Adverse psychological reactions to potentially traumatic events in the Navy: prevalence and testing a personal construct model of maintaining mental health

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ADVERSE PSYCHOLOGICAL REACTIONS TO POTENTIALLY TRAUMATIC EVENTS IN THE NAVY: PREVALENCE AND TESTING A PERSONAL CONSTRUCT MODEL OF MAINTAINING MENTAL HEALTH

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Stephen Philip Shepherd Rayner

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Abstract

The impact of potentially traumatic events on Australian Navy personnel is described through 2 studies of the long-term psychological experiences of survivors of a fatal fire in HMAS Westralia in 1998. Study 1 reports on the prevalence of indicated post traumatic stress disorder at three times since the fire, ranging from four months to six years, and general psychological distress and alcohol problems at six years. There were no significant associations between gender and military rank, and mental health disorders. A model of how mental health can be maintained in the aftermath of exposure to potentially traumatic events, based on personal construct theory, is then described. This model is tested in Study 2, using a sample of participants from Study 1 who maintained positive mental health in the years after the fire. Narratives provided by participants were analysed using content analysis scales, to assess positive emotions, emotions of transition, and social relating. Experiencing positive emotions, having resolved guilt, overt hostility directed outwards, and depression, and reporting positive interpersonal relationships based on perceived resources and intimacy, were associated with positive mental health. These results support aspects of the proposed model and are consistent with personal construct theory. Strategies for the management of Navy personnel involved in future potentially traumatic events, based on these findings are discussed. The focus on positive mental health rather than disorder, and the use of content analysis scales are unique features of this study.
Acknowledgements

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Chapter 1. An introduction to two studies on mental health following exposure to a potential traumatic event, in Australian Navy personnel.
1.1 Statement of the thesis

In this thesis, I study the mental health of people exposed to a potentially traumatic event. My aim is to advance the understanding of distressing psychological reactions to potentially traumatic events through developing and testing a model of how people maintain mental health in the aftermath of exposure to a potentially traumatic event. Firstly, I undertake a prevalence study of the psychological impact of a potentially traumatic event; namely survivors of a major fire in an Australian warship - HMAS Westralia. Secondly, I develop a personal construct model of maintaining mental health in the face of exposure to potentially traumatic events. Thirdly, I will test this model using the experiences of the Navy personnel involved in the fire in HMAS Westralia. The first study is a prevalence study. While prevalence studies of trauma are often undertaken with military samples, most are with Army personnel. There is a relative paucity of studies in the field of psychological reactions to potentially traumatic events undertaken in the maritime environment or with Navy personnel. This research should add to the scant body of research on the experience of Navy personnel who experience potentially traumatic events.

The model expands upon existing personal construct psychology research into the experience of psychological reactions to potentially traumatic events, and focuses on mental health and the processes leading to long-term mental health, rather than the more typical focus on disorder. This research will combine both quantitative and qualitative data to test aspects of the proposed model.

The importance of this project is based on its clinical usefulness. While mental health, rather than disorder, is usually the more prevalent long-term outcome than disorder, even following severe traumatic events, most research focuses on disorders, rather than on the processes leading to maintaining or restoring mental health. An
understanding of these processes should lead to strategies that may increase the likelihood of maintaining mental health and avoiding disorder, or restoring mental health in people exposed to potentially traumatic events in the future.

1.2 Choosing personal construct theory for the model and as the basis of research into the model

The experiences of people involved in potentially traumatic events appear to be highly subjective, and range from no lasting impact to ongoing and chronic disorder. My clinical experience working with people who have experienced a range of different traumatic events, leads me to a conclusion that is consistent with most research in the field; that when a group of people are involved in the same event, many may be moved or impacted on in the short term, but most also manage to incorporate the memories of the event into their life experiences, and move on with their lives without disorder, and with distress dissipating over time. They may have differences in the way they manage some aspects of their lives, and may be sensitive to reminders of the event, but the central aspects of their personalities, and their way of interacting with the world and other people, remains largely the same as before the event.

It is only the minority for whom the impact on their lives is much more dramatic, life-changing and long-lasting. Disorder following trauma leads to significant negative change in almost all aspects of the lives of those afflicted; as-if the memory of the event becomes the most dominant aspects of their personality; and as-if they are dominated by (or even obsessed with), the same fear and horror that they experienced at the time of the event. In essence, this minority just don’t seem to get over the event as they do other events in their lives.
The obvious question is; why can some people incorporate the memories of events into their lives, and move on; and why some people are clearly overwhelmed by memories of the event? The experience of trauma must be highly subjective; otherwise, all people would react the same way when involved in the same event. The differences in reactions cannot just be the sensations of the event. Research into trauma, therefore, should involve theories and methodologies that are subjective and focus on individual experiences.

A focus on meaning-making, and research methodologies that focus on peoples’ subjective experiences led me to Personal Construct Theory. Kelly’s (1955/1991) original theory of personal constructs predates specific disorders such as Post Traumatic Stress Disorder (PTSD), and perhaps for this reason, Kelly did not specifically explain psychological reactions to potentially traumatic events. However, personal construct theory is concerned with the meanings people make of events and experiences, how meaning-making develops into construct systems, and how their construct systems ‘live’, adapt, and are refined through new experiences, and how people use their construct systems to anticipate their responses and interactions with their worlds. Further, personal construct theory has led to methodologies that allow clinicians and researchers to understand and rigorously quantify highly subjective and personal experiences.

Personal construct psychology holds that the meanings people ascribe to individual events combine to form complex and relatively stable systems of meaning-making, with hierarchies of importance and centrality. As these systems develop complexity, they can be applied to increasingly complex events and situations. More importantly, people use construct systems to make predictions about themselves, their interactions with other people, and about events in their future. The predictions people
make are tested through experience, with predictions either validated or invalidated. People act as-if they were scientists, experimenting with predictions and their outcomes, adding to their growing pool of knowledge and meaning-making. Anticipations that are validated by experience are valued and kept in the systems, resulting in positive emotions. Anticipations that are invalidated result in unpleasant emotions, indicating the need for further experimentation and revision of construing, until they are validated.

Optimal mental health involves people constantly testing and revising constructs, and refining their construct systems, based on how effective they are in anticipating, and being validated by, their experiences. Kelly (1955/1991 & 1980) describes processes by which people revise, test, and reconstrue the meanings events ascribe to their experiences as cycles of transition of construing. He described the Creativity Cycle, the Circumspection-Pre-emption-Control Cycle, and the Experience Cycle. Each involves scientific processes of construct formation, testing, and revision. They exemplify Kelly's (1955/1991) description of people acting in all aspects of their lives, as-if they were scientists, engaging in the process of experimentation and scientific endeavour to further understanding. Disorders are considered to be failures to engage in, or to complete cycles of transition when necessary to resolve invalidation, and to continue to, and repeatedly use constructs that have been invalidated by experience, to anticipate events and guide their behaviour.

Construct systems are ordered in terms of importance, with those higher in the hierarchy being of more central importance to the individual. The systems and hierarchies of constructs that people develop are highly individual, being based on their meaning-making, their validational experiences, their importance, their ability to experiment, and conditions that influencing their processes, such as social interaction and the experiences they have in life. With this level of complexity, no two people are
ever likely to have exactly the same construct systems; although, the greater the degree of similarity of these factors between people, the greater the degree of similarity of their construct systems is likely to be.

Rayner and Viney (2003) described the important impact of interpersonal relating on the experiences of people exposed to potentially traumatic events and their recovery from such events, in Navy personnel. This link between interpersonal relating or social support, and the experience of trauma is common in trauma research; although I argue that it is one that is not well understood. Kelly’s (1955/1991) theory of personal constructs places a significant emphasis on interpersonal relating. Firstly, the meaning people ascribe to new experiences, and how these meanings are compared to their existing construct systems are shaped by the shared expectations and anticipations of people. Secondly, validation and invalidation of meanings of events, and of people as construers of events and experiences, are strongly influenced by the meanings ascribed by other people with whom people interact. Thirdly, people can play different roles in their interactions with others, at different times, and with different outcomes for validation and the scientific processes of experiment, validation and revision of construing. Finally, relationships that contribute new ideas and avoid preoccupation with old material, that validate people as they engage in experiments, and contribute as co-experimenters in revising meanings, are conditions for the formation of new constructs necessary to avoid or recover from, disorders.

With its focus on subjective meaning-making, personal construct psychology has developed methodologies that help researchers access and measure aspects of the construct systems of other people with scientific and quantifiable rigor. Methods such as analysing narratives using content analysis scales, allows researchers to understand the psychological states of people, through the language they use to describe themselves
and their experiences, and then to quantify this for statistical analysis. Content analysis scales are more subjective and do not suffer demand characteristics to the same extent as more objective questionnaires (that are also used in this research). Content analysis scales are more sensitive to individual variations in experience than objective questionnaires that are often limited to endorsing, or not endorsing, the construing of experiences by the questionnaire designers. While content analysis scales have been used to measure the psychological states of people experiencing a range of challenges, there are relatively few studies using content analysis scales to measure mental health following potentially traumatic events. Content analysis scales, derived from personal construct psychology theory, not only provide a unique means of measuring psychological states, but are sensitive and ethical tools to research the potentially distressing aftermath of exposure to potentially traumatic events.

While content analysis is based on quantitative analysis of text, content analysis scales are quantitative measures, and therefore the results can be subjected to statistical analysis. The application of content analysis scales to study mental health following potential trauma, and the combining of the qualitative data from content analysis scales with quantitative data, are unique features of this research.

This brief synopsis of the most important features of personal construct psychology describes my choice of the theory to underpin this research and the model I will develop, along with providing an appropriate methodology to employ to understand the experience of people involved in trauma, in one of my studies.
1.3 The report of the two studies on maintaining mental health following potential trauma, in the Navy.

This report combines two separate studies to come to understand some aspects of the experience of mental health following potential trauma, for a sample of Australian Navy personnel. I will address the aims of my research through a series of literary reviews, the proposing of a personal construct model of mental health following exposure to potentially traumatic events, and the two studies.

The first review introduces distressing psychological reactions to potentially traumatic events, with a focus on the experience of people in the military, while the second review is of existing theories of distressing psychological reactions to potentially traumatic events, and notes limitations to these theories. The third review focuses on describing personal construct theory. The model is derived from both the literary reviews of psychological reactions to potentially traumatic events and personal construct theory, and aims to overcome the limitations of existing models.

The two studies have different aims and use different forms of assessment. However, they compliment each other to form an understanding of the complex experiences of people who have experienced potentially trauma. The first study is quantitative, providing an understanding of the prevalence of psychological disorder in Navy personnel who all experienced the same potentially traumatic event. A select subset of this sample who maintained positive mental health are the participants in Study 2. This is primarily a qualitative study, using content analysis scales, to understand the experience of these individuals who have experienced an event that has the potential to cause disorder (as evidenced by Study 1), yet who have incorporated the event into their lives and their systems of meaning-making without apparent disorder. The results of this study are used to validate the personal construct model of mental health posed, and are
synthesised to complete the aim of understanding of the process of maintaining mental health in the aftermath of potential trauma.

The proposed model, the research methodologies chosen, the combination of qualitative and quantitative data, the focus on mental health rather than disorder, and the sample of Navy people who have maintained mental health in the face of exposure to potentially traumatic events, and are unique features of this research.

1.4 Layout of this report

The specific layout of this report is as follows. In Chapter 1, I introduce my research and describe in broad terms, what is to follow in the thesis. In Chapter 2, I provide a literary review on psychological reactions to potentially traumatic events, focusing on the experiences of military personnel.

In Chapter 3, I describe Study 1, a prevalence study of long-term, distressing psychological reactions to potentially traumatic events in Australian Navy personnel. I introduce as a potentially traumatic event, a fatal fire in an Australian Navy ship. Participants for Study 1 and Study 2 will be drawn from the survivors of this event. I pose a series of four research questions to guide the quantitative study to follow. Study 1 describes the short and long-term mental health impact of the fire on those involved and makes comparisons with similar samples. While this is a stand-alone study, it also provides the context for Study 2.

Chapter 4 is a review of the major theories of psychological reactions to potentially traumatic events. I provide a brief description of each theory and how they conceptualise psychological reactions, along with comments on their usefulness and limitations. In Chapter 5, I detail personal construct theory. I describe the major tenants
of the theory, focusing on how the theory deals with mental health, disorder and movement between the two.

In Chapter 6, I develop and propose a personal construct model of maintaining mental health in people exposed to potentially traumatic event. I describe how personal construct theorists have conceptualized post traumatic stress disorder, and use this as a base to describe a model of maintaining mental health in the face of potential trauma. I then state this model in a series of propositions.

Chapter 7 describes Study 2. Using research methods that compliment the personal construct theory described, I test aspects of the proposed model of maintaining mental health in the face of potential trauma. I use a sub-set of Study 1 participants, who report a positive long-term positive mental health outcome since the fire in HMAS Westralia, to undertake this study.

Chapter 8 synthesises and concludes the two studies. I summarise and draw conclusions from the results and outcomes from the two studies. Further, I make recommendations for the future management of personnel exposed to potentially traumatic events, and then conclude the research report.
Chapter 2. A background to distressing psychological reactions to potentially traumatic events.
In this chapter I introduce the formal diagnostic criteria and historical context for posttraumatic stress disorder (PTSD). This chapter encapsulates an historical view on disorders, and set the scene for the studies to follow. The context will be based on military populations, which in general, are mostly male. However, the view that women may suffer at least as much from posttraumatic stress disorder - from traumatic events that have nothing to do with military services - is also put, albeit briefly. The relative space provided to this view reflects the general literature on posttraumatic stress disorder. However, it also reflects the focus of the studies to follow.

2.1 A background to psychological reactions to potentially traumatic events

Disorders involving long term adverse psychological reactions to traumatic events, are recognised and described by both the American Psychiatric Association (1994), in their Diagnostic and Statistical Manual of Mental Disorders – fourth edition (DSM-IV); and the World Health Organisation (1994) in their International Classification of Diseases – tenth edition (ICD-10), as Post Traumatic Stress Disorder (PTSD). While there are some differences in these classification systems, the main features of PTSD are emotional distress, including a significant impairment in social, occupational or some other important area of functioning, resulting from exposure to clearly identifiable and extreme events. Events that are likely to result in PTSD include those that involve death, threatened death, serious threat to physical integrity, or are outside the range or usual human experience, and could reasonably expect to produce strong reactions in people. PTSD is seemingly one of the few disorders in either the DSM-IV or the ICD-10 where there is a clear link between a specific event and a person’s long-term mental health outcomes; i.e.: the disorder develops in response to a
specific event, and presumably would not have developed if the event had not occurred, or if the person had not been intimately involved with the event.

A. The person has been exposed to a traumatic event in which both of the following were present:
   (1) the person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others, and
   (2) The person's response involved intense fear, helplessness, or horror.

B. The traumatic event is persistently re-experienced in one (or more) of the following ways:
   (1) recurrent and intrusive distressing recollections of the event, including images, thoughts, or preoccupations;
   (2) recurrent distressing dreams of the event;
   (3) acting or feeling as if the traumatic event were recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur on awakening or when intoxicated);
   (4) intense psychological distress at exposure to internal or external cues that symbolise or resemble an aspect of the traumatic event; and
   (5) physiological reactivity on exposure to internal or external cues that symbolise or resemble an aspect of the traumatic event.

C. Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by three (or more) of the following:
   (1) efforts to avoid thoughts, feelings, or conversations associated with the trauma;
   (2) efforts to avoid activities, places, or people that arouse recollections of the trauma;
   (3) inability to recall an important aspect of the trauma;
   (4) markedly diminished interest or participation in significant activities;
   (5) feeling of detachment or estrangement from others;
   (6) restricted range of affect (eg: unable to have loving feelings); and
   (7) sense of a foreshortened future (eg: does not expect to have a career, marriage, children, or a normal life span).

D. Persistent symptoms of increased arousal (not present before the trauma), as indicated by two (or more) of the following:
   (1) difficulty falling or staying asleep;
   (2) irritability or outbursts of anger;
   (3) difficulty concentrating;
   (4) hypervigilance; and
   (5) exaggerated startle response.

