A Prospective, Longitudinal Examination of Pre-Existing Cognitive, Emotional and Behavioural Risk Factors for Post-Trauma Adjustment

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A thesis submitted for the degree of Doctor of Philosophy (in Clinical Psychology) from

The Australian National University

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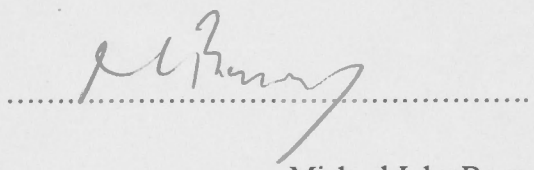
Canberra, Australia

9 August 2010

DECLARATION

I declare that this thesis reports my original work, that no part has been previously accepted and presented for the award of any degree or diploma from any university, and that to the best of my knowledge, no material published or written by any other person is included, except where due acknowledgement is given.



Michael John Barry

DEDICATION

This thesis is dedicated to the men and women of Australian and coalition forces who have lost their lives, or been injured, in the war against terrorism in Iraq and Afghanistan. May their sacrifice not be in vain.

ACKNOWLEDGEMENTS

I would first like to acknowledge, and thank the men and women of Reconstruction Task Force IV, and Security Detachment XIII, for their time and participation in this research. Without their efforts, this research would not have been possible, and more importantly, thanks to their sacrifice and commitment, the people of Iraq and Afghanistan are one step closer to a lasting peace.

I would like to thank Colonel Stephanie Hodson, Director of Mental Health within the Department of Defence, who has been instrumental in opening doors within the Department and helping me to gain support for the research. I would also like to thank the staff at the Directorate of Mental Health and the Psychology Research and Technology Group for providing invaluable support by either reading drafts of the thesis, providing advice on statistical analysis or helping me to fix data entry problems. You have all shown a genuine interest in my research, and I appreciate your friendship and thank you for your support and encouragement over the past four years.

To Cath, Sam, Erti, Tushara and Lou at the ANU. We started this road together, and have supported each other through the frustrations and anxieties of our journey as clinicians and researchers. We have shared a lot of laughs and you have never ceased to provide me with encouragement and support, I count you all as close friends.

I would like to thank my supervisory panel, Associate Professor Richard O'Kearney, Colonel (Dr) Stephanie Hodson and Dr Jay Brinker. You have been patient, maintained a sense of humour and provided me with guidance and support throughout this research.

Finally, to parents, my wife Sharon, and my daughters Erin and Kelly. I cannot thank you enough for believing in me over the years. I would not be the person I am today without your love and support and this would not have been possible without your encouragement, good humour and patience. To Erin, my budding author and editor, thank you for your comments on my drafts; to Kelly, thank you for encouraging escape through sci-fi TV and fantasy fiction; and, finally, to my soulmate, thank you for being there for the long haul, and for sharing this journey with me.

PUBLICATIONS ARISING FROM THIS THESIS

It is acknowledged that the findings of this research have contributed to the following research papers:

Barry, M.J., (2010). *Mental Health Research Report 1/2010 – Pre-existing Cognitive and Emotional Predictors of Post-Deployment (RtAPS) Mental Health amongst ADF Personnel Deployed on Operations Catalyst and Slipper during 2008.* Canberra: Defence Force Psychology Organisation, Department of Defence.

Barry, M.J., (2010). *Mental Health Research Report 2/2010 – Pre-existing Cognitive and Emotional Predictors of Mental Health at Follow-Up (POPS) amongst ADF Personnel Deployed on Operations Catalyst and Slipper during 2008.* Canberra: Defence Force Psychology Organisation, Department of Defence.

Barry, M.J., (2010). *Mental Health Research Report 3/2010 – Coping Behaviour and Post-Deployment Mental Health amongst ADF Personnel Deployed on Operations Catalyst and Slipper during 2008.* Canberra: Defence Force Psychology Organisation, Department of Defence.

ABSTRACT

Using a sample of 519 Australian Defence Force (ADF) personnel deployed on active service to Iraq and Afghanistan during 2008, this thesis proposed and tested a vulnerability model for post-trauma pathology through a prospective, longitudinal examination of the relationship between cognitive, emotional regulation and behavioural factors and post-traumatic stress and psychological distress. Data was collected at three time points. The first was prior to deployment with data collected on self and world beliefs, appraisal style, capacity for emotional regulation, coping behaviour, pre-existing levels of pathology and previous operational experience. The second was at the end of the deployment with data collected on the cognitive and emotion variables, exposure to trauma and non-traumatic stressors, and post-traumatic stress and psychological distress. The third was at follow-up, 4-8 months following return to Australia, with data collected on coping behaviour, post-traumatic stress and psychological distress. The variables under question are important to study as they are measurable, and in high-risk populations potentially modifiable through intervention prior to exposure to trauma.

The vulnerability model proposed in this thesis provides support for cognitive and appraisal theories of post-traumatic stress and related pathology. It identifies pre-existing cognitive, emotional and behavioural factors that contribute to the prediction of both post-trauma and ongoing pathology. The research found that the variables were remarkably stable across the deployment, with variation explained more by exposure to deployment-related stressors, than by exposure to traumatic events. This is thought to be because traumatic events were to some degree anticipated, and occurred in context, whereas non-traumatic deployment related stressors were more difficult to prepare for, and may have contributed to increased frustration and stress over time.

The findings showed that negative beliefs around benevolence of the world, and a lack of emotional regulation strategies were associated with increased post-traumatic stress at the end of the deployment, while non-acceptance of emotional response and a lack of emotional regulation strategies were associated with increased psychological distress. At follow-up, avoidant coping behaviour was related to increased pathology, while a lack of self-worth, strong beliefs around events having meaning, and a reduced ability to pursue goal directed behaviour were associated with post-traumatic stress. A general lack of awareness and acceptance of emotional response, and strong positive beliefs about the benevolence of the world, were associated with increased psychological distress.

There was also a general tendency to adopt a problem-focussed coping style in preference to emotion-focussed strategies, and the research found that this, combined with a reluctance to adopt emotion-focussed strategies, may act as a risk factor for poor adjustment. This is thought to be because many of the problems causing distress are not able to be readily addressed, and so the application of problem-focussed strategies has the potential to be unsuccessful, and result in increased frustration and distress.

This thesis identifies a need for education for Defence personnel into the role of appraisals and beliefs in influencing peri- and post-deployment adjustment, the relationship between emotional expression and adaptive adjustment, and the need to be able to access alternate coping strategies. The research was unique in integrating pre-existing cognitive, emotional and behavioural factors as predictors of pathology, and paves the way for further research into how these factors influence adjustment among other high-risk populations.

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CHAPTER 1

OVERVIEW

Trauma does not occur against a blank slate, but to individuals and groups who bring their own histories of assumptions and self beliefs to that crisis.

Dr Kate Gillespie, Director of the Northern Ireland Centre for Trauma and Transformation
Keynote Address to the 2007 Australasian Society for Traumatic Stress Studies Conference.

This thesis proposes and tests a vulnerability model for post-trauma adjustment which prospectively considers the relationship between pre-existing cognitions, emotional competencies and coping mechanisms; and post-trauma functioning. Researchers have separately shown that self and world beliefs (Dekel, Solomon, Elklit, & Ginzburg, 2004; Janoff-Bulman, 1989, 1992), appraisal style (Ali & Dunmore, 2002; Andrews, Brewin, Rose, & Kirk, 2000), emotional response (Brewin, Andrews, & Rose, 2000; Gratz & Roemer, 2004) and coping behaviour (Lazarus, 1993; Solomon, Mikulincer, & Avitzur, 1988), measured *after* exposure to traumatic events, predict post-traumatic adjustment. Due to the difficulty in conducting *pre*-trauma research however, few studies have prospectively examined these factors prior to exposure to trauma, and none have attempted to measure and integrate these factors as predictors of adjustment.

In order to conduct prospective pre-trauma research without violating ethical guidelines, it is necessary to identify a population which can reasonably be expected to experience traumatic events without the manipulation of the researcher. Such a population exists in the form of military personnel deployed on active service in a war-zone. This thesis addresses limitations in previous studies of pre-trauma vulnerabilities by collecting data at three time points using a sample of Australian Defence Force (ADF) personnel who were deployed to Iraq and Afghanistan during 2008. In doing so,

this thesis investigates the relationship between pre-existing vulnerability factors and post-trauma psychopathology, through the use of a prospective, longitudinal examination of cognitive, emotional regulation and behavioural variables.

Diathesis-Stress models propose that individuals have a level of predisposing factors which create vulnerability for any given psychological disorder. These models propose that while the nature and severity of the trauma or stressor is closely related to the development of psychopathology, they are not the sole aetiological pathway, as pre-existing demographic factors (Breslau, 2001; Leskin & Sheikh, 2002; Rosenman, 2002), prior exposure (Breslau, 2001; Ozer, Best, Lipsey, & Weiss, 2003), previous pathology (Kulka et al., 1990; Rosenman, 2002), access to social support (Breslau, 2001; Ozer, et al., 2003), and pre-existing appraisal style, cognitions and schemas (Ehlers & Clark, 2000; Foa & Rothbaum, 1998; Janoff-Bulman, 1992; Mikulincer & Solomon, 1988), capacity for emotional response (Gross, 2002; Price, Monson, Callahan, & Rodriguez, 2006), and coping behaviour (Dirkzwager, Bramsen, & van der Ploeg, 2003; Mikulincer & Solomon, 1989; Solomon, Mikulincer, et al., 1988), are also important in contributing to the development of pathology. Most cognitive models of trauma related pathology focus on peri- and post-trauma factors, and issues impacting on the integration of the traumatic experience into memory. While a small number of cognitive models do refer to pre-existing cognitive factors and schemas in providing vulnerability for pathology, they tend to not clearly define or explain the nature of these variables.

Post-Traumatic Stress Disorder (PTSD) is characterised by three broad clusters of symptoms: re-experiencing, avoidance-numbing and hyper-arousal (*Diagnostic and Statistical Manual of Mental Disorders-IV, Text Revision* (DSM-IV TR); American Psychiatric Association, 2000), and PTSD symptoms have been reported at lifetime rates of 19% and current rates of 9% for US Vietnam veterans (Dohrenwend et al.,

2006), 10% of US Gulf War veterans, and 8% of US Iraq and Afghanistan War veterans (Hoge et al., 2004; Smith et al., 2008). These figures are consistent with recent Australian data showing that 8% of ADF Iraq and Afghanistan War veterans were in medium – high risk categories on a screening measure of PTSD symptomatology (Benassi, 2008). These statistics suggest that military personal form a high risk group.

One way in which wartime experiences differ from many other traumatic experiences lies in their impact on a person's identity, on their sense of self and on their view of their world. A number of models do discuss the influence of pre-existing self and world schemas in explaining post-trauma adjustment. Ehlers and Clark (2000) specifically include the role of prior experiences, beliefs and the coping state of the individual in providing a pre-existing vulnerability for PTSD, and of relevant negative appraisals in the maintenance of PTSD; while Janoff-Bulman (1989; 1992) included the role of pre-existing belief systems about oneself and the world in her Cognitive-Appraisal Theory. In addition, Foa et al., (1993; 1996; 1998) included ideas from schema theory to explain the relationship between knowledge available before, during and after the trauma, and subsequent psychopathology. While more recently, Dalgleish (2004) suggested that individual differences in trauma responses are a function of the content and nature of pre-event schemas, and the degree that these schemas are maintained following the trauma.

Due to the difficulty in conducting prospective pre-trauma research however, these models have not been explicitly tested, and so tend to be unclear about the precise nature of the pre-existing cognitions, emotional competencies and coping behaviours which are important in creating vulnerability. This thesis proposes a model which addresses this limitation of existing models by integrating specific pre-existing cognitive, emotional and behavioural factors, and post-trauma pathology.

Identifying relevant vulnerability factors is important because these are potentially modifiable in populations which can be expected to experience trauma in the course of their duties, through intervention prior to exposure to trauma. The research reported in this thesis therefore seeks to answer four broad research questions:

- What is the impact of exposure to trauma and non-traumatic stressors on pre-existing cognitive appraisals, capacity for emotional regulation and coping behaviour?
- To what degree can pre-existing cognitive appraisals and capacity for emotional regulation predict adjustment measured following exposure to trauma?
- To what degree can pre-existing cognitive appraisals and capacity for emotional regulation predict ongoing adjustment measured at follow-up?
- What is the relationship between cognitive appraisals, emotional regulation and coping behaviour, and how does coping behaviour influence adjustment?

Data was collected on the cognitive and emotion variables, coping behaviour, pre-existing levels of pathology, and previous operational experience prior to deployment; on the cognitive and emotion variables, trauma exposure, exposure to non-traumatic deployment related stressors and pathology at the end of the deployment, and on pathology and coping behaviour at follow-up.

Four studies were developed to investigate the research questions. The first study is reported in Chapter 5 and describes the relationships between the cognitive and emotional predictor variables. This study explores the degree to which these variables are stable across the deployment, and takes account of the impact of exposure to trauma and non-traumatic deployment-related stressors.

The second study is reported in Chapter 6 and aims to identify the degree that pre-existing characteristics can be used to predict post-deployment adjustment. This study describes the relationship between the cognitive and emotional predictor variables

and post-traumatic stress and psychological distress at the end of the deployment (T2). In doing so, the analysis controls for previous operational experience and pre-existing levels of psychological distress, trauma exposure and exposure to deployment-related stressors.

The third study is reported in Chapter 7, and replicates the second study at follow-up (T3), to identify the degree that pre-existing characteristics can be used to predict ongoing adjustment.

Finally, the fourth study is reported in Chapter 8 and examines the role of coping behaviour. This study describes the relationship between the cognitive and emotional predictors and coping, examines the degree that coping behaviours are stable across the deployment, and examines the relationship between coping behaviour and adjustment at the end of the deployment and at follow-up. Coping was examined separately to investigate the degree to which internal (cognitive and emotional) processes predict external processes (coping behaviour), and to differentiate between the influence of cognitive and emotional processes, and coping behaviour on prediction of pathology.

The remaining chapters of this introductory section describe the theoretical literature and introduce the variables under examination. Chapter 2 describes the theoretical models and nature of PTSD in the context of military related trauma, while Chapter 3 examines the literature describing the cognitive-appraisal models of PTSD, emotional regulation and coping behaviour. Chapter 3 concludes by proposing a vulnerability model which integrates pre-existing cognitive, emotional and behavioural factors and post-trauma pathology, taking account of trauma and non-trauma related stressors, and prior experience and pathology. Finally, Chapter 4 provides a description of the research sample, describes the variables under question and outlines the overall research methodology.

CHAPTER 2

THE NATURE OF POST-TRAUMA PATHOLOGY

The Nature of Military Related Trauma

Military operations, whether they predominantly involve participation in combat, counter-terrorism, peacekeeping or humanitarian activities, are by their very nature, potentially traumatic. They are rarely conducted in a benign environment, and in addition to the threat of being injured or killed, deployed personnel are routinely exposed to widespread human suffering and poverty, the destruction of property and the environment, and disease and environmental health hazards. Gabriel (1987) suggested that the chance of becoming a psychiatric casualty in war is greater than the chance of being killed by enemy fire, and Grossman (1995) provides data to support this assertion, pointing out that during World War Two, the United States of America lost 504,000 serving men due to psychiatric injury, compared to 416,000 who were killed. This was despite excluding 800,000 men from service on psychiatric grounds.

A recent review of Australian Defence Force (ADF) operations in Iraq and Afghanistan during the period January 2003 to August 2006, found that two-thirds of deployed personnel had been exposed to Criteria A[1] traumatic events (Twomey, 2007). The top events listed on a trauma exposure inventory, were 'danger of being killed or injured', 'seeing dead bodies', 'witnessing degradation/human suffering on a large scale', and 'fear of exposure to toxic agent/infectious disease'. Of those reporting traumatic exposure, over two-thirds reported being adversely affected by the event. A more recent study of Australian Army personnel who served in Iraq during the period July 2005 to December 2006, found that one-third scored within the medium-high risk

[1] Based on Criteria A for Post-traumatic Stress Disorder as defined in DSM-IV TR (APA, 2000).

categories on a measure of psychological distress, and approximately 8% were in medium to high risk categories on a screening measure of PTSD symptomatology, with 2% in the high to very high risk categories (Benassi, 2008). Of 25,650 ADF personnel who had deployed to the Middle East up to 1 October 2009, 447 have subsequently been medically discharged (Benassi, 2010). Of those medically discharged, 183 personnel, or 41%, were discharged for mental health reasons, and of these, 122 were suffering symptoms deemed attributable (directly or indirectly) to their Middle Eastern deployment. While this comprises 0.48% of personnel who have deployed to the Middle East, it represents 27.3% of those medically discharged.

Post-Trauma Psychopathology

Throughout history, descriptions of the range of symptoms that typify post-traumatic psychopathology have often been closely linked to loss of identity, damage to a person's sense of self, or character, and a lack of courage. Ulysses writes of damaged character amongst surviving soldiers of the Trojan Wars (Barlow, 2002), while the Spanish described trauma related reactions as *estar roto*, meaning literally, 'to be broken' (Gabriel, 1987). Terms such as 'nostalgia' (Rosen, 1975), 'irritable heart' and 'soldier's heart', were used to describe sufferers during the European wars of the 17th and 18th Centuries, and the American Civil War (Tick, 2005), while traumatised survivors of mass trauma caused by 19th Century railway accidents were said to be experiencing 'railway spine', 'spinal irritation', and 'traumatic neurosis' (Parry-Jones & Parry-Jones, 1994). After treating war veterans for many years, Erikson (1963, p. 42) wrote, "what impressed me most, was the loss in these men of a sense of identity". These approaches acknowledge the deep mental scars caused by war related, and mass trauma.

During the First World War, 80,000 British soldiers presented with symptoms resembling PTSD (Beveridge, 1997), with most given diagnoses of 'war neurosis', 'shell fever' or 'shell shock' (Borders & Kennedy, 2006; Cantor, 2005; Tyquin, 2006). This war saw the start of the formal psychological study of the human response to trauma in military and civilian populations, while during World War II, PTSD-like symptoms were variously labelled 'battle fatigue', 'combat exhaustion', 'psycho-neurosis' and 'operational fatigue' (Campise, Geller, & Campise, 2006), with terms like 'fatigue' and 'exhaustion' perhaps reflecting the overwhelming nature of the symptoms. It was not until the Vietnam War however, that the terms post-traumatic stress syndrome and PTSD were introduced, and today, PTSD and combat stress reaction are widely used to diagnose veterans (Campise, et al., 2006). The term PTSD has since been adopted more broadly in the diagnosis of a wide variety of post-trauma reactions.

With the inclusion of PTSD in DSM III (APA, 1980), the group of psychological problems experienced by some people following a traumatic event could finally be diagnosed as a formal psychiatric disorder. Since then, definitions for both the traumatic event itself, and for the list of symptoms, have continued to evolve. By the fourth edition of the DSM, PTSD was grouped with anxiety disorders, and the main criterion had expanded from actual or threatened death or serious injury, to include awareness of events that threatened others, eliciting a response that involves intense fear, helplessness, or horror (DSM-IV) (APA, 2000).

This evolution has not been without controversy, and debate continues about a number of issues concerning the diagnosis of PTSD. Indeed, Forbes, Haslam, Williams and Creamer (2005) found support for a dimensional, rather than a taxonomic model of PTSD in combat veterans and, according to Frueh, Elhai and Kaloupek (2004), there is only limited support for the three cluster symptom model itself. In a review of studies

analysing the underlying factor structure of PTSD symptoms, Frueh et al., noted that there is significant heterogeneity of symptom presentation, with factor analysis producing between two and five factors depending on the population being studied. This calls into question the validity of the disorder itself, and suggests that studies of post-trauma psychopathology should not limit themselves to the strict criteria listed in DSM-IV.

McNally (2004) suggested that redefining Criterion A to include the subjective experience of 'intense fear, helplessness or horror', placed greater emphasis on appraisal factors. This emphasises a person's subjective estimation of the threat, meaning that cognitive vulnerability factors could potentially account for more of the variance than the nature of the traumatic event itself. Conversely, Adler, Wright, Bliese, Eckford, and Hoge (2008) point out that people who are trained to respond to potentially traumatic events may not experience the PTSD Criterion A2 of fear, helplessness or horror, and may have a lower subjective estimation of the threat, yet may still go on to develop significant PTSD symptoms. This view is particularly relevant with respect to military populations, but may also be relevant to other populations such as police, ambulance officers and other emergency responders, who are trained to respond to traumatic events. In addition, isolating post-trauma responses to PTSD is complicated because many of the symptoms of PTSD overlap significantly with other Axis I disorders, particularly other anxiety disorders, depression and specific phobias. Using a large community based sample however, Elhai, Grubaugh, Kashdan and Frueh (2008) found that removing overlapping anxiety and mood disorder symptoms did not result in significant differences in PTSD prevalence rates, which suggests that there is something unique about the core PTSD symptoms.

Post-Traumatic Stress Disorder

To meet DSM-IV criteria for a diagnosis of PTSD, a person must have witnessed, experienced or been confronted with an event or events involving actual or threatened death, or serious injury to themselves or others; and their response to the trauma must have involved intense fear, helplessness or horror. The symptoms of PTSD fall into three broad clusters: re-experiencing symptoms (memories of trauma), avoidance-numbing symptoms and hyper-arousal symptoms (Barlow, 2001).

Re-experiencing symptoms are unique to PTSD and reflect the persistence of thoughts, feelings and behaviours specifically related to the traumatic event. These recollections are generally experienced as distressing and intrusive, because they are unwanted, the individual cannot control when they occur and because they invoke strong negative emotions associated with the initial trauma (Janoff-Bulman, 1992; Resick & Calhoun, 2001). Re-experiencing symptoms include intrusive thoughts and images of the event, nightmares about the event, increased mental and/or physiological distress on being reminded of the event, and flashbacks during which individuals feel that they are reliving the event in the present. According to McFarlane (1988) the re-experiencing symptoms are often the first to diminish, while avoidant and hyper-arousal symptoms are typically more enduring.

Avoidance-numbing symptoms represent the behavioural, cognitive or emotional strategies used to gain psychological and emotional distance from the trauma. Cognitive symptoms include suppressing or avoiding distressing thoughts, images, feelings or memories; behavioural symptoms include avoidance of situations, people, places or conversations associated with the traumatic event, or that may trigger memories of the event, and dissociative symptoms include amnesia for all or part of the event, and depersonalisation (Briere & Scott, 2006). Numbing responses are an attempt

to prevent the negative feeling associated with the intrusive memories (Resick & Calhoun, 2001). Emotional numbing can also result in people having difficulty expressing positive emotions, and being incapable of experiencing and expressing the full range of emotions that were available prior to the trauma (Litz & Gray, 2002).

Hyper-arousal symptoms place the person in a constant state of alertness similar to the body's reaction to the actual traumatic event. In this state of alert, the individual is constantly prepared to react to new threats of danger, even in relatively 'safe' situations. Hyper-arousal includes symptoms such as sleep disturbance, diminished attention or concentration, attentional hyper-vigilance to signals of danger, increased irritability, and an exaggerated startle response. A diagnosis of PTSD is differentiated from the expected response by the requirement that a minimum of one month must have elapsed since exposure. There is, however, no requirement for the symptoms to appear within a certain time of the event, and there may be a delay of months or even years before the symptoms appear (APA, 2000). According to Bryant and Harvey (2002) however, such delayed response appears to be relatively rare.

Symptoms of post-traumatic stress disorder have been reported in as many as 30% of US Vietnam veterans (Kulka, 1988; Kulka, et al., 1990), and in more than 10% of US Gulf War veterans (Kang, Natelson, Mahan, Leek, & Murphy, 2003), although re-examination of the Vietnam data using DSM-IV, rather than DSM-III criteria, have resulted in lifetime rates being reassessed as 19% compared to 30%, and current rates of 9% compared to 15% (Dohrenwend, et al., 2006). Early reports of PTSD among US veterans of the current Middle East conflicts revealed rates of 15-17% for Iraq veterans and 11% for Afghanistan (Hoge et al., 2004), whereas more recent data reveals PTSD symptoms in approximately 8% of deployed personnel who reported combat exposure (Smith et al., 2008). These US findings are consistent with recent Australian data

showing 8% of Middle East veterans were in medium – high risk categories on a screening measure for PTSD symptomatology (Benassi, 2008).

Comorbid Disorders

As stated earlier, many of the symptoms of PTSD overlap significantly with other Axis I disorders, with up to 80% of people with PTSD demonstrating comorbidity for at least one other anxiety disorder, depression and/or a substance abuse disorder (Breslau, 2001; Breslau, Davis, Andreski, & Peterson, 1991; Creamer, Burgess, & McFarlane, 2001; Foa, Keane, & Friedman, 2000; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; O'Donnell, Creamer, & Pattison, 2004). It has also been suggested that this figure is even higher amongst traumatised veterans (Creamer & Forbes, 2003; Kulka, et al., 1990).

A major US epidemiological study found that the lifetime prevalence rate for a major depressive disorder co-occurring with PTSD was 36.6%, compared to 13% for those exposed to trauma but not suffering PTSD, and 10.1% for those not exposed to trauma (Breslau, 2001). While a recent British study of veteran admissions to Armed Forces mental health hospitals found that depression accounted for 33% of admissions, while PTSD only accounted for 7% (Finnegan, Finnegan, & Gamble, 2007); a study of 4000 US Iraq and Afghanistan veterans found that 44% reported posttraumatic stress symptoms, depressive symptoms or both; with 31% indicating clinically significant levels of posttraumatic stress, and 37-38% reporting depressive symptoms (Lapierre, Schwegler, & LaBauve, 2007). Comorbid depression has been found to predict the chronicity of PTSD (Breslau, et al., 1991; McFarlane, 1998), and generally develops after the onset of PTSD symptomatology (Joseph, Yule, & Williams, 1994; Kessler, et al., 1995). Additionally, the existence of pre-existing major depression was associated with increased vulnerability for PTSD following exposure to trauma (Breslau, 2001).

While PTSD is classified as an anxiety disorder, there is high comorbidity with other anxiety disorders, including panic disorder, agoraphobia, generalised anxiety disorder, social phobia and simple phobia in both community (Breslau, Kessler, Chilcoat, Schultz, & Davis, 1998; Engdahl, Diekl, Eberly, & Blank, 1998), and veteran samples (O'Toole, Marshall, Scheureck, & Dobson, 1998). The Australian Vietnam Veterans Cohort Study found that 30% of veterans reported panic attacks, and 41% a range of other anxiety disorders (Department of Veteran Affairs, 1997), while O'Toole et al., (1998) reported a strong correlation between obsessive compulsive behaviours and proximity to combat. Other studies have found even higher levels of comorbidity, with a study by Falsetti and Resick (1997) finding that 69% of people presenting for treatment of PTSD also reported panic attacks.

Early theoretical efforts to understand the nature of PTSD included models which were based on learned processes, and on information processing during and after the traumatic experience, while diathesis-stress models focused on psychological, social and biological vulnerabilities. The next section briefly summarises the literature surrounding these approaches.

Theoretical Models of Post-Traumatic Stress Disorder

Conditioning Processes

Conditioning processes are thought to play a role in the development of post-trauma psychopathology, and Mowrer's (1947) two-factor theory of classical and operant conditioning was proposed during the 1980s to account for the post-traumatic symptoms experienced by Vietnam veterans and rape victims (e.g. Holmes & St. Lawrence, 1983; Keane, Zimering, & Caddell, 1985; Kilpatrick, Veronen, & Best, 1985). Basic conditioning theory suggests that a traumatic event acts as an unconditioned stimulus leading to an unconditioned response, fear (Mowrer, 1960),

while the unconditioned stimulus may also be linked to contextual cues that can become conditioned stimuli to fear, and that act as learned alarms (Orr et al., 2000). In this way, classical conditioning explains the distress and fear observed in trauma victims in response to trauma-related stimuli, while operant conditioning is used to explain the development of avoidance behaviours, and the maintenance of fear in the absence of the traumatic stressor (Resick, Monson, & Rizvi, 2008).

In a study of Vietnam veterans, Keane, Zimering and Caddell (1985) developed a conditioning model for the development of PTSD based on a combination of high-order conditioning and stimulus generalisation. Avoidance of the trauma memory, whether through distraction, blocking of memories, or other behaviours, is reinforced by a reduction in painful emotions. Thus, avoidance of the conditioned stimuli is negatively reinforced, thereby maintaining avoidance behaviour, and leading to the maintenance of PTSD and the adoption of avoidance strategies as a coping mechanism (Joseph, 1999; Resick, et al., 2008). Avoidant coping strategies lead to increased vigilance for cues and triggers, resulting in hyper-arousal symptoms, and are predictive of the development and severity of PTSD (Bryant & Harvey, 1995; Litz & Keane, 1989; Solomon, Kotler, & Mikulincer, 1988). While conditioning approaches are able to explain many of the key features of post-trauma psychopathology, particularly with regard to the development and maintenance of fear and avoidance in PTSD, and the generalisation of contextual stimuli, they are less useful with respect to the role of non-avoidant coping strategies, and emotions other than fear and anger such as guilt and shame, which are more closely related to cognitive beliefs and appraisals.

Information Processing Approaches

There are conflicting views on how the processing of trauma related information influences post-trauma reactions. One common view is that information fails to be

processed when it conflicts with the dominant view of the self, and thus cannot be readily incorporated within the autobiographical knowledge base (Brewin & Holmes, 2003) An opposing view however, suggests that the traumatic memory stays highly accessible, and acts as a reference point for the organisation of autobiographical knowledge, because of its distinctive nature and high emotional impact (Berntsen & Rubin, 2007). According to the latter view, it is the *enhanced* integration of trauma memories into one's identity that appears to be a key factor in predicting PTSD symptomatology, rather than poor integration. This would suggest that it is assimilated to create or reinforce negative self schemas (Dalgleish, 1999; Foa & Rothbaum, 1998), negative beliefs (Ehlers & Clark, 2000) or negative identities (Brewin, 2003), thus reinforcing the need to better understand the role of pre-existing self-schemas, beliefs and sense of identity.

In an effort to better understand the processing of the trauma memory, *Dual Representation Theory* (Brewin, Dalgleish, & Joseph, 1996), identifies two memory systems that influence the processing of the trauma memory. Verbally accessible memories (VAMs) are contextualised within a person's autobiographical database, and are characterised by their ability to be deliberately retrieved and progressively edited by the person. Conversely, situationally accessible memories (SAMs) contain information that cannot be deliberately accessed by the individual, and are accessed only when triggered by stimuli linked to the original traumatic situation. SAMs are therefore not readily available for progressive editing.

Dual representation theory proposes that VAM and SAM representations are encoded in parallel at the time of the trauma, and continue to operate in parallel, although one may take precedence over the other at different times (Brewin & Holmes, 2003). Although dual representation theory does not explicitly include pre-existing

schemas and belief frameworks, the implication is that there are two mechanisms at work, with the first, (VAM), involving the representation of retrievable memories containing conscious evaluations of the trauma and its aftermath, and one's reactions both during, and following the traumatic event. This representation includes primary emotions relating to the event, and secondary emotions relating to retrospective cognitive appraisals of those events. The second mechanism (SAM) involves the integration into memory of contextual information that has been obtained from lower level perceptual processing of the event. These sensory cues were not consciously attended to at the time of the event, and were therefore not encoded into the VAM system. The SAM system also records information about a person's physiological responses to the trauma (Brewin, et al., 1996; Brewin & Holmes, 2003).

The central idea underpinning information processing approaches is that there is something special about the way the traumatic information is processed into memory, which impacts on subsequent psychopathology. While information processing theories help to explain the distinctive nature of traumatic memories, they are not clear however, on the role of predisposing risk factors, nor on how a person's pre-trauma experiences, beliefs and appraisals influence the trauma response.

Vulnerability approaches

The previous approaches have focussed on peri- or post-trauma processes. By comparison, Diathesis-Stress models focus on vulnerability factors and propose that there are predisposing variables, or diatheses, creating vulnerability for any given psychological disorder. Ingram and Price (2001) suggest that three themes emerge when examining vulnerability: vulnerability as a trait, the endogenous and latent nature of vulnerability and the role of stress. Trait-like factors exist even in the absence of a disorder, creating a diathesis or pre-morbid risk factor on which daily stresses act. Each

individual's 'breaking-point' varies, depending on the interaction between these risk factors and the degree of stress being experienced (Monroe & Simons, 1991).

Diathesis-Stress models propose that while the nature and severity of the trauma are closely related to the development of psychopathology, they are not the sole aetiological pathway. Trauma related factors which predict greater pathology can include intentional acts of personal violence (as opposed to non-personal violence) (Briere & Elliot, 2000; Green, Grace, Lindy, & Gleser, 1990), sexual (as opposed to non-sexual) violence (Nishith, Mechanic, & Resick, 2000; Ullman & Filipas, 2001), physical injury (Briere & Elliot, 2000; Foy, Resnick, Sipprelle, & Carroll, 1987), witnessing death or the death of a friend or loved one (Green, et al., 1990), unpredictability or uncontrollability (Foa, Zinbarg, & Rothbaum, 1992), and the risk of death to oneself (Holbrook, Hoyt, Stein, & Sieber, 2001; Ullman & Filipas, 2001).

McKeever and Huff's (2003) Diathesis-Stress model of PTSD suggests that in addition to the nature and severity of the trauma, ecological and biological diatheses interact with each other, and a residual stress pathway, to trigger the onset of the disorder. They argue that an ecological pathway consisting of personal, familial, cultural and social risk factors interacts with physiological, genetic and biological risk factors to create a base level of vulnerability, or diathesis. This diathesis then interacts with stress from the traumatic event itself, with greater levels of stress said to be the result of more severe trauma experiences (McKeever & Huff, 2003).

Summary

This chapter has provided a brief introduction to the nature of military related trauma and a description of PTSD and related pathology. It also provided a brief review of conditioning and information processing approaches to understanding post-trauma pathology. Finally, it introduced the role of pre-existing vulnerabilities through the

Diathesis-Stress model of pathology. A Diathesis-Stress approach provides an advantage over post-trauma models, as this approach provides an insight into pre-existing vulnerabilities which are potentially modifiable in certain populations, and which may be targeted through early intervention or prevention strategies.

The next chapter expands on the role of pre-existing vulnerabilities by examining the specific cognitive, emotional and behavioural factors under consideration, and concludes by proposing a vulnerability model which integrates the pre-existing variables to predict post-trauma adjustment.

CHAPTER 3

COGNITIVE, EMOTIONAL REGULATION AND BEHAVIOURAL APPROACHES TO POST-TRAUMA PATHOLOGY

Introduction

The previous chapter provided an overview of the nature of military related trauma and post-trauma pathology, and a brief review of conditioning, information processing and vulnerability approaches to understanding post-trauma adjustment. This chapter expands on the role of pre-existing vulnerabilities by introducing the specific factors under consideration, and concludes by proposing a new model which integrates pre-existing cognitive, emotional and behavioural vulnerabilities to predict post-trauma adjustment.

During the 1980s, several theorists noted that animals' behavioural responses to uncontrollable and unpredictable threats resembled the symptoms of PTSD (e.g. Kolb, 1987; van der Kolk, Greenberg, Boyd, & Krystal, 1985). This led Foa, Zinbaug and Rothbaum (1992) to propose a model of PTSD that suggested that the similarity between animals' fear, arousal and conditioned responses to threats, and the reaction of humans who have experienced traumatic events, may reflect a common aetiology. They pointed out that stressful experiences occur within a framework of pre-existing memory networks, and that there are two ways that the information contained in the stressful experience interacts with a person's pre-event framework to produce a post-trauma response. The first occurs when a traumatic event violates a person's strongly held beliefs, and knowledge which are contained in a pre-existing network; and the second occurs in the absence of strongly held beliefs or expectations, but when the trauma consists of repeated exposure to traumatic stimuli such that expectations are created that

danger can occur at any time, and is inescapable. This would suggest that cognitive and emotional processes are involved in both the relationship between the traumatic experience and the person's pre-existing belief systems, as well as in appraisals of the traumatic event as unpredictable and uncontrollable.

Unpredictability and uncontrollability are appraised states, therefore, if these are critical factors in the development of PTSD as Foa, et al., (1992) suggest, then individual differences in appraisals are also important. Several appraisals or beliefs influence the development of PTSD and other post-trauma psychopathology; appraisal of the actual event as threatening, beliefs about personal vulnerability, appraisal of causation, beliefs around the perception of control, and attempts to assign meaning to the event (Bowman & Yehuda, 2004). It is suggested therefore, that post-trauma adjustment is related in part to individual differences in pre-trauma cognitions, appraisals and beliefs. The next section emphasises the role of pre-existing cognitive factors in providing vulnerability for post-trauma adjustment, and examines the key cognitive approaches to the understanding of post-trauma pathology.

Cognitive approaches to Post-Traumatic Stress Disorder

McFarlane and Girolamo (1996) suggest that exposure to traumatic events attacks the individual's sense of self and predictability of the world. In support of this view, studies have shown that people exposed to traumatic events perceived themselves more negatively, perceived people and the world as less benevolent, and events as less meaningful, than people who had not been exposed to a trauma (e.g. Janoff-Bulman, 1989; Magwaza, 1999). This section summarises four contemporary cognitive approaches to understanding post-trauma adjustment: Ehlers and Clark's *Cognitive Model of PTSD* (2000), Janoff-Bulman's *Cognitive-Appraisal Theory* (1989; 1992), Foa et al.,'s *Integrated Model of PTSD* (1993; 1996; 1998), and Dalgleish's *Schematic,*

Propositional, Analogue and Associative Representational Systems (SPAARS) Model, (2004).

Ehlers and Clark's Cognitive Model of PTSD

Ehlers and Clark's *Cognitive Model of PTSD* (2000), is one of the key contemporary clinical models of PTSD, and addresses an apparent paradox whereby people feel anxious about the future, even though the trauma lies in the past. The model emphasises the processing of traumatic information, and identifies the thoughts, appraisals and beliefs that contribute to problematic outcomes during and after the traumatic experience. Ehlers and Clark propose that initial responses to trauma become persistent when the traumatic information is processed in a way that produces a sense of serious, current threat. This threat can manifest either as an external threat to safety, or an internal threat to the self and the future. They suggest that two major mechanisms produce this sense of current threat: individual differences in the negative appraisals of the trauma and its sequelae, and individual differences in the nature of the memory representation of the traumatic event.

The model, which is depicted at Figure 3-1, suggests that several types of appraisals of the traumatic event serve to produce this sense of current threat, which helps to maintain post-trauma psychopathology. Firstly, people may overgeneralise from the event to exaggerate the possibility of danger, or to perceive normal activities as more threatening than they actually are. Secondly, they might misinterpret their feelings or behaviour during the event, or appraise these feelings or behaviours in an unreasonably negative fashion. Finally, in addition to appraisals of the event, negative appraisals of the sequelae of the event can also serve to produce a sense of current threat. These may include negative interpretations of one's own reaction during and immediately following the trauma, which may have included fear, shock or disgust; and

negative interpretations of other people's reactions following the event, such as blame or lack of understanding. Negative appraisals serve to maintain PTSD by reinforcing responses such as anxiety, depression, anger and guilt, and by encouraging people to adopt maladaptive coping mechanisms.

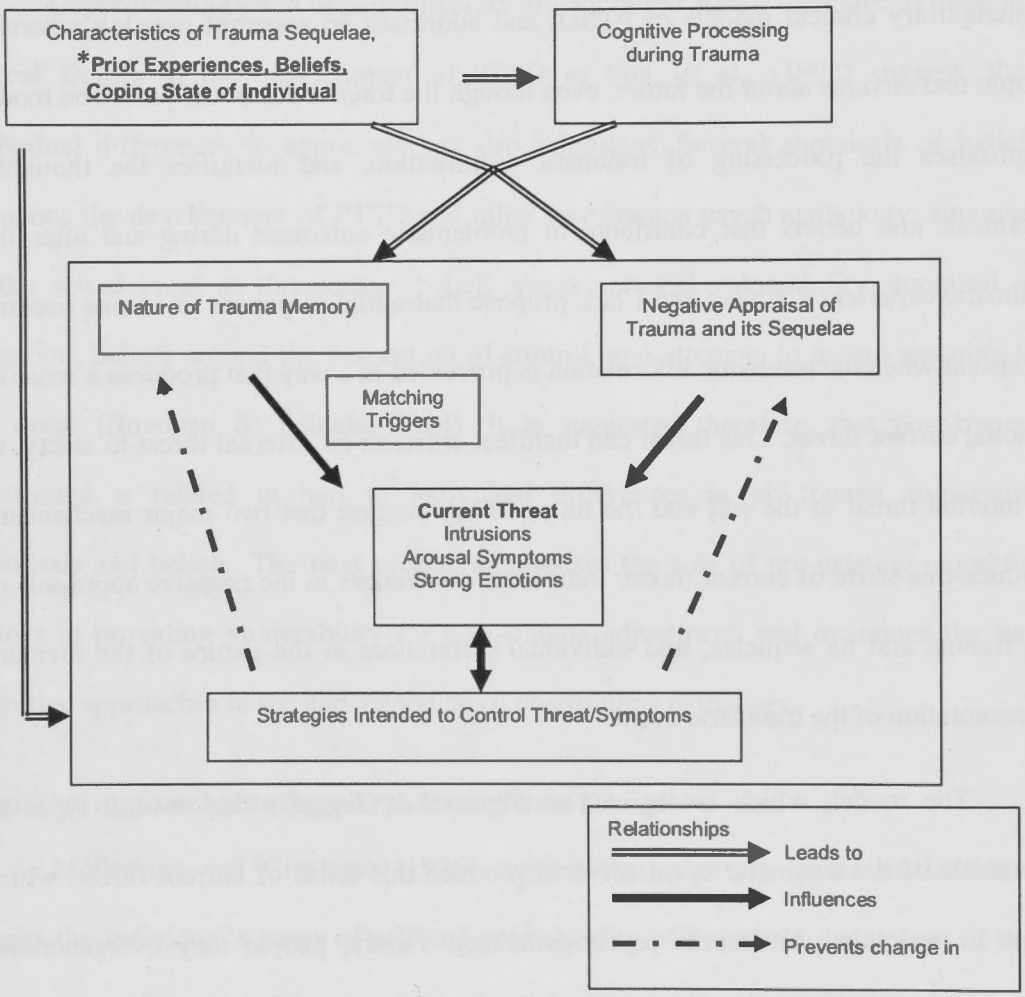

Figure 3-1. Cognitive Model of PTSD. Adapted from "A cognitive model of posttraumatic stress disorder", by A. Ehlers, & D. M. Clark, 2000, *Behaviour Research and Therapy, 38*(4), 319-345. Copyright 2000 by Elsevier Science Ltd. Reprinted with permission from Elsevier. (* Emphasis added)

While Ehlers and Clark's model identifies peri- and post-trauma cognitions that contribute to the development and maintenance of pathology, it does not explicitly clarify the influence of the pre-existing experiences and beliefs that the person takes with them into the trauma. It does however, introduce a new aspect of trauma

processing; mental defeat, which involves appraisals of self-worth and control, and is an important risk factor for later disorder. Mental defeat appears to be related to the concept of learned helplessness (Seligman & Maier, 1967), and has been defined as "the perceived loss of all autonomy, a state of giving up in one's own mind all efforts to retain one's identity as a human being with a will of one's own" (Ehlers, Maercker, & Boos, 2000, p.45). Trauma victims who experience mental defeat may describe themselves as like an object, as being destroyed, or as ceasing to care whether they lived or died. Mental defeat leads to the breakdown of one's will to continue (Brewin & Holmes, 2003), and is a strong predictor of chronic PTSD in assault victims (Dunmore, Clark, & Ehlers, 1997, 1999, 2001), and amongst combat veterans (Gabriel, 1988; Grossman, 1995).

One criticism of Ehlers and Clark's model is that it is relatively trauma-centric (Dalgliesh, 2004). While it helps to explain how post-trauma appraisals and cognitive coping factors influence the course of PTSD, how peri-traumatic memories of the event are coded, and while it introduces the role of mental defeat as a risk factor for recovery, it fails to explain the relationship between the pre-trauma cognitions, appraisals and beliefs, and the post-trauma cognitions, appraisals and beliefs.

The relevance of post-trauma cognitions, appraisals and beliefs is dependent on the nature of the pre-existing beliefs, and yet pre-existing beliefs are grouped with a number of other pre-trauma, trauma, and post-trauma factors within one box in the model. As a consequence, the model makes broad assumptions about a key input to the model, that of the prior experiences, beliefs and coping state of the individual, but does not explicitly elaborate on these. An earlier model, which is more explicit in describing the role of pre-existing belief structures, is Janoff-Bulman's (1989, 1992) Cognitive Appraisal Theory.

Janoff-Bulmann's Cognitive Appraisal Theory

Horowitz (1976, 1986) proposed that trauma processing is driven by a completion tendency, which is the need for new, incompatible information to be integrated with existing beliefs. New experiences are assigned meaning based on one's existing model of the world, and recovery is achieved by reconstructing original beliefs to take account of the new information. Cognitive appraisal approaches address the way the trauma breaches existing mental structures, and examine innate mechanisms for reconciling incompatible information with previous beliefs (Janoff-Bulman, 1985, 1989, 1992; Janoff-Bulman & Frantz, 1999).

In Chapter 2 it was suggested that by redefining Criterion A of PTSD to include the subjective experience of 'intense fear, helplessness or horror', the APA has placed greater emphasis on appraisal factors, and a person's subjective estimation of the threat McNally (2004). Subjective perception of threat is often a more influential predictor of distress than objective indicators, illustrating the significance of beliefs in the development of PTSD (Alvarez-Conrad, Zoellner, & Foa, 2001; Bernat, Ronfeldt, Calhoun, & Arias, 1998; Girelli, Resick, Marhoefer-Dvorak, & Hutter, 1986). One of the key beliefs threatened by severe trauma relates to beliefs about one's sense of identity. At the most fundamental level, traumatic life events cause survivors to confront questions of meaning in their lives (Frankl, 1962; Janoff-Bulman & Frantz, 1999), and to seek causal explanations for such events (Ehlers & Clark, 2000; Weiner, 1985b). The explanations that people offer for such events have been shown to influence both the severity, and chronicity of symptoms following a trauma (Gray & Lombardo, 2004; Gray, Pumphrey, & Lombardo, 2003; Joseph, Yule, & Williams, 1993a).

A number of psychologists have explored the nature and importance of people's fundamental assumptions about themselves and the world. Parkes (1975) introduces the concept of 'assumptive world' to describe "a strongly held set of assumptions about the world and the self which is confidently maintained and used as a means of recognising, planning and acting" (p.132). Epstein (1984, p.65) suggested that "everyone unwittingly develops a personal theory of reality that includes a self-theory and a world-theory". He considers this personal theory of reality to be a preconscious conceptual system that structures people's experiences, and helps to direct their behaviour (Epstein, 1973, 1980). These personal theories of reality are structured hierarchically, with the most fundamental assumptions existing at the most abstract level, and more specific assumptions occurring at higher levels (Epstein, 1980). There is clearly a difference between the assumption that 'I am a moral person', and the assumption that 'I am good at my job'. The fundamental assumptions are the ones that people are least aware of and least likely to challenge, and are established as the result of their entire learning history (Janoff-Bulman, 1989, 1992).

Cognitive-Appraisal Theory, sometimes known as the *Theory of Shattered Assumptions*, (Janoff-Bulman, 1985, 1989, 1992) focuses on these pre-existing assumptions and beliefs about oneself and the world, and suggests that they can be either challenged, or confirmed by the impact of the trauma. This model is more explicit than many other cognitive models, in detailing the nature of the pre-existing assumptions that the individual carries into the traumatic situation. Janoff-Bulman proposed that these core beliefs are divided into three clusters: the benevolence of the world, the meaningfulness of the world, and the worthiness of the self.

Benevolence of the world is related to the assumption of personal invulnerability, expressed as: 'it can't happen to me'. People tend to believe that the

world is a good place, that people and events are mainly benevolent, and that positive events and good fortune occur more frequently than negative events and misfortune (Catlin & Epstein, 1992; Janoff-Bulman, 1989; Taylor & Brown, 1988, 1994). According to Janoff-Bulmann (1985), people have a tendency to underestimate their vulnerability to misfortune, which protects them from the stress and anxiety associated with such a threat. She also proposes that people are able to maintain the assumption of benevolence in the face of evidence to the contrary, because they tend to distinguish between what happens to them and what happens within the larger world. Of course, not everyone holds this assumption that the world is generally benevolent; many people experience or perceive negative outcomes, and have a more jaundiced view of the world. For this reason, it is now more commonly accepted that benevolence of the world is concerned with the way people view events and people positively or negatively, rather than assuming that they all perceive the world in a positive light (e.g. Dekel, et al., 2004). The more positive a person's assumptions are concerning benevolence, the more they expect positive, rather than negative things to happen, and the more they view people as basically good, rather than bad.

Meaningfulness of the world refers to beliefs about the distribution of good and bad outcomes. In Western cultures, it is the perception that events are meaningful and that they make sense (Frankl, 1962; Silver, Boon, & Stones, 1983). It is the belief that the world is comprehensible, that it is just, controllable and predictable. The world is considered just, when viewing outcomes from a perspective that there is a relationship between what a person does, and what happens to them (Janoff-Bulman, 1992). Lerner's *Just-World Theory* proposes that people need to believe in a just world, that people 'get what they deserve', and 'deserve what they get' (Lerner, 1980).

Just-world theory emphasises the need to perceive outcomes as distributed fairly, a belief which represents a defence against the randomness of events. The world is not predictable if people cannot make sense of why particular events happen to particular people; if they perceive that things seem to happen by chance. People who believe in randomness are likely to feel vulnerable because justice and controllability are not regarded as primary determinants of future outcome (Janoff-Bulman, 1989). If they assume that the world functions according to chance, then they lose their sense of controllability, and perceive that there is nothing they can do to prevent future negative events. Accordingly, people tend to view chance as a self-correcting process whereby a deviation in one direction, induces a deviation in the opposite direction, to restore equilibrium (Tversky & Kahneman, 1982). People generally feel threatened by the possibility that negative events are random, and can therefore happen to them. However, by believing in a relationship between behaviour and consequence, there is a perception that it is possible to exercise direct control over what happens through one's own actions. It is therefore not 'who we are', but 'what we do', which affects what happens to us (Janoff-Bulman, 1982; Lerner, 1980).

Outcomes are considered controllable if people can directly influence their world through their behaviour and actions, and can minimise their vulnerability by exercising caution and foresight (Dekel, et al., 2004). People generally have an illusion of control, and tend toward an exaggerated sense of their ability to control chance outcomes (Langer, 1975; Taylor & Brown, 1988). This view has implications for psychopathology consistent with the reformulated concept of learned helplessness (Abramson, Seligman, & Teasdale, 1978), which occurs when people experience situations that are beyond their ability to control and that result in negative outcomes. Helplessness is learned when a person sees no contingency between their actions and

the outcomes. It results in the development of a belief that nothing can be done to make a difference, leading to the loss of motivation, and the tendency to give up.

According to Janoff-Bulman (1989, 1992), a higher-order notion of self-worth involves three specific assumptions about the self: an assumption of general worthiness, self-controllability and luck. People generally assume that they are worthy people who do not deserve to be victimised (Jeavons & Godber, 2005). Just as meaning is related to belief in a behaviour-outcome contingency leading to perceptions of justice and control, self-worth often reflects similar concepts of the self. A person's degree of self-worth is related to judgements about character, and reflects the degree to which people perceive themselves worthy, moral, and capable. Similarly, self-controllability reflects judgments about one's behaviour, and reflects the extent that a person views themselves as able to engage in appropriate precautionary behaviours to minimise their vulnerability to negative outcomes. These judgements include self-evaluations about competence, as well as one's willingness to engage in appropriate behaviours. On the whole, people tend to view themselves in a positive light, with studies of self-esteem generally showing that people tend to identify with 'winners' more readily than 'losers', and to recall and accept responsibility for success far more readily than failures (Bandura, 1982; Greenwald, 1980). The final element of self-worth is related to a perception of oneself as more or less lucky, or unlucky. Despite a desire for a controllable world where outcomes are related to behaviours, most people generally realise that there is an element of randomness around events, and accept that luck plays a part in what befalls them. Thus, people who perceive the world as malevolent and unjust, yet feel worthy, lucky, and capable of eluding misfortune, may still be capable of maintaining a sense of invulnerability.

Consistent with Janoff-Bulman's (1989, 1992) Cognitive Appraisal Theory, McFarlane and Girolamo (1996) suggest that trauma attacks an individual's sense of self and predictability of the world. Historian Paul Fussell (1996, p. 105) summed up the impact of war on his own assumptions about the world, while writing about his experiences during World War II: "My boyish illusions ... fell away all at once, and suddenly I knew that I was not and never would be in a world that was reasonable or just." A central idea behind this view is that traumatic events can alter people's basic beliefs and assumptions about themselves and the world (Horowitz, 1976; Janoff-Bulman, 1989, 1992), and a number of studies have found that people exposed to traumatic events perceived themselves more negatively, and the world as less benevolent and meaningful, than people who had not been exposed to a trauma, and that these perceptions are associated with higher levels of PTSD symptomatology (Dekel, et al., 2004; Foa, Ehlers, Clark, Tolin, & Orsillo, 1999; Janoff-Bulman, 1989; Magwaza, 1999; Solomon, Iancu, & Tyano, 1997; Weiner, 1985a). Consistent with this, a general increase in negative beliefs about the self, others, and the world has been found in trauma victims with PTSD, compared to victims not suffering from PTSD (Dunmore, et al., 1999; Foa, et al., 1999).

Other studies that have examined the relationship between PTSD and world assumptions, have found that lower post-trauma perceptions of the benevolence of the world, benevolence of people, luck and self-worth were associated with higher levels of PTSD symptomatology (Dekel et al., 2004; Foa et al., 1999; Solomon et al., 1997). Interestingly however, a group of Holocaust survivors who viewed the world as less benevolent, nevertheless perceived the world as more meaningful than a control group (Prager & Solomon, 1995). The authors suggest that this could be in part due to a conviction that events have a purpose, arising out of the strong religious beliefs of many

of the survivors. This view is supported by Frankl (1962), himself a Holocaust survivor, who wrote about man's search for meaning in the context of the struggle to survive in the concentration camps during World War II.

While Janoff-Bulman focussed on the role of three sets of specific pre-existing assumptions and beliefs about oneself and the world in explaining post-trauma adjustment, other models focus more on the interaction between these pre-existing self and world schemas, and memory systems and emotional responses. The next section explores Foa's Integrated Model of PTSD, and Dalgleish's SPAARS Model.

Foa's Integrated Model of PTSD / Emotion Processing Theory

A more recent model which also includes information about the role of pre-existing schemas, was proposed by Foa et al., (Foa & McNally, 1996; Foa & Rothbaum, 1998; Foa, Rothbaum, & Steketee, 1993). This model included ideas from schema theory about the representation of abstract meaning, to elaborate on the relationship between knowledge available before, during and after the trauma, and the subsequent development of pathology. It should be noted that while Foa et al., did not name her revised theory, it has been variously labelled *Emotion Processing Theory* by Brewin and Holmes (2003), and the *Integrated Model of PTSD* by Dalgliesh (2004).

There are three core elements to Foa's model, which is depicted at Figure 3-2: memory records, schemas, and post-event reactions of the self and others.

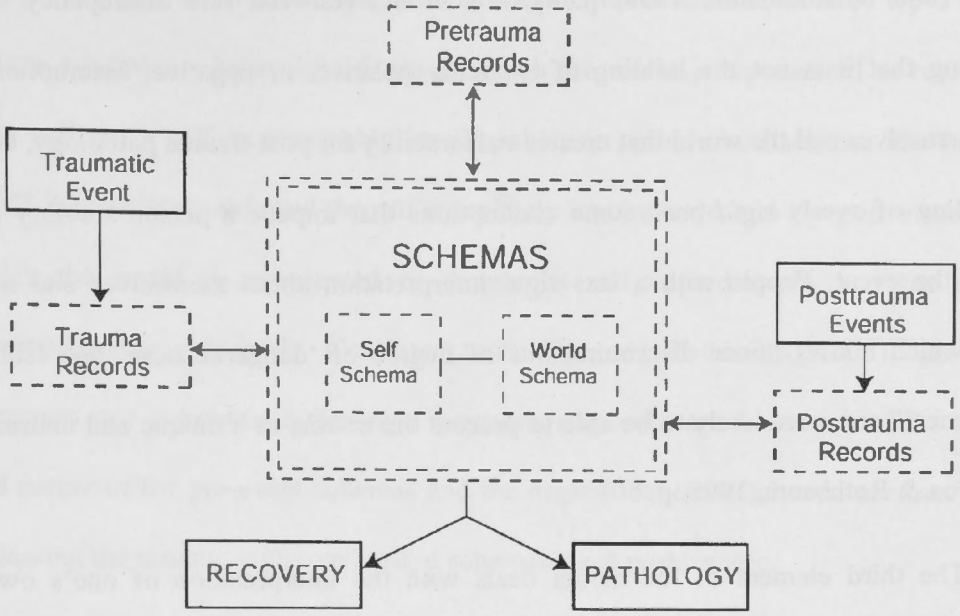

Figure 3-2. Integrated Model of PTSD. Reprinted from *Treating the Trauma of Rape: Cognitive Behavioral Therapy for PTSD,* E. B. Foa, and B. O. Rothbaum, 1998, Copyright by the Guilford Press. Reprinted with permission of The Guildford Press.

The memory records represent elements of the 'fear network' of her earlier theory, with the addition of a greater emphasis on the disorganised nature of the memory records due to the biased information processing that takes place at the time of the traumatic event (Foa, Molnar, & Cashman, 1995). In the case of rape victims, they found that the perception, attention and memory for the traumatic event are biased by the extreme emotions experienced at the time. The inclusion in her model of self and world schemas builds on work on the role of pre-trauma schemas by Horowitz (1986, 1997) and Janoff-Bulmann (1992). The model suggests that the trauma impacts on these pre-trauma records in one of two ways: first, emotional processing may be impeded when the trauma violates pre-existing beliefs about the self as competent, and the world as safe; alternatively, emotional processing may be impeded when the trauma "primes existing knowledge of oneself as extremely incompetent and the world as extremely

unsafe" (Foa & Rothbaum, 1998, p.79). Foa et al., resolved this discrepancy by suggesting that it is not the holding of explicitly positive, or negative, assumptions about themselves and the world that creates vulnerability for post-trauma pathology, but the holding of overly *rigid* pre-trauma assumptions that impede a person's ability to process the event. People with a less rigid interpretation about themselves and the world, which allows "finer discriminations of degree of 'dangerousness' and 'self-competence'" are more likely to be able to process the trauma as a unique and unusual event (Foa & Rothbaum, 1998, p. 80).

