of the adaptational outcomes of stress, they suggest that positive outcomes are more likely if the event is a major crisis, not specifically traumatic but an event which a person does not consider themselves as capable of managing. This suggests that traumatic encounters are more likely to create opportunities for positive outcomes than chronic stressors.

Despite this early understanding, the positive side of traumatic events did not begin to be investigated until the mid 1980's. Early studies attempting to assess the positive outcomes of stressors were anecdotal

qualitative descriptions by survivors of trauma. More recent empirical work has begun to suggest that a large number of people actually experience growth and thriving after traumatic events (Affleck, Tennen, Croog, & Levine, 1987; Taylor, 1983). These advancements have lead to the development of the concept "Posttraumatic Growth" (PTG).

2.3.1 Psychological growth and thriving – Posttraumatic Growth (PTG)

Posttraumatic Growth is the "positive psychological change experienced as a result of the struggle with highly challenging life circumstances" (Tedeschi & Calhoun, 2004, p.1). Growth differs from thriving in that thriving is a "higher level of functioning in some life domain following a stressful encounter" (Park, 1998, p.269).

PTG can be a potential precursor of thriving. Psychological growth occurs when an individual encounters an event which they appraise as stressful and they are able to employ resources beyond their believed capabilities to overcome it. The focus of the present study is on growth as opposed to thriving. PTG can be considered as a process or an outcome of a traumatic encounter, however most often the outcome conceptualisation is used (Fazio & Fazio, 2005). As an outcome PTG is the experience of "developing new strengths such as enhanced relationships, the ability to cope with adversity, and a stronger sense of community" (Fazio & Fazio, 2005, p.226). PTG involves developing and enhancing skills an individual was not aware they possessed before the

encounter (Park & Fenster, 2004). When an individual experiences PTG this does not necessarily imply they have completely overcome the distress they have experienced as a result of the event (Tedeschi & Kilmer, 2005). Measuring PTG involves an assessment of whether individuals have managed to successfully cope with and overcome the event and whether the experience of a traumatic encounter has helped them to develop and prosper.

2.3.2 Domains affected by PTG

Traumatic encounters may provide an opportunity for individuals to develop "superior life structures" (Fazio & Fazio, 2005, p.226). This progression seems to occur in three key domains. Firstly, an individual may experience changes in their self perception. This may include the belief that a traumatic encounter occurred to aid an individual's development and "become a better person" (Calhoun & Tedeschi, 1998, p.456). Changes in beliefs about the self can also include becoming more self-reliant or feeling more experienced about life. Secondly, an individual will often report changes in their relationships with others, including feeling special bonds with people afflicted by the same experience or a realisation of how important an individual's loved ones are. Finally, an individual may experience changes in their philosophical positions on life or the world. This can include altering perceptions on ones place in the world or an overall better perspective on life (Calhoun & Tedeschi, 1998).

The majority of theories, formulated to explain the processes through which psychological and physiological reactions occur after a traumatic encounter, tend to focus on negative outcomes. There is however an increasing recognition of PTG after traumatic events and a number of theories have been adapted to accommodate this potential outcome. These interpretations of how PTG occurs will be reviewed in the following chapter along with the most utilised model of trauma and traumatic stress, schema theory.

Chapter Three

SCHEMA THEORY AND THE COGNITIVE-BEHAVIOURAL MODEL

3.1 Theories of trauma

Studies investigating the effects and outcomes of traumatic events encountered during the performance of occupational roles are numerous. A few of these analyses are grounded in the cognitive-behavioural model of stress - investigating how an individual's primary and secondary appraisal and coping strategies influence their experience of a traumatic encounter (Lazarus & Folkman, 1984). Other studies are based on the Conservation of Resources model – looking at how ones resources for managing an event affect psychological and physiological outcomes (Hobfoll, 1989). Some use the demands-control-support model – examining the influence social support and personal control can have on outcomes (Karasek & Theorell, 1990). The majority however are grounded in schema theory (Janoff-Bulman, 1992; Tedeschi & Calhoun, 1995).

3.2 Schema theory & traumatic events

Schema are mental models of a particular object or interaction that help an individual to understand, simplify and interpret their surroundings (Janoff-Bulman, 1992). Individuals possess an expectation of how a particular interaction will occur, who will say what, what the outcome will be, how things will take place and so on. Environmental encounters are compared to these schema and are understood in terms of their similarity

to these. Schema can be context specific and as a result schema established in particular circumstance may not transfer outside of this context (Bransford, 1979; Paton, 1997).

An individual can possess a schema about almost any individual or situation. A *person schema* is a mental model about how specific people conduct themselves. A *role schema* is a model about how individuals holding specific positions behave; for example one may possess a schema which represents teachers as formal, strict and pretentious therefore a teacher who enjoys heavy metal would not conform to this schema. A *rule schema* is a representation of relationships between actions, events or things e.g. how to ask a question in class. Finally, an *event schema* is a model of how a common sequence of events will proceed; for example how a tsunami occurs after an earthquake (Elsbach, Barr, & Hargadon, 2005).

Traumatic encounters are hypothesised to affect schema in three ways. Firstly, they shatter adaptive schema about the benevolence of the world and an individual's self-worth. Self and rule schema regarding the individual's invulnerability and security are called into question (Horowitz, 1986). Event schema about how a particular event should occur are also destroyed. Secondly, traumatic encounters can promote the generation of maladaptive schema about individuals and the environment. This can lead to the development of stress symptoms and potentially to maladaptive psychological disorders such as phobias and anxiety

disorders as well as posttraumatic stress disorder. Finally trauma can restrict development of adaptive schema after the event has occurred, which can lead to difficulty overcoming an event and limit an individual's psychological growth (Newman, Riggs, & Roth, 1997).

This theory proposes that directly after a traumatic encounter the experience cannot be accommodated into a person's existing cognitive schema. The intrusion (thoughts, images, nightmares, etc) and avoidance symptoms (of situations, images, reminders, etc), which commonly occur in stress reactions are said to be defensive mechanisms against the recurring memories and visions of the trauma as the mind attempts to adjust existing schema and to integrate the event (Jones & Barlow, 1990). As a result of the massive alterations which are necessary the event is stored in active memory until it can be reinterpreted and integrated (Creamer, Burgess, & Pattison, 1992). Individual differences in the outcomes of traumatic encounters are thought to be the result of differences in cognitive schema before the event (Dalgleish, 2004). Studies utilising this theory within the occupational setting have tended to focus on war veterans (Buydens Branchey, Noumair, & Branchey, 1990; N. A. Cooper & Glum, 1989; Green, Grace, Lindy, Gleser, & Leonard, 1990) and emergency service personnel (Davidson & Baum, 1993; Galloucis, Silverman, & Francek, 2000; Paton, 1994), drawing the general conclusion that the longer the period of exposure or the more intense the event experienced the more schematic alterations must occur, therefore the greater the symptoms of stress.

3.3 Problems with schema theory

Despite its extensive application schema theory has a number of limitations in its application to work-related trauma. Schema theory does little to take into account the personal and external factors which influence how, when and why a stress reaction will occur. This theory is unable to accommodate how an individual's personal attributions and interpretations of a traumatic encounter affect psychological outcomes (Brewin et al., 1996). Schema theory suggests that with every traumatic encounter which does not fit with a person's schema a stress reaction will occur (Horowitz, 1986). This is a somewhat simplistic perspective and the contextual variables which create a stress reaction in a particular environment need to be included to more fully understand the process.

Schema theory may be capable of explaining the processes by which the symptoms of stress and PTSD occur directly after an event; however this theory has difficulty explaining symptoms which do not occur immediately after the event, but which become evident at a later point in time. Late onset symptoms threaten the conjecture that stress related symptoms occur as a result of an individual attempting to assimilate new information into their existing schema after a traumatic encounter (Brewin et al., 1996) as this suggests that stress symptoms should occur immediately after the event has taken place rather than developing later.

The assumption of schema theory that stress results when an event can not easily be accommodated into pre-existing schema tends to imply that individuals with more negative representations of the world should be less likely to experience distress after trauma as their pre-existing schema can more easily accommodate a traumatic event. However research evidence tends not to support this, finding that pre-event psychological problems and prior traumatic experiences tend to increase rather than decrease stress symptoms (Dalgleish, 2004).

There are methodological problems with schema theory also. Assessing and measuring ones schematic representations before a traumatic encounter, to compare these with representations afterwards is a difficult, if not impossible, endeavour. Individuals' mental representations of reality are unconscious, therefore requesting an individual to articulate retrospectively what their schema of the situation was prior to the encounter is likely to be difficult at best (Newman et al., 1997).

3.4 The Cognitive-Behavioural Model

The cognitive-behavioural model suggests that environmental demands are not inherently stressful; it is a person's appraisal of them which makes them so. This model proposes that cognitive appraisal mediates the relationship between environmental demands and outcomes. Cognitive appraisal is the process by which a person evaluates "*Am I in*

trouble or being benefited in any way?" and "*What if anything can be done about it?*" (Lazarus & Folkman, 1984, p.31).

Primary appraisal is the first step in the transaction between an individual and their environment. Primary appraisal is an assessment of how the demand will affect the individual, whether it is harmful, challenging or threatening. The next step is secondary appraisal; involving a review of resources for dealing with the demand. These resources are called coping strategies. Coping is the process by which individuals manage their encounter. These steps are depicted in figure 2.

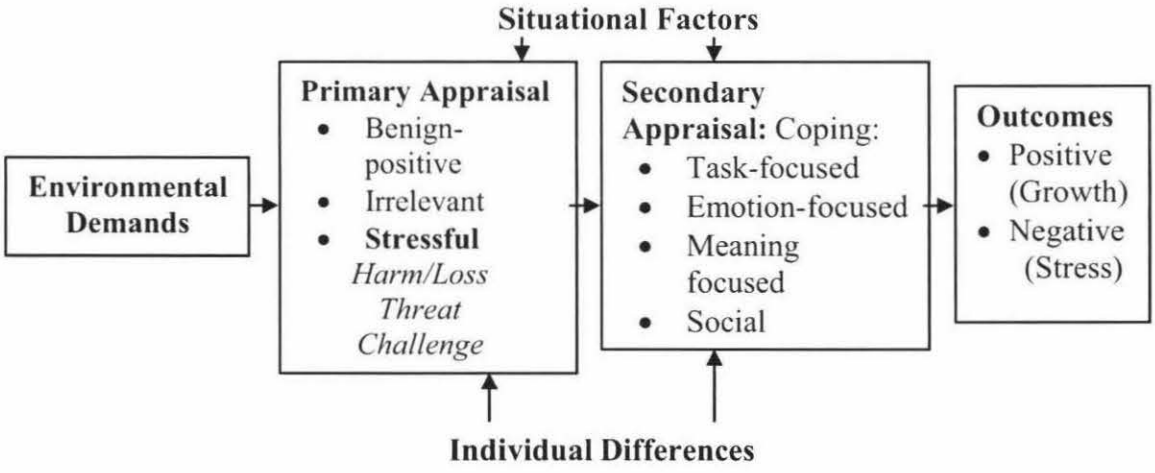

Figure 2. The Cognitive-Behavioral Model (Adapted from Lazarus & Folkman, 1984)

The explication of primary and secondary appraisal as steps in a process is primarily for conceptual clarity. In reality, primary and secondary appraisals occur concurrently. Lazarus (2001) suggests that the relationship between environmental demands, appraisals and outcomes is much like a seesaw, a balancing act between demands and resources.

When an individual encounters a relevant demand which they appraise as exceeding their coping resources stress is the most likely outcome (Lazarus, 1995).

3.5 Person-Environment transactions

The term 'transaction' refers to the reciprocal and ongoing relationship between the environment and the individual. The notion of a transaction between the environment and a person suggests that neither the person nor the environment alone creates a stress reaction; it is the interaction of the individual characteristics and the specific environmental circumstances which produce stress. Cognitive appraisals are transactional variables as they result from an interaction between the environment and an individual. The term 'transaction' implies that the exchange is not static but the person and the environment are constantly adjusting to accommodate new relevant information. It also indicates that particular events can be appraised and reappraised many times during one interaction (Lazarus, 1990). Transactional models hold that the person and the environment are in a "dynamic, mutually reciprocal and bidirectional relationship" (Folkman, Lazarus, Gruen, & DeLongis, 1986, p.572). Folkman and Lazarus (1985) considered change to be at the heart of coping and adaptation and integral to positive psychological outcomes after stressful environmental interactions.

3.6 Environmental demands

The first stage in the cognitive-behavioural model is for an individual to encounter a relevant demand. Very few environmental demands are inherently stressful in and of themselves but almost any environmental encounter can be characterised as a demand. Individuals perceive environmental situations very differently depending on the external and internal resources they possess to manage the event. In the work context organisational demands are commonly classified into six categories, listed below.

3.6.1 Occupational demands/stressors

Cooper and Marshall (1978) suggested that occupational demands or 'stressors' fall into one of six categories. The categories are examples of situations or factors which can activate the demand-appraisal-coping process.

1. *Factors intrinsic to the job.* This is the particular make up of an occupational role. It includes qualitative and quantitative factors such as pay rates, poor physical working conditions or long hours.

2. *Role in the organisation.* This includes three factors: role ambiguity – roles are not clear or well defined; role conflict – attempting to meet the demands of one position impinges on the individual's ability to meet the demands of another; and role overload - expectations exceed an individual's ability.

3. *Relationships at work.* Support and encouragement from ones co-workers has been linked to positive states of well-being (French &

Caplan, 1972), whereas poor working relationships have been linked to stress and decrease the possibility of an individual forming any supportive relationships at work (Cartwright & Cooper, 1996).