E. Duration of the disturbance (symptoms in Criteria B, C, and D) is more than 1 month.

F. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

Specify:
Acute: if duration of symptoms is less than 3 months
Chronic: if duration of symptoms is 3 months or more
Specify if:
With delayed onset: if onset of symptoms is at least 6 months after the stressor.


Figure 1. DSM-IV diagnostic criteria for PTSD.

Diagnostic criteria for PTSD for the DSM-IV (American Psychiatric Association, 1994) are presented in Figure 1, while the diagnostic criteria for the ICD-10 (World Health Organisation) are presented in Figure 2.
A. The patient must have been exposed to a stressful event or situation (either short- or long-lasting) of exceptionally threatening or catastrophic nature, which would be likely to cause pervasive distress in almost anyone;

B. There must be persistent remembering of 'reliving' of the stressor in intrusive ‘flashbacks’, vivid memories or recurring dreams, or in experiencing distress when exposed to circumstances resembling or associated with the stressor;

C. The patient must exhibit an actual preferred avoidance of circumstances resembling or associated with the stressor which was not present before exposure to the stressor;

D. Either of the following must be present:
   (1) inability to recall, either partially or completely, some important aspects of the period of exposure to the stressor;
   (2) persistent symptoms of increased psychological sensitivity and arousal (not present before exposure to the stressor), shown by any two of the following:
      (a) difficulty in falling or staying asleep
      (b) irritability or outbursts of anger
      (c) difficulty in concentrating
      (d) hypervigilence
      (e) exaggerated startle response; and

E. Criteria B, C, and D must all be met within 6 months of the stressful event or of the end of a period of stress. (For some purposes, onset delayed more than 6 months may be included, but this should be clearly specified).

**Figure 2. ICD-10 diagnosis criteria for PTSD**

In addition, the DSM-IV describes associated features of PTSD, including painful guilt feelings about survival, phobic avoidance of situation that symbolize the traumatic event, interference with interpersonal relationship, and if the trauma was predominantly interpersonal, impaired affect modulation, self-destructive and impulsive behaviour, dissociative symptoms, somatic complaints, feelings of ineffectiveness, shame despair or hopelessness, feeling permanently damaged, loss of previous beliefs, hostility, social withdrawal, feeling constantly threatened, impaired relationship or a change of personality characteristics.

While the criteria for PTSD are relatively recent (the American Psychiatric Association first introduced PTSD in the DSM-III in 1980), the condition of severe and enduring psychological disturbance in response to exceptionally stressful circumstances is not. Ezra (2001) argues a Sumerian cuneiform tablet from the 2nd century BC, describes both a traumatic event and subsequent psychiatric symptoms, and should be
considered early evidence of PTSD. Van der Kolk, Weisaeth, and van der Hart (1996) and Wastell (2005) describes a history of traumatic stress from the late 1800s, where terms such as: ‘railway spine’, ‘compensation neurosis’, ‘shellshock’, ‘soldier’s heart’, and ‘combat fatigue’, described conditions highly similar to what has more recently become known as post traumatic stress disorder. Shakespeare (in Exeter, 1984) wrote a description of what today could be described as PTSD in Henry IV, Part I, Scene III. In this scene, Lady Percy describes to her husband, Hotspur, what she sees as the enduring impact on their lives, of battle.

O, my good lord, why are you thus alone?
For what offence have I this fortnight been
A banish'd woman from my Harry's bed?
Tell me, sweet lord, what is't that takes from thee
Thy stomach, pleasure and thy golden sleep?
Why dost thou bend thine eyes upon the earth,
And start so often when thou sit'st alone?
Why hast thou lost the fresh blood in thy cheeks;
And given my treasures and my rights of thee
To thick-eyed musing and cursed melancholy?
In thy faint slumbers I by thee have watch'd,
And heard thee murmur tales of iron wars;
Speak terms of manage to thy bounding steed;
Cry 'Courage! to the field!' And thou hast talk'd
Of sallies and retires, of trenches, tents,
Of palisadoes, frontiers, parapets,
Of basilisks, of cannon, culverin,
Of prisoners' ransom and of soldiers slain,
And all the currents of a heady fight.
Thy spirit within thee hath been so at war
And thus hath so bestirr'd thee in thy sleep,
That beads of sweat have stood upon thy brow
Like bubbles in a late-disturbed stream;
And in thy face strange motions have appear'd,
Such as we see when men restrain their breath
On some great sudden hest. O, what portents are these?
Some heavy business hath my lord in hand,
And I must know it, else he loves me not.

Figure 3. King Henry IV – Part 1 [Act II Scene III] (Exeter, 1984, 395)

From this passage, the major DSM-IV and ICD-10 diagnostic criteria for PTSD (repeated intrusive recollections of traumatic events, avoidance of reminders or difficulty remembering, and increased physiological arousal to cues that are reminders of the event) can be deduced. Further, the interpersonal dysfunction, such as emotional
detachment and restricted range of affect noted in the DSM-IV, can also be clearly inferred. As this passage by Shakespeare is an example of what would now be described as PTSD, it is implied that the impact of traumatic events, including the impact on interpersonal relationships described with PTSD, have been known of in sufficient detail to be reported in popular media, since at least Shakespeare’s time.

Herman (1992) reports that, while historically, the initial focal point of interest in post-trauma reactions was with the reaction of soldiers to war (as it is with the Shakespeare quotation), the women’s liberation movement of the 1970’s recognized that the most common cause of trauma involved women in civilian life. The cause of such trauma was ‘sexual trauma’, including rape and domestic violence. Herman reports that the syndromes reported by victims of sexual trauma and those of combat veterans were essentially the same; indicating that the condition was more generalized than a specific response to war or combat. The essential features of trauma as described by Herman are threats to life or bodily integrity, or a close personal encounter with violence and death, confronting people with extreme helplessness, loss of control, terror, and evoking feelings of catastrophe or the threat of annihilation.

Foa and Rothbaum (1998) describe three possible responses to exposure to severe trauma such as rape. Firstly, most victims will reduce the severity of symptoms of time and resume a normal life, although they may never forget the event, and may retain sensitivity to reminders of the event (with some distress). Secondly, some victims will develop chronic, but restricted symptoms such as phobias to reminders of the traumatic event. The third group, comprising about 10-15% of victims, will develop consistent and long-lasting PTSD symptoms.
2.2 Psychological reactions to potentially traumatic events in the military.

2.2.1 Psychological reactions to potentially traumatic events in war

While the diagnostic descriptor of PTSD didn’t appear until 1980, inferences of PTSD symptoms can be made from literature pre-dating 1980. Mareth and Brooker (1985) report that by the later stages of World War I one-seventh of all discharges from the British Army were for mental disorders and that 20% of soldiers on Britain's pension list suffered from a psychiatric disability. They also reported that during WWII, 30% of casualties in North Africa, and between 20% and 48% of all casualties during the war resulted from psychiatric conditions that developed in reaction to events they endured. Kidson, Douglas and Holwill (1993) report that of the Australian WWII veterans who attended their outpatient clinic in the 1990s, just under half suffer from PTSD. Askevold (1976) noted that the symptoms of anxiety amongst Norwegian merchant marine sailors in WWII was similar to that of concentration camp survivors; noting that brain damage without having sustained physical trauma may be the result of prolonged stress and constant fear of dying.

Carson, Butcher, and Coleman (1988) report that during the Korean War, psychiatric disorders accounted for 27% of medical discharges from the US Army, and Irving, Telfer and Blake (1997) report that 15% of US Vietnam veterans met the criteria for PTSD in the years since the end of that war.

Salter (1989) noted that during the Yom Kippur war, Israeli combat stress casualties averaged around 30% of all casualties. O'Brien and Hughes (1991) examined the effects of the Falklands War on veterans from an elite unit who were still in the British Army 5 years after the conflict. Of this group about a quarter were diagnosed with PTSD, with a further 18% considered to have possible PTSD and about half
reporting increased alcohol intake. Only about one-quarter of the sample reported no PTSD symptomatology at all.

Coker, Bhatt, Blatchley and Graham (1999) reported that 12% of British veterans of the 1991 Gulf War were diagnosed with PTSD. This accounted for just under half of all psychiatric disorders. When other reactions to severe stress were included, the figure rose to about 15% of the total sample and two-thirds of all psychiatric disorders. Further, Southwick, Morgan III, Darnell Bremmer, Nicolaou, Nagy and Charney's (1995) study of 1991 Gulf War veterans indicated that the severity of symptoms increased for several years after the war. McCarroll, Ursano and Fullerton (1995), and Deahl, Gilham, Thomas, Searle and Srinivasan (1994) studied the effect of body handling during the 1991 Gulf War. Those involved reported higher levels of psychological disturbance over a year after the war compared to those who had not. Further, half had evidence of some psychological disturbance suggestive of PTSD and about a quarter experience relationship difficulties 9 months after the war.

These reports provide a clear indication of the potential longevity or chronicity of the disorder, along with the potential impact on lives, of the disorder.

2.2.2 Psychological reactions to potentially traumatic events in peacekeeping

Peacekeeping duties are a common form of military operation where there may be no actual combat, but where military personnel may have constant fear and witness atrocities. Hall (1996) contended that the need to show passivity rather than aggression in the face of threats was the key stressor in peacekeeping activities – especially for combat trained soldiers.

Rosebush (1998) argues that for Canadian soldiers involved in operational peacekeeping deployments in the former Yugoslavia in 1992/93, up to 15% developed
PTSD, and that this figure is similar to that reported in combat. He contended that operational stress is the greatest health risk for deployed soldiers in peacekeeping activities, exceeding that of the risk of injuries due to hostilities.

Ward (1997) examined the effect of a UN peacekeeping deployment to Somalia, on Australian military personnel, 15 months after their return. About one-fifth had significantly higher levels of psychiatric morbidity than a control group. Further, the rate of suspected psychiatric disorders was about twice that of the control group, but also lessened over time.

Mehlum (1999) looked at the effect of stress during peacekeeping duties for Norwegian military personnel who served in Lebanon. Just under half of their sample reported that they had increased their alcohol consumption during deployment to nearly double pre-deployment levels. Amongst personnel who reported high levels of stress during deployment, reasons for the increase in alcohol consumption were related to attempting to manage symptoms of stress and anxiety. However, it was also noted that following deployment, alcohol use among all peacekeepers returned to pre-deployment levels.

Weisaeth, Mehlum and Mortensen (1996) compiled data on UN Peacekeeping involvement from a variety of references. They report that: 5% of Dutch UNIFIL soldiers in Lebanon suffered from psychosocial problems several years after deployment; 0.5% of Swedish soldiers serving in Cyprus suffered from nervous breakdown; 30% of Danish personnel serving in ex-Yugoslavia showed some level of Post-Traumatic Stress Response (and 7% had severe symptoms); and 11.4% of US soldiers in Somalia met criteria for PTSD. Litz, Orsillo, Friedman, Ehlich and Batres (1997) found an 8% rate of PTSD among US peacekeepers serving in Somalia. These reports highlight the varied responses to PTSD related peacekeeping.
2.2.3 Psychological injury from accidents in the military.

McCaughey (1986) studied the effects on personnel of the 1975 collision between two US Navy ships, the USS Belknap and USS Kennedy. In comparing the Belknap’s crew with the crew of a similar ship with similar duties, significantly more of Belknap’s crew were hospitalised because of neurosis. Further, twice as many discharged from the Navy for psychiatric reasons and twice as many were considered for medical discharge in the following years. Common fears among survivors who sought mental health assistance, were of being below decks, being trapped in a closed space, or smelling smoke and fumes.

Ursano, Fullerton Tzu-Cheg and Bhartiya (1995) examined the effects on body handlers involved with the remains of 47 naval personnel killed in an explosion in a gun turret on USS Iowa. While nearly half had some experience working with bodies prior to this incident, the effects on all was significant. Fifteen percent reported significant levels of symptoms (including intrusion, avoidance, hostility and somatisation) at 13 months. Eleven percent met PTSD criteria immediately after the incident, with this number decreasing over the next year to about two percent.

Hull, Alexander and Klein (2002) studied the long-term effects of a large-scale fire at sea, with a large loss of life. Ten years after the 1988 Piper-Alpha Oil rig fire, in which 167 of the 226 participants aboard the oil rig were killed, Hull et al., established a prevalence rate of PTSD in survivors of 21% (with an estimate that 73% would have been indicated in the first three months after the disaster).

Berg, Grieger and Spira (2005) reported on the psychological impact on US submariners who had to abandon their submarine at sea, after flooding and fire. None percent of the crew developed PTSD in the seven months following the accident. This
figure was surprising low to the authors and attributed to the unusual selectiveness and thoroughness of submariner training.

2.2.4 The impact of psychological reactions to potentially traumatic events on families of military personnel

The effects of traumatic military experiences do not just have an effect on the individuals involved. Westerink and Giarratano (1999) reported that partners of Vietnam Veterans with PTSD displayed significantly higher levels of somatic complaints, anxiety, depression, insomnia, and social dysfunction, than did family members of other patients. The family members of Vietnam veterans with PTSD also reported poor relationships, low expressiveness of emotions, and high levels of conflict in their families. Children of veterans also reported significantly higher levels of conflict in their families, than did controls.

Rayner and Viney (2003) described common negative effects on interpersonal relationships in Navy veterans with PTSD, including marriage break ups (in the majority of subjects), inability to maintain friendships, avoidance of family and lack of dependability of relationships. Participants described trying to improve their interpersonal relationships as being as important in treatment as reducing the more obvious symptoms of PTSD such as intrusive recollections. Rosebush (1998) reported that if military personnel do not have time to emotionally process their experiences prior to returning home, they might come into to conflict with family expectations, as well as those of those of other individuals and their organisation. These reports highlight the impact of psychological reactions to potentially traumatic events on individuals and their families.
While PTSD is a relatively recently recognized disorder, it has long historic roots. The focus in literature has been on military conflict as the cause of PTSD, and that may be where the cause of disorders such as PTSD may be most clearly identified and where research may be most convenience. However, sexual assaults on women may provide the highest incidence of the type of events likely to result in PTSD. Although, they may not be as easy to define or research, and may not receive the same attention. As the focus of this paper will be on people in the Australian Navy, the focus of literature reviews will be on military samples, which are predominantly male. However, this does not diminish the fact that women, rather than men, and non-military personnel, may suffer as a result of traumatic events at a potentially higher rate.

Most literature on psychological reactions to potentially traumatic events in the military concern Army personnel, with relatively little undertaken with Navy personnel who experience traumatic event. The ability to generalise from army data to navy populations may be limited. The next chapter will address this relative dearth of mental health information regarding Navy personnel, and move from a background or theoretical examination, of psychological reactions to potentially traumatic events presented so far, to undertake a study determining the prevalence of psychological reactions to potentially traumatic events in an Australian Navy sample. The focus will be on the outcome of one specific event; however, the event is a typical one that could occur during military training or combat.
Chapter 3. Study 1 – The prevalence of psychological reactions to potentially traumatic events Royal Australian Navy personnel who survived a multiple fatality fire in HMAS Westralia.
In this Chapter, I present a prevalence study of psychology trauma, undertaken with Royal Australian Navy personnel, who survived a fatal engine room fire in a tanker, while underway at sea. The event serves as a reminder of the dangers faced by military personnel, even when not in combat. It also serves as a typical incident that could reasonably be expected to reoccur in the future (in that risk of fire is an ongoing risk at sea). This chapter presents data on the prevalence of mental health disorders on survivors, and may help planning for similar events in the future. I anticipate highlighting the impact on survivors, of involvement in potentially traumatic incidents such as a fire at sea. The aim is to increase our understanding of the impact of such events on people’s lives, and to lead to some exploration of how this process works; and potentially, how the adverse impact of future events, may be lessened.

3.1 Description of the fire and its aftermath.

On 5th May 1998, a fire erupted in the engine room of a large Australian Navy ship, HMAS Westralia. Four members of the crew in the engine room were killed by a massive fire-ball that took nearly two hours to control, and potentially endangered the lives of the remaining 94 personnel. As a result of the fire, the Navy established a Board of Inquiry (BOI) to examine the cause of the fire, the personnel involved, the ship and other units involved in the fire. It is from the report of the BOI, released nine months later (Commonwealth of Australia, 1998), that the synopsis of the incident below is based.