The third element of the model deals with the interpretation of one's own reactions, and the reactions of others following the traumatic event. Some individuals can interpret the onset of post-traumatic symptoms as a sign of failure, weakness or as a permanent threat to their physical or mental health (Dalgleish, 2004). Negative responses from other people can be viewed as abandonment or a lack of understanding, and paradoxically, others' concern as implying weakness or a lack of ability to cope (Ehlers & Clark, 2000). Interpretations such as these have major implications for acceptance of emotional expression, and may also reinforce the view that the world is untrustworthy and dangerous, and that the self is incompetent (Foa & Rothbaum, 1998).

Pre-trauma Schemas and Personality Style

One of the more contemporary approaches to the study of post-trauma pathology is Dalgleish's (2004) *SPAARS* model, which integrates features of Brewin et al.,'s Dual Representation Theory, Janoff-Bulman's Cognitive Appraisal Theory, Foa's Emotion Processing Model, and Ehlers and Clark's Cognitive Model. Consistent with Horowitz (1986, 1997), and Janoff-Bulman (1992), Dalgleish argued that there are often changes in a person's basic assumptions about the self, the world and the future, following a traumatic experience; and that a person's post-trauma functioning is related to the nature

of their pre-trauma schemas. The SPAARS model takes account of three types of pre-trauma schemas: a *balanced* schema in which the world is represented as reasonably safe, and one's self as reasonably invulnerable; an *over-valued* schema in which the world is completely safe and the self completely invulnerable, and a *negative* schema in which the world is represented as dangerous and unpredictable, and the self as incompetent or vulnerable. Consistent with Foa and Rothbaum (1998), the model presumes that individual differences in trauma responses are a function of the content and nature of the pre-event schemas and the degree that these schemas are maintained following the trauma, with overly rigid schemas most problematic.

The model proposes five personality types that predict post-trauma functioning and arise out of the interaction between the pre-trauma schemas, and a person's ability to inhibit, or assimilate trauma related information (Dalgleish, 2004). The first (and normative) personality type reflects a person with a *balanced* schematic representation of the world, self and others. Following an initial period of post-trauma symptomatology, such a person would normally be expected to be able to assimilate trauma-related information into their existing schematic systems within a few weeks or months of the trauma (Horowitz, 1976; Janoff-Bulman, 1989), and return to an adaptive level of coping.

Consistent with Janoff-Bulman's theory, the next two personality types relate to *overvalued* pre-trauma schemas. The first represents a person with a *valid* overvalued schema who has led a relatively predictable, controllable, safe and fulfilling life. Such a representation reflects their experiences, and is thus 'valid', but is 'overvalued' in the sense that it may not reflect reality, and thus they experience the traumatic event as being too discrepant from their previous experience. The second personality type represents a person with an *illusory* overvalued schema, who has maintained an

'overvalued' view of life through the inhibition of information relating to negative experiences (Dalgleish, Mathews, & Wood, 1999). This person is also at risk of experiencing the traumatic event as being discrepant from their previous experience, not because they have led a sheltered, or protected life, but because they have inhibited negative experiences.

The fourth personality type relates to people with *negative* pre-trauma schemas about *both* themselves and the world, as a consequence of their pre-trauma experiences. As pointed out by Foa and Rothbaum (1998), these people are likely to view the traumatic event as confirming their negative self and world view. The final personality type involves people with a *negative* view of the world, but a generally *positive* or *balanced* view of themselves ('the world is a bad place, but I am competent and can cope'). According to Prager and Solomon (1995), this schema type is common amongst trauma victims from the military, emergency services and other groups associated with negative environments. These individuals are able to cope as long as their self-schema remains intact – if this breaks down however, perhaps through perceptions of weakness, or feelings of guilt or helplessness as a consequence of inaction or actions taken during the event itself, then they are at risk of post-trauma psychopathology relating to the damage to their self-view, rather than the trauma itself. The SPAARS model is therefore effective in integrating ideas about pre-trauma schemas and a person's ability to inhibit, or assimilate trauma related information, to propose a number of personality types which impact on post-trauma functioning. It is less explicit however, about the nature of the causal attributions underpinning these schemas, and the relationship between the schema and personality type, and emotional response.

The Influence of Attribution Style

Thoughts, beliefs, attributions, cognitive schemas and general attitudes all contribute to emotional arousal and serve to provide meaning to life events. Whether or not a person's post-trauma adjustment is adaptive, therefore, depends in part on an individual's appraisal of the traumatic event. The subsequent impact of this appraisal on a person's views of themself and their ability to cope, are important in allowing them to integrate the experience into their sense of self (Tick, 2005; Weiner, 1985b). The way people appraise events draws in part from their attributional style (Seligman, 1990; Seligman, Abramson, Semmel, & von Baeyer, 1979), which has been shown to be important in both providing a vulnerability for PTSD (e.g. Ali & Dunmore, 2002; Andrews, Brewin, Rose, & Kirk, 2000; Dekel et al., 2004; Ehlers & Clark, 2000; Foa et al., 1999; Gray & Lombardo, 2004; Nixon & Nishith, 2005), and predicting acute and chronic post-traumatic symptomatology (Janoff-Bulman, 1985; Janoff-Bulman & Frantz, 1999). There is, therefore, an increasing amount of research being conducted into the relationship between attributional style and vulnerability for PTSD.

According to attribution theory, people have a need to explain the events that occur in their world, particularly when anything unusual, unwanted, or unexpected happens (Joseph, Yule; & Williams, 1993b; Weiner, 1985a, 1985b, 1992), and the nature of these explanations have consequences for how they respond to an event, and the severity of symptoms following a trauma (Gray & Lombardo, 2004; Gray et al., 2003; Seligman et al., 1988). Attribution of causation involves a number of dimensions: locus, stability and generalisability (Abramson, et al., 1978; Gray, et al., 2003; Seligman et al., 1988), and controllability (Weiner, 1992).

Locus refers to whether causes for events are perceived to relate to internal or external factors. Stability refers to whether causes for events are thought to be either

fixed and predictable, or unpredictable and subject to fluctuation. Generalisability refers to whether causes are viewed as either global and generalisable to many facets of life, or specific and relating only to a particular aspect of life. Controllability refers to whether causes for events are viewed as either contingent on, or beyond one's control.

The underlying process for the effect of attributional style following a trauma, is the sense of helplessness (Alloy & Tabachnik, 1984), and hopelessness (Peterson & Seligman, 1984; Seligman, 1990; Seligman, et al., 1979), which are associated with associations about controllability. The theory of learned helplessness suggests that when individuals perceive that they have no control over their outcomes, that nothing they can do will make a difference, they will feel helpless and give up. McFarlane and Girolamo (1996) suggest that helplessness, powerlessness and threat to life are central to the experience of traumatic stress. This view predicts that following a negative event, individuals who make causal attributions for the event's occurrence to stable and global factors experience an expectation of hopelessness. Trauma symptoms are compounded by lowered self-esteem if the stable and global attributions are also internal. The attribution literature suggests that stable, global and internal attributions are most associated with mental health problems (Abramson, Metalsky, & Alloy, 1989; Alloy, Abramson, Metalsky, & Hartlage, 1988; Gray & Lombardo, 2004; Gray, et al., 2003; Joseph, 1999; Joseph, et al., 1993b; Massad & Hulsey, 2006). It has therefore been suggested that a this type of attributional style might be similarly related to PTSD (e.g. Andrews, et al., 2000; Andrews et al., 2003; Greening, Stoppelbein, & Docter, 2002; Massad & Hulsey, 2006; Singer, 2004).

Conceptually, it makes sense that certain symptoms of PTSD, such as avoidance and hypervigilance, would be more likely if one believes danger to be ever present, versus believing that traumatic events are rare, or are unlikely to occur again in the

future. Attribution theorists suggest that when unexpected or unwanted events occur, people are motivated to generate causal explanations for those events, and these attributions may influence the severity of subsequent psychopathology. Consistent with this view, controllability has been shown to be the most important correlate in combat related psychopathology (Ginzburg, Solomon, Dekel, & Neria, 2003), and a perception of uncontrollability is related to more maladaptive coping strategies (Mikulincer, Florian, & Weller, 1993a; Mikulincer & Solomon, 1989). In addition, significant associations between pessimistic attributions for hypothetical negative events and PTSD symptoms, have been documented amongst combat veterans (McCormick, Taber, & Kruedelbach, 1989). Experience of combat provides exposure to a range and severity of trauma, rarely experienced by the wider population. It is therefore important to understand the influence of certain characteristics of the military population itself.

The Influence of Military Culture

The cognitive models described thus far have provided strong justification for the inclusion of information about pre-trauma schemas in models of post-trauma functioning. They don't, however, take account of the fact that beliefs about the self and world tend to be culturally bound, meaning that different cultures have different understandings about core beliefs. People from cultures where the world is not seen as benevolent, but perhaps ruled by malevolent and jealous Gods; or where the self is not seen as inherently worthy, but perhaps has to earn redemption; may not view a traumatic event as 'shattering' these core beliefs. They may, indeed, view such an event as a test or challenge of their worth.

Similarly, people within occupational groups that are expected to cope with trauma as a function of their employment, may also view traumatic experiences as a test or challenge, or at the least, as 'part of the job'. Military psychologists suggest that there

are several sub-cultures within the military, distinguished by their closeness to the 'fighting' role (Jans & Schmidtchen, 2002); these are headquarters, combat forces and support troops. Military organisations are structured and trained for fighting wars, and therefore promote a warrior ethos that stresses combat virtues and values as "required of all military men, even though most will never engage in combat" (Funnell, 1980, p.25). According to Phelps (1997) the military culture is enhanced if members have a vocational, rather than an occupational philosophy. A vocational philosophy is characterised by a basic belief in what the organisation stands for, a belief in service before self, and a sense of self-image derived from the organisation itself. New members are socialised to adopt military values, and initial training processes are intensive, focussed as much on values and attitudes, as they are on skills and competencies (Jans & Schmidtchen, 2002).

This acculturalisation process underpins the cohesion essential for a military force to succeed in combat, and ADF personnel have traditionally held a vocational approach to their profession, demonstrating service before self through a willingness to place operational objectives ahead of personal safety (Falconer, 2005). The nature of culture has been shown to influence expectations around emotional response (Jobson, 2008), and in explaining military culture, Australians often refer to the 'ANZAC spirit', which is defined by Carlyon (2001) as encompassing irreverence and mateship (these two suggesting egalitarianism), fatalism and stoicism (these reflecting a less radical and more realistic approach to war). Thus, within a culture promoting a vocational, egalitarian, and stoic warrior ethos, members may not view combat-related and similar experiences as 'shattering' their core beliefs about themselves and the world. Instead, they may view such experiences as tests of their training, competence and belonging, and consequently are likely to view negative emotional responses as signs of weakness

or failure. Within a military organisation therefore, beliefs around self-worth and competence, and expectations derived from cultural norms, can have a major impact on perceptions of control, acceptance of emotional response and on coping behaviour. Consequently, it is more likely to be a negative emotional response to a traumatic experience that would challenge, or 'shatter', core beliefs about themselves and the world, than the actual traumatic experience itself.

Emotional Response and Emotional Regulation

There has been a substantial amount of research conducted into post-trauma emotional responses, with evidence that a range of negative emotions such as anger, guilt, self-blame, sadness, betrayal, humiliation and shame frequently accompany PTSD (e.g. Andrews, et al., 2000; Chemtob, Novaco, Hamada, & Gross, 1997; Grey, Holmes, & Brewin, 2001; Holmes, Grey, & Young, 2005; Jakupcak et al., 2007; Kubany, 1994; Leskela, Dieperink, & Thuras, 2002; Novaco & Chemtob, 2002; Singer, 2004). Trauma related guilt is highly correlated with PTSD, depression and suicidal ideation (Kubany, 1994; Kubany & Manke, 1995), and anger, negative self-esteem, shame, social anxiety and avoidance (Kubany, Haynes, Abueg, Manke, & Brennan, 1996).

Longitudinal studies also show that high levels of anger (e.g. Ehlers et al., 1998; Forbes et al., 2008), and more specifically anger with others (Andrews, et al., 2000), predict treatment outcomes, and influence recovery from PTSD. Given the strong relationship between emotional response and post-trauma pathology, it has been suggested that PTSD involves disturbances in emotions, as well as anxiety (Price, et al., 2006; Resick, 2001; van der Kolk, 1994). Further, it has been shown that beliefs about the negative consequences of losing control of one's emotions are considered to be one of the key features of PTSD (Williams, Chambless, & Ahrens, 1997a). This leads to the

idea that capacity for emotional control, or regulation, should be important in determining the nature and extent of a person's emotional response to a trauma.

The Relationship between Trauma and Emotional Response

Intense emotions at the time of the trauma initiate long-term conditioned responses to reminders of the event, which are associated both with alterations in the stress response and with the memory difficulties characteristic of PTSD (van der Kolk, 1994). According to Herman (1997), emotional regulation consists of two key components, the ability to tolerate strong emotions, and the ability to modulate or assert a degree of control over one's emotions. Within this broad view, emotional regulation has been variously defined as the "process by which individuals influence what emotions they have, when they have them and how they experience and express them" (Gross, 1998, p. 275); the ability to "assert a degree of control over one's emotions, such that one can experience a sense of stability and can easily transition between emotional states" (Price, et al., 2006, p.662); and the ability to tolerate strong positive, and negative emotions without feeling overwhelmed (Mauss, Bunge, & Gross, 2007).

A recent, and more comprehensive approach, which was suggested by Gratz and Roemer (2004), conceptualises emotional regulation as involving four key processes: (a) awareness and understanding of emotions; (b) acceptance of emotions; (c) the ability to control impulsive behaviours and behave in accordance with desired goals when experiencing negative emotions; and (d) the ability to use situationally appropriate emotion regulation strategies flexibly to modulate emotional responses as desired in order to meet individual goals and situational demands. This approach suggests that there are both behavioural and cognitive aspects to emotional response.

A Behavioural View of Emotional Response

Some researchers have suggested that rather than changing the discrete emotion that is experienced, adaptive emotion regulation involves altering the intensity or duration of an emotion (Thompson, 1994; Thompson & Calkins, 1996), thus emphasising the ability to inhibit inappropriate or impulsive behaviours, in order to be able to behave in accordance with desired goals when experiencing negative emotions (Gratz & Roemer, 2004). In other words, adaptive regulation involves modulating the experience of emotions, rather than eliminating certain emotions. Such an approach suggests a potential link between attribution theory and emotional regulation. The *Two-Process Model of Perceived Control* (Rothbaum, Weisz, & Snyder, 1982), integrates attribution (Seligman, et al., 1979) and locus of control (Rotter, 1966) theories, to outline a two-stage process whereby people attempt to gain control over situations and their emotions. People attempt to gain control through primary control processes by bringing the situation into line with their wishes, or, where the situation is uncontrollable, through secondary control processes by bringing themselves in line with situational forces. Primary control processes involve acting to alter the situation itself; while secondary control processes involve either reducing one's expectations through attributions to limited ability, chance or luck; attribution to powerful others; or by attempting to understand and derive meaning from otherwise uncontrollable events.

The *Process Model of Emotional Regulation* (Gross, 1998, 2002) builds on Rothbaum et al.,'s (1982) two-process model, and draws a distinction between antecedent- and response-focused emotional regulation strategies. The model suggests that antecedent-focused strategies consist of four specific strategies that are implemented before the emotion response has become fully activated. The first strategy occurs at the point of *situation selection,* and refers to a decision to approach or avoid

certain situations in order to regulate emotional responses, such as selecting a situation that will lead to a positive emotion, rather than a negative emotion. The second strategy, *situation modification*, occurs once the situation has been selected, and involves the process of tailoring the situation to modify its emotional impact, a process which is also referred to as primary control (Rothbaum, et al., 1982), and is related to problem-focussed coping (Lazarus & Folkman, 1984). The third strategy, *attentional deployment*, involves the process of deciding which aspect of the situation to focus one's attention on; while the fourth strategy, *cognitive change,* involves the assignment of meaning to the situation or aspect. While these models represent a way of understanding general coping behaviour, they are also relevant in the understanding of post-trauma emotional response.

These last two strategies, attentional deployment, and cognitive change, are consistent with appraisal theories of emotion that propose it is the way that a person interprets a situation, rather than the situation itself, which determines the nature of their emotional response (Lazarus, 1991; Scherer, 1999; Siemer, Mauss, & Gross, 2007). One of the core ideas underpinning appraisal theories of emotion is the notion that people respond with different emotions to the same situation, depending on how they interpret, or appraise, the situation, and a recent study supporting this idea, finding that appraisals predicted emotional reactions across participants (Siemer, et al., 2007). This study found that appraisals are both necessary, and sufficient, to determine different emotional responses in a given situation. Finally, the fifth strategy, *response modulation* refers to attempts to influence emotional responses, often through suppression, once they have already been elicited (Gross, 2002).

A Cognitive View of Emotional Response

Along with behavioural responses, an associated construct involved in emotional processing is the fear of losing affective control. The affective control construct is an expansion of the cognitive construct of anxiety sensitivity, which relates to fear of the consequences of anxiety, and the loss of control related to anxiety (Feldner, Lewis, Leen-Feldner, Schnurr, & Zvolensky, 2006; Reiss, Peterson, Gursky, & McNally, 1986). Affective control expands the concept of anxiety sensitivity to include beliefs about the harmful consequences of losing control over other emotions. Further, affective control is a cognitive construct that relates to a fear of the negative consequences of strong emotions, as well as the fear that one will not be able to control their emotions or how they respond to them (Williams et al, 1997). A major aspect of post-trauma functioning is a concern about feeling unable to control one's emotions, usually in relation to trauma reminders or recollections (Price, et al., 2006). Thus, the cognitive construct of affective control is related to, but different, from the behavioural construct of emotion regulation, which emphasizes the ability to tolerate, modulate, and control emotional reactions.

A study that examined both fear of losing affective control, and difficulties in emotional regulation, found that fear of losing affective control was associated with re-experiencing and hyperarousal symptoms of PTSD, while emotional regulation was associated with avoidance/numbing symptoms of PTSD, and efforts to regulate emotions already experienced. Given the relationship between emotional regulation and rumination about emotional responses, common in both PTSD and depression, the ability to understand a person's pre-trauma capacity for emotional regulation would be useful in the subsequent treatment of trauma related psychopathology. Research has shown that adaptive emotional regulation involves flexibility in the use of emotion

regulation strategies, as well as being able to alter the intensity or duration of emotions, rather than merely changing the actual emotion being experienced (Cole, Michel, & Teti, 1994; Thompson, 1994).

The Gratz and Roemer Model of Emotional Regulation

In a recent study, Gratz and Roemer (2004) identified the presence of six dimensions of emotional regulation, thereby developing a model which integrates both behavioural and cognitive aspects of emotional response. They labelled these dimensions as: (1) *Non-acceptance of Emotional Responses*, which reflects a tendency to have negative secondary emotional responses to one's negative emotions, or non-accepting reactions to one's distress; (2) *Difficulties Engaging in Goal-Directed Behaviour*, which reflects difficulties concentrating and accomplishing tasks when experiencing negative emotions; (3) *Difficulties with Impulse Control*, which reflects difficulties remaining in control of one's behaviour when experiencing negative emotions; (4) *Lack of Emotional Awareness*, which reflects an inattention to, and lack of awareness of, emotional responses; (5) *Limited Access to Emotion Regulation Strategies*, which reflects the belief that there is little that can be done to regulate emotions effectively, once an individual is upset; and (6) *Lack of Emotional Clarity*, which reflects the extent to which individuals know (and are clear about) the emotions they are experiencing.

People who have problems with emotion regulation tend to experience rapid and intense emotional reactions, resulting in difficulty returning to baseline levels of arousal (Van der Kolk, 1996). A number of studies suggest the need for a broader understanding of emotional regulation, as deficits in emotional regulation have been shown to predict maladaptive coping following a trauma (Cloitre, Miranda, Stovall-McClough, & Han, 2005; Price, et al., 2006), and can occur when there is poor, or a

lack of modulation of emotional responses, limited clarity and awareness of one's emotional responses, and/or the negative evaluation of, non-acceptance of, and reactivity in response to one's emotional responses (Tull, Jakupcak, McFadden, & Roemer, 2007). This can involve deficits in both the modulation of emotional arousal and in emotion utilisation (Abbott, 2005). According to Price et al., (2006), research into the emotional processes involved in post-trauma psychopathology, and in particular the role of one's capacity for emotional regulation, has lagged behind research into the actual emotional responses themselves. This could be in part because emotional regulation has often been poorly defined, and in part because of the difficulty in conducting research on pre-trauma variables, thus highlighting an important gap in our understanding of the role of pre-existing emotional capacity in influencing post-trauma functioning.

This chapter has, thus far, examined cognitive and emotional factors which impact on post-trauma functioning. The final area of interest relates to coping behaviour. The next section examines coping behaviour with respect to the interaction between the nature of the stressful event, the individual's cognitive appraisal of the event, the emotional resources available and the specific coping strategies the person uses.

Trauma and Coping Behaviour

Summary of the Coping Literature

According to *Stress and Coping Theory,* coping is defined as the "cognitive and behavioural efforts to manage specific external and or internal demands that are appraised as taxing or exceeding the resources of a person" (Lazarus, 1993, p.237). In other words, coping can be described as a combination of a person's cognitive and behavioural efforts to manage stress and trauma. Within the field of coping literature

however, there is little consensus regarding the core dimensions that best discriminate among different coping strategies, leading to difficulty comparing results between studies, and confusion about core constructs (Skinner, Edge, Altman, & Sherwood, 2003). One of the difficulties is that coping is not a readily observed behaviour or a reliably reported belief. It is an organisational construct used to describe the range of actions and behaviours people employ to deal with stressful experiences. Pearlin and Schooler (1978) suggested that "coping ...functions at a number of levels and is attained by a plethora of behaviours, cognitions and perceptions" (pp. 7-8).

Coping has been conceived as both a *style,* and personality characteristic; and as a *process*. Psychodynamic theory underpinned the conceptualisation of coping as a style through its interest in defence mechanisms as a means of managing threats. From this approach, developmental processes were considered to be responsible for the development of one's sense of competence, control and defence patterns (Clark, 1998; Cramer, 1991). Consistent with our understanding of coping strategies, some defences were considered to be more healthy, or less regressed, than others (Lazarus, 1993). By the 1970s however, the psychodynamic concept of defences, which were considered to be rigidly bound by early experiences, was questioned by Haan (1977), in favour of a hierarchy that separated coping styles from defence mechanisms. Defences were characterised by rigidity, undifferentiated thinking, magical thinking and distortion of present reality, and pressure from the past. By contrast, coping processes were seen to be flexible, open to choice, oriented to present reality as well as the future, and focused on a realistic compromise between wishes and affect (Clark, 1998). This distinction led to the more common conceptualisation of coping as a process.

From a process perspective, coping is contextual, and able to change over time and in accordance with the situational context in which it occurs. From this viewpoint,

whether a coping process is adaptive or maladaptive depends on the person and the stressful or traumatic situation. In an exhaustive review of the coping literature, Skinner et al., (2003), identified 400 different 'ways' of coping broken into 13 potential families or functions, which they divided amongst five core categories: problem solving, support seeking, escape-avoidance, distraction and positive cognitive restructuring.

A Coping Strategies Model

According to Lazarus et al., (Lazarus, 1993; Lazarus & Folkman, 1984), there are two broad categories of coping strategies: *problem-focussed* and *emotion-focussed.* Problem-focussed coping aims to actively change the person-situation relationship by acting on either the situation, or on oneself to 'fix' the problem, while emotion-focussed coping aims to change the perception of the situation by changing either the *way* the stressful situation is attended to, or to change the *meaning* of what is happening. This can involve such strategies as reappraisal, acceptance, seeking social support, wishful thinking and avoidance. Coping strategies are able to mediate the emotional outcome of a situation, and one study showed that problem solving and positive reappraisal were associated with positive changes in emotion; while other strategies, such as confrontational coping and distancing were correlated with negative emotional changes (Folkman & Lazarus, 1988). From a conceptual viewpoint therefore, the structure of coping can therefore be seen to encompass higher level processes, intermediate level categories and functions, and lower level strategies consisting of specific behaviours.

Another way of understanding coping, conceptualises coping strategies as either approach or avoidant (Littleton, Horsley, John, & Nelson, 2007). This approach looks at whether the strategies are focussed on addressing the problem or issue itself, or the emotions associated with the problem or issue, this is known as 'approach' coping; or on avoiding the problem or issue, or the emotions associated with the problem or issue,

known as 'avoidant' coping. By categorising coping strategies as either problem or emotion focused, and approach or avoidant focused, it is possible to identify four sub-categories: problem- and emotion-approach, and problem- and emotion-avoidant. These approaches, with several examples, are summarised in Figure 3-3.

	Problem-Focussed	**Emotion-Focussed**
Approach	Seeking information about the problem Breaking the problem down into manageable steps	Social support seeking Positive reappraisal Acceptance
Avoidant	Denial Distraction (e.g. work, play) Wishful thinking Behavioural disengagement	Self-blame Numbing (e.g. alcohol use) Distraction Comfort (e.g. eating, shopping)

Figure 3-3. Coping Strategies Matrix

Problem-focussed coping. Within Western cultures, and certainly within the military, there is a strong tendency toward taking action to deal with problems; and problem-approach coping styles have been associated with a sense of mastery and control over stressful and traumatic events, thereby reducing the sense of helplessness (Ness & Macaskill, 2003). Problem solving 'approach' strategies have also been linked to increased social support (Dirkzwager, et al., 2003; Holahan & Moos, 1987a). These types of strategies have been found to result in fewer PTSD symptoms following a trauma, and have been shown to be the best strategy in situations seen as controllable by action (Dirkzwager, et al., 2003; Mikulincer, Florian, & Weller, 1993b; Solomon, Mikulincer, et al., 1988; Solomon, Mikulincer, & Benbenishty, 1989). This is dependent on both the situation and the individual, however, and a situation in which one person can take action, may be beyond the capacity of another.

Emotion-focussed coping. By comparison, emotion-focussed coping strategies seek to change either the way the stressful relationship with the environment is attended to (vigilance or avoidance), or to change the meaning of what is happening. This mitigates the stress even though the actual relationship has not changed, and results in a reappraisal of what has happened. Emotion-focussed coping can be sub-classified as emotion-focussed (approach) coping and emotion-focussed (avoidant) coping. Emotion-focused strategies such as positive reappraisal and social support seeking (Roth & Cohen, 1986), are considered to be 'approach' strategies as they allow the person to 'manage' their distressing emotions and facilitate a return to problem-focused coping (Carver, Scheier, & Weintraub, 1989). Emotion-focused strategies such as numbing and distraction are considered 'avoidant' however, due to their orientation away from the stressor, and are often considered to be maladaptive and associated with lower mental health outcomes in the long term (Moos, 1997). Some emotion-focussed strategies, such as distraction, cognitive blunting, avoidance, assuming responsibility for events outside one's control, wishful thinking and dissociation have been linked to reduced social support (Dirkzwager, et al., 2003; Holahan & Moos, 1987a), increased hypervigilance and intrusive symptoms in PTSD (Kanninen, Punamäki, & Qouta, 2002), and increased severity and maintenance of PTSD (Dirkzwager, et al., 2003; Solomon, Mikulincer, et al., 1988).

Avoidant coping. While problem-focused and emotion-focused 'approach' coping strategies are generally associated with improved psychological adjustment in response to stressors,. reliance on 'avoidant' strategies in the long term is associated with lower levels of psychological adjustment (Carver, et al., 1989; Johnsen, Laberg, & Eid, 1998). In a recent study of US Navy personnel undergoing survival training,

avoidant and emotion-focused coping predicted acute stress symptoms, whereas problem-focused coping did not (Taylor et al., 2009).

Under some circumstances however, even 'avoidant' coping has been shown to be related to better outcomes (Clutton, Pakenham, & Buckley, 1999). Problem and emotion 'avoidant' coping can be adaptive in the short term in situations of low perceived control, where nothing useful can be done to change the situation (Brown, Mulhern, & Joseph, 2002), and where emotional support is not readily available. Distancing, distraction and avoidance can be useful in situations where there is no possibility of action in the short term, as they provide the person time to assimilate what has happened and adjust to the new situation, or simply to occupy them until such time that they can take action, or emotional support becomes available. In these situations, problem-approach coping strategies are likely to be maladaptive, rather than adaptive, as they are likely to lead to failure, and increase distress.

Coping, Control and Appraisal

Folkman (1984, p.849) stated that "a time honoured principle of effective coping is to know when to appraise a situation as uncontrollable and hence abandon efforts directed at altering the that situation and turn to emotion-focused processes in order to tolerate or accept the situation". Adaptive coping is therefore closely related to perceptions of control, and it is one's flexibility in being able to adopt an appropriate coping strategy that is adaptive, rather than adopting one specific strategy over another. In a review of experimental coping studies, Endler et al., (2000) concluded that perception of control is generally associated with problem-focussed coping and less distress, whereas higher levels of distress appears to warrant the use of emotion-focussed strategies, regardless of the level of perceived control.

When facing traumatic situations, people appraise how relevant, harmful and controllable the situation is, and these appraisals influence their choice of coping strategy (Kanninen, et al., 2002). In some individuals, normal responses to traumatic events can be misinterpreted by the individual as indicators of permanent change, or a threat to one's mental and physical health (Ehlers & Clark, 2000). Such appraisals act to maintain PTSD by producing negative emotions such as anxiety, depression or anger (Brewin, Andrews, & Rose, 2000; Novaco & Chemtob, 2002), and by encouraging individuals to adopt maladaptive coping strategies.

A limited number of studies of combat-related trauma have demonstrated a link between causal attributions, and coping strategies. Mikulincer and Solomon (1989) showed that attribution of negative events to internal, temporary and controllable causes was related to greater use of problem-focused coping strategies. Conversely, attribution of negative events to internal, stable and uncontrollable causes was related to greater use of emotion-focused coping strategies. They suggested that a person with the latter pattern of attributions develops expectancies of uncontrollability, which are generalised over time reducing their level of motivation. In a separate study, Mikulincer (1989) showed that making internal, stable and global attributions was associated with a lower expectancy of control, greater use of emotion-focused coping strategies and less use of problem-focused coping strategies. A lower expectancy of control over future negative events reduces a person's belief in the effectiveness of instrumental responses. Mikulincer suggested that attribution of failure to internal, stable and global causes enhances the threat to self-esteem produced by the failure and lowers expectancy of control, which in turn leads to the selection of emotion-focused coping strategies to deal with the inner tension. Summarising this research, Mikulincer (1994) concluded that most studies found that the higher the expectancy of control, the more likely people

were to use problem-focused coping strategies, and the lower the expectancy of control, the more likely people were to rely on emotion-focused coping.

Limitations of Previous Research

Few studies have attempted to prospectively examine pre-existing cognitive, emotional or behavioural factors, and none have sought to integrate these factors in a single prospective, longitudinal research study. Much of the vulnerability associated research which has been conducted with military personnel has tended to focus on the retrospective examination of pre-existing psycho-social, education and psychiatric factors. Zohar et al., (2009) examined pre-enlistment education and measures of behavioural, cognitive and linguistic ability in Israeli veterans; Rona et al., (2009) examined pre-existing psychological symptoms in UK Iraq War veterans; Kulka et al., (1990) and Schnurr, Friedman and Rosenburg (1993) examined pre-existing psychiatric conditions and enlistment measures of personality traits in US Vietnam War veterans; and Bramsen, Dirkzwager and Ploeg, (2000) did the same with former Dutch peacekeepers. In other studies, demographic factors such as education, marital status and childhood adversity were examined in British (Iversen et al., 2008; Jakupcak, Luterek, Hunt, Conybeare, & McFall, 2008), and US (Cabrera, Hoge, Bliese, Castro, & Messer, 2007) Iraq War veterans, while Solomon et al., (2008) examined the impact of stressful life events in Israeli Lebanon War veterans. More recently, Vasterling et al., (2010) compared pre- and post-deployment stress exposure and PTSD symptom severity in 774 US Army soldiers who had deployed to Iraq, and compared this with 309 soldiers who had not deployed.

In a non-military study, pre-trauma measures of personality type collected as part of a longitudinal community study, were used to retrospectively assess survivors of an Australian natural disaster (a bushfire in the national capital), which occurred three

years after the data had been collected (Parslow, Jorm, & Christensen, 2005). Researchers found that while PTSD symptoms were associated with gender, education, pre-existing mental health and higher levels of neuroticism prior to the trauma; participant's experiences during the emergency, including being evacuated and feeling distressed during the event, were more strongly associated with PTSD symptoms than were the pre-trauma factors.

While the studies outlined above have focussed on psycho-social and personality factors, some studies have attempted to *retrospectively* measure pre-existing beliefs and cognitions (e.g. Brewin, Andrews, & Valentine, 2000; Dunmore, et al., 2001; Engelhard, van den Hout, & Kindt, 2003), but this form of research is prone to distortion through memory effects and selection bias, and there have been inconsistent results (Southwick, Morgan, Nicolau, & Charney, 1997). A recent Australian study did, however, *prospectively* examine variables similar to those considered in this thesis, albeit in a non-military sample. Bryant and Guthrie (2005) conducted a prospective study of negative self and world beliefs in Australian trainee fire-fighters, and related this to pathology after a year of service. They found that a pre-existing pattern of maladaptive appraisals about themselves, rather than maladaptive appraisals about the world, contributed to posttraumatic stress symptoms, which is consistent with ideas around self-worth but not world-beliefs. They pointed to evidence by Solomon (1989) that emergency-services and military personnel often function with self-images characterised by high levels of perceived competence and self-efficacy, and concluded that fire-fighters' stress reactions may be associated more with concerns about self-image, than with concerns about other issues.

In a recent study using a military sample, Dutch researchers examined self-other vulnerability associations in Dutch soldiers prior to deployment to Iraq and again, along

with measures of pathology, after their return home (Engelhard, Huijding, Van den Hout, & de Jong, 2007). The concept of self-other vulnerability associations is derived from Janoff-Bulman's (1992) ideas that traumatic experiences may 'shatter' beliefs about a benevolent world, and personal invulnerability. The Dutch study sought to examine whether explicit and implicit vulnerability associations before and after trauma exposure would predict the onset and persistence of post-traumatic stress. The results did not support the use of pre-deployment vulnerability measures, finding that the strength of pre-deployment self-other vulnerability associations did not predict PTSD symptoms following deployment, or at follow-up, whereas post-deployment measures did predict pathology. This led the authors to suggest that strong implicit associations between the self, and vulnerability, are a consequence, rather than a cause of PTSD symptoms.

While the Bryant and Guthrie, and Engelhard et al., studies have prospectively examined cognitive vulnerability factors, they have been quite narrow in scope, particularly with respect to the integration of cognitive, emotional and behavioural factors, suggesting that a gap still remains in our understanding of the relationship between these issues and post-trauma pathology. This thesis reports the results of a study which addresses this gap in the literature through a prospective, longitudinal examination of the relationship between pre-existing cognitive, emotional and behavioural factors, and post-trauma adjustment.

Development of a Proposed Vulnerability Model

The literature surrounding post-trauma psychopathology shows that negative beliefs about the self and the world, a negative attribution style, a lack of capacity for emotional regulation, and avoidant coping behaviour, measured following a traumatic experience, predicts the development of post-trauma pathology. What is not known,

however, is whether exposure to traumatic events causes change in belief and emotional styles that act to increase vulnerability to psychopathology, or whether these beliefs and emotional styles existed prior to the trauma, creating an existing vulnerability that then acts as a catalyst or trigger for psychopathology.

Figure 3-4 proposes a vulnerability model that charts the relationships between pre-existing individual differences in cognitive, emotional and behavioural variables and post-trauma pathology, taking account of trauma exposure and non-traumatic stressors, and baseline measures of pathology and prior experience.

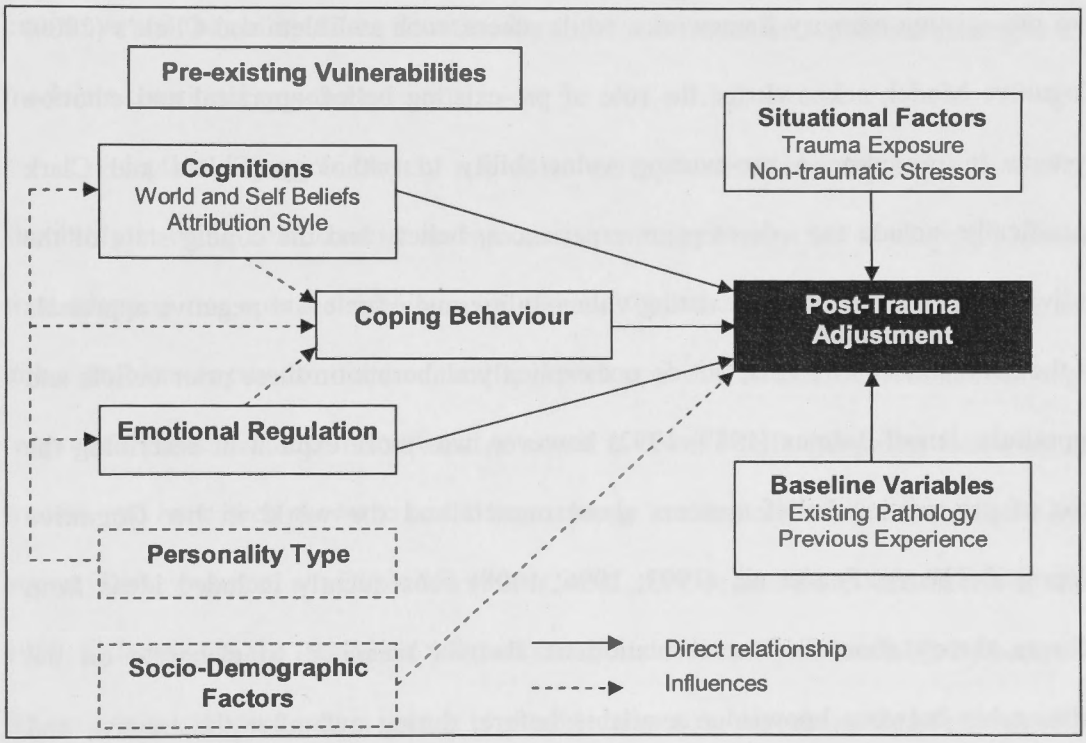

Figure 3-4 Proposed Vulnerability Model for Post-Trauma Adjustment

While personality and socio-demographic factors are not explicitly explored in this study, Dalgleish (2004) showed that personality type is related to cognitive style, capacity for emotional regulation and coping behaviour, and socio-demographic factors are known to influence pathology. Figure 3-4 therefore depicts this relationship within the context of the overall model. This model is unique in reflecting the relationship

between the pre-existing vulnerability factors and post-trauma pathology, whilst acknowledging the role of existing pathology and previous experience, as well as exposure to traumatic and stressful events, in determining general vulnerability for pathology.

In summary, cognitive models highlight the importance of individual differences in cognitions and appraisals in influencing how traumatic event information is processed and integrated into pre-existing frameworks. Some models, such as Brewin's (1996) Dual Representation Theory, describe the representation of the trauma memory into pre-existing memory frameworks, while others, such as Ehlers and Clark's (2000) Cognitive Model, acknowledge the role of pre-existing belief, appraisal and emotion systems in providing a pre-existing vulnerability to pathology. Ehlers and Clark specifically include the role of prior experiences, beliefs and the coping state of the individual in providing a pre-existing vulnerability, and of relevant negative appraisals in the maintenance of PTSD, but do not explicitly elaborate on these prior beliefs and appraisals. Janoff-Bulman (1989; 1992) however, was more explicit in describing the role of pre-existing belief systems about oneself and the world in her Cognitive Appraisal Theory. Foa et al., (1993; 1996; 1998) subsequently included ideas from schema theory about the representation of abstract meaning, to elaborate on the relationship between knowledge available before, during and after the trauma, and subsequent psychopathology, and Dalgleish (2004) proposed that individual differences in trauma responses are a function of the content and nature of pre-event schemas, and the degree that these schemas are maintained following the trauma. Due to the difficulty in conducting prospective pre-trauma research however, these models have not been explicitly tested, and so tend to be unclear about the precise nature of the pre-existing cognitions, emotions and behaviours which are proposed to create vulnerability.

Research into the emotional processes involved in post-trauma adjustment, and in particular the role of one's capacity for emotional regulation, has lagged behind research into the actual emotional responses themselves. Deficits in emotional regulation have been shown to predict maladaptive coping following a trauma (Cloitre, et al., 2005; Price, et al., 2006), and Gratz and Roemer (2004) conceptualise emotion regulation as involving six measurable factors: the awareness, and understanding of emotional response; acceptance of emotional response; the ability to control impulsive behaviours, and behave in accordance with desired goals when experiencing negative emotions; and the ability to use situationally appropriate emotion regulation strategies to modulate emotional responses.

Adaptive coping is closely related to perceptions of control, and it is one's flexibility in being able to adopt an appropriate coping strategy that is adaptive, rather than adopting one specific strategy over another. This thesis conceptualises coping as either problem or emotion-focused, and approach or avoidant-focused. Problem solving 'approach' strategies have been found to result in fewer PTSD symptoms following a trauma, and have been shown to be the best strategy in situations seen as controllable by action (Dirkzwager, et al., 2003; Mikulincer, et al., 1993b; Solomon, Mikulincer, et al., 1988; Solomon, et al., 1989), but what of situations not readily controllable by action? By categorising coping in this way, it is possible to explore the relationship between self and world beliefs, and emotional regulation, and coping behaviour. It is also possible to determine the relationship between coping behaviour, and post-trauma adjustment, with more fidelity.

Where most models of post-trauma pathology do not explicitly include pre-trauma factors, this thesis proposes a model which addresses this limitation by integrating pre-existing cognitive, emotional and behavioural factors, and post-trauma

pathology. Vulnerability factors are important because they are potentially modifiable in populations which can be expected to experience trauma in the course of their work, and because they may be targeted in these populations through intervention prior to exposure to trauma.

The research reported in this thesis therefore seeks to determine the impact of exposure to trauma and non-traumatic stressors on pre-existing cognitive appraisals, capacity for emotional regulation and coping behaviour. It examines the degree to which pre-existing cognitive appraisals and capacity for emotional regulation can predict post-traumatic stress and general psychological distress measured following exposure to trauma and at follow-up. It explores the relationship between cognitive appraisals, emotional regulation and coping behaviour; and finally, it examines how coping behaviour influences the development and maintenance of post-traumatic stress and general psychological distress following exposure to trauma.

CHAPTER 4

RESEARCH OUTLINE AND METHODOLOGY

Description of the Study Sample

Participants in the study were Australian Defence Force (ADF) personnel (N = 519) who completed six month active service deployments to Afghanistan and Iraq during 2008. Participants were deployed as members of either Reconstruction Task Force (IV) (RTF-IV) (n = 407) in Orukzan Province, Afghanistan, or Security Detachment (XIII) (SECDET XIII) (n = 112) in Baghdad, Iraq.

The roles of these two organisations, and the dangers that they faced were different. RTF-IV was involved in the reconstruction of critical infrastructure in Afghanistan, and consisted predominantly of Australian Army construction engineers and logistic support personnel, supported by an infantry protection group. The danger faced by RTF-IV consisted primarily of the threat of ambush and direct attack by groups of Taliban militia and Al-Qaida insurgents, roadside bombs and mines and a general threat from suicide bombers. SECDET XIII, by comparison, was tasked to provide protection to the Australian Head of Mission and diplomatic staff in Iraq (Department of Defence, 2008), and consisted primarily of Australian Army infantry personnel and Royal Australian Air Force airfield defence guards. The main dangers faced by SECDET XIII was from Al Qaeda insurgents and local militias, and included direct attacks by snipers and suicide bombers, and indirect attack in the form of roadside bombs, mortar and rocket attack.

In addition, both groups faced the threat of being taken captive and held hostage, witnessing civilians being killed or injured, seeing friends and colleagues killed or injured and facing the threat of harm to themselves, including the likelihood of

participation in combat operations and the requirement to use lethal force against other human beings. Participants also faced a wide range of environmental risks including exposure to widespread poverty and human suffering, and an ongoing threat of disease and other health risks from depleted uranium, animals, insects and water supplies.

Demographic Data

Demographic data for Gender, Service, Rank and Previous Operational Service is reported at Table 4-1.

Table 4-1

Demographic Data

		SECDET XIII (Iraq)	RTF-IV (Afghanistan)	Total
Personnel		112	407	519
Gender	M	109	393	502
	F	3	14	17
Service	Navy	1	5	6
	Army	99	399	498
	Air Force	12	3	15
Rank	JNCO & other	99	301	400
	SNCO	9	60	69
	Officer	4	46	50
Previous Operational Service	0	59	141	200
	1	27	123	150
	2	11	90	101
	3 +	15	50	65

The total sample was 519 personnel who completed deployments to Iraq (SECDET XIII) and Afghanistan (RTF-IV) between March and September 2008. Of the total number, 96.1%, were male and 3.4% were female. Due to the low number of female respondents, and the potential gender response bias, females are excluded from

comparison against baseline data except where otherwise stated. Although this was a land-force deployment, a small number of Navy and Air Force personnel with comparable skills were deployed as part of predominantly Army units.

Rank. Participants were asked to indicate their rank by marking the relevant option on the Personal Details form. For the purpose of reporting, and to reduce the likelihood of identifying individual participants, ranks are grouped into Junior Non-Commissioned Officers (JNCO) (including private soldiers), senior NCOs (SNCO) (Sergeant – Warrant Officer), and Commissioned Officers (Lieutenant and above). Table 4-1 reports results grouped by unit. The higher proportion of SNCOs and officers in RTF IV is consistent with the more technical nature of this unit. These figures are consistent with rank ratios for these types of units across the broader Army.

Previous operational experience. Data was sought on the degree of participants' previous operational experience. This includes overseas deployments on humanitarian, peacekeeping and warlike operations; it does not include overseas visits or training activities. Participants were asked to report how many previous times they had deployed on operational service. Table 4-1 reports previous operational experience as measured by the number of previous operational deployments. Approximately 38% of participants had not deployed previously, 29% had deployed once, and 32% more than once. The highest reported number of deployments was 10.

Variables and Psychometric Measures

Cognitions

Self and world beliefs. Self and world beliefs were measured using the World Assumption Scale (WAS) (Janoff-Bulman, 1989). The WAS is derived from the Theory of Shattered Assumptions (Janoff-Bulman, 1989, 1992) and is a 32-item, 6-point Likert-type self-report measure of beliefs regarding benevolence of the world, meaningfulness

of the world, and self-worth anchored by respondent options of *strongly disagree* and *strongly agree*. The WAS classified 72% of traumatized individuals according to a self-report PTSD derived diagnosis, with a sensitivity of .91 and a specificity of .26 (Foa et al., 1999).

There are eight primary subscales, each comprised of four items corresponding to the theoretical dimensions of the model: benevolence of the world, benevolence of people, belief in a just world, control, randomness, self-worth, self-control and luck. The self-worth, randomness and benevolence of the world subscales were found to differentiate between trauma victims and nonvictims (Dekel, et al., 2004; Janoff-Bulman, 1989), and mean scores for all sub-scales tended to decrease in relation to PTSD severity (Elklit, Shevlin, Solomon, & Dekel, 2007). Most studies use either these eight dimensions or combine them into three secondary dimensions: benevolence of the world (sum of benevolence of people and benevolence of the world scores), meaningfulness of the world (sum of justice, randomness and control scores), and self-worth (sum of self-worth, luck and self-control scores) (Elklit, et al., 2007). Higher scores indicate stronger beliefs, with scores summing to potential totals of 48 for benevolence, and 72 for meaningfulness and self-worth.

A number of studies have used the scale on groups exposed to a range of different traumas. A study of Israeli Army combat veterans produced reliabilities across the eight primary dimensions ranging from .66 to .76 (Dekel, et al., 2004), while a study of sexual abuse victims produced reliabilities of .86, .74 and .87 for the Benevolence, Meaningfulness and Self-worth secondary dimensions respectively (Ullman, 1997). A more recent study of Australian road accident trauma victims (Jeavons & Godber, 2005), produced reliabilities of .79, .70 and .68 for the three secondary dimensions respectively; with .80, .74 and .84 produced at six month follow-up. Although Jeavons

and Godber did not measure test-retest reliability, they found that while the trauma measures used showed significant decline over a period of 12 months following the accident, the WAS scales did not, supporting Janoff-Bulman's (1985) view that once affected by a traumatic experience, these assumptions remain affected for long periods of time. Other studies have used the scale with South African torture survivors (Magwaza, 1999); holocaust survivors (Prager & Solomon, 1995); refugees (Mooren & Kleber, 2001); car and bus accident victims (Solomon, et al., 1997); and assault, sexual assault and abuse victims (Ali & Dunmore, 2002; Webb & Whitmer, 2001).

The World Assumption Scale is included at Appendix A-1 and was used prior to deployment (T1) and at the end of the deployment (T2), producing reliabilities for each phase across the three dimensions comparable with the pattern of findings described above: Benevolence $\alpha = .81$ and .85 for phases 1 and 2 respectively; Meaningfulness $\alpha = .61$ and .61; and Self-Worth $\alpha = .79$ and .83.

Attributional Style. Attributional Style was measured using the Attributional Style Questionnaire – General Use (ASQ-G.) (Dykema, Bergbower, Doctora, & Peterson, 1996) which is derived from the Attributional Style Questionnaire (ASQ) (Peterson et al., 1982) but has broader applicability by simplifying some of the wording and deleting 'college' based situations.

Participants were asked to identify a likely cause for each of 12 hypothetical situations and then to answer three questions, each pertaining to one of the dimensions, about each cause. The internal-external dimension asks participants to answer the question "*Does the cause you gave have something to do with you or does it have something to do with other people or circumstances?*" Participants rate their response on a 7-point scale ranging from -3 ("other people or circumstances") and +3 ("completely with you"). Similarly, to determine the perceived instability-stability of

the attributed causes, participants were asked "*How likely is it that the cause you gave will continue to affect you?*" Ratings were made on 7-point scales ranging from -3 ("Will never affect you") to +3 ("Will always affect you"). The specific versus global dimension asks participants "*Is the cause you gave something that just affects this situation or does it affect other areas of your life?*" Participants rate their response on a 7-point scale ranging from -3 ("Just affects this situation") to +3 ("affects all other areas"). For all scales, scores are transformed to 1-7 point scales with higher scores indicating increased external, stable and global attributions respectively. In a study using just the unstable-stable and specific-global dimensions with a sample of 146 undergraduate students, Dykema et al., (1996) found satisfactory reliabilities of .81 and .74 respectively. The ASQ-G is included at Appendix A-2 and was used at T1 and T2, producing satisfactory reliabilities across the three dimensions: locus $\alpha = .79$ and .85 at T1 and T2 respectively; stability $\alpha = .87$ and .92, and generalisability $\alpha = .82$ and .89.

Emotion Regulation

Emotional regulation was measured using the *Difficulties in Emotion Regulation Scale (DERS)* (Gratz & Roemer, 2004). The DERS is a 36-item, self-report scale that assesses modulation of emotional arousal, awareness, understanding, and acceptance of emotions, and the ability to act in desired ways regardless of emotional state. It comprises six sub-scales that measure different aspects of emotion regulation: (a) lack of awareness of emotional responses, (b) lack of clarity of emotional responses, (c) non-acceptance of emotional responses, (d) limited access to emotion regulation strategies perceived as effective, (e) difficulties controlling impulses when experiencing negative emotions, and (f) difficulties engaging in goal-directed behaviours when experiencing negative emotions. The DERS was developed to overcome shortcomings with earlier scales such as the Generalised Expectancy for Negative Mood Regulation Scale (NMR)

(Catanzaro & Mearns, 1990), the Affective Control Scale (ACS) (Williams, Chambless, & Ahrens, 1997b), and the Regulation of Emotional Distress Scale (REDS) (Larson, 1994), that measured emotional arousal, affective control or emotional distress, but did not comprehensively measure emotional regulation or disregulation.

The DERS is a comprehensive measure of capacity for emotional regulation that takes into account the contextually dependent nature of adaptive regulation strategies (Gratz & Roemer, 2004). Participants are asked to indicate how often items such as "*When I am upset, I acknowledge my feelings*", apply to themselves on a five-point scale ranging from 'Almost Never' to 'Almost Always'. DERS items are coded so that higher scores indicate greater difficulties with emotional regulation, with scores summed to total 40 for lack strategies, 30 for non-acceptance, lack impulse control and lack awareness, and 25 for lack goal behaviour and lack clarity.

Results from developmental testing indicated high internal consistency $\alpha = .93$ with internal consistency $\alpha > .80$ for each of the sub-scales. Validity testing revealed high correlations between the 'Strategies' and 'Goals' sub-scales and their NMR counterparts, high correlations between the 'Awareness' and 'Clarity' subscales and their EER counterparts, and that all of the sub-scales accounted for additional variance above that accounted for by the other measures. Test–retest reliability of the DERS subscales was adequate: lack awareness, $\rho_I = .68$; lack clarity, $\rho_I = .80$; non-acceptance, $\rho_I = .69$; lack strategies, $\rho_I = .89$; lack impulse control, $\rho_I = 57$; and lack goal behaviour $\rho_I = .69$; all ps < .01 (Gratz & Roemer, 2004).

The DERS is included at Appendix A-3 and was used at T1 and T2, producing reliabilities across the six sub-scales comparable with the pattern of findings described above: lack awareness, $\alpha = .82$ and .81; lack clarity, $\alpha = .76$ and .76; non-acceptance, α

= .87 and .91; lack strategies, α = .80 and .88; lack impulse control, α = .77 and .82; and lack goal-directed behaviour, α = .73 and .76.

Coping Behaviour

Coping behaviour was measured using the Coping Inventory for Stressful Situations – Short Form (CISS-SF) (Cohan, Jang, & Stein, 2006; Endler & Parker, 1990). The CISS-SF is a 21-item measure derived from the longer 48-item CISS and measures problem-focussed, emotion-focussed, and avoidance-focussed coping behaviours with seven items in each sub-scale. Respondents rate the extent that they engage in various coping activities when confronted with a difficult, stressful, or upsetting situation using a five-point scale ranging from 'Not at All' to 'Very Much', and scores are summed to indicate greater use of specific coping strategies.

In a student and community based study the CISS-SF produced internal reliabilities consistent with the larger scale: problem-focussed α = .85 to .87, emotion-focussed α = .79 to .88, distraction avoidance α = .61 to .72, and social diversion avoidance α = .76 to .87. (Cohan, et al., 2006). The study found that the two avoidance sub-scales were moderately correlated, and the authors concluded that they might actually represent a single avoidance factor. Given the limited number of items in these two sub-scales, for the purpose of this study the avoidant sub-scales were combined into a single sub-scale.

The CISS-SF is included at Appendix A-4 and was used at T1 to establish a baseline measure of coping style and again at follow-up (T3), to measure coping behaviour once participants had an opportunity to reintegrate following their return from deployment. The study produced reliabilities for problem-focussed and avoidance coping that were comparable with those found in the earlier studies: problem-focussed coping α = .89 and .91, and avoidance-focussed coping α = .75 and .73. Reliabilities for

emotion-focussed coping were approximately 10-15 points lower than in the earlier studies, α = .68 and .68 respectively. This may be a reflection of the nature of the sample in this study, which consisted primarily of male military personnel, who could be expected to be less likely to use emotion coping strategies than an equal gender sample of students and general community members.

Exposure Factors

Traumatic event exposure. Exposure to traumatic events was measured using the Traumatic Stress Exposure Scale – Revised (TSES-R) (Hodson, 2002; Swann & Hodson, 2004), which was designed by Australian Army psychologists to measure frequency and severity of exposure to traumatic events, consistent with research suggesting the latter is a significant risk factor for the development of PTSD. The TSES-R features twelve generic potentially traumatic events, each with examples relevant to both military activities and general life, (Eg. "*You were in danger of being killed. e.g. combat, Motor Vehicle Accident, assault, sexual assault, natural disaster, hostage situation*").

Each event is accompanied by rating scales measuring frequency of exposure, severity of impact in terms of feelings of fear, horror, or helplessness at the time of the event and enduring impact. Column A requires respondents to indicate how frequently they experienced the event with options ranging from 'Never', to 'Very Often (11+)'. Column B asks how the event affected respondents at the time terms of feelings of fear, horror, or helplessness, with options ranging from 'Not at all', to 'A great deal', and Column C asks how the event affects respondents now, using the same rating scales. Reliabilities for the TSES-R are acceptable, with consistent results above .70, and test-retest reliabilities ranging from α = .49 to .86 (Swann & Hodson, 2004). The TSES-R is

included at Appendix B-1 and was used at T1 to provide a measure of previous traumatic exposure, and at T2 to measure traumatic exposure on the actual deployment.

Deployment-related stressors. Experience from previous deployments indicates that a range of non-traumatic deployment-related stressors (herein known as deployment-related stressors) can have a major impact on peri-deployment performance and satisfaction, and post-deployment psychological well-being. Using the Major Stressors Inventory (MSI), participants were asked to rate the level of stress caused by a list of 36 factors covering a range of issues, including the behaviour of others, impact of separation from family and friends, quality of leadership, exposure to a foreign culture, and lack of personal privacy. Respondents rate each stressor on a five-point scale ranging from 'No Stress' to 'Extreme Stress'. While the MSI is usually considered more as a list of discrete stressors than a cohesive scale, it does have some properties of a stress related scale, producing internal reliability coefficients in testing by the Department of Defence over a series of deployments during the period Jan 03 – Aug 06 of $\alpha = .90$, and total score correlates of 0.6, with the K10 and PCL-C (Twomey, 2007).

Exploratory factor analysis using 881 Australian Defence Force personnel deployed to East Timor during 2001/02 identified three distinct factors in the MSI: frustration, operational concerns and separation concerns, suggesting that the construct of non-traumatic deployment stress has consistent quantifiable themes that can be measured (Deans, 2007). Follow-up exploratory factor analysis using 695 personnel deployed to East Timor during 2002/03, supported the factor structure identified in the first study. Confirmatory factor analysis, using a combined sample supported the earlier findings, and was consistent with Theorell and Kareseks' (Karesek & Theorell, 1990; Theorell & Karesek, 1996) model of occupational stress, which proposes three factors: control, job demands and social support. The MSI is included at Appendix B-2.

Psychopathology

PTSD Symptomatology. PTSD symptomatology was measured using the Posttraumatic Stress Disorder Checklist – Civilian (PCL-C) (Weathers, Litz, Herman, Huska, & Keane, 1993). The PCL-C is a 17-item self-report instrument corresponding to DSM-IV diagnostic criteria B, C and D (intrusions, avoidance, and hyperarousal) for PTSD. Validity studies have demonstrated strong internal consistency coefficients ranging between .89 to .93 for cluster B, .82 to .85 for cluster C, and .84 to .92 for cluster D, for male veterans (Weathers, et al., 1993), female assault victims (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996) and university students (Ruggiero, Del Ben, Scotti, & Rabalais, 2003).

The PCL-C has strong test-retest reliability $\alpha = .96$ (Weathers, et al., 1993) and has been validated against the Clinician Administered PTSD Scale (CAPS), the History of Psychosocial Stressors (HPS), the Symptom Checklist 90 – Revised (SQL-90R), the Mississippi Scale for PTSD – Civilian version (MS-C) and the Impact of Event Scale (IES) (Blanchard, et al., 1996; Ruggiero, et al., 2003). It is in current use by the Australian Department of Defence as a screening instrument for PTSD.