4. *Career Development.* Positions where promotion is unlikely or overly likely or where organisational career plateaus are experienced are often appraised as very stressful if individuals feel their skills are being under utilised or they are insecure about their ability to cope with extra demands. Perceived job insecurity can be a major cause of occupational stress, as occupational roles are important for financial security and can often influence one's sense of self-worth.

5. *Organisational structure and climate.* Lack of communication between management and employees, lack of participation in decision making, lack of feedback or ineffective managerial styles can all create work-related stress. Organisational culture and climate can also influence stress reactions. This is particularly important in the emergency services, and will be discussed further below.

6. *Work-Life Balance.* An imbalance in either area can deplete an individual's resources and can impinge on their ability to perform well in the other area.

3.7 Primary appraisal

Primary appraisal involves an assessment of the relevance and potential consequences of an encounter. This assessment of personal relevance is influenced by an individual's beliefs and underlying assumptions about the world. The personal relevance of a situation is

affected by the extent an individual believes their values, goals and commitments are violated or benefited by a particular interaction. Events that challenge an individuals values, goals or commitments are more likely to be negatively evaluated than events that do not (Park & Folkman, 1997). Park and Folkman (1997) suggested the reasoning for this is that humans are goal-oriented and all human actions are performed in aid of achieving a particular goal or purpose. When an event arises that prevents attainment of this purpose stress is the most likely outcome.

Environmental demands can be appraised as irrelevant to the well-being of the individual, benign-positive - where a person believes there is potential for positive outcomes to occur as a result of the encounter, or stressful - where they believe the encounter will likely result in negative outcomes. For all stressful appraisals the demand must be considered personally relevant to the individual. Stress appraisals can be made about events which have already occurred (retrospective) or events which are likely to occur in the future (anticipatory). The focus of the present study is on retrospective challenge and threat appraisals.

Challenge appraisals are made when an encounter is anticipated and the individual perceives the event may potentially have positive outcomes. Challenge appraisals are defined as a perceived "potential for gain even under difficult situations" (Karademas & Kalantzi-Azizi, 2004, p.1034). An event which is appraised as a challenge is viewed by the individual as an opportunity for recognition, praise, learning and personal

growth (Lazarus, 1991; Lazarus & Folkman, 1984). Traumatic encounters can be perceived as challenging when they are appraised as "promoting broadened perspectives, new coping skills, and (aiding) the development of new personal and social resources" (Park & Fenster, 2004, p.195).

Threat appraisals are also made when an event is anticipated but perceived as likely to result in negative outcomes for the individual. A threat appraisal "refers to the potential for harm and it is experienced when the person anticipates future harm or loss" (Karademas & Kalantzi-Azizi, 2004, p.1034). An appraisal of threat or challenge "is a function of a specific set of environmental conditions that are appraised by a particular person with particular psychological characteristics" (Karademas & Kalantzi-Azizi, 2004, p.572). Threat and challenge appraisal differ in their precursors, the cognitive processes by which they occur and their psychological and physiological outcomes.

Hypothesis 1: There will be an inverse correlation between threat appraisals and challenge appraisals.

3.7.1 Individual differences and appraisal

An individual's personal characteristics can influence the relationship between demands and primary appraisal. A number of variables have been studied in an attempt to establish their influence on the stressor-strain relationship. Commitments and beliefs (Lazarus & Folkman, 1984), self efficacy; (Karademas & Kalantzi-Azizi, 2004) and

self-esteem; (Kernis, 2003) have consistently predicted whether a situation is appraised as manageable or beyond the individual's control (Regehr et al., 2001; Regehr, Hill, & Glancy, 2000). The personality characteristics negative affectivity (NA), and neuroticism have been shown to increase the likelihood an individual will appraise a situation as threatening (David & Suls, 1999; Elliott, Sherwin, Harkins, & Marmarosh, 1995) whereas extraversion has been linked to positive evaluations and challenge appraisals (Amirkhan, Risinger, & Swickert, 1995). Social support has been shown to play a positive mediation role in the relationship between stressful encounters and negative outcomes (for a review of the literature on social support see Kinicki, McKee, & Wade, 1996). Finally an individual's locus of control and the actual or perceived controllability of a situation can influence appraisal (Vitaliano, DeWolfe, Maiuro, Russo, & Katon, 1990). The controllability of the environment is likely to be one of the most important factors influencing both primary appraisal and coping in the present study and will therefore be discussed later in this chapter.

3.8 Primary appraisal and outcomes

Primary appraisal is one of the key processes which influences the outcomes of a potentially stressful interaction. The literature suggests that along with the direct correlations between primary appraisals and outcomes, there are also likely to be other variables which can influence these relationships. The present study will focus on the relationships between primary appraisal and measures of negative affect, symptoms of stress and general health and wellbeing as outcomes.

Negative affect is defined as "a general factor of subjective distress and subsumes a broad range of aversive mood states, including distressed, nervous, afraid, angry, guilty, and scornful" (Watson, 1988, p.1020). State affect differs from trait affectivity in that it is "transient fluctuations in mood" as opposed to "persistent differences in mood" (Watson, 1988, p.1020). Affect has been studied as a confounding variable in the demand-stress relationship and also as an outcome variable in this relationship. Research has illustrated that events appraised as threatening lead to increases in state negative affect. Challenge events have the reverse effect, leading to decreases in negative affect (Dua, 1993). Dua and Price (1992) found that threat appraisals of daily events were related to negative affect, anxiety, stress and depressive thoughts. Other studies have suggested that negative trait affectivity increases the likelihood of an individual appraising a potentially stressful situation as threatening which increases negative state affect (Dua, 1995).

Research has also suggested that threat appraisals may be linked to greater psychological maladjustment. Gallagher, Parle and Cairns (2002) found that when an event is appraised as a threat as opposed to a challenge, an individual tends to display more symptoms on the General Health Questionnaire six months after the event has occurred. Karademas and Kalantzi-Azizi (2004) reported that challenge appraisals were positively related to self-efficacy and the ability to overcome a potentially stressful encounter, and negatively related to General Health

Questionnaire scores. It has also been found that threat appraisals were more likely to result in high levels of anxiety and subjective stress due to the endangerment of well-being or self-esteem (Skinner & Brewer, 2002). Other studies have suggested that threat appraisals increase anxiety leading to psychological maladjustment. Conversely challenge appraisals can lead to reduced anxiety and increased positive outcomes after a stressful encounter (Raffety, Smith, & Ptacek, 1997).

Hypothesis 2: There will be a negative correlation between challenge appraisals and symptoms of stress and negative affect.

Hypothesis 3: There will be a positive correlation between threat appraisals and symptoms of stress and negative affect.

3.9 Secondary appraisal

Secondary appraisal is an individual's assessment of their personal resources for coping. It involves a person reviewing the options, resources and strategies they can use to deal with a particular demand. This use of strategies and resources for managing the demand constitutes coping. Coping is a process. It is the "constantly changing cognitive and behavioural effort to manage specific external and/or internal demands" appraised as a threat or a challenge by the individual (Lazarus & Folkman, 1984, p.141).

3.9.1 Coping strategies and models

In their original formulation of the cognitive-behavioural model of stress Lazarus and Folkman (1984) suggested two discrete forms of coping termed task-focused coping and emotion-focused coping. Since then other authors have proposed numerous different typologies, some suggesting as many as 14 different strategies for coping. One dichotomy distinguishes between approach and avoidance coping and this is the preferred typology for the present study. Approach and avoidance coping typologies have been utilised in studies investigating the coping mechanisms of elite athletes and sports people. Given the high intensity of performance demanded of these individuals a number of comparisons between this field and the work of the rescue helicopter crews can be drawn. For both elite athletes and rescue helicopter crews "the ability to cope with stressful events ... is an integral part of performance" (Anshel & Anderson, 2002, p.193) and "effective coping ... can facilitate motivation and attention and enable (athletes) to reach their standards of performance" (Hatzigeorgiadis, 2006).

Task-focused coping and approach coping are similar in that both strategies aim to "take active steps in attempting to deal directly with the stressor to ameliorate its effect" (Anshel & Anderson, 2002, p.195). Approach coping can include techniques such as breaking the problem into smaller more manageable parts, attempting to gather information and resources to effectively manage the problem or directly attacking the issues (Lazarus, 1993). In the present study approach coping is

operationalised as a combination of acceptance, active engagement, planning, positive reframing, social support and humour.

Avoidance coping strategies involve "cognitive and behavioural effort oriented toward denying, minimizing, or otherwise avoiding dealing directly with stressful demands" (Holahan, Moos, Holahan, Brennan, & Schutte, 2005, p.659). This can involve attempting to minimise the threat, wishing the event had not happened or the effects would go away, suppressing emotions, or substance use to stifle emotional responses (Folkman & Lazarus, 1985). In the present study avoidance coping is operationalised as a combination of distraction, venting, religion, self-blame, denial, disengagement, and substance use.

Primary and secondary appraisal and coping are all linked and an appraisal of an event as a threat or challenge will affect the selection and efficacy of a coping strategy. However the use of one particular style of coping does not exclude the concurrent use of another. Folkman and Lazarus (1980) found approach and avoidance strategies were used in conjunction in more than 80% of stressful situations. Often avoidance and approach coping are used in an attempt to gather resources to overcome the threat whilst minimising potentially detrimental emotional responses (Bjorck & Cohen, 1993). When individuals appraise a situation as a challenge, approach coping mechanisms tend to be most effectively utilised (Bjorck & Cohen, 1993), however the complexity of the coping process makes it difficult for theorists and researchers to draw well-

defined conclusions on which strategies are most effective in general or in any specific situations.

Hypothesis 4: Challenge appraisals will be positively correlated with the use of approach coping strategies.

Hypothesis 5: Threat appraisals will be positively correlated with the use of avoidance coping strategies.

3.9.2 Contextual variables, appraisal and coping

A variety of environmental characteristics and inter-person variables have been shown to influence how an event is appraised and dealt with. Lazarus and Folkman (1984) list 8 environmental factors which they consider to be especially relevant when considering appraisal and coping. *Novelty* can affect appraisal. If a situation is completely novel it is unlikely that the individual will appraise it as threatening, however if any previous experiences, vicarious or direct, have indicated that a situation may be dangerous it is more likely the situation will be appraised as a threat. The *predictability* of a situation affects appraisal by allowing for anticipatory coping and providing an individual with a perception of control. *Event uncertainty* is the likelihood that a particular situation will occur. Uncertainty can influence appraisal as it limits the effects of anticipatory coping and makes preparation for any particular outcome difficult. The three temporal factors of *imminence* (the time before an event), *duration* (how long the event lasts for), and *temporal uncertainty* (not knowing when an event will happen) can greatly affect an

individual's appraisal and coping in particular circumstances. If the potential *outcomes of a situation are ambiguous* it is likely an individual will experience greater stress reactions. Finally the *timing* of a stressful event in a person's life can influence how it is appraised. If a situation arises when an individual is under a great deal of pressure from other sources, e.g. exams, it is more likely the event will be perceived as threatening rather than benign or challenging.

3.9.3 Controllability and Adaptive vs. Maladaptive Coping

The effectiveness of any particular appraisal and coping strategy is contingent upon the context and the controllability of the environment. Taking into account the likely environmental demands in the present study it is probable that the actual controllability of the situation will be the most important factor influencing both primary appraisal and coping. If a situation is controllable it is more likely to be appraised as a challenge, as with the right coping strategies the consequences are alterable. However if an event is completely out of one's control it is more likely this event will be appraised as threatening as little can be done to alter the consequences.

"Coping processes are not inherently good or bad" (Folkman & Moskowitz, 2004, p.753) and the controllability of the situation can play an important role in whether a strategy is adaptive or maladaptive. Adaptive coping effectively deals with the stressful event whereas maladaptive coping fails to manage the event successfully. If a situation is completely out of an individual's control, approach coping is likely to be much less adaptive than in controllable situations. Conversely, avoidance

coping is likely to be maladaptive in situations which are controllable. For example approach coping prior to an exam, where the outcome is still changeable, is likely to be more adaptive than avoidance coping, however in a situation where little can be done, such as waiting for the results of the exam, avoidance coping is likely to be adaptive and approach coping maladaptive (Bjorck & Cohen, 1993; Bjorck & Klewicki, 1997; Folkman & Lazarus, 1980).

3.9.4 Coping and outcomes

The literature suggests there is a consistent relationship between primary appraisal and coping strategy. When an event is appraised as threatening maladaptive coping strategies are more likely to be used to deal with the event (Bjorck & Cohen, 1993). Conversely if an event is appraised as challenging then adaptive strategies are more likely to be utilised. Folkman (1984) found that when an event is viewed as a challenge an individual is more likely to cope by focusing directly on the task than if the event is perceived as threatening.

The results of a meta-analysis reviewing the relationship between coping strategies and outcomes found that approach coping was consistently associated with positive psychological and physiological outcomes (Penley, Tomaka, & Wiebe, 2002) while confrontive coping, distancing, self-control, social support, accepting responsibility, wishful thinking and avoidance were negatively associated with psychological and physical health outcomes. Avoidance coping has been linked to increases

in cardiovascular reactivity (Vitaliano, Russo, Paulsen, & Bailey, 1995b) and to increases in cortisol levels (Arnetz et al., 1991) indicating greater stress reactions for these types of coping responses in a laboratory situation. Research has also shown that war veterans who dealt with their experiences via avoidance and emotion-focused coping tended to be less well adjusted and showed increased pathology (Green, Lindy, & Grace, 1988).