HMAS Westralia was originally built as a petroleum tanker, and later converted for use in replenishment at sea by the Navy. HMAS Westralia displaces 40,000 tonnes fully laden, and carried a crew of 98 on the day of the fire. The ship deployed from Fleet Base West (south of Perth, in Western Australia) carrying 20,000 tonnes of diesel fuel
and sailed north, intending to rendezvous with another Australian Navy tanker as part of routine exercises. The BOI reported that at about 10:30am a fire in the engine room was discovered, resulting from a fuel leak in a hose feeding the engine. High pressure fuel sprayed onto one of the hot engines and erupted into a fire ball that developed into a major, and out-of-control, fire. The crew had trained for such an event and responded with fire-fighting and other emergency responses. However, the fire proved difficult to extinguish and a number of different strategies to manage the fire were utilised, until the fire was finally extinguished at about 12:30pm. Twelve personnel were in the engine room at the time the fire erupted. Eight escaped; however four died as a result of acute carbon monoxide toxicity (from smoke inhalation). Five additional casualties were treated in a Perth hospital. The ship was towed back to its base, arriving at approximately 6:30pm on the same day. The BOI reported that the fire that resulted was dangerous and difficult and was: “fought heroically and effectively by the ship’s crew”. (Commonwealth of Australia, 1998, p12). A copy of the executive summary of the BOI that provides more complete details of the incident is included as Appendix A.

Given the type of incident and its ramifications (sudden fire; death of colleagues; threat of death or serious injury; or being confronted by death or serious injury, by all personnel on the ship; the ship being badly damaged; and a comprehensive and public BOI), I argue that this incident is sufficient to expect it to threaten the mental health of those involved, with disorders such as PTSD a foreseeable outcome. As such, I believe that the fire in HMAS Westralia was a potentially traumatic event (based on DSM-IV and ICD-10 definitions).

To date, no summary or comparative data regarding the longer term impact on personnel involved in this incident has been provided. This is consistent with the view expressed at a 2005 Australian Senate Inquiry into military justice, where it was stated
that the Navy acknowledged a lack of understanding of PTSD (Commonwealth of Australia, 2005). It is also consistent with the opinion of Rayner and Viney (2003), that while there is a wealth of trauma-related research conducted with Army, and military personnel in general, there is a comparatively very little research on psychological reactions to potentially traumatic events with Navy personnel specifically; and that of Berg, Grieger and Spira (2005), that studies of military personnel exposed to single, but potentially fatal accidence during peacetime, are also limited.

I argue that the fire in HMAS Westralia is an event worthy of research, as a large number of people of varying ages and experiences were exposed to the same event – allowing an opportunity to conduct research with a control for the type of triggering event. Having a sample who participated in the same event reduces the potential for confounding variables. Further, HMAS Westralia and her crew are part of a much larger organisation for which there exists normative data on baseline rates of traumatic stress, with which to compare those involved in the fire. Therefore, the relevance of this study to the field of psychological trauma is:

1. It is an example of a potentially traumatic event (it satisfies DSM-IV and ICD-10 definitions of potentially traumatic events);
2. It has group exposure to similar event (good control for incident);
3. It will contribute to research into navy veterans; and
4. The results can be compared to other similar groups (navy and other military groups).
3.2 Aims and Research Questions

3.2.1 Aims of the study

The aim of this study is to assess the prevalence and extent of distressing psychological reactions in personnel who survived a potentially traumatic event, namely the fire in HMAS Westralia.

3.2.2 Research questions

To guide the research process, a series of research questions are proposed:

1. What is the prevalence of distressing psychological reactions linked to the fire in HMAS Westralia, on personnel directed involved?

2. What is the prevalence of other mental health problems in survivors of the fire in HMAS Westralia?

3. What differences in the prevalence of distressing psychological reactions exist, in sub-groups such as gender and rank groupings?

4. What differences in the prevalence of distressing psychological reactions exist over time?

and

5. How does the prevalence of distressing psychological reactions associated with the fire in HMAS Westralia compare with similar populations?

3.3 Method

3.3.1 Design

This study utilises a combination of cross-sectional and longitudinal methods, based on an examination of health records of personnel who survived the fire in HMAS.
Westralia. As a component of mental health management of personnel involved in the fire, the Australian Navy instigated mental health screening for PTSD symptoms to personnel from HMAS Westralia, approximately 4 months post-fire, again at 11 months, and again at four to six years after the fire. These screens were primarily undertaken by the author of this research as part of his clinical practice within the Navy.

To be eligible for the screening, potential participants had to be in the Navy at the time. It is understood that some survivors began to discharge from the Navy within months of the event. This creates a potential bias in participation, based on employment, with this effect likely to be greatest with elapsed time since the fire (and presumably greatest at the four to six screening). At the time of the four to six year screening, 51 of the original 94 (54.26%) survivors of the fire were still in the Navy and available to participate in the screening program.

Because screening was voluntary, not all personnel who were eligible, participated in this study. Therefore, data is not available for all personnel at all times. However, these screens provide cross-sectional views of participants at three different times (four months, 11 months and four to six years). As some participants were assessed at two and three times, some data for use in longitudinal screening was available.

All members of the crew of HMAS Westralia who survived the fire are considered to satisfy the event criterion for PTSD; namely that they all experienced, witnessed or were confronted by an event that involved actually or threatened death, serious injury, or a threat to physical integrity. While exposure was not specifically tested, it is understandably assumed, given the circumstances of the event. All survivors of the fire in HMAS Westralia were trapped on a ship at sea with 20,000 tonnes of fuel oil as cargo, and a major and uncontrolled fire, that threatened the ship. The BOI reports
that the ship was without power and drifting (posing a risk of collision or of running aground). Many of the crew were directly involved in fire fighting and it would not be unreasonable therefore to assume that all faced either the burning or sinking of the ship, with significant risk to all. HMAS Westralia is 171 metres in length; so at the absolute maximum, all personnel onboard were within 200 metres (most would have been considerably closer) to a major and uncontrolled fuel fire that had killed four personnel, with the potential to sink or cause an even larger fire or explosion of 20,000 tonnes of fuel. All personnel onboard the ship would have been aware of the fire, as the ship had been brought to a state of ‘emergency stations’ by means of warning, alarms, orders and updates broadcast throughout the ship. Many were directly involved in approaching the fire to conduct fire-fighting activities. The only way to achieve greater distance from the fire would have been to be off the ship, and that would have posed potentially even greater risks. Some personnel witnessed the bodies of those who perished, and all would have been intimately confronted by the reality of death and threat to life, of those involved in a major fire. As noted by Cordner, a warship is not just a collection of individuals. Rather: “the naval community is very close, so that the victims were well known” (Cordner, 2003, p110). This closeness could be considered to amplify the sense of loss of ship-mates and contributed to at least all survivors being confronted by the potential trauma.

In such circumstances (exposure to a potentially traumatic event), it is reasonable to foresee PTSD in some of the crew who survived the fire in HMAS Westralia. This approach to research (where all participants are assumed to meet the exposure criterion of PTSD by examination of circumstances, rather than by assessing individual reports), was utilized by O’Brien and Hughes (1991) in their study of combat veterans of the 1982 Falklands War.
3.3.2 Sampling

Sample 1 comprises all available personnel who survived the fire and who were still in the Navy four to six years after the fire. The names of personnel who survived the fire in HMAS Westralia were published in the report of the BOI. At the time of the fire the crew consisted of 73 males (74.5%) and 25 females (25.5%) for a total of 98 personnel. Commonly used rank groupings in the Navy are Junior Sailors (Seaman, Able Seaman and Leading Seaman), Senior Sailors (Petty Officers, Chief Petty Officers and Warrant Officers), and Officers (Sub-Lieutenant, Lieutenant, Lieutenant-Commander, Commander, Captain, Commodore and Admiral). There were 60 Junior Sailors (61.2%), 18 Senior Sailors (18.4%), and 20 Officers (20.4%).

Four personnel died in the fire, leaving 70 males (74.5%) and 24 females (25.5%) as survivors. This group comprised 58 Junior Sailors (61.70%), 17 Senior Sailors (18.08%) and 19 Officers (20.21%). Those who survived the fire were virtually identical to those who sailed with the ship on the day, with regard to gender and rank distribution. The age range was 18 - 44, with an average age of 27.45 years, and a modal age of 20 years. The gender and rank distribution of survivors is presented in Figure 4.

![Figure 4. Rank and sex distribution of Sample 1 (n=94)]
As can be seen in Figure 4, there are more males in each rank category and overall, more Junior Sailors than either Senior Sailors or Officers, and similar numbers of Senior Sailors and Officers.

Screening for symptoms of distressing psychological reactions in Sample 1 was conducted at different times with different numbers of participants. The size and frequency distribution of gender and rank within each group at each time point is presented in Table 1.

Table 1.

Total number of participants and distribution by Gender and Rank, of Sample 1, and of all Survivors of the fire in HMAS Westralia.

<table>
<thead>
<tr>
<th></th>
<th>4 months (n=44)</th>
<th>11 months (n=56)</th>
<th>4-6 years (n=50)</th>
<th>Total survivors (n=94)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>30 (68.18%)</td>
<td>41 (73.21%)</td>
<td>38 (76.00%)</td>
<td>70 (74.47%)</td>
</tr>
<tr>
<td>Female</td>
<td>14 (31.82%)</td>
<td>15 (26.79%)</td>
<td>12 (24.00%)</td>
<td>24 (25.53%)</td>
</tr>
<tr>
<td>Junior sailor</td>
<td>27 (61.36%)</td>
<td>30 (53.57%)</td>
<td>23 (46.00%)</td>
<td>58 (61.70%)</td>
</tr>
<tr>
<td>Senior sailor</td>
<td>6 (13.64%)</td>
<td>11 (19.64%)</td>
<td>12 (24.00%)</td>
<td>17 (18.08%)</td>
</tr>
<tr>
<td>Officer</td>
<td>11 (25.00%)</td>
<td>15 (26.79%)</td>
<td>15 (30.00%)</td>
<td>19 (20.21%)</td>
</tr>
</tbody>
</table>

With regard to individuals who completed screenings on more than one occasion (allowing for comparisons of scores and indicators of disorder over time), 30 participants completed both the four month and 11 month screening, 22 participants completed both the four month and 4-6 year screening, 29 participants completed both
the 11 month and 4-6 year screening, and 17 participants completed all three screenings (four month, 11 month, and 4-6 years).

3.3.3 Generalisations about the sample

Rayner (2005) reported on the mental health of Australian Navy personnel involved in operational deployments in the middle-east between 2001 and 2005. This sample was considered to represent Navy personnel, although did not include all ship-types in the Navy and did not include HMAS Westralia. However, given the large number of personnel (n=1739) and the large number of cohort involved (10 separate ships), it could be viewed as generally representative of the Royal Australian Navy.

![Figure 5](image_url)

*Figure 5.* Comparison of gender and rank distribution between Sample 1 (n=94) and Australian Navy personnel (Rayner, 2005, n=1739).

Figure 5 and Table 1 display the gender and rank percentage distribution of Sample 1 sub-groups at four months, 11 months and four to six years, as well as the HMAS Westralia survivor population, and the Navy sample of Rayner (2005). While there are some minor variations within the relative distribution of gender and rank, the trends across each sample at each time-point are the same as that of the HMAS.
Westralia population at the time of the fire, and the larger Navy sample (i.e.: a considerably higher proportion of males and junior sailors, than females, and senior sailors or officers). The relatively small sample sizes of each time-sample and the HMAS Westralia population, compared to the larger Navy sample, could lead to an amplification of the apparent differences in percentage distribution; as one or two individual cases may result in a proportionally larger percentage variation. Taking these variations into consideration, the trends in the demographic breakdown indicate that each subgroup of Sample 1 is considered to be representative of the HMAS Westralia population, which in turn, is representative of the larger Navy sample.

3.3.4 Measures used

Of greatest significance in determining prevalence of distressing psychological reactions to potentially traumatic events are two questionnaires measuring symptoms of posttraumatic stress disorder (PTSD). These are the Impact of Events Scale – Revised (IES-R), and the Posttraumatic Check List – Civilian version (PCL-C). Non-trauma-specific questionnaires that measure aspects of mental health related to trauma are the General Health Questionnaire – 28 item version (GHQ-28), and the Alcohol Use Disorders Identification Test (AUDIT). Different measures were used at different times. The IES-R was used only at the four and eleven month screenings. The other measures were used only at the four to six screening. The measures were administered in accordance with the instructions for each measure. The principal researcher was one of approximately three Department of Defence Psychologists who administered the IES-R at the four and eleven month screening, and administered nearly all of the measures at the four to six year screen.
3.3.4.1 Impact of Events Scale – Revised

The IES-R is a development of the original Impact of Events Scale (IES) developed by Horowitz, Wilner and Alvarez (1979) for studying the level of symptomatic responses to trauma. Weiss and Marmar (1997) describe the original IES as being based on Horowitz’s conceptualization of trauma comprising intrusion and avoidance. This pre-dated the diagnosis of PTSD by the American Psychiatric Association’s (1980) Diagnostic and Statistical Manual – third edition (which included a wider range of symptoms to the diagnosis).

The original IES was a 15-item questionnaire with respondents rating on an unequal-interval, five-point scale (scoring 0, 1, 3 or 5), the impact of items related to intrusion and avoidance of life events during the past week (but did not include a rating of description of the event itself). Weiss and Marmar (1997) describe the original IES as being well regarded, with good reliability, validity and usefulness. However, Weiss and Marmar (1997), along with Bryant and Harvey (2000), consider the IES’s diagnostic usefulness to be limited by its lack of an indicator of hyperarousal (which was later included in the DSM as a diagnostic criterion for PTSD).

With the introduction of the DSM-IV, the IES was revised to include a measure of hyperarousal symptoms, and renamed the Impact of Events Scale – Revised (IES-R). Along with six new items addressing hyperarousal, one existing item was split into two separate items. The IES-R became a 22-item questionnaire with subscales measuring symptoms of intrusion, avoidance, and hyperarousal associated with stressful life events. The IES-R items are similar, but not identical to, the diagnostic criteria for PTSD in the DSM-IV and ICD-10, and the IES-R is more compatible with the DSM-IV criteria for PTSD, than the IES. However, as the IES-R does not measure the degree of exposure to a trauma event (which is a criterion for PTSD for both the DSM-IV and the
ICD-10), the IES-R can indicate degree of symptom severity against common PTSD-type symptoms; but cannot, on its own, diagnose PTSD. For this reason, the IES-R should be said to only indicate, rather than diagnose, PTSD.

Weiss and Marmar (1997) recommend modifying the scoring from the original 4 point-scale (0, 1, 3, 5), to an equal interval, 5 point-scale (0, 1, 2, 3, 4 for endorsing responses of 'not at all', 'a little bit', 'moderately', 'quite a bit', and 'extremely' respectively), and using the mean score of non-missing items along with a total item score. Using these scoring rules, Creamer, Bell and Failla (2003) recommend a cutoff mean score of 1.5. Asukai, Kato, Kawamura, Kim, Yamamoto, Kishimoto, Miyake, Y., & Nishizono-Maher (2002) recommend a total cutoff score of 24/25 (equivalent to a mean item score of 1.14) to screen for PTSD at either an early or late state of trauma, although they report that a cutoff of 29/30 (equivalent to a mean item score of 1.36) provided an equal level of sensitivity and specificity.

The mean item cutoff score of 1.5 (equivalent to a total score of 33) recommended by Creamer et al. (2003) is used in this study, in preference to the lower 1.36 (equivalent to a total score of 25) recommended by Asukai et al. (2002). This decision was based on the participants in Creamer et al.’s (2003) study (Australian Vietnam veterans) being considered to more closely approximate the sample in this study than Asukai et al.’s (2002) Japanese civilian participants.