Participants rate each question according to the extent that the symptom has bothered them in the past month using a 5-point scale ranging from 1 'not at all' to 5 'extremely'. The scale's authors suggest an over-all cut-off of 50 as providing evidence of the respondent having PTSD, and the Australian Guidelines for the Treatment of Adults with Acute Stress Disorder (ASD) and PTSD (ACPMH, 2007) have endorsed this cut-off for diagnostic purposes. Other research however, suggests that a lower cut-off may be more useful from a preventative perspective (e.g. Bliese et al., 2008; Lang, Laffaye, Satz, Dresselhaus, & Stein, 2003; Nicholson, 2007). Current ADF guidance is that scores from 17-29 are considered to place respondents in the low-risk category for

PTSD, while scores from 30-39 are in the medium-risk category, warranting further investigation by a psychologist. Respondents who score above or close to 40 are considered to be in the high-risk category (Department of Defence, 2009). The PCL-C provides an overall score, as well as sub-scale scores representing the symptom clusters of PTSD.

The PCL-C is included at Appendix C-1, and was used at T2 to measure PTSD symptomatology at the end of the deployment, and again at T3 to measure PTSD symptomatology at follow-up. The PCL-C produced reliability coefficients for the three symptom clusters across the two time points that were slightly lower than, but consistent with those found in other research: Cluster B - intrusions, α = 0.85, 0.88; Cluster C - avoidance, α = 0.82, 0.84; and Cluster D – hyper-arousal α = 0.79, 0.82.

Psychological distress. Psychological distress was measured using the Kessler Psychological Distress Scale (K-10) (Kessler et al., 2002) which is a widely used 10-item self-report questionnaire designed to measure the level of distress and severity associated with psychological symptoms in population surveys (Kessler, et al., 2002). The K-10 consists of 4 factors: Nervous, Negative Affect, Fatigue, and Agitation; within a second-order factor structure representing Depression and Anxiety (Brooks, Beard, & Steel, 2006). Several Australian studies used data from the 1997 National Survey of Mental Health and Well-Being to compare the K-10 results with the 12-item General Health Questionnaire (GHQ-12), the SF-12 and the Composite International Diagnostic Instrument (CIDI) (Andrews & Slade, 2001; Furukawa, Kessler, Slade, & Andrews, 2003), finding support for the validity of the K-10. The K-10 is currently used by the World Health Organisation, the Australian Defence Force, the Australian Bureau of Statistics, and a range of Australian mental health services as a general measure of psychological distress.

Within the ADF, the K-10 is used at post-deployment and at follow-up, to measure levels of current anxiety and depressive symptoms, and as a screen to identify the need for further psychological assistance (Department of Defence, 2009). K-10 scores are usually summed to provide an overall rating between 10 and 50 for each individual. Although there is no formal consensus on cut-offs within the literature, scores between 15-19 comprise 20.4 percent of the Australian population, and are associated with a prevalence of 3.8% to 6.6% for anxiety disorders, and 3.0% to 7.8% for an affective disorder (Andrews & Slade, 2001). A score of 15 has a sensitivity of 0.90 and a specificity of 0.78.

Following research by Twomey (2007), current ADF guidance for the interpretation of K-10 scores is that members scoring above 15 be provided with psycho-education and information on self-help resources and monitored, while those with a score of 20 or higher be referred for further assessment (Department of Defence, 2009). The K-10 is included at Appendix C-2 and was used at T1 to provide baseline indications of psychological functioning, and again at T2 and T3 to measure post-deployment and follow-up psychological functioning. The K-10 produced reliability coefficients across the three phases of $\alpha = .86$, .85 and .91 respectively.

Design

The research design consisted of a longitudinal study with data collection over a period of 16 months both prior to, and following deployment. Participants provided informed consent to participate in the study and were able to withdraw their participation at any time. Data collection was conducted in three phases: prior to deployment; in-country at the end of the deployment, immediately prior to their return to Australia; and at their home locations at follow-up between four and eight months after their return to Australia.

Phase 1. Phase 1 (T1) was conducted prior to the deployment of participants and involved the collection of baseline data. Data was collected relating to self and world beliefs, attributional style, emotional regulation, coping behaviour, psychological distress, and previous operational experience.

Phase 2. Phase 2 (T2) was conducted in Iraq and Afghanistan at the end of the deployment, several days prior to participants returning to Australia. Data was collected relating to self and world beliefs, attributional style, emotional regulation, trauma exposure and exposure to deployment-related stressors, PTSD symptomatology and psychological distress.

Phase 3. Phase 3 (T3) was conducted between four and eight months after participants returned to Australia. Data was collected relating to coping behaviour, PTSD symptomatology and psychological distress.

Table 4-2 outlines the timeline for data collection across the study.

Table 4-2

Timeline for Data Collection across the Phases of the Study

Variable	T1 (Pre-deployment)	T2 (Post-deployment)	T3 (Follow-up)
Self and World Assumptions	X	X	
Attributional Style	X	X	
Difficulties with Emotional Regulation	X	X	
Coping Behaviour	X		X
Trauma Exposure	X[1]	X	
Deployment-Related Stressors		X	
Post-traumatic Stress		X	X
Psychological Distress	X	X	X

Notes:

1. Data relating to previous trauma exposure was collected to provide prior exposure rates

Procedure

Approval

The Australian National University Ethics Committee (ANUEC) and the Australian Defence Human Research Ethics Committee (ADHREC), provided ethics approval in 2007 for the research project, and organisational approval was obtained from the ADF Commander of Joint Operations, and the Australian Army Land Forces Commander, prior to operational units being approached to participate in the study. Approval for the study was provided on the proviso that the units identified were not involved in concurrent psychological research to avoid over-sampling of Defence personnel.

Three units identified for upcoming deployments to Afghanistan and Iraq, were initially selected for the study, and approval was sought from unit commanders to approach personnel to participate in the study. During this preparatory stage however, there was a change of government within Australia, resulting in a change in policy regarding Australia's commitment to Iraq. As a consequence, a major unit identified for the study was advised that they would not be deploying, reducing the potential sample by approximately 500 people. Commanding officers of the remaining two units agreed to participate in the study and provided unrestricted access to their personnel. During this stage, questionnaires were converted into Teleform format to allow completed instruments to be scanned, rather than manually entered, into the research database.

Administration

For the first phase of the study, surveys were administered by the researcher at pre-deployment locations in group sessions consisting of between 100 - 150 personnel. Participants were briefed on the purpose of the study, and provided with a letter of invitation from the Director General Support for Joint Operations, an information pack,

a consent form, a copy of the survey instruments and a return addressed envelope. Participants then completed the surveys and sealed them in the envelopes before handing them in for collection.

Phase two of the study was conducted in conjunction with routine psychological screening conducted by Defence psychologists prior to deployed personnel being returned to Australia. Because this phase was conducted within the operational theatre, Army psychologists who were deployed to Iraq and Afghanistan administered these questionnaires.

Phase three questionnaires were administered in conjunction with routine follow-up psychological screening conducted approximately 4-8 months following the deployment. Because this phase was conducted in members' home unit locations, study questionnaires were either mailed to participants, or provided individually to participants by the researcher or regionally based Army psychologists, depending on the location.

Data Analysis

Four discrete studies were conducted as part of the overall research project. These studies are reported in the next four chapters.

The first study is reported in Chapter 5, and seeks to determine the impact of trauma exposure and exposure to deployment-related stressors on the stability of the cognitive and emotional variables across the deployment. First, Pearson correlations between the T1 and T2 variables are examined to determine the stability of individual responses across the deployment. The second set of analyses uses paired t-tests for parametric variables, and the Wilcoxon Signed Ranks Test for non-parametric variables, to examine changes in the sample mean scores across the deployment. Hierarchical linear regression is then used to determine the impact of trauma exposure and exposure

to deployment-related stressors, on the relationship between the individual T1 and T2 cognitive and emotional variables across the deployment.

The second study is reported in Chapter 6, and aims to identify the degree that pre-existing characteristics can be used to predict post-deployment adjustment. The first set of analyses examines Pearson correlations to determine the relationships between the cognitive and emotional regulations variables, trauma exposure, deployment-related stressors, psychological distress and post-traumatic stress. The second set of analyses uses hierarchical linear regression to determine prediction models for severity of post-traumatic stress and psychological distress, while the third set of analyses uses binomial logistic regression to determine prediction models for respondents reporting above and below clinical cut-off levels of post-traumatic stress and psychological distress. In both cases, models are developed controlling for previous operational experience, baseline psychological distress, trauma exposure and exposure to deployment-related stressors.

The third study is reported in Chapter 7, and aims to identify the degree that pre-existing characteristics can be used to predict ongoing adjustment measured at follow-up, 4 to 8 months following return to Australia. Follow-up at this time has been shown to provide sufficient opportunity for normal stress reactions to subside, whilst remaining symptomatology has been shown to predict ongoing maladjustment (Hodson, 2002). This study replicates the analyses used in the second study, to first examine the relationships between the predictor variables, trauma exposure, deployment-related stressors, psychological distress and post-traumatic stress at follow-up, and then to develop prediction models for severity and above/below clinical cut-off for post-traumatic stress and psychological distress.

The final study is reported in Chapter 8, and describes the relationship between the T1 cognitive and emotional predictors, and coping behaviour, the degree that coping

behaviours are stable across the deployment, and the relationship between coping behaviour and ongoing adjustment. The first set of analyses uses paired t-tests to determine preference for coping style, and to examine the stability of mean scores across the deployment, while Pearson correlations between the T1 and T3 variables were examined to determine the stability of individual coping behaviour. Hierarchical linear regression is then used to determine prediction models for coping behaviour using T1 cognitive and emotional variables as predictors. The final stage of analysis uses hierarchical linear regression to determine prediction models for severity of T2 and T3 post-traumatic stress and psychological distress, using coping behaviour as predictor variables, controlling for previous operational experience, baseline psychological distress, trauma exposure and exposure to deployment-related stressors.

Prior to the detailed analysis of the data, the data was screened for missing values, univariate outliers, and multivariate outliers using Mahalanbois and Cooks Distance. In line with procedures outlined by Holmes-Smith (2008), the replacement of missing values routine in SPSS was used to replace missing values prior to checking for univariate outliers. Holmes-Smith warns against wholesale use of this procedure without careful consideration of the nature of the missing data, and so to retain data integrity, it was decided to discard cases with greater than 20% missing values.

CHAPTER 5

STUDY 1: STABILITY OF COGNITIVE AND EMOTIONAL REGULATION VARIABLES

This chapter addresses the first research question, and reports the results of a study examining the impact of exposure to trauma and deployment-related stressors on pre-existing cognitive appraisals and capacity for emotional regulation. The literature surrounding post-trauma psychopathology shows that negative beliefs about the self and the world, a stable and global attributional style, and a lack of capacity for emotional regulation, measured following a traumatic experience, predict post post-trauma adjustment. The evidence is mixed however, on whether an internal, or external, attribution style better predicts PTSD, and this is more likely to be related to the nature of the trauma itself. What is also not known is whether traumatic events cause changes in belief and emotional styles that act to impair post-trauma adjustment, or whether these beliefs and emotional styles existed prior to the trauma, creating an existing vulnerability for poor post-trauma adjustment.

Unfortunately, few longitudinal studies have prospectively examined pre-existing cognitions and emotional capacity, making it difficult to definitively establish the relationship between the trauma exposure and changes in cognitions and emotional regulation. This study examines the degree that pre-existing self and world beliefs, attribution style and capacity for emotional regulation are influenced by exposure to trauma and deployment-related stressors. If it is found that there is a major change in these variables as a consequence of exposure to trauma, then they are potentially less useful as predictors of pathology. If however, it is found that these variables are relatively stable, despite exposure to trauma, then they become more important as

predictors of adjustment, particularly as they are potentially modifiable through intervention prior to trauma exposure. Subsequent chapters examine the relationship between these predictors and post-traumatic stress and psychological distress, to identify the degree that pre-existing characteristics can be used to predict adjustment following exposure to trauma.

Cognitive Appraisals and Beliefs

McFarlane and Girolamo (1996) suggest that exposure to traumatic events attacks the individual's sense of self, and predictability of the world. Studies that have examined the impact of exposure to trauma on self and world beliefs, have shown that people exposed to traumatic events perceived themselves more negatively, and perceived people and the world as less benevolent and events as less meaningful, than people who had not been exposed to a trauma (Janoff-Bulman, 1989; Magwaza, 1999). A central idea is that traumatic events can alter people's basic beliefs and assumptions about themselves and the world (Horowitz, 1976; Janoff-Bulman, 1989, 1992). However, unlike Janoff-Bulman's (1992) suggestion that people with overly positive views of the world and self are more vulnerable because these are 'shattered' by the traumatic experience, Foa and Riggs (1993) suggest that it is people with extreme, rigid views who are more vulnerable, whether these views are positive or negative. It is therefore important to understand the impact of traumatic experiences on the rigidity of a person's pre-existing beliefs around themselves and the world in order to better understand the relationship between these beliefs and post-trauma adjustment.

According to attribution theory, people have a need to explain the events that occur in their world, particularly when anything unusual, unwanted, or unexpected happens (Joseph, et al., 1993a; Weiner, 1985a, 1985b, 1992). The nature of these explanations have consequences for how they respond to an event, and the severity of

symptoms following a trauma (Gray & Lombardo, 2004; Gray et al., 2003; Seligman et al., 1988). The evidence for the relationship between attribution style and post-trauma pathology is mixed, however. A major longitudinal post-trauma study of the relationship between attributions and PTSD in Israeli combat veterans, found that the attribution of negative events to *external*, *stable* and *uncontrollable* causes was significantly related to an increase in PTSD symptomatology (Mikulincer & Solomon, 1988). Some studies meanwhile, have found that attribution of events to *internal*, *stable* and *global* causes is related to the severity of PTSD in victims of both interpersonal and non-interpersonal trauma (e.g. Gray, et al., 2003; Joseph, et al., 1993a; Runyon & Kenny, 2002). Other studies however, have failed to find a clear relationship between attributional style and PTSD (e.g. Dixon, Howie, & Starling, 2005; Greening, et al., 2002). While the relationship between PTSD and *post*-trauma attributional style is well researched, albeit with inconsistent findings, there has been little research into the impact of traumatic events on the *pre*-trauma attributions.

Emotional Regulation

In addition to research into post-trauma attributions and belief styles, there has also been a substantial amount of research conducted into post-trauma emotional responses, with evidence that a range of negative emotions frequently accompany PTSD. Studies have also shown that beliefs about the negative consequences of losing control of one's emotions are a key feature of post-trauma pathology (e.g. Williams, et al., 1997a). Given the strong relationship between emotional response and post-trauma psychopathology, it has been therefore been suggested that PTSD involves disturbances in emotions, as well as anxiety (Price, et al., 2006; Resick, 2001; van der Kolk, 1994). This suggests that capacity for emotional control, or regulation, should be important in determining the nature and extent of a person's emotional response to a trauma, and one

of the core ideas underpinning appraisal theories of emotion is that people respond with different emotions to the same situation, depending on how they interpret, or appraise, the situation. Given the relationship between emotional regulation and rumination about emotional responses, common in post-trauma pathology, it is important to understand the impact of exposure to traumatic events on a person's capacity for, and beliefs about emotional regulation. As with research into cognitions however, there has been little prospective research that has examined the impact of exposure to trauma on pre-existing capacity for emotional regulation.

While research has shown that adaptive emotional regulation involves flexibility in the use of emotion regulation strategies, as well as being able to alter the intensity or duration of emotions, (Cole, et al., 1994; Thompson, 1994), according to Price et al., (2006), research into the emotional processes involved in post-trauma psychopathology, and in particular the role of one's capacity for emotional regulation, has lagged behind research into the actual emotional responses themselves. This could be in part because emotional regulation is often poorly defined, and in part because of the difficulty in conducting research on pre-trauma variables.

Deployment-Related Stressors

US, UK and Australian research into the impact of operational service on military personnel has shown that in addition to combat related trauma, there is a range of environmental and deployment related stressors that cause psychological distress and are common to operational service. These stressors include separation from family and friends, interpersonal and cultural differences, the actual physical environment and the duration of the operation (Booth-Kewley, Larson, Highfill-McRoy, Garland, & Gaskin, 2010; Cotton, 2001; Jones et al., 2002; Taylor, 2004). More specifically, contemporary Australian research indicates that organisationally related stressors such as 'double

standards', 'leadership', and 'Australian military hierarchy' tended to be most frequently cited by deployed personnel as causing increased stress (Bell & Steele, 2005; Deans, 2007). Followed by separation related stressors, these stressors were reported most often in studies of ADF personnel across operations from 2002 to 2004. Some authors also argue that it is the transition process into the unfamiliar environment, and the reintegration process back into the home environment following the deployment, that may be the most stressful components (e.g. Adler, Litz, & Bartone, 2003; Castro, 2003). Certainly, the focus of the psychological education currently provided to ADF soldiers prior to deployment, and on return, is on transition related stressors, rather than on the actual deployment-related stressors they are likely to encounter during. While there is no doubt that transition related stressors are important areas to address, more recent Australian research suggests that it is stressors related to the deployment itself that lead to increased frustration and distress (Deans, 2007; Steele & Twomey, 2006), and yet the impact of these stressors on self and world beliefs, attribution style and capacity for emotional regulation has not yet been examined.

This study examines the relationship between the pre-deployment (T1) and post-deployment (T2) cognitive and emotional regulation predictors, and examines the impact of trauma exposure and deployment-related stressors on the stability of these variables across the deployment.

Hypotheses

There were four hypotheses. First; that correlations between the T1 and T2 cognitive and emotion regulation variables would be moderate to high, with the strength of the correlation reflecting stability of individual responses across the deployment.

Second; that mean scores for the T1 and T2 cognitive and emotional regulation variables would vary across the deployment, indicating cognitions becoming more negative, and a general worsening of capacity for emotional regulation.

Third; that cognitions would become more negative, and difficulties with emotional regulation would increase over the deployment, associated with the impact of exposure to trauma.

Fourth; that cognitions would become more negative, and difficulties with emotional regulation would increase, associated with the impact of exposure to deployment related stressors.

Method

Participants

Participants were Australian Defence Force personnel who undertook six month deployments to war-zones in Afghanistan and Iraq during 2008. Data collection was conducted both prior to (T1), and at the end of the deployment (T2), and involved the collection of information relating to world and self beliefs, attribution style, capacity for emotional regulation, and exposure to trauma and deployment stressors.

Variables.

Demographic factors. Demographic items were measured using questions to determine the participant's age, gender, seniority, length of service and previous operational service.

Self and world beliefs. Self and world beliefs were measured using the World Assumption Scale (WAS) (Janoff-Bulman, 1989), which measures beliefs regarding benevolence of the world, meaningfulness of the world, and self-worth. Reliabilities were reported in Chapter 4 and were comparable with the pattern of findings described in the literature.

Emotional regulation. Capacity for emotional regulation was measured using the 36-item Difficulties in Emotion Regulation Scale (DERS), which assesses modulation of emotional arousal, awareness, understanding, and acceptance of emotions, and the ability to act in desired ways regardless of emotional state. Reliabilities were reported in Chapter 4 and were comparable with the pattern of findings described in the literature.

Attribution style. Attribution style was measured using the Attributional Style Questionnaire – General Use (ASQ-G.), which measures locus of control, stability and generalisability of attributions (Dykema, et al., 1996). Reliabilities were reported in Chapter 4 and were comparable with the pattern of findings described in the literature.

Trauma exposure. Exposure to traumatic events during the deployment was measured using the Traumatic Stress Exposure Scale – Revised (TSES-R) (Hodson, 2002; Swann & Hodson, 2004).

Deployment related stressors. The Major Stressors Inventory (MSI) was used to rate the level of stress caused by a list of 36 stressors including the behaviour of others, impact of separation from family and friends, quality of leadership, exposure to a foreign culture, and lack of personal privacy.

Results

Data Preparation

Screening of the data showed that benevolence of the world, meaningfulness of the world, self-worth, lack awareness and lack clarity were normally distributed and within acceptable limits for skewness and kurtosis, while the attribution style variables had high kurtosis indicating a central response bias. The remaining emotional regulation variables were positively skewed, but a comparison of results after conducting logarithmic transformations showed that the level of skewness did not significantly

influence the outcome and so these variables were left in their original form for ease of analysis. Tabachnick and Fidell (2001) point out that in large samples even a variable with statistically significant skewness often does not make a substantive difference to the analysis. Non-parametric tests were conducted on this data where appropriate. According to Cohen, Cohen, West and Aiken (2003), no assumptions about the shape of the distribution are necessary with respect to the calculation and interpretation of correlation and regression when they are used to describe the sample data, and so these analyses were not considered to be influenced by the skewness of the variables.

Data Analysis

Data analysis was conducted in several stages using SPSS v16. The first hypothesis was tested by examining correlations between the paired T1 and T2 variables to determine the stability of individual responses across the deployment.

The second hypothesis was tested through the use of paired t-tests for parametric variables, and the Wilcoxon Signed Ranks Test for non-parametric variables, to examine changes in sample mean scores across the deployment. Scores for the WAS and DERS variables were then adjusted by dividing by the number of items and multiplying by 10. This was to compensate for the different number of items in some of the sub-scales, to facilitate comparison of the relative strengths of each sub-scale.

The third hypothesis was tested using hierarchical linear regression to determine the impact of trauma exposure on the relationship between the T1 and T2 cognitive and emotional variables. This was done separately for each of the variables by entering the T1 variables in the first step, with the T2 variables acting as dependent variables. Then trauma exposure and impact of exposure were entered into the equation in the second step, to determine the degree that these influence the regression relationship between the T1 and T2 cognitive and emotion variables.

The final hypothesis was tested using hierarchical linear regression to determine the impact of deployment-related stressors on the relationship between the T1 and T2 cognitive and emotional variables. Again, the T1 variables were entered in the first step, with the T2 variables acting as dependent variables. Then exposure to deployment-related stressors was entered into the equation to determine the degree that these influence the relationship between the T1 and T2 cognitive and emotion variables.

Study 1a: General Stability of Cognitive and Emotion Regulation Variables

Stability of the individual responses

The first hypothesis predicted that correlations between the paired T1 and T2 cognitive and emotion regulation variables would be moderate to high, with the strength of the correlation reflecting stability of individual responses across the deployment.

The correlations range from $r = .37$ to $r = .57$ for the cognitive variables, and $r = .30$ to $r = .55$ for the emotion regulation variables, suggesting moderate to strong relationships between T1 and T2. The results provide partial support for the first hypothesis and indicate that the emotional regulation variables tended to have lower paired correlations than the cognitive variables.

Stability of the mean scores

The second hypothesis predicted that mean scores for the T1 and T2 cognitive and emotional regulation variables would vary across the deployment, indicating cognitions becoming more negative, and a general worsening of capacity for emotional regulation. Paired t-tests were used to compare mean scores to evaluate the stability of the variables across the deployment. The Wilcoxon Signed Ranks test was used to test four variables: non-acceptance of emotional response, lack goal behaviour, lack impulse control and lack strategies, to take account of the non-normal distribution of this data.

Unadjusted means and standard deviations for the cognitive and emotional regulation variables are listed in Tables D-1 and D-2 in Appendix D.

Stability of World and Self Beliefs.

The results show stronger beliefs around self-worth than benevolence and meaningfulness, and there were statistically significant effects for time for self-worth. Mean scores for self-worth decreased over the deployment, $t = 2.753$, $p < .01$, $\eta^2 = .023$. The decrease in the unadjusted mean score was 1.17 out of a possible score of 72, with a 95% confidence interval ranging from 0.33 to 2.00. There were no significant effects for time for benevolence, $t = 1.009$, $p = .314$; or meaningfulness, $t = -.312$, $p = .755$. Adjusted mean scores and 95% Confidence Intervals are depicted in Figure 5-1.

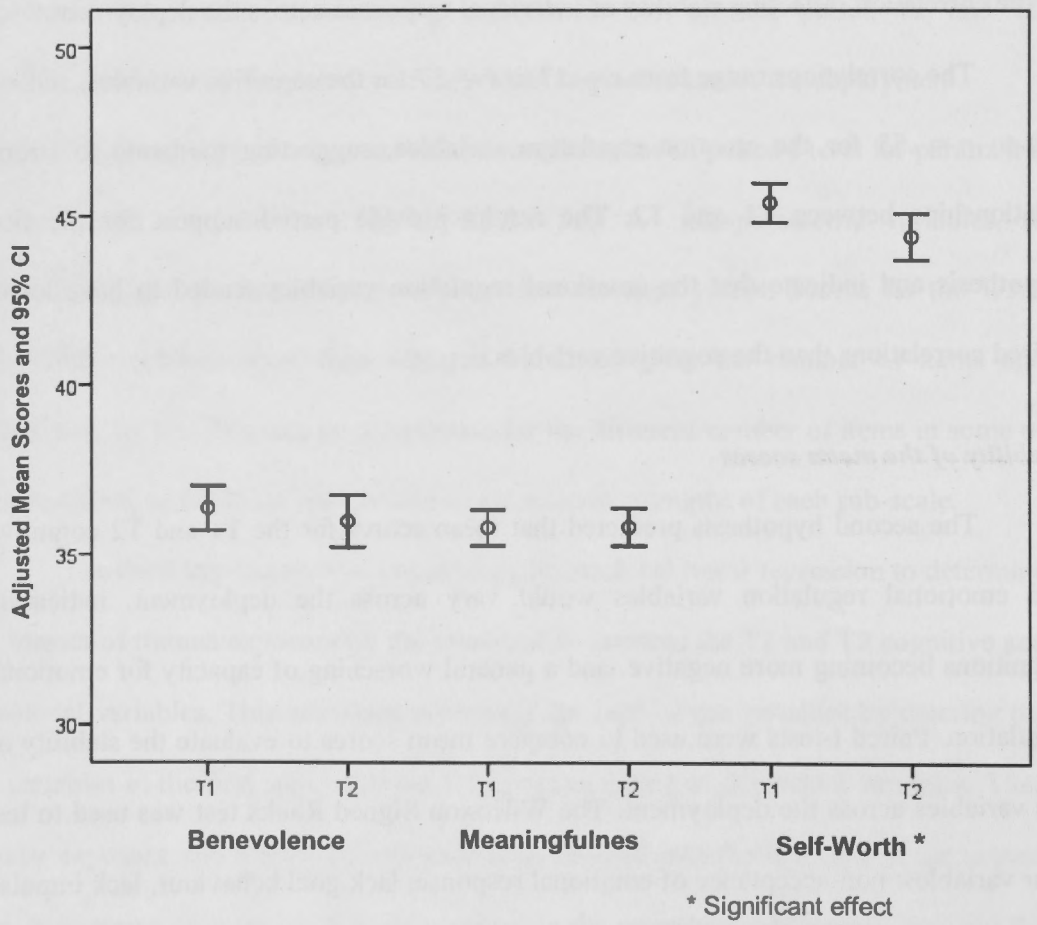

Figure 5-1. Changes in Adjusted Mean Scores for World and Self Beliefs

Stability of Attribution Style.

The results show that scores for attribution style were relatively consistent across the three dimensions. There were no statistically significant effects for time for any of the three variables: locus, t =-.222, p =.825, stability, t = -.815, p =.416, or generalisability, t = .201, p =.841, of attribution. Mean scores and 95% Confidence Intervals are depicted in Figure 5-2.

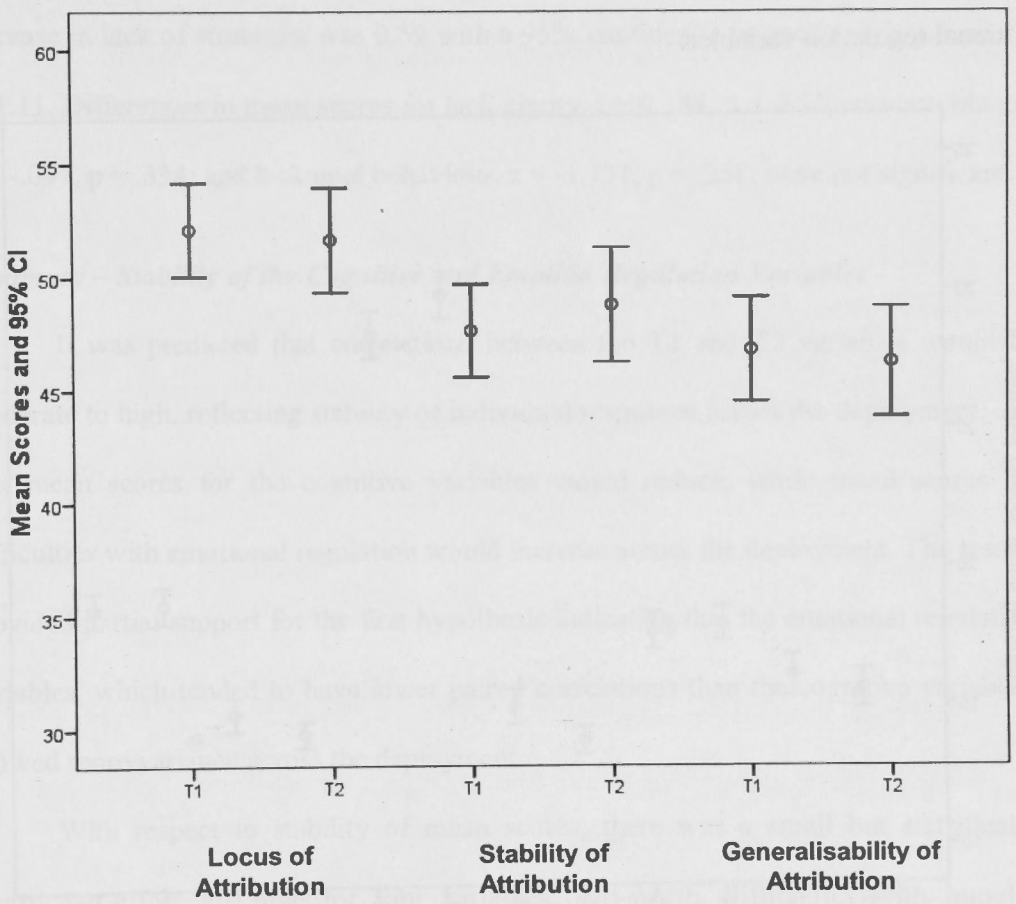

Figure 5-2. Changes in Mean Scores for Attribution Style

Stability of Difficulties with Emotional Regulation.

Figure 5-3 depicts adjusted mean scores and 95% Confidence Intervals for the difficulties with emotional regulation variables. The results show that there were small but statistically significant effects for time for three variables: lack of awareness, lack of emotional regulation strategies, and lack of impulse control. Given that higher scores indicate increased difficulties, the results show that participants in this sample reported greater difficulty with respect to awareness of emotional response than with the other emotional regulation variables.

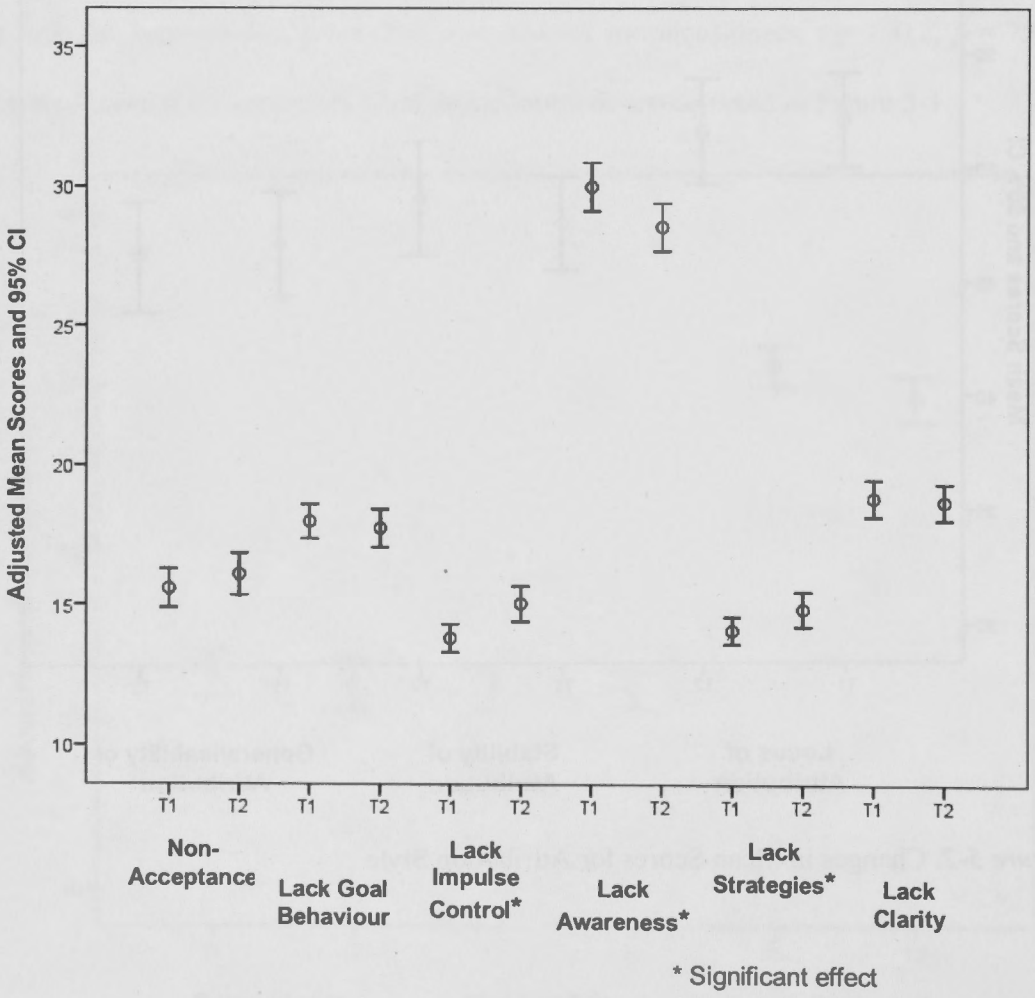

Figure 5-3. Changes in Adjusted Mean Scores for Emotional Regulation

Lack of awareness of emotional response improved over the deployment, $t = 2.816$, $p < .01$, $\eta^2 = .024$. The difference in the unadjusted mean for lack of awareness was -.72 with a 95% confidence interval ranging from -.22 to -1.22. The Wilcoxon Signed Ranks test showed more positive differences (indicating a deterioration in capacity) for lack of impulse control, $z = -3.242$, $p < .01$; and lack of emotional regulation strategies, $z = -1.454$, $p < .05$. The mean increase in difficulties with impulse control was 0.72 with a 95% confidence interval ranging from .33 to 1.12, and the mean increase in lack of strategies was 0.59 with a 95% confidence interval ranging from .08 to 1.11. Differences in mean scores for lack clarity, t = 0.184, p = .854; non-acceptance, z = -.097, p = .334; and lack goal behaviour, z = -1.131, p = .258; were not significant.

Summary – Stability of the Cognitive and Emotion Regulation Variables

It was predicted that correlations between the T1 and T2 variables would be moderate to high, reflecting stability of individual responses across the deployment, and that mean scores for the cognitive variables would reduce, while mean scores for difficulties with emotional regulation would increase across the deployment. The results provided partial support for the first hypothesis indicating that the emotional regulation variables, which tended to have lower paired correlations than the cognitive variables, showed more variance across the deployment.

With respect to stability of mean scores, there was a small but statistically significant effect for time for four variables: self-worth, difficulties with impulse control, difficulties accessing strategies and awareness of emotional responses. Three variables worsened over the deployment: self-worth, difficulties with impulse control and difficulties accessing strategies; while awareness of emotional responses improved. The next stage of analysis examines the impact of exposure to trauma on the stability of the variables across the deployment.

Study 1b: Impact of Trauma Exposure on Variable Stability

The third hypothesis predicted that cognitions would become more negative, and difficulties with emotional regulation would increase over the deployment, associated with the impact of exposure to trauma. Table 5-1 reports the mean score for exposure for each traumatic event, and the percentage of respondents who reported traumatic exposure.

Table 5-1

Prevalence of Traumatic Exposure on Previous and Current Deployment

Nature of Traumatic Exposure	Trauma Exposure On Previous Deployments[1]		Trauma Exposure on Current Deployment	
	Mean	%[2]	Mean	%[2]
Danger of being killed	0.94	37.7%	1.69	79.2%
Danger of being injured	1.48	46.3%	1.72	80.7%
Handled dead bodies/human remains	0.42	17.3%	0.22	15.4%
Witnessed dead bodies/human remains	0.92	34.3%	0.54	37.8%
Heard of close friend or co-worker injured, killed or died	0.33	12.1%	0.45	34.5%
Present when close friend or co-worker injured, killed or died	0.82	37%	0.09	7.3%
Fear had been exposed to contagious disease or toxic agent	0.23	11.9%	0.40	21.6%
Witness to human degradation or misery on a large scale	0.49	21.2%	0.45	23.5%
Heard of loved one injured or killed	0.53	18.9%	0.11	8.5%
Present when a loved one was injured or killed	0.90	25.1%	0.01	.4%
Belief that your actions or inaction resulted in someone being seriously injured	0.76	21.6%	0.08	5.1%
Belief that your actions or inaction resulted in someone being killed	0.56	2.1%	0.08	4.9%

Notes:
1. Participants with no previous deployments did not complete the first 12 items of this instrument: resulting N = 344 - 350 across the 12 items
2. Percentage of respondents who reported exposure to at least one potentially traumatic event

In interpreting this data it should be noted that mean scores are based on what are essentially categorical variables and should be interpreted loosely in this context. The scores do however indicate relative levels of exposure as perceived by respondents. The results indicate that participants felt that they were in increased danger of being injured or killed on this deployment, than on previous deployments, thus highlighting the inherent dangers faced during this deployment.

Table 5-2 compares the mean level of exposure for this sample to a comparison group consisting of 8033 Army personnel who deployed during the period Jan 03 to Aug 06. The results show that participants in this study reported higher levels of traumatic exposure than the comparison group.

Table 5-2

Comparison between Prevalence of Traumatic Exposure for this Deployment and Comparison Group

	n	%[1]	Mean	SD
Sample total for current deployment	506	87.1%	5.96	4.52
Sample total for previous deployments	331	55.8%	7.96	7.25
Comparison Group[2]	8033	66.8%	3.19	3.9

Notes:

1. Percentage of respondents who recorded experiencing at least one potentially traumatic event rarely or more frequently
2. Comparison Group consisting of Army personnel who deployed during the period Jan 03 to Aug 06, N = 8033 (Twomey, 2007)

Correlations between trauma exposure, and reported initial and current impact of exposure are reported at Table 5-3. 'Initial impact of exposure' refers to a retrospective report of the impact of the event at the time of the exposure, while 'current impact of exposure' refers to the impact of the event felt at the time the questionnaire was completed, which was at the end of the deployment. As would be expected, these correlations show strong positive relationships both between trauma exposure and initial

impact of exposure, and between initial and current impact of exposure. This suggests that for those participants who reported exposure to traumatic events, there was a direct positive relationship between amount of exposure and the subjective impact in terms of fear, horror or helplessness. There was also a direct relationship between the impact experienced at the time of the event, and the residual impact reported at the end of the deployment.

Table 5-3

Bivariate Correlations between Trauma Exposure and Reported Impact of Trauma

	Trauma Exposure	Initial Impact[1]	Current Impact[2]
Trauma Exposure	1.00		
Initial Impact[1]	.583***	1.00	
Current Impact[2]	.526***	.715***	1.00

1. Initial impact is retrospective report of impact at time of exposure
2. Current impact is impact reported at the time the questionnaire was completed

*** $p < .001$

Impact of trauma exposure on stability of self and world beliefs.

Sequential regression analysis was used to determine whether addition of trauma exposure, and reported impact of exposure, moderates the relationship between T1 and T2 benevolence, meaningfulness and self-worth, for those who reported exposure to traumatic experiences.

Benevolence of the World. Using post-deployment benevolence as a dependent variable, after step 1 with pre-deployment benevolence in the equation, $R^2 = .33$, ($F_{inc\ (1, 282)} = 137.87$, $p < .001$). In subsequent steps, addition of trauma exposure, R^2 change = .006, ($F_{change\ (1,281)} = 2.59$, $p = .11$); initial impact of exposure, R^2 change = .001, ($F_{change\ (1,280)} = .27$, $p = .61$); and current impact of exposure, R^2 change = .001,

($F_{change\,(1,279)}$ = .51, p = .47), failed to result in a statistically significant change in the model.

Meaningfulness of the World. Using post-deployment meaningfulness as a dependent variable, after step 1 with pre-deployment meaningfulness in the equation, R^2 = .21, ($F_{inc\ (1,\ 283)}$ = 74.21, p < .001). In subsequent steps, addition of trauma exposure, R^2 change = .002, ($F_{change\,(1,282)}$ = 0.86, p = .35); initial impact of exposure, R^2 change = .007, ($F_{change\,(1,281)}$ = 2.33, p = .13), and current impact of exposure, R^2 change = .00, ($F_{change\,(1,280)}$ = .07, p = .79), failed to result in a statistically significant change in the model.

Self-worth. Using post-deployment self-worth as a dependent variable, after step 1 with pre-deployment self-worth in the equation, R^2 = .21, ($F_{inc\ (1,\ 280)}$ = 75.85, p < .001). In subsequent steps, addition of trauma exposure, R^2 change = .001, ($F_{change\,(1,279)}$ = 0.48, p = .49); initial impact of exposure, R^2 change = .000, ($F_{change\,(1,278)}$ = 0.07, p = .80); and current impact of exposure, R^2 change = .002, ($F_{change\,(1,002)}$ = 0.66, p = .42), to the equation failed to result in a statistically significant improvement in the model.

As shown in Table 5-4, addition of trauma exposure and impact of exposure did not significantly explain additional variance in post-deployment scores over that explained by pre-deployment scores for any of the self and world belief variables.

Table 5-4

Summary of Multiple Regression Analysis for Impact of Trauma Exposure on World and Self Beliefs

Variables	F	B	β	sr^2 (unique)	R	R^2	Adj R^2
Benevolence	$F_{(4, 279)} = 35.35$				.580	.336	.327
T1 Benevolence		.685	.575***	.574			
Trauma Exposure		-.129	-.085	-.092			
Trauma Initial Impact		.138	.053	.049			
Trauma Current Impact		-.167	-.045	-.043			
Meaningfulness	$F_{(4, 280)} = 19.38$				.466	.217	.206
T1 Meaningfulness		.493	.464***	.462			
Trauma Exposure		-.153	-.093	-.092			
Trauma Initial Impact		.223	.080	.068			
Trauma Current Impact		.077	.019	.016			
Self Worth	$F_{(4, 277)} = 19.14$				.465	.217	.205
T1 Self Worth		.555	.463***	.459			
Trauma Exposure		.072	.036	.035			
Trauma Initial Impact		.169	.050	.041			
Trauma Current Impact		-.285	-.057	-.049			

* $p < .05$, ** $p < .01$, *** $p < .001$

Impact of exposure to trauma on stability of attribution style.

Sequential regression analysis was used to determine whether addition of trauma exposure, and reported impact of exposure, moderates the relationship between T1 and T2 locus, generalisability and stability of attribution, for those who reported exposure to traumatic experiences.

Locus of attribution. Using post-deployment locus of attribution as a dependent variable; after step 1 with pre-deployment locus of attribution in the equation, $R^2 = .17$, ($F_{\text{inc } (1, 113)} = 19.85$, $p < .001$). In subsequent steps, addition of trauma exposure, R^2

change = .006, ($F_{change\,(1,112)}$ = 0.85, p = .36); initial impact of exposure, R^2 change = .001, ($F_{change\,(1,111)}$ = 0.10, p = 0.75); and current impact of exposure to the equation, R^2 change = .011, ($F_{change\,(1,110)}$ = 1.44, p = .23), failed to result in a statistically significant improvement in the model.

Generalisability of attribution. Using post-deployment generalisability of attribution as a dependent variable; after step 1 with pre-deployment generalisability of attribution in the equation, R^2 = .23, ($F_{inc\,(1,\,102)}$ = 30.17, p < .001). In subsequent steps, addition of trauma exposure, R^2 change = .003, ($F_{change\,(1,101)}$ = 0.34, p = .56); initial impact of exposure, R^2 change = .000, ($F_{change\,(1,100)}$ = 0.004, p = .95); and current impact of exposure to the equation, R^2 change = .003, ($F_{change\,(1,99)}$ = 0.42, p = .52), failed to result in a statistically significant improvement in the model.

Stability of attribution. Using post-deployment stability of attribution as a dependent variable; after step 1 with pre-deployment stability of attribution in the equation, R^2 = .19, ($F_{inc\,(1,\,106)}$ = 24.35, p < .001). In subsequent steps, addition of trauma exposure, R^2 change = .022, ($F_{change\,(1,105)}$ = 2.86, p = .09); initial impact of exposure, R^2 change = .000, ($F_{change\,(1,104)}$ = 0.02, p = .88); and current impact of exposure to the equation, R^2 change = .014, ($F_{change\,(1,103)}$ = 1.88, p = .17), failed to result in a statistically significant improvement in the model.

As shown in Table 5-5, addition of trauma exposure did not significantly explain additional variance in post-deployment scores over that explained by pre-deployment scores for any of the attribution style variables.

Table 5-5

Summary of Multiple Regression Analysis for Impact of Trauma Exposure on Attribution Style

Variables	F	B	β	sr^2 (unique)	R	R^2	Adj R^2
Locus of Attribution	$F_{(4, 110)} = 5.53$				.409	.149	.142
T1 Locus		.407	.390***	.383			
Trauma Exposure		-.259	-.082	-.075			
Trauma Initial Impact		-.644	-.125	-.093			
Trauma Current Impact		1.114	.149	.114			
Generalisability	$F_{(4, 99)} = 7.56$				.484	.234	.203
T1 Generalisability		.477	.469***	.469			
Trauma Exposure		-.216	-.059	-.060			
Trauma Initial Impact		-.323	-.050	-.042			
Trauma Current Impact		.734	.075	.065			
Stability	$F_{(4, 103)} = 7.37$				.472	.223	.193
T1 Stability		.509	.431***	.438			
Trauma Exposure		-.601	-.163	-.159			
Trauma Initial Impact		-.651	-.101	-.085			
Trauma Current Impact		1.537	.155	.134			

* $p < .05$, ** $p < .01$, *** $p < .001$

Impact of exposure to trauma on stability of emotional regulation.

Sequential regression analysis was used to determine whether addition of trauma exposure, and reported impact of exposure, moderates the relationship between T1 and T2 scores for difficulties with emotional regulation, for those who reported exposure to traumatic experiences.

Non-acceptance of emotional responses. Using post-deployment non-acceptance as a dependent variable; after step 1 with pre-deployment non-acceptance in

the equation, $R^2 = .11$, ($F_{inc\ (1,\ 282)} = 33.98$, $p < .001$). In subsequent steps, addition of trauma exposure, R^2 change = .000, ($F_{change\ (1,281)} = 0.01$, $p = .93$); initial impact of exposure, R^2 change = .000, ($F_{change\ (1,280)} = 0.10$, $p = .75$); and current impact of exposure to the equation, R^2 change = .005, ($F_{change\ (1,314)} = 1.49$, $p = .22$), failed to result in a statistically significant improvement in the model.

Lack goal behaviour. Using post-deployment lack goal behaviour as a dependent variable; after step 1 with pre-deployment goals in the equation, $R^2 = .20$, ($F_{inc\ (1,\ 283)} = 71.80$, $p < .001$). In subsequent steps, addition of trauma exposure, R^2 change = .003, ($F_{change\ (1,282)} = 0.97$, $p = .33$); initial impact of exposure, R^2 change = .002, ($F_{change\ (1,281)} = 0.88$, $p = .35$); and current impact of exposure to the equation, R^2 change = .008, ($F_{change\ (1,280)} = 2.93$, $p = .09$), failed to result in a statistically significant improvement in the model.

Lack impulse control. Using post-deployment lack impulse control as a dependent variable; after step 1 with pre-deployment impulse control in the equation, $R^2 = .13$, ($F_{inc\ (1,\ 275)} = 41.69$, $p < .001$). In subsequent steps, addition of trauma exposure, R^2 change = .005, ($F_{change\ (1,274)} = 1.46$, $p = .23$); initial impact of exposure, R^2 change = .001, ($F_{change\ (1,273)} = 0.29$, $p = .59$); and current impact of exposure to the equation, R^2 change = .006, ($F_{change\ (1,272)} = 2.00$, $p = .16$), failed to result in a statistically significant improvement in the model.

Lack awareness of emotional responses. Using post-deployment lack awareness as a dependent variable; after step 1 with pre-deployment awareness in the equation, $R^2 = .33$, ($F_{inc\ (1,\ 277)} = 135.75$, $p < .001$). In subsequent steps, addition of trauma exposure, R^2 change = .000, ($F_{change\ (1,276)} = 0.00$, $p = .97$); initial impact of exposure, R^2 change = .001, ($F_{change\ (1,275)} = 0.47$, $p = .49$); and current impact of exposure to the

equation, R^2 change = .000, ($F_{change\,(1,274)}$ = 0.18, p = .67), failed to result in a statistically significant improvement in the model.

Lack Strategies. Using post-deployment lack strategies as a dependent variable; after step 1 with pre-deployment strategies in the equation, R^2 = .11, ($F_{inc\ (1,280)}$ = 35.31, p < .001). In subsequent steps, addition of trauma exposure, R^2 change = .001, ($F_{change\,(1,279)}$ = 0.46, p = .50); initial impact of exposure, R^2 change = .003, ($F_{change\,(1,278)}$ = 0.98, p = .32); and current impact of exposure to the equation, R^2 change = .011, ($F_{change\,(1,277)}$ = 3.63, p = .06), failed to result in a statistically significant improvement in the model.

Clarity of emotional responses. Using post-deployment lack clarity as a dependent variable; after step 1 with pre-deployment clarity in the equation, R^2 = .23, ($F_{inc\ (1,\ 285)}$ = 89.913, p < .001). In subsequent steps, addition of trauma exposure, R^2 change = .009, ($F_{change\,(1,284)}$ = 3.36, p =.07); initial impact of exposure, R^2 change = .009, ($F_{change\,(1,283)}$ = 3.34, p = .07); and current impact of exposure to the equation, R^2 change = .005, ($F_{change\,(1,282)}$ = 1.96, p = .16), failed to result in a statistically significant improvement in the model.

Table 5-6 shows that addition of trauma exposure and reported impact of trauma, did not significantly explain additional variance in post-deployment scores over that explained by pre-deployment scores for any of the difficulties in emotional regulation variables.

Table 5-6

Summary of Multiple Regression Analysis for Impact of Trauma Exposure on Difficulties with Emotional Regulation

Variables	*F*	*B*	*β*	sr^2 (unique)	*R*	R^2	Adj R^2

Non-Acceptance	$F_{(4, 279)} = 8.85$				.336	.108	.104
T1 Non-Acceptance		.388	.327***	.327			
Trauma Exposure		-.022	-.021	-.019			
Trauma Initial Impact		-.071	-.040	-.029			
Trauma Current Impact		.227	.098	.073			
Lack Goal Behaviour	$F_{(4, 280)} = 19.26$				.465	.202	.200
T1 Goals		.505	.458***	.449			
Trauma Exposure		.003	.004	.004			
Trauma Initial Impact		-.033	-.026	-.020			
Trauma Current Impact		.220	.131	.102			
Lack impulse control	$F_{(4, 272)} = 11.39$				.363	.132	.128
T1 Impulsivity		.482	.373***	.371			
Trauma Exposure		.026	.030	.028			
Trauma Initial Impact		-.052	-.036	-.027			
Trauma Current Impact		.212	.115	.086			
Lack Awareness	$F_{(4, 274)} = 33.81$				.575	.330	.321
T1 Awareness		.575	.573***	.572			
Trauma Exposure		-.031	-.026	-.027			
Trauma Initial Impact		.040	.020	.017			
Trauma Current Impact		.075	.030	.026			
Lack Strategies	$F_{(4, 277)} = 10.17$				.358	.128	.115
T1 Strategies		.456	.339***	.338			
Trauma Exposure		-.020	-.018	-.016			
Trauma Initial Impact		-.057	-.031	-.023			
Trauma Current Impact		.370	.153	.114			
Lack Clarity	$F_{(4, 282)} = 24.35$				.507	.257	.246
T1 Clarity		.514	.491***	.491			
Trauma Exposure		.019	.025	.025			
Trauma Initial Impact		.057	.046	.046			
Trauma Current Impact		.167	.102	.102			

* $p < .05$, ** $p < .01$, *** $p < .001$

Summary - Impact of exposure to trauma on variable stability

The results did not provide support for the third hypothesis. Analysis of the results showed that addition of trauma exposure and reported impact of trauma, did not significantly explain additional variance in post-deployment scores over that explained by pre-deployment scores for any of the cognitive or emotional regulation variables. This suggests that these variables are stable, even accounting for the impact of traumatic exposure.

These results suggest that pre-trauma measures of cognitions and emotional regulation may be useful in contributing to the prediction of post-trauma adjustment, even accounting for the impact of exposure to traumatic events. The next stage of analysis examines the impact of exposure to non-traumatic deployment-related stressors on the stability of the variables across the deployment.

Study 1c: Impact of Deployment-related Stressors on Variable Stability

In addition to exposure to trauma, participants were exposed to a range of non-traumatic deployment-related stressors during the deployment. Table 5-7 reports both the mean level of stress and the percentage of respondents reporting slight stress or higher for each individual stressor, with a comparison group consisting of 8033 Army personnel who deployed during the period Jan 03 to Aug 06.

Stressors are listed in the order they appear on the questionnaire, with the top stressors relating to frustrations with leadership, separation from family and interactions with colleagues. Participants in this sample reported a higher mean level of stress than those in the comparison group, although there was general consistency between the groups with respect to which stressors were perceived to have the most impact.

Table 5-7

Exposure to Deployment-related Stressors

Stressor	Current Sample		Comparison Group[1]	
	Mean	%[2]	Mean	%[2]
Risk of unauthorised discharge (UD) of weapons	1.3	23.7	1.3	20.1
Risk of vehicle accidents	1.5	39.1	1.7	48.5
Living conditions	1.6	47.2	1.4	31.0
Isolation from Australia	1.5	41.3	1.5	37.9
Isolation from other deployed members	1.1	10.7	1.1	7.7
Personal privacy	1.5	39.1	1.4	28.7
Sorting out problems at home	1.8	56.3	1.6	44.8
Boredom	1.6	45.5	1.5	38.5
Living and working with the same people	1.8	55.7	1.6	40.6
Overload of work	1.7	44	1.5	34.6
Periods of high activity then low/no activity	1.5	37.1	1.4	30.2
Health concerns	1.5	33.9	1.3	25.9
Behaviour of others	1.8	57.5	1.7	49.5
Living in a different culture	1.2	18	1.2	15.8
Separation from family and friends	1.8	56.3	1.7	53.5
Threat of danger	1.6	48.2	1.4	26.7
Not getting on with others	1.5	33.7	1.3	23.4
Lack of opposite sex company	1.7	45.5	1.5	33.1
Language barriers	1.3	33.7	1.3	23.6
Sorting out disagreements with others	1.5	34.8	1.4	27.3
Frustration generally	1.8	54.5	1.6	44.0
Thinking about returning home	1.5	35.7	1.4	32.8
The overseas organisation (e.g. UN, MFO)	1.2	13.9	1.3	18.0
Your role in the country	1.5	32.8	1.3	19.6
Completing deployment's objectives	1.3	23	1.3	20.4
ADF's lack of concern with deployed troops	1.5	32.9	1.4	26.8
The Australian military hierarchy	2.1	58.7	1.8	46.1
Leadership	2.2	64	1.8	48.1
The deployment's rules and regulations	1.8	49.1	1.6	39.5

Double standards	2.3	62.7	2.1	57.4
Contact with family/friends	1.5	35.8	1.3	26.6
Taking leave back in Australia	1.2	17.5	1.3	16.9
Taking leave other than in Australia	1.1	8.4	1.1	4.5
Mail service	1.2	12.5	1.3	23.6
Working with military of other countries	1.3	21.2	1.2	15.4
Length of deployment	1.3	24.9	1.3	20.9
Total (Mean)	1.54	37.53	1.44	30.67

Notes:

1. Comparison Group consisting of Army personnel who deployed during the period Jan 03 to Aug 06, N = 8033 (Twomey, 2007).

2. Mean percentage of respondents reporting "Slight Stress" or higher.

Impact of deployment-related stressors on stability of self and world beliefs.

The fourth hypothesis predicted that cognitions would become more negative, and capacity for emotional regulation would deteriorate, associated with the impact of exposure to deployment related stressors. Sequential regression analysis was used to determine whether addition of deployment stressors moderates the relationship between T1 and T2 scores for benevolence of the world, meaningfulness of the world and self-worth.

Benevolence of the World. Using T2 benevolence as a dependent variable, after step 1 with T1 benevolence in the equation, $R^2 = .32$, ($F_{inc\ (1,\ 297)} = 139.19$, $p < .001$). In step 2, addition of deployment-related stressors resulted in a small but statistically significant improvement in the model, R^2 change = .011, ($F_{change\ (1,296)} = 4.65$, $p < .05$).

Meaningfulness of the World. Using T2 meaningfulness as a dependent variable, after step 1 with T1 meaningfulness in the equation, $R^2 = .20$, ($F_{inc\ (1,\ 297)} = 74.71$, $p < .001$). In step 2, addition of deployment-related stressors failed to result in a

statistically significant improvement in the model, R^2 change = .000, ($F_{change\,(1,296)}$ = 0.14, p = .71).

Self-worth. Using T2 self-worth as a dependent variable, after step 1 with T1 self-worth in the equation, R^2 = .18, ($F_{inc\,(1,296)}$ = 68.71, p < .001). In step 2, addition of deployment-related stressors failed to result in a statistically significant improvement in the model, R^2 change = .001, ($F_{change\,(295)}$ = 0.45, p = .50).

The results provide partial support for the hypothesis, showing that deployment related stressors did not moderate the relationship between T1 and T2 scores for meaningfulness and self-worth, but did for benevolence. Regression statistics for the final equations are displayed in Table 5-8.

Table 5-8

Summary of Multiple Regression Analysis for Impact of Deployment-related Stressors on World and Self Beliefs

Variables	F	B	β	sr^2 (unique)	R	R^2	Adj R^2
Benevolence	$F_{(2,296)}$ = 72.78				.574	.330	.325
T1 Benevolence		.657	.555***	.565			
Deployment-related Stressors		-.041	-.103*	-.124			
Meaningfulness	$F_{(2,296)}$ = 37.32				.449	.201	.196
T1 Meaningfulness		.475	.451***	.448			
Deployment-related Stressors		.008	.020	.022			
Self Worth	$F_{(2,295)}$ = 34.51				.435	.190	.184
T1 Self Worth		.509	.430***	.429			
Deployment-related Stressors		-.018	-.035	-.039			

* p < .05, ** p < .01, *** p < .001

Impact of deployment-related stressors on stability of attribution style.