Hypothesis 6: Approach coping will be negatively correlated with symptoms of stress and negative affect.

Hypothesis 7: Avoidance coping will be positively correlated with symptoms of stress and negative affect.

Hypothesis 8ai: The relationship between challenge appraisal and the positive outcomes of potentially traumatic encounters, posttraumatic growth and positive affect, will be moderated by approach coping. Participants with high levels of challenge appraisals and high levels of approach coping will show higher levels of posttraumatic growth and positive affect than those with low levels of challenge appraisals and/or low levels of approach coping.

Hypothesis 8aii: The relationship between challenge appraisals and the negative outcomes of potentially traumatic encounters, stress symptoms and negative affect, will be moderated by approach coping. Participants with high levels of challenge appraisals and high levels of approach coping will show fewer

symptoms of stress and less negative affect than those with low levels of challenge appraisals and/or low levels of approach coping.

Hypothesis 8bi: The relationship between threat appraisals and the positive outcomes of potentially traumatic encounters, posttraumatic growth and positive affect, will be moderated by avoidance coping. Participants with high levels of threat appraisals and high levels of avoidance coping will show less posttraumatic growth and positive affect than those with low levels of threat appraisals and/or low levels of avoidance coping.

Hypothesis 8bii: The relationship between threat appraisals and the negative outcomes of potentially traumatic encounters, stress symptoms and negative affect, will be moderated by avoidance coping. Participants with high levels of threat appraisals and high levels of avoidance coping will show increased symptoms of stress and greater negative affect than those with low levels of threat appraisals and/or low levels of avoidance coping.

3.10 Theories on how positive outcomes occur after trauma

Information processing theories suggest that the symptoms of stress are the result of incomplete processing of the event and therefore a lack of understanding and acceptance of what has occurred. The human need for understanding is termed the "completion tendency" (Horowitz,

1986). These theories posit that PTG results through this tendency. The process of coming to comprehend and acknowledge an event means an individual must venture beyond their believed capabilities and resources, thereby experiencing psychological growth. Once an individual has managed to accept and grasp the magnitude of the event they begin to perceive themselves as capable and important once again (Joseph & Linley, 2005).

Schema theories suggest that traumatic encounters disrupt an individual's worldview. The necessary reintegration of new information provides opportunities for the individual to explore and come to understandings of areas, events and people they have not encountered before. The individual's struggle to deal with and understand the traumatic event after it has occurred is the primary factor which can lead to psychological growth (Tedeschi & Kilmer, 2005). Tedeschi and Calhoun (2004) used the metaphor of an earthquake to explicate this theory. The landscape is flattened by the quake but the individual rebuilds using better materials and design so as the resulting structure can withstand further shockwaves. Schema theory suggests that PTG involves the individual reconstructing their worldview in a form more aligned with the world around them.

The cognitive-behavioural model suggests that PTG occurs as a result of adaptive appraisal and coping mechanisms (Schaefer & Moos, 1992). This model suggests that growth will occur when a relevant

demand is appraised as a challenge and dealt with in an adaptive manner. Research suggests that demands appraised as challenges are perceived as surmountable which can encourage mobilisation of coping resources. This mobilisation of resources and ability to overcome a stressful situation makes PTG more likely in challenging than threatening situations. In a meta-analysis of 39 studies, Linley and Joseph (2004) reported that after a traumatic encounter individuals who used approach coping, acceptance, positive reinterpretation and religious coping were more likely to experience PTG after the event, than those using other techniques such as avoidance and social support.

Hypothesis 9: Approach coping will be positively associated with posttraumatic growth and positive affect.

Hypothesis 10: Avoidance will be negatively associated with posttraumatic growth and positive affect.

3.11 Emergency services – Individual and Environmental differences

Studies investigating how emergency service personnel cope with the events they encounter in performance of their occupational roles has led some researchers to believe there may be specific personality attributes related to the desire to work the emergency services and to effectively perform these roles (Lindy, 1985). There have been numerous suggestions as to which personality and environmental factors contribute to successful performance of rescue related occupational roles. Personality variables such as fearlessness, low openness, and low agreeableness have been

shown to be important in individuals who take part in physically demanding emergency service roles, for example fire-fighters (Fannin & Dabbs, 2003). Aggression and tough mindedness have been shown to be significantly predictive of superior performance of police officers (Fabrictore, Azen, Schoentgen, & Snibbe, 1978; Wagner, 2005). Mitchell and Bray (1990) suggested there may be a "rescue personality" defined by an action orientation, inner-direction, obsession with high standards, traditional and conservative values, low tolerance of boredom and high dedication. It is likely that the 'rescue personality' is an extreme form of cognitive hardiness, which has been developed over multiple exposures to traumatic events.

Despite the differences in personality characteristics between rescue service personnel and the general population, the majority of studies have found evidence that certain events encountered in the performance of emergency work-related roles can still lead to psychological distress and sometimes PTSD. Some research suggests that repeated exposure to traumatic encounters can "harden" emergency service personnel to these experiences making situations which to most people would be threatening seem irrelevant or challenging (Regehr & Bober, 2005). However this issue has not been uncontroversial with other authors reporting that "seasoned" emergency service personnel may appraise situations as more threatening due to repeated exposure, removing the novelty of these environments (Regehr, Hill, & Sault, 2003). It is important to begin to establish which personality and social characteristics

are important for performance in the emergency services in general and in more specific defined occupations. The present study will attempt to establish whether cognitive hardiness is an important personality characteristic for helicopter rescue personnel. This will be discussed further in chapter 4.

3.11.1 Emergency services – Organisational climate

Organisational climate can strongly influence appraisal and outcomes of work-related stressors. Every occupation related experience occurs within an organisational climate. Supportive climates can foster satisfaction in the workplace and commitment to an organisation. These climates are also more likely to reassure individuals that they possess the necessary resources to deal effectively with a demand, decreasing the likelihood of threat appraisals. Unsupportive climates will likely have the opposite effects, increasing hostility and indifference and making an individual question whether they are able to effectively manage an environmental demand.

Organisational climates can be important for how individuals cope with work-related stressors. Within the emergency services the organisational climate has been characterised as competitive, conflict oriented, misogynistic and patriarchal (Brown, Fielding, & Grover, 1999). Emergency service personnel are expected to act in a specific manner and must fulfil not only their occupational roles as protectors, but often social roles as supporters and carers. From an organisational perspective rescue

personnel are expected to go about their duties in a detached but personable manner (Pogrebin & Poole, 1991). Organisational norms regarding professional conduct "dictate that officers must remain calm and in control, constantly guarding their emotions" (Pogrebin & Poole, 1991, p.395). This environment can often lead to maladaptive coping strategies such as avoidance, suppression and alcohol being utilised as a result of a climate which opposes expression of emotion (Brown et al., 1999). Emergency service personnel tend to reinforce this organisational climate by not respecting others' emotions and by not expressing caring towards one another (Evans, Coman, & Stanley, 1992). Researchers have also found that individuals who operate within a climate characterised by "toughness" and opposed to the expression of emotion tend to be more at risk for PTSD and display greater symptoms of stress than those who operate in a more open, receptive environment (Stephens, Long, & Miller, 1997).

3.12 Advantages of the cognitive-behavioural model

Lazarus and Folkman's cognitive-behavioural model of stress has been reasonably successful in explaining the variation in appraisal and coping processes and outcomes when applied to chronic occupational stressors. It has been employed to test for the effects of mood states, negative affect (Fuller et al., 2003), psychological vulnerability (Cassidy & Burnside, 1996), accumulation of stressful events (Bolger, DeLongis, Kessler, & Schilling, 1989), personality and satisfaction (Fogarty et al., 1999) on the outcomes of chronic occupational demands. The cognitive-

behavioural model has undoubtedly been one of the most thoroughly researched models in understanding how workplace stress arises and what factors influence it. However in the context of traumatic stress the model has not been so wholeheartedly adopted and further work is necessary.

The cognitive-behavioural model has logical appeal in application to traumatically stressful situations and a small number of studies have used this model to investigate traumatic stressors and how coping mechanisms affect psychological outcomes. Beaton, Murphy, Johnson, Pike and Corniel (1999) used the cognitive-behavioural model in their study looking at symptoms of PTSD in 220 urban fire-fighters and paramedics, finding that individuals who used avoidance and numbing strategies were more likely to display signs of maladjustment than those using approach strategies. Hart, Wearing and Headey (1995) examined how coping strategies affected the psychological well-being of 527 police officers in Australia. These authors reported that avoidance coping was observed to be maladaptive and approach coping was found to be adaptive in dealing with work-related traumatic encounters. Haisch and Meyers (2004) employed the cognitive-behavioural model with 257 police officers in California reporting higher levels of stress in officers who used behavioural disengagement, alcohol and drugs, humor, mental disengagement and venting as coping strategies to deal with work-related traumatic encounters.

For the present study this model was selected as it can encompass important individual mediators and/or moderators, such as personality traits or cognitive hardiness that can influence the psychological outcomes of traumatic encounters. In addition the constructs in the cognitive-behavioural model tend to be more measurable; measuring appraisal and coping resources for an event is simpler than assessing individuals' pre and post-event schema for a particular circumstance. Also schema theory does little to explain the process by which PTG occurs. The cognitive-behavioural model goes much further in explaining how and why PTG occurs and provides insight into important factors which may help to produce this outcome (Tedeschi & Calhoun, 2004).

As a result of the limitations of schema theory it is possible that the cognitive-behavioural model may potentially further understanding of the relationship between environmental demands and psychological outcomes and may be able to advance our knowledge in areas where schema theory cannot. This model may also help extend our understanding of the positive and negative outcomes which can occur as a result of both chronic and traumatic stressors and may aid in enhancing our knowledge of the contextual and individual variables which can influence this relationship.

The following chapter will discuss a number of individual difference variables which can affect the relationship between traumatic demands and psychological stress. This chapter will focus on one variable

which has consistently been found to buffer the effects of demands on stress, cognitive hardiness.

Chapter Four

COGNITIVE HARDINESS AND RESILIENCE

The cognitive-behavioural model of stress suggests that individual differences can moderate the relationship between appraisal and psychological outcomes. Individual differences in gender, age, motivation, education, tolerance for ambiguity, locus of control, health and life experiences can all influence the way a person appraises and copes with a traumatic demand (Scheck & Kinicki, 2000). Personality factors such as perfectionism, pessimism, self-efficacy and esteem have been shown to influence primary and secondary appraisal as well as outcomes (O'Driscoll & Dewe, 2001; Regehr et al., 2001). One of the factors which can influence the relationship between appraisal and outcomes is *cognitive hardiness.* This variable has been identified as the "most consistent predictor of decreased scores of psychological and somatic distress" (Beasley, Thompson, & Davidson, 2002, p.92).

4.1 Cognitive Hardiness

Cognitive hardiness is a personality characteristic which helps to buffer the effects of stressors on an individual (Maddi, Kahn, & Maddi, 1998). Kobasa (1979) defined the three 'C's' of cognitive hardiness as an individual's *commitment* to the activities they are performing and to others around them, a belief of *control* over a situation, and a perception of change as a *challenge* rather than a threat. To be classified as being "cognitively hardy" an individual must possess all three characteristics of

control, commitment and challenge (Maddi, 2002). Researchers often use the terms hardiness and resilience interchangeably in their work, however these concepts are discrete in their meaning and this distinction must be clarified.

4.2 Resilience

The concept of psychological resilience was originally based on, and research continues to be done on, people exposed to adverse events in childhood (Almedom, 2005). Rutter (1985) in his studies of abused and neglected children stated that ''resilience does not lie in an avoidance of stress, but rather in encountering stress at a time and in a way that allows self confidence and social competence to increase through mastery and appropriate responsibility'' (p. 608). Bonanno (2004) defined resilience in adults along similar lines stating that resilience is "the ability of adults ... who are exposed to an isolated and potentially highly disruptive event ... to maintain relatively stable, healthy levels of psychological functioning" (p.20). Simply put resilience is a characteristic that enables individuals to overcome stress or adversity to reach a positive outcome (Rutter, 1999). There are many factors which have been found to be associated with resilience such as sustaining strong relationships with others, being optimistic about the world, trying to keep events in perspective, genetic and environmental vulnerability, setting goals and taking steps to reach them, and self-confidence (Luthar & Cicchetti, 2000).

4.3 Hardiness vs. Resilience

Resilience tends to be defined in terms of an individual's overall ability to maintain stable functioning after experiencing stressful life events. Hardiness on the other hand is a personality characteristic which can help to buffer stress and enhance resilience in the face of aversive events (Maddi, 2005). Resilience differs from hardiness in that resilience includes a variety of "protective factors that foster development of positive outcomes ... among (individuals) exposed to unfavourable or aversive life events" (Bonanno, 2004, p.20). Hardiness is one factor amongst many that contributes to resilience against distressing life events. However, the terms *hardiness* and *resilience* are often used interchangeably. A number of tools, such as the Dispositional Resilience Scale (DRS), which are said to measure resilience in fact measure the three factors of commitment, control and challenge which define cognitive hardiness. Distinguishing between the two concepts often can create more confusion than is justified by the differences between the terms. For conceptual clarity however the present study will use the term *cognitive hardiness* to refer to the personality characteristic which has been associated with positive psychological outcomes and decreased stress responses after trauma.