The IES-R is not as frequently used as its predecessor, the IES. However, it is reported to have good internal consistency, good re-test reliability at up to five months, good predictive power, correlates well with a similar screening questionnaire for PTSD, and has been reported at least six times, as being used to measure PTSD symptoms following traumatic or high stress events. A copy of the IES-R questionnaire is attached.
as Appendix E, and the psychometric properties of the IES-R are detailed in Table 16 (Appendix I).

3.3.4.2 Posttraumatic Check List – Civilian version

The Posttraumatic Check List (PCL) is a 17-item checklist based on the items for Criteria B, C, and D of the DSM-IV’s PTSD diagnostic criteria. Participants indicate on an equal-interval five-point scale, (rating from a score of one, for ‘not at all’, to five, for ‘extremely’) their experiences of symptoms during the past month. The overall range of scores is 17-85. There are three versions of the PCL, each with very slight wording differences in some questions. These are the civilian version (known as the PCL-C); the military version (known as the PCL-M); and the stress version (known as the PCL-S). Examples of the types of differences in wording relate to reporting of symptoms include: "Repeated disturbing memories, thought, or images of a stressful experience from the past" (PCL-C); "Repeated, disturbing memories, thoughts or images of a stressful military experience" (PCL-M); and "Repeated, disturbing memories, thoughts, or images of the stressful experience" (PCL-S) (italics added for emphasis of differences only). The PCL-C appears to be by far, the most commonly used and generic version of the PCL. While the name ‘military version’ may, at face value, seem more appropriate for use with a military sample, the differences between it an the other versions is minor. The military version of the PCL-C asks about military experiences, which may lead respondents who experience PTSD symptoms from non-military situations, to either not report them, or try to determine which symptoms may be a result of military experiences, and which may not. To reduce this type of confusion and its resulting false negatives, I have chosen to use the PCL-C for this study.
As the PCL-C measures symptoms that are based on the DSM-IV diagnostic criteria for PTSD, it is more closely aligned to measuring a specific condition (PTSD) than the IES-R. However, like the IES-R, the PCL-C does not measure the degree of exposure to a trauma event (which is a criterion for PTSD for both the DSM-IV and the ICD-10). Therefore, like the IES-R, the PCL (all versions) only indicates, but does not diagnose, PTSD.

Forbes, Creamer and Biddle (2001) state that the commonly used total cutoff score of 50, and an individual item score of three (to satisfy individual DSM-IV criteria), are optimal for indicating PTSD. Newman, Kaloupek and Keane (1996) describe the advantages of the PCL-C being its psychometric properties and its brevity, with the disadvantage of being validated mostly with a single sample group – that of male combat veterans. Blanchard, Jones-Alexander, Buckley, and Forneris (1996) address the concerns of Newman et al. (1996) by studying the PCL on female, non-combat samples. They supported the use of the PCL as a screening tool for possible PTSD, although noted that gender differences may need to be considered and proposed a different cut-off for female, non-combat samples. Ventureyra, et al. (2002) support the use of the PCL as a simple self-report instrument, recommending a cutoff score of 44 in screening for PTSD in female populations.

The scoring rule of Forbes, Creamer and Biddle (2001) - requiring a total cutoff score of 50 and an individual item score of three (applied to DSM-IV criteria for PTSD) to indicate PTSD is used in this study. The cutoff of 50+ is commonly used with military veterans, is commonly used in male dominated samples, and has been used with Australian military samples.

The PCL-C is a commonly used measure to screen for PTSD symptoms and is reported to have good internal consistency, good predictive power, good re-test
reliability over 1-2 weeks, correlates at a good level with up to five other commonly used measures for PTSD, and is well validated for use with people who have experienced a large range of potentially traumatic events. A copy of the PCL-C questionnaire is attached, as Appendix F, while the psychometric properties of the PCL-C are reported in detail in Table 17 (Appendix I).

3.3.4.3 General Health Questionnaire – 28 item version

Goldberg and Williams (1988) describe the General Health Questionnaire (GHQ) as: “a self-administered screening test aimed at detecting psychiatric disorder among respondents in community settings and non-psychiatric clinical settings” (Goldberg & Williams, 1988, p1). They report that the GHQ indicates state, rather than longer-standing, trait distress. The GHQ was originally developed as a 60-item questionnaire (GHQ-60), but has been shortened into a 30-item questionnaire (GHQ-30), a 28-item version (GHQ-28) and a 12-item version (GHQ-12). The GHQ-28 is the only version of the GHQ to include sub-scales. These sub-scales measure somatic symptoms, anxiety, social dysfunction, and depression. The GHQ-28 sub-scales are based on factor analysis and represent dimensions of symptoms rather than diagnostic classifications. Further, they are not independent of each other. However, they allow for understanding the relative contributions of these dimensions to total GHQ-28 scores.

Respondents are asked to rate on a 4-point scale, their experience of potentially distressing condition, over the past two weeks. The scale rates conditions from ‘less than usual’, through ‘no more than usual’, ‘rather more than usual, to ‘much more than usual’. The usual means of establishing indicators of disorder, or an overall level of symptom reporting, is to score items on the four-point scale as 0-0-1-1 depending on which of the responses is endorsed by the participant. This approach is generally
referred to as GHQ scoring. Goldberg & Williams, 1988 report on 16 studies of the GHQ-28 with a common threshold score to indicate disorder, as being 5 or greater, with a positive predictive value of the GHQ-28 of 0.67.

However, Goodchild and Duncan-Jones (1985) highlight potential problems with this scoring method, due to concerns regarding the wording and meanings of some items. A number of items provide a choice of responding ‘same as usual’. In GHQ scoring, endorsement of this answer is considered to show a lack of symptoms (presumably because ‘usual’ is considered to be symptom-free). Goodchild and Duncan-Jones argue that this assumption may be incorrect, especially with people with chronic conditions, or where symptoms last longer than two weeks. In such cases, endorsing ‘same as usual’ will then refer to the respondent experiencing the symptom as being as severe or distressing as usual. Goodchild and Duncan-Jones argue that using the usual GHQ scoring with respondent who may have chronic conditions will result in lower rates of identified disorders than may be the case.

In response to these concerns, Goodchild and Duncan-Jones (1985) propose an alternate scoring system for the GHQ, to correct this perceived bias toward false positives. The alternate scoring method is referred to as CGHQ scoring, with the ‘C’ indicating recognition of ‘chronic’ conditions. CGHQ scoring involves dividing questions into those where an endorsement of ‘same as usual’, indicates positive mental health (such as ‘have you recently felt capable of making decision about things?’) from those where endorsement would indicate negative health (such as ‘have you recently felt that life isn’t worth living?’). For those questions where endorsement of ‘same as usual’ indicates negative mental health (questions A2 – A7, B1-B7, C2, and D1 – D7), responses are scored 0-1-1-1, while those where endorsement of ‘same as usual’ indicates positive mental health (questions A1, C1, and C3 – C7), are scored in the usual
Goodchild and Duncan-Jones argue that using the CGHQ scoring results in a more accurate reflection of chronicity and therefore a more accurate index of a person's condition, has greater stability over time, and is a more robust tool for research, than GHQ scoring. While the CGHQ scoring was developed on the GHQ-30, Goodchild and Duncan-Jones state that it is equally applicable to the GHQ-28 and other GHQ versions. With the GHQ-28, Goodchild and Duncan-Jones endorse a revised threshold score to indicate disorder, of 12/13.

Applying the CGHQ scoring system to the 12-item version of the GHQ, Whaley, Morrison, Payne Fritschi and Wall (2005) reported that the CGHQ scoring system was consistently superior to GHQ scoring method, more strongly correlated with measures of anxiety and depression than the GHQ scoring system, and displayed superior internal consistency. Whaley et al. (2005) also concluded that the CGHQ scoring was psychometrically appropriate for occupational samples. Koeter, van den Brink and Ormel (1989) compared the two scoring systems on the GHQ-28 to assess psychiatric outpatients. They reported that while the CGHQ scoring system was superior to the usual GHQ scoring, the improvement was only marginal.

The GHQ-28 provides subscale scores for somatic complaints, anxiety, social dysfunction and depression. However, scoring criteria for these subscales are based on factor analysis rather than specifically on DSM-IV or ICD-10 criteria, and there is some overlap between subscales. Like the IES-R and the PCL-C, the GHQ-28 indicates, rather than diagnoses, specific conditions.

The CGHQ scoring technique, with a cutoff score to indicated disorder of 13+, as endorsed by Goodchild and Duncan-Jones (1985), will be used in this study as a measure of general psychological distress.
The GHQ-28 is very well reported on for its good predictive power. Its re-test reliability has been established over eight months, and while it has been most frequently validated in general mental health setting, has been used to measure psychological distress in people who have experienced potentially traumatic events. A copy of the GHQ-28 questionnaire is attached, as Appendix G, while the psychometric properties of the GHQ-28 are detailed in Table 18 (Appendix I).

3.3.4.4 Alcohol Use Disorder Identification Test (AUDIT)

Co-morbidity between PTSD and substance abuse in general, is well-established, with alcohol being the substance most commonly reported co-morbidly with PTSD in Australian sufferers (Mills, Teeson, Ross & Peters, 2006). Therefore, a measure of alcohol-related problems is appropriate in this study.

The World Health Organisation developed the Alcohol Use Disorder Identification Test (AUDIT) as a simple screen to “identify persons with hazardous and harmful patterns of alcohol consumption” (Babor, Higgins-Biddle, Saunders, Maristela & Monteiro, 2001, p4). The AUDIT was designed to be used by a range of health professions, in a wide range of health settings, and identifies hazardous drinking patterns (consumption that leads to an increased risk of harmful consequences), harmful use patterns (leading to physical, mental health and social consequences), and alcohol dependence (behavioural, cognitive and physiological phenomenon that concern a strong desire to use alcohol; impaired ability to control consumption despite harmful consequences; prioritizing alcohol consumption above other activities and obligations; increasing tolerance; and withdrawal symptoms when discontinued).

The AUDIT comprises 10 questions that can be delivered as an oral interview or written questionnaire. Respondents use a five-point, equal-interval, Likert scale to rate
responses to eight of the ten questions (scored 0-1-2-3-4), with the remaining two questions answered on a three-point, equal-interval, scale (scored 0-2-4). This provides for a total score ranging from 0 to 40. Babor, et al., (2001) recommend that scores of 8 or more be used to indicate alcohol problems. Slightly higher or lower scores influence either, but not both, sensitivity and specificity. Further, Babor, et al. (2001) note that scores of one or more on Questions 2 or 3 indicate consumption at a hazardous level, points scored on questions four to six indicate possible alcohol dependence, and points scored on questions seven to ten indicate harmful alcohol use. Overall scores of up to seven indicates a low level of alcohol problems, while scores of eight to 15 indicate a medium level of alcohol problems, scores above 16 indicate a high level of alcohol problems, and scores above 20 indicating further diagnostic evaluation for alcohol dependence.

The AUDIT is reported to have good internal consistency, is well reported on for its predictive power, has good re-test reliability at up to one month, correlates well with other measures of alcohol abuse, and has been often used with military veterans to screen for alcohol problems. A copy of the AUDIT questionnaire is attached as Appendix H, while its psychometric properties are detailed in Table 19 (Appendix I).

3.3.5 Method

The psychology files from all personnel involved in the fire in HMAS Westralia were examined for data that could answer the Research Questions. In the Australian Defence Force, all personnel have a psychology file, created as a matter of course during recruitment, and added to on an ad-hoc basis during their career. It is routine procedure for all psychological tests and questionnaires results to be recorded in psychology files. The psychology files of all 94 survivors of the fire in HMAS
Westralia were examined in January 2006, approx seven and a half years after the fire (May 1998). Data from mental health screenings conducted since the fire were transcribed into a database, which was then analysed to answer the research questions.

3.3.6 Ethical Issues

This study summarises existing data, with no reporting of individual results. As such, the only ethical concern involves the release of information. The project was approved by the Australian Defence Human Research Ethics Committee (ADHREC), and the University of Wollongong/Illawarra Area Health Service Human Ethics committees (see Appendices B and C for copies of approval). With the approval of these Ethics Review Committees, the Director of the Defence Force Psychology Organisation agreed to release the information requested.

3.3.7 Statistical Analysis

Test scores from psychological screening were transferred to a project database suitable for analysis with the Statistical Package for Social Science (SPSS) – version 11. Statistical analysis will be limited due to the size of the study group, and the requirement for mostly descriptive analysis.

Assumptions of normality of the distribution of the PCL-C scores were tested. The result, K-S (Lilliefors) = 0.197, df = 44, a = .000, indicates that normality of the PCL-C distribution of scores cannot be assumed. Therefore, non-parametric statistical techniques will be used.

For Research Questions 1 and 2 (prevalence of symptoms), descriptive reporting of results is provided. This involves reporting the number of participants exceeding established cutoffs indicating the conditions of interest, and reporting of the distribution
of test scores. For Question 3, the results of Research Questions 1 and 2 are further analysed to reveal comparisons between sub-groups based on gender and rank grouping. To assess for proportionality of gender and rank sub-groups, a series of Chi-Square tests will be used. Results for Question 4 (comparison over time) are the result of analysis of data obtained at three different times. Finally, Research Question 5 compares the results obtained from Research Questions 1 to 4, with samples that compare to Sample 1, to provide meaning to these results.

Where correlations are reported, the size of the correlations can be interpreted using the descriptions provided by Cohen (1988). Correlations of ±.10 to ±.29 will be described as small associations, while correlations of ±.30 to ±.49 are described as medium associations, and correlations of ±.50 to 1.00 are described as large associations.

3.4 Results

3.4.1 Research Question 1 – The prevalence of trauma.

Available data for Sample 1 was retrieved from three sources: screening conducted approximately four months after the fire (using the IES-R); approximately 11 months after the fire (again using the IES-R); and four to six year after the fire (using the PCL-C).

3.4.1.1 Indicators of PTSD at 4 months.

From the screening undertaken four months after the fire, IES-R scores for 44 participants (46.81% of those who survived the fire) were located and reviewed. All were complete and valid questionnaires. Mean-item IES-R scores for this screening range from 0.00 to 3.36 (equivalent to a total score range of 0 to 74). Within Sample 1,
seventeen participants (38.64%) are indicated for PTSD (exceeding the mean item cutoff score of 1.5). The mean, mean item score is 1.10, SD=0.90; equivalent to an IES-R total score of 24.29, SD=19.74.

3.4.1.2 Indicators of PTSD trauma at 11 months.

The results of 56 participants who survived the fire (59.57%), and who completed the IES-R at 11 months after the fire, were located and reviewed. All were complete and valid questionnaires. Total mean-item IES-R scores range from 0.00 to 3.45 (equivalent to a total score range of 0 to 76). Again, within Sample 1, 17 participants (30.36%) are indicated for PTSD. The mean, mean item score for the IES-R is 1.09, SD=0.89, equivalent of an IES-R total score of 24.09, SD=19.60.

3.4.1.3 Indicators of PTSD at four to six years.

The results of 50 participants who survived the fire (53.19%) and who completed the PCL-C during the 4-6 year review were examined. All questionnaires were complete and valid. Total raw PCL-C scores for this group range from a minimum of 17 to a maximum of 68 (total possible range of the PCL-C – 17 to 85). Nine participants (18.00%) exceeded the PCL-C cutoff raw score of 50+. Of these, eight participants (16.00% of the sample) also met the DSM-IV criteria for PTSD resulting from individual DSM-IV criterion item scores of three or more. Therefore, the prevalence rate for indicated PTSD in Sample 1 at 4-6 years after the fire is 16.00%. The mean PCL-C score is 33.36, SD=14.25.
3.4.2 Research Question 2 - Other mental health indicators at 4-6 years.

Along with the PCL-C, both the GHQ-28 and the AUDIT were administered as part of mental health screening undertaken 4-6 years after the fire in Sample 1. Both measures are therefore useful in assessing co-existing mental health disorders in Sample 1.

3.4.2.1 Indicators of general psychological distress.

Complete and valid GHQ-28 questionnaires were available for 50 participants. Using CGHQ scoring criteria, 26 participants (52.00%) are identified as displaying disorders involving general psychological distress (CGHQ scores of >12). Total scores (CGHQ scoring) range from 1-27, with a mean of 12.50, SD=7.47.