Sequential regression analysis was used to determine whether addition of deployment-related stressors moderates the relationship between T1 and T2 scores for attribution style. Regression statistics are displayed in Table 5-9.

Table 5-9

Summary of Multiple Regression Analysis for Impact of Deployment Related Stress on Attribution Style

Variables	F	B	β	sr^2 (unique)	R	R^2	Adj R^2
Locus	$F_{(2, 128)} = 14.12$				.425	.181	.168
T1 Locus		.475	.421***	.422			
Deployment-related Stressors		.045	.054	.059			
Generalisability	$F_{(2, 115)} = 20.92$				.517	.267	.254
T1 Generalisability		.529	.499***	.494			
Deployment-related Stressors		.056	.064	.072			
Stability	$F_{(2, 120)} = 10.91$				.392	.154	.140
T1 Stability		.466	.369***	.367			
Deployment-related Stressors		.074	.080	.085			

* $p < .05$, ** $p < .01$, *** $p < .001$

Locus of attribution. Using T2 locus as a dependent variable; after step 1 with T1 locus in the equation, $R^2 = .18$, ($F_{\text{inc }(1, 129)} = 27.91$, $p < .001$). In step 2, addition of deployment-related stressors failed to result in a statistically significant improvement in the model, R^2 change = .003, ($F_{\text{change }(1,128)} = 0.45, p = .50$).

Generalisability of attribution. Using T2 generalisability as a dependent variable; after step 1 with T1 generalisability in the equation, $R^2 = .26$, ($F_{\text{inc }(1, 116)} = 41.38, p < .001$). In step 2, addition of deployment-related stressors failed to result in a statistically significant improvement in the model, R^2 change = .004, ($F_{\text{change }(1,115)} = 0.61, p = .45$).

Stability of attribution. Using T2 stability as a dependent variable; after step 1 with T1 stability in the equation, $R^2 = .15$, ($F_{inc\ (1,\ 121)} = 20.95$, $p < .001$). In step 2, addition of deployment-related stressors failed to result in a statistically significant improvement in the model, R^2 change = .006, ($F_{change\ (1,120)} = 0.88$, $p = .35$).

The results did not support the hypothesis showing that deployment-related stressors did not moderate the relationship between T1 and T2 scores for any of the attribution variables.

Impact of deployment-related stressors on stability of emotional regulation.

Sequential regression analysis was used to determine whether addition of deployment stress moderates the relationship between T1 and T2 scores for difficulties with emotional regulation.

Non-acceptance of emotional responses. Using T2 non-acceptance as a dependent variable; after step 1 with T1 non-acceptance in the equation, $R^2 = .09$, ($F_{inc\ (1, 299)} = 30.02$, $p < .001$). In step 2, addition of deployment-related stressors resulted in a statistically significant improvement in the model, R^2 change = .034, ($F_{change\ (1,298)} = 11.57$, $p = .001$).

Lack goal behaviour. Using T2 goals as a dependent variable; after step 1 with T1 goals in the equation, $R^2 = .22$, ($F_{inc\ (1,\ 300)} = 82.63$, $p < .001$). In step 2, addition of deployment-related stressors resulted in a statistically significant improvement in the model, R^2 change = .044, ($F_{change\ (1,299)} = 17.64$, $p < .001$).

Impulsivity. Using T2 impulsivity as a dependent variable; after step 1 with T1 impulsivity in the equation, $R^2 = .13$, ($F_{inc\ (1,\ 291)} = 44.54$, $p < .001$). In step 2, addition of deployment-related stressors resulted in a statistically significant improvement in the model, R^2 change = .053, ($F_{change\ (1,290)} = 18.79$, $p < .001$).

Awareness of emotional responses. Using T2 lack awareness as a dependent variable; after step 1 with T1 lack awareness in the equation, $R^2 = .33$, ($F_{inc\ (1,\ 293)} = 140.84, p < .001$). In step 2, addition of deployment-related stressors failed to result in a statistically significant improvement in the model, R^2 change = .004, ($F_{change\ (1,292)} = 1.64, p = .20$).

Strategies. Using T2 lack strategies as a dependent variable; after step 1 with T1 lack strategies in the equation, $R^2 = .11$, ($F_{inc\ (1,\ 296)} = 37.57, p < .001$). In step 2, addition of deployment-related stressors resulted in a statistically significant improvement in the model, R^2 change = .052, ($F_{change\ (1,295)} = 18.26, p < .001$).

Clarity of emotional responses. Using T2 lack clarity as a dependent variable; after step 1 with T1 lack clarity in the equation, $R^2 = .27$, ($F_{inc\ (1,\ 300)} = 113.12, p < .001$). In step 2, addition of deployment-related stressors resulted in a statistically significant improvement in the model, R^2 change = .062, ($F_{change\ (1,299)} = 27.96, p < .001$).

Table 5-10 shows that the results provided partial support for the hypothesis. Addition of deployment stress resulted in statistically significant change to the regression equations for five of the six difficulties in emotional regulation variables. This suggests that emotional response is influenced by exposure to deployment-related stressors.

Table 5-10

Summary of Multiple Regression Analysis for Impact of Deployment Related Stress on Emotional Regulation

Variables	*F*	*B*	*β*	sr^2 (unique)	*R*	R^2	Adj R^2
Non-Acceptance	$F_{(2, 298)} = 21.33$				.354	.125	.119
T1 Non-Acceptance		.290	.265***	.268			
Deployment-related Stressors		.052	.188**	.193			
Goals	$F_{(2, 299)} = 52.43$				.510	.260	.255
T1 Goals		.487	.440***	.450			
Deployment-related Stressors		.044	.210***	.236			
Lack Impulse Control	$F_{(2, 290)} = 33.03$				.431	.186	.180
T1 Impulsivity		.428	.348***	.359			
Deployment-related Stressors		.052	.230***	.247			
Lack Awareness	$F_{(2, 292)} = 71.39$				.573	.328	.324
T1 Awareness		.560	.565***	.566			
Deployment-related Stressors		.019	.062	.075			
Lack Strategies	$F_{(2, 295)} = 29.01$				.405	.164	.159
T1 Strategies		.401	.307***	.316			
Deployment-related Stressors		.068	.229***	.241			
Lack Clarity	$F_{(2, 299)} = 75.62$				.580	.336	.331
T1 Clarity		.504	.493***	.515			
Deployment-related Stressors		.050	.251***	.292			

* $p < .05$, ** $p < .01$, *** $p < .001$

Summary - Impact of exposure to deployment-related stressors on variable stability

It was predicted that cognitions would become more negative, and capacity for emotional regulation would deteriorate, associated with the impact of exposure to deployment-related stressors. The hypothesis was only partially supported, while five of the six emotional regulation variables were affected by deployment-related stressors (non-acceptance of emotional response, lack goal behaviour, lack impulse control, lack

strategies and lack clarity); the cognitive variables (with the exception of benevolence) remained stable, even taking account of deployment-related stressors.

Discussion

Examination of the mean scores showed that there were stronger beliefs about self-worth, than there were for benevolence and meaningfulness. This is consistent with Prager and Solomon's (1995), view that a schema type consisting of a negative view of the world, but a generally positive view of themselves ('the world is a bad place, but I am competent and can cope') is common amongst the military, emergency services and other groups associated with negative environments. Examination of the mean scores also showed that participants reported increased difficulties with respect to awareness of emotional response, than for the other emotional response variables.

Stability of the individual responses

The results of the first sub-study provided partial support for the first hypothesis, with examination of the paired correlations between the T1 and T2 variables revealing moderate to strong relationships. The emotional regulation variables tended to have lower paired correlations than the cognitive variables, noting that higher correlations suggest greater consistency of individual scores across the deployment. This could indicate that the emotion variables are more influenced by situational factors than the cognitive variables.

Stability of the mean scores

Examination of the mean scores between T1 and T2 revealed small changes between the pre-deployment and post-deployment variables, suggesting that as a group, mean scores are quite stable. While there was a statistically significant effect for time for four variables: self-worth, lack impulse control, lack strategies and lack awareness

of emotional responses, the mean differences were quite small. Three variables worsened over the deployment: self-worth, lack impulse control and lack strategies; and one variable, lack awareness, improved, showing a reduction in mean scores.

The next two sections explore the reason for these differences by examining the influence of exposure to trauma, and exposure to non-traumatic deployment-related stressors on the variables in question.

Impact of exposure to trauma on the cognitive and emotional regulation variables

The third hypothesis proposed that cognitions would become more negative, and difficulties with emotional regulation would increase over the deployment, associated with the impact of exposure to trauma. In an attempt to understand what is impacting on the change in self-worth, lack impulse control, lack strategies and lack awareness, regression analysis was employed to control for exposure to, and impact of trauma, both at the time of the event and at the time of reporting. While the Theory of Shattered Assumptions, (Janoff-Bulman, 1985, 1989, 1992) suggests that pre-existing beliefs about the benevolence of the world, the meaningfulness of the world, and the worthiness of the self may be shattered by exposure to trauma, the results did not support this view. Addition of trauma exposure and reported impact of trauma did not significantly explain additional variance in post-deployment scores over that explained by pre-deployment scores for the participants as a group, for any of the observed variables.

According to Foa, Zinbaug and Rothbaum (1992) traumatic experiences fail to be integrated with pre-event frameworks in one of two ways: when the traumatic event violates strongly held pre-existing beliefs; or when repeated exposure to traumatic stimuli creates expectations that danger can occur at any time, and is inescapable. For trained soldiers, it is unlikely that combat related traumatic events 'violate strongly held

pre-existing beliefs', instead, the experiences are more likely to reinforce beliefs about the nature of war. Repeated exposure to combat may, over time, 'create expectations that danger can occur at any time, and is inescapable', but this does not appear to be the case for the participants in this sample where combat incidents tended to consist of relatively infrequent and isolated events.

It was pointed out earlier that Janoff-Bulmann's theory did not specifically take into account the fact that beliefs about the self are culturally bound. While this was discussed in the context of societal cultures that view the world not as benevolent, but perhaps ruled by malevolent and jealous Gods; or where the self is not seen as inherently worthy, but has to earn redemption; it may be possible to apply the same analogy to certain occupational cultures. Jans and Schmidtchen (2002) suggested that there were several sub-cultures within the Army, distinguished by their closeness to the 'fighting' role. These are headquarters, combat forces and support troops. Military organisations are structured and trained for fighting wars, and therefore promote a 'warrior' ethos, "combat virtues and values are stressed as those required of all military men, even though most will never engage in combat" (Funnell, 1980, p.25).

This acculturalisation process underpins the cohesion essential for a military force to succeed in combat, and Australian Defence Force personnel have traditionally held a vocational approach to their profession, demonstrating service before self through a willingness to place operational objectives ahead of personal safety (Falconer, 2005). Within a culture that promotes a vocational, 'warrior' ethos, members may not view a trauma, particularly a trauma for which they have been trained to cope, as 'shattering' their core beliefs about themselves and the world. They may, indeed, view such trauma as a test or challenge of their skills and abilities as soldiers. Given that the majority of participants in this study were combat or combat support personnel, and that combat-

related experiences tended to be relatively isolated events, it is not surprising that exposure to the traumas experienced during the deployment did not have the same impact on the participants as would be expected for people not trained to deal with such experiences, or who do not hold such strong beliefs derived from a 'warrior' ethos.

Impact of deployment-related stressors on the cognitive and emotional regulation variables

The fourth hypothesis proposed that cognitions would become more negative, and difficulties with emotional regulation would increase over the deployment, due to the impact of exposure to non-traumatic deployment-related stressors. Recent US, UK and Australian research and experience from previous deployments indicates that a range of non-traumatic stressors can have a major impact on peri-deployment performance and satisfaction, and post-deployment psychological well-being. The results provided partial support for the fourth hypothesis showing that addition of deployment-related stressors significantly explained additional variance for five of the six emotional regulation variables: non acceptance of emotional response, lack goal behaviour, lack impulse control, lack strategies and lack clarity; as well as for beliefs about benevolence of the world.

Unlike isolated incidents of trauma, day-to-day stressors such as frustration with leadership and organisational processes, separation from family and frustration with colleagues, can have an insidious effect, building over time to create a general sense of frustration. In this study, the stressors that caused the highest levels of stress fell into three main areas: operational concerns, separation related concerns and social concerns. The operational stressors consisted primarily of concerns about leadership, double standards and military hierarchy; the main separation related stressors were being away from family and friends, and sorting out problems at home; and the key social stressors

were living and working with the same people, behaviour of others and lack of opposite sex company.

These findings are consistent with other studies of ADF personnel deployed to Iraq, Afghanistan, East Timor, Bougainville, and the Solomon Islands during the past decade (Bell & Steele, 2005; Deans, 2007; Steele & Twomey, 2006), and recent US studies of Iraq War veterans (e.g. Booth-Kewley et al., 2010). Other research conducted within the Department of Defence has consistently found that the stressors measured in this study are a reliable predictor of poor adjustment at the end of the deployment (Deans, 2007; Nicholson, 2006; Steele & Twomey, 2006; Twomey, 2006, 2007), and the next chapter explores this relationship between stressors and post-deployment adjustment in more detail.

Benefits and limitations of this study

Compared to many studies into psychological attributes, this study used a specific sample of individuals who self-select into a population at increased risk of exposure to traumatic events. These individuals are expected to be able to cope both during, and following, traumatic events, so they can continue to perform their role. While the results from such a sample are not easily generalisable to the wider population, they may be generalisable to similar high-risk groups, such as police, ambulance and other emergency workers, aid workers and health workers, who also self-select into at-risk populations. Due to the close relationship between coping and pathology following exposure to traumatic events, it is important to identify those pre-existing patterns of attributes that influence an individual's coping ability and serve to either protect from, or provide a vulnerability for, post-trauma pathology.

This study has identified two key findings: first, that the variables demonstrate good stability across the deployment; and second, that the variance that did emerge

appeared to be explained by the impact of non-traumatic deployment-related stressors, rather than by exposure to traumatic events. This is thought to suggest that participants were better able to cope with the impact of isolated traumatic events than with the cumulative effect of day-to-day stressors, suggesting that the ability to find context, or meaning, is important in providing stability to cognitive and emotional variables.

These results are important as they demonstrate the stability of cognitions and emotional regulation, even accounting for the impact of traumatic exposure. This suggests that pre-trauma measures of cognitions and emotional regulation may be useful in contributing to the prediction of post-trauma adjustment. While this study did not explore the relationship between the pre-existing variables and post-deployment pathology, the next chapter seeks to identify the degree that pre-existing characteristics can be used to predict post-trauma adjustment, by exploring the relationship between the pre-existing cognitive and emotional regulation variables, and post-traumatic stress and psychological distress measured at the end of the deployment.

CHAPTER 6

STUDY 2: PREDICTION OF POST-DEPLOYMENT ADJUSTMENT

The previous chapter explored the degree that the pre-deployment cognitive and emotional regulation variables are stable across the deployment, taking account of the impact of exposure to trauma and non-traumatic deployment-related stressors. This chapter addresses the second research question, and seeks to describe the relationship between these vulnerabilities and post-deployment post-traumatic stress and psychological distress, to identify the degree that pre-existing cognitive appraisals and capacity for emotional regulation predict adjustment measured following exposure to trauma.

Cognitive Vulnerabilities and Post-Trauma Adjustment

Research into the relationship between PTSD and self and world beliefs has found that people exposed to traumatic events perceived themselves more negatively, perceived people and the world as less benevolent, and perceived events as less meaningful, than people who had not been exposed to a trauma, and that these perceptions are associated with higher levels of PTSD symptomatology (Dekel, et al., 2004; Dunmore, et al., 1999; Foa, et al., 1999; Janoff-Bulman, 1989; Magwaza, 1999; Solomon, et al., 1997; Weiner, 1985a). A number of theoretical models support this research. Janoff-Bulman believed that exposure to trauma 'shatters' positive world and self beliefs, Foa et al., suggested that it is the rigidity with which these beliefs are held which contributes to pathology, rather than whether they are predominantly negative or positive, and Dalgleish proposed that poor post-trauma adjustment is related to either 'over-valued', or overly negative pre-trauma schemas.

In addition to self and world beliefs, beliefs around causation have also been shown to be linked to post-trauma adjustment. A negative attribution style, which consists of internal (causation attributed to self), stable (persistent across time), and global (extending to many situations) attributions, serves as a cognitive vulnerability to mental health problems in general (Abramson, et al., 1989; Alloy, et al., 1988; Joseph, 1999; Joseph, et al., 1993b; Massad & Hulsey, 2006), and the severity of PTSD (Gray, et al., 2003; Joseph, Brewin, Yule, & Williams, 1991). Some studies, however (e.g. Mikulincer & Solomon, 1988) have found that attribution to *external*, stable and global causes is related to an increase in PTSD symptoms; while others have found that the stability and global dimensions are associated with PTSD symptoms, while the locus (internal vs external) dimension is not (e.g. Gray & Lombardo, 2004; Wenniger & Ehlers, 1998). Many of these studies however, are focussed on post-trauma attributions, rather than pre-existing attributional style.

Emotional Response and Post-Trauma Adjustment

Another major aspect of the presentation of PTSD is a concern about feeling out of control or unable to regulate of one's emotions, usually in relation to trauma reminders or recollections (Price, et al., 2006). Gratz and Roemer (2004) conceptualise emotional regulation as involving a number of elements. These include the awareness and understanding of emotions, acceptance of emotional response, the ability to control impulsive behaviours and to behave in accordance with desired goals when experiencing negative emotions, and the flexibility to use situationally appropriate emotion regulation strategies to modulate emotional responses. Deficits in emotional regulation have been shown to predict maladaptive coping following a trauma (Cloitre, et al., 2005; Price, et al., 2006), and research has shown that adaptive emotional regulation involves flexibility in the use of emotion regulation strategies, as well as

being able to alter the intensity or duration of emotions, rather than changing the actual emotion being experienced (Cole, et al., 1994; Thompson, 1994). The previous chapter showed that capacity for emotional regulation appears to be affected by exposure to a range of non-traumatic, deployment-related stressors and so this chapter also seeks to better understand the impact of these stressors on prediction of post-deployment adjustment.

Deployment-Related Stressors

It is not only exposure to traumatic events that causes problems with adjustment in military personnel during and following operational deployment. Increasingly, research into the impact of operational deployments on post-deployment adjustment shows that in addition to combat related trauma, there are a range of deployment-related and environmental stressors that are common to operational service, and that cause distress to returning service personnel (Cotton, 2001; Engelhard et al., 2007; Jones, et al., 2002; King, King, Vogt, Knight, & Samper, 2006; Taylor, 2004; Vogt, Samper, King, King, & Martin, 2008; Vogt & Tanner, 2007). These stressors include separation from family and friends, interpersonal and cultural differences, a difficult living and working environment, preparedness for deployment and the duration of the operation. In addition, recent research by Australian Department of Defence psychologists has found that key stressors, including 'double standards' and 'leadership', in addition to separation from family related stressors, were reported most often by ADF personnel following operations in Afghanistan and Iraq between 2002 and 2006 (Bell & Steele, 2005; Benassi, 2008; Steele & Twomey, 2006).

Based on the findings of the first study that deployment-related stressors appeared to influence the stability of a number of the pre-existing vulnerability

variables, it was decided to further explore the role of these stressors, in predicting post-deployment adjustment in addition to trauma.

In summary, post-trauma adjustment has been shown to be related in part to individual differences in beliefs, appraisals and emotional capacity, and the impact of deployment-related stressors, in addition to exposure to traumatic events. This study examines the degree that pre-existing self and world beliefs, attribution style, and emotional regulation are able to predict both severity and clinical levels of post-traumatic stress and psychological distress, taking account of exposure to trauma and deployment-related stressors, and controlling for previous operational experiences and pre-deployment levels of psychological distress.

Hypotheses

There were three hypotheses: first; that higher levels of exposure to traumatic events and deployment-related stressors would be associated with higher levels of post-traumatic stress and psychological distress at T2.

Second; the T1 cognitive and emotional variables would contribute to prediction of poor adjustment at T2, controlling for T1 psychological distress and previous operational experience, and accounting for exposure to trauma and deployment-related stressors.

Third; the T1 cognitive and emotional variables would contribute to prediction of participants falling above or below clinical cut-off levels for post-traumatic stress and psychological distress at T2, controlling for T1 psychological distress and previous operational experience, and accounting for exposure to trauma and deployment-related stressors.

Method

Participants

Participants were Australian Defence Force Personnel who completed six month active duty deployments to Afghanistan and Iraq during 2008. Data collection was conducted both prior to and at the end of the deployment, and consisted of pre-deployment measures of the cognitive and emotional predictors, psychological distress and previous operational experience; and post-deployment measures of exposure to trauma and deployment-related stressors, post-traumatic stress and psychological distress.

Variables.

Demographic factors. Demographic items were measured using questions to determine the participant's age, gender, seniority, length of service and previous operational service.

Self and world beliefs. Self and world beliefs were measured using the World Assumption Scale (WAS) (Janoff-Bulman, 1989), which measures beliefs regarding benevolence of the world, meaningfulness of the world, and self-worth. Reliabilities were reported in Chapter 4 and were comparable with the pattern of findings described in the literature.

Emotional regulation. Capacity for emotional regulation was measured using the 36-item Difficulties in Emotion Regulation Scale (DERS), which assesses modulation of emotional arousal, awareness, understanding, and acceptance of emotions, and the ability to act in desired ways regardless of emotional state. Reliabilities were reported in Chapter 4 and were comparable with the pattern of findings described in the literature.

Attribution Style. Attribution Style was measured using the Attributional Style Questionnaire – General Use (ASQ-G.), which measures locus of control, stability and generalisability of attributions (Dykema, et al., 1996). Reliabilities were reported in Chapter 4 and were comparable with the pattern of findings described in the literature.

Trauma exposure. Exposure to traumatic events during the deployment was measured using the Traumatic Stress Exposure Scale – Revised (TSES-R) (Hodson, 2002; Swann & Hodson, 2004). The degree of exposure to traumatic events reported by participants was reported in Chapter 5.

Deployment-related stressors. The Major Stressors Inventory (MSI) was used to rate the level of stress caused by a list of 36 stressors that cover a range of issues including the behaviour of others, impact of separation from family and friends, quality of leadership, exposure to a foreign culture, and lack of personal privacy. The level of stress reported by participants that was caused by exposure to deployment-related stressors was reported in Chapter 5.

Post-traumatic Stress. PTSD symptomatology was measured using the Posttraumatic Stress Disorder Checklist – Civilian (PCL-C) (Weathers, et al., 1993), which asks respondents to indicate how much they have been bothered by a list of 17 symptoms over the previous month. Clinical cut-off levels were applied in accordance with current Defence guidelines as reported in Chapter 4.

Psychological distress. Post-deployment psychological distress was measured using the Kessler Psychological Distress Scale (K-10) (Kessler, et al., 2002). Clinical cut-off levels were applied in accordance with current Defence guidelines as reported in Chapter 4.

Results

Data analysis was conducted in three stages using SPSS v16. During the first stage, Pearson correlations were examined to determine the relationships between trauma exposure, deployment-related stressors, psychological distress and post-traumatic stress. This sought to test the first hypothesis that higher levels of exposure to traumatic events and deployment-related stressors would be associated with higher levels of post-traumatic stress and psychological distress at the end of the deployment. Then, Pearson correlations between the T1 cognitive and emotional predictor variables, and T2 post-traumatic stress and psychological distress, were examined to determine whether these relationships were consistent with those expected from the literature.

During the second stage of analysis, hierarchical linear regression was used to determine prediction models for severity of T2 post-traumatic stress and psychological distress. This sought to test the hypothesis that the T1 cognitive and emotional variables would contribute to prediction of poor adjustment at T2, accounting for T1 psychological distress, previous operational experience and exposure to trauma and deployment-related stressors. Hierarchical regression involves entering the predictor variables in blocks to enable the effects of previously entered variables to be controlled for. In this analysis, T1 psychological distress and previous operational experience were entered first to account for pre-existing pathology and experience, then exposure to trauma and deployment-related stressors were added to establish a baseline equation. The cognitive and emotional regulation variables were added to the equation in the final step to determine whether these explained additional variance in pathology above that explained by the previous factors.

In the third stage, hierarchical binomial logistic regression was used to test the third hypothesis that the T1 cognitive and emotional predictors would predict

participants falling above and below clinical cut-off levels for T2 post-traumatic stress and psychological distress, controlling for pre-existing psychological distress, previous operational experience and exposure to trauma and deployment-related stressors. Prediction of above/below cut-off has clinical applications, providing an indication of the predicted prevalence of a disorder within a given population. T1 psychological distress and previous operational experience were entered first to account for pre-existing pathology and experience, then exposure to trauma and deployment stressors were added to establish a baseline equation. The cognitive and emotional regulation variables were added to the equation in the final step to determine whether these improved the prediction model above that explained by the previous factors.

Study 2a: Relationships between the Predictor Variables and T2 Pathology

The first hypothesis proposed that higher levels of exposure to traumatic events and deployment-related stressors would be associated with higher levels of post-traumatic stress and psychological distress at the end of the deployment. This section reports the Bivariate relationships between trauma exposure, deployment-related stressors, the T1 cognitive and emotional regulation variables, and T2 post-traumatic stress and psychological distress.

Trauma Exposure, Deployment Stressors and Psychopathology

Table 6-1 details the Pearson correlations between T1 psychological distress, previous operational experience, trauma exposure, deployment-related stressors, T2 post-traumatic stress and psychological distress. Examination of the correlations provides support for the hypothesis revealing that both deployment-related stressors and exposure to traumatic events were positively correlated with T2 psychopathology. It should be noted that deployment-related stressors had stronger correlations with both psychological distress and post-traumatic stress than did trauma exposure.

Table 6-1

Summary of Pearson Correlations between T1 Psychological Distress, Previous Operational Experience, Trauma Exposure, Deployment-related Stressors and T2 Psychopathology

	1	2	3	4	5	6
1. T1 Psych Distress	1.000					
2. Previous Operational Experience	-.034	1.000				
3. Trauma Exposure	.014	.243***	1.000			
4. Deployment-related Stressors	.200***	.063	.329***	1.000		
5. T2 Psych Distress	.271***	.022	.236***	.618***	1.000	
6. T2 Post-Traumatic Stress	.169**	.091*	.364***	.602***	.700***	1.000

* $p < .05$, ** $p < .01$, *** $p < .001$

While the results provide support for the first hypothesis, they suggest that post-traumatic stress and psychological distress were less associated with traumatic exposure than with the organisational and day-to-day stressors that were encountered. It was suggested earlier that traumatic events that occur in context, and are expected, are less likely to cause a pathological response than events that occur out of context or are unexpected. The results appear to support this suggestion.

T1 Cognitive and Emotional Variables and Psychopathology

Table 6-2 details the Pearson correlations between the T1 cognitive and emotional variables, T1 psychological distress, previous operational experience, and T2 psychological distress and post-traumatic stress. Examination of the correlations reveals that the data did not violate the assumptions of multi-collinearity and were largely in the direction expected from the literature.

Self and world beliefs. The negative correlations between self and world beliefs and psychopathology were in the direction expected, demonstrating that negative beliefs were associated with higher psychopathology. Benevolence covaried negatively with both psychological distress and post-traumatic stress, while self-worth only covaried significantly with psychological distress. The correlations between meaningfulness and both psychological distress and post-traumatic stress, although non-significant, were in the direction expected.

Emotional Regulation. The positive correlations between the emotional regulation variables and pathology were in the direction expected, suggesting that increased difficulties with emotional regulation were associated with higher psychopathology. Four of the six emotional regulation variables covaried significantly with psychological distress, and the remaining two, although non-significant, covaried in the direction expected. Although only one of the emotion variables, non-acceptance of emotional response, covaried significantly with post-traumatic stress, four of the remaining five were in the direction expected.

Attribution. As predicted by the literature, an internal, stable and global attribution style was associated with increased psychopathology, although only stability was significantly correlated with both psychological distress and post-traumatic stress. While generalisability was only significantly correlated with post-traumatic stress, the direction of the remaining relationships was as expected.

Table 6-2

Summary of Bivariate Correlations between T1 Psychological Distress, Previous Operational Experience, T1 Cognitive and Emotional Regulation Variables and T2 Psychopathology

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Benevolence	1.000														
2. Meaningfulness	.210***	1.000													
3. Self-Worth	.454***	.211***	1.000												
4. Non Acceptance	-.191***	.020	-.308***	1.000											
5. Lack Goal Behaviour	-.136**	-.043	-.303***	.521***	1.000										
6. Lack Impulse Control	-.214***	-.047	-.344***	.493***	.563***	1.000									
7. Lack Awareness	-.242***	-.101*	-.307***	.134***	.139***	.229***	1.000								
8. Lack Strategies	-.255***	-.034	-.378***	.650***	.663***	.663***	.226***	1.000							
9. Lack Clarity	-.224***	-.126**	-.380***	.386***	.431***	.433***	.587***	.524***	1.000						
10. Locus	-.053	.031	.022	.084	.062	.013	-.073	.027	-.015	1.000					
11. Stability	-.056	-.061	-.090	.117	.113	.021	.007	.037	.051	.317***	1.000				
12. Generalisability	-.059	-.011	-.124*	.116	.184**	.042	.050	.116	.082	.278***	.675***	1.000			
13.T1 Psych Distress	-.218***	-.094*	-.279***	.386***	.388***	.364***	.194***	.479***	.352***	.006	-.043	.159*	1.000		
14. Prev Op Exp	.031	.009	.111*	-.032	-.113*	-.066	-.108*	-.089	-.125*	-.037	.033	-.048	-.034	1.000	
15.T2 Psych Distress	-.121*	-.081	-.150**	.177***	.156**	.118*	.081	.113*	.076	.113	.197**	210**	.271***	..022	1.000
16. T2 PTSD	-.130**	-.032	-.049	.127**	.039	.040	.032	.052	-.048	.054	.141*	.119	169**	.091*	.700***

* $p < .05$, ** $p < .01$, *** $p < .001$

Study 2b: Prediction of Severity of T2 Pathology

Hierarchical linear multiple regression was used to test the second hypothesis that the T1 cognitive and emotional variables would predict poor adjustment at T2, accounting for T1 psychological distress, previous operational experience, and exposure to trauma and deployment-related stressors. Based on the finding reported in the previous chapter that deployment-related stressors influenced the mean scores between T1 and T2 for a number of the variables, it was anticipated that these stressors would influence prediction of post-deployment pathology. The regression analysis was therefore conducted in two stages to isolate the impact of deployment-related stressors. The first model was developed controlling for T1 psychological distress, previous operational experience and exposure to trauma; then a second regression model was developed controlling for deployment-related stressors in addition to these variables.

Prediction of severity of Post-traumatic Stress

Regression model for prediction of T2 Post-traumatic Stress controlling for exposure to trauma. A hierarchical linear regression was performed to determine whether T1 cognitive and emotional variables would contribute to prediction of severity of T2 post-traumatic stress, controlling for T1 psychological distress, previous operational experience and exposure to trauma.

Using T2 post-traumatic stress as a dependent variable, after step 1 with T1 psychological distress and previous operational experience in the equation, $R = .206$, $R^2 = .043$, ($F_{inc\ (2,\ 197)} = 4.32$, $p < .05$), only T1 psychological distress ($sr^2 = .206$) was significant. In step 2, exposure to trauma was added to the equation, R^2 change = .174, ($F_{change\,(1,196)} = 43.65$, $p < .001$), in addition to T1 psychological distress ($sr^2 = .189$), trauma exposure ($sr^2 = .418$) was significant. In step 3, the T1 cognitive and emotional predictors were added to the equation, R^2 change = .064, ($F_{change\,(12,184)} = 1.37$, $p = .18$).

Table 6-3

Hierarchical Regression Analysis for Prediction of Severity of T2 PTSD using T1Variables as Predictors, Controlling for T1 Psych Distress, Previous Operational Experience and Exposure to Trauma

Variables	F	B	β	sr^2 (unique)	R	R^2	Adj R^2
Step 1	$F_{(2, 197)} = 4.382$				.206	.043	.033
T1 Psychological Distress		.402	.207**	.206			
Previous Operational Experience		.026	.004	.004			
Step 2	$F_{(3, 196)} = 18.104$				.466	.217	.205
T1 Psychological Distress		.369	.189**	.189		($R^2\Delta = .174$***)	
Previous Operational Experience		-.677	-.105	-.102			
Trauma Exposure		.722	.432***	.418			
Step 3	$F_{(15\ 184)} = 4.799$				.530	.281	.223
T1 Psychological Distress		.406	.209**	.172		($R^2\Delta = .064$)	
Previous Operational Experience		-.921	-.143*	-.135			
Trauma Exposure		.701	.419***	.390			
Benevolence		-.258	-.195**	-.167			
Meaningfulness		.041	.036	.032			
Self-Worth		.089	.085	.067			
Locus		-.013	-.021	-.019			
Stability		.072	.118	.084			
Generalisability		.008	.014	.010			
Non Acceptance		.214	.106	.073			
Lack Goal Behaviour		.129	.051	.036			
Lack Impulse Control		.157	.056	.041			
Lack Awareness		-.018	-.012	-.009			
Lack Strategies		-.410	-.204	-.120			
Lack Clarity		-.255	-.104	-.071			

* $p < .05$, ** $p < .01$, *** $p < .001$

As shown in Table 6-3, there were four significant variables in the final equation, T1 psychological distress (sr^2 = .172), previous operational experience (sr^2 = -.135), trauma exposure (sr^2 =.390) and benevolence (sr^2 = -.167).

Regression model for prediction of T2 Post-traumatic Stress controlling for exposure to trauma and deployment-related stressors. A second hierarchical linear regression was performed to determine whether T1 cognitive and emotional variables would contribute to prediction of severity of T2 post-traumatic stress, controlling for T1 psychological distress, previous operational experience, exposure to trauma and exposure to deployment-related stressors.

Using T2 post-traumatic stress as a dependent variable, after step 1 with T1 psychological distress and previous operational experience in the equation, R = .203, R^2 = .042, ($F_{inc\ (2,\ 193)}$ = 4.128, $p < .05$), only T1 psychological distress (sr^2 = .202) was significant. In step 2, exposure to trauma and deployment-related stressors were added to the equation, R^2 change = .370, ($F_{change\ (2,191)}$ = 60.011, $p < .001$), T1 psychological distress became non-significant, while trauma exposure (sr^2 =.222) and deployment-related stressors (sr^2 =.443), were significant. In step 3, the T1 cognitive and emotional predictors were added to the equation, R^2 change = .053, ($F_{change\ (12,179)}$ = 1.466, p = .14).

As shown in Table 6-4, there were four significant variables in the final equation, trauma exposure (sr^2 =.194), deployment-related stressors (sr^2 =.429), benevolence (sr^2 = -.137) and lack strategies (sr^2 = -.113), although lack clarity (sr^2 = -.106), and T1 psychological distress (sr^2 = .106) approached significance with p = .053.

Table 6-4

Hierarchical Regression Analysis for Prediction of Severity of T2 PTSD using T1 Variables as Predictors, Controlling for T1 Psychological Distress, Previous Operational Experience, Exposure to Trauma and Deployment-Related Stressors

Variables	F	B	β	sr^2 (unique)	R	R^2	Adj R^2
Step 1	$F_{(2, 193)} = 4.128$				.203	.041	.031
T1 Psychological Distress		.395	.203*	.202			
Previous Operational Experience		.014	.002	.002			
Step 2	$F_{(3, 191)} = 33.331$				.641	.411	.399
T1 Psychological Distress		.147	.075	.073		($R^2\Delta = .370$***)	
Previous Operational Experience		-.402	-.062	-.060			
Trauma Exposure		.414	.247***	.222			
Deployment-related Stressors		.203	.492***	.443			
Step 3	$F_{(6, 179)} = 9.676$				.681	.464	.416
T1 Psychological Distress		.255	.130#	.106		($R^2\Delta = .053$)	
Previous Operational Experience		-.626	-.097	-.091			
Trauma Exposure		.379	.226***	.194			
Deployment-related Stressors		.203	.492***	.429			
Benevolence		-.213	-.160*	-.137			
Meaningfulness		.046	.040	.036			
Self-Worth		.090	.085	.067			
Locus		-.011	-.017	-.016			
Stability		.032	.051	.037			
Generalisability		-.004	-.006	-.004			
Non Acceptance		.203	.100	.069			
Lack Goal Behaviour		.187	.074	.051			
Lack Impulse Control		.006	.002	.002			
Lack Awareness		.057	.039	.029			
Lack Strategies		-.388	-.193*	-.113			
Lack Clarity		-.385	-.158#	-.106			

* $p < .05$, ** $p < .01$, *** $p < .001$, # $p = .053$

Summary, prediction of severity of Post-traumatic Stress. It was hypothesised that T1 cognitive and emotional predictors would contribute to prediction of severity of T2 post-traumatic stress accounting for T1 psychological distress, previous experience, and exposure to trauma and deployment-related stressors. The results provide partial support for the hypothesis, showing that benevolence emerged as a consistent predictor of T2 post-traumatic stress, appearing in both models. The results also highlight the significant contribution of deployment-related stressors as a predictor for post-traumatic stress, and previous operational experience as a protective factor. In the first model, exposure to trauma (sr^2 = .39) was the most significant contributor to variance in post-traumatic stress, explaining 15.36% of the total variance. In the second model however, deployment-related stressors emerged as the most significant variable (sr^2 = .429), explaining 18.4% of the variance, while trauma exposure (sr^2 = .194) only explained an additional 3.76% of the variance. The direction of the relationship for benevolence suggests that this acts as a protective factor against post-traumatic stress symptoms.

Prediction of severity of Psychological Distress

Regression model for the prediction of T2 Psychological Distress controlling for exposure to trauma. A hierarchical linear regression was performed to determine whether T1 cognitive and emotional variables would contribute to prediction of severity of T2 psychological distress, controlling for T1 psychological distress, previous operational experience and exposure to trauma.

Using T2 psychological distress as a dependent variable, after step 1 with T1 psychological distress and previous operational experience in the equation, R = .263, R^2 = .069, ($F_{\text{inc}\,(2,\,200)}$ = 7.403, p = .001), only T1 psychological distress (sr^2 =.256) was significant. In step 2, trauma exposure was added to the equation, R^2 change = .054, ($F_{\text{change}\,(1,199)}$ = 12.179, p = .001), in addition to T1 psychological distress (sr^2 =.247),

trauma exposure (sr^2 =.232) was significant. In step 3, the T1 cognitive and emotional predictors were added, R^2 change = .088, ($F_{change\,(12,\,187)} = 1.744$, $p = .06$).

Table 6-5

Hierarchical Regression Analysis for Prediction of Severity of T2 Psychological Distress using T1 Variables as Predictors, Controlling for Exposure to Trauma

Variables	F	B	β	sr^2 (unique)	R	R^2	Adj R^2
Step 1	$F_{(2,\,200)} = 7.403$				.263	.069	.060
T1 Psychological Distress		.294	.257***	.256			
Previous Operational Experience		-.163	-.044	-.044			
Step 2	$F_{(3,\,199)} = 9.271$				.350	.123	.109
T1 Psychological Distress		.284	.247***	.247		($R^2\Delta = .054$**)	
Previous Operational Experience		-.354	-.096	-.093			
Trauma Exposure		.233	.238**	.232			
Step 3	$F_{(15,\,187)} = 3.33$				.459	.211	.148
T1 Psychological Distress		.229	.199*	.165		($R^2\Delta = .088$)	
Previous Operational Experience		-.452	-.122	-.116			
Trauma Exposure		.243	.248***	.233			
Benevolence		-.006	-.008	-.007			
Meaningfulness		-.043	-.065	-.059			
Self-Worth		-.019	-.030	-.024			
Locus		.006	.017	.016			
Stability		.062	.175	.125			
Generalisability		.008	.024	.017			
Non Acceptance		.244	.206*	.142			
Lack Goal Behaviour		.083	.057	.039			
Lack Impulse Control		.137	.083	.061			
Lack Awareness		-.035	-.041	-.031			
Lack Strategies		-.303	-.257*	-.152			
Lack Clarity		-.050	-.035	-.024			

* $p < .05$, ** $p < .01$, *** $p < .001$

As shown in Table 6-5, there were four significant variables in the final equation, T1 psychological distress (sr^2 =.165), trauma exposure (sr^2 =.233), non-acceptance (sr^2 = .142), and lack strategies (sr^2 = -.152).

Regression model for the prediction of T2 Psychological Distress controlling for exposure to trauma and deployment-related stressors. A second hierarchical linear regression was performed to determine whether T1 cognitive and emotional variables would contribute to prediction of severity of psychological distress at the end of the deployment, controlling for T1 psychological distress, previous operational experience, exposure to trauma and exposure to deployment-related stressors.

Using T2 psychological distress as a dependent variable, after step 1 with T1 psychological distress and previous operational experience in the equation, R = .264, R^2 = .070, ($F_{inc\ (2,\ 193)}$ = 7.125, p = .001), only T1 psychological distress (sr^2 =.258) was significant. In step 2, exposure to trauma and deployment-related stressors were added to the equation, R^2 change = .283, ($F_{change\ (2,191)}$ = 41.701, $p < .001$), in addition to T1 psychological distress (sr^2 =.123), deployment-related stressors (sr^2 =.482) was significant, trauma exposure was not significant. In step 3, the T1 cognitive and emotional predictors were added to the equation, R^2 change = .067, ($F_{change\ (12,176)}$ = 1.721, p = .06).

As shown in Table 6-6, there were three significant variables in the final equation, deployment-related stressors (sr^2 =.446), non-acceptance, (sr^2 =.149) and lack strategies (sr^2 = -.155).

Table 6-6

Hierarchical Regression Analysis for Prediction of Severity of T2 Psychological Distress using T1 Variables as Predictors, Controlling for Exposure to Trauma and Deployment-Related Stressors

Variables	F	B	β	sr^2 (unique)	R	R^2	Adj R^2
Step 1	$F_{(2, 193)} = 7.215$				.264	.070	.060
T1 Psychological Distress		.296	.258***	.258			
Previous Operational Experience		-.169	-.045	-.044			
Step 2	$F_{(4, 191)} = 25.979$				.594	.352	.339
T1 Psychological Distress		.146	.128*	.123		($R^2\Delta = .283$***)	
Previous Operational Experience		-.211	-.056	-.054			
Trauma Exposure		.033	.034	.030			
Deployment-related Stressors		.130	.535***	.482			
Step 3	$F_{(16, 179)} = 8.08$				.648	.419	.367
T1 Psychological Distress		.139	.122	.099		($R^2\Delta = .067$)	
Previous Operational Experience		-.315	-.083	-.078			
Trauma Exposure		.043	.044	.038			
Deployment-related Stressors		.124	.511***	.446			
Benevolence		-.003	-.004	-.003			
Meaningfulness		-.021	-.031	-.028			
Self-Worth		-.022	-.035	-.028			
Locus		.006	.015	.014			
Stability		.040	.109	.078			
Generalisability		.005	.015	.011			
Non Acceptance		.258	.216**	.149			
Lack Goal Behaviour		.152	.102	.071			
Lack Impulse Control		.005	.003	.002			
Lack Awareness		.013	.015	.012			
Lack Strategies		-.314	-.266**	-.155			
Lack Clarity		-.133	-.093	-.063			

* $p < .05$, ** $p < .01$, *** $p < .001$

Summary, prediction of severity of post-deployment psychological distress. It was hypothesised that T1 cognitive and emotional predictors would contribute to prediction of severity of T2 psychological distress, controlling for T1 psychological distress, previous operational experience, and exposure to trauma and deployment-related stressors. The results provide partial support for the hypothesis, showing that none of the T1 cognitive variables acted as predictors of T2 psychological distress, while two of the emotional regulation variables, non-acceptance of emotional response and lack strategies, emerged as significant predictors. The results again highlight the significant contribution of deployment-related stressors as a predictor for pathology. In the first model, exposure to trauma ($sr^2 = .233$) was the most significant contributor to variance in psychological distress, explaining 5.42% of the total variance. In the second model however, deployment-related stressors emerged as the most significant variable ($sr^2 = .446$), explaining 19.89% of the total variance, while trauma exposure was non-significant.

Study 2c: Prediction of Above and Below Clinical Cut-off of T2 Pathology

Hierarchical binomial logistic regression was used to test the third hypothesis that the T1 cognitive and emotional variables would predict respondents falling above and below clinical cut-off scores for T2 post-traumatic stress and psychological distress, accounting for T1 psychological distress, previous operational experience, and exposure to trauma and deployment-related stressors. As with the previous analysis, the analysis was conducted in two stages to isolate the impact of deployment-related stressors. First, a regression model was developed accounting for T1 psychological distress, previous operational experience and exposure to trauma; then a second regression model was developed controlling for deployment-related stressors in addition to these variables.

Prediction of above and below clinical cut-off for Post-traumatic Stress

Table 6-7 reports T2 PCL-C scores grouped into above and below a clinical cut-off score of 30, with scores for 7761 Army personnel who deployed during the period Jan 03 to Aug 2006 provided as a comparison. The rational for the selection of the cut-off score was provided in Chapter 4. Participants in this study reported higher mean levels of post-traumatic stress at T2 than the comparison group, while a higher percentage of participants in this study also recorded scores above cut-off.

Table 6-7

Post-Deployment (T2) PTSD (PCLC) scores

	Mean (SD)	Below Cutoff (<30)	Above Cutoff (30+)
Post-Deployment (T2)	21.63 (6.61) n = 518	468 (91.8%)	42 (8.2%)
Comparison Group[1]	20.5 (5.6) n =7761	7263 (92.7%)	489 (6.3%)

Notes:

1. Comparison Group consisting of Army personnel who deployed during the period Jan 03 to Aug 06 (Twomey, 2007)

Binomial logistic regression model for the prediction of Post-traumatic Stress controlling for exposure to trauma. Binomial logistic regression was performed to determine whether the T1 cognitive and emotional variables would predict that respondents would report above clinical cut-off levels of post-traumatic stress at the end of the deployment, controlling for T1 psychological distress, previous operational experience and exposure to trauma. A cut-off value of 30 was selected in line with current Defence policy as reported in Chapter 4.

After the first step, with T1 psychological distress and previous operational experience in the model, the model was significant $\chi^2_{(2, N = 202)} = 8.67$, $p < .05$. The model explained between 4.2% (Cox and Snell R^2) and 9.9% (Nagelkerke R^2) of the

variance in post-traumatic stress, and was able to correctly classify 92.6% of all cases. Previous operational experience however, was non-significant. In step 2, with trauma exposure in the model, the model was significant $\chi^2_{(3, N = 202)} = 26.28$, $p < .001$, and explained between 12.2% (Cox and Snell R^2) and 28.7% (Nagelkerke R^2) of the variance in post-traumatic stress, and was able to correctly classify 92.1% of all cases. T1 psychological distress and trauma exposure were significant.

The cognitive and emotional regulation variables were added in step 3, resulting in a significant model that provided the best fit to the data, $\chi^2_{(15, N = 202)} = 39.56$, $p = .001$. The Homer and Lemershow goodness-of-fit statistic was non-significant ($p = .88$) indicating the model fit the data. The model as a whole explained between 17.8% (Cox and Snell R^2) and 41.8% (Nagelkerke R^2) of the variance in post-traumatic stress, and correctly classified 94.1% of all cases, indicating that the model was able to distinguish between respondents who score above cut-off for post-traumatic stress, from those who score below cut-off. Specifically, respondents who scored below cut-off were predicted with 98.4% accuracy and those who scored above were predicted with 43.8% accuracy.

As shown in Table 6-8, only one of the T1 variables, lack strategies, was significant in the final model, suggesting that for this sample the remaining T1 cognitive and emotional variables did not contribute to prediction of above cut-off post-traumatic stress at the end of the deployment. The strongest predictor of post-deployment post-traumatic stress was T1 psychological distress reporting an odds ratio of 1.39 CI [1.156 – 1.667], with trauma exposure also significant.

Table 6-8

Logistic Regression for Prediction of Reporting Above Cut-off PTSD symptomatology at T2 using T1 Variables as Predictors, Controlling for Exposure to Trauma

	B	S.E.	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
T1 Psych Distress***	.328	.093	12.374	1	.000	1.388	1.156	1.667
Previous Experience	-.631	.347	3.316	1	.069	.532	.270	1.049
Trauma Exposure***	.295	.077	14.706	1	.000	1.343	1.155	1.561
Benevolence	-.110	.064	2.897	1	.089	.896	.790	1.017
Meaningfulness	.024	.057	.179	1	.672	1.024	.916	1.146
Self Worth	.094	.063	2.225	1	.136	1.098	.971	1.243
Locus	-.039	.032	1.526	1	.217	.962	.904	1.023
Stability	.005	.041	.014	1	.907	1.005	.928	1.088
Generalisability	.018	.039	.204	1	.651	1.018	.942	1.099
Non-acceptance	.157	.116	1.834	1	.176	1.170	.932	1.467
Lack goal behaviour	.169	.154	1.208	1	.272	1.185	.876	1.602
Lack impulse control	.202	.175	1.333	1	.248	1.224	.868	1.727
Lack awareness	.113	.090	1.551	1	.213	1.119	.937	1.336
Lack strategies*	-.289	.146	3.903	1	.048	.749	.563	.998
Lack clarity	-.283	.177	2.562	1	.109	.753	.532	1.066
Constant	-12.19	6.065	4.043	1	.044	.000		

* $p < .05$, ** $p < .01$, *** $p < .001$

Binomial logistic regression model for the prediction of Post-traumatic Stress controlling for exposure to trauma and deployment-related stressors. A second binomial logistic regression was performed to determine whether the T1 cognitive and emotional variables would predict that respondents would report above cut-off levels of post-traumatic stress at the end of the deployment, controlling for T1 psychological distress, previous operational experience and exposure to trauma and deployment-related stressors.

After the first step, with T1 psychological distress and previous operational experience in the model, the model was significant $\chi^2_{(2, N = 198)} = 8.44$, $p < .05$. The model explained between 4.2% (Cox and Snell R^2) and 9.7% (Nagelkerke R^2) of the variance in post-traumatic stress, and was able to correctly classify 92.4% of all cases. Previous operational experience however, was non-significant. In step 2, with trauma exposure and deployment-related stressors in the model, the model was significant $\chi^2_{(4, N = 198)} = 36.12$, $p < .001$, and explained between 16.7% (Cox and Snell R^2) and 38.8% (Nagelkerke R^2) of the variance in post-traumatic stress, and was able to correctly classify 91.9% of all cases.

The cognitive and emotional regulation variables were added in step 3, resulting in a significant model that provided the best fit to the data, $\chi^2_{(16, N = 198)} = 49.27$, $p < .001$. The Homer and Lemershow goodness-of-fit statistic was non-significant ($p = .98$) indicating the model fit the data. The model as a whole explained between 22.0% (Cox and Snell R^2) and 51.3% (Nagelkerke R^2) of the variance in post-traumatic stress, and correctly classified 93.9% of all cases, indicating that the model was able to distinguish between respondents who score above cut-off for post-traumatic stress, from those who score below cut-off. Specifically, respondents who scored below cut-off were predicted with 98.4% accuracy and those who scored above were predicted with 43.8% accuracy.

As shown in Table 6-9, none of the T1 cognitive and emotional regulation variables were significant in the final model, although lack strategies approached significance suggesting that this remains an important variable worthy of further consideration. The strongest predictor of post-traumatic stress was T1 psychological distress reporting an odds ratio of 1.309 CI [1.08 – 1.586], with trauma exposure and deployment-related stressors also significant.

Table 6-9

Logistic Regression for Prediction of Reporting Above Cut-off PTSD at T2 using T1 Variables as Predictors, Controlling for Exposure to Trauma and Deployment Related Stressors

	B	S.E.	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
T1 Psych Distress**	.269	.098	7.532	1	.006	1.309	1.080	1.586
Previous Experience	-.634	.391	2.624	1	.105	.530	.246	1.142
Trauma Exposure**	.222	.084	6.998	1	.008	1.248	1.059	1.471
Deployment Stressors**	.067	.023	8.452	1	.004	1.069	1.022	1.118
Benevolence	-.024	.075	.103	1	.749	.976	.842	1.131
Meaningfulness	.015	.060	.059	1	.808	1.015	.902	1.141
Self Worth	.098	.074	1.789	1	.181	1.103	.955	1.274
Locus	-.039	.031	1.542	1	.214	.962	.905	1.023
Stability	-.015	.045	.109	1	.742	.985	.903	1.076
Generalisability	.006	.043	.019	1	.892	1.006	.925	1.094
Non-acceptance	.193	.132	2.138	1	.144	1.212	.937	1.569
Lack goal behaviour	.168	.165	1.029	1	.310	1.183	.855	1.635
Lack impulse control	.144	.200	.519	1	.471	1.155	.780	1.709
Lack awareness	.120	.100	1.441	1	.230	1.127	.927	1.371
Lack strategies	-.301	.164	3.339	1	.068	.740	.536	1.022
Lack clarity	-.280	.195	2.055	1	.152	.756	.515	1.108
Constant	-15.74	7.152	4.841	1	.028	.000		

* $p < .05$, ** $p < .01$, *** $p < .001$

Summary, prediction of above/below cut-off of T2 post-traumatic stress. It was hypothesised that T1 cognitive and emotional predictors would contribute to prediction of participants scoring above clinical cut-off for post-traumatic stress at the end of the deployment, accounting for T1 psychological distress, previous operational experience, and exposure to trauma and deployment-related stressors. The results provide only partial support for the hypothesis, showing that of the cognitive and

emotional regulation variables, only lack strategies emerged as a significant predictor of post-traumatic stress in the first model. The results highlight the significant contribution of deployment-related stressors as a predictor for post-traumatic stress. In the first model, T1 psychological distress, (odds ratio 1.388) CI [1.156 – 1.667], and exposure to trauma (odds ratio 1.343) CI [1.155 – 1.561] were the most significant contributor to post-traumatic stress. In the second model however, deployment-related stressors emerged as a significant variable, reporting an odds ratio of 1.069 CI [1.022 – 1.118], while the odds ratio for trauma exposure was reduced (1.248) CI [1.059 – 1.471]. It should be remembered however, that PTSD symptoms typically take time to develop and that diagnosis of post-traumatic stress cannot be made for a minimum of one month following exposure to trauma. In addition, participants were still in the environment where they had been exposed to the trauma when they completed the T2 measures, and may not have had sufficient time to process their experiences.

Prediction of above and below clinical cut-off of Psychological Distress

Table 6-10 reports K10 scores grouped into above and below a clinical cut-off score of 20, with pre-deployment scores for this sample and post-deployment scores for 8021 Army personnel who deployed during the period Jan 03 to Aug 2006, provided as a comparison. The rational for the selection of the cut-off score was provided in Chapter 4. Participants in this study reported comparable levels of psychological distress with the comparison group, with a higher percentage scoring above cut-off for psychological distress at T2, compared to T1.

Table 6-10

Post-Deployment (T2) Psychological Distress (K10) scores

	Mean (SD)	Below Cutoff (<20)	Above Cutoff (20+)
Pre-Deployment (T1)	13.58 (3.84) n = 481	447 (92.9%)	34 (7.1%)
Post-Deployment (T2)	14.25 (4.25) n = 518	469 (90.5%)	49 (9.5%)
Comparison Group[1]	14.2 (4.7) n = 8021	7209 (88.8%)	812 (11.2%)

Notes:

1. Comparison Group consisting of Army personnel who deployed during the period Jan 03 to Aug 06 (Twomey, 2007)

Binomial logistic regression model for the prediction of Psychological Distress controlling for exposure to trauma. Binomial logistic regression was performed to determine whether the T1 cognitive and emotional variables would predict that respondents would report above clinical cut-off levels of psychological distress at the end of the deployment, controlling for T1 psychological distress, previous operational experience, and exposure to trauma. A cut-off value of 20 was selected in line with current Defence policy as reported in Chapter 4.

After the first step, with T1 psychological distress and previous operational experience in the model, the model was significant $\chi^2_{(2, N = 205)} = 10.91$, $p < .01$. The model explained between 5.2% (Cox and Snell R^2) and 11.2% (Nagelkerke R^2) of the variance in psychological distress, and was able to correctly classify 90.2% of all cases. Previous operational experience however, was non-significant. In step 2, with trauma exposure in the model, the model was significant $\chi^2_{(3, N = 205)} = 13.83$, $p < .01$, and explained between 6.5% (Cox and Snell R^2) and 14.2% (Nagelkerke R^2) of the variance in psychological distress, and was able to correctly classify 90.7% of all cases. Trauma exposure was not significant.

The cognitive and emotional regulation variables were added in step 3, resulting in a significant model that provided the best fit to the data, $\chi^2_{(15, N=205)} = 23.30, p = .08$. The Homer and Lemershow goodness-of-fit statistic was non-significant ($p = .23$) indicating the model fit the data. The model as a whole explained between 10.7% (Cox and Snell R^2) and 23.3% (Nagelkerke R^2) of the variance in psychological distress, and correctly classified 93.9% of all cases, indicating that the model was able to distinguish between respondents who score above cut-off for psychological distress, from those who score below cut-off. Specifically, respondents who scored below cut-off were predicted with 99.5% accuracy and those who scored above were predicted with 15.8% accuracy.

As shown in Table 6-11, none of the T1 variables were significant in the final model, although non-acceptance approached significance, suggesting that this remains an important variable worthy of further consideration. The strongest predictor of post-deployment psychological distress was T1 psychological distress reporting an odds ratio of 1.19 CI [1.032 – 1.372], with trauma exposure and deployment stressors also significant.

Table 6-11

Logistic Regression for Prediction of Reporting Above Cut-off Psychological Distress at T2 using T1Variables as Predictors, Controlling for Exposure to Trauma

	B	S.E.	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
T1 Psych Distress*	.174	.073	5.701	1	.017	1.190	1.032	1.372
Previous Experience	-.005	.255	.000	1	.983	.995	.603	1.639
Trauma Exposure*	.128	.063	4.079	1	.043	1.137	1.004	1.287
Benevolence	.018	.057	.097	1	.755	1.018	.910	1.138
Meaningfulness	.011	.046	.051	1	.821	1.011	.923	1.107
Self Worth	-.030	.053	.319	1	.572	.970	.875	1.077
Locus	.014	.026	.291	1	.589	1.014	.964	1.067
Stability	.006	.034	.033	1	.855	1.006	.941	1.076
Generalisability	.022	.032	.483	1	.487	1.023	.960	1.089
Non-acceptance	.172	.092	3.500	1	.061	1.187	.992	1.421
Lack goal behaviour	.121	.119	1.036	1	.309	1.129	.894	1.427
Lack impulse control	-.044	.126	.123	1	.725	.957	.747	1.225
Lack awareness	-.013	.076	.029	1	.865	.987	.850	1.146
Lack strategies	-.146	.107	1.844	1	.174	.865	.701	1.067
Lack clarity	.014	.133	.011	1	.918	1.014	.782	1.314
Constant	-7.917	4.556	3.019	1	.082	.000		

* $p < .05$, ** $p < .01$, *** $p < .001$

Binomial logistic regression model for the prediction of T2 Psychological Distress controlling for exposure to trauma and deployment-related stressors. Binomial logistic regression was performed to determine whether the T1 cognitive and emotional variables would predict that respondents would report above cut-off levels of psychological distress at the end of the deployment, controlling for T1 psychological distress, previous operational experience, and exposure to trauma and deployment-related stressors.