4.4 Developing cognitive hardiness

Maddi (2002) suggests that it is possible to train cognitive hardiness in the occupational environment. He cites research conducted at Illinois Bell Telephone Co. (Maddi, 1987) using four coping techniques he believed to be associated with hardiness. He found that the executives

trained in these techniques exhibited higher levels of cognitive hardiness along with increased job satisfaction and decreases in objective and subjective levels of strain. His later work (Maddi et al., 1998) showed that hardiness training was more effective in reducing strain than relaxation-meditation or passive listening techniques. Maddi and associates (Khoshaba & Maddi, 1999) have presented "HardiTraining' as a way of teaching individuals likely to be exposed to trauma or to chronic stressors, both hardy attitudes and skills, however research is still needed into whether this method of training is valid and efficacious. At this point in time it is not clear as to whether cognitive hardiness is a characteristic which can be trained or whether it is the result of an individual's experiences and environment during their lifespan.

4.5 The moderating relationship of cognitive hardiness

A moderator variable is one that affects the interaction between the independent and the dependant variable to the point where the impact of the independent variable on the dependant variable differs according to the level of the moderator (Holmbeck, 1997). A mediator "specifies how (or the mechanism by which) a given effect occurs" (Holmbeck, 1997, p.599). Hardiness has been investigated both as a mediating and moderating variable (Hull, Van Treuren, & Virnelli, 1987), however past research has established that cognitive hardiness has limited impact as a mediating variable in the stressor-outcome relationship (Kobasa, Maddi, & Courington, 1981). Within the present study a number of moderating

relationships are expected, which will be explicated as variables are discussed.

4.6 Cognitive hardiness and primary appraisal

Hardiness can impact on outcomes of the stress process by altering an individual's primary appraisal of a situation. In a study of 820 undergraduate psychology students, hardy individuals appraised a subjectively stressful test situation as less threatening than did less hardy individuals (Wiebe, 1991). Rhodewalt and Zone (1989) reported similar findings in their study of 243 women; although hardy and non-hardy women were found to have experienced the same number of disruptive life events, hardy individuals were more likely to appraise these events positively than non-hardy individuals. In a study of 600 students, hardy individuals were more likely to perceive their experience as positive, less disruptive and more controllable than their less hardy counterparts (Rhodewalt & Agustsdottir, 1984). Bonanno (2004) summed the effect of hardiness on primary appraisal stating that "armed with this set of beliefs, hardy individuals have been found to appraise potentially stressful situations as less threatening, thus minimizing the experience of distress" (p.25).

Hypothesis 11: Cognitive hardiness will be positively associated with challenge appraisals and negatively associated with threat appraisals.

4.6.1 Cognitive hardiness, secondary appraisal and coping

Kobasa (1982) suggested that hardiness exerts its influence on psychological outcomes through coping strategies. It is suggested that hardiness decreases the use of ineffective or regressive coping strategies and increases the use of adaptive coping. Research has tended to support this conjecture. One study found that hardiness increased the used of transformational coping (defined as a combination of action, planning, seeking instrumental support and positive reinterpretation) and led to the avoidance of the use of regressive coping (a combination of mental or behavioural disengagement, denial and alcohol or drug use) (Maddi & Hightower, 1999). Others have found that hardiness is positively related to the use of approach coping and inversely related to the use of avoidance coping strategies (Kobasa & Puccetti, 1983; Williams, Wiebe, & Smith, 1992).

Hypothesis 12: Cognitive hardiness will be positively associated with approach coping and negatively associated with avoidance.

4.6.2 Cognitive hardiness and outcomes

A variety of research has suggested that cognitive hardiness moderates the relationship between stressors and outcomes. In their research with undergraduate psychology students, Wiebe (1991) found that hardiness moderated stress outcomes through the appraisal processes. Individuals high on hardiness exhibited less adverse affective and

psychophysiological responses than individuals low on hardiness. A study of 110 full-time employees in America supported the recurrent finding of a relationship between hardiness and decreased stress symptomology, stating "consistent with the research literature, hardiness ... (was) inversely related to stress and symptoms of illness" (Soderstrom, Dolbier, Leiferman, & Steinhardt, 2000, p.335).

Hypothesis 13ai: The relationship between challenge appraisals and the positive outcomes of potentially traumatic encounters, posttraumatic growth and positive affect, will be moderated by hardiness such that levels of posttraumatic growth and positive affect will be higher for those individuals who are high on both challenge appraisals and hardiness (pictured in Figure 3a.) than for individuals who are low on both these variables.

Hypothesis 13aii: The relationship between challenge appraisals and the negative outcomes of potentially traumatic encounters, stress symptoms and negative affect, will be moderated by hardiness such that symptoms of stress and negative affect will be lower for those individuals who are high on both challenge appraisals and hardiness (pictured in Figure 3a.) than for those individuals who are low on both these variables.

Hypothesis 13bi: The relationship between threat appraisals and the positive outcomes of potentially traumatic encounters,

posttraumatic growth and positive affect, will be moderated by hardiness such that levels of posttraumatic growth and positive affect will be lower for those individuals who are high on threat appraisals and low on hardiness (pictured in Figure 3b.) than for individuals who are low on threat and high on hardiness.

Hypothesis 13bii: The relationship between threat appraisals and the negative outcomes of potentially traumatic encounters, stress symptoms and negative affect, will be moderated by hardiness such that symptoms of stress and negative affect will be higher for those individuals who are high on threat appraisals and low on hardiness (pictured in Figure 3b.) than for individuals who are low on threat and high on hardiness.

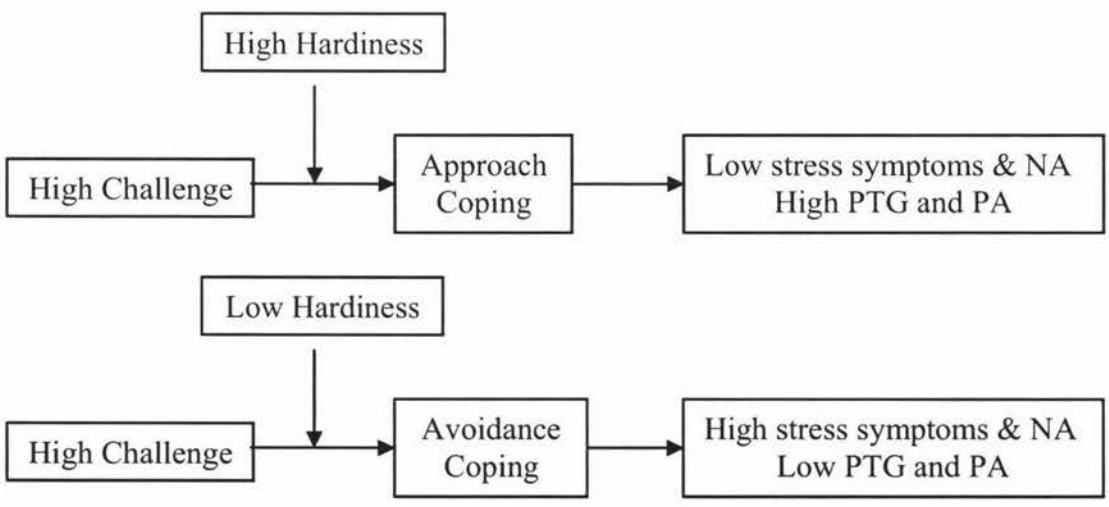

Figure 3a: Expected moderating effect of hardiness on challenge appraisals and outcomes

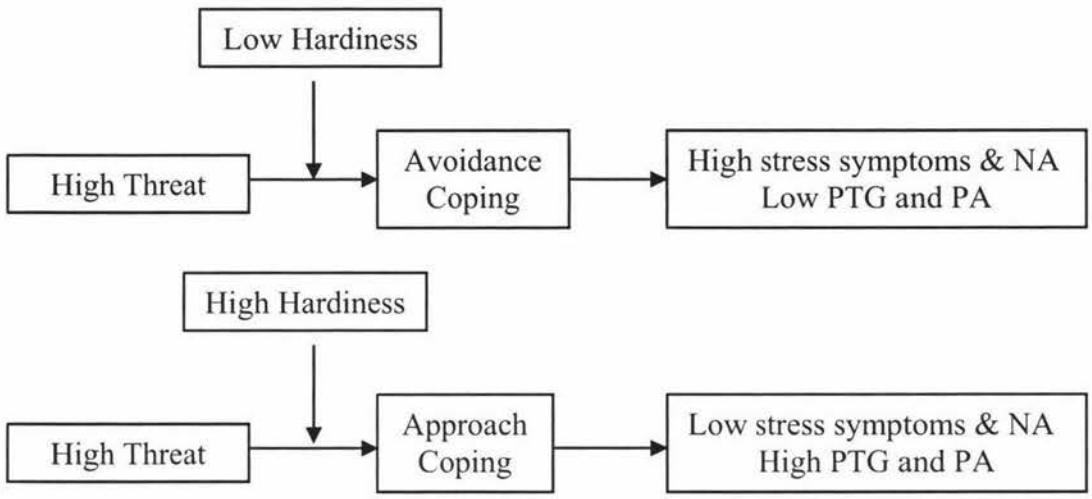

Figure 3b: Expected moderating effect of hardiness on threat appraisals and outcomes

Hypothesis 14ai: The relationship between approach coping and the positive outcomes of potentially traumatic encounters, posttraumatic growth and positive affect, will be moderated by hardiness such that levels of posttraumatic growth and positive affect will be higher for those individuals who are high on both approach coping and hardiness (pictured in Figure 4a.) than for individuals who are low on both these variables.

Hypothesis 14aii: The relationship between approach coping and the negative outcomes of potentially traumatic encounters, stress symptoms and negative affect, will be moderated by hardiness such that symptoms of stress and negative affect will be lower for those individuals who are high on both approach coping and hardiness (pictured in Figure 4a.) than for those individuals who are low on both these variables.

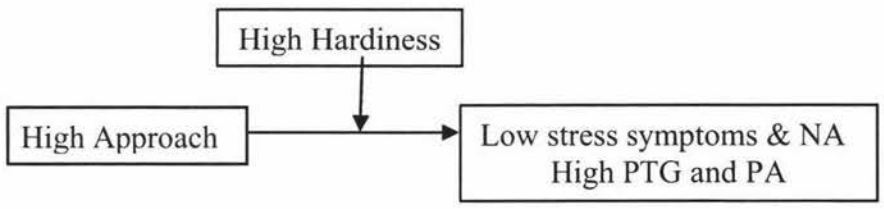

Figure 4a: Expected moderating effect of hardiness on approach coping and outcomes

Hypothesis 14bi: The relationship between avoidance coping and the positive outcomes of potentially traumatic encounters, posttraumatic growth and positive affect, will be moderated by hardiness such that levels of posttraumatic growth and positive affect will be lower for those individuals who are high on avoidance coping and low on hardiness (pictured in Figure 4b.) than for individuals who are low on avoidance and high on hardiness.

Hypothesis 14bii: The relationship between avoidance coping and the negative outcomes of potentially traumatic encounters, stress symptoms and negative affect, will be moderated by hardiness such that symptoms of stress and negative affect will be higher for those individuals who are high on avoidance coping and low on hardiness (pictured in Figure 4b.) than for individuals who are low on avoidance and high on hardiness.

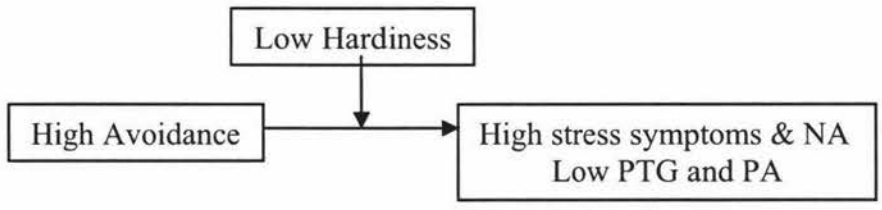

Figure 4b: Expected moderating effect of hardiness on avoidance coping and outcomes

Chapter Five

METHOD

The present study attempted to examine whether the cognitive-behavioural model of chronic stress could be applied to traumatic occupational stressors. To test this theory primary appraisal and coping, positive and negative affect, symptoms of stress, post traumatic growth and cognitive hardiness were all assessed with rescue helicopter personnel.

5.1 Participants and Procedure

Approval for this study to be undertaken was gained through the Massey University Human Ethics Committee in Auckland (Approval Number MUAHEC 06/024). Twelve rescue helicopter bases throughout New Zealand were invited to take part in the study, of which 11 accepted the invitation. It is estimated the number of people involve with the rescue helicopter throughout New Zealand is approximately 60 people. This estimate is based on an average of 5 people actively and directly involved with the rescue helicopter on each of the 12 bases. Of the 60 questionnaires distributed 20 (33%) were returned. A demographic description of the sample population is provided in the results section.

Of the 11 bases which agreed to take part, 8 were personally visited by the researcher to distribute hard copies of the questionnaire. The other 3 were sent email versions that respondents could complete online and return via email, or print and return via a freepost address.

Participants were given one month to complete and return the questionnaire. The questionnaire contained 149 questions and took approximately 20 minutes to complete (Appendix A).

5.2 Measures

Participants in this study were asked to:

"think about the most traumatic situation that you have experienced at work, or as a result of work, in the past six months, and then answer the questions that follow with this situation in mind. However, if you are unable or do not wish to recall or answer questions about an event that was traumatic for you, we would like you to think instead of a work event that was stressful but not necessarily traumatic".

They were also asked to briefly describe the event and state whether they considered it was traumatic or stressful. Respondents were asked to keep this event in mind when answering the questions that followed assessing primary appraisal, coping, general health and wellbeing, positive and negative state affect and posttraumatic growth. Respondents also answered questions assessing their cognitive hardiness.