Figure 6 displays the individual subscale scores, indicating that the Anxiety and Somatic Concerns Subscales contribute relatively more to the Total GHQ-28 score (29.54% and 34.87% respectively), than either the Social Dysfunction or Depression Subscales (19.43% and 16.24% respectively).

![Figure 6. GHQ-28 mean subscale scores, n=50.](image-url)
3.4.2.2 Indicators of alcohol problems.

As with other questionnaires from the 4-6 year screen, complete and valid AUDIT questionnaires were available for 50 participants. Of these, 14 participants (28.00%) are indicated for alcohol problems (exceeding the cutoff scores of >7). The mean AUDIT score is 6.94, SD=5.06.

Table 2 displays the prevalence of alcohol related disorders, identified by AUDIT, along with the indicated degree of alcohol problem, and type of problem. This suggests that most participants indicated as displaying disorder were drinking at a moderate level, with little difference between types of use. Of the nine participants who are indicated for PTSD, six (66.7%) are indicated as displaying alcohol-related disorders, with two participants (22.2%) indicating a high level of alcohol problems.

Table 2.

<table>
<thead>
<tr>
<th>Indicated for disorder</th>
<th>Moderate use</th>
<th>High use</th>
<th>Hazardous use</th>
<th>Alcohol dependence</th>
<th>Harmful alcohol use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14</td>
<td>10</td>
<td>4</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>28.00%</td>
<td>20.00%</td>
<td>8.00%</td>
<td>28.00%</td>
<td>18.00%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>22.00%</td>
</tr>
</tbody>
</table>

3.4.4.3 Overall Mental Health

Table 3 displays the number and percentage of participants considered either indicated for any of the three possible disorders, or not, in the four to six year mental health screening.
Table 3.

Number and Percentage of Sample Indicated and not indicated for PTSD at Four to six year Screening, based on Scores for Three Mental Health Measures. N=50

<table>
<thead>
<tr>
<th></th>
<th>PCL-C</th>
<th>GHQ-28</th>
<th>AUDIT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(score of 50+)</td>
<td>(score of 13+)</td>
<td>(score of 8+)</td>
</tr>
<tr>
<td>Indicated for PTSD</td>
<td>8 (16.00%)</td>
<td>26 (52.00%)</td>
<td>14 (28.00%)</td>
</tr>
<tr>
<td>Not indicated for PTSD</td>
<td>42 (84.00%)</td>
<td>24 (48.00%)</td>
<td>36 (72.00%)</td>
</tr>
</tbody>
</table>

Using the cutoff scores provided for each measure, the mental health of Sample 1, at four to six years after the fire (n=50), can be summarized as follows:

- Eight participants (16.00%) are indicated for PTSD;
- 26 participants (52.00%) are indicated for general psychological distress;
- 14 participants (28.00%) are indicated for alcohol problems;
- 29 participants (58.00%) are indicated for disorder on any one measure;
- Five participants (10.00%) are indicated for disorder on all three measures;
- 21 participants (42.00%) are considered not indicated for disorder on all measures; and
- Of the 8 participants indicated for PTSD, all are indicated for disorders involving general psychological distress and six (75%) are indicated for alcohol-related disorders.

3.4.3 Research Question 3 - Intra-group differences.

Analysis of differences within Sample 1 is restricted by size and evenness of sizes of subgroups. However, while considering these limitations, reporting and describing prevalence can still be made.
A series of Chi-Square tests of distribution were undertaken to assess possible associations between gender, rank, and indications of disorder, on all measures. Chi-Square rests will determine whether the distribution of participants categories as having disorder or not, on each measure, is consistent with gender and rank distribution of the sample. As Chi-square tests use categorical data (such as disorder or no-disorder) rather than continuous data, they are appropriate to use with PCL-C data, which does not have a normal distribution.

For the measures of mental health, two categories (disorder or no disorder) were used. For gender, two categories (male or female) were used. While rank in the military is usually defined as Junior Sailor, Senior Sailor and Officer, the small numbers in some rank categories would have resulted in almost all invalid results if three rank categories were used. To increase the number of valid analyses involving rank, the categories of Senior Sailor and Officer were combined, to result in two categories of rank (Junior Sailor or Senior Sailor / Officer). Table 4 displays the results of the series of Chi-Square tests undertaken.

No results are included for the analysis of association between PCL-C as 50% of the cells had expected counts of less than 5, invalidating the Chi-Square test. While the analyses for IES-R administered at 11 months and gender, and PCL-C and gender each had 25% of cells with counts of less than 5 would also strictly be invalidated, the number of cells with counts of >5 is close to the 80% required, and are based on only 1 cell each with a count below 5 (the percentage with cell counts below 5 can only be 0% or 25% - therefore, while it is possible that they are invalid, it is also possible that they could be valid). They are maintained in table 4 for consistency with other test, to help corroborate overall trends in the remaining data.
Table 4.

Results of Pearson's Chi-Square test of association between gender and rank, and dependent variable, for Sample 1.

<table>
<thead>
<tr>
<th></th>
<th>IES-R (4 months)</th>
<th>IES-R (11 months)</th>
<th>PCL-C (four to six years)</th>
<th>GHQ-28 (four to six years)</th>
<th>AUDIT (four to six years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>$X^2=0.877$ (p=.349)</td>
<td>$X^2=1.040^*$ (p=.308)</td>
<td>$X^2=0.019^*$ (p=.890)</td>
<td>$X^2=0.254$ (p=.614)</td>
<td>$X^2=2.667$ (p=.102)</td>
</tr>
<tr>
<td>Rank</td>
<td>$X^2=2.667$ (p=.102)</td>
<td>$X^2=1.217$ (p=.270)</td>
<td>$X^2=0.349$ (p=.555)</td>
<td>$X^2=0.125$ (p=.723)</td>
<td></td>
</tr>
</tbody>
</table>

* 25% of cells have expected count of <5.

Table 4 displays that none of the Chi-Square tests administered have p values below .05, indicating that there are no significant associations between gender, rank, and the dependent variables. The tests based on analyses with cell counts below 5, contain the same findings, corroborating the other tests indicating that there are no significant associations between gender, rank, and the classifications of disorder or no disorder on the dependent variables (trauma, general psychological distress and alcohol problems).

3.5 Discussion

3.5.1 Research Question 1 - prevalence of indicated trauma

The prevalence of indicated PTSD in Sample 1 were determined at four months, eleven months, and four to six years after the fire in HMAS Westralia, using the PCL-C.
The prevalence rate for indicated PTSD at four months, eleven months, and four to six years, respectively, are 38.64%, 30.36%, and 16.67%. Ninety-four people survived the fire, with sample sizes for this study of 44, 56, and 48 at four months, eleven months and four to six year after the fire, respectively.

While the prevalence rates are determined from available data, they only include people who were in the Navy at the time of screening. As such, the available samples may not be representative of the entire ship’s company. Those with PTSD, may, as a group, be less likely to remain in the same employment if the trauma occurred in the workplace, in order to avoid the distress association with ongoing reminders of the event. It could further be expected that separation from employment due to the impact of PTSD would be cumulative over time. Therefore, the possible impact of this separation due to PTSD may be greater at the four to six year screening, than at earlier times. However, while actually knowing the reasons for discharging from the navy would help clarify this process, reasons for discharging from the Navy are not easily obtainable. Such data is not recorded in the files used to extract other data used in this study, and may not actually be recorded at all (especially if personnel did not specifically declare reasons). It was considered that the degree of difficulty to obtain access to other files that may not reveal any significant information, and was not pursued. As part of Study 2, all personnel who had left the Navy at the time of the study were approached by letter, to seek contribution to the study. Only two of the more than 50 people written to, replied, indicating that contacting individual to seek information on why they discharged from the Navy, would not have been fruitful. Therefore, while a viable theory, the possibility that those who remained in the Navy four to six years after the fire, may, as a group, have had less disorder than those who left in the first years following the fire, remains only speculative.
This effect suggests that the prevalence rate of indicated PTSD in the HMAS Westralia sample should be considered conservative, and that the actual prevalence may be higher. At the four to six years screening, the actual prevalence rate may be higher than indicated, as almost half of the survivors were not in the Navy at the time and did not take part in this study. It could reasonably be expected that the half that did not take part in the study may have a higher rate of indicated PTSD that did those who did. Therefore, the established prevalence rate at four to six years, of 16.67%, should be considered to be a conservative figure.

It is tempting to attribute the prevalence of indicated PTSD in HMAS Westralia solely to the fire. However, the measures used to indicate PTSD do not discriminate between distressing psychological reactions associated with the fire in HMAS Westralia, and distressing psychological reactions associated with other possible causes. In a study of Australian Navy personnel at the commencement of deployments, Rayner (2005) established that about 1.2% of personnel (n=460) exceeded a cutoff score of 50+ on the PCL-C. While this cutoff doesn't use the additional criteria for indicating PTSD (a cutoff score of 50+ and endorsement of three items for each criteria in the DSM-IV), it can be used to provide a correction for baseline, or underlying levels of indicated PTSD in a Navy sample. Applying this correction to the established prevalence rate of 16.00% indicates a corrected prevalence rate of indicated PTSD associated with the fire in HMAS Westralia, of 14.80% (excluding a probable pre-existing rate of PTSD).

Two corrections to the prevalence rates of indicated rates of disorder have now been described. One indicates that the initial prevalence rate of 16.00% is lower than it actually should be, while the one indicates that this prevalence rate is inflated. While it is impossible to determine precisely with the data available whether one should cancel the other out, some speculation can be provided. I propose that a correction resulting
from people leaving the Navy due to PTSD (and rendering the determined prevalence rate of indicated PTSD as conservative), is likely to have a greater impact than a correction due to a pre-existing or baseline rate.

3.5.2 Research Question 2 - other mental health indicators

The prevalence rate of indicated disorder involving general psychological distress in Sample 1, using the GHQ-28 (with CGHQ scoring), four to six years after the fire, is 54.17%. In addition to establishing a prevalence rate, the scores on individual subscales, for those identified as displaying disorder (n=26), is provided, with the results displayed in Figure 7.

![GHQ-28 Subscales](image)


Figure 7. Relative contribution of each GHQ-28 subscale score, to the total GHQ-28 score, for participants indicated as displaying disorder involving general psychological distress (n=26).

Figure 7 indicates that for participants identified as disorders involving general psychological distress, the elevation in their scores is more attributable to scores for the
Anxiety and Somatic Concerns subscales, than to Social Dysfunction or Depression subscales.

In addition to the simple reporting of indicators of mental health at three times, the predictability of one measure at one time, on other measures at other times, can also be made.

Table 5.

*Intercorrelation matrix of associations between study measures.*

<table>
<thead>
<tr>
<th></th>
<th>IES-R 2 (11 month)</th>
<th>PCL-C (4 to 6 year)</th>
<th>GHQ-28 (4 to 6 year)</th>
<th>AUDIT (4 to 6 year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IES-R 1</td>
<td>Sig (2-tailed) .000</td>
<td>Sig (2-tailed) .008</td>
<td>Sig (2-tailed) .613</td>
<td>Sig (2-tailed) .271</td>
</tr>
<tr>
<td>(4 month)</td>
<td>n=31</td>
<td>n=24</td>
<td>n=24</td>
<td>N=24</td>
</tr>
<tr>
<td></td>
<td>.77*</td>
<td>.53*</td>
<td>.11</td>
<td>.23</td>
</tr>
<tr>
<td>IES-R 2</td>
<td>Sig (2-tailed) .000</td>
<td>Sig (2-tailed) .006</td>
<td>Sig (2-tailed) .043</td>
<td></td>
</tr>
<tr>
<td>(11 month)</td>
<td>n=30</td>
<td>n=30</td>
<td>n=30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>.55*</td>
<td>.34*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCL-C</td>
<td>Sig (2-tailed) .000</td>
<td></td>
<td></td>
<td>Sig (2-tailed) .016</td>
</tr>
<tr>
<td>(4 to 6 year)</td>
<td>n=50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>.31*</td>
<td></td>
</tr>
<tr>
<td>GHQ-28</td>
<td></td>
<td>Sig (2-tailed) .026</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4 to 6 year)</td>
<td></td>
<td></td>
<td></td>
<td>N=50</td>
</tr>
</tbody>
</table>

*Correlation is significant at the .01 level (2-tailed)

*Correlation is significant at the .05 level (2-tailed)*
Table 5 displays an intercorrelational matrix of all study variables. The significant associations are: a large and positive association between measures of PTSD at all three times; and while there are significant associations between measures of PTSD and measures of both general psychological distress and alcohol problems (at four to six years), measures of PTSD are more strongly associated with general psychological distress than alcohol problems.

3.5.3 Research Question 3 - Intra-group differences.

Table 4 indicates that gender and rank are not associated with indicators of disorder at any of the three screenings. While Sample 1 is small and limited to the one event, these results can be compared to the findings within an Australian Navy sample (n=1739), reported by Rayner (2005). Rayner determined that PTSD was about twice as prevalent in females, than males, compared with no significant difference in prevalence due to gender in Sample 1. However, the finding with Sample 1 that there was no significant association between rank and disorder was consistent with the finding of Rayner.

3.5.4 Research Question 4 – Indicators of distressing psychological reactions to potentially traumatic events, over time.

Figure 8 graphs the prevalence rates for indicated PTSD for Sample 1, at approximately four months, eleven months, and 4-6 years post-fire. While different measures are used (the IES-R at four, and eleven months, and the PCL-C at four to six years), it is disorder rates that are reported, rather than specific scores.

The trend in disorder, reported in Figure 8, is for decreasing rates of disorder with increasing time, with the rate of decrease seemingly slowing with time. With
regard to changes in indicated PTSD over all three screening occasions, 17 individuals were tracked across the three screenings (four months, 11 months and 4-6 years). Of these, two (11.7%) were identified as displaying disorder at all three screenings and eleven participants (64.7%) did not display disorder at any of the three screenings (76.47% of the sample did not change status as either displaying disorder or not displaying disorder). Three participants (17.6%) were considered to display disorder at the first screening (four months) and were considered no longer to display disorder at the four to six year screening, and one person (5.97%) was indicated as not displaying disorder at the four month screening, but displayed disorder at the four to six year screening. This indicates that most participants maintained the same status (either indicated for disorder or not indicated for disorder) over time. Of those who changed status, most were in the direction expected (changing from displaying disorder to no longer displaying disorder over time). Only one of the 17 participants for whom measures were taken on three occasions changed status from being not identified for disorder, to displaying disorder, over time.

![Graph showing percentage of Sample 1 indicated for PTSD on PCL-C at three times since the fire.](image)

**NB:** Time is approximate, as Apr 03 data is based on average of 5 years since the fire. Time is to scale.

*Figure 8.* Percentage of Sample 1 indicated for PTSD on PCL-C at three times since the fire.
Sample 1 data therefore provide two trends. One is for PTSD prevalence to reduce over time, with the rate of reduction lessening with time. The second trend is for individuals to remain fairly stable with regard to their status as either reporting disorder or not, over time. The change in the overall prevalence in the sample is due to the change in status of disorder or not, in only a small number of individuals, rather than changes in prevalence of disorder across the sample.

The formal diagnosis of PTSD (DSM-IV and ICD-10) includes a delayed onset variant, whereby onset of symptoms does not occur until at least six months after the traumatic event. The results above indicate one possible case of delayed onset PTSD (the participant not indicated for PTSD at four months, but who was indicated at four to six years). One possible case from a pool of eight participants indicated for disorder suggests that the delayed onset variant of PTSD presents in the minority (12.5% of Sample 1).

The predictiveness of scores on trauma questionnaires at one time, on scores at other times, was established using correlations. As assumptions of normality for the PCL-C cannot be made, non-parametric correlations (Spearman correlations) are used. While different measures are used at different time, the correlation between the IES and PCL-C is considered to be large, at .84, p<.001 (Creamer, Bell & Failla, 2003) and .77, p<.001 (Ruggiero, Del Ben, Scotti, & Rabalais, 2003).