After the first step, with T1 psychological distress and previous operational experience in the model, the model was significant $\chi^2_{(2, N = 198)} = 10.62$, $p < .01$. The model explained between 5.2% (Cox and Snell R^2) and 11.1% (Nagelkerke R^2) of the variance in psychological distress, and was able to correctly classify 89.9% of all cases. Previous operational experience however, was non-significant. In step 2, with trauma exposure and deployment-related stressors in the model, the model was significant $\chi^2_{(4, N = 198)} = 31.57$, $p < .001$, and explained between 14.7% (Cox and Snell R^2) and 31.5% (Nagelkerke R^2) of the variance in psychological distress, and was able to correctly classify 91.9% of all cases. Trauma exposure was not significant.

The cognitive and emotional regulation variables were added in step 3, resulting in a significant model that provided the best fit to the data, $\chi^2_{(16, N = 198)} = 45.59$, $p < .001$. The Homer and Lemershow goodness-of-fit statistic was significant ($p < .001$) however, suggesting that the model did not fit the data. The model as a whole explained between 20.6% (Cox and Snell R^2) and 43.9% (Nagelkerke R^2) of the variance in psychological distress, and correctly classified 93.9% of all cases, indicating that the model was able to distinguish between respondents who score above cut-off for psychological distress, from those who score below cut-off. Specifically, respondents who scored below cut-off were predicted with 98.9% accuracy and those who scored above were predicted with 36.8% accuracy.

As shown in Table 6-12, only one of the T1 variables, non-acceptance, was significant in the final model. This was the strongest predictor of post-deployment psychological distress reporting an odds ratio of 1.342 CI [1.065 – 1.693], with deployment-related stressors also significant.

Table 6-12

Logistic Regression for Prediction of Reporting Above Cut-off Psychological Distress at T2 using T1Variables as Predictors, Controlling for Exposure to Trauma and Deployment-related Stressors

	B	S.E.	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
T1 Psych Distress	.152	.080	3.637	1	.057	1.164	.996	1.360
Previous Experience	.204	.318	.408	1	.523	1.226	.657	2.288
Trauma Exposure	-.004	.083	.003	1	.960	.996	.846	1.172
Deployment Stressors***	.083	.020	16.396	1	.000	1.086	1.044	1.131
Benevolence	.075	.064	1.378	1	.240	1.078	.951	1.223
Meaningfulness	.002	.056	.001	1	.969	1.002	.898	1.118
Self Worth	-.043	.059	.535	1	.465	.958	.852	1.076
Locus	.018	.028	.449	1	.503	1.019	.965	1.075
Stability	-.014	.041	.125	1	.724	.986	.910	1.068
Generalisability	.014	.036	.143	1	.705	1.014	.944	1.089
Non-acceptance*	.294	.118	6.198	1	.013	1.342	1.065	1.693
Lack goal behaviour	.216	.147	2.164	1	.141	1.241	.931	1.654
Lack impulse control	-.276	.167	2.749	1	.097	.759	.547	1.052
Lack awareness	-.021	.090	.054	1	.817	.979	.822	1.168
Lack strategies	-.178	.129	1.888	1	.169	.837	.650	1.079
Lack clarity	-.017	.145	.014	1	.905	.983	.740	1.305
Constant	-11.14	5.685	3.843	1	.050	.000		

* $p < .05$, ** $p < .01$, *** $p < .001$

Summary, prediction of above and below cut-off for Psychological Distress. It was hypothesised that T1 cognitive and emotional predictors would contribute to prediction of participants scoring above clinical cut-off for T2 psychological distress accounting for T1 psychological distress, previous operational experience, and exposure to trauma and deployment-related stressors. The results provide only partial support for

the hypothesis, showing that of the vulnerablility variables, only non-acceptance emerged as a significant predictor of T2 psychological distress. The results again highlight the significant contribution of deployment-related stressors as a predictor. In the first model, T1 psychological distress, (odds ratio 1.19) CI [1.032 – 1.372], and exposure to trauma (odds ratio 1.137) CI [1.004 – 1.287] were the most significant contributors to psychological distress. In the second model however, deployment-related stressors again emerged as a significant variable, reporting an odds ratio of 1.086 CI [1.044 – 1.131], while the trauma exposure was non-significant. Non-acceptance, which emerged as a significant predictor for severity of psychological distress, again emerged as a potential predictor coming close to significance with an 1.187 CI [.992 – 1.421] in the first model, and emerging as significant with an odds ratio of 1.342 CI [1.065 – 1.693] in the second model.

Discussion

Relationship between trauma exposure and T2 adjustment

The results provided support for the first hypothesis that higher levels of exposure to traumatic events and deployment-related stressors would be associated with increased psychopathology at the end of the deployment. Interestingly, while the results showed that both traumatic exposure and exposure to deployment-related stressors were correlated with pathology, higher correlations between the stressors and T2 pathology suggests that the traumatic events experienced by the participants were less distressing than the organisational and day-to-day stressors that they encountered. It was suggested earlier that traumatic events that occur in context, and are expected, are less likely to cause a pathological response than events that occur out of context or are unexpected. The results appear to support this suggestion and reinforce the need for further research into the impact of non-traumatic factors on pathology.

Prediction of severity of T2 psychopathology

The study provided support for the second hypothesis by identifying pre-existing cognitive and emotional variables that were related to the prediction of severity of pathology at the end of the deployment.

In addition to trauma exposure and deployment-related stressors, two pre-existing factors; benevolence and lack strategies, were found to be related to the prediction of severity of post-traumatic stress. The results indicate that participants with a generally positive, or benevolent view of the world appeared to be better able to protect themselves against the impact of their experiences. This could be in part because they were able to determine a context for what they had experienced. Participants in this study were trained, experienced soldiers who underwent a period of intense training prior to the deployment that was specifically designed to prepare them for what they would experience. The nature of their operational experience was largely consistent with what they expected. They were therefore able to distinguish between what happened to them, and what happens within the larger world. In other words, they had context for what they experienced. Participants who had a less benevolent view of the world were less able to contextualise their experience and instead, had their negative view of the world confirmed. According to Janoff-Bulmann (1985, 1989, 1992) people are able to maintain the assumption of benevolence in the face of evidence to the contrary because they tend to distinguish between what happens to them and what happens within the larger world. People who possess negative pre-trauma schemas about themselves and the world however, are likely to view traumatic and stressful events as confirming their negative world view.

Lack strategies emerged as a predictor in both the severity and cut-off models for post-traumatic stress, and for severity of psychological distress. This variable

reflects the belief that there is little that can be done to effectively regulate emotions once an individual is upset (Gratz & Roemer, 2004). The negative direction of the relationship between lack strategies and pathology is counter-intuitive. It suggests that participants who believed they would be able to regulate their emotions when distressed but then found that they couldn't, were more vulnerable to poor adjustment than those who did not hold this belief as strongly. This implies that these are people with strong beliefs about emotional control. It is suggested that they feel the need to avoid becoming upset, and perhaps tend to bottle-up their emotions, to be stoic and put on a 'brave face', rather than talking about their experiences for fear of becoming upset, and then finding themselves unable to regulate their emotions.

In addition to lack strategies, non-acceptance of emotional response was related to prediction of severity for psychological distress. Non-acceptance of emotional response emerged as a significant predictor in both the severity and cut-off models for psychological distress. The positive relationship between this variable and general psychological distress suggests a tendency to have negative secondary emotional responses to one's negative emotions, or a non-accepting reaction to one's distress. In Chapter 3 it was pointed out that there has been a substantial amount of research conducted into post-trauma emotional responses, with substantial evidence that a range of negative emotions frequently accompany pathology (e.g. Andrews, et al., 2000; Chemtob, et al., 1997; Grey, et al., 2001; Holmes, et al., 2005; Jakupcak, et al., 2007; Kubany, 1994; Leskela, et al., 2002; Novaco & Chemtob, 2002; Singer, 2004). It was also suggested that beliefs about the negative consequences of losing control of one's emotions are considered to be one of the key features of post-trauma pathology (Williams, et al., 1997a). Given the specific nature of the culture in which the participants in this study operate, it is not surprising that people with strong beliefs

about expressing negative emotions would be more vulnerable to increased psychological distress.

Prediction of above and below clinical cut-off for T2 psychopathology

The third hypothesis proposed that the T1 cognitive and emotional variables would contribute to prediction of participants falling above or below clinical cut-off levels for T2 post-traumatic stress and psychological distress, controlling for T1 psychological distress, previous operational experience, and exposure to trauma and deployment-related stressors. One variable, lack strategies contributed to the identification of participants falling above and below cut-off levels for PTSD, while pre-existing beliefs around acceptance of emotional response contributed to identification of participants falling above and below cut-off levels for psychological distress. These results reinforce the findings reported earlier with respect to prediction of severity of pathology.

Influence of T1 Psychological distress

Several of the control variables also emerged as significant predictors of pathology at T2. Pre-existing (T1) levels of psychological distress were measured to identify the level of distress reported prior to the deployment, and may reflect a range of stressors impacting on participants at this time. This baseline measure of distress potentially includes anxiety relating to the upcoming deployment, frustration with the close living conditions and the impact of separation from immediate family and social supports. Pre-deployment levels of psychological distress emerged as a significant predictor in each of the models, although in each case became non-significant when deployment-related stressors were added, suggesting that while important as a baseline measure, its effect is later subsumed by the impact of other, more relevant stressors.

Impact of Deployment-related Stressors

Deployment-related stressors emerged as a significant predictor variable for general psychological distress as well as for post-traumatic stress. The instrument used to capture this data is the Major Stressors Inventory (MSI) which is currently used by the Australian Department of Defence to determine the level of stress caused by a list of factors shown to have a major impact on peri-deployment performance and satisfaction, and post-deployment psychological well-being. It is not a perfect measure and captures both the degree of stress, and the degree of exposure to a list of stressors, in the one instrument. With any measure of stressors, it is difficult to separate the measurement of stress from the stressor itself, and so as a consequence the results need to be interpreted with caution. This notwithstanding, other research with this population has consistently found that this measure is a reliable predictor of post-deployment adjustment (e.g. Deans, 2007; Nicholson, 2006; Steele & Twomey, 2006; Twomey, 2006, 2007).

The findings reported here support the use of the MSI as an indicator of adjustment at the end of the deployment, and also as a list of stressors that can be targeted for remedial action. Given that a number of studies covering deployments dating back to 2003 have consistently linked deployment-related stressors to general levels of dissatisfaction, and that dissatisfaction at the end of the deployment has been linked to reported intent to leave the service (Benassi, 2008), more work is needed within Defence to address and remediate those stressors that are causing the most concern, and that are within the Department's ability to address.

Benefits and limitations of this study

The results of this study provide support for cognitive and appraisal theories of PTSD and related pathology by identifying pre-existing cognitive and emotional factors that contribute to the prediction of post-trauma adjustment. This study identified several

key findings: first, the importance of non-traumatic factors in predicting adjustment; second; the importance of pre-existing negative beliefs around benevolence of the world as a risk factor for poor adjustment; and third, the role of strong beliefs about emotional control, and non-acceptance of emotional response, as risk factors for poor adjustment. This is one of the first studies to address limitations of previous research by providing a prospective, longitudinal examination of the relationship between pre-existing cognitive and emotional factors and post-trauma adjustment. The next chapter reports the results of analysis with respect to the relationship between the pre-existing cognitive and emotional regulation variables, and adjustment at follow-up.

CHAPTER 7

STUDY 3: PREDICTION OF ADJUSTMENT AT FOLLOW-UP

This chapter addresses the third research question and seeks to identify the degree that pre-existing cognitive appraisals and capacity for emotional regulation predict ongoing adjustment measured at follow-up. This is done by exploring the relationship between the cognitive and emotional predictors and post-traumatic stress and psychological distress measured 4-8 months following participants' return to Australia. Follow-up at this time has been shown to provide sufficient opportunity for normal stress reactions to subside, whilst remaining symptomatology has been shown to predict ongoing maladjustment (Hodson, 2002).

Maintenance of Pathology

A retrospective study that differentiated between risk factors for the development versus the maintenance of PTSD in Vietnam War veterans identified that the maintenance of PTSD was related to demographic factors such as ethnicity and lower pre-military education, more severe childhood punishment, higher war zone exposure, peri-traumatic dissociation, reduced social support and a higher number of recent life events (Schnurr, Lunney, & Sengupta, 2004). Other studies have identified the impact of *post-trauma* cognitions and appraisals, and emotional capacity on the maintenance of pathology, but few have examined the impact of *pre-trauma* cognitions and appraisals, and emotional capacity on the maintenance of pathology.

Cognitive Vulnerabilities and Adjustment at Follow-up

Ehlers and Clark's *Cognitive Maintenance Model* (2000), model suggests that several types of appraisals of a traumatic event serve to produce a sense of current

threat, which helps to maintain post-trauma psychopathology. Firstly, people may overgeneralise from the event to exaggerate the possibility of danger, or to perceive normal activities as more threatening than they actually are, suggesting a global attribution bias. Secondly, they might misinterpret their feelings or behaviour during the trauma, or they may appraise these feelings or behaviours in an unreasonably negative fashion, suggesting difficulties with emotional regulation. Negative appraisals serve to maintain PTSD by producing negative emotions such as anxiety, depression, anger and guilt, and by encouraging people to adopt maladaptive coping mechanisms. The cognitive maintenance model helps us to understand the role of relevant negative *post-trauma* appraisals in the maintenance of PTSD, but it fails to explain the relationship between *pre-trauma*, and post-trauma cognitions, appraisals and beliefs. As a consequence, it makes assumptions about a key input to the model, that of the prior experiences, beliefs and coping state of the individual.

Emotional Response and Adjustment at Follow-up

Given that negative appraisals serve to maintain PTSD by producing negative emotions; a lack of acceptance of one's emotional response becomes a key risk factor in the maintenance of post-trauma pathology. Longitudinal studies show that high levels of anger (Ehlers, et al., 1998; Forbes, et al., 2008), and more specifically anger with others (Andrews, et al., 2000), predict treatment outcomes, and influence recovery from PTSD. In addition, beliefs about the negative consequences of losing control of one's emotions are considered to be one of the key features of PTSD (Williams, et al., 1997a), and guilt, self-blame, sadness, betrayal, humiliation and shame frequently serve to maintain PTSD symptomatology (Chemtob, Novaco, Hamada, & Gross, 1997; Grey, Holmes, & Brewin, 2001; Holmes, Grey, & Young, 2005; Jakupcak et al., 2007; Kubany, 1994; Leskela, Dieperink, & Thuras, 2002; Novaco & Chemtob, 2002; Singer, 2004). If we

also take account of cultural factors within a culture that promotes a vocational, 'warrior' ethos, members are likely to view wartime experiences as a test of their competence and belonging. They are then less likely to want to admit to, or accept the negative effects of such experiences.

Following return from active service deployment, a soldier goes through a process of reintegration back into their family, unit and society. What happens during this period of time has a major impact on their long term psychological health. Studies into the experiences of returning Vietnam War veterans found that feeling psychologically isolated and disconnected within the first months of returning home has been shown to be one of, if not the most significant predictor of subsequent PTSD after the effects of combat exposure, earlier trauma, and present stressful life events are accounted for (Orsillo, Roemer, Litz, Ehlich, & Friedman, 1998; Wilson & Krauss, 1985). Further, Bolton, Litz, Glenn, Orsillo, and Roemer (2002) suggest that returning from an operational mission can be associated with negativity, disruption, and stress; be extremely unsettling and confusing for military personnel at the personal, family, and work levels; and exacerbate deployment-related stress. In response to findings such as these, much work is currently being done by the US military to address reintegration issues. This is being achieved through programmes designed to assist returning veterans to translate battlefield coping skills into peacetime coping skills, to talk about their experiences and acknowledge their emotional response, and to reduce the stigma about mental health (Adler, Castro, & McGurk, 2009; Department of Defense, 2008).

A recent study into the impact of mental health stigma across the US, UK, Australian, New Zealand and Canadian armed forces found similar patterns of reported stigma and barriers to care across all five nations (Gould et al., 2010). This, and other studies highlight perceptions about being seen as weak, having a tendency to internalise

responsibility for mental health problems, and concerns about potential adverse career implications as major barriers to help seeking (e.g. Britt et al., 2008; Britt, Greene-Shortridge, & Castro, 2007; Corrigan & Watson, 2002; Gall, 2006; Gould, et al., 2010; Hoge, et al., 2004). Psychological barriers to care in returning veterans may include excessive and ineffective attempts to control unwanted thoughts, feelings and memories (e.g. Orsillo & Batten, 2005), beliefs that negative psychological or emotional experiences are a sign of weakness (e.g. Linley, 2003), and beliefs that emotional responses are a sign that they are 'going crazy' (Litz, 2007). Consistent with Gratz and Roemer's (2004) work on emotional regulation, it is therefore not only a lack of capacity for emotional response, but also negative beliefs about emotional response, which are likely to contribute to poor ongoing adjustment.

If follows therefore that the maintenance of pathology is related in part to both an individual's appraisal of the event, and their ability to respond to the experience. This is influenced by individual differences in cognitions, appraisals and beliefs, and their capacity for adaptive emotional regulation. The previous two chapters have explored the degree that pre-existing cognitive and emotional variables are affected by traumatic experiences and deployment-related stressors, and the degree to which they are able to explain some of the variance in post-trauma, or post-deployment, adjustment. This chapter examines the degree that pre-existing self and world beliefs, attribution style and capacity for emotional regulation explains variance in post-traumatic stress and psychological distress measured at follow-up.

Hypotheses

There were three hypotheses: first; that higher levels of exposure to traumatic events and deployment-related stressors would be associated with higher levels of post-traumatic stress and psychological distress at follow-up.

Second; the T1 cognitive and emotional variables would contribute to prediction of severity of T3 post-traumatic stress and psychological distress, controlling for T1 psychological distress, previous operational experience, and accounting for exposure to trauma and deployment-related stressors.

Third; the T1 cognitive and emotional variables would contribute to prediction of participants falling above or below clinical cut-off levels for T3 post-traumatic stress and psychological distress, controlling for T1 psychological distress, previous operational experience, and accounting for exposure to trauma and deployment-related stressors.

Method

Participants

Participants were Australian Defence Force Personnel who completed six month active duty deployments to Afghanistan and Iraq during 2008. Data collection was conducted both prior to and at the end of the deployment, and at follow-up 4-8 months following their return to Australia. Data was collected at pre-deployment using measures of the cognitive and emotional predictors, psychological distress and previous operational experience. Measures of exposure to trauma and deployment-related stressors were collected at the end of the deployment. Data on post-traumatic stress and psychological distress was collected at the end of the deployment and at follow-up.

Variables.

Demographic factors. Demographic items were measured using questions to determine the participant's age, gender, seniority, length of service and previous operational service.

Self and world beliefs. Self and world beliefs were measured using the World Assumption Scale (WAS) (Janoff-Bulman, 1989), which measures beliefs regarding

benevolence of the world, meaningfulness of the world, and self-worth. Reliabilities were reported in Chapter 4 and were comparable with the pattern of findings described in the literature.

Emotional regulation. Capacity for emotional regulation was measured using the 36-item Difficulties in Emotion Regulation Scale (DERS), which assesses modulation of emotional arousal, awareness, understanding, and acceptance of emotions, and the ability to act in desired ways regardless of emotional state. Reliabilities were reported in Chapter 4 and were comparable with the pattern of findings described in the literature.

Attribution Style. Attribution Style was measured using the Attributional Style Questionnaire – General Use (ASQ-G.), which measures locus of control, stability and generalisability of attributions (Dykema, et al., 1996). Reliabilities were reported in Chapter 4 and were comparable with the pattern of findings described in the literature.

Trauma exposure. Exposure to traumatic events during the deployment was measured using the Traumatic Stress Exposure Scale – Revised (TSES-R) (Hodson, 2002; Swann & Hodson, 2004). The degree of exposure to traumatic events reported by participants was reported in Chapter 5.

Deployment-related stressors. The Major Stressors Inventory (MSI) was used to rate the level of stress caused by a list of 36 stressors that cover a range of issues including the behaviour of others, impact of separation from family and friends, quality of leadership, exposure to a foreign culture, and lack of personal privacy. The level of stress reported by participants that was caused by exposure to deployment-related stressors was reported in Chapter 5.

Post-traumatic Stress. PTSD symptomatology was measured using the Posttraumatic Stress Disorder Checklist – Civilian (PCL-C) (Weathers, et al., 1993),

which asks respondents to indicate how much they have been bothered by a list of 17 symptoms over the previous month. Clinical cut-off levels were applied in accordance with current Defence guidelines as reported in Chapter 4.

Psychological distress. Psychological distress was measured using the Kessler Psychological Distress Scale (K-10) (Kessler, et al., 2002). Clinical cut-off levels were applied in accordance with current Defence guidelines as reported in Chapter 4.

Results

Data analysis was conducted in three stages using SPSS v16. During the first stage, Pearson correlations were examined to determine the relationships between trauma exposure, deployment-related stressors, post-traumatic stress and psychological distress. This sought to test the first hypothesis that higher levels of exposure to traumatic and deployment-related stressors would be associated with higher levels of post-traumatic stress and psychological distress measured at follow-up. Then, Pearson correlations between the T1 cognitive and emotional predictors, and T3 post-traumatic stress and psychological distress, were examined to determine whether these relationships were consistent with those expected from the literature.

During the second stage of analysis, hierarchical linear regression was used to determine prediction models for severity of T3 post-traumatic stress and psychological distress. This sought to test the hypothesis that the T1 cognitive and emotional variables would contribute to prediction of severity of T3 psychopathology accounting for T1 psychological distress, previous operational experience, and exposure to trauma and deployment-related stressors. In this analysis, T1 psychological distress and previous operational experience were entered first to account for pre-existing pathology and experience, then exposure to trauma and deployment-related stressors were added to establish a baseline equation. The cognitive and emotional regulation variables were

added to the equation in the final step to determine whether these explained additional variance in pathology above that explained by the previous factors.

In the third stage, hierarchical binomial logistic regression was used to determine prediction models for respondents reporting above and below cut-off levels of post-traumatic stress and psychological distress. This sought to test the hypothesis that the T1 cognitive and emotional predictors would predict participants falling above and below clinical cut-off for T3 psychopathology controlling for T1 psychological distress, previous operational experience, and exposure to trauma and deployment-related stressors. Prediction of above/below cut-off has clinical applications, providing an indication of the predicted prevalence of a disorder within a given population. T1 psychological distress and previous operational experience were entered first to account for pre-existing pathology and experience, then exposure to trauma and deployment stressors were added to establish a baseline equation. The cognitive and emotional regulation variables were added to the equation in the final step to determine whether these improved the prediction model.

Study 3a: Relationship between the Predictor Variables and T3 Pathology

The first hypothesis proposed that higher levels of exposure to traumatic events and deployment-related stressors would be associated with higher levels of post-traumatic stress and psychological distress when measured at follow-up. This section reports the Bivariate relationships between trauma exposure, deployment-related stressors, the T1 cognitive and emotional regulation variables, and T3 post-traumatic stress and psychological distress.

Trauma Exposure, Deployment Stressors and Psychopathology

Table 7-1 details the Pearson correlations between T1 psychological distress, previous operational experience, trauma exposure, deployment-related stressors, T3 post-traumatic stress and psychological distress. Examination of the correlations provides support for the first hypothesis revealing that both deployment-related stressors and exposure to traumatic events are positively correlated with T3 psychopathology, although as would be expected, this relationship is weaker than it was at T2.

Table 7-1

Summary of Pearson Correlations between T1 Psychological Distress, Previous Operational Experience, Trauma Exposure, Deployment-related Stressors and T2 Psychopathology

	1	2	3	4	5	6
1. T1 Psych Distress	1.000					
2. Previous Operational Experience	-.034	1.000				
3. Trauma Exposure	.014	.243***	1.000			
4. Deployment-related Stressors	.200***	.063	.329***	1.000		
5. T3 Psych Distress	.239***	.005	.103*	.146*	1.000	
6. T3 Post-Traumatic Stress	.130*	.013	.216***	.227***	.659***	1.000

* $p < .05$, ** $p < .01$, *** $p < .001$

T1 Cognitive and Emotional Variables and Psychopathology

Table 7-2 details the Pearson correlations between the T1 cognitive and emotional variables, T1 psychological distress, previous operational experience and T3 post-traumatic stress and psychological distress. Examination of the correlations reveals that although small, the correlations were largely in the direction expected from the literature.

Self and world beliefs. Only self-worth covaried significantly with psychological distress, suggesting that positive self-worth acts as a protective factor against ongoing pathology. The negative correlations between meaningfulness and both post-traumatic stress and psychological distress, while not significant, were in the direction expected, suggesting that strong beliefs around events having meaning are associated with lower psychopathology.

Emotional Regulation. Four of the six emotional regulation variables covaried significantly with psychological distress, and the remaining two, although non-significant, covaried in the direction expected. Two of the emotional regulation variables, non-acceptance of emotional response and lack goal behaviour, covaried significantly with post-traumatic stress, while the remaining variables, although non-significant, were also in the direction expected. Although small, the positive correlations between the emotional regulation variables and pathology were all in the direction expected, suggesting that increased difficulties with emotional regulation were associated with increased psychopathology at follow-up.

Attribution style. While none of the attribution style variables were significantly correlated with post-traumatic stress or psychological distress, the direction of the relationship was in the direction predicted by the literature, suggesting that an internal, stable and global attribution style is associated with increased psychopathology.

Table 7-2

Summary of Bivariate Correlations between T1 Psychological Distress, Previous Operational Experience, T1 Cognitive and Emotional Regulation Variables and T3 Psychopathology

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Benevolence	1.000														
2. Meaningfulness	.210***	1.000													
3. Self-Worth	.454***	.211***	1.000												
4. Non Acceptance	-.191***	.020	-.308***	1.000											
5. Lack Goal Behaviour	-.136**	-.043	-.303***	.521***	1.000										
6. Lack Impulse Control	-.214***	-.047	-.344***	.493***	.563***	1.000									
7. Lack Awareness	-.242***	-.101*	-.307***	.134***	.139***	.229***	1.000								
8. Lack Strategies	-.255***	-.034	-.378***	.650***	.663***	.663***	.226***	1.000							
9. Lack Clarity	-.224***	-.126**	-.380***	.386***	.431***	.433***	.587***	.524***	1.000						
10. Locus	-.053	.031	.022	.084	.062	.013	-.073	.027	-.015	1.000					
11. Stability	-.056	-.061	-.090	.117	.113	.021	.007	.037	.051	.317***	1.000				
12. Generalisability	-.059	-.011	-.124*	.116	.184**	.042	.050	.116	.082	.278***	.675***	1.000			
13.T1 Psych Distress	-.218***	-.094*	-.279***	.386***	.388***	.364***	.194***	479***	.352***	.006	-.043	.159*	1.000		
14. Prev Op Exp	.031	.009	.111*	-.032	-.113*	-.066	-.108*	-.089	-.125*	-.037	.033	-.048	-.034	1.000	
15.T3 Psych Distress	.003	-.030	-.126*	.223***	.171**	.088	.071	.151**	.136**	.008	.125	.136	.239***	.005	1.000
16. T3 PTSD	.006	-.024	-.060	.130*	.112*	.035	.054	.074	.059	.053	.078	.104	130*	.013	.700***

* $p < .05$, ** $p < .01$, *** $p < .001$

Study 3b: Prediction of Severity of T3 Pathology

Hierarchical linear multiple regression was used to test the second hypothesis that the T1 cognitive and emotional variables would predict severity of T3 post-traumatic stress and psychological distress, accounting for T1 psychological distress, previous operational experience, exposure to trauma and deployment-related stressors.

Consistent with the analysis reported in the previous chapter, the regression analysis was conducted in two stages to isolate the impact of deployment-related stressors. The first model was developed controlling for T1 psychological distress, previous operational experience and exposure to trauma; then a second model was developed controlling for the impact of deployment-related stressors in addition to these variables.

Prediction of severity of Post-traumatic Stress

Regression model for prediction of T3 Post-traumatic Stress controlling for exposure to trauma. A hierarchical linear regression was performed to determine whether T1 cognitive and emotional variables would contribute to prediction of severity of T3 post-traumatic stress, controlling for T1 psychological distress, previous operational experience and exposure to trauma.

Using T3 post-traumatic stress as a dependent variable, after step 1 with T1 psychological distress and previous operational experience in the equation, R = .139, R^2 = .019, ($F_{inc\ (2,\ 162)}$ = 1.601, p = .21), neither variable was significant. In step 2, exposure to trauma was added to the equation, R^2 change = .033, ($F_{change\ (1,161)}$ = 5.68, p < .05), only trauma exposure (sr^2 =.183) was significant. In step 3, the T1 cognitive and emotional predictors were added to the equation, R^2 change = .073, ($F_{change\ (12,149)}$ = 1.04, p = .42). As shown in Table 7-3, there were two significant variables in the final equation, trauma exposure (sr^2 =.173) and self-worth (sr^2 = -.157).

Table 7-3

Hierarchical Regression Analysis for Prediction of Severity of T3 Post-traumatic Stress using T1 Variables as Predictors, Controlling for T1 Psych Distress, Previous Operational Experience and Exposure to Trauma

Variables	F	B	β	sr^2 (unique)	R	R^2	Adj R^2
Step 1	$F_{(2, 162)} = 1.601$				.139	.019	.007
T1 Psychological Distress		.243	.125	.125			
Previous Operational Experience		.390	.065	.065			
Step 2	$F_{(3, 161)} = 2.991$				.230	.053	.035
T1 Psychological Distress		.229	.118	.118		($R^2\Delta = .033$*)	
Previous Operational Experience		.142	.024	.023			
Trauma Exposure		.321	.188*	.183			
Step 3	$F_{(15,149)} = 1.430$				.355	.126	.038
T1 Psychological Distress		.274	.142	.118		($R^2\Delta = .073$)	
Previous Operational Experience		.284	.048	.044			
Trauma Exposure		.318	.186*	.173			
Benevolence		.131	.101	.088			
Meaningfulness		.105	.093	.084			
Self-Worth		-.204	-.202*	-.157			
Locus		.048	.075	.070			
Stability		.008	.013	.010			
Generalisability		.038	.066	.048			
Non Acceptance		.118	.060	.042			
Lack Goal Behaviour		.210	.085	.055			
Lack Impulse Control		-.392	-.141	-.102			
Lack Awareness		.125	.090	.066			
Lack Strategies		-.171	-.082	-.046			
Lack Clarity		-.293	-.122	-.081			

* $p < .05$, ** $p < .01$, *** $p < .001$

Regression model for prediction of T3 post-traumatic stress controlling for exposure to trauma and deployment stressors. A second hierarchical linear regression was performed to determine whether T1 cognitive and emotional variables would contribute to prediction of severity of T3 post-traumatic stress, controlling for T1 psychological distress, previous operational experience, exposure to trauma and deployment-related stressors.

Using T3 post-traumatic stress as a dependent variable, after step 1 with T1 psychological distress and previous operational experience in the equation, $R = .133$, $R^2 = .018$, ($F_{inc\ (2,\ 156)} = 1.398$, $p = .25$), neither of the variables were significant. In step 2, exposure to trauma and deployment-related stressors were added to the equation, R^2 change = .063, ($F_{change\ (2,154)} = 5.304$, $p < .01$), only trauma exposure ($sr^2 = .158$) was significant.

In step 3, the T1 cognitive and emotional predictors were added to the equation, R^2 change = .085, ($F_{change\ (12,142)} = 1.205$, $p = .28$). As shown in Table 7-4, none of the variables in the final equation were significant, although trauma exposure ($sr^2 = .145$) approached significance with $p = .06$.

Table 7-4

Hierarchical Regression Analysis for Prediction of Severity of T3 Post-traumatic Stress using T1 Variables as Predictors, Controlling for T1 Psychological Distress, Previous Operational Experience, Exposure to Trauma and Deployment Stressors

Variables	F	B	β	sr^2 (unique)	R	R^2	Adj R^2
Step 1	$F_{(2, 156)} = 1.398$				.133	.018	.005
T1 Psychological Distress		.242	.129	.128			
Previous Operational Experience		.221	.037	.037			
Step 2	$F_{(4, 154)} = 3.39$				.284	.081	.057
T1 Psychological Distress		.158	.084	.081		($R^2\Delta = .063$*)	
Previous Operational Experience		-.025	-.004	-.004			
Trauma Exposure		.293	.174*	.158			
Deployment-related Stressors		.059	.146	.132			
Step 3	$F_{(12, 142)} = 1.765$				.407	.166	.072
T1 Psychological Distress		.196	.104	.085		($R^2\Delta = .085$)	
Previous Operational Experience		.084	.014	.013			
Trauma Exposure		.281	.167#	.145			
Deployment-related Stressors		.059	.145	.127			
Benevolence		.108	.083	.072			
Meaningfulness		.115	.104	.093			
Self-Worth		-.139	-.141	-.109			
Locus		.055	.083	.079			
Stability		.003	.006	.004			
Generalisability		.039	.067	.049			
Non Acceptance		.167	.085	.060			
Lack Goal Behaviour		.375	.152	.097			
Lack Impulse Control		-.466	-.171	-.122			
Lack Awareness		.234	.169	.125			
Lack Strategies		-.240	-.117	-.065			
Lack Clarity		-.331	-.140	-.094			

* $p < .05$, ** $p < .01$, *** $p < .001$, # $p = .06$

Summary, prediction of severity of Post-traumatic Stress. It was hypothesised that T1 cognitive and emotional predictors would contribute to prediction of severity of T3 post-traumatic stress, accounting for T1 psychological distress, previous operational experience, and exposure to trauma and deployment-related stressors. In the first model, exposure to trauma (sr^2 = .173) and self-worth (sr^2 = -.157) emerged as significant predictors with exposure to trauma explaining 3.0% of the total variance and self-worth explaining 2.5% of the total variance. In the second model however, which included deployment related stressors, none of the variables were significant.

Prediction of severity of Psychological Distress

Regression model for the prediction of T3 Psychological Distress controlling for exposure to trauma. A hierarchical linear regression was performed to determine whether T1 cognitive and emotional variables would contribute to prediction of severity of T3 psychological distress, controlling for T1 psychological distress, previous operational experience and exposure to trauma.

Using T3 psychological distress as a dependent variable, after step 1 with T1 psychological distress and previous operational experience in the equation, R = .191, R^2 = .036, ($F_{\text{inc (2, 163)}}$ = 3.085, $p < .05$), only T1 psychological distress (sr^2 =.191) was significant. In step 2, exposure to trauma was added to the equation, R^2 change = .003, ($F_{\text{change (1,162)}}$ = 0.49, p = .48), none of the added variables were significant. In step 3, the T1 cognitive and emotional predictors were added to the equation, R^2 change = .103, ($F_{\text{change (12, 150)}}$ = 1.504, p = .13).

As shown in Table 7-5, there were two significant variables in the final equation, T1 psychological distress (sr^2 =.158) and benevolence (sr^2 =.196), while non-acceptance (sr^2 = .139) approached significance with p = .06.

Table 7-5

Hierarchical Regression Analysis for Prediction of Severity of T3 Psychological Distress using T1 Variables as Predictors, Controlling for Exposure to Trauma

Variables	F	B	β	sr^2 (unique)	R	R^2	Adj R^2
Step 1	$F_{(2, 163)} = 3.085$				.191	.036	.025
T1 Psychological Distress		.324	.191*	.191			
Previous Operational Experience		-.021	-.004	-.004			
Step 2	$F_{(3, 162)} = 2.213$				.198	.039	.022
T1 Psychological Distress		.320	.189*	.188		($R^2\Delta = .003$)	
Previous Operational Experience		-.085	-.016	-.016			
Trauma Exposure		.083	.055	.054			
Step 3	$F_{(15, 150)} = 1.662$				.378	.143	.057
T1 Psychological Distress		.322	.190*	.158		($R^2\Delta = .103$)	
Previous Operational Experience		.008	.001	.001			
Trauma Exposure		.070	.047	.043			
Benevolence		.256	.226*	.196			
Meaningfulness		-.043	-.044	-.040			
Self-Worth		-.105	-.119	-.092			
Locus		-.020	-.035	-.033			
Stability		.042	.078	.058			
Generalisability		.029	.058	.042			
Non Acceptance		.347	.200#	.139			
Lack Goal Behaviour		.088	.041	.026			
Lack Impulse Control		-.434	-.178	-.129			
Lack Awareness		.164	.135	.099			
Lack Strategies		-.071	-.039	-.022			
Lack Clarity		-.211	-.101	-.067			

* $p < .05$, ** $p < .01$, *** $p < .001$, # $p = .06$

Regression model for the prediction of T3 Psychological Distress controlling for exposure to trauma and deployment-related stressors. A second hierarchical linear regression was performed to determine whether T1 cognitive and emotional variables would contribute to prediction of severity of psychological distress at follow-up, controlling for T1 psychological distress, previous operational experience, exposure to trauma and deployment-related stressors.

Using T3 psychological distress as a dependent variable, after step 1 with T1 psychological distress and previous operational experience in the equation, R = .19, R^2 = .036, ($F_{inc\ (2,\ 157)}$ = 2.940, p = .056), only T1 psychological distress (sr^2 =.190) was significant. In step 2, exposure to trauma and deployment-related stressors were added to the equation, R^2 change = .003, ($F_{change\ (2,155)}$ = 0.226, p = .79), none of the added variables were significant. In step 3, the T1 cognitive and emotional predictors were added to the equation, R^2 change = .109, ($F_{change\ (12,143)}$ = 1.522, p = .12).

As shown in Table 7-6, there were two significant variables in the final equation, psychological distress (sr^2 =.157) and benevolence (sr^2 =.184), although again non-acceptance, (sr^2 =.144) approached significance with p = .06.

Table 7-6

Hierarchical Regression Analysis for Prediction of Severity of T3 Psychological Distress using T1 Variables as Predictors, Controlling for Exposure to Trauma and Deployment Stressors

Variables	*F*	*B*	*β*	sr^2 (unique)	*R*	R^2	Adj R^2
Step 1	$F_{(2, 157)} = 2.94$				.190	.036	.024
T1 Psychological Distress		.323	.190*	.190			
Previous Operational Experience		-.033	-.006	-.006			
Step 2	$F_{(4, 155)} = 1.569$				.197	.039	.014
T1 Psychological Distress		.325	.191*	.184		($R^2\Delta = .003$)	
Previous Operational Experience		-.116	-.022	-.021			
Trauma Exposure		.088	.058	.053			
Deployment-related Stressors		-.005	-.013	-.012			
Step 3	$F_{(16, 143)} = 1.550$				.384	.148	.052
T1 Psychological Distress		.327	.193*	.157		($R^2\Delta = .109$)	
Previous Operational Experience		-.048	-.009	-.008			
Trauma Exposure		.084	.055	.048			
Deployment-related Stressors		-.008	-.022	-.019			
Benevolence		.249	.214*	.184			
Meaningfulness		-.032	-.032	-.029			
Self-Worth		-.089	-.100	-.077			
Locus		-.016	-.027	-.026			
Stability		.052	.093	.069			
Generalisability		.023	.043	.032			
Non Acceptance		.364	.207#	.144			
Lack Goal Behaviour		.136	.061	.039			
Lack Impulse Control		-.464	-.189	-.135			
Lack Awareness		.189	.152	.112			
Lack Strategies		-.087	-.047	-.026			
Lack Clarity		-.197	-.093	-.063			

* $p < .05$, ** $p < .01$, *** $p < .001$, # $p = .06$

Summary, prediction of severity of psychological distress at follow-up. It was hypothesised that T1 cognitive and emotional predictors would contribute to prediction of severity of T3 psychological distress, controlling for T1 psychological distress, previous operational experience, and exposure to trauma and deployment-related stressors. The results provide partial support for the hypothesis, showing that of the T1 cognitive and emotional predictors, benevolence consistently acted as a significant predictor of T3 psychological distress, explaining 3.38% of the variance in a model including deployment-related stressors, and 3.84% in a model not including deployment-related stressors. Deployment-related stressors were not significant, although higher baseline psychological distress was related to increased psychological distress at follow-up. The direction of the relationship between benevolence and psychological distress suggests that participants who have an overly positive view of the world tend towards increased vulnerability for ongoing psychopathology. The direction of the relationship for non-acceptance of emotional response, and the fact that this approached significance in both models, suggests that this may be an important vulnerability that needs further study.

Study 3c: Prediction of Above and Below Clinical Cut-off of T3 Pathology

Hierarchical binomial logistic regression was used to test the third hypothesis that the T1 cognitive and emotional variables would predict respondents falling above and below clinical cut-off scores for PTSD symptomatology and psychological distress at follow-up, accounting for T1 psychological distress, previous operational experience, exposure to trauma and deployment-related stressors. As with the previous analysis, the analysis was conducted in two stages to isolate the impact of deployment-related stressors. First, a regression model was developed accounting for T1 psychological distress, previous operational experience and exposure to trauma; then a second

regression model was developed controlling for the impact of deployment-related stressors in addition to these variables.

Prediction of above and below clinical cut-off for Post-traumatic Stress

Table 7-7 reports T3 PCL-C scores grouped into above and below a clinical cut-off score of 30, with post-deployment scores for 7761 Army personnel who deployed during the period Jan 03 to Aug 2006 provided as a comparison. The rational for the selection of the cut-off score was provided in Chapter 4. Participants reported higher mean levels of post-traumatic stress at T3 than the comparison group, and a higher percentage of participants in this study recorded scores above cut-off.

Table 7-7

Follow-up (T3) Post-traumatic Stress (PCL-C) scores

	Mean (SD)	Below Cut-off (<30)	Above Cut-off (30+)
Post-traumatic stress	21.12 (6.99) n = 428	390 (91.1%)	38 (8.9%)
Comparison Group[1]	20.5 (5.6) n =7761	7263 (92.7%)	489 (6.3%)

Notes:

1. Comparison Group consisting of Army personnel who deployed during the period Jan 03 to Aug 06 (Twomey, 2007)

Binomial logistic regression model for the prediction of Post-traumatic Stress controlling for exposure to trauma. Binomial logistic regression was performed to determine whether the T1 cognitive and emotional variables would predict that respondents would report above clinical cut-off levels of post-traumatic stress at follow-up, controlling for T1 psychological distress, previous operational experience and trauma exposure. A cut-off value of 30 was selected in line with current Defence policy as reported in Chapter 4.

After the first step, with T1 psychological distress and previous operational experience in the model, the model was not significant $\chi^2_{(2, N = 167)} = 1.28$, $p = .53$, and neither of the predictors were significant. In step 2, with trauma exposure in the model, the Omnibus Tests of Model Coefficients indicated that the model was not a good fit, $\chi^2_{(3, N = 167)} = 3.00$, $p = .39$, although the Homer and Lemershow Test of fitness was non-significant $p = .131$, indicating that the model fit the data. At step 2, the model explained between 1.8% (Cox and Snell R^2) and 4.2% (Nagelkerke R^2) of the variance in post-traumatic stress, and was able to correctly classify 92.2% of all cases. Again, none of the predictors contributed significantly to the model.

Addition of the cognitive and emotional regulation variables in step 3 resulted in a model that provided the best fit to the data, $\chi^2_{(15, N = 167)} = 19.58$, $p = .189$. Although the Omnibus Tests of Model Coefficients indicated that the model was not a good fit, the Homer and Lemershow goodness-of-fit statistic was non-significant ($p = .77$) indicating the model did fit the data. The model as a whole explained between 11.1% (Cox and Snell R^2) and 26.3% (Nagelkerke R^2) of the variance in post-traumatic stress, and correctly classified 93.4% of all cases, indicating that the model was able to distinguish between respondents who score above cut-off for post-traumatic stress, from those who score below cut-off. Specifically, respondents who scored below cut-off were predicted with 100% accuracy and those who scored above were predicted with 15.4% accuracy.

As shown in Table 7-8, only one of the T1 variables, meaningfulness, with an odds ratio of 1.177 CI [1.022 – 1.355], was significant in the final model, suggesting that for this sample the remaining predictor variables did not contribute to prediction of above cut-off post-traumatic stress at the end of the deployment.

Table 7-8

Logistic Regression for Prediction of Reporting Above Cut-off for PTSD symptomatology using T1 Variables as Predictors, Controlling for Exposure to Trauma

	B	S.E.	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
T1 Psych Distress	.182	.097	3.542	1	.060	1.200	.992	1.450
Previous Experience	.125	.275	.207	1	.649	1.133	.661	1.943
Trauma Exposure	.121	.087	1.915	1	.166	1.128	.951	1.339
Benevolence	.014	.075	.033	1	.856	1.014	.875	1.174
Meaningfulness*	.163	.072	5.142	1	.023	1.177	1.022	1.355
Self Worth	-.103	.069	2.236	1	.135	.903	.789	1.032
Locus	-.006	.038	.029	1	.865	.994	.922	1.071
Stability	-.016	.042	.147	1	.702	.984	.906	1.069
Generalisability	.078	.047	2.767	1	.096	1.081	.986	1.186
Non-acceptance	-.093	.139	.444	1	.505	.911	.693	1.198
Lack goal behaviour	.172	.172	.997	1	.318	1.188	.847	1.664
Lack impulse control	.000	.212	.000	1	.997	.999	.659	1.515
Lack awareness	.025	.090	.077	1	.781	1.025	.860	1.222
Lack strategies	-.202	.199	1.030	1	.310	.817	.553	1.207
Lack clarity	-.177	.187	.897	1	.344	.837	.580	1.209
Constant	-8.041	5.150	2.438	1	.118	.000		

* $p < .05$, ** $p < .01$, *** $p < .001$

Binomial logistic regression model for the prediction of post-traumatic stress controlling for exposure to trauma and deployment-related stressors. A second binomial logistic regression was performed to determine whether the T1 cognitive and emotional variables would predict that respondents would report above clinical cut-off levels of post-traumatic stress at follow-up, controlling for T1 psychological distress, previous operational experience and exposure to trauma and deployment-related stressors.

After the first step, with T1 psychological distress and previous operational experience in the model, the model was not significant $\chi^2_{(2, N = 161)} = 1.087$, $p = .58$ and both of the predictors were not significant. In step 2, with trauma exposure and deployment-related stressors in the model, the Omnibus Tests of Model Coefficients again indicated that the model was not a good fit, $\chi^2_{(4, N = 198)} = 8.337$, $p = .08$, although the Homer and Lemershow Test of fitness was non-significant $p = .275$, indicating that the model fit the data. At step 2, the model explained between 5.0% (Cox and Snell R^2) and 12.3% (Nagelkerke R^2) of the variance in post-traumatic stress, and was able to correctly classify 91.9% of all cases. Only deployment-related stressors contributed significantly to the model.

The cognitive and emotional regulation variables were added in step 3, resulting significant model that provided the best fit to the data, $\chi^2_{(16, N = 161)} = 26.978$, $p < .05$. The Homer and Lemershow goodness-of-fit statistic was non-significant ($p = .99$) also indicating that the model fit the data well. The model as a whole explained between 15.4% (Cox and Snell R^2) and 37.5% (Nagelkerke R^2) of the variance in post-traumatic stress, and correctly classified 93.8% of all cases, indicating that the model was able to distinguish between respondents who score above cut-off for post-traumatic stress, from those who score below cut-off. Specifically, respondents who scored below cut-off were predicted with 99.3% accuracy and those who scored above were predicted with 25.0% accuracy.

As shown in Table 7-9, two of the T1 variables, meaningfulness of events and lack goal behaviour were significant in the final model. The strongest predictor of post-traumatic stress was lack goal behaviour reporting an odds ratio of 1.536, CI [1.013 – 2.328], with meaningfulness reporting an odds ratio of 1.210, CI [1.022 – 1.432].

Table 7-9

Logistic Regression for Prediction of Reporting Above Cut-off PTSD symptomatology using T1 Variables as Predictors, Controlling for Exposure to Trauma and Deployment Stressors

	B	S.E.	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
T1 Psych Distress	.156	.106	2.156	1	.142	1.169	.949	1.440
Previous Experience	.044	.321	.019	1	.891	1.045	.557	1.960
Trauma Exposure	.120	.113	1.128	1	.288	1.128	.903	1.407
Deployment Stressors	.037	.020	3.341	1	.068	1.037	.997	1.079
Benevolence	-.018	.087	.044	1	.835	.982	.827	1.165
Meaningfulness*	.190	.086	4.871	1	.027	1.210	1.022	1.432
Self Worth	-.040	.073	.310	1	.578	.960	.833	1.107
Locus	-.001	.046	.001	1	.981	.999	.913	1.093
Stability	-.021	.050	.188	1	.664	.979	.888	1.079
Generalisability	.083	.052	2.567	1	.109	1.086	.982	1.202
Non-acceptance	-.030	.156	.036	1	.849	.971	.715	1.318
Lack goal behaviour*	.429	.212	4.090	1	.043	1.536	1.013	2.328
Lack impulse control	-.123	.272	.206	1	.650	.884	.519	1.506
Lack awareness	.117	.104	1.275	1	.259	1.124	.917	1.378
Lack strategies	-.374	.252	2.205	1	.138	.688	.420	1.127
Lack clarity	-.186	.199	.869	1	.351	.831	.562	1.227
Constant	-15.59	6.701	5.410	1	.020	.000		

* $p < .05$, ** $p < .01$, *** $p < .001$

Summary, prediction of above/below cut-off of T3 post-traumatic stress. It was hypothesised that T1 cognitive and emotional predictors would contribute to prediction of participants scoring above clinical cut-off for post-traumatic stress at follow-up, accounting for T1 psychological distress, previous operational experience, and exposure to trauma and deployment-related stressors. The results provide partial support for the hypothesis, showing that of the cognitive and emotional regulation variables, meaningfulness and lack goal behaviour emerged as significant predictors for

identifying participants likely to report above clinical cut-off levels of post-traumatic stress at follow-up. The direction of the relationships for the significant variables suggests that participants who have a strong world view around events having meaning, and those who lack the ability to engage in goal directed behaviour when emotionally distressed, tend towards increased vulnerability for ongoing psychopathology.

Prediction of above and below clinical cut-off of Psychological Distress

Table 7-10 reports K10 scores grouped into above/below a clinical cut-off score of 20, with pre-deployment scores for this sample, and post-deployment scores for 7761 Army personnel who deployed during the period Jan 03 to Aug 2006, provided as a comparison. The rational for the selection of the cut-off score was provided in Chapter 4. Participants reported comparable levels of psychological distress with the comparison group, with a higher percentage scoring above cut-off at follow-up, compared to at pre-deployment.

Table 7-10

Follow-up (T3) Psychological Distress (K10) scores

	Mean (SD)	Below Cutoff (<20)	Above Cutoff (20+)
Pre-Deployment (T1)	13.58 (3.84) n = 481	447 (92.9%)	34 (7.1%)
Follow-Up (T3)	13.39 (5.16) n = 430	387 (90%)	43 (10%)
Comparison Group[1]	14.2 (4.7) n = 8021	7209 (88.8%)	812 (11.2%)

Notes:

1. Comparison Group consisting of Army personnel who deployed during the period Jan 03 to Aug 06 (Twomey, 2007)

Binomial logistic regression model for the prediction of T3 Psychological distress controlling for exposure to trauma. Binomial logistic regression was performed to determine whether the T1 cognitive and emotional variables would predict that respondents would report above clinical cut-off levels of psychological distress at follow-up, controlling for T1 psychological distress, previous operational experience and exposure to trauma.

After the first step, with T1 psychological distress and previous operational experience in the model, the model was significant $\chi^2_{(2, N = 168)} = 8.785$, $p < .05$, explaining between 5.1% (Cox and Snell R^2) and 10.6% (Nagelkerke R^2) of the variance in psychological distress. Only T1 psychological distress contributed significantly to the model. In step 2, with trauma exposure in the model, the model was a good fit, $\chi^2_{(3, N = 168)} = 9.261$, $p < .05$, the Homer and Lemershow Test of fitness was non-significant $p = .947$, indicating that the model fit the data. In step 2 the model explained between 5.4% (Cox and Snell R^2) and 11.2% (Nagelkerke R^2) of the variance in psychological distress. Trauma exposure did not contribute significantly to the model.

The cognitive and emotional regulation variables were added in step 3, resulting in a significant model that provided the best fit to the data, $\chi^2_{(15, N = 168)} = 27.268$, $p < .05$. The Homer and Lemershow goodness-of-fit statistic was not significant ($p = .576$), further suggesting that the model was a good fit to the data. The model as a whole explained between 15% (Cox and Snell R^2) and 31.2% (Nagelkerke R^2) of the variance in psychological distress, and correctly classified 91.1% of all cases, indicating that the model was able to distinguish between respondents who score above cut-off for psychological distress, from those who score below cut-off. Specifically, respondents who scored below cut-off were predicted with 98.7% accuracy and those who scored above were predicted with 23.5% accuracy.

As shown in Table 5-11, three of the T1 variables, benevolence, lack awareness and lack clarity were significant in the final model. Lack awareness was the strongest predictor of post-deployment psychological distress reporting an odds ratio of 1.282, CI [1.054 – 1.560].

Table 7-11

Logistic Regression for Prediction of Reporting Above Cut-off Psychological Distress at T3 using T1 Variables as Predictors, Controlling for Exposure to Trauma

	B	S.E.	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
T1 Psych Distress	.136	.075	3.290	1	.070	1.146	.989	1.327
Previous Experience	.290	.303	.914	1	.339	1.336	.738	2.419
Trauma Exposure	-.044	.089	.245	1	.620	.957	.803	1.140
Benevolence*	.187	.078	5.736	1	.017	1.206	1.035	1.406
Meaningfulness	.002	.063	.001	1	.974	1.002	.885	1.135
Self Worth	-.075	.064	1.393	1	.238	.927	.818	1.051
Locus	.005	.034	.019	1	.891	1.005	.940	1.074
Stability	-.001	.040	.001	1	.974	.999	.923	1.080
Generalisability	.019	.037	.256	1	.613	1.019	.947	1.096
Non-acceptance	.043	.113	.144	1	.705	1.044	.836	1.303
Lack goal behaviour	.231	.162	2.031	1	.154	1.259	.917	1.730
Lack impulse control	-.194	.168	1.322	1	.250	.824	.592	1.146
Lack awareness*	.249	.100	6.195	1	.013	1.282	1.054	1.560
Lack strategies	.127	.146	.759	1	.383	1.136	.853	1.513
Lack clarity*	-.316	.159	3.973	1	.046	.729	.534	.995
Constant	-11.21	5.434	4.260	1	.039	.000		

* $p < .05$, ** $p < .01$, *** $p < .001$

Binomial logistic regression model for the prediction of Psychological Distress controlling for exposure to trauma and deployment-related stressors. Binomial logistic regression was performed to determine whether the T1 cognitive and emotional variables would predict that respondents would report above cut-off levels of psychological distress at follow-up, controlling for T1 psychological distress, previous operational experience, and exposure to trauma and deployment-related stressors.

After the first step, with T1 psychological distress and previous operational experience in the model, the model was significant $\chi^2_{(2, N = 162)} = 8.58$, $p < .05$. The model explained between 5.2% (Cox and Snell R^2) and 10.5% (Nagelkerke R^2) of the variance in psychological distress, and was able to correctly classify 90.1% of all cases. Previous operational experience however, was non-significant. In step 2, with trauma exposure and deployment-related stressors in the model, the Omnibus Tests of Model Coefficients indicated that the model was not a good fit, $\chi^2_{(4, N = 162)} = 8.896$, $p = .06$, although the Hosmer and Lemershow Test of fitness was non-significant $p = .103$, indicating that the model did fit the data. In step 2 the model explained between 5.3% (Cox and Snell R^2) and 10.9% (Nagelkerke R^2) of the variance in psychological distress, and was able to correctly classify 90.1% of all cases. Neither of the additional predictors was significant.

The cognitive and emotional regulation variables were added in step 3, resulting in a significant model that provided the best fit to the data, $\chi^2_{(16, N = 162)} = 26.434$, $p < .05$. The Homer and Lemershow goodness-of-fit statistic was not significant ($p = .503$), further suggesting that the model was a good fit to the data. The model as a whole explained between 15.1% (Cox and Snell R^2) and 30.8% (Nagelkerke R^2) of the variance in psychological distress, and correctly classified 90.1% of all cases, indicating that the model was able to distinguish between respondents who score above cut-off for

psychological distress, from those who score below cut-off. Specifically, respondents who scored below cut-off were predicted with 98.6% accuracy and those who scored above were predicted with 17.6% accuracy.

Table 7-12

Logistic Regression for Prediction of Reporting Above Cut-off Psychological Distress at T3 using T1 Variables as Predictors, Controlling for Exposure to Trauma and Deployment-related Stressors

	B	S.E.	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
T1 Psych Distress	.135	.076	3.162	1	.075	1.145	.986	1.329
Previous Experience	.274	.305	.807	1	.369	1.316	.723	2.394
Trauma Exposure	-.049	.094	.271	1	.602	.952	.792	1.145
Deployment Stressors	.003	.020	.018	1	.895	1.003	.965	1.042
Benevolence*	.179	.080	4.938	1	.026	1.196	1.021	1.400
Meaningfulness	.005	.065	.005	1	.943	1.005	.885	1.141
Self Worth	-.073	.064	1.279	1	.258	.930	.820	1.055
Locus	.007	.034	.037	1	.847	1.007	.941	1.077
Stability	.001	.041	.001	1	.974	1.001	.924	1.085
Generalisability	.018	.037	.230	1	.631	1.018	.946	1.095
Non-acceptance	.046	.115	.159	1	.690	1.047	.836	1.310
Lack goal behaviour	.231	.165	1.966	1	.161	1.260	.912	1.741
Lack impulse control	-.205	.171	1.442	1	.230	.815	.583	1.138
Lack awareness*	.244	.099	6.035	1	.014	1.276	1.051	1.550
Lack strategies	.125	.147	.723	1	.395	1.133	.849	1.512
Lack clarity*	-.314	.159	3.885	1	.049	.731	.535	.998
Constant	-11.30	5.500	4.222	1	.040	.000		

* $p < .05$, ** $p < .01$, *** $p < .001$

As shown in Table 7-12, consistent with the previous model three of the T1 variables, benevolence, lack awareness and lack clarity were significant in the final

model. Deployment-related stressors were not significant, and again, lack awareness was the strongest predictor of psychological distress at follow-up reporting an odds ratio of 1.276, CI [1.051 – 1.550].