5.2.1 Primary Appraisal

Primary appraisal was measured using the eight item Cognitive Appraisal Scale (Skinner & Brewer, 2002). This measure comprises two subscales. Threat appraisal was measured by four questions, such as "I was concerned about my ability to perform under pressure". Challenge

was also measured by four questions, such as "I was focused on the possible positive outcomes of this situation". Participants were asked to respond on a 4-point Likert scale where 1 indicated strong disagreement and 4 indicated strong agreement. In the present study the reliability coefficients of the two subscales were: threat $\alpha = 0.81$ and challenge $\alpha = 0.84$.

5.2.2 Coping

The Brief COPE (Carver, 1997) was used to assess the coping strategies used by respondents to manage the stressful or traumatic event. This measure contains 28 items which the authors suggest comprise 14 subscales. Participants were asked to respond on a 4-point Likert scale where 1 indicated a method was not used at all and 4 indicated that a method was used often. For the present study factor analysis of the Brief COPE was not possible due to the sample size. Based on a priori theory two subscales, approach coping and avoidance coping, were hypothesised (Roth & Cohen, 1986). Approach coping involves directly addressing the demand. This was theorised to be to be a combination of the original subscales acceptance, active coping, planning, positive reframing, social support and humour. The coefficient alpha showed acceptable reliability for this subscale with an $\alpha = 0.79$. Avoidance coping, where the event is not engaged or dealt with, was theorised to be a combination of the original subscales, distraction, venting, religion, self-blame, denial, disengagement, and substance use. The coefficient alpha again showed acceptable reliability with an $\alpha = 0.78$.

5.2.3 Positive and Negative Affect

Positive and negative affect were measured by the Job-related Affective Well-being Scale (JAWS) (Van Katwyk, Spector, & Kelloway, 2000). This 20 item measure assesses how an individual felt during the given situation for example "this event made me feel anxious" and "this event made me feel satisfied". This was measured on a 4 point Likert scale with 1 indicating not at all and 4 indicating often. This measure contained two subscales. The first measuring positive affect made up of 10 items and in the present study had a reliability coefficient of $\alpha = 0.87$, and the second measuring negative affect, again containing 10 items with a reliability coefficient of $\alpha = 0.84$.

5.2.4 Negative Outcomes

Negative outcomes and stress symptoms were measured by 2 scales, the General Health Questionnaire (GHQ) (Goldberg & Williams, 1988) and the Impact of Events Scale (IES) (Horowitz, Wilner, & Alvarez, 1979).

The GHQ attempts to uncover general health problems which may occur after a stressful or traumatic encounter. Questions include "since the event took place have you been able to concentrate on whatever you're doing?" and "since the event have you been losing confidence in yourself?" These questions were scored on a 4 point Likert scale with 1 indicating no change and 4 indicating more often than usual. The twelve

item version of the GHQ was used as the present study did not aim to identify psychiatric morbidity and the shorter version, as well as demonstrating adequate reliability and validity was of an appropriate length for the survey. Reliability coefficients in this study showed an $\alpha = 0.77$.

The IES is a 15 item measure questioning the effect an event had on the individual. Examples of questions are "I tried to remove it from my memory" and "my feelings about it were a kind of numb". The IES was scored on a 4 point Likert scale with 1 indicating not at all and 4 indicating more often than usual. Research suggests the IES may contain two subscales, avoidance and intrusion; however reliability coefficients for these have shown wide variation and a number of studies have supported the use of a single scale to increase reliability (Sundin & Horowitz, 2002). For the present study scores for the IES were calculated as a total score, as subscale scores were unnecessary given the objectives of the study. The reliability coefficient of this scale was $\alpha = 0.90$.

5.2.5 Positive Outcomes

Positive outcomes of traumatic or stressful encounters were measured using the Post Traumatic Growth Inventory (PTGI) (Tedeschi & Calhoun, 1996). This is a 21 item scale measuring the positive impact of trauma with questions such as "I changed my priorities about what is important in life" and "I discovered I am stronger than I thought I was", where 1 indicated no change and 4 indicated a great degree of change.

The development of this measure suggested its 21 items have a high internal consistency and therefore it is best used as a whole rather than as subscales. The reliability of this measure in the present study was $\alpha = 0.87$.

5.2.6 Cognitive Hardiness

Cognitive hardiness was measured using the Dispositional Resilience Scale (DRS) (Bartone, Ursano, Wright, & Ingraham, 1989). This 45 item measure assesses the three factors of cognitive hardiness: commitment, control and challenge, with each subscale being made up of 15 items. Examples of the questions in the DRS are "most of my life gets spent doing things that are worthwhile" and "it's exciting to learn something about myself" which are scored on a 4 point Likert scale with 1 indicating not at all true and 4 indicating completely true. Reverse scoring was necessary for negatively scored items in the DRS. For the present study only total cognitive hardiness scores were necessary and this was calculated by averaging scores on each of the subscales. To improve scale reliability items from the full scale of the DRS were dropped if item-total correlations were less than 0.10. The final DRS scale was calculated with 32 items with a reliability coefficient of $\alpha = 0.76$.

Chapter Six

RESULTS

6.1 Sample Demographics

Nineteen (95%) respondents to the questionnaire were males, whose ages ranged between 31 and 55. These individuals had an average of 7.5 years experience working with the rescue helicopter. A variety of personnel involved with the rescue helicopters took part in this study; exact numbers are outlined in Table 2. Responses were geographically representative, ranging from the top of the North Island to the bottom of the South. Table 2 provides a summary of this information.

6.2 Data analysis – Bivariate Correlations

Raw data was entered into Microsoft Excel and then transferred into an SPSS data file with no identifying information being recorded. The analyses were conducted using SPSS version 12. Descriptive statistics were computed for demographic information. Missing data was accommodated using pair-wise deletion due to the small sample size and the necessity to retain as many cases as possible.

Bivariate correlation analyses using the Pearson-Product moment correlations were run to examine direct relationships between the variables. For all bivariate correlations a significance level of 0.05 was used.

Table 2.

Summary of Demographic information of Participants (N=20)

	Number of Respondents	Percentage of Respondents
Gender		
Male	19	95
Female	1	5
Age		
31-35	2	10
36-40	2	10
41-45	8	40
46-50	2	10
51-55	6	30
Years Experience		
>1yr	1	5
1-5yrs	7	35
5-10yrs	7	35
<10	4	20
Missing	1	5
Position		
Pilots	9	45
Crewman	1	5
Paramedic	7	35
Combined	3	15

6.3 Correlations between variables

The correlation matrix presented in Table 3 outlines the bivariate correlations between the variables in this study.

A number of relationships were observed for which no formal hypotheses were stated. Firstly, there was a positive correlation between the demographic variables age and tenure (Refer to Table 3). A negative relationship between tenure and hardiness was also identified.

A strong positive correlation was observed between approach and avoidance coping strategies. Both negative and positive affect showed a positive relationship with scores on the Impact of Events scale. A positive correlation between scores on the General Health Questionnaire and the Posttraumatic Growth Inventory was observed.

Table 3. Inter-correlations between variables with Pair wise deletion

	Mean	Std Dev.	1	2	3	4	5	6	7	8	9	10	11
1 Tenure	7.7	4.91	1										
2 Age	3.40	1.31	.71**	1									
3 Threat	1.99	0.62	.23	.19	1								
4 Challenge	2.43	0.63	.21	.35	.14	1							
5 Approach	2.76	0.49	.15	.41	.67**	-.01	1						
6 Avoidance	1.55	0.38	.17	.14	.50*	.15	.68**	1					
7 Positive affect	1.66	0.66	-.05	.29	.26	.28	.57*	.54*	1				
8 Negative affect	1.99	0.57	.26	.13	.55*	.29	.71**	.79**	.37	1			
9 Hardiness	3.21	0.25	-.58**	-.31	-.12	-.53*	-.07	-.49*	-.32	-.37	1		
10 IES	1.84	0.54	.01	.04	.42	.44	.38	.63**	.50*	.47*	-.27	1	
11 GHQ	1.37	0.45	.07	-.03	.44	-.12	.20	.13	-.10	.11	-.08	-.20	1
12 PTGI	1.47	0.34	-.14	-.13	.26	.20	.07	.09	.04	.08	-.004	.27	.477*

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

6.3.1 Primary Appraisal

Figure 5 shows the mean scores for threat and challenge appraisals. It can be seen that the participants in this study were more inclined to appraise a potentially stressful situation as challenging as opposed to threatening. The following will discuss the findings regarding primary appraisals.

The correlation table (table 3) shows that challenge appraisals were not related to scores on the General Health Questionnaire, Impact of Events Scale or negative affect therefore hypothesis 2, that a negative correlation between challenge appraisals and symptoms of stress and negative affect would be observed, was not supported. Threat appraisals were also not correlated with scores on the GHQ and IES. However threat appraisals did show a positive correlation with negative affect, providing weak partial support for hypothesis 3.

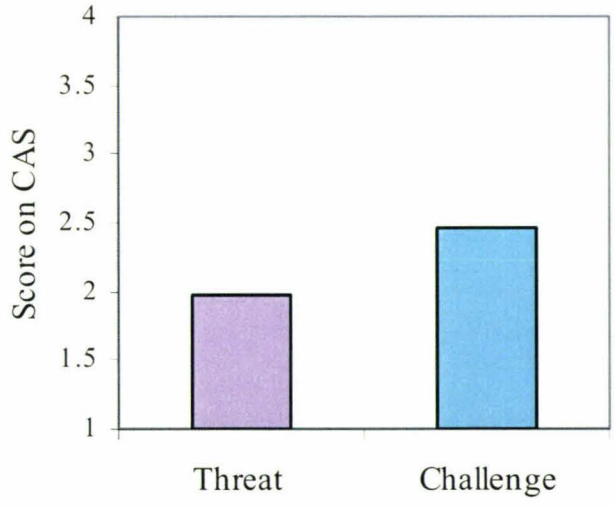

Figure 5: Means scores for Threat and Challenge Appraisal on the CAS

With regards to the relationship between primary appraisals and coping, challenge appraisals were not correlated with the use of approach coping therefore hypothesis 4 was not supported. Threat appraisals were seen to correlate positively with avoidance coping partially supporting hypothesis 4. However, unexpectedly threat appraisals also indicated a positive correlation with approach coping contradicting hypothesis 5. Further results on the coping data will be presented next.

6.3.2 Coping

Figure 6 shows the frequency of use of each of the 14 coping strategies identified by the Brief COPE. For the remaining analysis the factors are grouped into approach coping and avoidance coping based on a-priori theory. Hypothesis testing was based on this distinction.

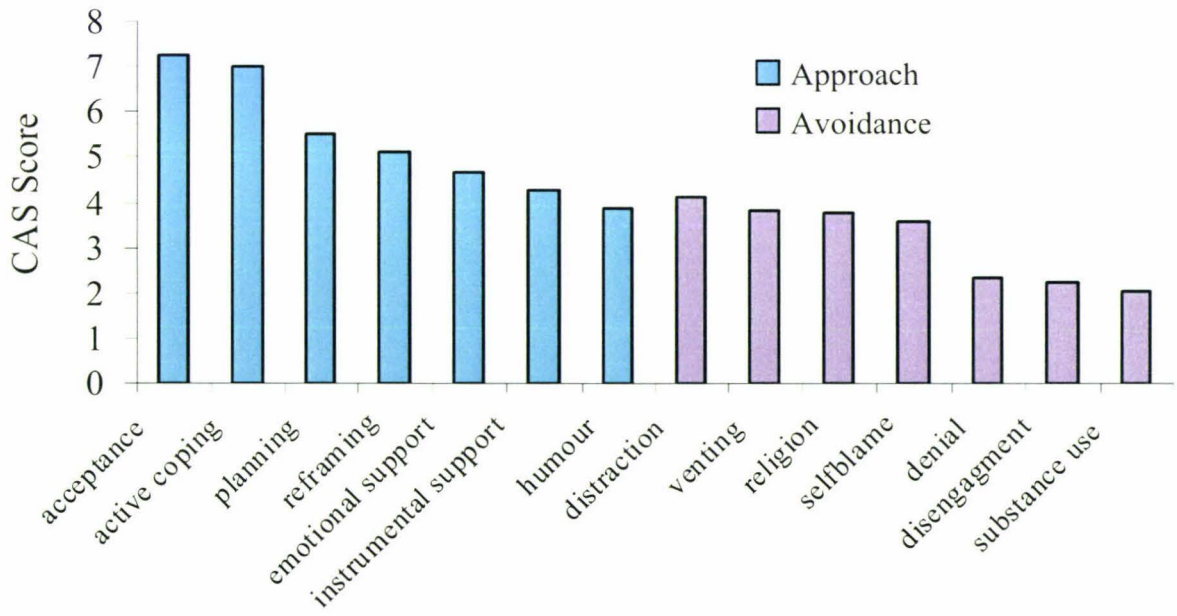

Figure 6: Frequency of use of the 14 coping strategies of the Brief COPE

Approach coping was not correlated with scores on the GHQ or IES, therefore hypothesis 6 was not supported. Unexpectedly approach coping was positively correlated with negative affect, suggesting an inverse relationship to that hypothesised. Avoidance coping was not correlated with scores on the GHQ, however it was correlated with scores on the IES and negative affect, providing partial support for hypothesis 7.

Approach coping was not correlated with posttraumatic growth but was positively correlated with positive affect providing partial support for hypothesis 9. Avoidance coping showed no correlation with posttraumatic growth. However, contrary to hypothesis 10 a significant *positive* correlation between avoidance coping and positive affect was demonstrated.