Table 6 displays the Spearman correlations between scores on the IES-R and PCL-C for the three screenings. All correlations are significant (p<.05, 2-tailed).
Table 6.

*Table 6. Spearman Correlation Coefficients between Measures indicating PTSD, in Sample 1 at Four Months, Eleven Months and Four to six Years.*

<table>
<thead>
<tr>
<th></th>
<th>T1 (4 months)a</th>
<th>T2 11 months)a</th>
</tr>
</thead>
<tbody>
<tr>
<td>T2 (11 months)</td>
<td>r=.76, p&lt;.000 (n=30)</td>
<td></td>
</tr>
<tr>
<td>T3 (4-6 years)</td>
<td>r=.51, p&lt;.015 (n=22)</td>
<td>r=.74, p&lt;.000 (n=29)</td>
</tr>
</tbody>
</table>

a IES-R
b PCL-C

Table 6 indicates that the association between each of the screenings is large and positive. IES-R scores at four months predict IES-R scores at eleven months, and PCL-C scores at four to six years; and IES-R scores at eleven months predict PCL-C scores at four to six years. While the correlation is large between all three screenings, the correlation coefficient is at its least, over the greatest time interval (as would be reasonably expected, due to the greater likelihood of recovery with time, of the greater potential for influence by intervening variables with time).

3.5.5 Research Question 5 - Comparison with survivors of similar events.

Sample 1 comprises military personnel with a majority of males. The rate of long term indicated PTSD is 16.00%, psychological distress, 54.17% alcohol problems, 29.17%. I will now describe the results of research with similar populations to provide meaning to the results from Study 1. This data is presented in tabular form in Tables 20-22 (Appendix J).
3.5.5.1 Comparing distressing psychological reactions.

The American Psychiatric Association’s DSM-IV (APA, 1994) provides prevalence rates for PTSD for community-based studies at 1% to 14%, and for high risk groups at 3% to 58%. Sample 1’s prevalence rate of 16.00% exceeds the upper range for the general community sample, and is in the lower third of a wide range for high-risk groups, at all three screenings.

Berg, Grieger and Spira (2005) examined the rates of PTSD, using the IES-R, in US Navy submariners, who had to abandon their submarine after flooding and fires threatened the crew with toxic smoke. This was a similar incident to that experienced by Sample 1; namely a single and unexpected incident, although one that both samples were trained to manage. Further, the mental health response to the incident appears similar to that for Sample 1 (see Appendix A for details). Using modified scoring procedures for the IES-R, Berg, et al., established a rate of indicated PTSD at seven months post-incident, of 9%. This is about one-third, to one-quarter the rate indicated in Sample 1 (37% and 31% at four and 11 months post-incident respectively). Berg, et al., describes the rate of indicated PTSD as unusually low, and attributed this to the specialist selection and training of the sample.

Grieger, Fullerton and Ursano (2003) assessed levels of psychological trauma, using the IES-R, in a mostly male sample of survivors of the 2001 terrorist attack on the Pentagon. They established a rate of disorder of 14%. The rate of indicated rate of disorder in Sample 1 was more than twice this rate at both four months and 11 months.

Rayner (2005) provides a baseline rate of psychological trauma, using the PCL-C, with Australian Navy personnel (n=1739) deployed on operations in the middle-east between 2001 and 2005. Using a cutoff score of 50+ to indicate disorder, Rayner (2005) established a prevalence rate of 1.4%, and a mean PCL-C score for a Navy sample of
23.4, SD=7.4. In comparison, Sample 1 indicated PTSD at nearly 12 times the rate of the general Navy sample reported by Rayner (2005). Using a single-sample t-test, the distribution of Sample 1 mean PCL-C scores is significantly different ($t=5.13$, $df=47$, $p<.005$) to the distribution reported by Rayner (2005).

McKenzie, Ikin, McFarlane, Creamer, Forbes, Kelsall, Glass, Ittak, and Sim (2004) used the PCL-S with Australian veterans ($n=1424$) of the 1991 Gulf War and a control group ($n=1548$). Their sample was male, predominantly Navy participants (86.5%), and was assessed 10 years after the war. Using the PCL cutoff of 50+ to determine disorder, McKenzie et al. (2004) established a prevalence rate of trauma of 7.9% for the study sample, and 4.6% for controls. Sample 1, assessed four to six years after the fire, had a prevalence rate of more than twice that of McKenzie et al.’s study group and nearly four times that of controls. While Sample 1 shows a reduction of disorder over time, and was conducted sooner after the fire than McKenzie et al.’s study, the reduction also appears to be slowing over time, and the difference in prevalence rate between the two samples may still indicate a higher prevalence rate among Sample 1, compared to the Navy veterans of the 1991 Gulf War.

Similar to McKenzie et al. (2004), Barrett, Doebbeling, Schwartz, Voelker, Falter, Woolson and Doebbeling (2002), and Kang, Natelson, Mahan, Lee and Murphy (2003) used the PCL (cutoff of 50+) to assess rates of disorder (PTSD) with US veterans of the 1991 Gulf War. Barrett et al. established a prevalence rate among a primarily Army sample ($n=3682$) of 3.4% for combat veterans, and 1.4% for non-combat veterans. Kang et al. established a prevalence rate of 12.1% for Gulf war veterans, 4.3% for non-Gulf war veterans, and 7.7% for a Navy subset ($n=1499$). The prevalence rate for indicated PTSD in Sample 1 if the PCL-C cutoff of 50+ only were used would be revised to 18.00%, more than five times the rate for combat veterans
(Barrett et al.), more than 13 times the rate for controls (Barrett et al.), more than four times the rate for US military (Kang et al.), and more than twice the rate of US Navy veterans of the 1991 Gulf War (Kang et al.).

O’Brien and Hughes (1991) determined the prevalence of PTSD in British Army veterans, five years after they fought in the Falkland’s conflict (n=64), to be 22%. A further 28% of their sample reporting elevated PTSD symptoms (but presumable insufficient to be identified as displaying disorder). The rate of indicated PTSD in Sample 1 is lower than for the Falkland veterans’ sample.

Comparisons can also be made with non-combat military activity, such as peacekeeping activities. In their study of Australian peacekeepers deployed to Rwanda, Hodson, Ward and Rapee (2003) reported a long-term rate of PTSD of 15%. In a wide ranging analysis of peacekeeping, Litz, Gray and Bolton (2003) report a prevalence range of 3% to 15%, with a level of 8% being considered the norm. This prevalence rate is consistent with the rate established by Litz, Orsillo, Friedman, Ehlich and Batres (1997), for US Army peacekeepers in Somalia. Sample 1 provides a prevalence rate of indicated PTSD at about twice the average rate expected as an average for peacekeeping operations, at the high end of the expected range, and at a similar rate to Australian peacekeepers who served in Rwanda.

Hull, Alexander and Klein (2002) studied the long-term effects of a large-scale fire at sea, with a large loss of life. Ten years after the 1988 Piper-Alpha Oil rig fire, in which 167 of the 226 participants aboard the oil rig were killed, Hull et al. (2002) established a prevalence rate of PTSD in survivors of 21% (with an estimate that 73% would have been indicated in the first three months after the disaster). The initial estimate of prevalence is about twice that of Sample 1 (which was 38.63% at four months, and 30.36% at 11 months). However, the longer term prevalence rate is similar
to the rate determined for Sample 1, despite the much larger loss of life in the Piper-
Alpha oil rig fire.

3.5.5.2 Comparing general psychological distress.

The prevalence rates for general psychological distress and alcohol problems for Sample 1 can also be compared with findings for similar samples. For Sample 1, the prevalence rate for indicated disorder for general psychological distress is 54.17%, and 29.17%, for indicated alcohol problems.

In addition to using the PCL-S to study psychological trauma with a predominantly Australian navy sample who were veterans of the 1991 Gulf War, McKenzie, Ikin, McFarlane, Creamer, Forbes, Kelsall, Glass, Ittak, and Sim (2004) also administered the GHQ-12, a shortened version of the GHQ-28 based on GHQ-28 questions (with GHQ scoring). They assessed a rate of disorder of 39.6%, with 32.5% for controls. Sample 1’s prevalence rate of 54.17% is higher than the study sample, and about one-and-a-half time the prevalence rate of the control group. However, Sample 1 used CGHQ scoring, which more accurately assesses chronic conditions that GHQ scoring.

In their study of British Army participants involved in combat during the 1982 Falkland’s war (n=64), O’Brien and Hughes (1991) used the GHQ-60, a 60-item version of the GHQ-28 from which the GHQ-28 is derived (using GHQ scoring). They established that 23.44% of their sample were indicated for disorders involving general psychological distress. The rate for Sample 1 is about twice the rate established by O’Brien and Hughes.

Chung, Easthope, Chung and Clark-Carter (1999) used the GHQ to study residents of a British housing estate who were narrowly missed by a crashing transport
jet airliner. Chung et al.'s study was conducted six months after the incident and involved 82 residents of the estate. While the exact versions of the GHQ used is not stated, it can be assumed that it was the 28 item version as sub-scale scores are discussed and only the GHQ-28 includes subscales (Goldberg & Williams, 1988). Chung et al. (1999) reported that 52% of residents sampled scored above the GHQ-28 score for disorders involving general psychological distress. This is about the same prevalence rate as Sample 1. However, Chung et al.'s study was conducted much sooner after the incident than Sample 1 was, and it could be speculated that the rate may reduce over time, as did the prevalence rate for indicated PTSD.

In their study of the survivors of the Piper-Alpha oil rig fire, Hull, Alexander and Klein (2002) also used the GHQ-28 (although they may have used GHQ scoring, which may underestimate chronic disorder). Ten years after the fire, 44% of survivors were indicated for general psychological distress. While lower than Sample 1, Hull et al.'s sample may actually be similar given the tendency of GHQ scoring to underestimate rates of disorder.

3.5.5.3 Comparing alcohol problems.

With regard to alcohol use, McKenzie, McFarlane, Creamer, Ikin, Forbes, Kelsall, Clarke, Glass, Ittak and Sim (2006) reported that for a sample of Australian Navy male veterans of the 1991 Gulf War (n=1232), the prevalence of alcohol problems measured 10 years after the war (using the AUDIT) is 25.7%. However, McKenzie et al. (2006) use a cutoff score of 10+ to indicate disorder. While Sample 1 indicates alcohol problems at 29.17%, and is higher than McKenzie et al.’s findings, the standard cutoff score of eight or more is used with Sample 1. If the cutoff of 10+ (used by McKenzie et
al., 2006) is applied to Sample 1, the revised prevalence rate would be 20.83% (lower than that established by McKenzie, et al.).

Erbes, Westermayer, Engdahl and Johnsen (2007) assessed alcohol use in a sample of mostly male, Army veterans, who had returned from military operations in Iraq and Afghanistan. They indicated a rate of disorder of 27% in their sample, using the AUDIT. This is also about the same prevalence rate for indicated disorders involving alcohol problems as Sample 1.

The prevalence of indicated alcohol problems co-morbid to indicated PTSD in Sample 1 (22.2%), is similar to the co morbid rate of 24.1% reported by Mills, et al. (2006) in a large Australian study sample.

3.5.6 Summary of findings of Study 1.

The findings of Study 1 are summarized in Table 7.

Table 7.

Summary of the Major Findings of Study 1.

<table>
<thead>
<tr>
<th>Time</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 months after fire</td>
<td>38.64%</td>
</tr>
<tr>
<td>11 months after fire</td>
<td>28.57%</td>
</tr>
<tr>
<td>4-6 years after fire</td>
<td>16.00%</td>
</tr>
</tbody>
</table>

At 4-6 years after the fire in HMAS Westralia, 54.17%, or just over half the sample, are indicated with disorders involving general psychological distress.

General psychological distress appears to be associated more with anxiety and somatic concerns, than social dysfunction and depression.

At four to six years after the fire in HMAS Westralia, 29.17%, or between one-quarter and one-third of participants, were indicated for alcohol-related disorders, with 8.33% of the sample indicating a high level of alcohol problems. Alcohol problems are predominantly hazardous use, with a relatively smaller proportion with either alcohol dependence or harmful alcohol use.
The size and makeup of the sample limits the confidence with which intra-group comparisons such as gender and rank can be made. However, there is no significant association between gender and rank, and rates of disorder for PTSD, general psychological distress and alcohol problems, at any screenings. The finding of increased numbers of males with PTSD is consistent with the distribution of gender within the sample.

While these is variation in the overall sample prevalence of PTSD over time, there is general stability in status of individuals as either reporting PTSD or not. Therefore, the variation in the sample is due to changes in status of a small number of individuals, rather than across-the-board changes in status.

One possible case of delayed-onset PTSD is indicated (12.5% of the total number of PTSD cases and 2% of the sample). This suggests that delayed onset PTSD occurs in only a minority of the cases of PTSD.

There is a strong association between measures of PTSD at all screenings. Prevalence of PTSD, and individual scores on measures of PTSD, assessed in the months after the fire (as early as four months) has a strong association with PTSD prevalence of PTSD and scores on measures of PTSD up to four to six years.

The prevalence of indicated PTSD in Sample 1, four months and eleven months after the fire, is about twice the rate of a sample of survivors of the 2001 terrorist attack on the Pentagon.

The prevalence of indicated PTSD in Sample 1, four to six years after the fire, is: higher than for general community samples and within the range of at-risk samples; more than thirteen times that of a large, Australian Navy, normative sample; three to four times higher than a similar accident in a US Navy submarine; more than twice that of Australian and United States Navy samples, and higher than Australia and United States Army samples, taken 10 years after the 1991 Gulf War; and about three-quarters that of either a British Army unit five years after combat in the Falklands War, or a sample of British civilian oil-rig workers, taken ten years after a major fire at sea.

The prevalence of disorders involving general psychological distress four to six years after the fire is: higher than for Australian Navy veterans of the 1991 Gulf War, and about twice that of controls; about twice that of British Army combat veterans five years after the Falklands War; about the same as survivors of a large disaster (plane crash), measured six months after the crash (although it is assumed that the difference at four to six years would be considerably less); and about the same as British survivors of a large oil-rig fire, measured 10 years after the fire.

The prevalence of disorders involving alcohol problems in Sample 1 four to six years after the fire is: about the same as an Australian Navy sample taken 10 years after the 1991 Gulf War; and about the same as a sample of US Army, male veterans recently returned from Iraq and Afghanistan.
3.5.7 Limitations of the study

The measures used in this study are primarily screening instruments, and used on their own, as they have been in this study, indicate, rather than diagnose disorders. Comprehensive diagnostic processes may result in different diagnostic rates. However, given the psychometrics of the measures used, the rates of indicated disorder, are in-line with comparable research.

The sample is an Australian Navy sample, and may not generalize to non-military populations, or to other non-Navy military samples. However, it provides an example of a non-combat, potentially traumatic event, in a military environment.

The overall size of the sample (<50) and the size of gender and rank sub-groups, limits the extent to which the results can be generalised. However, similar sized groups are not uncommon in research in psychological trauma.

This study has only focused on the level of indicated mental health disorders in the sample, and has not been able to distinguish between pre-existing mental health conditions, or to possible disorder(s) that may develop in participants independent the fire. However, it can be assumed that this would be the same for comparative studies. Further, this study is limited to describing associations between the fire in HMAS Westralia, and indicated PTSD, general psychological distress, and alcohol problems. While it may be tempting to attribute a causal relationship between the fire and mental health outcomes, it is beyond the scope of this study to do so.

A significant limitation is that the data gathered was done so for clinical reasons, rather than research reasons. The data gathered was intended to compliment clinical interviews, so does not contain a significant amount of demographic data, or data that could lead to conclusion or inferences about pre-incident personality factors, significant factors during or after the event, and about lives since the fire. While this may be
appropriate for clinical reviews, where this data may have been gathered on an individual basis, it none-the-less limits the data available for this study.

3.5.8 Strengths of the study

All participants in this study had exposure to the same traumatic event. While there may have been differences in proximity to the fire, roles played in firefighting, and exposure to those killed in the fire, all personnel were involved in the same life-threatening event and no-one was further away that the length of the ship (171 metres) from a major, out-of-control fire at sea, that killed four people, and threatened the lives of another 94.