Summary, prediction of above and below cut-off for Psychological Distress. It was hypothesised that T1 cognitive and emotional predictors would contribute to prediction of participants scoring above clinical cut-off for psychological distress at follow-up accounting for T1 psychological distress, previous operational experience, and exposure to trauma and deployment-related stressors. The results provide partial support for the hypothesis, showing that three of the cognitive and emotional regulation variables; benevolence, lack awareness of emotional response and lack clarity of emotional response, were significant predictors of T3 psychological distress in both models. The direction of the relationships for benevolence and lack awareness suggests that participants who have an overly benevolent world view, and those who experience difficulty accessing or being aware of the emotional response, tend towards increased vulnerability for ongoing psychopathology.

Discussion

Relationship between trauma exposure and T3 adjustment

The results provided partial support for the first hypothesis that higher levels of exposure to traumatic events and deployment stressors would be associated with psychopathology at follow-up. As expected, the bivariate correlations between exposure and pathology showed that higher levels of exposure to traumatic events and deployment-related stressors were associated with psychopathology at follow-up. The relationships between exposure and pathology were weaker than they had been at the end of the deployment however, suggesting a moderating of this relationship over time.

The positive effect of time was most evident for the relationship between deployment-related stressors and pathology, with the bilateral correlations reducing from $r = .6$ for both post-traumatic stress and psychological distress at T2, to $r = .2$ and $r = .1$ respectively at T3. Additionally, in the regression models, deployment-related stressors were no longer significant at T3, further suggesting that the impact of these issues reduces over time. The relationship between trauma exposure and pathology also reduced at T3, compared to T2, although this reduction was less pronounced. Again, however, the results demonstrate an effect of time.

Prediction of severity of T3 psychopathology

The study provided support for the second hypothesis by identifying pre-existing cognitive and emotional variables that were related to the prediction of severity of pathology at T3. In addition to trauma exposure, pre-existing beliefs about self-worth were found to be related to the prediction of severity of post-traumatic stress. Wartime experience can challenge a person's sense of self-worth by affecting their identity and making them feel like 'damaged goods', feel weak for being scared and feel weak for asking for help (Armstrong, Best, & Domenici, 2006). Consistent with Cognitive-Appraisal Theory (Janoff-Bulman, 1985, 1989, 1992), the results of this study suggest that people with lower pre-existing levels of self-worth may be less confident that they can engage in appropriate precautionary behaviours, and are more likely to experience difficulties accessing and expressing emotion. They are therefore less likely to engage in help and support seeking behaviour, thus making them more vulnerable for ongoing pathology.

Two pre-existing variables; benevolence and non-acceptance of emotional response were found to be related to prediction of severity of psychological distress. The results provide support for Janoff-Bulman's (1989, 1992), view that people with an

overly benevolent view of the world were at increased risk of ongoing pathology, as their negative experiences disrupt this view, showing that positive beliefs around benevolence of the world contributed to prediction of severity of psychological distress at follow-up. The results also support Dalgliesh's (1999, 2004) suggestion that a person with a *valid overvalued schema* who has led a relatively predictable, controllable, safe and fulfilling life, or a person with an *illusory overvalued schema*, who has maintained an 'overvalued' view of life through the inhibition of information relating to negative experiences, are also at risk. Such representations may not reflect reality, and thus these people experience traumatic or stressful events as being too discrepant from their previous experience.

A pre-existing disposition towards non-acceptance of emotional response also emerged as a significant variable in the prediction model for severity of psychological distress at follow-up. The results suggest that a tendency to have negative secondary emotional responses to negative emotions or a non-accepting reaction to distress, contributes to the maintenance of psychopathology. Beliefs about the negative consequences of losing control of one's emotions are a key feature of post-trauma pathology (Williams et al., 1997), and the fact that this study shows that non-acceptance of emotional response remains significant at follow-up suggests that it may be linked to beliefs that negative psychological or emotional responses are a sign of weakness. This can lead to perceptions about being seen as weak, thereby possibly acting as a major barrier to help seeking (e.g. Britt et al., 2008; Britt et al., 2007; Corrigan & Watson, 2002; Gall, 2006; Hoge et al., 2004).

Prediction of above and below clinical cut-off for T3 psychopathology

The third hypothesis proposed that the T1 cognitive and emotional variables would contribute to prediction of participants falling above or below clinical cut-off

levels for T3 post-traumatic stress and psychological distress, controlling for T1 psychological distress, previous operational experience, and exposure to trauma and deployment related stressors. Two variables; meaningfulness and difficulties engaging in goal-related behaviour, contributed to the identification of participants falling above and below clinical cut-off levels for PTSD symptomatology.

In Western cultures, meaningfulness is the belief that events are comprehensible, and that the world is just, controllable and predictable (Janoff-Bulman, 1992; Lerner, 1980). In the context in which this study was conducted, the world of the participants was not predictable, events were random, and there was an ambiguous relationship between their skills and training (their behaviour), and their ability to remain safe. When five vehicles drive safely down a road, and the sixth is blown up, it is difficult to believe that events are meaningful and that one has control over one's fate. The results provide support for the hypothesis showing that a pattern of strong, or rigid beliefs around events having meaning, provides vulnerability for ongoing pathology.

Difficulties engaging in goal-directed behaviour also emerged as a significant variable in the model for the prediction of participants falling above or below cut-off for PTSD symptomatology. This variable is related to beliefs around competence and controllability (Gratz & Roemer, 2004), and reflects participants who report difficulties concentrating and accomplishing tasks when experiencing negative emotions, suggesting an inability to engage in longer term coping behaviour. That this variable was related to prediction of cut-off, rather than severity of pathology, suggests that it may be differentiating between participants who are coping well and those who are experiencing transition or reintegration difficulties. It may therefore be related to the ability to adopt different coping strategies, suggesting the need for further research into the relationship between ability to engage in goal directed behaviour and coping.

Two variables; lack of awareness of emotional response and clarity of emotional response contributed to identification of participants falling above and below clinical cut-off levels for psychological distress. Lack of awareness of emotional response reflects the extent to which people do not recognise that they are experiencing negative emotions, while lack of emotional clarity reflects the extent that individuals are able to label and understand the emotions they are experiencing (Gratz & Roemer, 2004). Ongoing adjustment is closely linked to the ability to access social and professional support, and people who lack the capacity to acknowledge or even recognise their emotional response are unlikely to perceive or admit that they have a problem. Recent studies into the impact of mental health stigma within the military have repeatedly highlighted that having a tendency to internalise responsibility for mental health problems acts as a major barrier to help seeking (e.g. Britt, et al., 2008; Britt, et al., 2007; Corrigan & Watson, 2002; Gall, 2006; Gould, et al., 2010; Hoge, et al., 2004). Psychological barriers to care in returning veterans can include not only a lack of capacity for emotional response, but also a lack of awareness about emotional response, both likely to contribute to the maintenance of psychopathology.

Benefits and limitations of this study

The results of this study extends the work of the previous chapter and provides further support for cognitive and appraisal theories of PTSD and related pathology. This study identified several key findings: first, the reduced importance of deployment-related stressors in predicting adjustment at follow-up; second; the importance of low self worth, and pre-existing positive beliefs around benevolence of the world as risk factors for poor adjustment; and third, a tendency to lack awareness, clarity and acceptance of emotional response, and to report difficulties engaging in goal directed behaviour when distressed, emerged as risk factors for poor on-going adjustment.

This study also identified issues that may impact on coping behaviour, and these are addressed in more detail in the next chapter. While this and the previous chapter examined the relationships between the cognitive and emotional regulation variables and adjustment, the next chapter describes the relationship between the cognitive and emotional predictors and coping behaviour, and between coping behaviour and adjustment measured both at the end of the deployment, and at follow-up.

CHAPTER 8

STUDY 4: PREDICTION OF COPING BEHAVIOUR AND RELATIONSHIP TO ADJUSTMENT

The previous chapters explored the degree that the pre-deployment cognitive and emotional regulation variables are stable across the deployment and the relationship between the cognitive and emotional predictors and adjustment. This chapter addresses the fourth research question, and explores the stability of coping behaviour across the deployment, the relationship between the cognitive and emotional predictors and coping behaviour, and the relationship between coping behaviour and adjustment measured at the end of the deployment, and at follow-up.

Coping Strategies and Trauma Response

Stress and Coping Theory (Lazarus & Folkman, 1984) emphasises the interaction between the nature of a stressful event, the individual's cognitive appraisal of the event, the coping resources available and the specific coping strategies the person uses. Coping was defined in Chapter 3 as a person's "cognitive and behavioural efforts to manage specific external and or internal demands that are appraised as taxing or exceeding the resources of a person" (Lazarus, 1993, p. 237). In other words, coping is a combination of person's cognitive and behavioural efforts to manage stress. Several appraisals or beliefs have been shown to influence coping *following* traumatic exposure: appraisal of the actual event as threatening, beliefs about personal vulnerability, appraisal of causation, beliefs around the perception of control, attempts to assign meaning to the event (Bowman & Yehuda, 2004), and the ability to adopt appropriate coping mechanisms (Endler, et al., 2000; Lazarus, 1991, 1993). But Ehlers and Clark's (2000) Cognitive Maintenance Model highlights the importance of the coping *state* of

the individual in influencing threat and symptom control strategies. In other words, it is the *pre-existing* pattern of coping strategies that the person takes *into* the traumatic event, which influences how they manage the traumatic threat, and their ability to control their symptoms both during and after the event. This suggests that it is their *pre-existing* pattern of coping, and their experience of how they have coped successfully before, which influences their choice of coping strategies both during the trauma and afterwards.

Coping is contextual, and needs to be able to change over time and in accordance with the situational context where it occurs. From this viewpoint therefore, whether a coping process is adaptive or maladaptive, depends on the person and the situation. That notwithstanding, within the field of coping literature, two primary conceptualisations of adaptive and maladaptive coping have emerged. The first, based on Stress and Coping Theory, conceives coping strategies as either problem-focused or emotion-focused (Lazarus, 1993; Lazarus & Folkman, 1984), while the second conceptualises coping strategies as either approach or avoidant (Littleton, et al., 2007).

By categorising coping strategies as either problem or emotion focused, and approach or avoidant focused, it is possible to identify several sub-categories of coping: problem- and emotion-approach, and problem- and emotion-avoidant. Problem-approach coping strategies aim to actively change the person-situation relationship by acting on either the situation, or on oneself to address the perceived problem; while emotion-approach strategies seek to actively manage the emotions or thoughts about the stressor (Carver, et al., 1989), and are reliant on the individual having the capacity to do this, or to be able to access social support (Roth & Cohen, 1986). Avoidant strategies, by comparison, take the focus away from the stressor by seeking to either avoid the

stressor itself, or to avoid the distressing emotions or thoughts about the stressor (Holahan & Moos, 1987b; Littleton, et al., 2007).

Some writers (e.g. Masel, Terry, & Gribble, 1996) suggest that problem-focused strategies are more adaptive than emotion-focused strategies because they focus on actively addressing the problem, thereby changing the situation. However, Folkman stated that "a time honoured principle of effective coping is to know when to appraise a situation as uncontrollable, and hence abandon efforts directed at altering that situation, and turn to emotion-focused processes in order to tolerate or accept the situation" (1984, p.849). Adaptive coping is therefore closely related to perceptions of control, and it is one's flexibility in being able to adopt an appropriate coping strategy that is adaptive, rather than simply being able to adopt a problem-focused approach.

Cognitive Appraisals and Coping Behaviour

A limited number of studies have demonstrated a link between causal attributions and coping strategies. Mikulincer and Solomon (1989) showed that attribution of negative events to internal, temporary and controllable causes was related to greater use of problem-focused coping strategies. Conversely, attribution of negative events to internal, stable and uncontrollable causes was related to greater use of emotion-focused coping strategies. They suggested that someone who has the latter pattern of attributions develops expectancies of uncontrollability, which are generalised over time through reducing the person's level of motivation.

In a separate study, Mikulincer (1989) showed that making internal, stable and global attributions enhances the threat to self-esteem produced by the failure, and lowers expectancy of control. A lower expectancy of control over future negative events was found to reduce the individual's belief in the effectiveness of instrumental responses, and was associated with less use of problem-focused coping strategies, and

the selection of emotion-focused coping strategies to deal with the inner tension. Summarising this research, Mikulincer (1994) concluded that the higher the expectancy of control, the more likely people were to use problem focused coping strategies, and the lower the expectancy of control, the more likely people were to rely on emotion-focused coping.

Another key appraisal that impacts on coping ability following stressful or traumatic events relates to people's appraisals about themselves and the world. Janoff-Bulmann (1985, 1989, 1992) suggests that people with strong feelings of self-worth, and who view others as generally benevolent, are more likely to be able to adopt problem-focused coping strategies, or be able to access social support, than people who doubt their own ability to cope, or who view others with suspicion. Conversely, people with low self-worth are less likely to believe that they have the capacity to solve problems and cope with stress, while those who view others as less benevolent, are less likely to turn to believe they can access social supports.

Emotional Response and Coping Behaviour

While problem-focused and emotion-focused 'approach' coping strategies are generally associated with improved psychological adjustment in response to stressors, reliance on 'avoidant' strategies is usually associated with lower levels of psychological adjustment (Carver, et al., 1989; Johnsen, et al., 1998). When facing traumatic situations, people appraise how relevant, harmful and controllable the situation is, and these appraisals influence their choice of coping strategy (Kanninen, et al., 2002). In some individuals, a normal emotional response to a traumatic event can be misinterpreted as an indicator of permanent change, or as a threat to their mental and physical health (Ehlers & Clark, 2000). Such appraisals act to maintain PTSD by producing negative emotions such as anxiety, depression or anger (Brewin, Andrews, &

Rose, 2000; Novaco & Chemtob, 2002), and by encouraging individuals to adopt maladaptive coping strategies. Given that military personnel tend to be highly task and solution focussed it is anticipated that there will be a preference for problem-focussed coping strategies. In a recent study of US Navy personnel for example, avoidant and emotion-focused coping was found to predict acute stress symptoms in response to realistic survival training, whereas problem-focused coping did not (Taylor et al., 2009). Deficits in emotional regulation have also been shown to predict maladaptive coping following a trauma (Cloitre, et al., 2005; Price, et al., 2006).

In summary, post-trauma adjustment has been shown to be related in part to coping behaviour, with problem-focussed strategies thought to be more adaptive than emotion-focused and avoidant strategies. It is expected that problem-focused coping would be associated with internal, temporary and specific attributions, positive self and world beliefs, and reduced difficulties with emotional regulation. That emotion-focused coping would be associated with internal, stable, and global attributions, positive self and world beliefs, and reduced difficulties for emotional regulation; and that avoidant coping would be associated with internal, stable, and global attributions, lower levels of self-worth, a negative world view and increased difficulties with emotional regulation.

This study examines the degree that measures of pre-existing patterns of coping behaviour can be used to predict severity of post-traumatic stress and psychological distress, taking account of exposure to trauma and deployment-related stressors, and controlling for previous operational experience and pre-deployment levels of psychological distress.

Hypotheses

There were four hypotheses: first, the correlations between the paired T1 and T3 coping variables would be moderate to high, with the strength of the correlation reflecting stability of individual responses.

Second, that mean scores for the T1 and T3 coping variables would not significantly change across the deployment reflecting a stable pattern of coping behaviour.

Third, the T1 cognitive and emotional variables would contribute to prediction of T1 coping behaviour.

Fourth; that T1 coping behaviour would contribute to prediction of severity of T2 and T3 post-traumatic stress and psychological distress, controlling for T1 psychological distress and previous operational experience, and accounting for exposure to trauma and deployment-related stressors.

Method

Participants

Participants were Australian Defence Force Personnel who completed six month active duty deployments to Afghanistan and Iraq during 2008. Data collection was conducted both prior to and at the end of the deployment, and at follow-up 4-8 months following their return to Australia. Data was collected at pre-deployment using measures of the cognitive and emotional predictors, psychological distress and previous operational experience. Data on coping behaviour was collected at pre-deployment and at follow-up. Measures of exposure to trauma and deployment-related stressors were collected at the end of the deployment. Data on PTSD symptomatology and psychological distress was collected at the end of the deployment and again at follow-up.

Variables.

Demographic factors. Demographic items were measured using questions to determine the participant's age, gender, seniority, length of service and previous operational service.

Self and world beliefs. Self and world beliefs were measured using the World Assumption Scale (WAS) (Janoff-Bulman, 1989), which measures beliefs regarding benevolence of the world, meaningfulness of the world, and self-worth. Reliabilities were reported in Chapter 4 and were comparable with the pattern of findings described in the literature.

Emotional regulation. Capacity for emotional regulation was measured using the 36-item Difficulties in Emotion Regulation Scale (DERS), which assesses modulation of emotional arousal, awareness, understanding, and acceptance of emotions, and the ability to act in desired ways regardless of emotional state. Reliabilities were reported in Chapter 4 and were comparable with the pattern of findings described in the literature.

Attribution Style. Attribution Style was measured using the Attributional Style Questionnaire – General Use (ASQ-G.), which measures locus of control, stability and generalisability of attributions (Dykema, et al., 1996). Reliabilities were reported in Chapter 4 and were comparable with the pattern of findings described in the literature.

Trauma exposure. Exposure to traumatic events during the deployment was measured using the Traumatic Stress Exposure Scale – Revised (TSES-R) (Hodson, 2002; Swann & Hodson, 2004). The degree of exposure to traumatic events reported by participants was reported in Chapter 5.

Deployment-related stressors. The Major Stressors Inventory (MSI) was used to rate the level of stress caused by a list of 36 deployment related stressors that cover a

range of issues including the behaviour of others, impact of separation from family and friends, quality of leadership, exposure to a foreign culture, and lack of personal privacy. The level of stress reported by participants that was caused by exposure to deployment-related stressors was reported in Chapter 5.

Post-traumatic Stress Disorder. PTSD symptomatology was measured using the Posttraumatic Stress Disorder Checklist – Civilian (PCL-C) (Weathers, et al., 1993), which asks respondents to indicate how much they have been bothered by a list of 17 symptoms over the previous month.

Psychological distress. Post-deployment psychological distress was measured using the Kessler Psychological Distress Scale (K-10) (Kessler, et al., 2002).

Coping behaviour. Coping behaviour was measured using the Coping Inventory for Stressful Situations – Short Form (CISS-SF) (Cohan, et al., 2006; Endler & Parker, 1990). The CISS-SF is a 21-item self-report instrument measuring problem-focussed, emotion-focussed, and avoidance-focussed coping behaviours. Reliabilities were reported in Chapter 4 and were comparable with the pattern of findings described in the literature for problem and avoidant focussed coping. Reliabilities for emotion-focussed coping were approximately 10-15 points lower than in the litreature, $\alpha = .68$ and .68 at T1 and T2 respectively.

Results

Data analysis was conducted in several stages using SPSS v16. During the first stage of analysis, mean scores and Pearson correlations were examined to test the first hypothesis and determine the stability of individual coping behaviour, and the relationships between the T1 and T3 coping variables; while paired t-tests were used to test the second hypothesis and determine the stability of the mean scores across the deployment.

During the second stage, hierarchical linear regression was used to determine prediction models for T1 coping behaviour. This sought to test the third hypothesis that the T1 cognitive and emotional variables would contribute to prediction of coping behaviour.

During the final stage, hierarchical linear regression was used to determine prediction models for severity of T2 and T3 post-traumatic stress and psychological distress using T1 coping behaviour as the predictor. This sought to test the fourth hypothesis that T1 coping behaviour would contribute to prediction of severity of T2 and T3 post-traumatic stress and psychological distress, controlling for T1 psychological distress and previous operational experience, and accounting for exposure to trauma and deployment-related stressors.

Study 4a: Description of coping behaviour

Stability of coping behaviour across the deployment

Stability of individual responses. The first hypothesis proposed that correlations between the paired T1 and T3 coping variables would be moderate to high, with the strength of the correlation reflecting stability of individual responses across the deployment. Examination of the bivariate correlations between the T1 and T3 variables indicated moderate to strong relationships; with $r = .57$ for problem-focussed coping; $r = .45$ for emotion-focussed coping; and $r = .33$ for avoidant coping, all $p < .001$.

Stability of the mean scores. The second hypothesis proposed that mean scores for the T1 and T3 coping variables would be stable across the deployment. Paired sample t-tests were used to compare mean scores with the results showing a significant reduction in the mean score for avoidant coping between T1 and T3, $t = 5.382$, $p < .001$. The differences between the paired means for problem-focussed coping, $t = .911$, $p = .364$, and emotion focussed coping, $t = .683$, $p = .496$, were not significant.

Means and standard deviations for the paired variables are listed in Table D-3 in Appendix D, while Figure 8-1 depicts the relationship between the mean scores.

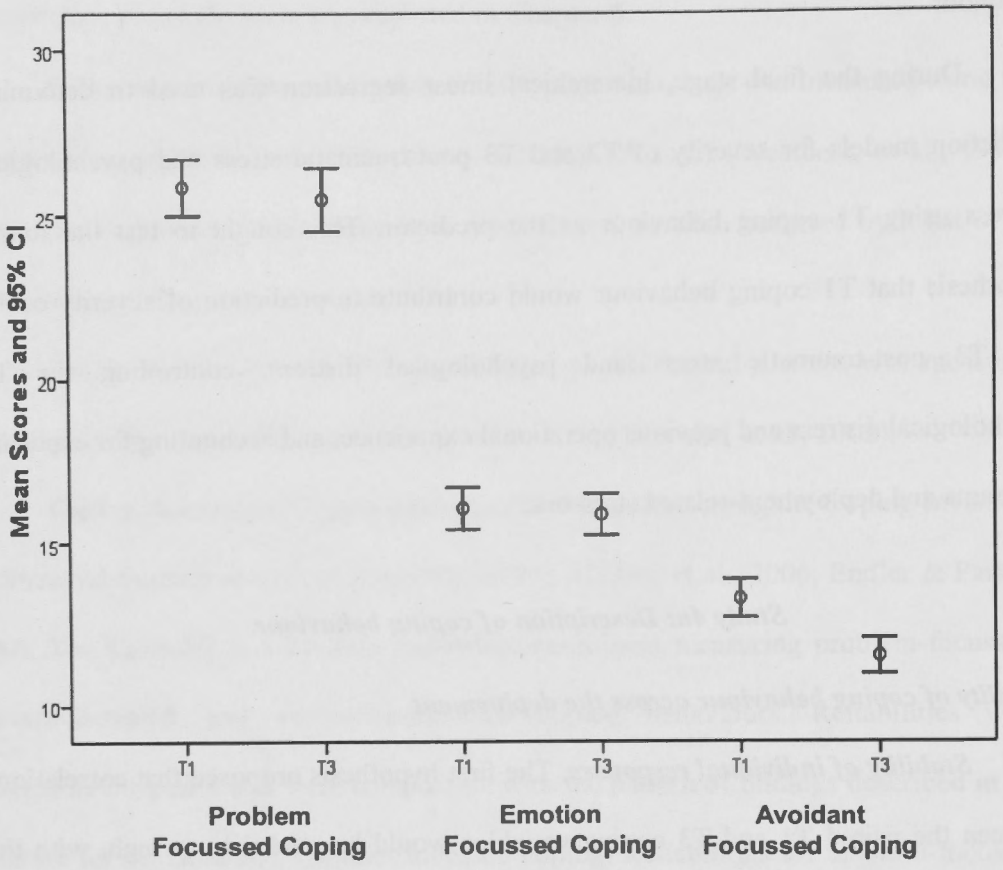

Figure 8-1. Changes in Mean Scores for Coping Behaviour from T1 to T3

Identification of preferred coping behaviour

Figure 8-1 also shows that participants appear to demonstrate a preference for problem-focussed coping strategies over emotion or avoidant strategies. This was tested through the use of paired sample t-tests to determine whether there would be a distinct preference for problem-focussed coping strategies over emotion or avoidant strategies for this sample.

The results showed that significant differences were identified between problem- and emotion-focussed coping at both T1, $t = 29.635$, $p < .001$, and T3, $t = 18.452$, $p < .001$. Between emotion- and avoidant-focussed coping at both T1, $t = 18.89$, $p < .001$, and T3, $t = 14.706$, $p < .001$, and between problem- and avoidant-focussed coping at both T1, $t = 39.294$, $p < .001$, and T3, $t = 24.464$, $p < .001$.

Participants in this sample were more likely to exhibit a problem focused, rather than an emotion or avoidant coping style. Means, standard deviations and mean differences for the T1 and T3 coping behaviour pairs are provided at Table D-4 in Appendix D.

Study 4b: Prediction of coping behaviour

The third hypothesis proposed that the T1 cognitive and emotional variables would contribute to prediction of coping behaviour. Multivariate linear regression was used to determine prediction models for coping behaviour both prior to deployment and at follow-up. Correlations between the T1 cognitive and emotional regulation variables and coping behaviour are reported at Table 8-1.

Table 8-1

Summary of Bivariate Correlations between T1 Cognitive and Emotional Regulation Variables and T1 Coping Behaviour

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Benevolence	1.000														
2. Meaningfulness	.212***	1.000													
3. Self Worth	.455***	.216***	1.000												
4. Locus	-.051	.041	.016	1.000											
5. Stability	-.053	-.065	-.086	.317***	1.000										
6. Generalisability	-.056	-.018	-.118	.279***	.675***	1.000									
7. Non-Acceptance	-.197***	.003	-.317***	.084	.113	.114	1.000								
8. Lack Goal Behaviour	-.140**	-.053	-.305***	.060	.109	.181**	.533***	1.000							
9. Lack Impulse Control	-.218***	-.067	-.355***	.014	.018	.041	.514***	.574***	1.000						
10. Lack Awareness	-.234***	-.108*	-.307***	-.074	.006	.048	.131**	.140**	.229***	1.000					
11. Lack Strategies	-.260***	-.058	-.386***	.026	.035	.115	.663***	.668***	.681***	.217***	1.000				
12. Lack Clarity	-.228***	-.144**	-.385***	-.014	.048	.081	.396***	.442***	.446***	.586***	.530***	1.000			
13. Problem	.133**	.055	.366***	.021	-.045	-.033	-.154**	-.307***	-.348***	-.394***	-.306***	-.344***	1.000		
14. Emotion	-.020	.057	-.018	-.044	-.054	-.020	.182***	.137**	.188***	-.064	.138**	.039	.071	1.000	
15. Avoidant	-.110*	-.050	-.264***	-.018	.045	.081	.559***	.451***	.344***	.087	.460***	.346***	-.081	.470***	1.000

* $p < .05$, ** $p < .01$, *** $p < .001$

Prediction of Problem-focussed coping. A multivariate linear regression was performed to determine a regression model for problem-focussed coping using the cognitive and emotional regulation variables as predictor variables.

The regression model was significant, $R = .596$, adjusted $R^2 = .322$, ($F_{(12, 231)} = 10.624$, $p < .001$). Five independent variables contributed significantly to prediction of problem-focussed coping: benevolence ($sr^2 = -.118$), self-worth ($sr^2 = .229$), non-acceptance ($sr^2 = .143$), lack awareness ($sr^2 = -.269$) and lack strategies ($sr^2 = -.144$). Model statistics are reported at Table 8-2.

Table 8-2

Linear Regression Analysis for Prediction of T1 Problem Focussed Coping

Variables	*B*	*β*	sr^2 (unique)	*R*	R^2	Adj R^2
Intercept	27.057			.596***	.356	.322
Benevolence	-.139	-.136*	-.118			
Meaningfulness	-.006	-.007	-.006			
Self-Worth	.237	.291***	.229			
Locus	-.008	-.015	-.014			
Stability	-.042	-.084	-.062			
Generalisability	.050	.110	.079			
Non Acceptance	.279	.198**	.143			
Lack Goal Behaviour	-.083	-.044	-.032			
Lack Impulse Control	-.216	-.111	-.081			
Lack Awareness	-.397	-.360***	-.269			
Lack Strategies	-.368	-.249**	-.144			
Lack Clarity	.083	.047	.031			

* $p < .05$, ** $p < .01$, *** $p < .001$

Prediction of Emotion-focussed coping. A multivariate linear regression was performed to determine a regression model for emotion-focussed coping using the cognitive and emotional regulation variables as predictor variables.

The regression model was not significant, $R = .249$, adjusted $R^2 = .013$, ($F_{(12, 231)} = 1.268$, $p = .239$). Only lack awareness ($sr^2 = -.126$) contributed significantly to prediction of emotion-focussed coping, although lack impulse control ($sr^2 = .123$) approached significance with $p = .056$.

Model statistics are reported at Table 8-3.

Table 8-3

Linear Regression Analysis for Prediction of T1 Emotion Focussed Coping

Variables	*B*	β	sr^2 (unique)	*R*	R^2	Adj R^2
Intercept	17.214			.249***	.062	.013
Benevolence	-.019	-.025	-.022			
Meaningfulness	.057	.089	.083			
Self-Worth	-.027	-.046	-.036			
Locus	-.010	-.027	-.025			
Stability	.012	.034	.025			
Generalisability	-.014	-.042	-.030			
Non Acceptance	.083	.082	.059			
Lack Goal Behaviour	.059	.043	.031			
Lack Impulse Control	.236	.168#	.123			
Lack Awareness	-.135	-.169*	-.126			
Lack Strategies	-.099	-.093	-.054			
Lack Clarity	-.018	-.008	-.005			

* $p < .05$, ** $p < .01$, *** $p < .001$, # $p = .056$

Prediction of Avoidant coping. A multivariate linear regression was performed to determine a regression model for avoidant coping using the cognitive and emotional regulation variables as predictor variables.

The regression model was significant, $R = .586$, adjusted $R^2 = .310$, ($F_{(12, 231)} = 10.079$, $p < .001$). Two independent variables contributed significantly to prediction of avoidant coping: non-acceptance ($sr^2 = .272$), lack goal behaviour ($sr^2 = .193$) while lack awareness ($sr^2 = -.104$) approached significance with $p = .052$.

Model statistics are reported at Table 8-4.

Table 8-4

Linear Regression Analysis for Prediction of T1 Avoidant Coping

Variables	*B*	*β*	sr^2 (unique)	*R*	R^2	Adj R^2
Intercept	13.117			.586***	.344	.310
Benevolence	.020	.029	.025			
Meaningfulness	-.041	-.070	-.065			
Self-Worth	-.053	-.098	-.077			
Locus	-.013	-.039	-.036			
Stability	.016	.048	.035			
Generalisability	-.010	-.035	-.025			
Non Acceptance	.352	.375***	.272			
Lack Goal Behaviour	.336	.268***	.193			
Lack Impulse Control	-.109	-.084	-.061			
Lack Awareness	-.102	-.139#	-.104			
Lack Strategies	.010	.010	.006			
Lack Clarity	.105	.090	.060			

* $p < .05$, ** $p < .01$, *** $p < .001$, # $p = .052$

Summary, prediction of Coping Behaviour. It was hypothesised that T1 cognitive and emotional variables would predict T1 coping behaviour. Four of the T1 variables contributed significantly to prediction of problem-focussed coping behaviour, with the direction of the relationships indicating that higher self-worth, an awareness of but lack of acceptance of emotional response, and the ability to regulate emotional response supports a problem focussed coping style. These appear to indicate participants who may be aware of their emotions, but prefer not to access emotional coping strategies. Similarly, for avoidant coping, non-acceptance of emotional response and difficulties engaging in goal directed behaviours when experiencing negative emotions, were shown to predict avoidant coping behaviour. Interestingly, difficulties controlling impulses when experiencing negative emotions, which covaried positively with avoidant behaviour, emerged as a negative predictor in the final model. The prediction model for emotion-focussed coping was not significant.

Study 4c: Prediction of T2 and T3 Psychopathology

Hierarchical linear multiple regression was used to test the fourth hypothesis that problem and emotion coping strategies would predict lower pathology at T2 and T3, while avoidant coping would predict higher pathology.

Prediction of severity of T2 Post-traumatic Stress

A hierarchical linear regression was performed to determine how T1 coping behaviour contributes to prediction of severity of T2 PTSD, controlling for T1 psychological distress, previous deployment experience, exposure to trauma and deployment-related stressors. Using T2 post-traumatic stress as a dependent variable, after step 1 with T1 psychological distress and previous operational experience in the equation, $R = .173$, $R^2 = .030$, ($F_{\text{inc}\ (2, 396)} = 6.12$, $p < .01$), only T1 psychological distress ($sr^2 = .155$) was significant. In step 2, exposure to trauma and deployment-related

stressors were added to the equation, R^2 change = .352, ($F_{change\ (2,394)}$ = 112.096, $p <$ .001), T1 psychological distress became non-significant, while trauma exposure (sr^2 =.172) and stressors (sr^2 =.468) were significant. In step 3, T1 coping behaviours were added to the equation, R^2 change = .019, ($F_{change\ (3,391)}$ = 4.183, $p < .05$). As shown in Table 8-5, of the additional variables, only problem focussed coping was significant (sr^2 =.136), resulting in three significant variables in the final model, trauma exposure (sr^2 =.165), deployment stressors (sr^2 =.471) and problem focussed coping (sr^2 =.136).

Table 8-5

Hierarchical Regression Analysis for Prediction of Severity of T2 Post-traumatic Stress using T1 Coping Behaviour as Predictors, Controlling for Exposure to Trauma and Deployment-related Stressors

Variables	*F*	*B*	*β*	sr^2 (unique)	*R*	R^2	Adj R^2
Step 1	$F_{(2, 396)} = 6.124$				.173	.030	.025
T1 Psychological Distress		.281	.155**	.155			
Previous Operational Experience		.512	.083	.083			
Step 2	$F_{(4, 394)} = 60.829$				.618	.382	.376
T1 Psychological Distress		.093	.051	.050		($R^2\Delta = .352$***)	
Previous Operational Experience		.026	.004	.004			
Trauma Exposure		.291	.191***	.172			
Deployment-related Stressors		.220	.511***	.468			
Step 3	$F_{(7, 391)} = 37.394$				.633	.401	.390
T1 Psychological Distress		.136	.075	.067		($R^2\Delta = .019$**)	
Previous Operational Experience		-.060	-.010	-.009			
Trauma Exposure		.282	.184***	.165			
Deployment-related Stressors		.223	.519***	.471			
Problem Coping		.182	.142**	.136			
Emotion Coping		.012	.007	.006			
Avoidant Coping		.015	.007	.006			

* $p < .05$, ** $p < .01$, *** $p < .001$

Prediction of severity of T2 Psychological Distress

A hierarchical linear regression was performed to determine how T1 coping behaviour contributes to prediction of severity of T2 psychological distress, controlling for T1 psychological distress, previous deployment experience, exposure to trauma and deployment-related stressors.

Using T2 psychological distress as a dependent variable, after step 1 with T1 psychological distress and previous operational experience in the equation, $R = .257$, $R^2 = .066$, ($F_{inc\ (2, 395)} = 13.977$, $p < .001$), only T1 psychological distress ($sr^2 = .257$) was significant. In step 2, exposure to trauma and deployment-related stressors were added to the equation, R^2 change = .333, ($F_{change\ (2,393)} = 108.719$, $p < .001$), in addition to T1 psychological distress ($sr^2 = .143$), deployment-related stressors ($sr^2 = .523$) was significant. In step 3, T1 coping behaviours were added to the equation, R^2 change = .008, ($F_{change\ (3,390)} = 1.83$, $p = .14$).

As shown in Table 8-6, of the additional variables, only problem focussed coping was significant, resulting in three significant variables in the final model, T1 psychological distress ($sr^2 = .136$), deployment-related stressors ($sr^2 = .524$) and problem focussed coping ($sr^2 = .078$).

Table 8-6

Hierarchical Regression Analysis for Prediction of Severity of T2 Psychological Distress using T1 Coping Behaviour as Predictors, Controlling for Exposure to Trauma and Deployment-related Stressors

Variables	F	B	β	sr^2 (unique)	R	R^2	Adj R^2
Step 1	$F_{(2, 395)} = 13.977$				.257	.066	.061
T1 Psychological Distress		.291	.257***	.257			
Previous Operational Experience		-.033	-.009	-.008			
Step 2	$F_{(4, 393)} = 65.159$				.631	.399	.393
T1 Psychological Distress		.165	.146***	.143		($R^2\Delta = .333$***)	
Previous Operational Experience		-.198	-.051	-.049			
Trauma Exposure		.043	.045	.041			
Deployment-related Stressors		.154	.571***	.523			
Step 3	$F_{(7, 390)} = 38.254$				.638	.407	.396
T1 Psychological Distress		.172	.152**	.136		($R^2\Delta = .008$	
Previous Operational Experience		-.213	-.055	-.052			
Trauma Exposure		.039	.041	.037			
Deployment-related Stressors		.155	.577***	.524			
Problem Coping		.065	.081*	.078			
Emotion Coping		.040	.036	.031			
Avoidant Coping		.016	.012	.010			

* $p < .05$, ** $p < .01$, *** $p < .001$

Prediction of severity of T3 Post-traumatic Stress

A hierarchical linear regression was performed to determine how T1 coping behaviour contributes to prediction of severity of T3 PTSD, controlling for T1 psychological distress, previous deployment experience, exposure to trauma and deployment-related stressors.

Using T3 post-traumatic stress as a dependent variable, after step 1 with T1 psychological distress and previous operational experience in the equation, $R = .122$, $R^2 = .015$, ($F_{inc(2,313)} = 2.73$, $p = .095$), T1 psychological distress ($sr^2 = .122$) was significant. In step 2, exposure to trauma and deployment-related stressors were added to the equation, R^2 change = .068, ($F_{change\,(2,311)} = 11.614$, $p < .001$), T1 psychological distress became non-significant, while trauma exposure ($sr^2 = .160$) and stressors ($sr^2 = .143$) were significant. In step 3, T1 coping behaviours were added to the equation, R^2 change = .022, ($F_{change\,(3,308)} = 2.526$, $p = .058$).

As shown in Table 8-7, there were three significant variables in the final equation, trauma exposure ($sr^2 = .170$), deployment-related stressors ($sr^2 = .139$) and avoidant coping ($sr^2 = .138$).

Table 8-7

Hierarchical Regression Analysis for Prediction of Severity of T3 Post-traumatic Stress using T1 Coping Behaviour as Predictors, Controlling for Exposure to Trauma and Deployment-related Stressors

Variables	F	B	β	sr^2 (unique)	R	R^2	Adj R^2
Step 1	$F_{(2, 313)} = 2.373$				.122	.015	.009
T1 Psychological Distress		.209	.122*	.122			
Previous Operational Experience		.031	.005	.005			
Step 2	$F_{(4, 311)} = 7.074$				.289	.083	.072
T1 Psychological Distress		.162	.095	.092		($R^2\Delta = .068$***)	
Previous Operational Experience		-.244	-.041	-.040			
Trauma Exposure		.275	.174**	.160			
Deployment-related Stressors		.069	.154**	.143			
Step 3	$F_{(7, 308)} = 5.184$				.325	.105	.085
T1 Psychological Distress		.089	.052	.046		($R^2\Delta = .022$)	
Previous Operational Experience		-.232	-.039	-.037			
Trauma Exposure		.294	.186**	.170			
Deployment-related Stressors		.067	.151*	.139			
Problem Coping		.088	.070	.066			
Emotion Coping		-.130	-.077	-.067			
Avoidant Coping		.345	.170*	.138			

* $p < .05$, ** $p < .01$, *** $p < .001$

Prediction of severity of T3 Psychological Distress

A hierarchical linear regression was performed to determine how T1 coping behaviour contributes to prediction of severity of T3 psychological distress, controlling for T2 psychological distress, meaning of event, and exposure to trauma and deployment-related stressors.

Using T3 psychological distress as a dependent variable, after step 1 with T1 psychological distress and previous operational experience in the equation, $R = .222$, $R^2 = .049$, ($F_{inc\ (2,\ 316)} = 8.183$, $p < .001$), only T1 psychological distress ($sr^2 = .219$) was significant. In step 2, exposure to trauma and deployment-related stressors were added to the equation, R^2 change = .010, ($F_{change\ (2,314)} = 1.658$, $p = .192$), neither of the additional variables were significant. In step 3, T1 coping behaviours were added to the equation, R^2 change = .058, ($F_{change\ (3,311)} = 6.852$, $p < .001$).

As shown in Table 8-8, in the final model, only avoidant coping was significant ($sr^2 = .241$).

Table 8-8

Hierarchical Regression Analysis for Prediction of Severity of T3 Psychological Distress using T1 Coping Behaviour as Predictors, Controlling for Exposure to Trauma and Deployment Stressors

Variables	F	B	β	sr^2 (unique)	R	R^2	Adj R^2
Step 1	$F_{(2, 316)} = 8.183$				.222	.049	.043
T1 Psychological Distress		.303	.219***	.219			
Previous Operational Experience		-.145	-.030	-.030			
Step 2	$F_{(4, 314)} = 4.938$				.243	.059	.047
T1 Psychological Distress		.293	.212***	.207		($R^2\Delta = .010$)	
Previous Operational Experience		-.238	-.049	-.048			
Trauma Exposure		.098	.077	.071			
Deployment-related Stressors		.017	.046	.043			
Step 3	$F_{(7, 311)} = 5.916$				.343	.118	.098
T1 Psychological Distress		.152	.110	.097		($R^2\Delta = .058$***)	
Previous Operational Experience		-.143	-.030	-.028			
Trauma Exposure		.125	.098	.090			
Deployment-related Stressors		.012	.033	.031			
Problem Coping		.012	.011	.011			
Emotion Coping		-.145	-.107	-.093			
Avoidant Coping		.487	.298***	.241			

* $p < .05$, ** $p < .01$, *** $p < .001$

Summary, prediction of severity of T2 and T3 pathology. It was hypothesised that T1 coping strategies would contribute to prediction of severity of T2 and T3 post-traumatic stress and psychological distress, controlling for T1 psychological distress and previous operational experience, and accounting for exposure to trauma and deployment-related stressors. The results provide support for the hypothesis showing that pre-existing patterns of problem-focussed coping predicted higher levels of both post-traumatic stress and psychological distress at T2, after accounting for the impact of

exposure to trauma and deployment stressors, while emotion and avoidant coping were not significant. This suggests that a problem-focussed coping style contributes to poor adjustment at the end of deployment, which could reflect the difficulty of applying problem-focussed coping strategies to situations that can't be easily addressed at this time. The size of the βeta values for emotion and avoidant coping were too small to draw any conclusions about the potential impact of these variables.

By comparison, at T3 pre-deployment patterns of avoidant coping predicted higher levels of both post-traumatic stress and psychological distress, after accounting for the impact of exposure to trauma and deployment-related stressors, although problem- and emotion-focussed coping were not significant. The direction of the βeta values for emotion-focussed coping for both post-traumatic stress and psychological distress were however, in the direction hypothesised, suggesting that it is possible that emotion-focussed coping may act as a protective factor against ongoing pathology. While the βeta values for problem-focused coping in the prediction of psychological distress were too small to draw any conclusions, the direction of the βeta value for prediction of post-traumatic stress was positive, suggesting that problem-focussed strategies may remain a risk factor for post-traumatic stress at follow-up within this population. It is clear though, that avoidant strategies are a significant risk factor.

Discussion

Stability of coping behaviour

There was partial support for the first hypothesis, with examination of the correlations between the T1 and T3 coping variables revealing moderate to strong relationships, with higher correlations reflecting greater consistency of individual responses across the deployment. The relationships were strongest for problem-focussed

coping and weakest for avoidant-focussed coping, suggesting some variability in individual response for avoidant coping.

Examination of the mean scores between the paired T1 and T3 coping variables provided support for the second hypothesis suggesting that as a group, these forms of coping behaviour were largely stable across the deployment and follow-up period. Results for avoidant coping were less consistent, with a reduction in mean scores suggesting a possible reduction in avoidant behaviour.

Dominant coping style

Examination of the means also revealed a preference for problem-focussed coping strategies over emotion or avoidant strategies. Paired sample t-tests showed that significant differences existed between problem-focussed coping and emotion- and avoidant-focussed coping at both T1 and T3. Participants in this sample were more likely to endorse problem-focussed coping strategies, over emotion and avoidant strategies, suggesting a significant cohort effect for this population. Given that the organisational culture in which this study was conducted endorses taking action to solve problems, it is not surprising that problem-focussed coping strategies are preferred over emotion and avoidant, but the strong dominance of problem-focussed coping, and the apparent rejection of emotion-focussed strategies is potentially problematic.

Prediction of coping behaviour

There was partial support for the third hypothesis that the cognitive and emotional variables would contribute to prediction of T1 coping behaviour. From Cognitive-Appraisal Theory (Janoff-Bulman, 1985, 1989, 1992) it was expected that people with strong feelings of self-worth, and who view others as generally benevolent,

are more likely to be able to adopt problem and emotion focused coping strategies, than people with poor self-worth, or who find it difficult to trust others.

Prediction of problem-focused coping. There were moderate positive correlations identified between problem-focused coping, and self-worth and a benevolent world view, and negative correlations between problem-focused coping and all of the six difficulties in emotional regulation variables. This provides initial support for the hypothesis.

Two factors were positively related to the prediction of problem-focused coping, non-acceptance of emotional responses, and self-worth. Non-acceptance of emotional response reflects a tendency to have negative secondary emotional responses to one's negative emotions, or being non-accepting of one's distress (Gratz & Roemer, 2004). It could therefore be expected that people who exhibit a preference for a solution-focused approach to problems would be likely to perceive negative emotional responses as a sign of weakness or lack of control, particularly in a culture that values strength, self-discipline and personal control. These people would therefore tend to perceive such emotions in a negative light, resulting in negative secondary emotions, as predicted. The positive relationship between non-acceptance and problem-focused coping supports this notion. Self-worth reflects, in part, the degree to which people perceive themselves as capable and competent, and it is to be expected that people with high self-worth would exhibit a tendency toward a coping style which includes task oriented coping strategies focussed on taking steps to deal directly with the stressor.

In addition to the two variables described above, three variables were negatively related to the prediction of problem-focused coping, benevolence, lack of strategies and lack of awareness of emotional response. Benevolence is related to the way people view events and people positively or negatively, and the negative relationship between

benevolence and problem-focussed coping strategies indicates that people with a less benevolent world view are more likely to adopt problem-focused coping strategies. This may suggest a belief amongst this population that they have to solve their problems themselves, rather than rely on others for emotional support.

As previously stated, problem-focused coping aims to actively change the person-situation relationship by acting on either the situation, or on oneself, and includes strategies which involve taking steps to deal directly with the stressor (Lazarus, 1993; Lazarus & Folkman, 1984). The negative relationship between problem-focused coping, and a lack of strategies, is congruent with the idea that people who experience difficulties concentrating and accomplishing tasks, or experience difficulties remaining in control of their behaviour when experiencing negative emotions, will be less likely to be able to adopt a problem-focused coping style in such situations. Similarly, lack of emotional awareness reflects an inattention to, and lack of awareness of, emotional responses. Problem solving and positive reappraisal are associated with positive changes in emotion (Folkman & Lazarus, 1988), suggesting an ability to attend to and acknowledge emotions, or emotional awareness; as opposed to a lack of emotional awareness as measured by this variable.

Prediction of emotion-focused coping. Emotion-focused coping seeks to change the way the stressful relationship with the environment is attended to, or the meaning of what has happened. Emotion-focused coping strategies allow a person to 'manage' their distress and facilitate a return to problem-focused coping (Carver, et al., 1989). This mitigates the stress even though the actual relationship has not changed, through a reappraisal of what has happened. One variable, lack of awareness of emotional response, was negatively related to emotion-focussed coping strategies. This suggests that the more that people are aware of and accept their emotional response, the more

likely they are to be able to adopt emotion-focussed coping behaviours. One variable, difficulties with impulse control when emotionally aroused, was positively related to the prediction of emotion-focused coping. In combination with awareness of emotional response, this suggests that individuals who are aware of, but experience difficulties remaining in control of their impulses and behaviour when experiencing negative emotions, are more likely to seek support to manage their distress than to attempt to manage the stressor on their own.

Prediction of Avoidant-focused coping. Avoidant coping relates to attempts to either avoid the stressor itself, or avoid the distressing emotions and thoughts about the stressor. Two factors were positively related to the prediction of avoidant coping: non-acceptance of emotional responses and difficulties engaging in goal-directed behaviours, while one, lack awareness, was negatively related to the prediction of avoidant coping. Non-acceptance of emotional responses reflects a tendency to have negative secondary emotional responses to one's negative emotions, or being non-accepting of one's distress (Gratz & Roemer, 2004). It could therefore be expected that people who would be likely to perceive negative emotional responses as a sign of weakness or lack of control will have difficulty seeking support to manage their distress, and so they focus their distress inwards and adopt avoidant strategies by either denying the problem, or disengaging from social supports.

Similarly, individuals who experience difficulties engaging in goal-directed behaviours when experiencing negative emotions are likely to have difficulty engaging in problem solving or help seeking behaviours, and are therefore more likely to adopt an avoidant approach. The negative relationship between lack awareness and avoidant coping, which approached significance, suggests that people who are aware of their

emotional response are more likely to be able to adopt emotional coping behaviours and therefore not engage in avoidant coping behaviour.

Coping behaviour as a predictor for adjustment

Previous research has shown that problem-focussed coping styles result in fewer PTSD symptoms following a trauma (Dirkzwager, et al., 2003; Mikulincer, et al., 1993b; Solomon, Mikulincer, et al., 1988; Solomon, et al., 1989), but this study found the opposite. Problem-focussed coping involves either taking steps to deal directly with the stressor through strategies such as planning and problem solving, or to change oneself though positive reappraisal or help seeking (Dirkzwager, et al., 2003; Holahan & Moos, 1987a; Lazarus, 1993; Lazarus & Folkman, 1984). While these strategies may be helpful in situations where there is a problem that can be addressed, they may be less useful in situations where the stressors are not problems which can be readily solved, or within cultures where people are reluctant to admit that they need help.

The difficulty faced by the participants in this study is that they had little actual control over many of the problems that they found distressing. The loss or wounding of a friend in combat, witnessing poverty and human suffering, frustration over perceived inequities in leadership and double standards, and the inability to address problems impacting on their families at home during the deployment; all issues identified by the participants as causing stress, are not easily addressed while in a combat zone, or even after their return home. As a consequence, in situations where there is little actual control and, according to theory, emotional support coping strategies such as social support seeking (Roth & Cohen, 1986) are more effective (Mikulincer, 1994), participants with a strong problem-focussed approach, and who are reluctant or unable to use emotion focussed coping strategies, then find themselves more vulnerable.

One of the key prognostic indicators for recovery from PTSD is social support, and a major theme in the treatment of PTSD is to be able to address the traumatic memory in a safe environment to enable processing and integration into one's memory framework. But returning veterans often feel unable to talk about their experiences, either because of the perceived stigma of admitting that they have a problem, because people who "weren't there, won't understand", or because they do not want to upset their primary support network, their family. They therefore shun support and seek to solve the problem themselves, but where this is unsuccessful, there is an increase in pathology.

Benefits and limitations of this study

This study provides an important insight into the nature of this population with respect to coping behaviour, and identifies potential problems with the use of problem-focussed coping strategies in situations of low actual control. It identified several key findings: first, the clear preference for problem-focussed coping strategies over emotion- and avoidant-focussed strategies; second, that problem-focussed coping strategies act as a risk factor for pathology at the end of the deployment; and third, that avoidant coping acts as a risk factor for pathology at follow-up.

This is possibly the first study to examine the relationship between pre-existing coping behaviour and post-trauma pathology, and to identify the relationship between cognitive and emotional regulation factors and coping behaviour. There clearly needs to be more research into the impact of the use of problem-focussed coping strategies in this population, as the results differ to those found in other research. The study also however, supported previous research that avoidant coping strategies are a significant risk factor for on-going pathology. It did this by demonstrating that people with a pre-

existing pattern of avoidant coping, are likely to apply this style of coping following a traumatic experience and are therefore at increased risk for ongoing pathology.

The study was limited because it used a single measure of general coping strategies. It is recommended that future research in this area uses more specific measures that assess coping in different situations. These could be structured around scenarios that lend themselves to different forms of coping strategies, to determine whether participants still adopt a default problem-focussed approach, or whether they have the flexibility to adopt alternate (i.e. emotion-focussed) approaches.

CHAPTER 9

GENERAL DISCUSSION

In this final chapter, the main findings of this thesis are discussed in the context of the research questions outlined in the introduction. Second, a model is proposed which integrates pre-existing cognitions, emotional competency and coping, and post-trauma adjustment. Third, theoretical implications are discussed in light of the findings. Fourth, implications of the findings for the Department of Defence are proposed, and finally, this chapter reviews limitations and makes recommendations for future research.

Overview of Main Findings

This thesis sought to answer four broad research questions:

- What is the impact of exposure to trauma and non-traumatic stressors on pre-existing cognitive appraisals, capacity for emotional regulation and coping behaviour?
- To what degree can pre-existing cognitive appraisals and capacity for emotional regulation predict adjustment measured following exposure to trauma?
- To what degree can pre-existing cognitive appraisals and capacity for emotional regulation predict ongoing adjustment measured at follow-up?
- What is the relationship between cognitive appraisals, emotional regulation and coping behaviour, and how does coping behaviour influence adjustment?

Impact of Exposure Factors on Stability of the Variables

The first study examined the impact of exposure to trauma and deployment-related stressors on the cognitive and emotional regulation variables, while Study 4 examined the impact of exposure on coping. The results showed that there was a significant effect of time across the deployment for self-worth, lack impulse control, lack strategies and lack awareness of emotional responses, and avoidant coping, but that

these effects were small. When the impact of exposure to traumatic events and deployment-related stressors was taken into account using regression analysis, the results showed that deployment-related stressors, rather than exposure to traumatic events, explained more of the variance in scores. The variables affected were beliefs about benevolence of the world, non acceptance of emotional response, lack goal behaviour, lack impulse control, lack strategies and lack clarity.

It is possible that the finding that deployment-related stressors contributed more to variance in scores than trauma exposure, is due to traumatic events being to some degree anticipated and prepared for, and occurring in context, whereas the deployment-related stressors were more difficult to anticipate or prepare for. Ongoing stressors also tend to be more insidious than isolated traumatic events, and may contribute to a rise in general levels of frustration over time. Three variables actually worsened over the deployment, self-worth, impulse control when emotionally aroused, and access to emotional regulation strategies; while one variable improved, awareness of emotional response.

Prediction of Post-Trauma Pathology

Studies 2 and 3 addressed the second and third research questions, and examined the relationship between the pre-existing cognitive and emotional regulation predictors, and post-traumatic stress and psychological distress. These studies sought to identify the degree that pre-existing characteristics can be used to predict post-trauma adjustment. Study 2 found that in addition to trauma exposure and deployment stressors, three pre-existing factors; benevolence, non-acceptance and lack strategies, were related to poorer adjustment at the end of the deployment. At follow-up however, the impact of exposure to trauma and deployment stressors was less apparent. Study 3 showed that three cognitive variables; self-worth, benevolence and meaningfulness; and four of the

emotional regulation variables; non-acceptance, lack awareness, lack clarity and lack goal behaviour, were significant in predicting adjustment at follow-up.

Impact of Coping Behaviour

The final study addressed the fourth research question, and examined the relationship between cognitive appraisals, emotional regulation and coping behaviour, and the relationship between coping behaviour and adjustment. The results showed that there was a general tendency to adopt problem-focussed coping strategies in preference to alternate strategies, and that this may provide vulnerability for poor adjustment at the end of the deployment, and at follow-up.

The Proposed Model

Where most models of post-trauma adjustment do not explicitly include pre-trauma factors, this thesis proposes a vulnerability model which addresses this limitation by integrating pre-existing cognitive, emotional and behavioural factors to predict vulnerability for post-trauma pathology. Vulnerability factors are important in high-risk populations, because they are potentially modifiable through intervention prior to exposure to trauma.

The theoretical model

Most contemporary models of trauma related pathology focus on peri- and post-trauma factors, and issues impacting on the integration of the traumatic experience into memory. While a small number of cognitive models do refer to pre-existing cognitive factors and schemas in providing vulnerability for pathology, they tend to not clearly define or explain the nature of these variables. In addition to not clearly explaining the nature of the pre-existing cognitive variables, it is felt that current cognitive models of

pathology are not sufficiently flexible to also accommodate issues around emotional response and coping.

Recognition of the role of pre-existing factors in providing vulnerability for pathology is not new, however no current model has explicitly included pre-existing belief, appraisal and emotional factors, as well as coping behaviour, to explain vulnerability for post-trauma adjustment. Figure 9-1 addresses this gap in the literature by proposing a theoretical model which addresses weaknesses in previous models through integrating pre-existing cognitive, emotional and behavioural factors in a single model. The proposed model also takes account of trauma and relevant non-traumatic stressors, and prior experience and pathology.

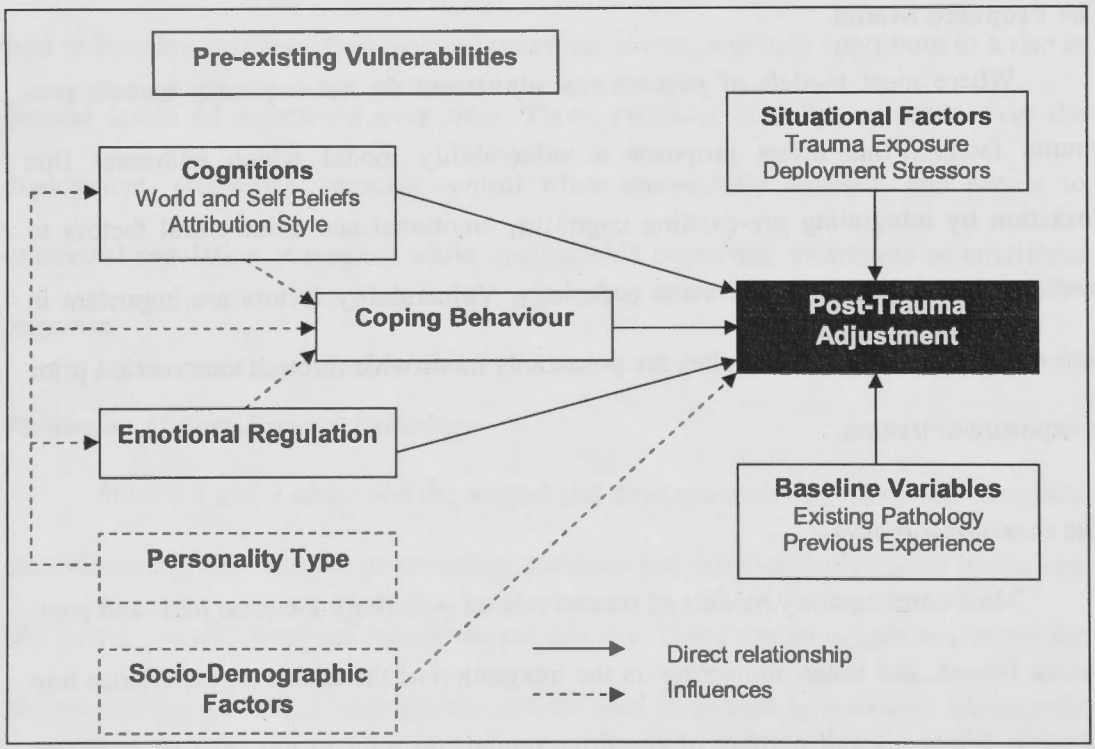

Figure 9-1 Proposed Vulnerability Model for Post-Trauma Adjustment

While personality and socio-demographic factors were not explicitly explored in this study, personality traits influence cognitive style, capacity for emotional regulation and coping behaviour, and socio-demographic factors influence pathology. Figure 9-1

therefore depicts this relationship within the context of the overall model. In addition to trauma exposure, this model makes explicit the role of non-traumatic factors which also contribute to pathology, through the inclusion of specific deployment-related stressors.