6.3.3 Cognitive Hardiness

Interestingly cognitive hardiness was found to be negatively correlated with challenge appraisals, contradicting hypothesis 11. No relationship was found between cognitive hardiness and threat appraisals. Cognitive hardiness also showed no correlation with approach coping however demonstrated a negative correlation with avoidance coping providing partial support for hypothesis 12.

6.4 Moderated Regression

Hierarchical multiple regression analyses were used to test for the potential moderating effects of coping on the relationship between primary appraisal and outcomes and also to test for the potential moderating effects of

cognitive hardiness on both primary appraisal and outcomes and coping and outcomes. All significant moderating relationships are included in appendix B. To test the moderating interaction the procedure described by Baron and Kenny (1986) was used with a hierarchical regression model. To test for direct relationships the independent variable and the moderator were entered separately into the regression equation. Then to test for an interaction effect the independent variable and the moderator were multiplied together and this was entered along with the independent variable and the moderator into the model. Both the independent variable and the moderator variable were centred by subtracting the sample mean from the individuals score so as to control for potential multicollinearity (Clarke & Singh, 2005). The moderating model is diagrammed in figure 7.

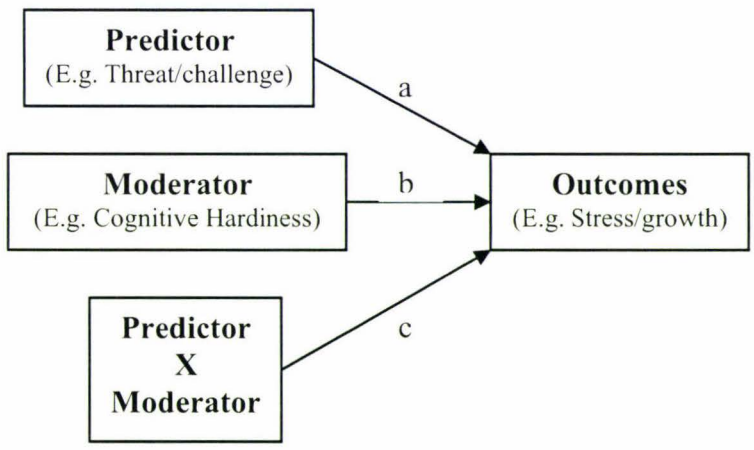

Figure 7: The moderating model (Adapted from Baron & Kenny, 1986)

6.4.1 The role of coping in moderating the relationship between primary appraisals and outcomes

Hypothesis 8ai and 8aii proposed that approach coping would moderate the relationship between challenge appraisals and outcomes such that high challenge appraisals and high approach coping would lead to decreased levels of stress and negative affect and increased levels of PTG and positive affect. However the interaction term for challenge appraisals and approach coping was not associated with decreased scores on the GHQ, IES or negative affect nor was it associated with increased PTG. Approach coping did moderate the relationship between challenge appraisals and positive affect providing weak support for hypothesis 8ai. Respondents who were high on challenge appraisals and approach coping showed greater positive affect than those who were low on challenge appraisals or low on approach coping (Figure 8).

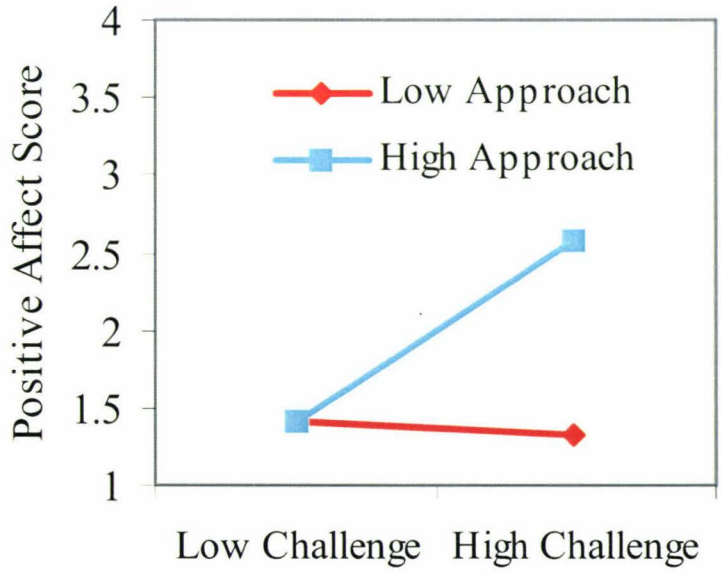

Figure 8: The moderation effect of approach coping on challenge appraisals and positive affect

Hypothesis 8bi and 8bii proposed that avoidance coping would moderate the relationship between threat appraisals and outcomes such that high threat appraisals and high avoidance would increase stress and negative affect and decrease PTG and positive affect. However avoidance coping did not moderate the relationship between threat appraisals and scores on the GHQ, IES, negative or positive affect or PTG providing no support for hypothesis 8bi or 8bii.

6.4.2 The role of cognitive hardiness in moderating the relationship between primary appraisals, coping and outcomes

No support was found for hypothesis 13ai, 13aii, 13bi or 13bii as cognitive hardiness did not moderate the relationship between primary appraisals and positive or negative outcomes, nor did hardiness moderate the effect of approach coping on outcomes, positive or negative.

Cognitive hardiness did moderate the relationship between approach coping and positive affect, partially supporting hypothesis 14ai. Respondents showing higher levels of approach coping and lower levels of cognitive hardiness displayed increased positive affect. The interaction of cognitive hardiness and approach coping on positive affect is pictured in figure 9.

Cognitive hardiness did not moderate the relationship between approach coping and symptoms of stress or negative affect, providing no support for hypothesis 14aii.

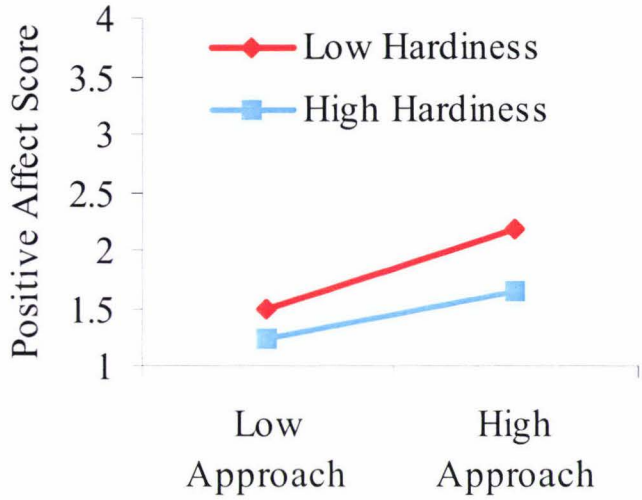

Figure 9: Moderating relationship of Hardiness on Approach Coping and Positive Affect

Cognitive hardiness did moderate the relationship between avoidance coping and scores of positive affect however not in the manner predicted in hypothesis 14bi. Figure 10 shows that respondents who were high on avoidance and who were low on cognitive hardiness displayed greater positive affect than those high on hardiness or low on avoidance. This interesting finding will be discussed further in the next chapter.

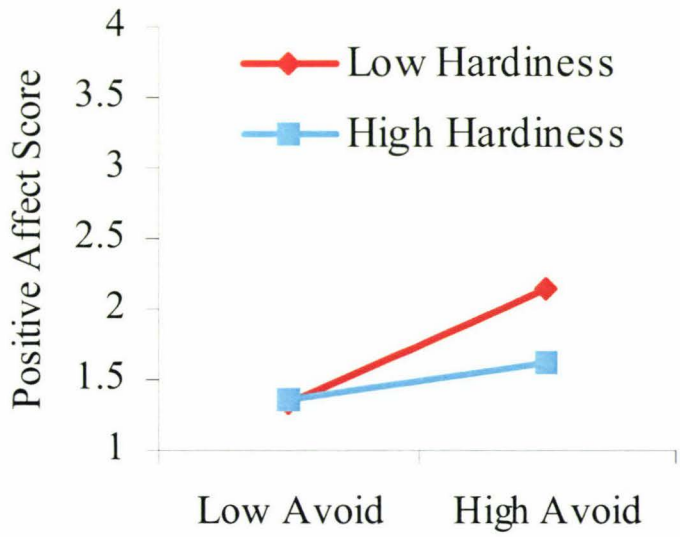

Figure 10: Moderating relationship of hardiness on avoidance coping and positive affect

Cognitive hardiness also moderated the relationship between avoidance coping and scores on the GHQ again however not in the manner predicted by hypothesis 14bii. Figure 11 shows that respondents who were low on avoidance coping and also low on cognitive hardiness show increased symptoms of stress as scored on the GHQ compared with those high on cognitive hardiness or high on avoidance coping. This relationship will be discussed further in the following chapter.

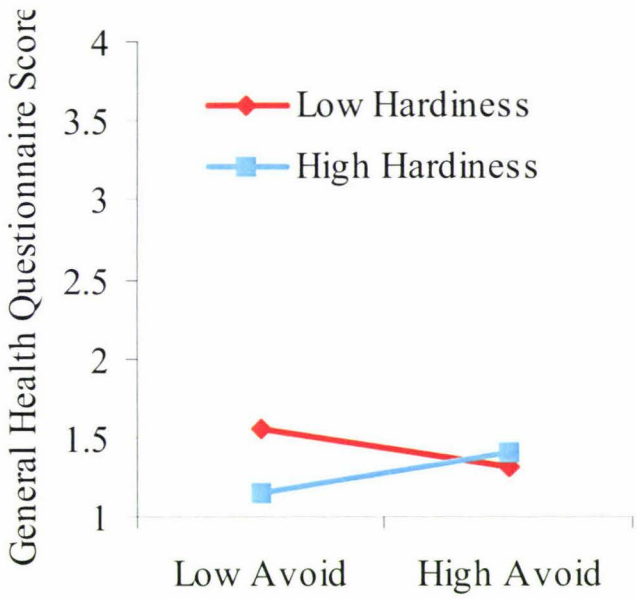

Figure 11: Moderating relationship of hardiness on avoidance coping and GHQ

A number of important significant relationships have been identified in the analysis. The following chapter will discuss these relationships in depth, so as to provide further rationale as to their significance in the present context. Also a number of hypotheses were not supported. This lack of significant findings is also noteworthy and reasoning as to why these results occurred and the implications of this will also be discussed in the following chapter.

Chapter Seven

DISCUSSION

The present study applied the cognitive-behavioural model to traumatic stressors in an attempt to further understanding of the processes through which stress and posttraumatic growth occur with rescue helicopter crews. Several unanticipated and interesting relationships were found which suggest this population may use different appraisal and coping processes to the general population and other emergency service personnel. The findings relating to primary appraisal, coping, cognitive hardiness and outcomes will be discussed in the following sections.

7.1 Primary Appraisal

One interesting finding was that challenge appraisals did not have an inverse relationship with threat appraisals. This may suggest rescue helicopter crew-members simultaneously appraise the situations they encounter during the performance of their work as an opportunity for utilising well learnt technical skills (challenging) and also as situations in which deficits in performance could be realised (threatening). Overall, challenge appraisals were higher than threat appraisals, suggesting that respondents perceived even difficult situations as a chance to display there abilities and to perform well.

Numerous studies have found challenge appraisals to be associated with decreases in negative affect and stress after exposure to a potentially stressful encounter (Bennett & Holmes, 1975; Dua, 1993; Karademas &

Kalantzi-Azizi, 2004). The present study however did not find this relationship as challenge appraisals were not linked to any significant decreases in the symptoms of stress or negative affect. This is may be as a result of the small sample size and may represent an area where further more detailed research is necessary. The lack of significant relationships between threat appraisals and stress also contradicts the findings of much other of research (Gallagher et al., 2002; Skinner & Brewer, 2002). However, consistent with previous research, threat appraisals were correlated with negative affect as expected (Dua & Price, 1992). State and trait affect are distinct concepts. State affect is negative emotion which has arisen as the result of environmental circumstance. Trait affect is a characteristic of an individual's personality and is relatively unaltered by the environment. It is unclear in the present study whether the results are due to trait or state affect. Individuals who are high in negative trait affectivity tend to appraise situations as more threatening than those low on this trait (Parkes, 1990; Watson & Clark, 1984). However threatening situations may potentially increase an individual's levels of negative state affect (Dua, 1990). Further research needs to be undertaken to distinguish between the effects of state and trait affect with this population.

As expected threat appraisals correlated with avoidance coping but unexpectedly threat appraisals also correlated positively with approach coping. This may suggest that when rescue helicopter crew members are concerned about their ability to perform or carry out their duties they may engage a wide range of coping strategies including those which involve more

in-depth engagement with the situation as well as those involving avoidance and mental detachment.

7.2 Coping

Approach coping was defined as a combination of acceptance, active coping, planning, positive reframing, social support and humour. Prior research has suggested that approach coping decreases the symptoms of stress and increases well-being; however in the present study approach coping did not show any correlation either positive or negative with growth or with stress. This may be a result of the required roles performed and situations encountered by rescue helicopter crews. Active involvement with potentially distressing situations is a necessary part of these emergency service providers' job roles. Helicopter rescue crews have been trained and are experienced in performing their roles, therefore interacting with stimuli which the general population would find distressing may have limited short-term effects which were not evident with the measures of long term growth and stress which were used in this study.

Contrary to the findings of prior research and the hypothesised direction of the relationship, approach coping had a positive correlation with negative affect. This may indicate that the nature of the events encountered by these individuals may have a short term impact on their mood. However the lack of relationships with the GHQ and IES indicates these events do not tend to have long term impacts or increase ill-health in the long term.