The use of standardized measures allows for meaningful comparisons of scores, between the results of Sample 1, and other military and non-military samples.

3.5.9 Future research

While the prevalence of indicated disorder is useful in research, further directions should include diagnosis of PTSD, general psychological distress and alcohol problems, along with appropriate treatment option to be made available for those involved in this type of research.

Further studies with larger samples sizes that include populations from a range of traumatic events, and include both military and non-military backgrounds, would further knowledge of the potential impact of psychological trauma. It is recommended that studies use multiple instruments such as those used in this study.

Future studies that examine the outcomes from specific events, should control as much as possible, for pre-existing mental health conditions, or for conditions arising from other events. While it is tempting to associate all pathology with the target event, a
proportion of pathology may come from extraneous and uncontrolled for, sources. Large sample sizes, or strategies to identify such extraneous sources, are strongly recommended.

I have not speculated on any possible explanation for the results presented. Factors that could describe maintaining mental health in the aftermath of a potentially traumatic event will be taken up with Study 2 in this project.

3.6 Conclusion

In this chapter I have presented research into mental health related to the survivors of a potentially traumatic event. The fire, which serves as an example of a significant non-combat event, is one that could potentially be repeated in the future. Further, fighting a major fire at sea under worse conditions could be an expected task in naval combat. Therefore, it should serve as an indicator of potential mental health outcomes in future traumatic events involving navy personnel. The culture and experience of navy personnel could be construed to have similarities, but also differences from, the Army personnel who are far more often researched in order to understand conditions such as PTSD. It is hoped that this chapter serves to increase the understanding of the mental health threats in the military, and in large scale accidents, in general, as well as specifically in the naval environment.

In the next chapter, I will move back to the theoretical, to begin the process of understanding why, and how, some people who experience certain types of events, either develop adverse outcomes, or disorder. I will move on to describe theories of psychological trauma, a new model will be presented, and a study undertaken with the survivors of the fire in HMAS Westralia, to test aspects of this model. While the first
part of this report has focused on what happens in the aftermath of trauma, my report now moves on to explore why this happens.
Chapter 4. Theoretical models of psychological trauma
In this chapter I describe and critique the major models of psychological trauma and PTSD. They serve to explain the process of traumatisation and the phenomenon assessed in Study 1. In order to understand the usefulness of models of trauma, it is necessary to have standards against which such models, along with any alternates, can be judged. Three sets of existing standards for models of psychological trauma are introduced, and combined to form a generic set of standards against which models of PTSD can be assessed. These standards are applied to the four major models of PTSD described in this chapter.

4.1 Standards for models of psychological trauma

Horowitz (1997) argued that any theory of traumatic stress needed to account for a series of basic experimental, field and clinical findings regarding response syndromes. He proposed that there were five generally observable experiences regarding traumatic stress that should be covered. Firstly, theories must accept that there are general response tendencies toward stressful events. Secondly, different types of events produce different qualities and quantities of responses. Thirdly, that many stress responses persist long after the event is over and some may only begin after an interval of time without response. Fourthly, symptoms of severe stress will include intrusive repetitions in thought, emotion and/or behaviour, and may include denial, emotional numbness and behavioural avoidance. Fifthly, and finally, responses to severe stressors may occur in temporal and sequential phases (initial realization and impact, denial and numbness, denial and intrusive repetition in thought, emotion and behaviour, and further working through and acceptance with a loss of either denial or peremptory recollection of the stress event).
Similarly, Jones and Barlow (1990) argue that all models of PTSD should account for: the constellation of symptoms (especially re-experiencing); the absence of symptoms in some individuals; the importance of pre-trauma characteristics (such as sense of control, and social support); event severity; emotional numbing; and delayed onset.

Brewin, Dalgleish and Joseph (1996) also proposed standards for models of PTSD. They argue that models should account for: the clinical characteristics of the disorder (including range of symptoms and temporal aspects of PTSD); both normal and abnormal responses to traumatic events; different severity of disorder and outcomes; the ability to discriminate PTSD from other disorders; how information is processed in PTSD; and empirical evidence to test the model.

These three lists of standards address the key psychological events to be explained by any models of psychological trauma. A composite list of these standards for models of psychological trauma include:

(1) There are characteristic symptoms of PTSD;
(2) Responses can be range from normal to abnormal, with different severity;
(3) Symptoms can be enduring;
(4) Disorder may have a delayed onset;
(5) Symptoms present in phases that maybe overlapping or discrete;
(6) Pre- and post-event characteristics influence responses; and
(7) Models should be testable.
4.2 Biological models of PTSD

Jones and Barlow (1990) describe biological models of PTSD as paralleling the behavioural and biochemical changes that take place in animals when faced with inescapable or unavoidable shock. Calhoun and Resnick (1993) describe biological models of PTSD as those which explain damage or change to the neuronal pathways and neuro-chemical systems, caused by the effects of extreme stressors placed on the central nervous system at the time of the trauma. While describing a complex interplay of neural interactions, Nemeroff, Bremner, Foa, Mayberg, North and Stein (2006) describe the changes brought on by trauma, as primarily resulting in reduced hippocampal volume and changes in blood flow in specific parts of the brain. These changes are enduring, and primarily impact on neurotransmitter activity in response to stimuli initially considered dangerous. Once the changes occur, cues that are associated with the original stimuli, lead to feeling that the original event is about to reoccur. This produces an exaggerated neuro-chemical response related to the initial event, including physical and behavioural effects such as startle response and aggressive behaviour.

Wastell (2005) indicates that after an initial neurotransmitter burst that depletes neurotransmitters such as norepinephrine and dopamine, organisms release endogenous opioids to restore control, or homeostasis. These opioids have an analgesic response, manifested as a lack of memory for some aspects of the event. Further, they cause an addiction, which sees people seek out stimuli that remind them of the original event, in order to have the neurotransmitter effects, and in turn, the release of the opioids. Between the release of opioids and the next neurotransmitter release, come withdrawal symptoms, such as anxiety, hyperalertness and sleep disturbance.

McFarlane and Yehuda (1996) describe a ‘kindling’ effect, whereby people retain a biological memory of succeeding stressful events with increased potential for
reaction over time and repetition of response. This: “progressive sensitivity to affective destabilization” (p170), allows an increased triggering of responses and greater vulnerability to future events that have some similarity with the original triggering event.

Wastell (2005) indicates that while complex, the biological model is based on the assumption that trauma initiates a biological process that is out of the control of the individual. As the biological response is a generalized response and explains the characteristic symptoms of PTSD, it satisfies the first standard for models of trauma. The process of ‘kindling’ can account for some individual variations in responses, along with the observation that some responses can take time to develop into disorder.

The biological model provides a good account of the characteristic symptoms of PTSD and the enduring nature of the disorder. However, it does not adequately account for normal (non-pathological) responses to disorder, and the process of resolving disorder or recovering (how the biological changes described in disorder are reversed when recovery takes place). There is no accounting for delayed onset disorder, and the biological model of PTSD does not account for pre- and post-event characteristics such as social support or perceptions of control and coping.

Wastell (2005) notes that the biological model doesn’t adequately explain the complex range and intensity of psychological experiences that occur with PTSD, especially emotional reactions and memories. Nemeroff et al. (2006) and Neumeister, Henry and Krystal (2007) describe puzzling inconsistencies in findings among patients with PTSD, and highlights that neural processes involved in recovery are poorly understood. Further, Neumeister, Henry and Krystal add that biological differences in those with and without PTSD may be more markers of vulnerability to disorder than the
effects of exposure to traumatic events. This leaves the biological model currently more theoretical, than testable.

4.3 Psychodynamic models of PTSD

Calhoun and Resnick (1993) report that repetition and denial in stress reactions were described by Freud, and that these features were essentially the forerunners of the hallmark symptoms of PTSD; now recognized as re-experiencing and avoidance. Kudler (2007) adds that Freud was the first clinician to view traumatic disorders differently to the concept of the ‘broken brain’ approach that was the basis for ‘shell-shock’. He adds that a conflict between conceptualizing PTSD as a physical disorder or a psychic disorder is an ongoing and unresolved issue.

Repetition and denial of re-experiencing aspects of traumatic event were incorporated into a broader model of PTSD by Horowitz (1997). Jones and Barlow (1990) describe the broader psychodynamic model of PTSD as a consequence of peoples’ inability to integrate traumatic events into their cognitive schemas. Joseph, Williams and Yule (1997) indicate that new information is interpreted, and meaning ascribed to it, through the use of mental models or schemas that individuals have developed over time, and that people have an: “inherent drive to make our mental health coherent with new information” (p. 73). The unusual nature of information related to traumatic events is usually so incoherent with existing schemas that the new information cannot easily be made sense of by the old schemas. However, the new information is not completely incomprehensible; trauma related information usually results in fear responses, with high arousal and a potential for action. Active memory continually repeats representations of the new information in an attempt to facilitate opportunities for integration. The repeating of new information is usually helpful for integration of
non-traumatic memories (as discussed in length, by Naugle, Bell, & Polosney, 2003, in their account of clinical considerations of integration). As the degree of incoherence between existing schemas and the new information increases (as happens with information related to traumatic events), repetitions of representations of new information required to achieve coherence will also increase over time. With this comes a greater repetition of accompanying fear, arousal and potential for action responses. Ongoing repetitions of this process can be easily overwhelming to those experiencing it. An inhibitory mechanism, takes over to control the amount of information presented and to slow down cognitive processing to avoid distress. When this inhibitory process is too strong, avoidance of the event and cues to it result. However, when the inhibitory process is not strong enough, too much information is represented, in an attempt to process it. This process results in the flooding and distressing effects of re-experiencing. This model suggests that people alternate or oscillate between re-experiencing and avoidance, as the balance between the need to process information and the need to control the flow of information, alternates, until equilibrium is reached, when the new information and existing schemas are integrated. Social support is viewed as important in mediating tolerance of the information processing.

Horowitz (1979/1997) describes the psychoanalytic model of trauma as being based on modulating excessive stimuli that overexcites the mind. The entry of information and energy is regulated by a 'stimulus barrier'. This is a psychic barrier, rather than an organic one. The amount of information allowed to reach awareness is altered, according to the perception of signals of danger, with increasing signals of danger and anxiety resulting in a higher threshold for entry of that information. This barrier is comprised of the defensive or inhibiting mechanisms used to protect the ego. This conceptualization of processing information related to stressful events includes a
feedback loop. As stimuli became more anxiety provoking, the greater the defensive inhibitions, resulting in decreased information processing. With decreased information processing, threat is also decreased, allowing for the defensive inhibitions to decrease. However, this decreased defence allowed greater processing and a potentially increase in threat and so on. This produces an unstable system and phases of anxiety and reduced anxiety, and phases of perception and information processing alternating with phases of inhibited stimulation and information processing.

Van der Kolk (2007) describes post traumatic disorder as the stimulus barrier being unprepared for trauma and ineffective in screening information, resulting in a flooding of stimulus related to the trauma. This flood of information resulted in the mental paralysis and intense emotions experienced by people who are said to have been traumatized.

Horowitz (1997) and Van der Kolk (2007) indicate that as the ego protects itself from the information of traumatic events (in order to ensure the safety of the person), the result is impaired information intake about what has happened. People thus have difficulty making sense of what they know they have experienced. When they try to remember what has happened, they have either uncontrolled or blocked recollections depending on the effectiveness of their defensive inhibitions, and if they try to not remember, their ego defences will be down, and they may have intrusive and uninhibited breakthrough recollections. Van der Kolk (2007) describes these recollections as contemporary experiences, rather than memories of a past event. Horowitz (1997) describes five phases people go through as they process the information of a traumatic event. These are outcry, denial, intrusion, working through and completion. For each, there is also a pathological response leading to disorder, that begins when people are overwhelmed by an event. The pathological stages include
panic or exhaustion, extreme avoidance, flooded states, psychosomatic responses, and character distortions.

Krupnick (2002) and Kudler (2007) focus on the interpersonal nature of psychodynamic therapy, in helping people cope with the adjustment to trauma. Krupnick indicates that trauma stems from some people being unable to make revisions to their views of the world in order to incorporate what has happened. The symptoms of avoidance and arousal are the result of the need for revision to incorporate what has happened, and a defence against the pain of this process. The role of therapist is help people bring to awareness, the balance between psychological, social and biological factors in play during disorder, and help them develop a sense of coherence and meaning in their lives.

Schnyder (2005) adds that the process of re-engaging normal coping mechanisms involves addressing the unconscious aspects of the trauma, and bringing them into consciousness in tolerable doses. People will need to become aware of the meanings they made of the event, along with the wishes, fantasies, fears and defenses stirred up by the event.

The issue of diagnosis or classification of disorder is taken up from a psychodynamic view by Kudler (2007). He argues that it is too limiting to consider only specific disorders (such as PTSD) that either exist or not, that there are normal and abnormal reactions to trauma, or even that people should be considered either well or ill after trauma. Rather, a broader view by therapists, that people experience a range of experience following trauma, and that disorder is represented by how well they cope and adjust is advocated from the psychodynamic perspective.

This model explains the major symptoms of PTSD, and with the assumption of a stimulus barrier, explains individual variations such as no disorder or disorder in people
exposed to the same stressor. The delayed onset of disorder is explained through constant repetitions increasing in frequency and impact, over time, until the person finally becomes overwhelmed by an increasing threshold for entry of information (some time after the event). Phases of alternating symptoms are explained well, although it is more a model of disorder than normality or recovery, with little to describe how mental health is maintained or how recovery occurs. Social support is acknowledged as a mediator, but the process of mediation is not well explained. Further, other pre-event characteristics such as perceived control and coping are also not well incorporated in psychodynamic models. With a psychic barrier to information, rather than an organic one, the model is also more theoretical, than testable. Wastell (2005) also criticizes Horowitz's model for focusing exclusively on the cognition, while much of the experience of PTSD involves emotional responses.

Cahill and Foa (2007) note that the concept of existing schemas that are shattered by the experience of trauma, may explain people developing disorders at the very first exposure to trauma. However, it doesn't explain how people may experience disorder following multiple traumas. They argue that if people experience potentially traumatic event without developing disorder, it would be because they have developed schemas that integrate such events. Therefore, repeated exposure to potentially traumatic events should actually reaffirm such schemas, rather than shatter them. Cahill and Foa note two further discrepancies with people who experience multiple traumatic events. Firstly, they note that individuals with history of trauma are more likely to develop chronic PTSD in the face repeated exposures to traumatic events, and secondly, that some people who integrate traumatic events well, experience personal growth, effectively protecting them from developing disorder. There appears to be no way to determine or explain why these differences occur.
4.4 Cognitive/Information processing models of PTSD

Jones and Barlow (1990) describe cognitive/information processing models as being based on the structure of fear responses. Fear is viewed as a program designed to avoid or escape danger, and information about the stimulus and the response evoked, is stored in a neural network. The fear network is different to other memory networks. It contains information about threat and safety, which is of higher priority and significance than less survival-focused information, and is more readily accessible. This prioritizing and sensitivity to threat-based information, and the provision of a ready response established to manage danger, can result in over-activation of the network. Joseph, Williams and Yule (1997) describe people developing: “a number of information-processing biases such as in attentional hypervigilence toward trauma-related stimuli” (p75). They tend to increase their estimation of the risk of a repeat episode of a traumatic event, leading them to respond to stimuli that resemble the fear-network producing stimuli, even if they are of less significance. This results in false-positive responses to danger. The responses may be appropriate to survival, perhaps as it may have been during the original event, but may occur even in non-life-threatening situations. Responding to cues that remind people of the original event is no-doubt intended to ensure survival, and includes intense awareness and focus on the cue, fear, and avoidance. The network and the resulting response will be reinforced if a response is enacted, yet there is no adverse outcome (with people believing that their responses, designed to protect them, was the cause of there being no harm done). The strength of the fear network, the response, and the neuro-chemical activity produced, is considered to inhibit the development of any alternate or more adaptive network, with fear the enduring legacy of development and activation of the fear network.
Calhoun and Resnick (1993) describe information processing models of PTSD as focusing on problems in processing or integrating trauma-related information as the cause of disorder. More recently, this line of research has developed into an integration of human evolutionary theory (Cantor, 2005) in which PTSD is presented as a defensive strategy whereby information-processing becomes focused, to the exclusion of all else, on defensiveness and preparing for danger. Recovery is a staged process that includes feedback about processes that produce fear responses that are appropriate and proportional to current situations, rather than only to the original situation.