The next section integrates the research findings into the proposed theoretical model. Two specific vulnerability models for post-deployment pathology are presented, the first reflecting vulnerability for pathology at the end of the deployment, while the second reflects vulnerability for pathology at follow-up.

Post-Deployment Vulnerability Model

Figure 9-2 presents a specific vulnerability model that illustrates the relationships between the pre-existing cognitive, emotional and behavioural vulnerabilities, and pathology at the end of the deployment.

In addition to trauma exposure and deployment-related stressors, the model shows that three pre-existing variables acted as risk factors for both post-traumatic stress and psychological distress at the end of the deployment: beliefs about access to emotion regulation strategies, a pre-existing tendency to adopt problem focussed coping strategies, and pre-existing levels of psychological distress. With respect to post-traumatic stress, negative beliefs about the benevolence of the world acted as a risk factor, while previous operational experience appeared to act as a protective factor; and non-acceptance of emotional response acted as a risk factor for psychological distress.

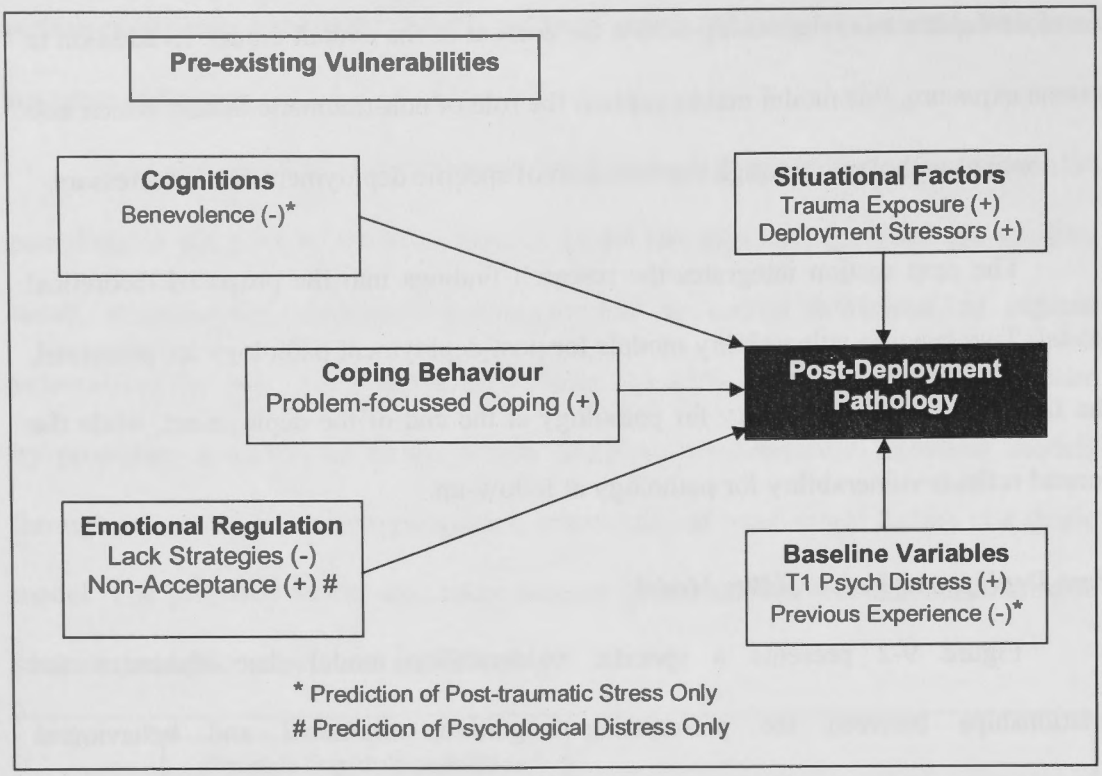

Figure 9-2 Post-Deployment Vulnerability Model

Cognitive factors. The model shows that at the end of the deployment, participants with pre-existing low, or negative beliefs about benevolence were more at risk of poor adjustment. This suggests that those with a generally positive view of the world appeared to be better able to protect themselves against the impact of their experiences. This could be in-part because they were able to determine a context for what they had experienced. Participants in this study were experienced soldiers, and the results suggest that the nature of their wartime experience was largely consistent with what they expected, and did not 'shatter' their view of the world. They could therefore be expected to be able to distinguish between what happened to them, and what happens within the larger world. In other words, they had context for what they experienced. The findings were not conclusive with respect to the role of attribution style, however, in predicting adjustment at the end of the deployment, suggesting a need for further

research in this area. In addition, beliefs around self-worth and meaningfulness of events were not significant at this time.

Emotional regulation. A pre-existing tendency towards non-acceptance of emotional response emerged as a significant variable in the model for post-traumatic stress, while lack strategies emerged as a predictor for both post-traumatic stress and for severity of psychological distress. These finding are consistent with the view that people with strong beliefs about the need to regulate emotion, and who hold strong beliefs about the negative consequences of losing control of one's emotions, are more vulnerable to poor adjustment at the end of the deployment.

In Chapter 3 it was pointed out that a range of negative emotions frequently accompany pathology, and these findings suggest that people who have difficulty accepting what may be a normal emotional response to traumatic and stressful events, are more at risk of poor adjustment than those better able to accept such a response. In other words, it is not necessarily the traumatic or stressful events themselves that cause distress, but negative attributions and beliefs about one's emotional response to the events, particularly within a population in which emotional expression is viewed as a sign of weakness.

Coping. The model depicts the finding that a pre-existing pattern of problem-focussed coping strategies may act as a risk factor for both post-traumatic stress and psychological distress at the end of the deployment. This may be reflective of a situation where these strategies are not immediately adaptive (i.e. under conditions of low control over stressful events), leading to frustration of efforts to solve problems causing distress, rather than resolution, thereby increasing vulnerability for poor adjustment. The findings were not conclusive however, with respect to the role of emotion-focussed

and avoidant coping in predicting adjustment at the end of the deployment, suggesting a need for further research in this area.

This section has presented a specific vulnerability model for pathology at the end of the deployment. The next section integrates the research findings into the theoretical model to present a specific vulnerability model for pathology at follow-up.

Vulnerability model for Adjustment at Follow-up

Figure 9-3 presents a specific vulnerability model that illustrates the relationships between the pre-existing cognitive, emotional and behavioural vulnerabilities, and adjustment, at follow-up. While the contribution of deployment-related stressors was not a significant predictor at follow-up, suggesting that the impact of this variable reduces over time, trauma exposure remained a significant predictor for post-traumatic stress.

In addition to trauma exposure, the model shows that three pre-existing variables were found to act as risk factors for the prediction of post-traumatic stress: low self-worth, positive beliefs about the meaningfulness of events, and difficulties pursuing goal directed behaviour when emotionally distressed. Five pre-existing variables are shown to act as risk factors for psychological distress: positive beliefs about benevolence of the world, lack awareness and non-acceptance of emotional response, beliefs about clarity of emotional response, and pre-existing levels of psychological distress. Only avoidant-related coping acted as a risk factor for both post-traumatic stress and psychological distress. This suggests that despite the strong correlation between post-traumatic stress and psychological distress, different pre-existing factors contribute to the maintenance of these measures of pathology.

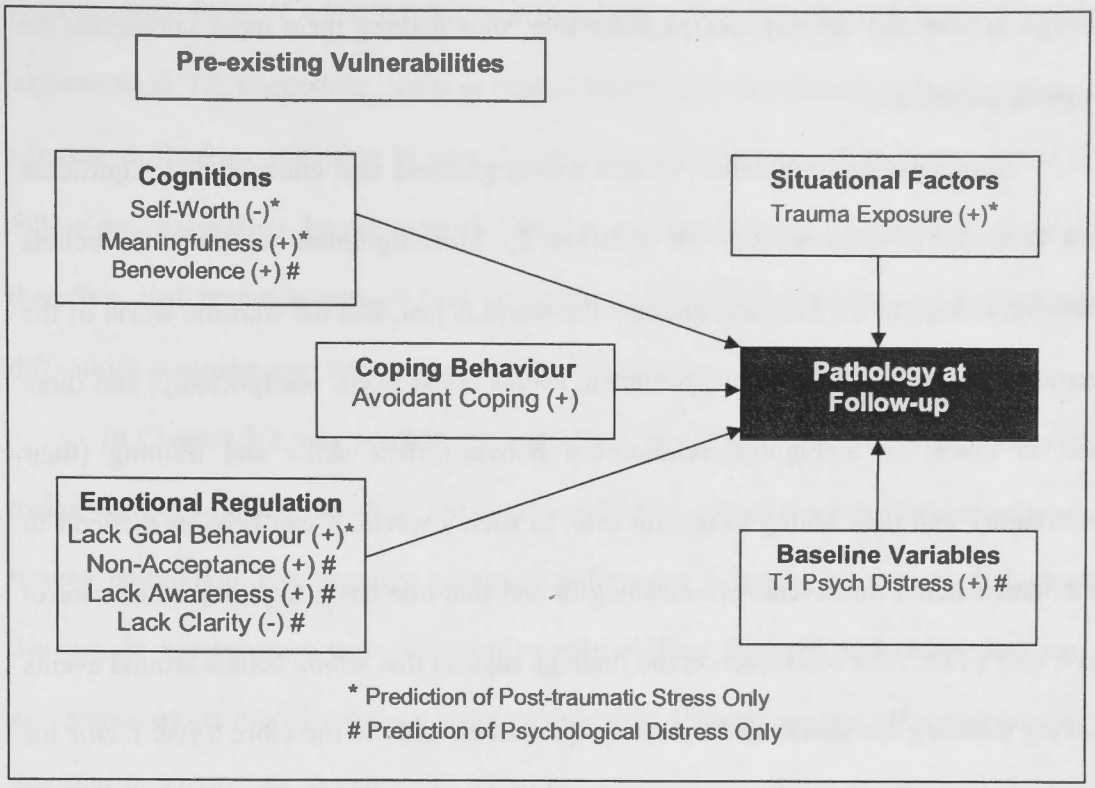

Figure 9-3 Vulnerability Model for Adjustment at Follow-Up

Cognitive Factors. Low pre-existing beliefs around self-worth was found to be a risk factor for post-traumatic stress at follow-up. In Chapter 3, self-worth was described as relating to judgements about character and behaviour, and reflects the extent that a person views themselves as able to engage in appropriate precautionary behaviours to minimise their vulnerability to negative outcomes. These self-evaluations include judgements about competence, as well as one's willingness to engage in appropriate behaviours. Wartime experience can challenge a person's sense of self-worth by affecting their identity and making them feel like 'damaged goods', feel weak for being scared and feel weak for seeking help (Armstrong, et al., 2006). The findings suggest that people with low self-worth may have less confidence that they can engage in appropriate precautionary behaviours, and may be more likely to experience difficulties accessing and expressing emotion. It is suggested that they are therefore less likely to

engage in help and support seeking behaviour, thus making them more vulnerable for ongoing pathology.

Strong pre-existing beliefs around meaningfulness also emerged as a significant risk factor for post-traumatic stress at follow-up. Meaningfulness relates to the beliefs that events happen for a reason, and that the world is just. But the wartime world of the participants was not predictable, traumatic events could occur unexpectedly, and there was at times, an ambiguous relationship between their skills and training (their behaviour), and their ability to remain safe. In such a world, it can become difficult to maintain a belief that events are meaningful and that one has a high degree of control over one's fate. As a consequence, the findings suggest that strong beliefs around events having meaning are challenged by such experiences, and are therefore a risk factor for poor ongoing adjustment.

The model also reflects the finding that people with overly positive beliefs around benevolence of the world were at risk of increased psychological distress at follow-up, suggesting that their negative experiences disrupt their view of the world. These findings provide support for Janoff-Bulman's (1989, 1992), view that such representations may not reflect reality, and thus these people experience highly traumatic or stressful events as being too discrepant from their previous experience.

Emotional regulation. The model shows that four emotional regulation variables contributed to poor adjustment at follow-up. A lack of ability to pursue goal directed behaviour when emotionally distressed acted as a risk factor for post-traumatic stress; while non-acceptance of emotional response, and a lack of awareness and clarity of emotional response, acted as risk factors for psychological distress.

In Chapter 5, it was reported that 'difficulties engaging in goal-directed behaviour' was strongly correlated with 'lack strategies', implying that these two

variables are related. 'Lack strategies' was identified as an important risk factor for poor adjustment at T2, suggesting that it is related to capacity to respond in the short-term, whereas difficulties engaging in goal-directed behaviour emerged as a risk factor at follow-up, suggesting longer-term difficulties in functioning. The results suggest, therefore, that higher scores on lack strategies at T2 may be predictive of increased difficulties pursuing goal directed behaviour at follow-up.

In Chapter 3 it was pointed out that beliefs about the negative consequences of losing control of one's emotions are considered to be one of the key features of post-trauma pathology. The negative relationship between lack clarity and psychological distress, in combination with the positive relationships between lack awareness and acceptance of emotional response and psychological distress, suggests that people who are able to clarify, or identify, the emotions they are experiencing, but who do not accept or acknowledge their emotional response, are at increased risk of poor adjustment. This may also reflect people who experience secondary emotions such as guilt and shame, in response to primary emotions such as anger and fear.

Earlier it was suggested that beliefs that negative psychological or emotional experiences are a sign of weakness (e.g. Linley, 2003), can act as a major barrier to help seeking in military populations (e.g. Britt, et al., 2008; Britt, et al., 2007; Corrigan & Watson, 2002; Gall, 2006; Hoge, et al., 2004). Ongoing adjustment is closely linked to the ability to access social and professional support, and people who lack the capacity to acknowledge or even recognise their emotional response are unlikely to perceive or admit that they have a problem, and are therefore less likely to perceive the need to seek help or support.

Coping. A pre-existing pattern of avoidant coping behaviour is depicted in the model as being a risk factor for both post-traumatic stress and psychological distress at

follow-up. People with a pre-existing tendency to avoid problems, and to seek ways to numb, or distract themselves from distressing emotions, are unlikely to have learned adaptive strategies to use following traumatic or stressful events. Avoidant coping strategies are not effective in the long term, and have been linked to reduced social support (Dirkzwager, et al., 2003; Holahan & Moos, 1987a), increased hypervigilance and intrusive symptoms (Kanninen, et al., 2002), and increased severity and maintenance of PTSD (Dirkzwager, et al., 2003; Solomon, Mikulincer, et al., 1988).

This section has proposed a theoretical model of post-trauma adjustment which addresses weaknesses in previous models by integrating pre-existing cognitive, emotional and behavioural factors in a single model. It has also integrated the research findings with the theoretical model to present two models of post-trauma adjustment which depict the relationships between the specific cognitive, emotional and coping variables and post-traumatic stress and psychological distress at the end of the deployment, and at follow-up. The next section summarises the implications of the research findings for existing models of post-trauma pathology.

Theoretical Implications

Cognitive Models

The research findings contribute to Ehlers and Clark's Cognitive Model (2000) by making the role of prior experiences, beliefs and the coping state of the individual more explicit in providing a pre-existing vulnerability for PTSD. The findings also contribute to Janoff-Bulman's (1989; 1992) Cognitive Appraisal Theory by providing evidence for the role of pre-existing beliefs around benevolence, meaningfulness of events and self-worth in predicting post-trauma adjustment.

Tick (2005) explores the effect of warfare on soldiers in his seminal work, *War and the Soul*. He writes, "Modern warfare damages and destroys the youth and his

character and threatens him with annihilation at the very time rites of passage are supposed to mature him in psychologically nurturing, socially useful and spiritually enlightened ways" (p. 106). Where most trauma-related research focuses on the integration of traumatic experiences into memory frameworks, this study has leaned heavily on the Cognitive Appraisal model of Janoff-Bulman, and appraisal theory, in an attempt to better understand the relationship between pre-existing cognitive factors and post-trauma adjustment.

After treating veterans for many years, Erikson (1963, p. 42) wrote that, "what impressed me most, was the loss in these men of a sense of identity. They knew who they were; they had a personal identity, but it was as if, subjectively, their lives no longer hung together." One of the ways that wartime experiences differ from many other traumatic experiences is in their impact on a person's sense of identity, on their sense of self, and on their view of their world. Beliefs about meaningfulness represent a defence against the randomness of events, and Armstrong et al., (2006) point out that it is common for returned veterans to believe that nothing they do will make a difference in their lives, or in other people's lives. They argue that while soldiers may have done what was expected of them in war, they commonly found that they were unable to "personally control the outcome of the war or what happened next" (p. 131). The results support this view, with strong pre-existing beliefs about events having meaning emerging as a risk factor for poor adjustment.

There were mixed results with respect to beliefs around benevolence however, with pre-existing negative beliefs emerging as a risk factor at the end of the deployment, while a generally positive, or benevolent view, acted as a risk factor at follow-up. This may be because during the deployment, participants could determine a context for what they had experienced, and so the experiences did not 'shatter' these beliefs. At follow-

up however, the findings provided support for Janoff-Bulman's (1989, 1992) view that people with an overly benevolent view of the world are at increased risk of ongoing pathology, as their negative experiences disrupt this view. These latter results support Dalgliesh's (1999, 2004) suggestion that people with an overvalued schema are at risk, as such representations may not reflect reality, and thus these people experience traumatic or stressful events as being too discrepant from their previous experience. The discrepancy between the findings at the end of the deployment, and at follow-up, could be because of the influence of transition and reintegration issues following their return home, and exposure to the marked contrast between the hostile war-time environment, and a more benign home environment. The mixed results also may be explained by Foa et al.,'s (1998) view that it is the holding of overly rigid, rather than specifically positive, or negative beliefs, which place people most at risk.

In the SPAARS Model, Dalgleish (2004) suggests that one of the five personality types involves people with a negative view of the world, but a generally positive view of themselves. From the perspective of Cognitive-Appraisal Theory (Janoff-Bulman, 1989, 1992), this would be characterised as low beliefs around benevolence, but high self-worth. According to Prager and Solomon (1995), this schema type is common amongst trauma victims from the military, emergency services and other groups operating within negative environments. These individuals are able to cope as long as their self-schema remains intact – if this breaks down however, then they are at risk of ongoing psychopathology relating to the damage to their self-view, rather than the trauma itself, due to their lack of ability to engage in adaptive coping strategies. Consistent with the cognitive models, the findings identified that people with a generally positive view of the world, but a negative self-view, were at increased risk of poor ongoing adjustment. Thus, once one's self-schema breaks down, individuals

become less able to cope. Overall, the findings support Dalgleish's (2004) attempt to integrate pre-event schemas, emotional response and coping, by making more explicit the relationship between the individual variables involved, and by providing insight into how these schemas are maintained following a trauma.

Emotional Response

From a dialectical-constructive view, emotions are seen as the primary generator of personal meaning, which involves the integration of emotional experiences with one's interpretation of events, and one's pre-existing self and world view (Greenberg & Pascual-Leone, 1995, 1997). In his forward to the book, *Courage after Fire* (Armstrong, et al., 2006), which was written to assist US veterans of the Afghanistan and Iraq Wars and their families reintegrate back into their home environment, US Senator Robert Dole, himself a World War Two veteran, writes, "Coming back from a war is a longer journey than any plane flight home" (p. 1). After talking about his own injuries, he goes on to write, "I wish I could say the emotional and psychological recovery paled in comparison to the physical injuries, but that is not the case".

The findings reported in this thesis highlight the importance of capacity for emotional response in contributing to adjustment. Five of the six emotional regulation variables were shown to explain variance in pathology, above that explained by trauma exposure, in one form or another. Within this population, there are strong cultural expectations, and individual beliefs, about the expression of emotion, and this was clearly seen to be problematic with respect to post-trauma adjustment.

Emotional awareness is a prerequisite to effective emotional regulation and effective coping. Emotional awareness allows people to modulate emotions in a more purposeful and direct way than is possible if they attempt to avoid or suppress them, or to experience them as a flood of undifferentiated sensation. Lack of awareness of

emotional response reflects the extent to which people do not recognise that they are experiencing negative emotions, while lack of emotional clarity reflects the extent that individuals are able to label and understand the emotions they are experiencing (Gratz & Roemer, 2004).

Beliefs about the negative consequences of losing control of one's emotions are considered to be one of the key features of post-trauma pathology (Williams et al., 1997), and the results suggest that a tendency to have negative secondary emotional responses to one's emotional response contributes to poor adjustment. Individuals who interpret negative emotions as a sign of weakness are more likely to hold strong beliefs around the need to regulate their emotions, and part of the problem may be that many normal trauma-related emotions such as fear, anger and guilt, may be perceived to be bad (Harris, 2009). Soldiers may find it difficult to express their fear, may be concerned if they feel angry that they may lose control, or may find it difficult to talk about their guilt, particularly when they have survived where friends or colleagues have been injured or killed, (Armstrong, et al., 2006). They still experience these emotions, but they believe that they shouldn't, and they believe that they can't satisfactorily express them.

It is common for returning veterans to feel concerned that expressing emotion may lead to negative consequences for their career, or that they will be treated differently by their colleagues or superiors, and earlier it was suggested that people can hold strong beliefs that negative psychological or emotional experiences are a sign of weakness (e.g. Linley, 2003). These beliefs are common in military populations (e.g. Britt, et al., 2008; Britt, et al., 2007; Corrigan & Watson, 2002; Gall, 2006; Gould, et al., 2010; Hoge, et al., 2004). Ongoing pathology is closely linked to the ability to access social and professional support, and people who are unwilling to accept their

emotional response, or who lack the capacity to acknowledge or even recognise their emotional response, are unlikely to perceive or admit that they have a problem. The findings therefore provide support for results of research into the impact of mental health stigma as a major barrier to help seeking in military populations.

Coping Behaviour

This thesis sought to determine the impact of coping behaviour on mental health outcomes. While the findings identified a preference for problem-focussed coping in this population, they also show that a problem-focussed coping style acts as a risk factor for poor adjustment at the end of the deployment.

Problem- and Emotion-focussed Coping. Mikulincer (1994), suggested that the higher the expectancy of control, the more likely people were to use problem focused coping strategies, and the lower the expectancy of control, the more likely people were to rely on emotion-focused coping. The results show support for this view, suggesting that participants in this study, who have high expectations of control as a consequence of their training, tend to display a preference for problem-solving coping behaviour over emotional coping strategies.

Conventional coping theory suggests that problem-focussed coping strategies are associated with a sense of mastery and control over events (Ness & Macaskill, 2003), which reduces one's sense of helplessness, and are therefore the best strategy in situations of high actual control. The finding that a pre-existing tendency towards problem-focussed coping strategies may provide a risk factor for poor adjustment is counter-intuitive therefore, as previous research has shown that problem-focussed coping styles result in fewer PTSD symptoms following a trauma (Dirkzwager, et al., 2003; Mikulincer, et al., 1993b; Solomon, Mikulincer, et al., 1988; Solomon, et al., 1989). This has important implications for our understanding of the relationship

between coping behaviour and pathology, and is an important finding for this population, especially given nature of the organisational culture.

Problem-focussed coping involves taking steps to deal directly with the stressor (Dirkzwager, et al., 2003; Holahan & Moos, 1987a; Lazarus, 1993; Lazarus & Folkman, 1984), and while these strategies may be helpful in situations where there is a problem that can be addressed; they may be less useful in situations where the stressors are not problems which can be readily solved. The difficulty faced by the participants in this study is that while they may have had high expectations of control as a consequence of their training, they had little actual control over many of the problems that they found distressing. As a consequence, in situations where there is little actual control, and where according to conventional theory, emotional and support-focussed coping strategies are more effective (Mikulincer, 1994), participants with a strong problem-focussed approach are potentially more vulnerable to poor adjustment. Particularly if they lack flexibility to access emotion-focussed coping strategies. The findings therefore suggest that work needs to be done to encourage flexibility amongst military personnel into the use of alternate (i.e. emotion-focussed) coping strategies.

Avoidant Coping. The findings also support previous research that shows that avoidant coping strategies are a significant risk factor for ongoing pathology (e.g. Moos, 1997). The results indicate that people with a pre-existing pattern of avoidant coping are at increased risk for poor ongoing adjustment, suggesting that they maintain this form of coping following trauma exposure. Avoidant coping strategies are not effective in the long term, and strategies such as denial, distraction, cognitive blunting, avoidance, assuming responsibility for events outside our control, wishful thinking and dissociation have been linked to reduced social support (Dirkzwager, et al., 2003; Holahan & Moos, 1987a), increased hypervigilance and intrusive symptoms (Kanninen, et al., 2002), and

increased severity and maintenance of PTSD (Dirkzwager, et al., 2003; Solomon, Mikulincer, et al., 1988). People with a pre-existing tendency to avoid problems and to seek ways to numb, or distract themselves from distressing emotions, are therefore unlikely to have learned adaptive strategies to use following traumatic or stressful events, and are subsequently more vulnerable to poor adjustment in the longer term.

Deployment-related Stressors

One of the additional findings of the research was the role of deployment-related stressors in acting as a risk factor for poor adjustment at the end of the deployment. This study examined the impact of deployment-related stressors using the Major Stressors Inventory (MSI), which is used by ADF psychologists to rate the level of stress caused by a range of non-traumatic potential stressors. The results showed that deployment-related stressors contributed to changes in emotional regulation, and beliefs about benevolence, and contributed to prediction of poor adjustment at the end of the deployment.

Unlike isolated incidents of trauma, day-to-day stressors tend to build over time to create a general sense of frustration. The results of this study are consistent with those from previous studies of stressors involving ADF personnel deployed to Iraq, Afghanistan, East Timor, Bougainville, and the Solomon Islands over the past decade (e.g. Bell & Steele, 2005; Deans, 2007; Steele & Twomey, 2006), as well as recent US studies involving Iraq War veterans (e.g. Booth-Kewley et al., 2010). Unlike previous studies however, the research reported in this thesis examines the impact of deployment-related stressors, in conjunction with trauma exposure, to determine the relative importance of these stressors in relation to trauma in predicting adjustment. This research also examines the impact of these stressors both at the end of the

deployment, and at follow-up, to determine if there is a reduction in the impact of deployment-related issues over time.

Recent US research involving Iraq and Afghanistan veterans showed that deployment-related stressors had a stronger association with PTSD than any other variable (Booth-Kewley, et al., 2010). The results reported in Chapter 5 support Booth-Kewley's findings showing not only that deployment-related stressors were more strongly correlated with both psychological distress and post-traumatic stress than trauma exposure at the end of the deployment, but when added to regression models for prediction of severity of pathology, explained more of the variance in both post-traumatic stress, and psychological distress, than trauma exposure. Similar results were obtained in logistic regression models for the prediction of participants falling above and below clinical cut-off for post-traumatic stress and psychological distress, with deployment-related stressors recording higher odds ratios than trauma exposure in both cases. This has important implications for our understanding of the role of relevant non-traumatic stressors as a risk factor for poor adjustment following a traumatic event.

Implications of the Research

The vulnerability model proposed in this thesis provides support for cognitive and appraisal theories of post-traumatic stress and related pathology. It identifies pre-existing cognitive, emotional and behavioural factors that contribute to the prediction of adjustment at the end of the deployment, and at follow-up, and it identifies the contribution of non-traumatic stressors in also providing risk for pathology. This is one of the first studies of its kind to address a number of limitations of previous research by providing a prospective, longitudinal examination of the relationship between pre-existing factors and post-trauma adjustment. The findings reported in this thesis have the potential to reduce adverse mental health outcomes, and improve post-trauma

adjustment through intervention to build resilience in high-risk populations prior to exposure to trauma. This section briefly outlines some of the key implications of the research, particularly with respect to issues impacting on Defence personnel.

Deployment-related Stressors. While deployment-related stressors emerged as a significant predictor of both post-traumatic stress and psychological distress at the end of the deployment, they were not significant at follow-up, suggesting that the impact of specific deployment-related factors reduces over time. This notwithstanding, these findings are consistent with research conducted within the Department of Defence which has repeatedly found that the stressors measured by the Major Stressors Inventory are a reliable predictor of adjustment at the end of the deployment (Deans, 2007; Nicholson, 2006; Steele & Twomey, 2006; Twomey, 2006, 2007). While the impact of deployment-related issues reduces over time following return from deployment, the damage may already have been done, as more recent research has found a direct correlation between high levels of deployment-related stress, and an increase in members' desire to separate from the service following the deployment, or at the end of their current term of engagement (Benassi, 2008). Given that self-reported willingness to continue or discontinue service has been shown to have a measurable outcome in terms of retention (Deans, 2002, 2007), these are significant issues that are within the Department's ability, and interest to address.

Taken together, the findings suggest that the impact of deployment-related stressors may be mitigated through the provision of education into the nature of the stressors that deploying personnel can expect to experience, and the relationship between the stressors and peri- and post-deployment adjustment. This can be delivered during pre-deployment training by expanding the scope of existing psycho-education, which tends to focus on transition–related factors. From a broader perspective, the

research highlights the importance of relevant organisational stressors as a risk factor for poor adjustment following a traumatic event. Other high-risk populations, such as police, ambulance officers and fire-fighters, health workers and aid workers, all work within organisations with distinct cultures, and their own, sometimes unique set of work-related stressors. There is a need for ongoing research both within the Department of Defence, and within other high-risk organisations, to better understand and mitigate the impact of such stressors.

Cognitions. The finding that low self-worth was related to the prediction of post-traumatic stress at follow-up suggests that these individuals lack confidence that they can engage in appropriate precautionary behaviours, and are more likely to experience difficulties accessing and expressing emotion. The results also found that holding strong, or rigid beliefs around events having meaning, and the world as being just, controllable and predictable, provides vulnerability for ongoing poor adjustment. This suggests a need for education into the relationship between cognitive appraisals (and in particular beliefs around meaning) and post-deployment adjustment. This education should have a particular focus on better preparing deploying personnel for the unpredictability and uncontrollability of events occurring in war.

Emotional Regulation. This thesis highlights the importance of understanding and acceptance of emotional response in predicting adjustment. Five of the six emotional regulation variables were shown to explain variance in adjustment above that explained by trauma exposure. In this population, there are strong cultural expectations, and individual beliefs about the expression of emotion, and this was found to be problematic with respect to post-trauma adjustment. ADF personnel tend to have strong beliefs about emotional control and those who had difficulty accepting a negative emotional response to trauma and stressors were at increased risk of poor adjustment at

the end of the deployment, and remained at increased risk at follow-up. Such people tend to avoid expressing emotion, and tend to experience difficulty seeking or accepting emotional support, possibly due to military-cultural expectations around resilience, and beliefs about the stigma of admitting mental health problems. This highlights the need for education into the relationship between beliefs around emotional control, regulation and expression, and post-deployment adjustment. This education can be delivered as part of existing pre-deployment training processes.

Coping Behaviour. The finding that a problem-focussed coping style acts as a risk-factor for both post-traumatic stress and psychological distress at the end of the deployment is of interest to military psychologists. The results also suggest that in some cases, a problem-focussed coping style may continue to contribute to poor adjustment in the months following a deployment. It was to be expected that ADF personnel would tend to display a preference for problem-focussed, rather than emotion- or avoidant-focussed coping styles. It is of concern however, that for many people, this preference tends to render them less able to adopt other, more adaptive coping strategies, in situations where they cannot readily solve the problem. There is a need for training to diversify coping behaviours within the Department of Defence, and within other high-risk populations which promote emotional control and the use of problem-focussed coping strategies.

Use as a screen for selection purposes. There is a risk that the strengths of the relationships between the vulnerability factors and adjustment identified in this thesis could be used to develop or support screening processes at point of entry to the armed forces, or prior to deployment. There is a danger if this were to occur that people who would be capable of coping would be excluded on the basis of scores on measures of beliefs about benevolence, meaningfulness, or emotional control. The variables reported

in this thesis were selected on the basis that they are modifiable, and have the potential to inform intervention strategies prior to exposure to trauma, not on the basis that they act as strong predictors of individual pathology. As with other vulnerability factors, these variables provide an indication of vulnerability for poor adjustment, but do not in isolation, provide a guarantee of the presence, or absence of future pathology following exposure to trauma.

Limitations

This study was limited by the sample size and the nature of the sample. While there were approximately 500 ADF personnel involved in the study, the number of variables being examined, and inconsistent responses (particularly with respect to the attribution variables) limited the sample in some analyses to a lower number. That being said, there was sufficient power in the study to identify small changes in the mean scores, and to achieve the results that were obtained. One of the difficulties in undertaking prospective pre-trauma research is being able to identify participants who can be expected to experience traumatic events without the manipulation of the researcher. Such populations tend to be limited to people in specific high-risk groups such as the military, who face specific threats and stressors and who may have attitudes that may not be typical of the broader community, thus restricting generalisability to similar groups. The results of the study need to be replicated using larger military samples, as well as in other high-risk populations, in order to confirm the findings reported here. These populations could include police, ambulance, fire-fighters and other emergency service personnel, health workers, and aid workers.

A second limitation of the research is that findings with respect to appraisal style were inconclusive. This may be related in part to the design of the survey instrument, which was poorly completed by some participants, and in part to the complexity of the

concepts being measured. The attributional style questionnaire is designed for student and community samples and uses hypothetical scenarios against which participants are required to assess their response. Future studies need to simplify the design of this instrument, make the scenarios more specific to the population being studied, and ensure that instructions to participants are adequate for the instruments that are used.

Conclusion

This thesis proposed and tested a vulnerability model for post-trauma pathology through a prospective, longitudinal examination of the relationship between cognitive, emotional regulation and behavioural factors and post-traumatic stress and psychological distress. Data was collected at three time points. The first was prior to deployment, and included data on self and world beliefs, appraisal style, capacity for emotional regulation, coping behaviour, pre-existing levels of pathology and previous operational experience. The second was at the end of the deployment, on the cognitive and emotion variables, exposure to trauma and non-traumatic stressors, and post-traumatic stress and psychological distress. The third was at follow-up, on coping behaviour, post-traumatic stress and psychological distress. The variables under question are important to study as they are measurable, and in high-risk populations potentially modifiable through intervention prior to exposure to trauma.

The research found that the variables were remarkably stable across the deployment, with variation explained more by exposure to deployment-related stressors, than by exposure to traumatic events. This is thought to be because traumatic events were to some degree anticipated, and occurred in context, whereas non-traumatic deployment related stressors were more difficult to prepare for, and may have contributed to increased frustration and stress over time.

The findings showed that negative beliefs around benevolence of the world, and a lack of emotional regulation strategies were associated with increased post-traumatic stress at the end of the deployment, while non-acceptance of emotional response and a lack of emotional regulation strategies were associated with increased psychological distress. At follow-up, avoidant coping behaviour was related to increased pathology, while a lack of self-worth, strong beliefs around events having meaning, and a reduced ability to pursue goal directed behaviour were associated with post-traumatic stress. A general lack of awareness and acceptance of emotional response, and strong positive beliefs about the benevolence of the world, were associated with increased psychological distress.

Amongst the sample, there was also a general tendency to adopt a problem-focussed coping style in preference to emotion-focussed strategies, and the research found that this, combined with a reluctance to adopt emotion-focussed strategies, may act as a risk factor for poor adjustment. This is thought to be because many of the problems causing distress are not able to be readily addressed, and so the application of problem-focussed strategies has the potential to be unsuccessful, and result in increased frustration and distress.

This study was unique in integrating pre-existing cognitive, emotional and behavioural factors as predictors of pathology, and paves the way for further research into how these factors influence adjustment among other high-risk populations.

Future Directions

A key finding of the study was the impact of deployment-related stressors on adjustment at the end of the deployment. The results highlight the importance of deployment-related stressors in contributing to and predicting both psychological distress and post-traumatic stress. This is an important finding because deployment-

related stressors can be identified and reduced in this population. One area that does not appear to have been adequately researched by the Department of Defence, and which could build on the findings of this study, is the relationship between deployment-related stressors and reintegration difficulties. It could be hypothesised that higher levels of self-reported deployment stress would be correlated with increased reintegration difficulties. Such research would need to control for individual differences in level of satisfaction by measuring general levels of satisfaction both prior to the deployment, and following reintegration, and correlating these finding with deployment-related stressors. This would allow researchers to determine if high scores reflect actual stress, or individual differences in general levels of satisfaction.

The findings highlight the importance of pre-existing psychological vulnerabilities in contributing to risk for poor adjustment following trauma exposure. In particular, the findings provided support for cognitive models of PTSD by showing that pre-existing self and world schemas, particularly beliefs around benevolence and meaningfulness, act as vulnerabilities for post-trauma pathology. There is a need for more prospective, longitudinal research using both Defence and other high-risk populations, to further guide our understanding in this area.

In addition to further research into the relationship between the cognitive factors and post-trauma adjustment, there is also a need for more research into the relationship between the cognitive factors and beliefs around emotional control within these high-risk populations. Given that the findings with respect to appraisal style in this study were inconclusive, and given that a negative attributional style has previously been shown to provide vulnerability for pathology, there is a need for further research into the relationship between self and world schemas, and attributional style. Where a specific population is being studied, future research into attributional style should use

scenarios that are appropriate for and specific to the population, in preference to the more general instruments which were developed for use in student or general community samples.

One of the other key outcomes of this study was the finding that problem-focussed coping strategies were not adaptive at the end of the deployment, and were linked to increased vulnerability for poor adjustment. This is potentially problematic, given that this population, and other high-risk groups who are required to cope with trauma in the course of their duties, tend to be oriented towards problem-focussed approaches. This study was limited because it used a single measure of general coping strategies, and it is recommended that future research in this area uses more specific measures that assess coping in different situations. These could be structured around scenarios that lend themselves to different forms of coping strategies, to determine the degree to which participants still adopt a default problem-solving approach, and the degree to which they have the flexibility to adopt alternate approaches.

REFERENCES

Abbott, B. V. (2005). *Emotion Dysregulation and Re-regulation: Predictors of Relationship Intimacy and Distress.* PhD, Texas A&M University, Galveston.

Abramson, L. Y., Metalsky, G. I., & Alloy, L. B. (1989). Hopelessness Depression: A Theory-Based Subtype of Depression. *Psychological Review, 96*(2), 358-372.

Abramson, L. Y., Seligman, M. E. P., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology, 87*(49-74).

Adler, A. B., Castro, C., & McGurk, D. (2009). Time-Driven Battlemind Psychological Debriefing: A Group-Level Early Intervention in Combat. *Military Medicine.* Retrieved from http://findarticles.com/p/articles/mi_qa3912/is_200901/ai_n31426196/

Adler, A. B., Litz, B. T., & Bartone, P. T. (2003). The nature of peacekeeping stressors. In T. W. Britt, Adler, A.B. (Ed.), *The psychology of peacekeepers: lessons in the field* (pp. 149-169). Westport: Praeger Publishers.

Adler, A. B., Wright, K. M., Bliese, P. D., Eckford, R., & Hoge, C. W. (2008). A2 diagnostic criterion for combat-related posttraumatic stress disorder. *Journal of Traumatic Stress, 21*(3), 301-308.

Ali, T., & Dunmore, E. (2002). The role of negative beliefs in posttraumatic stress disorder: A comparison of assault victims and non victims. *Behavioural and Cognitive Psychotherapy, 30*, 249-257.

Alloy, L. B., Abramson, L. Y., Metalsky, G. I., & Hartlage, S. (1988). The hopelessness theory of depression: Attributional aspects. *British Journal of Clinical Psychology 27*, 5-21.

Alloy, L. B., & Tabachnik, N. (1984). Assessment of covariation by humans and animals: The joint influence of prior expectations and current situational information. *Psychological Review, 91*(1), 112-149.

Andrews, B., Brewin, C. R., Rose, S., & Kirk, M. (2000). Predicting PTSD Symptoms in Victims of Violent Crime: The Role of Shame, Anger, and Childhood Abuse. *Journal of Abnormal Psychology, 109*(1), 69-73.

Andrews, G., Creamer, M., Crino, R., Hunt, C., Lampe, L., & Page, A. (2003). *The Treatment of Anxiety Disorders: Clinicians Guides and Patient Manuals* (2nd ed.). Cambridge: Cambridge University Press.

Andrews, G., & Slade, T. (2001). Interpreting scores on the Kessler Psychological Distress Scale (K10). *Australian and New Zealand Journal of Public Health, 25*(6), 494-497.

APA. (1980). *Diagnostic and Statistical Manual of Mental Disorders.* (Third Edition ed.). Washington, DC: American Psychiatric Association.

APA. (2000). *Diagnostic and Statistical Manual of Mental Disorders.* (Fourth Edition, Text Revision ed.). Washington, DC: American Psychiatric Association.

Armstrong, K., Best, S. R., & Domenici, P. (2006). *Courage after fire*. Berkely: Ulysses Press.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist, 37*, 122-147.

Barlow, D. H. (2002). *Anxiety and its Disorders: The nature and treatment of anxiety and panic* (2nd ed.). New York: The Guildford Press.

Barlow, D. H. (Ed.). (2001). *Clinical Handbook of Psychological Disorders: A Step-by-Step Treatment Manual* (3 ed.). New York: The Guilford Press.

Bell, D., & Steele, N. (2005). *Technical Brief 06/2005 - Analysis of the Major Stressors Inventory*. Defence Force Psychology Organisation, Canberra.

Benassi, H. (2008). Technical Brief 12/2008 - Mental Health Surveillance: Army and RAAF Personnel Deployed to Operation Catalyst: Jul 2005 - Dec 2006. In Department of Defence (Ed.). Canberra: Defence Force Psychology Organisation.

Benassi, H. (2010, 2 Mar 2010). [Deployment Statistics - Personal Communication].

Berntsen, D., & Rubin, D. C. (2007). When a trauma becomes a key to identity: Enhanced integration of trauma memories predicts posttraumatic stress disorder symptoms. *Applied Cognitive Psychology, 21*, 417-431.

Beveridge, A. (1997). On the origins of posttraumatic stress disorder. In D. Black, M. Newman, J. Harris-Hendriks & G. Mezey (Eds.), *Psychological Trauma: A developmental approach*. London: Gaskell.

Blanchard, E. B., Jones-Alexander, J., Buckley, T. C., & Forneris, C. A. (1996). Psychometric properties of the PTSD Checklist (PCL). *Behaviour Research and Therapy, 34* 669-673.

Bliese, P., Wright, K., Adler, A., Thomas, J., Oscar, C., Castro, C. (2008). Validating the PTSD Checklist and PC-PTSD with soldiers returning from combat. *Journal of Consulting Psychology, 72*(2), 272.

Bolton, E. E., Litz, B. T., Glenn, M., Orsillo, S., & Roemer, L. (2002). The impact of homecoming reception on the adaptation of peacekeepers following deployment. *Military Psychology, 14*, 241-251.

Booth-Kewley, S., Larson, G. E., Highfill-McRoy, R. M., Garland, C. F., & Gaskin, T. A. (2010). Correlates of posttraumatic stress disorder symptoms in Marines back from war. *Journal of Traumatic Stress, 23*(1), 69-77.

Borders, M. A., & Kennedy, C. H. (2006). Psychological Interventions after Disaster or Trauma. In C. H. Kennedy & E. A. Zillmer (Eds.), *Military Psychology: Clinical and Operational Applications* (pp. 331-352). New York: The Guilford Press.

Bowman, M. L., & Yehuda, R. (2004). Risk factors and the Adversity-stress model. In G. M. Rosen (Ed.), *Posttraumatic Stress Disorder: Issues and controversies* (pp. 15-38). Chicester, UK: John Wiley & Sons Ltd.

Bramsen, I., Dirkzwager, A. J. E., & Ploeg, H. M. v. d. (2000). Predeployment personality traits and exposure to trauma as predictors of posttraumatic stress symptoms: A prospective study of former peacekeepers. *The American Journal of Psychiatry, 157*(7), 1115.

Breslau, N. (2001). The epidemiolopgy of posttraumatic stress disorder: What is the extent of the problem? *Journal of Clinical Psychiatry, 62*(Suuplement 17), 16-22.

Breslau, N., Davis, G. C., Andreski, P., & Peterson, E. L. (1991). Traumatic events and posttraumatic stress disorder inan urban population of young adults. *Archives of general psychiatry, 48*, 216-222.

Breslau, N., Kessler, R. C., Chilcoat, H. D., Schultz, L. R., & Davis, G. C. (1998). Trauma and posttraumatic stress disorder in the community: The 1996 Detroit area survey of trauma. *Archives of General Psychiatry, 55*, 626-632.

Brewin, C. R. (2003). *Post-traumatic Stress Disorder: Malady or Myth?* New Haven: Yale University Press.

Brewin, C. R., Andrews, B., & Rose, S. (2000). Fear, Helplessness, and Horror in Posttraumatic Stress Disorder: Investigating DSM-IV Criterion A2 in Victims of Violent Crime. *Journal of Traumatic Stress, 13*(3), 499-509.

Brewin, C. R., Andrews, B., & Valentine, J. (2000). Meta-analysis of risk factors for post-traumatic stress disorder in trauma-exposed adults. *Journal of Consulting & Clinical Psychology, 68*, 748-766.

Brewin, C. R., Dalgleish, T., & Joseph, S. (1996). A Dual Representation Theory of Posttraumatic Stress Disorder. *Psychological Review October, 103*(4), 670-686.

Brewin, C. R., & Holmes, E. A. (2003). Psychological theories of posttraumatic stress disorder. *Clinical Psychology Review, 23*, 339-376.

Briere, J., & Elliot, D. (2000). Prevalence, Characteristics, and Long-Term Sequelae of Natural Disaster Exposure in the General Population *Journal of Traumatic Stress, 13*(4), 661-679.

Briere, J., & Scott, C. (2006). *Principles of Trauma Therapy: A guide to symptoms, evaluation and treatment*. Thousand Oaks, Ca: Sage Publications.

Britt, T. W., Greene-Shortridge, T. M., Brink, S., Nguyen, Q. B., Rath, J., Cox, A. L. (2008). Percieved stigma and barriers to care for psychological treatment: Implications for reactions to stressors in different contexts. *Journal of Social and Clinical Psychology, 27*(4), 317-335.

Britt, T. W., Greene-Shortridge, T. M., & Castro, C. (2007). The stigma of mental health problems in the military. *Military Medicine, 172*(2), 157-161.

Brooks, R. T., Beard, J., & Steel, Z. (2006). Factor Structure and Interpretation of the K10. *Psychological Assessment, 18*(1), 62-70.

Brown, J., Mulhern, G., & Joseph, S. (2002). Incident-related stressors, Locus of control, Coping, and psychological distress among firefighters in Northern Ireland. *Journal of Traumatic Stress, 15*(2), 161-168.

Bryant, R. A., & Harvey, A. G. (1995). Avodiant coping style and post-traumatic stress disorder following motor vehicle accidents. *Behaviour Research and Therapy, 33*, 631-635.

Bryant, R. A., & Harvey, A. G. (2002). Delayed onset posttraumatic stress disorder: A prospective evaluation. *Australian and New Zealand Journal of Psychiatry, 36*(2), 205-209.

Cabrera, O., Hoge, C., Bliese, P., Castro, C., & Messer, S. C. (2007). Childhood adversity and comobat as predictors of depression and post-traumatic stress in deployed troops. *American Journal of Preventative Medicine, 33*(2), 77-82.

Campise, R. L., Geller, S. K., & Campise, M. E. (2006). Combat Stress. In C. H. Kennedy & E. A. Zillmer (Eds.), *Military Psychology: Clinical and Operational Applications* (pp. 215-240). New York: The Guilford Press.

Cantor, C. (2005). *Evolution and Postraumatic Stress*. London: Routledge.

Carlyon, L. (2001). *Gallipoli*. Sydney: Pan MacMillan.

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing Coping Strategies: A Theoretically Based Approach. *Journal of Personality and Social Psychology, 56*(2), 267-283.

Castro, C. (2003). Considerations when conducting psychological research during peacekeeping: The scientist and the commander. In T. W. Britt, Adler, A.B. (Ed.), *The psychology of the peacekeeper: lessons from the field* (pp. 11-27). Westport: Praeger Publishing.

Catanzaro, S. J., & Mearns, J. (1990). Measuring Generalized Expectancies for Negative Mood Regulation: Initial Scale Development and Implications. *Journal of Personality Assessment, 54*(3&4), 546-563. doi: doi:10.1207/s15327752jpa5403&4_11

Catlin, G., & Epstein, S. (1992). Unforgettable experiences: The relation of life events to basic beliefs about self and world. *Social Cognition, 10*, 189-209.

Chemtob, C. M., Novaco, R. W., Hamada, R. S., & Gross, D. M. (1997). Cognitive-Behavioral Treatment for Severe Anger in Posttraumatic Stress Disorder. *Journal of Consulting & Clinical Psychology, 65*(1), 184-189.

Clark, A. J. (1998). *Defence Mechanisms in the Counselling Process*. Thousand Oaks, Ca: Sage Publications, Inc.

Cloitre, M., Miranda, R., Stovall-McClough, K., & Han, H. (2005). Beyond PTSD: Emotion Regulation and Interpersonal Problems as Predictors of Functional Impairment in Survivors of Childhood Abuse. *Behavior Therapy, 36*(2), 119-124.

Clutton, S., Pakenham, K. I., & Buckley, B. (1999). Predictors of emotional well-being following a 'false-positive' breast cancer screening result. *Psychology and Health, 14*(2), 263-275.

Cohan, S. L., Jang, K. L., & Stein, M. B. (2006). Confirmatory factor analysis of a short form of the Coping Inventory for Stressful Situations. *Journal of Clinical Psychology, 62*(3), 273-283.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied Multiple Regression/Correlation Analysis for the Behavioural Sciences* (3 ed.). New Jersey: Lawrence Erlbaum Associates, Publishers.

Cole, P. M., Michel, M. K., & Teti, L. O. (1994). The development of emotional regulation and dysregulation: A clinical perspective. *The development of emotional regulation: Biological and Behavioural Considerations. Monographs of the Society for Research in Child Development, 59*, 73-100.

Corrigan, P. W., & Watson, A. C. (2002). The paradox of self-stigma and mental illness. *Clinical Psychology 9*, 35-53.

Cotton, A. (2001). Non operational military stress management in the ADF: Where have we been and where are we going? In G. Kearney, Creamer, M., Marshall, R., Goyne, A. (Ed.), *The management of stress in the Australian Defence Force: Human factors, families and the welfare of military personnel away from the combat zone* (pp. 1-6). Canberra: Department of Defence.

Cramer, P. (1991). *The development of defence mechanisms: Theory, research and assessment*. New York: Springer-Verlag.

Creamer, M., Burgess, P., & McFarlane, A. C. (2001). Post-traumatic stress disorder: findings from the Australian National Survey of Mental Health and Well-being. *Psychological Medicine, 31*(07), 1237-1247. doi: doi:10.1017/S0033291701004287

Creamer, M., & Forbes, D. (2003). Long-term effects of traumatic stress. In G. Kearney, Creamer, M., Marshall, R., Goyne, A. (Ed.), *Military Stress and Performance* (pp. 175-184). Melbourne: Melbourne University Press.

Dalgleish, T. (1999). Cognitive theories of post-traumatic stress disorder. In W. Yule (Ed.), *Post-traumatic Stress Disorders: Concepts and Therapy* (pp. 192-220). New York, NY: John Wiley & Sons Ltd.

Dalgleish, T. (2004). Cognitive Approaches to Posttraumatic Stress Disorder: The Evolution of Multirepresentational Theorising. *Psychological Bulletin, 130*(2), 228-260.

Dalgleish, T., Mathews, A., & Wood, J. (1999). Inhibition processes in cognition and emotion: A special case? In T. Dalgleish & M. J. Power (Eds.), *Handbook of cognition and emotion* (pp. 243-266). Chichester: Wiley.

Deans, C. (2002). Research Report 06/2002: The psychological impact of peacekeeping deployments: analysis of questionnaire data 1999 - 2001: Part 1: mental health

of deployed personnel. In Department of Defence (Ed.): Psychology Research and Technology Group, Canberra.

Deans, C. (2007). Research Report 08/2007: Non-Traumatic Stressors in Deployed Military Personnel: Impact on Mental Health. In Department of Defence (Ed.): Defence Force Psychology Organisation, Canberra.

Dekel, R., Solomon, Z., Elklit, A., & Ginzburg, K. (2004). World Assumptions and Combat-Related Posttraumatic Stress Disorder. *The Journal of Social Psychology, 144*(4), 407.

Department of Defence. (2008). Security Detachment XIII, Operational Order 002/08.

Department of Defence. (2009). Health Bulletin 11/2009 Mental Health Screen for Casework: Surgeon General Australian Defence Force, 9 Oct 2009.

Department of Defense. (2008). Battlemind Psychological Debriefing. Maryland, USA: Battlemind Training Office, Walter Reed Army Institute of Research.

Department of Veteran Affairs. (1997). *Mortality of Vietnam Veterans: The Veteran Cohort Study*. Commonwealth of Australia.

Dirkzwager, A. J., Bramsen, I., & van der Ploeg, H. M. (2003). Social support, coping, life events, and posttraumatic stress symptoms among former peacekeepers: A prospective study. *Personality and Individual Differences, 34*(8), 1545-1559.

Dixon, A., Howie, P., & Starling, J. (2005). Truama exposure, Posttraumatic Stress, and psychiatric comorbidity in female juvenile offenders. *Journal of the American Academy of Child and Adolescent Psychiatry, 44*, 798-806.

Dohrenwend, B., Turner, J., Turse, N., Adams, B., Koenen, K., & Marshall, R. (2006). The psychological risks of Vietnam for U.S. veterans: a revisit with new data and methods. *Science 313*, 979-982.

Dunmore, E., Clark, D., & Ehlers, A. (1997). Cognitive factors in persistent versus recovered post-traumatic stress disorder after physical or sexual assault: A pilot study. *Behavioural and Cognitive Psychotherapy, 25*(2), 147-159.

Dunmore, E., Clark, D., & Ehlers, A. (1999). Cognitive factors involved in the onset and maintenance of posttraumatic stress disorder (PTSD) after physical or sexual assault. *Behaviour Research and Therapy, 37*(9), 809-829.

Dunmore, E., Clark, D., & Ehlers, A. (2001). A prospective investigation of the role of cognitive factors in persistent Posttraumatic Stress Disorder (PTSD) after physical or sexual assault. *Behaviour Research and Therapy, 39*(9), 1063-1084.

Dykema, J., Bergbower, K., Doctora, J., & Peterson, C. (1996). An attributional style questionnaire for general use. *Journal of Psychoeducational Assessment, 14*(2), 100-108.

Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy, 38*(4), 319-345.

Ehlers, A., Clark, D. M., Dunmore, E., Jaycox, L., Meadows, E., & Foa, E. B. (1998). Predicting Response to Exposure Treatment in PTSD: The Role of Mental Defeat and Alienation. *Journal of Traumatic Stress, 11*(3), 457.

Ehlers, A., Maercker, A., & Boos, A. (2000). Posttraumatic Stress Disorder Following Political Imprisonment: The Role of Mental Defeat, Alienation, and Perceived Permanent Change. *Journal of Abnormal Psychology, 109*(1), 45-55.

Elhai, J. D., Grubaugh, A. L., Kashdan, T. B., & Frueh, B. C. (2008). Empirical Examination of a Proposed Refinement to DSM-IV Posttraumatic Stress Disorder Symptom Criteria Using the National Comorbidity Survey Replication Data. *Journal of Clinical Psychiatry, 69*(4), 597-602.

Elklit, A., Shevlin, M., Solomon, Z., & Dekel, R. (2007). Factor structure and concurrent validity of the world assumptions scale. *Journal of Traumatic Stress, 20*(3), 291-301.

Endler, N. S., & Parker, J. D. A. (1990). Multidimensional Assessment of Coping: A Critical Evaluation. *Journal of Personality & Social Psychology, 58*(5), 844-854.

Endler, N. S., Speer, R. L., Johnson, J. M., & Flett, G. L. (2000). Controllability, Coping, Efficacy, and Distress. *European Journal of Personality, 14*(3), 245-264.

Engdahl, B., Diekl, T. N., Eberly, R., & Blank, A. (1998). Comorbidity and the course of psychiatric disorders in a community sample of former prisoners of war. *American Journal of Psychiatry, 155*(12), 1740-1745.

Engelhard, I. M., Huijding, J., Van den Hout, M. A., & de Jong, P. J. (2007). Vulnerability associations and symptoms of post-traumatic stress disorder in soldiers deployed to Iraq. *Behaviour Research and Therapy, 45*(10), 2317-2325.

Engelhard, I. M., van den Hout, M. A., & Kindt, M. (2003). The relationship between neuroticism, pre-traumatic stress and post-traumatic stress: A prospective study. *Personality and Individual Differences, 35*, 381-388.

Engelhard, I. M., Van den Hout, M. A., Weerts, J., Arntz, A., Hox, J. J. C. M., & McNally, R. J. (2007). Deployment-related stress and trauma in Dutch soldiers returning from Iraq. *British Journal of Psychiatry, 191*, 140-145.

Epstein, S. (1973). The self-concept revisited: Or a theory of a theory. *American Psychologist, 28*(5), 404-416.

Epstein, S. (1980). The self-concept: A review and the proposal of an integrated theory of personality. In E. Staub (Ed.), *Personality: Basic issues and current research*. Englewood Cliffs: NJ: Prentice-Hall.

Epstein, S. (1984). Controversial issues in emotion theory. In P. Shaver (Ed.), *Review of personality and social psychology: Emotrions, relationships and health*. Beverly Hills, Calif: Sage.

Erikson, E. (1963). *Childhood and Society*. New York: Norton.

Falconer, B. (2005). Human factors and the 'can-do' attitude: Strength or weakness. *Australian Defence Force Journal*(169), 23-32.

Falsetti, S. A., & Resick, P. A. (1997). Frequency and severity of panic attack symptoms in a treatment seeking sample of trauma victims. *Journal of Traumatic Stress, 10*(4), 683-689.

Feldner, M. T., Lewis, S. F., Leen-Feldner, E. W., Schnurr, P. P., & Zvolensky, M. J. (2006). Anxiety Sensitivity as a Moderator of the Relation Between Trauma Exposure Frequency and Posttraumatic Stress Symptomatology. *Journal of Cognitive Psychotherapy, 20*(2), 201.

Finnegan, A., Finnegan, S., & Gamble, D. (2007). A review of one year of British Armed Forces mental health admissions. *Journal Royal Army Medical Corps, 153*(1), 26-31.

Foa, E. B., Ehlers, A., Clark, D. M., Tolin, D. F., & Orsillo, S. M. (1999). The Posttraumatic Cognitions Inventory (PTCI): Development and Validation. *Psychological Assessment 11*(3), 303-314.

Foa, E. B., Keane, T. M., & Friedman, M. J. (2000). Guidelines for Treatment of PTSD. *Journal of Traumatic Stress, 13*(4), 539.