Prior research suggests that PTG and positive affect should be greater when approach coping is used (Linley & Joseph, 2004). In the present study no relationship was observed between approach coping and PTG, however a positive correlation between approach coping and positive affect was observed. This may again support the conjecture that these individuals experience short-term mood state changes due to the events encountered, however they will most often maintain a relatively stable health equilibrium over the longer term.

Avoidance coping was defined as a combination of distraction, venting, religion, self-blame, denial, disengagement, and substance use. Avoidance coping showed a positive correlation with scores on the IES and negative affect which is consistent with the findings of prior research (Vitaliano, Russo, Paulsen, & Bailey, 1995a). This suggests that avoidance coping increases symptoms of stress and negative emotional reactions.

Unexpectedly, avoidance coping also showed a positive correlation with positive affect. This finding is inconsistent with prior research, however it is extremely important. It may suggest that for this population avoidance coping may be potentially adaptive. This may be as a result of the stimuli and situations with which they encounter. Not only are the situations with which this population deal likely to be explicit and potentially distressing, the crew-members are likely to have limited control over the long-term outcomes. The literature has suggested that avoidance coping and distancing may be adaptive in stressful situations where controllability is minimised (Vitaliano et al.,

1990; Wrosch, Scheier, Carver, & Schultz, 2003). Vitaliano (1990) reported "problem-focused efforts should be most adaptive for situations perceived as changeable, as opposed to unchangeable" (p.589). Given that the majority of events with which this population encounter are for the most part unalterable, avoidance and detachment are likely to be necessary for crew members to continue successfully carrying out their duties.

Contrary to the findings of prior research, cognitive hardiness showed a negative correlation with challenge appraisals but no relationship with threat appraisals. One possible reason for this interesting outcome is that individuals who constantly perceive situations as challenging may be less inclined to grow and learn from their experiences as they feel confident in their own abilities and are particularly focused on the positives of a situation. Research has suggested hardiness may develop through exposure to adverse circumstance (Bonanno, 2004). Appraisals of situations as challenging may decrease the perception of unpleasantness or aversiveness and therefore may not provide the opportunity for individuals to become cognitively hardy. This conjecture could be an interesting avenue for further research to follow.

Consistent with the findings of previous research cognitive hardiness demonstrated a negative correlation with avoidance coping, suggesting that those individuals who are less hardy tend to engage less with stressful stimuli and to use avoidance strategies more than those who are hardier.

7.3 Moderation

7.3.1 Coping

Approach coping did not play a moderating role between challenge appraisals, stress, negative affect or PTG. It did however moderate the relationship between challenge appraisals and positive affect. Approach coping was associated with increased levels of positive affect but only for individuals with higher levels of challenge appraisals. For those with low levels of challenge appraisals approach coping did not influence outcomes. This finding provides partial support for a positive pathway from challenge and approach coping to positive outcomes occurring after trauma.

Avoidance coping did not moderate the relationships between threat appraisals and any of the outcome measures, positive or negative. This suggests that for rescue helicopter crews' avoidance coping has little impact, either positive or negative, on outcomes when a situation is appraised as threatening.

7.3.2 Cognitive Hardiness

Cognitive hardiness did not play a moderating role on the relationships between threat or challenge appraisals and outcomes. Hardiness also did not moderate the effect of approach coping on stress, negative affect, or PTG. However cognitive hardiness did moderate the relationship between approach coping and positive affect. Individuals who used high levels of approach coping and were low on hardiness displayed greater positive affect than those using approach coping who were also high on hardiness. This is the reverse

of the expected relationship. This suggests that approach coping is more adaptive for people who are low on cognitive hardiness. Individuals who are not hardy may be reliant on the environment to provide external reinforcement that they have performed their roles well and this approach coping may provide them with positive reinforcement, thereby increasing positive affect. However hardy individuals may have accepted their lack of control over the situation and may also be more self-reliant and possess greater trust in their own ability, therefore approach coping may be less adaptive for this group.

Hardiness did not moderate the relationship between avoidance coping and scores on the IES, negative affect or PTG. It did however moderate the relationship between avoidance coping and GHQ and positive affect. The effect of cognitive hardiness on GHQ scores was similar to that hypothesised. For individuals who used high levels of avoidance coping, cognitive hardiness had little impact on stress. However for those who were low on avoidance coping, those also possessing low hardiness displayed more distress compared with those high on hardiness, suggesting that for individuals low in cognitive hardiness avoidance may protect them from distress. This finding in combination with the former regarding increased use of approach coping by individuals low in cognitive hardiness suggests this low hardy group engages in a wider variety of coping strategies than their hardy counterparts to deal with the events they encounter do their occupational roles.

The relationship between hardiness and positive affect was unexpected. For people who used were low in cognitive hardiness avoidance

coping was associated with increased positive affect. One potential explanation for this finding is that for individuals who do not possess the adaptive capabilities and psychological resources to manage potentially stressful demands i.e. individuals who a low on hardiness, avoidance coping may provide a means to extricate and distance themselves from the situation thereby decreasing distress and increasing positive affect. This again provides support for the notion that avoidance coping may be adaptive for this population.

7.4 Limitations of the Present Research

The present research had a number of limitations. Firstly and mostly importantly was the sample size. A sample of 20 participants makes analysis of the data difficult and makes the generalisability of findings questionable. It was also impossible to perform a factor analysis which would have been helpful in establishing whether the approach and avoidance dichotomy was justified.

The accuracy and sensitivity of a number of the measures may have been questionable. The Posttraumatic Growth Inventory failed to correlate with any of the other measures and scores on this measure were very low. This construct may also not be suitable for traumatic events experienced during the performance of work-related roles. PTG is more likely to occur when loss or harm experienced is personal or the individual is directly involved (Linley & Joseph, 2004).

The GHQ also showed no zero-order correlations with any other study variables. It is designed to measure more extreme levels of stress and therefore may not be sensitive enough to accurately measure the small fluctuations which may occur with this population.

The Dispositional Resilience Scale was problematic as a number of questions had to be removed due to their low inter-item correlations and the low reliability scores obtained with the 45 item measure. The wording of this questionnaire may have been a problem for participants with double negatives common in the questions.

Finally the accuracy of the coping measures can be difficult to establish. There are difficulties in getting individuals to admit to socially undesirable coping strategies such as substance use or denial. This is especially problematic with participants whose job security is based on their ability to cope well under pressure.

7.5 Future Research

The present study has just scraped the surface of research on appraisals and coping strategies with rescue helicopter crews. It has provided support for the cognitive-behavioural model's application to work-related traumatic encounters. However it has only begun to investigate the individual difference variables which can affect the relationships between primary appraisal, coping and outcomes. Further research is needed to investigate a variety of topics including:

- Perceptions of control and locus of control. These are important areas which need further investigation so as to more fully understand the role they play in affecting whether a coping strategy is adaptive or maladaptive.
- Research is also needed with larger sample sizes to clarify the consistency of these findings and to further our understanding of the significant and non-significant relationships found here.
- Qualitative research may be an avenue worth exploring so as to gain a greater depth of understanding about the experiences of rescue helicopter crews. It is likely that qualitative research could help to clarify why the interesting and unexpected relationships shown in this study have occurred.
- Future research is also need to compare this population's experiences, appraisals and coping strategies with other groups of emergency service personnel and with the general population so as to identify where divergences and similarities arise.
- It is important to study the individual difference factors which are important for this specific population.
- Finally it would be interesting to establish the effect of repeated exposure on this population. Our sample had an average of 7.5 years experience. It would be interesting to examine whether individuals who are new to the rescue helicopters appraise and cope with the events in a different manner to those more experienced and practised members.

7.6 Implications for Practice

Increasing our understanding of the emotional and psychological responses to traumatic events encountered during the performance of their occupational roles is vital for the long-term mental health of all emergency service personnel. Rescue helicopter crews encounter events on an almost daily basis which an untrained, inexperienced individual would most likely find traumatic. Understanding more about the roles primary appraisal and coping play in minimising the traumatic responses and outcomes is important in terms of both humanitarian and monetary terms.

The present research has suggested that avoidance coping is more adaptive for this population than approach coping. If supported, this would be almost unique for this group compared with the majority of other populations studied. This implies that standardised training procedures for coping should be used with caution as these techniques typically tend to increase approach and decrease avoidance strategies. The differences in coping strategies used, stress experienced and positive and negative affect between individuals who are high or low in cognitive hardiness suggests that training may need to be individualised. This may be feasible with rescue helicopter crew members due to the small size of this population and also given the monetary investment made in helicopter crews in terms of equipment and specialised position training.

7.7 Conclusion

Overall this research has been extremely valuable in advancing our understanding of the way rescue helicopter crew members cope with the events they encounter in the performance of their occupational roles. It seems Lazarus and Folkman's (1984) cognitive-behavioural model of stress can be applied to traumatic work-related encounters, specifically those experienced by rescue helicopter personnel. This model helped to identify that avoidance coping may be adaptive for this group if they possess little personal, direct control over the situations they experience. Cognitive hardiness also seemed to be adaptive for this population in that it can help individuals choose the most adaptive coping strategy for themselves, be it approach or avoidance.

This study has identified a specific environment where the efficacy of coping depends on the environmental context. It has also helped us to understand a little more about the individuals who on a daily basis risk their lives to save others and how they manage to continue with their extremely high levels of performance after encountering events which would make most of us weak at the knees. It is vital that research continue to be done with all groups of emergency service personnel so as they can continue performing their fundamental and critical occupational roles.

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Appendix A.

QUESTIONNAIRE FOR RESCUE HELICOPTER CREWS

Massey University

POSITIVE AND NEGATIVE EFFECTS OF WORK RELATED STRESSORS

2006

Questionnaire

Thank you for choosing to take part in this study. Please ensure you have read and understood the information sheet before continuing. Please answer the following questions as openly and honestly as possible. All answers will be kept completely anonymous and you have the right to withdraw at any stage.

A "traumatic event" is defined as an event that involves actual or threatened death or serious injury to ones self or to others.

The focus of this survey is how people manage their experience of traumatic events. A traumatic event is one which involves actual or threatened death or serious injury. We would like you to take a few moments and think about the most traumatic situation that you have experienced at work, or as a result of work, in the past six months, and then to answer the questions that follow with this situation in mind.

However, if you are unable or do not wish to recall or answer questions about an event that was traumatic for you, we would like you to think instead of a work event that was stressful but not necessarily traumatic and to keep this situation in mind as you answer the questions.

Before responding to the questions that follow, think about the details of this situation, such as where it happened, who was involved, how you acted or reacted, and why it was important to you. While you may still be involved in the situation, or it could have already happened, it should be the most traumatic or stressful work situation that you have experienced during the past six months.

Please indicate briefly the situation

.....

.....

Do you feel this situation was traumatic ❑ or stressful ❑ for you? (Please tick the box that applies).

As you answer the following questions, please keep this situation in mind

Please circle the number that most closely represents how you felt about the situation you identified.

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. I was concerned that others would be disappointed in my performance	1	2	3	4
2. I was worried that I may not be able to carry out my duties properly	1	2	3	4
3. I was concerned about my ability to perform under pressure	1	2	3	4
4. I was thinking about the consequences of performing poorly	1	2	3	4
5. I was looking forward to testing my knowledge, skills, and abilities	1	2	3	4
6. I was focused on the possible positive outcomes of this situation	1	2	3	4
7. I was looking forward to the rewards of success	1	2	3	4
8. I was thinking about the consequences of performing well	1	2	3	4

The following asks about how you attempted to manage the situation you faced. With this situation in mind, please indicate the extent you used a particular method.

	Not at all	Rarely	Sometimes	Often
1. I took action to try and make the situation better	1	2	3	4
2. I blamed myself for the things that happened	1	2	3	4
3. I prayed or meditated	1	2	3	4
4. I refused to believe it had happened	1	2	3	4
5. I thought hard about what steps to take to amend the situation	1	2	3	4
6. I expressed my negative feelings	1	2	3	4
7. I tried to look for something good in what had happened	1	2	3	4

	Not at all	Rarely	Sometimes	Often
8. I gave up attempting to cope	1	2	3	4
9. I did something to think about it less	1	2	3	4
10. I accepted the reality of the fact that it had happened	1	2	3	4
11. I concentrated my efforts on doing something about the situation	1	2	3	4
12. I made jokes about the situation	1	2	3	4
13. I tried to find comfort in my religion or spiritual beliefs	1	2	3	4
14. I received emotional support from others	1	2	3	4
15. I tried to come up with a strategy about what to do	1	2	3	4
16. I received comfort and understanding from someone	1	2	3	4
17. I used alcohol or other drugs to help me get through it	1	2	3	4
18. I tried to get advice/help from other people about what to do	1	2	3	4
19. I tried to make fun of the situation	1	2	3	4
20. I turned to other activities to take my mind off the situation	1	2	3	4
21. I tried to see it in a different light, to make it seem more positive	1	2	3	4
22. I said to myself 'it wasn't real'	1	2	3	4
23. I received help and advice from other people	1	2	3	4
24. I said things to let my unpleasant feeling escape	1	2	3	4
25. I used alcohol or other drugs to make myself feel better	1	2	3	4
26. I gave up trying to deal with it	1	2	3	4
27. I criticized myself	1	2	3	4
28. I learnt to live with it	1	2	3	4

Were there any other ways you attempted to manage the situation?

No ❑ Yes ❑ (If yes please specify)

.....

Below are statements describing emotions that an event can make you feel. Please indicate the amount to which the event made you feel that emotion.