Foa, E. B., & McNally, R. J. (1996). Mechanisms of change in exposure therapy. In R. M. Rapee (Ed.), *Current controversies in the Anxiety Disorders* (pp. 329-343). New York: Guildford Press.

Foa, E. B., Molnar, C., & Cashman, L. (1995). Change in rape narratives during exposure therapy for posttraumatic stress disorder *Behavioral Science, 8*(4), 675-690

Foa, E. B., & Riggs, D. B. (1993). Posttraumatic stress disorder in rape victims: . In J. Oldham, M. B. Riba & A. Tasman (Eds.), *American psychiatric press review of psychiatry* (Vol. 12). Washington, D.C.: American Psychiatric Press.

Foa, E. B., & Rothbaum, B. O. (1998). *Treating the trauma of rape: cognitive behavioral therapy for PTSD*. New York: Guilford Press.

Foa, E. B., Rothbaum, B. O., & Steketee, G. S. (1993). Treatment of rape victims. *Journal of Interpersonal Violence, 8*(2), 256.

Foa, E. B., Zinbarg, R., & Rothbaum, B. O. (1992). Uncontrollability and Unpredictability in Post-Traumatic Stress Disorder: An Animal Model. *Psychological Bulletin, 112*(2), 218-238.

Folkman, S. (1984). Personal control and stress and coping processes: A theoretical analysis. *Journal of Personality & Social Psychology, 46*(4), 839-852.

Folkman, S., & Lazarus, R. S. (1988). Coping as a Mediator of Emotion. *Journal of Personality & Social Psychology, 54*(3), 466-475.

Forbes, D., Haslam, N., Williams, B. J., & Creamer, M. (2005). Testing the latent structure of Posttraumatic Stress Disorder: A Taxometric Study of Combat Veterans. *Journal of Traumatic Stress, 18*(6), 647-656.

Forbes, D., Parslow, R., Creamer, M., Allen, N., McHugh, T., & Hopwood, M. (2008). Mechanisms of anger and treatment outcome in combat veterans with posttraumatic stress disorder. *Journal of Traumatic Stress, 21*(2), 142-149.

Foy, D. W., Resnick, H. S., Sipprelle, R. C., & Carroll, E. M. (1987). Premilitary, military and postmilitary factos in the development of combat-realted Postraumatic stress disorder. *Behavior Therapist, 10*(1), 3-9.

Frankl, V. (1962). *Man's search for meaning: An introduction to logotherapy*. Boston: Beacon Press.

Frueh, B., Elhai, J. D., & Kaloupek, D. (2004). Unresolved issues in the assessment of trauma exposure and posttraumatic reactions. In G. M. Rosen (Ed.), *Posttraumatic Stress Disorder: Issues and controversies* (pp. 64-84). Chichester, UK: John Wiley & Sons, Ltd.

Funnell, R. G. (1980). The Professional Military Officer in Australia. *Defence Force Journal*(23).

Furukawa, T. A., Kessler, R. C., Slade, T., & Andrews, G. (2003). The performance of the K6 and K10 screening scales for psychological distress in the Australian National Survey of Mental Health and Well-Being *Psychological Medicine, 33*(2), 357-362.

Fussell, P. (1996). *Doing Battle: The Making of a Skeptic*. Boston: Little, Brown and Co.

Gabriel, R. A. (1987). *No more heroes: Madness and Psychiatry in War*. New York: Hill and Wang.

Gabriel, R. A. (1988). *The painful field: The psychiatric dimension of modern war.* Westport, Connecticut: Greenwood Press, Inc.

Gall, K. A. (2006). *Identifying Perceived Barriers to Mental Health Care in the ADF: The Impact of Self-Recognition of Mental Health Problems, Help-Seeking Inclinations and Gender.* Master of Psychology (Health), Monash University, Melbourne.

Ginzburg, K., Solomon, Z., Dekel, R., & Neria, Y. (2003). Battlefield functioning and chronic PTSD: Associations with perceived self-efficacy and causal attribution. *Personality and Individual Differences 34*(3), 463-476.

Gould, M., Adler, A., Zamorski, M., Castro, C., Hanily, N., Steele, N. (2010). Do stigma and other percieved barriers to mental health care differ across Armed Forces. *Journal of the Royal Society of Medicine, 103*, 148-156.

Gratz, K. L., & Roemer, L. (2004). Multidimensional Assessment of Emotion Regulation and Dysregulation: Development, Factor Structure, and Initial Validation of the Difficulties in Emotion Regulation Scale. *Journal of Psychopathology and Behavioral Assessment, 26*(1), 41-54.

Gray, M. J., & Lombardo, T. W. (2004). Life Event Attributions as a Potential Source of Vulnerability Following Exposure to a Traumatic Event. *Journal of Loss & Trauma, 9*(1), 59-72.

Gray, M. J., Pumphrey, J. E., & Lombardo, T. W. (2003). The relationship between dispositional pessimistic attributional style versus trauma-specific attributions and PTSD symptoms. *Journal of Anxiety Disorders, 17*(3), 289-303

Green, B. L., Grace, M. C., Lindy, J. D., & Gleser, G. C. (1990). War stressors and symptom persistence in posttraumatic stress disorder. *Journal of Anxiety Disorders, 4*(1), 31-39.

Greening, L., Stoppelbein, L., & Docter, R. (2002). The mediating effects of attributional style and event-specific attributions on postdisaster adjustment. *Cognitive Therapy and Research 26*(2), 261-274.

Greenwald, A. G. (1980). The totalitarian ego: Fabrication and revision of personal history. *American Psychologist, 35*(7), 603-618.

Grey, N., Holmes, E. A., & Brewin, C. R. (2001). Peri-traumatic emotional 'hotspots' in traumatic memory: a case series of patients with posttraumatic stress disorder. *Behavioural and Cognitive Psychotherapy, 29*(3), 367-372.

Gross, J. J. (1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology, 2*(3), 271-299.

Gross, J. J. (2002). Emotion regulation: Affective, cognitive, and social consequences. *Psychophysiology, 39*(3), 281-291.

Grossman, D. (1995). *On killing: The psychological cost of learning to kill in war and society*. Boston: Little, Brown and Company.

Haan, N. (1977). *Coping and defending: processes of self-environment organization.* New York: Academic Press.

Harris, R. (2009). *ACT Made Simple*. Oakland, CA: New Harbinger Publications, Inc.

Herman, J. (1997). *Truama and recovery*. New York: Basic Books.

Hodson, S. E. (2002). *Key predictors of post-trauma symptomatology in military and peacekeeping veterans.* PhD Macquarie University, Sydney.

Hoge, C. W., Castro, C. A., Messer, S. C., McGurk, D., Cotting, D. I., & Koffman, R. L. (2004). Combat duty in Iraq and Afghanistan, mental health problems and barriers to care. *The New England Journal of Medicine, 351*(1), 13-22.

Holahan, C. J., & Moos, R. H. (1987a). Personal and Contextual Determinants of Coping Strategies. *Journal of Personality & Social Psychology 52*(5), 946-955.

Holahan, C. J., & Moos, R. H. (1987b). Personal and Contextual Determinants of Coping Strategies. *Journal of Personality & Social Psychology, 52*(5), 946-955.

Holbrook, T. L., Hoyt, D. B., Stein, M. B., & Sieber, W. J. (2001). Perceived threat to life predicts posttraumatic stress disorder after major trauma: risk factors and functional outcome. *Journal of Trauma: Injury, Infection, and Critical Care, 51*, 287-293.

Holmes-Smith, P. (2008). Advanced Structural Equation Modelling. Red Hill, Victoria: School Research, Evaluation and Measurement Services.

Holmes, E. A., Grey, N., & Young, K. A. (2005). Intrusive images and "hotspots" of trauma memories in Posttraumatic Stress Disorder: An exploratory investigation of emotions and cognitive themes. *Journal of Behavior Therapy and Experimental Psychiatry, 36*(1), 3-17.

Holmes, M. R., & St. Lawrence, J. S. (1983). Treatment of rape-induced trauma: Proposed behavioural conceptualisation and review of the literature. *Clinical Psychology Review, 3*(4), 417-433.

Horowitz, M. J. (1976). *Stress Response Syndromes* (1st ed.). New York: Jason Aronson, Inc.

Horowitz, M. J. (1986). *Stress Response Syndromes* (2nd ed.). Northvale, NJ: Aronson.

Horowitz, M. J. (1997). *Stress Response Reactions* (2nd ed.). Northvale, NJ: Aronson.

Ingram, R. E., & Price, J. M. (2001). The role of vulnerability in understanding psychopathology. In R. E. Ingram & J. M. Price (Eds.), *Vulnerability to psychopathology: Risk across the lifespan.* New York: The Guildford Press.

Iversen, A. C., Fear, N. T., Ehlers, A., Hacker Hughes, J., Hull, L., Earnshaw, M. (2008). Risk factors for post-traumatic stress disorder among UK Armed Forces personnel. *Psychological Medicine, 38*(4), 511-522.

Jakupcak, M., Conybeare, D., Phelps, L., Hunt, S., Holmes, H. A., Felker, B. (2007). Anger, hostility, and aggression among Iraq and Afghanistan war veterans reporting PTSD and subthreshold PTSD. *Journal of Traumatic Stress, 20*(6), 945-954.

Jakupcak, M., Luterek, J., Hunt, S., Conybeare, D., & McFall, M. (2008). Posttraumatic stress and its relationship to physical health functioning in a sample of Iraq and Afghanistan War veterans seeking postdeployment VA Health care. *Journal of Nervous Mental Disorders, 196*(5), 425-428.

Janoff-Bulman, R. (1982). Esteem and control bases of blame: "Adaptive" strategies for victims versus observers. *Journal of Personality, 50*(2), 180-192. doi: doi:10.1111/j.1467-6494.1982.tb01022.x

Janoff-Bulman, R. (1985). The aftermath of victimization: rebuilding shattered assumptions. In C. Figley (Ed.), *Trauma and Its Wake Vol.1 The Study and Treatment of Post-Traumatic Stress Disorder* (pp. 15-33). New York: Brunner/Mazel.

Janoff-Bulman, R. (1989). Assumptive worlds and the stress of traumatic events: Applications of the schema construct. *Social Cognition, 7*(2), 113-136.

Janoff-Bulman, R. (1992). *Shattered assumptions: Towards a new psychology of trauma*. New York: Free Press.

Janoff-Bulman, R., & Frantz, C. M. (1999). The impact of trauma on meaning: from meaningless world to meaningful life. In M. J. Power & C. R. Brewin (Eds.), *The Transformation of Meaning in Psychological Therapies* (pp. 91-106). New York Wiley.

Jans, N., & Schmidtchen, D. (2002). *The real C-Cubed: Culture, Careers and Climate and how they affect capability*. Canberra: Australian National University.

Jeavons, S., & Godber, T. (2005). World Assumptions as a meeasure of meaning in rural road crash victims. *Australian Journal of Rural Health, 13*, 226-231.

Jobson, L. A. (2008). *Cultural Differences in the Autobiographical Memory of Trauma.* PhD (Clinical Psychology) Dissertation, Australian National University, Canberra.

Johnsen, B. H., Laberg, J. C., & Eid, J. (1998). Coping strategies and mental health problems in a military unit. *Military Medicine, 163* (9), 599-602.

Jones, E., Hodgins-Vermaas, R., McCartney, H., Everitt, B., Beech, C., Poynter, D. (2002). Post-combat syndromes from the Boer War to the Gulf War: a cluster analysis of their nature and attribution. *British Medical Journal, 324*, 1-7.

Joseph, S. (1999). Attributional processes, coping and post-traumatic stress disorders. In W. Yule (Ed.), *Post-traumatic Stress Disorders: Concepts and Therapy* (pp. 51-70). New York, NY: John Wiley & Sons Ltd.

Joseph, S., Brewin, C. R., Yule, W., & Williams, R. M. (1991). Causal attributions and psychiatric symptoms in survivors of the Hearld of Free Enterprise Disaster. *British Journal of Psychiatry, 106*, 221-229.

Joseph, S., Yule, W., & Williams, R. (1993a). *Post-traumatic stress: Attributional aspects*: Journal of Traumatic Stress Vol 6(4) Oct 1993, 501-513 John Wiley & Sons.

Joseph, S., Yule, W., & Williams, R. M. (1993b). Post-traumatic stress: attributional aspects. *Journal of Traumatic Stress, 6*(4), 501-513.

Joseph, S., Yule, W., & Williams, R. M. (1994). The Herald of Free Enterprise disaster: The relationship of intrusion and avoidance to subsequent depression and anxiety. *Behavior Research and Therapy, 32*, 115-117.

Kang, H., Natelson, B., Mahan, C., Leek, Y., & Murphy, F. (2003). Post-traumatic stress disorder and chronic fatigue syndrome-like illness among Gulf War

veterans: a population-based survey of 30,000 veterans. *American Journal of Epidemiology, 157*, 141-148.

Kanninen, K., Punamäki, R.-L., & Qouta, S. (2002). The Relation of Appraisal, Coping Efforts, and Acuteness of Trauma to PTS Symptoms Among Former Political Prisoners *Journal of Traumatic Stress, 15*(3), 245-253.

Karesek, R., & Theorell, T. (1990). *Healthy work: stress, productivity, and the reconstruction of working life.* New York: Basic Books;.

Keane, T. M., Zimering, R. T., & Caddell, J. M. (1985). A behavioral formulation of posttraumatic stress disorder in Vietnam veterans. *Behavior Therapist, 8*(1), 9-12.

Kessler, R. C., Andrews, G., Colpe, L. J., Hiripi, E., Mroczek, D. K., Normand, S.-L. T. (2002). Short screening scales to monitor population prevalences and trends in non-specifc psychological distress. *Psychological Medicine, 32*, 959-976.

Kessler, R. C., Sonnega, J. R., Bromet, E., Hughes, M., & Nelson, C. B. (1995). Posttraumatic Stress Disorder in the National Comorbidity Survey. *Archives of General Psychiatry, 52*, 1048-1060.

Kilpatrick, D. G., Veronen, L. J., & Best, C. L. (1985). Factors predicting psychological distress among rape victims. In C. R. Figley (Ed.), *Trauma and its wake* (pp. 113-141). New York: Brunner/Mazel.

King, L. A., King, D. W., Vogt, D. S., Knight, J. A., & Samper, R. E. (2006). Deployment Risk and Resilience Inventory: A collection of measures of rstudying deployment-related experiences of military personel and veterans. *Military Psychology, 18*, 89-120.

Kolb, L. C. (1987). A Neuropsychological Hypothesis Explaining Posttraumatic Stress Disorders. *American Journal of Psychiatry, 144*(8), 989-995.

Kubany, E. S. (1994). A cognitive model of guilt typology in combat-related PTSD. *Journal of Traumatic Stress, 7*, 13-19.

Kubany, E. S., Haynes, S. N., Abueg, F. R., Manke, F. P., & Brennan, J. M. (1996). Development and validation of the Trauma-related Guilt Inventory. *Psychological Assessment, 8*, 428-444.

Kubany, E. S., & Manke, F. P. (1995). Cognitive therapy for trauma-related guilt: Conceptual basis and treatment outlines. *Cognitive and Behavioural Practice, 2*, 23-61.

Kulka, R. A. (1988). National Vietnam Veterans Readjustment Study *Brunner/Mazel Psychosocial Stress Series, No. 20* (Vol. I). Washington DC: Veterans Administration.

Kulka, R. A., Schlenger, W. E., Fairbank, J. A., Hough, R. L., Jordan, B. K., Marmar, C. R. (1990). *Trauma and the Vietnam War generation: Report of the findings from the National Vietnam Veteran's Readjustment Study*. New York: Brunner/Mazel.

Lang, A. J., Laffaye, C., Satz, L. E., Dresselhaus, T. R., & Stein, M. B. (2003). Sensitivity and Specificity of the PTSD Checklist in Detecting PTSD in Female Veterans in Primary Care *Journal of Traumatic Stress, 16*(3), 257-264.

Langer, E. J. (1975). The illusion of control. *Journal of Personality & Social Psychology, 32*(2), 311-328.

Lapierre, C. B., Schwegler, A. F., & LaBauve, B. J. (2007). Posttraumatic stress and depression symptoms in soldiers returning from combat operations in Iraq and Afghanistan. *Journal of Traumatic Stress, 20*(6), 933-943.

Larson, L. M. (1994). *The role of emotional regulation in coping with a chronic and uncontrollable life stressor: Navy wives' adjustment to deployment-related stressors.* PhD, Yale University, New Haven.

Lazarus, R. S. (1991). *Emotion and Adaption*. New York: Oxford University Press, Inc.

Lazarus, R. S. (1993). Coping theory and research: past, present and future. *Psychosomatic Medicine, 55*, 234-247.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal and coping*. New York: Springer.

Lerner, M. J. (1980). *The belief in a just world: A fundamental delusion*. New York: Plenum Press.

Leskela, J., Dieperink, M., & Thuras, P. (2002). Shame and postraumatic stress disorder. *Journal of Traumatic Stress, 15*(3), 223-226.

Leskin, G. A., & Sheikh, J. I. (2002). Lifetime trauma history and panic disorder: findings from the National Comorbidity Survey. *Journal of Anxiety Disorders, 16*(6), 599-603.

Linley, A. O. (2003). Positive adaptation to trauma: Wisdom as both process and ouctome. *Journal of Traumatic Stress, 16*(6), 601-610.

Littleton, H., Horsley, S., John, S., & Nelson, D. V. (2007). Trauma coping strategies and psychological distress: A meta-analysis. *Journal of Traumatic Stress, 20*(6), 977-988.

Litz, B. T. (2007). Research on the impact of Military Trauma: Current Status and Future Directions. *Military Psychology, 19*(3), 217-238.

Litz, B. T., & Keane, T. M. (1989). Information processing in anxiety disorders: Application to the understanding of Post-traumatic stress disorder. *Clinical Psychology Review, 9*, 243-257.

Magwaza, A. S. (1999). Assumptive world of traumatized South African adults. *The Journal of Social Psychology, 139*(5), 622.

Masel, C. N., Terry, D. J., & Gribble, M. (1996). The effects of coping on adjustment: Re-examining the goodness of fit model of coping effectiveness. *Anxiety, Stress and Coping, 9*, 279-300.

Massad, P. M., & Hulsey, T. L. (2006). Causal attributions in posttraumatic stress disorder: Implications for clinical research and practice. *Psychotherapy: Theory, Research, Practice, Training, 43*(3), 201-215.

Mauss, I. B., Bunge, S. A., & Gross, J. J. (2007). Automatic emotion regulation. . *Social and Personality Psychology Compass.*

McCormick, R. A., Taber, J. I., & Kruedelbach, N. (1989). The Relationship Between Attributional Style and Post-Traumatic Stress Disorder in Addicted Patients. *Journal of Traumatic Stress, 2*(4), 477-487.

McFarlane, A. C. (1988). The phenoomenology of post-traumatic stress disorders following a natural disaster. *Journal of Nervous and Mental Disorders, 176*, 22-29.

McFarlane, A. C. (1998). The longitudinal course or posttraumatic morbidity: the range of outcomes and their predictors. *Journal of Nervous and Mental Disorders, 176*, 498-504.

McFarlane, A. C., & De Girolamo, G. (1996). The nature of traumatic stressors and epidemiology of posttraumatic reactions. In B. van der Kolk, A. C. McFarlane & L. Weisaith (Eds.), *Traumatic Stress: the effects of overwhelming experience on mind, body and society*. New York: Guilford.

McKeever, V. M., & Huff, M. E. (2003). A Diathesis-Stress Model of Posttraumatic Stress Disorder: Ecological, Biological and Residual Stress Pathways. *Review of General Psychology, 7*(3), 237-259.

McNally, R. J. (2004). Conceptual problems with the DSM-IV criteria for psottraumatic stress disorder. In G. M. Rosen (Ed.), *Postraumatic stress disorder: Issues and Controversies* (pp. 1-14). Chichester: John Wiley & Sons, Ltd.

Mikulincer, M. (1989). Causal attributions, coping strategies and learned helplessness. *Cognitive Therapy and Research, 13*, 565-582.

Mikulincer, M. (1994). *Human Learned Helplessness: A Coping Perspective.* New York: Plenum.

Mikulincer, M., Florian, V., & Weller, A. (1993a). Attachment Styles, Coping Strategies, and Posttraumatic Psychological Distress: The Impact of the Gulf War in Israel. *Journal of Personality & Social Psychology, 64*(5), 817-826.

Mikulincer, M., Florian, V., & Weller, A. (1993b). Attachment Styles, Coping Strategies, and Posttraumatic Psychological Distress: The Impact of the Gulf War in Israel. *Journal of Personality & Social Psychology 64*(5), 817-826.

Mikulincer, M., & Solomon, Z. (1988). Attributional Style and Combat-Related Posttraumatic Stress Disorder. *Journal of Abnormal Psychology, 97*(3), 308-313.

Mikulincer, M., & Solomon, Z. (1989). Causal attribution, coping strategies, and combat-related post-traumatic stress disorder. *European Journal of Personality 3*(4), 269-284.

Monroe, S. M., & Simons, A. D. (1991). Diathesis-Stress Theories in the Context of Life Stress Research: Implications for the Depressive Disorders. *Psychological Bulletin, 110*(3), 406-425.

Mooren, G. T. M., & Kleber, R. J. (2001). The impact of the war in Bosnia and Hertzegovina. *International Journal of Mental Health, 30*(6-21).

Moos, R. H. (1997). Coping Responses Inventory: A measure of approach and avoidance coping skills. In C. P. Zalaquett & R. J. Wood (Eds.), *Evaluating Stress. A book of resources.* London: Scarecrow Press.

Mowrer, O. H. (1947). On the dual nature of learning - a re-interpretation of "conditioning" and "problem-solving". *Harvard Educational Review, 14*, 102-148.

Mowrer, O. H. (1960). *Learning theory and behaviour.* New York: Wiley.

Ness, G. J., & Macaskill, N. (2003). Preventing PTSD: The Value Of Inner Resourcefulness and a Sense of Personal Control of a Situation. Is it a Matter of Problem-Solving or Anxiety Management? *Behavioural and Cognitive Psychotherapy, 31*(4), 463-466.

Nicholson, C. (2006). *PRTG Technical Brief 23/2006 - Content Analysis of RtAPS Questionnaire Items: Percieved Difficulties in Returning Home.* Defence Force Psychology Organisation, Canberra.

Nicholson, C. (2007). *Research Report 8/06 v2 - A Review of the PCL-C Checklist.* Defence Force Psychology Organisation, Canberra.

Nishith, P., Mechanic, M. B., & Resick, P. A. (2000). Prior Interpersonal Trauma: The Contribution to Current PTSD Symptoms in Female Rape Victims. *Journal of Abnormal Psychology, 109*(1), 20-25.

Novaco, R. W., & Chemtob, C. M. (2002). Anger and combat related posttraumatic stress disorder. *journal of Traumatic Stress, 15*(2), 123-132.

O'Donnell, M. L., Creamer, M., & Pattison, P. (2004). Posttraumatic Stress Disorder and Depression Following Trauma: Understanding Comorbidity. *The American Journal of Psychiatry, 161*(8), 1390.

O'Toole, B. L., Marshall, R. P., Scheureck, R. J., & Dobson, M. (1998). Posttraumatic stress disorder and comobidity in Australian Vietnam veterans: Risk factos, chronicity and combat. *Australian and New Zealand Journal of Psychiatry, 32*(1), 32-42.

Orr, S. P., Metzger, L. J., Lasko, N. B., Macklin, M. L., Peri, T., & Pitman, R. K. (2000). De Novo Conditioning in Trauma-Exposed Individuals With and Without Posttraumatic Stress Disorder. *Journal of Abnormal Psychology, 109*(2), 290-298.

Orsillo, S. M., & Batten, S. V. (2005). Acceptance and Commitment Therapy in the treatment of posttraumatic stress disorder. *Behavior Modification, 29*(1), 95-129.

Orsillo, S. M., Roemer, L., Litz, B. T., Ehlich, P., & Friedman, M., J. (1998). Psychiatric symptomology associated with contemporary peacekeeping: An examination of post-mission functioning amopng peacekeepers in Somalia. *Journal of Traumatic Stress, 11*(4), 611-625.

Ozer, E. J., Best, S. R., Lipsey, T. L., & Weiss, D. S. (2003). Predictors of Posttraumatic Stress Disorder and Symptoms in Adults: A Meta-Analysis. *Psychological Bulletin, 129*(1), 52-73.

Parkes, C. M. (1975). What becomes of redundant world models? A contribution to the study of adaption to change. *British Journal of Clinical Psychology, 48*, 131-137.

Parry-Jones, B., & Parry-Jones, W. (1994). Post-traumatic stress disorder: supportive evidence from an eighteenth century natural disaster. *Psychological Medicine, 24*(1), 15-27.

Parslow, R., Jorm, A. F., & Christensen, H. (2005). Associations of pre-trauma attributes and trauma exposure with screening positive for PTSD: analysis of a community-based sample of 2085 young adults. *Psychological Medicine, 36*, 387-395.

Pearlin, L. I., & Schooler, C. (1978). The Structure of Coping. *Journal of Health and Social Behavior, 19*(1), 2-21.

Peterson, C., & Seligman, M. E. (1984). Causal explanations as a risk factor for depression: Theory and evidence. *Psychological Review, 91*(3), 347-374.

Peterson, C., Semmel, A., von Baeyer, C., Abramson, L., Metalsky, G. I., & Seligman, M. E. P. (1982). The Attributional Style Questionnaire. *Cognitive Therapy and Research, 6*(3), 287-300

Phelps, M. (1997). The Australian Army's Culture: From Institutional Warrior to Pragmatic Professional

Australian Defence Force Journal(123), 37-43.

Prager, E., & Solomon, Z. (1995). Perceptions of world benevolence, meaningfulness, and self-worth among elderly Israeli holocaust survivors and non-survivors. *Anxiety, Stress & Coping: An International Journal, 8*(4), 265-277.

Price, J. L., Monson, C. M., Callahan, K., & Rodriguez, B. F. (2006). The role of emotional functioning in military-related PTSD and its treatment. *Journal of Anxiety Disorders, 20*(5), 661-674.

Reiss, S., Peterson, R. A., Gursky, D. M., & McNally, R. J. (1986). Anxiety sensitivity, anxiety frequency and the prediction of fearfulness. *Behaviour Research and Therapy 24*(1), 1-8.

Resick, P. A. (2001). Cognitive therapy for posttraumatic stress disorder. *Journal of Cognitive Psychotherapy: An International Quarterly, 15*, 321-329.

Resick, P. A., & Calhoun, K. S. (2001). Posttraumatic Stress Disorder. In D. H. Barlow (Ed.), *Clinical Handbook of Psychological Disorders: A Step-by-Step Treatment Manual* (3 ed., pp. 60-113). New York: The Guilford Press.

Resick, P. A., Monson, C. M., & Rizvi, S. L. (2008). Posttraumatic Stress Disorder. In D. H. Barlow (Ed.), *Clinical Handbook of Psychological Disorders: A Step-by-Step Treatment Manual* (4 ed., pp. 65-122). New York: The Guilford Press.

Rona, R. J., Hooper, R., Jones, M., Iversen, A. C., Hull, L., Murphy, D. (2009). The contribution of prior psychological symptoms and combat exposure to post Iraq deployment mental health in the UK military *Journal of Traumatic Stress, 22*(1), 11-19.

Rosen, G. (1975). Nostalgia: A forgotten psychological disorder. *Psychological Medicine, 5*, 340-341.

Rosenman, S. (2002). Trauma and posttraumatic stress disorder in Australia: findings in the population sample of the Australian National Survey of Mental Health and Wellbeing. *Australian and New Zealand Journal of Psychiatry, 4*(2), 515-520.

Roth, S., & Cohen, L. (1986). Approach, avoidance and coping with stress. *American Psychologist, 41*, 813-819.

Rothbaum, F., Weisz, J. R., & Snyder, S. S. (1982). Changing the world and changing the self: A two-process model of perceived control. *Journal of Personality & Social Psychology, 42*(1), 5-37.

Rotter, J. B. (1966). Generalised expectanacies for internal versus external control of reinforcement. *Psychological Monographs, 80*(1), 1-28.

Ruggiero, K. J., Del Ben, K., Scotti, J. R., & Rabalais, A. E. (2003). Psychometric Properties of the PTSD Checklist—Civilian Version. *Journal of Traumatic Stress, 16*(5), 495-502.

Runyon, M. K., & Kenny, M. C. (2002). Relationship of attibutional style, depression and posttrauma distress among children who suffered physical or sexual abuse. *Child Maltreatment, 7*, 254-264.

Scherer, K. R. (1999). Appriasal theory. In T. Dalgleish & M. Power (Eds.), *Handbook of Cognition and Emotion* (pp. 637-663). Chicester: Wiley.

Schnurr, P. P., Friedman, M. J., & Rosenberg, S. D. (1993). Premilitary MMPI scores as predictors of combat-related PTSD. *American Journal of Psychiatry, 150*(3).

Schnurr, P. P., Lunney, C. A., & Sengupta, A. (2004). Risk factors for the development versus maintenance of Posttraumatic Stress Disorder. *Journal of Traumatic Stress, 17*(2), 85-95.

Seligman, M. E. (1990). *Learned Optimism*. Sydney: Random House.

Seligman, M. E., Abramson, L. Y., Semmel, A., & von Baeyer, C. (1979). Depressive attributional style. *Journal of Abnormal Psychology, 88*(3), 242-247.

Seligman, M. E., Castellon, C., Cacciola, J., Schulman, P., Luborsky, L., Ollove, M. (1988). Explanatory style change during cognitive therapy for unipolar depression. *Journal of Abnormal Psychology, 97*(13-18).

Seligman, M. E. P., & Maier, S. F. (1967). Failure to escape traumatic shock. *Journal of Experimental Psychology, 74*, 1-9.

Siemer, M., Mauss, I., & Gross, J. J. (2007). Same situation--Different emotions: How appraisals shape our emotions. *Emotion, 7*(3), 592-600.

Silver, R. L., Boon, C., & Stones, M. H. (1983). Searching for meaning in misfortune: Making sense of incest. *Journal of Social Issues, 39*(2), 81-101.

Singer, M. (2004). *Shame, Guilt, Self-Hatred and Remorse in the Psychotherapy of Vietnam Combat Veterans Who Committed Atrocities*: American Journal of Psychotherapy Vol 58(4) 2004, 377-385 Assn for the Advancement of Psychotherapy.

Skinner, E. A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the Structure of Coping: A Review and Critique of Category Systems for Classifying Ways of Coping. *Psychological Bulletin, 129*(2), 216-269.

Smith, T. C., Ryan, M. A. K., Wingard, D. L., Slymen, D. J., Sallis, J. F., & Kritz-Silverstein, D. (2008). New onset and persistent symptoms of post-traumatic stress disorder self reported after deployment and combat exposures: prospective population based US military cohort study *British Medical Journal, 336*(7640), 366-371.

Solomon, Z., Iancu, I., & Tyano, S. (1997). World Assumptions Following Disaster. *Journal of Applied Social Psychology, 27*(20), 1785-1798. doi: doi:10.1111/j.1559-1816.1997.tb01625.x

Solomon, Z., Kotler, M., & Mikulincer, M. (1988). Combat-Related Posttraumatic Stress Disorder among Second-Generation Holocaust Survivors: Preliminary Findings. *The American Journal of Psychiatry, 145*(7), 865.

Solomon, Z., Mikulincer, M., & Avitzur, E. (1988). Coping, Locus of Control, Social Support, and Combat-Related Posttraumatic Stress Disorder: A Prospective Study. *Journal of Personality & Social Psychology, 55*(2), 279-285.

Solomon, Z., Mikulincer, M., & Benbenishty, R. (1989). Locus of control and combat-related post-traumatic stress disorder: The intervening role of battle intensity, threat appraisal and coping. . *British Journal of Clinical Psychology, 28*, 131-144.

Solomon, Z., Zur-Noah, S., Horesh, D., Zerach, G., & Keinan, G. (2008). The contribution of stressful life events throughout the life cycle to combat-induced psychopathology. *Journal of Traumatic Stress, 21*(3), 318-325.

Southwick, S. M., Morgan, C. A. I., Nicolau, A. L., & Charney, D. S. (1997). Consistency of memory for combat-relatd traumatic events in veterans of Operation Desert Storm. *American Journal of Psychiatry, 154*, 173-177.

Steele, N., & Twomey, A. (2006). *Research Report 02/2006 - Mental Health Surveillance: Army and RAAF Personnel Deployed to Operation Catalyst: Jan 2003 - Jul 2005*. Defence Force Psychology Organisation, Canberra.

Swann, J., & Hodson, S. (2004). *A Psychometric Analysis of the Traumatic Stress Exposure Scale - Revised.* (AR 012-636). Canberra: Defence Force Psychology Organisation, Canberra.

Tabachnick, B. G., & Fidell, L. S. (2001). *Using Multivariate Statistics* (4 ed.). Boston: Allyn and Bacon.

Taylor, A. J. (2004). Occupational Stress and Peacekeepers *The Australasian Journal of Disaster and Trauma Studies, 1*. Retrieved from http://www.massey.ac.nz/~trauma/issues/2004-1/taylor.htm

Taylor, S. E., & Brown, J. D. (1988). Illusion and Well-Being: A Social Psychological Perspective on Mental Health. *Psychological Bulletin, 103*(2), 193-210.

Taylor, S. E., & Brown, J. D. (1994). Positive Illusions and Well-Being Revisited: Separating Fact From Fiction. *Psychological Bulletin, 116*(1), 21-27 <23>.

Theorell, T., & Karesek, R. A. (1996). Current issues relating to psychosocial job strain and cardiovascular disease research. *Journal of Occupational Health Psychology*(29), 271–360.

Thompson, R. A. (1994). Emotional Regulation: A theme in search of definition. *The development of emotional regulation: Biological and Behavioural Considerations. Monographs of the Society for Research in Child Development, 59*, 25-52.

Thompson, R. A., & Calkins, S. D. (1996). The double-edged sword:Emotional regulation for children at risk. *Development and Psychopathology, 8*, 163-182.

Tick, E. (2005). *War and the Soul.* Wheaton, Ilinois: Quest Books.

Tull, M. T., Jakupcak, M., McFadden, M., & Roemer, L. (2007). The Role of Negative Affect Intensity and the Fear of Emotions in Posttraumatic Stress Symptom

Severity Among Victims of Childhood Interpersonal Violence. *Journal of Nervous & Mental Disease, 195*(5), 580-587.

Tversky, A., & Kahneman, D. (1982). Judgement under uncertainty: Heuristics and biases. In D. Kahneman, P. Slovic & A. Tversky (Eds.), *Judgement under uncertainty: Heuristics and biases* (pp. 3-22). Cambridge: Cambridge University Press.

Twomey, A. (2006). *Technical Brief 07/2006 - ADF Mental Health Trends: RtAPS and POPS 2003 - 2005*. Defence Force Psychology Organisation, Canberra.

Twomey, A. (2007). *Technical Brief 02/2007 - ADF Mental Health Surveillance: Deployment Baselines Jan 03 - Aug 06*. Defence Force Psychology Organisation, Canberra.

Tyquin, M. (2006). *Madness and the Military: Australia's Experience in the Great War*. Sydney: Australian Military History Publications.

Ullman, S. E. (1997). Attributions, world assumptions, and recovery from sexual assault. *Journal of Child Sexual Abuse, 6*(1), 1.

Ullman, S. E., & Filipas, H. H. (2001). Predictors of PTSD Symptom Severity and Social Reactions in Sexual Assault Victims *Journal of Traumatic Stress, 14*(3), 369-389.

van der Kolk, B. (1994). The Body Keeps the Score: Memory and the Evolving Psychobiology of Posttraumatic Stress *Harvard Review of Psychiatry, 1*(5), 253-265.

Van der Kolk, B. (1996). The complexity of adaption to trauma: Self-regulation, stimulus discrimination, and characterological development. In B. Van der Kolk, A. C. McFarlane & I. Weisaeth (Eds.), *Truamatic Stress: The effects of overwhelming experience on mind, body, and society* (pp. 182-213). New York: Guildford Press.

van der Kolk, B., Greenberg, M., Boyd, H., & Krystal, J. (1985). Inescapable shock, neurotransmitters, and addiction to trauma: Toward a psychobiology of post traumatic stress. *Biological Psychiatry, 20*(3), 314-325.

Vasterling, J. J., Proctor, S. P., Friedman, M. J., Hoge, C. W., Heeren, T., King, L. A. (2010). PTSD symptom increases in Iraq-deployed soldiers: Comparison with nondeployed soldiers and associations with baseline symptoms, deployment experiences, and postdeployment stress. *Journal of Traumatic Stress, 23*(1), 41-51.

Vogt, D. S., Samper, R. E., King, D. W., King, L. A., & Martin, J. A. (2008). Deployment stressors and posttraumatic stress symptomatology: Comparing active duty and National Guard/Reserve personnel from Gulf War I *Journal of Traumatic Stress, 21*(1), 62-74.

Vogt, D. S., & Tanner, L. R. (2007). Risk and resilience factors for posttraumatic stress symptomology in war-exposed veterans. *Journal of Traumatic Stress, 20*, 27-38.

Weathers, F. W., Litz, B. T., Herman, J. A., Huska, J. A., & Keane, T. M. (1993). *The PTSD Checklist (PCL): Reliability, validity and diagnostic utility.* . Paper presented at the 9th Annual Conference of the ISTSS, San Antonio.

Webb, M., & Whitmer, K. (2001). Abuse History, World Assumptions and Religious Problem Solving. *Journal for the Scientific Study of Religion, 40*(3), 445-453.

Weiner, B. (1985a). An attributional theory of achievement motivation and emotion. *Psychological Review, 92*, 548-573.

Weiner, B. (1985b). "Spontaneous" Causal Thinking. *Psychological Bulletin, 97*(1), 74-84.

Weiner, B. (1992). *Human Motivation.* New York: Springer-Verlag.

Wenniger, K., & Ehlers, A. (1998). Dysfunctional cognitions and adult psychological functioning in child sexual abuse survivors. *Journal of Traumatic Stress, 11*, 281-300.

Williams, K. E., Chambless, D. L., & Ahrens, A. H. (1997a). Are emotions frightening? An extension of the fear construct. *Behaviour Research and Therapy, 35*(3), 239-248.

Williams, K. E., Chambless, D. L., & Ahrens, A. H. (1997b). Are emotions frightening? An extension of the fear of fear construct. *Behaviour Research and Therapy, 35*(3), 239-248.

Wilson, J. P., & Krauss, G. E. (1985). Predicting post-traumatic stress disorder among Vietnam veterans. In W. E. Kelly (Ed.), *Post-traumatic stress disorder and the war veteran patient* (pp. 102–147). New York: Brunner/Mazel.

Zohar, J., Fostick, L., Cohen, A., Bleich, A., Dolfin, D., Weissman, Z. (2009). Risk factors for the development of Posttraumatic Stress Disorder following Combat Trauma: A Semiprospective Study. *Journal of Clinical Psychiatry, 70*(12), 1629-1635.

APPENDICES

APPENDIX A: PREDICTOR VARIABLE MEASURES

A-1: World Assumptions Scale

Beliefs and Assumptions

Below is a list of statements which reflect beliefs and assumptions about yourself and the world. Using the scale below, please indicate the degree to which you agree or disagree with each statement.

	Strongly Disagree	Somewhat Disagree	Slightly Disagree	Slightly Agree	Somewhat Agree	Strongly Agree
1. Misfortune is least likely to strike worthy, decent people	O	O	O	O	O	O
2. People are naturally unfriendly and unkind	O	O	O	O	O	O
3. Bad events are distributed to people at random	O	O	O	O	O	O
4. Human nature is basically good	O	O	O	O	O	O
5. The good things that happen in the world far outnumber the bad	O	O	O	O	O	O
6. The course of our lives is largely determined by chance	O	O	O	O	O	O
7. Generally people deserve what they get in this world	O	O	O	O	O	O
8. I often think I am no good at all	O	O	O	O	O	O
9. There is more good than evil in the world	O	O	O	O	O	O
10. I am basically a lucky person	O	O	O	O	O	O
11. People's misfortunes result from mistakes they have made	O	O	O	O	O	O
12. People don't really care what happens to the next person	O	O	O	O	O	O
13. I usually behave in ways that are likely to maximise good results for me	O	O	O	O	O	O
14. People will experience good fortune if they themselves are good	O	O	O	O	O	O
15. Life is too full of uncertainties that are determined by chance	O	O	O	O	O	O
16. When I think about it, I consider myself very lucky	O	O	O	O	O	O
17. I almost always make an effort to prevent bad things from happening to me	O	O	O	O	O	O
18. I have a low opinion of myself	O	O	O	O	O	O
19. By and large, good people get what they deserve in this world	O	O	O	O	O	O
20. Through our actions we can prevent bad things happening to us	O	O	O	O	O	O
21. Looking at my life, I realise that chance events have worked out well for me	O	O	O	O	O	O
22. If people took preventive actions, most misfortune could be avoided	O	O	O	O	O	O
23. I take the actions necessary to protect myself against misfortune	O	O	O	O	O	O
24. In general, my life is mostly a gamble	O	O	O	O	O	O
25. The world is a good place	O	O	O	O	O	O
26. People are basically kind and helpful	O	O	O	O	O	O
27. I usually behave so as to bring about the greatest good for me	O	O	O	O	O	O
28. I am very satisfied with the kind of person I am	O	O	O	O	O	O
29. When bad things happen, it is typically because people have not taken the necessary actions to protect themselves	O	O	O	O	O	O
30. If you look closely enough, you will see that the world is full of goodness	O	O	O	O	O	O
31. I have reason to be ashamed of my personal character	O	O	O	O	O	O
32. I am luckier than most people	O	O	O	O	O	O

A-2: Attributional Style Questionnaire

Causes for Events

Please try to imagine yourself in the following situations. If such a situation happened to you, what do you think might have caused it? While situations like these may have many causes, we want you to choose only one.
The main cause, that is, what made the situation happen to you.
Please write the main cause in the box after each situation.
Next answer the three questions about the cause you provided by filling in the appropriate response.

First, write down the one main cause in the box alongside each statement. Next, answer each question by filling in the response	Q1. Does the cause you gave have something to do with you, or does it have something to do with other people or circumstances? Other people or situations ... Completely with you -3 -2 -1 0 +1 +2 +3	Q2. How likely is it that the cause you gave will continue to affect you? Will never affect you ... Will always affect you -3 -2 -1 0 +1 +2 +3	Q3. Is the cause you gave something that just affects this situation, or does it affect other areas of your life? Just affects this situation ... Affects all other areas -3 -2 -1 0 +1 +2 +3
1. You have problems sleeping Write cause here →	o o o o o o o	o o o o o o o	o o o o o o o
2. You feel sick and tired most of the time Write cause here →	o o o o o o o	o o o o o o o	o o o o o o o
3. You have a serious injury Write cause here →	o o o o o o o	o o o o o o o	o o o o o o o
4. You can't find a job Write cause here →	o o o o o o o	o o o o o o o	o o o o o o o
5. You can't get the work done that others expect of you Write cause here →	o o o o o o o	o o o o o o o	o o o o o o o
6. You are fired from your job Write cause here →	o o o o o o o	o o o o o o o	o o o o o o o
7. You don't help a friend who has a problem Write cause here →	o o o o o o o	o o o o o o o	o o o o o o o
8. You have financial problems Write cause here →	o o o o o o o	o o o o o o o	o o o o o o o
9. You don't understand what your boss wants of you Write cause here →	o o o o o o o	o o o o o o o	o o o o o o o
10. A friend is mad at you Write cause here →	o o o o o o o	o o o o o o o	o o o o o o o
11. You are guilty of breaking the law Write cause here →	o o o o o o o	o o o o o o o	o o o o o o o
12. You have a serious argument with someone in your family Write cause here →	o o o o o o o	o o o o o o o	o o o o o o o

A-3: Difficulties with Emotional Regulation Scale

Feelings and Emotions

Below is a list of items relating to your feelings and emotions. Using the scale provided, please select the response which indicates how often the items relate to you

	Almost Never (0-10%)	*Sometimes (11-35%)*	*About half the time (36-65%)*	*Most of the time (66-90%)*	*Almost Always (91-100%)*
1. I am clear about my feelings	○	○	○	○	○
2. I pay attention to how I feel	○	○	○	○	○
3. I experience my emotions as overwhelming and out of control	○	○	○	○	○
4. I have no idea how I am feeling	○	○	○	○	○
5. I have difficulty making sense out of my feelings	○	○	○	○	○
6. I am attentive to my feelings	○	○	○	○	○
7. I know exactly how I am feeling	○	○	○	○	○
8. I care about what I am feeling	○	○	○	○	○
9. I am confused about how I feel	○	○	○	○	○
10. When I'm upset, I acknowledge my emotions	○	○	○	○	○
11. When I'm upset, I become angry with myself for feeling that way	○	○	○	○	○
12. When I'm upset, I become embarrassed for feeling that way	○	○	○	○	○
13. When I'm upset, I have difficulty getting work done	○	○	○	○	○
14. When I'm upset, I become out of control	○	○	○	○	○
15. When I'm upset, I believe that I will remain that way for a long time	○	○	○	○	○
16. When I'm upset, I believe that I'll end up feeling very depressed	○	○	○	○	○
17. When I'm upset, I believe that my feelings are valid and important	○	○	○	○	○
18. When I'm upset, I have difficulty focusing on other things	○	○	○	○	○
19. When I'm upset, I feel out of control	○	○	○	○	○
20. When I'm upset, I can still get things done	○	○	○	○	○
21. When I'm upset, I feel ashamed with myself for feeling that way	○	○	○	○	○
22. When I'm upset, I know that I can find a way to eventually feel better	○	○	○	○	○
23. When I'm upset, I feel like I am weak	○	○	○	○	○
24. When I'm upset, I feel like I can remain in control of my behaviors	○	○	○	○	○
25. When I'm upset, I feel guilty for feeling that way	○	○	○	○	○
26. When I'm upset, I have difficulty concentrating	○	○	○	○	○
27. When I'm upset, I have difficulty controlling my behaviors	○	○	○	○	○
28. When I'm upset, I believe there is nothing I can do to make myself feel better	○	○	○	○	○
29. When I'm upset, I become irritated with myself for feeling that way	○	○	○	○	○
30. When I'm upset, I start to feel very bad about myself	○	○	○	○	○
31. When I'm upset, I believe that wallowing in it is all I can do	○	○	○	○	○
32. When I'm upset, I lose control over my behaviors	○	○	○	○	○
33. When I'm upset, I have difficulty thinking about anything else	○	○	○	○	○
34. When I'm upset, I take time to figure out what I'm really feeling	○	○	○	○	○
35. When I'm upset, it takes me a long time to feel better	○	○	○	○	○
36. When I'm upset, my emotions feel overwhelming	○	○	○	○	○

A-4: Coping Inventory of Stressful Situations

Stressful Situations

Below is a list of activities that people sometimes undertake in response to stressful situations. Please indicate how much you engage in these types of activities when you encounter a difficult, stressful or upsetting situation.

	Never	*Sometimes*	*About half the time*	*Most of the time*	*Almost Always*
1. Take some time off and get away from the situation	O	O	O	O	O
2. Focus on the problem and see how I can solve it	O	O	O	O	O
3. Blame myself for having gotten into this situation	O	O	O	O	O
4. Treat myself to a favourite food or snack	O	O	O	O	O
5. Feel anxious about not being able to cope	O	O	O	O	O
6. Think about how I solved similar problems before	O	O	O	O	O
7. Visit a friend or mate	O	O	O	O	O
8. Determine a course of action and follow it	O	O	O	O	O
9. Buy myself something	O	O	O	O	O
10. Blame myself for being emotional about the situation	O	O	O	O	O
11. Work to understand the situation	O	O	O	O	O
12. Become very upset	O	O	O	O	O
13. Take corrective action immediately	O	O	O	O	O
14. Blame myself for not knowing what to do	O	O	O	O	O
15. Spend time with a special person	O	O	O	O	O
16. Think about the event and learn from my mistakes	O	O	O	O	O
17. Wish that I could change what had happened or how I felt	O	O	O	O	O
18. Go out for a snack or meal	O	O	O	O	O
19. Analyse my problem before reacting	O	O	O	O	O
20. Focus on my general inadequacies	O	O	O	O	O
21. Phone a friend	O	O	O	O	O
22. Go out for a drink	O	O	O	O	O

APPENDIX B: EXPOSURE MEASURES

B-1: Traumatic Stress Exposure Scale (Revised)

TSES-R

The following questionnaire asks you about events that may have occurred during your deployment. Please read each event statement carefully and then indicate, by filling in the circle, how often you experienced the event, how it affected you at the time and how it affects you now. For each question some examples are given, please indicate if you experienced these or similar experiences. It is important that you mark a response in each of the three columns.

EVENT How often did the following occur..?	How often did you experience the event?					How did it affect you at the time? (felt fear, horror or helplessness)				How does it affect you now? (feelings of fear, horror or helplessness)			
	Never	Rarely	On Occasion (x2-5)	Often (x6-10)	Very Often (x11+)	Not at all	A little	A moderate amount	A great deal	Not at all	A little	A moderate amount	A great deal
1. You were in danger of being killed e.g. combat, motor vehicle accident (MVA), assault, sexual assault, natural disaster, hostage situation	○	○	○	○	○	○	○	○	○	○	○	○	○
2. You were in danger of being injured e.g. combat, MVA, assault, sexual assault, natural disaster, hostage situation	○	○	○	○	○	○	○	○	○	○	○	○	○
3. You had to handle dead bodies e.g. disaster situation, temporary morgue, mass graves including any form of human remains	○	○	○	○	○	○	○	○	○	○	○	○	○
4. You saw dead bodies e.g. disaster situation, temporary morgue, mass graves including any form of human remains	○	○	○	○	○	○	○	○	○	○	○	○	○
5. You heard of a close friend or co-worker who had been injured or killed e.g. combat, MVA, disaster situation	○	○	○	○	○	○	○	○	○	○	○	○	○
6. You were present when a close friend or co-worker was injured or killed e.g. combat, MVA, disaster situation	○	○	○	○	○	○	○	○	○	○	○	○	○
7. You feared that you had been exposed to a contagious disease, toxic agent or injury e.g. radioactivity, HIV, chemical warfare	○	○	○	○	○	○	○	○	○	○	○	○	○
8. You were witness to human degradation and misery on a large scale e.g. refugee camps, starvation	○	○	○	○	○	○	○	○	○	○	○	○	○
9. You heard of a loved one who had been injured or killed	○	○	○	○	○	○	○	○	○	○	○	○	○
10. You were present when a loved one was injured or killed	○	○	○	○	○	○	○	○	○	○	○	○	○
11. You believe your action or inaction resulted in someone being seriously injured e.g. in combat or as a result of rules of engagement or UN restrictions not allowing you to act	○	○	○	○	○	○	○	○	○	○	○	○	○
12. You believe your actions or inaction resulted in someone being killed e.g. in combat or as a result of rules of engagement or UN restrictions not allowing you to act	○	○	○	○	○	○	○	○	○	○	○	○	○

13. Were there any events that you found to be traumatic but that are not listed above? Please specify below:

_____

_____

B-2: Major Stressors Inventory

MAJOR STRESSORS

Below is a list of factors that some people may find stressful. Please read each factor carefully, and then indicate, by filling in the circle, the response that best describes how much stress that factor caused you during your deployment.

	No Stress	Slight Stress	Moderate Stress	A Lot of Stress	Extreme Stress
1. Risk of unauthorised discharge (UD) of weapons	○	○	○	○	○
2. Risk of vehicle accidents	○	○	○	○	○
3. Living conditions	○	○	○	○	○
4. Isolation from Australia	○	○	○	○	○
5. Isolation from other deployed members	○	○	○	○	○
6. Personal privacy	○	○	○	○	○
7. Sorting out problems at home	○	○	○	○	○
8. Boredom	○	○	○	○	○
9. Living and working with the same people	○	○	○	○	○
10. Overload of work	○	○	○	○	○
11. Periods of high activity then low/no activity	○	○	○	○	○
12. Health concerns	○	○	○	○	○
13. Behaviour of others	○	○	○	○	○
14. Living in a different culture	○	○	○	○	○
15. Separation from family and friends	○	○	○	○	○
16. Threat of danger	○	○	○	○	○
17. Not getting on with others	○	○	○	○	○
18. Lack of opposite sex company	○	○	○	○	○
19. Language barriers	○	○	○	○	○
20. Sorting out disagreements with others	○	○	○	○	○
21. Frustration generally	○	○	○	○	○
22. Thinking about returning home	○	○	○	○	○
23. The overseas organisation (e.g. UN, MFO)	○	○	○	○	○
24. Your role in the country	○	○	○	○	○
25. Completing deployment's objectives	○	○	○	○	○
26. ADF's lack of concern with deployed troops	○	○	○	○	○
27. The Australian military hierarchy	○	○	○	○	○
28. Leadership	○	○	○	○	○
29. The deployment's rules and regulations	○	○	○	○	○
30. Double standards	○	○	○	○	○
31. Contact with family/friends	○	○	○	○	○
32. Taking leave back in Australia	○	○	○	○	○
33. Taking leave other than in Australia	○	○	○	○	○
34. Mail service	○	○	○	○	○
35. Working with military of other countries	○	○	○	○	○
36. Length of deployment	○	○	○	○	○

Please list any other stressful experiences and fill in the circle that best describes how much stress it caused

37. _____	○	○	○	○	○
38. _____	○	○	○	○	○

APPENDIX C: PSYCHOPATHOLOGY MEASURES

C-1: Post-Traumatic Stress

PCL-C

Below is a list of problems and complaints that people sometimes have in response to stressful life experiences. Please read each question carefully and then indicate, by filling in the circle, the response that best describes how much you have been bothered by that problem in the past month.

	Not at all	A little bit	Moderately	Quite a bit	Extremely
1. Repeated, disturbing *memories, thoughts* or *images* of a stressful experience from the past?	○	○	○	○	○
2. Repeated, disturbing *dreams* of a stressful experience from the past?	○	○	○	○	○
3. Suddenly *acting* or *feeling* as if a stressful experience from the past were *happening again* (as if you were reliving it)?	○	○	○	○	○
4. Feeling *very upset* when *something reminded* you of a stressful experience from the past?	○	○	○	○	○
5. Having a *physical reaction* (e.g. heart pounding, trouble breathing, sweating) when *something reminded* you of a stressful experience from the past?	○	○	○	○	○
6. Avoiding *thinking about* or *talking about* a stressful experience from the past or avoiding *having feelings* related to it?	○	○	○	○	○
7. Avoiding *activities* or *situations* because *they reminded you* of a stressful experience from the past?	○	○	○	○	○
8. Trouble *remembering important parts* of a stressful experience from the past?	○	○	○	○	○
9. *Loss of interest* in activities that you used to enjoy?	○	○	○	○	○
10. Feeling *distant* or *cut off* from other people?	○	○	○	○	○
11. Feeling *emotionally numb* or being unable to have loving feelings for those close to you?	○	○	○	○	○
12. Feeling as if your *future* somehow will be *cut short*?	○	○	○	○	○
13. Trouble *falling* or *staying asleep*?	○	○	○	○	○
14. Feeling *irritable* or having *angry outbursts*?	○	○	○	○	○
15. Having *difficulty concentrating*?	○	○	○	○	○
16. Being *'superalert'* or watchful or on guard?	○	○	○	○	○
17. Feeling *jumpy* or easily startled?	○	○	○	○	○

C-2: Psychological Distress

K10

The following questions inquire about how you have been feeling over the last four (4) weeks. Please read each question carefully and then indicate, by filling in the circle, the response that best describes how you have been feeling.

	All of the time	*Most of the time*	*Some of the time*	*A little of the time*	*None of the time*
1. In the past four (4) weeks, about how often did you feel tired for no good reason?	○	○	○	○	○
2. In the past four (4) weeks, about how often did you feel nervous?	○	○	○	○	○
3. In the past four (4) weeks, about how often did you feel so nervous that nothing could calm you down?	○	○	○	○	○
4. In the past four (4) weeks, about how often did you feel hopeless?	○	○	○	○	○
5. In the past four (4) weeks, about how often did you feel restless or fidgety?	○	○	○	○	○
6. In the past four (4) weeks, about how often did you feel so restless that you could not sit still?	○	○	○	○	○
7. In the past four (4) weeks, about how often did you feel depressed?	○	○	○	○	○
8. In the past four (4) weeks, about how often did you feel that everything was an effort?	○	○	○	○	○
9. In the past four (4) weeks, about how often did you feel so sad that nothing could cheer you up?	○	○	○	○	○
10. In the past four (4) weeks, about how often did you feel worthless?	○	○	○	○	○

APPENDIX D: STATISTICAL TABLES

D-1: Summary of Mean Scores for the Vulnerability Variables

Table D-1

Mean Scores for Pre-Deployment (T1) and Post-Deployment (T2) Cognitive Variables

Variable	n	Time 1 Mean (SD)	Time 2 Mean (SD)
Benevolence	326	29.07 (4.97)	28.79 (5.83)
Meaningfulness	325	42.90 (6.05)	43.01 (6.38)
Self Worth	322	54.49 (6.62)	53.32 (7.91)
Locus	138	51.46 (11.68)	51.71 (12.50)
Stability	129	47.61 (11.43)	48.65 (14.11)
Generalisability	124	46.35 (13.14)	46.11 (13.56)

Table D-2

Mean Scores for Pre-Deployment (T1) and Post-Deployment (T2) Emotional Regulation Variables

Variable	n	Time 1 Mean (SD)	Time 2 Mean (SD)
Lack Awareness	317	17.91 (4.80)	17.20 (4.78)
Lack Clarity	325	9.38 (2.97)	9.34 (3.05)
Non Acceptance	323	9.32 (3.82)	9.68 (4.21)
Lack Goal Behaviour	324	8.98 (2.91)	8.87 (3.18)
Lack Impulse Control	316	8.26 (2.79)	8.98 (3.48)
Lack Strategies	320	11.23 (3.48)	11.82 (4.49)

Table D-3

Mean Scores for Pre-Deployment (T1) and Follow-up (T3) Coping Variables

Variable	n	Time 1 Mean (SD)	Time 3 Mean (SD)
Problem Coping	149	25.82 (5.29)	25.43 (5.95)
Emotion Coping	149	16.08 (3.89)	15.88 (3.86)
Avoidant Coping	149	13.30 (3.59)	11.52 (3.33)

Table D-4

Mean Scores for Differences between Coping Styles

Variable Pair	Time 1 (n = 483)		Time 3 (n = 191)	
	Mean (SD)	Difference in the Means	Mean (SD)	Difference in the Means
Problem vs Emotion	25.35 (5.39) 16.63 (3.98)	8.719	25.21 (6.02) 15.85 (3.83)	9.356
Problem vs Avoidant	25.35 (5.39) 13.22 (3.71)	12.126	25.21 (6.02) 11.70 (3.39)	13.508
Emotion vs Avoidant	16.63 (3.98) 13.22 (3.71)	3.408	15.85 (3.83) 11.70 (3.39)	4.152