	Not at all	Rarely	Sometimes	Often
1. This event made me feel at-ease	1	2	3	4
2. This event made me feel angry	1	2	3	4
3. This event made me feel anxious	1	2	3	4
4. This event made me feel bored	1	2	3	4
5. This event made me feel calm	1	2	3	4
6. This event made me feel content	1	2	3	4
7. This event made me feel depressed	1	2	3	4
8. This event made me feel disgusted	1	2	3	4
9. This event made me feel discouraged	1	2	3	4
10. This event made me feel energetic	1	2	3	4
11. This event made me feel excited	1	2	3	4
12. This event made me feel ecstatic	1	2	3	4
13. This event made me feel enthusiastic	1	2	3	4
14. This event made me feel frightened	1	2	3	4
15. This event made me feel furious	1	2	3	4
16. This event made me feel fatigued	1	2	3	4
17. This event made me feel gloomy	1	2	3	4
18. This event made me feel inspired	1	2	3	4
19. This event made me feel relaxed	1	2	3	4
20. This event made me feel satisfied	1	2	3	4

Below is a list of comments made by people after traumatic or stressful events. Please indicate how frequently these have occurred for you *since the event you described took place.*

	Not at all	Rarely	Sometimes	Often
1. I thought about it when I didn't mean to	1	2	3	4
2. I avoided letting myself get upset when I thought about it or was reminded of it	1	2	3	4
3. I tried to remove it from my memory	1	2	3	4
4. I had trouble falling asleep or staying asleep, because pictures or thoughts about the event came into my mind	1	2	3	4
5. I had waves of strong feelings about it	1	2	3	4
6. I had dreams about it	1	2	3	4
7. I stayed away from reminders of it	1	2	3	4
8. I felt as if it hadn't happened or wasn't real	1	2	3	4
9. I tried not to talk about it	1	2	3	4
10. Vivid memories of it popped into my mind	1	2	3	4
11. Other things kept making me think about it	1	2	3	4
12. I was aware that I still had a lot of feelings about it, but I didn't deal with them	1	2	3	4
13. I tried not to think about it	1	2	3	4
14. Any reminder brought back feelings about it	1	2	3	4
15. My feelings about it were kind of numb	1	2	3	4

Please indicate how the traumatic or stressful event you identified has impacted on your life

	No Change	Small Change	Moderate Change	Large Change
1. I changed my priorities about what is important in life	1	2	3	4
2. I have a greater appreciation for the value of my own life	1	2	3	4
3. I developed new interests	1	2	3	4
4. I have a greater feeling of self-reliance	1	2	3	4

	No Change	Small Change	Moderate Change	Large Change
5. I have a better understanding of spiritual matters	1	2	3	4
6. I more clearly see that I can count on people in times of trouble	1	2	3	4
7. I established a new path for my life	1	2	3	4
8. I have a greater sense of closeness with others	1	2	3	4
9. I am more willing to express my emotions	1	2	3	4
10. I know better that I can handle difficulties	1	2	3	4
11. I am able to do better things with my life	1	2	3	4
12. I can better appreciate each day	1	2	3	4
13. I am able to accept the way things work out	1	2	3	4
14. New opportunities occurred which wouldn't have otherwise	1	2	3	4
15. I have more compassion for others	1	2	3	4
16. I put more effort into my relationships	1	2	3	4
17. I am more likely to try to change things which need changing	1	2	3	4
18. I have a stronger religious faith	1	2	3	4
19. I discovered that I'm stronger than I thought I was	1	2	3	4
20. I learned a great deal about how wonderful people are	1	2	3	4
21. I better accept others in need	1	2	3	4

Please indicate how you have been feeling since the event occurred.

	No Change	Much Less	Less	More
1. Been able to concentrate on whatever you're doing	1	2	3	4
2. Lost much sleep over worry	1	2	3	4
3. Felt that you are playing a useful part in things	1	2	3	4
4. Felt capable of making decisions about things	1	2	3	4
5. Felt constantly under strain	1	2	3	4

	No Change	Much Less	Less	More
6. Felt you couldn't overcome your difficulties	1	2	3	4
7. Been able to enjoy you normal day-to-day activities	1	2	3	4
8. Been able to face up to your problems	1	2	3	4
9. Been feeling unhappy and depressed	1	2	3	4
10. Been losing confidence in yourself	1	2	3	4
11. Been thinking of yourself as a worthless person	1	2	3	4
12. Been feeling reasonably happy, all things considered	1	2	3	4

Below are statements about life that people often have differing opinions on. Read the items carefully and indicate how much you think each one is true. There are no right or wrong answers; just give your opinion.

	Untrue	A little true	Quite true	Very True
1. Most of my life gets spent doing things that are worthwhile	1	2	3	4
2. Planning ahead can help avoid most future problems	1	2	3	4
3. Trying hard doesn't pay, since things still don't turn out right	1	2	3	4
4. No matter how hard I try, my efforts usually accomplish nothing	1	2	3	4
5. I don't like to make changes in my everyday schedule	1	2	3	4
6. The 'tried and true' ways are always best	1	2	3	4
7. Working hard doesn't matter, since only the bosses profit by it	1	2	3	4
8. By working hard you can always achieve your goals	1	2	3	4
9. Most working people are simply manipulated by their bosses	1	2	3	4
10. Most of what happens in life is just meant to be	1	2	3	4
11. It's usually impossible for me to change things at work	1	2	3	4
12. New laws should never hurt a person's pay cheque	1	2	3	4
13. When I make plans, I'm certain I can make them work	1	2	3	4
14. It's very hard for me to change a friend's mind about something	1	2	3	4
15. It's exciting to learn something about myself	1	2	3	4
16. People who never change their minds have good judgment	1	2	3	4

	Untrue	A little true	Quite true	Very True
17. I really look forward to my work	1	2	3	4
18. Politicians run our lives	1	2	3	4
19. If I'm working on a difficult task I know when to seek help	1	2	3	4
20. I won't answer a question until I'm sure I understand it	1	2	3	4
21. I like a lot of variety in my work	1	2	3	4
22. Most of the time, people listen carefully to what I say	1	2	3	4
23. Daydreams are more exciting than reality for me	1	2	3	4
24. Thinking of yourself as a free person just leads to frustration	1	2	3	4
25. Trying your best at work really pays off in the end	1	2	3	4
26. My mistakes are usually very difficult to correct	1	2	3	4
27. It bothers me when my daily routine gets interrupted	1	2	3	4
28. It's best to handle most problems by just not thinking of them	1	2	3	4
29. Most good athletes and leaders are born, not made	1	2	3	4
30. I often wake up eager to take up my life wherever it left off	1	2	3	4
31. Lots of times, I don't really know my own mind	1	2	3	4
32. I respect rules because they guide me	1	2	3	4
33. I like it when things are uncertain or unpredictable	1	2	3	4
34. I can't do much to prevent it if someone wants to harm me	1	2	3	4
35. People who do their best deserve full support from society	1	2	3	4
36. Changes in routine are interesting to me	1	2	3	4
37. People who believe in individuality are kidding themselves	1	2	3	4
38. I have no use for theories that are not closely tied to facts	1	2	3	4
39. Most days life is really interesting and exciting for me	1	2	3	4
40. I want to be sure someone will care for me when I'm old	1	2	3	4
41. Its hard to imagine anyone getting excited about working	1	2	3	4
42. What happens to me tomorrow depends on what I do today	1	2	3	4
43. If someone gets angry at me, it's usually no fault of mine	1	2	3	4
44. It's hard to believe people who say their work helps society	1	2	3	4
45. Ordinary work is just too boring to be worth doing	1	2	3	4

We are interested in collecting some general demographic information about participants in order to assess the representativeness of our sample. Please tick the relevant boxes below.

1. What is your gender?

❑ Female ❑ Male

2. What is your age?

❑ 18-25 ❑ 41-45

❑ 26-30 ❑ 46-50

❑ 31-35 ❑ 50-55

❑ 36-40 ❑ 55+

3. What is your position in the Rescue Helicopter Crew?

❑ Pilot ❑ Specialist Paramedic

❑ Crewman ❑ Other (Please specify) _____

4. How long have you been employed/contracted by the Rescue Helicopter Trust?

Years: _____ Months: _____

5. Which district does the Rescue Helicopter you are employed/contracted by operate in?

❑ Auckland ❑ Gisborne

❑ Hamilton ❑ Palmerston North

❑ Taupo ❑ Wellington

❑ Taranaki ❑ Christchurch

❑ Rotorua ❑ Otago

❑ Tauranga ❑ Other (Please Specify) _____

Thank you very much for taking part in this study. Please ensure you have answered all the questions you wish and return this questionnaire to the researcher via email, freepost envelope or in person

☺

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Appendix B.

MULTIPLE REGRESSION MODELS

PRIMARY APPRAISALS AND COPING

Hypothesis 8ai: Moderated relationship between challenge appraisals, approach coping & positive affect (figure 8, pg78)

Dependant Variable: Positive Affect	R Squared	B	Beta	Sig.
Step 1	0.402			
Challenge		0.299	0.286	-
Approach		0.775	0.569	0.016
Step 2	0.688			
Challenge		0.264	0.253	-
Approach		1.054	0.773	0.000
Challenge X Approach		0.988	0.574	0.004

Hypothesis 8aii: Direct relationship between approach coping & negative affect

Dependant Variable: Negative Affect	R Squared	B	Beta	Sig.
Step 1	0.59			
Challenge		0.272	0.301	-
Approach		0.842	0.716	0.000
Step 2	0.59			
Challenge		0.273	0.302	-
Approach		0.834	0.709	0.001
Challenge X Approach		-0.27	-0.018	-

Hypothesis 8bii: Direct relationship between avoidance coping & the Impact of Events Scale

Dependant Variable: IES	R Squared	B	Beta	Sig.
Step 1	0.409			
Threat		0.126	0.144	-
Avoidance		0.781	0.555	0.029
Step 2	0.422			
Threat		0.080	0.091	-
Avoidance		0.858	0.610	0.031
Threat X Avoidance		-0.323	-0.555	-

Hypothesis 8bii: Direct relationship between avoidance coping & negative affect

Dependant Variable: Negative Affect	R Squared	B	Beta	Sig.
Step 1	0.659			
Threat		0.181	0.195	-
Avoidance		1.039	0.696	0.001
Step 2	0.705			
Threat		0.088	0.094	-
Avoidance		1.194	0.800	0.000
Threat X Avoidance		-0.653	-0.238	-

PRIMARY APPRAISALS AND COGNITIVE HARDINESS

Hypothesis 13bii: Direct relationship between threat appraisals & negative affect

Dependant Variable: Negative Affect	R Squared	B	Beta	Sig.
Step 1	0.393			
Threat		0.475	0.510	0.016
Hardiness		-0.721	-0.310	-
Step 2	0.484			
Threat		0.353	0.380	-
Hardiness		-0.724	-0.311	-
Threat X Hardiness		1.142	0.328	-

COPING AND COGNITIVE HARDINESS

Hypothesis 14ai: Moderated relationship between approach coping, cognitive hardiness & positive affect (Figure 9, pg.79)

Dependant Variable: Positive Affect	R Squared	B	Beta	Sig.
Step 1	0.398			
Approach		0.745	0.546	0.020
Hardiness		-0.752	-0.279	-
Step 2	0.617			
Approach		1.046	0.768	0.001
Hardiness		-0.425	-0.158	-
Approach x Hardiness		-2.719	-0.528	0.017

Hypothesis 14aii: Direct relationships between approach coping, cognitive hardiness & negative affect

Dependant Variable: Negative Affect	R Squared	B	Beta	Sig.
Step 1	0.610			
Approach		0.812	0.690	0.000
Hardiness		-0.742	-0.319	-
Step 2	0.625			
Approach		0.744	0.632	0.003
Hardiness		-0.816	-0.351	0.049
Approach X Hardiness		0.613	0.138	-

Hypothesis 14bi: Moderating relationship between avoidance coping, cognitive hardiness & positive affect (Figure 10, pg.80)

Dependant Variable: Positive Affect	R Squared	B	Beta	Sig.
Step 1	0.294			
Avoidance		0.87	0.503	-
Hardiness		-0.193	-0.072	-
Step 2	0.379			
Avoidance		0.777	0.449	-
Hardiness		0.095	0.035	-
Avoidance x Hardiness		-3.189	-0.471	0.040

Hypothesis 14bii: Direct relationship between avoidance coping & the Impact of Events Scale

Dependant Variable: IES	R Squared	B	Beta	Sig.
Step 1	0.396			
Avoidance		0.919	0.653	0.013
Hardiness		0.112	0.051	-
Step 2	0.421			
Avoidance		0.892	0.634	0.017
Hardiness		0.195	0.089	-
Avoidance X Hardiness		-0.911	-0.165	-

Hypothesis 14bii: Direct relationship between avoidance coping & negative affect

Dependant Variable: Negative Affect	R Squared	B	Beta	Sig.
Step 1	0.794			
Avoidance		1.205	0.807	0.000
Hardiness		0.062	0.027	-
Step 2	0.836			
Avoidance		1.252	0.839	0.000
Hardiness		-0.082	-0.035	-
Avoidance X Hardiness		1.595	0.273	-

Hypothesis 14bii: Moderated relationship between avoidance coping, cognitive hardiness & the General Health Questionnaire (Figure 11, pg.81)

Dependant Variable: GHQ	R Squared	B	Beta	Sig.
Step 1	0.016			
Avoidance		0.139	0.12	-
Hardiness		-0.029	-0.016	-
Step 2	0.364			
Avoidance		0.222	0.191	-
Hardiness		-0.284	-0.156	-
Avoidance x Hardiness		2.817	0.618	0.012