Foa and Kozak (1986) and Foa, Rothman and Hembree (2006) describe the basic fear response in people as a program to escape danger, that involves information stored in memory, of stimuli that are considered dangerous (involving meaning-making about dangerousness, and recognizing a stimulus as representing this meaning-making process), along with physiological information about how to escape. This process is not necessarily a conscious process, and can occur with stimuli that only resemble the feared response, evoking the same response as if the resembled stimuli were, in fact, the feared stimuli. Further, Joseph, Williams and Yule (1979) indicate that fear network responses enter consciousness, resulting in the symptoms of re-experiencing. The process of triggering fear memories by stimuli that resemble the original stimuli will be ongoing, while ever there is no new emotional-processing (revised meaning-making, through the presentation of new information that is incongruent with the fear response, presented at the time the fear is evoked). Resolution involves correcting the association of fear responses with stimuli. However, this involves evoking the fear response and modifying the association, which is potentially painful to people who have a bias to overestimate risk. Further, escape or avoidance, which is a response to fear, will reduce the likelihood of acceptance of the process of integration, correction of risk, and
meaning-making. The process of pathological fear is viewed as similar to normal fear, with excessive response elements, and resistance to modification.

Similarly, Walser and Hayes (2006) describe PTSD in an Acceptance and Commitment Therapy conceptualization, as a process of experiential avoidance. Firstly, individuals with PTSD are actively unwilling to experience, in the present moment, negative emotions (such as traumatic memories, negative thoughts and unpleasant physiological states) and second, that these individuals attempt to: “change the form or frequency of those events, even when there is a negative cost of doing so” (Walser & Hayes, 2006, p.10). This experiential avoidance can have secondary complications, as current research argues for avoidance being a significant risk factor not only for PTSD but for depression (Tull, Gratz, Salters & Roemer, 2004) and substance abuse (Ouimette & Brown, 2003) as well. Recent research argues that these shared vulnerabilities are: “characterized by a fundamental non-acceptance of one’s private experience” (Walser & Westrub, 2007, p.11). It is in this way that disorders: “are marked by dysfunctional, avoidant behaviors (sic.) that powerfully and negatively affect one’s life” (ibid.) The active attempt to change or in some way escape internal experiences of emotion, is the central premise of the experiential avoidance notion of PTSD.

Nemeroff et al. (2006) describe the common feature after trauma of people developing negative cognitions about their safety, their self-competence during the event, and the impact of symptoms they may develop. However, they add that for most people, everyday experiences following the traumatic event, tend to correct or mellow extreme cognitions, allowing the person to regain a sense of safety and competence. This assertion is supported empirically by the findings of Cao, McFarlane and Klimidis (2003) in their follow-up study of psychiatric disorder following an earthquake. Their findings showed conclusively that avoidance created disorder, whereas ‘life as normal’
facilitated acceptance and a reconciling of the event. Nemeroff et al, (2006) indicate that people, who use avoidance and emotional numbing in the aftermath of trauma, deny themselves the experiences necessary to correct overly negative cognitions, leaving them with only distorted cognitions related to safety, competence, and the consequences of any symptoms they develop. With specific regards to clinical implications, high levels of avoidance are directly correlated with poor treatment outcomes (Walser & Westrub, 2007).

This model explains the most characteristic symptom of PTSD; that of re-experiencing and reacting to cues that resembles a trauma, and also explains the enduring nature of PTSD. Further, it can be testable, to the extent that trauma and fear can be adequately distinguished. The model assumes individual responses in recognition of cues and of individual neural pathways. However, this model does not explain delayed-onset PTSD, or how people recovery from initial trauma. Finally, the model does not address pre- and post-trauma features that could mitigate responses.

4.5 Behavioural models of PTSD

Calhoun and Resnick (1993) and Jones and Barlow (1990) view behavioural models of PTSD as being based on classical conditioning theory. Over time, and with repetition and reinforcement, responses to one specific stimulus can become associated with other events or situations that usually would not evoke the same response. Previously neural stimuli (non-traumatic events) can evoke responses similar to those evoked by specific (traumatic) stimuli. The principal of generalisation broadens the range of previously neutral responses that can be associated with the original and specific stimuli or event. With regard to trauma, people exposed to traumatic events, and who respond with fear and anxiety, very quickly condition the fear and anxiety
response with other, previously neutral stimuli (Foa, Rothman, & Hembree, 2006). Cues that resemble those of the original event, then produce the conditioned response of fear and anxiety, while avoidance of such cues occurs as negative reinforcement (avoidance of cues results in avoidance of the painful experience of fear and anxiety). Stimulus generalization over time results in an increasing number of cues that become associated with the original event and therefore trigger fear and anxiety, along with the number which become avoided. Cahill and Foa (2007) add that the anger and irritability often seen in male combat veterans with PTSD can be the result of a conditioned response to fear, to evoke the aggression learned in their military training, with these responses reinforced through both positive reinforcement (such as attaining goals) and negative reinforcement (reducing anxiety as a result of aggressive behaviour).

Extinction of conditioned responses, which is well understood in learning theory, is impeded in people with PTSD. Extinction usually requires complete exposure to all components of memory. Bernstein, Penner, Clarke-Stewart & Roy (2006) and Naugle, Bell, & Polosney (2003) argue that the strength of avoidance of trauma-associated cues (due to the strength of the fear and anxiety produced) prevent people from gaining complete exposure to their memories, and extinction is impeded. They may experience some exposure, but avoid complete exposure or the level necessary for extinction to occur. Social support mitigates the fear and anxiety response, and is seen as an important mitigating effect in the development of PTSD. Cahill and Foa (2007) also describe people as having varying degrees of biological predispositions to the learning theory in the aftermath of traumatic events.

This model accounts for most of the characteristic symptoms of PTSD, although Cahill and Foa (2007) contend that learning models cannot adequately explain the presence of generalized exaggerated startle responses in sufferers of PTSD. Variations
in individual responses to traumatic events are the result of different initial responses to trauma. The enduring nature of symptoms can be explained through reinforcement, and recovery from disorder, explained through extinction. However, the extinction of fear should always result in the extinction of avoidance; however, this is not always the case with PTSD. While delayed onset PTSD can be accounted for by increasing generalization over time, until a threshold is exceeded, it still requires an initial response of fear and anxiety and therefore doesn’t really account for true delayed onset PTSD (where there are no initial symptoms). While the impact of pre and post event factors such as predictability and control, personality factors, and social support are acknowledged, the process by which they reinforce and influence the stimulus-response in fear, are not well explained.

4.6 Conclusions

Four brief summaries of the major models of PTSD are presented. All explain the development of the characteristic symptoms of PTSD. However, none fully explains all outcomes with post-trauma reactions, and none fully satisfy the standards for models of PTSD derived from Horowitz (1997), Jones and Barlow (1990), and Brewin, Dalgleish and Joseph (1996). With this in mind, new approaches to potentially explain all facets of PTSD need to be developed or explored. The next chapter will provide background to a personal construct theory, and will then move onto to apply this theory to post-traumatic stress. While personal construct theory has been used very successfully to describe some facets of post-traumatic stress, the development of a comprehensive personal construct psychology model of trauma that could be assessed against the standards developed in this chapter, has not yet been fully developed. In
further chapters, such a model will be proposed, and then tested, to validate the approach. The model will then be reviewed in the light of this validation.
Chapter 5. Personal construct theory of mental health and disorder
In this chapter I will introduce the theory of personal construct psychology originally published by George Kelly in 1955. The fundamental postulate, basic assumptions, corollaries and formal structure of the theory will be described, along with the principles governing everyday life, cycles of adaptation to experience, optimal health, disorder, and emotions. This chapter provides the conceptual base upon which a personal construct model of mental health and psychological trauma will be developed.

Kelly (1955/1991) describes his theory of personality with clinical examples in a two-volume work, the Psychology of Personal Constructs. Kelly's personal construct theory focuses on how individuals form meanings and make predicts about themselves and their worlds, including interpersonal interactions. Central to the theory are the premises that people develop their own unique sets of constructs of the world based on their experiences, and that construing is neither fixed nor absolute. They are individual and can change or be revised over times as a result of experience.

It should be noted that George Kelly will be quoted often, and that in his two-volume work on the Psychology of Personal Constructs, Kelly (1955/1991) uses language that, by the standards of the American Psychological Association (2001), would be considered to have a gender bias. This bias generally appears as use of masculine pronouns such as 'he', to represent both genders. Kelly was primarily writing in the 1950's; even though further articles such as Kelly (1970) and Kelly (1980) were published after his death in 1967. The time of his writing could be generally considered to pre-date the current conventions of the American Psychological Association (2001). It is argued that the bias in his writing is stylistic, and that Kelly's (1955/1991) Psychology of Personal Constructs can be equally applicable to both genders. An example of Kelly's intention to not be gender restrictive in his use of language is him noting that: "when we speak of man-the scientist we are speaking of all mankind and
not merely a particular class of men who have publicly attained the stature of ‘scientists’” (1955/1991: p.4). This passage appears to use ‘man’ or ‘men’ to refer to ‘all mankind’, rather than a sub-set based on gender.

5.1 Fundamental Postulate

Kelly’s (1955/1991) theory of personal constructs is based on a fundamental postulate and 11 corollaries. The fundamental postulate states that “a person’s processes are psychologically channelised by the ways in which he anticipates events” (Kelly, 1955/1991, Vol. 1, 32). How people present to others is determined by the way they anticipate events and themselves and their worlds interacting. Kelly notes that “everything man does follow lines laid down in his effort to anticipate what will happen” (1980: p.26). Therefore, the meanings people ascribe to their pasts, helps them anticipate their futures.

5.2 Constructive Alternativism

Kelly used the term ‘constructive-alternativism’ (1955/1991, Vol 1, p.3) to focus on the ability to review, recreate, and revise, individual construing of the world and events. As there are no absolute meanings ascribed to events, there are a range of possible alternate constructs that people can hold at the same time, or that different people can develop, at different times and with different experiences.

Kelly (1955/1991) describes people testing their expectations of their worlds and events based on their experiences as acting as-if they were scientists. Kelly holds that people can anticipate events through their experiences; test these predictions, revise and reflect on the accuracy or usefulness of their predictions based on experience, test them again, and so on. With each cycle, the construct system develops in much the same
manner as scientific knowledge develops – through repeated speculation, testing and revising, as if undertaken in scientific endeavours.

5.3 The formal structure of construct systems.

Kelly’s theory has 11 corollaries that provide the structure of constructs and construct systems. The first of the corollaries, the Construction Corollary, holds that: “a person anticipates events by construing their replications” (Kelly, 1955/1991, Vol 1, p.35). In other words, people anticipate replications of their experience of past events, through learning from experience.

The second corollary, the Individuality Corollary, holds that: “persons differ from each other in their construction of events” (Kelly, 1955/1991, Vol 1, p.38). People ascribe their own meanings to the events they have experienced and have unique anticipations or replications of events.

The third corollary, the Organisational Corollary, holds that: “each person characteristically evolves, for his convenience in anticipating events, a construction system embracing ordinal relationships between constructs” (Kelly, 1955/1991, Vol. 1, p.3). Constructs are organized in hierarchies, with some dominating or subsuming others. A hierarchy of constructs means that priorities of importance exist between constructs. Where one construct in a system appears incompatible with others, the one higher in the hierarchy usually dominates. Kelly also describes constructs as being either core or peripheral. Core constructs govern people’s sense of themselves and are described by Epting and Amerikaner (1980) as being of central importance in maintaining and developing entire construct systems. Peripheral constructs can be altered without serious modification of the core structure, and are described by Epting and Amerikaner (1980) as those that are usually adapted and revised on a frequent basis.
The fourth corollary, the Dichotomy Corollary, holds that: “a person’s construction system is composed of a finite number of dichotomous constructs” (Kelly, 1955/1991, Vol. 1, p.41). Dichotomous constructs have two poles – usually identified as clearly different to each other by construers. This provides a system in which constructs can be compared to others, based on the similarity or difference between the dichotomous poles of each. The greater the number of pairs of poles available, the greater the number of ways elements can be compared.

The fifth corollary, the Choice Corollary holds that: “a person chooses for himself that alternative in a dichotomized construct through which he anticipates the greater possibility for extension and definition of his system” (Kelly, 1955/1991, Vol. 1, p.45). People choose between the two poles of any construct, the pole that they believe will allow them to extend or reinforce their construct systems. People can exercise free choice in determining which pole of a construct is helpful to them. This concept implies that an event can usually be described as what it is like, as well as what it is different to. In terms of describing how one event relates to another, people tend to use one or other (either describing how one is event is similar to another, or how it contrasts with another). The type of description they prefer (whether a relationship is based on similarity or contrast) is described as the emergent pole of their construing, while the type of description that is not used is described as the implicit or contrast pole. Individuality of construing is based on the choice of pairs of poles (how people describe events as similar to, or contrasting with others) that people make.

The sixth corollary, the Range Corollary, holds that: “a construct is convenient for the anticipation of a finite range of events only” (Kelly, 1955/1991, Vol. 1, p.48). This implies that the constructs people hold to anticipate outcomes in one situation, may apply to some other similar situations, but not to all other situations. There is a range of
events for which constructs can be applied with maximum effect. Outside their range of convenience, constructs lose their usefulness to make sense of events or to anticipate events.

The seventh corollary, the Experience Corollary, states that: “a person’s construct system varies as he successively construes the replications of events” (Kelly, 1955/1991, Vol. 1, p.50). As people construe the replications of events there may be variations in the outcome of what they anticipated. The change in outcomes can lead people to revise their constructs in order to have greater accuracy of predictions in the future. Experience, if it involves re-construing, can lead to variations in peoples’ construct systems and the way they develop expectations. Kelly (1980) argues that experience does change people, and that change can come about a result of revision of the way meanings are made of experiences.

The eighth corollary, the Modulation Corollary, states that: “the variation in a person’s construction system is limited by the permeability of the constructs within whose range of convenience the variants lie” (Kelly, 1955/1991, Vol. 1, p.54). The usefulness to accommodate or make sense of events for which they were not specifically developed is described as the permeability of a construct. Permeable constructs can be applied to a wide range of new experiences, while impermeable constructs can only apply or adapt to a much smaller number of situations for which they were not specifically created.

The ninth corollary, the Fragmentation Corollary, holds that: “a person may successively employ a variety of construction subsystems which are inferentially incompatible with each other” (Kelly, 1955/1991, Vol. 1, p.58). In other words, there does not have to be total agreement between different constructs within people’s construct systems. While the hierarchical ordering of constructs usually sees one
subsume another, this superordinacy of one over another may not be perfect and some conflict between constructs may arise. However, provided any conflict is minor or inferential in nature, it can be tolerated. This process makes construct systems workable as a large number of constructs are bound to include inconsistencies. It also explains seeming inconsistencies (usually minor) in peoples' behaviours.

The tenth corollary, the Commonality Corollary, holds that: “to the extent that one person employs a construction of experience which is similar to that employed by another, his psychological processes are similar to those of the other person” (Kelly, 1955/1991, Vol. 1, p.63). While all construct systems are unique to individuals, there will be some similarities between the construing of different people. Where there is similarity in the ways people construe, there will be similarity of psychological processes. The greater the similarity in construct systems between people, the greater the similarity in their psychological processes, and therefore in the ways they anticipate events.

The eleventh and final of Kelly’s corollaries, the Sociality Corollary, holds that: “to the extent that one person construes the construction processes of another, he may play a role in a social process involving the other person” (Kelly, 1955/1991, Vol. 1, p.66). This corollary holds that people’s ability to construe other people’s construing determines to what extent they can play a role in social interactions with each other. Kelly (1955/1991, Vol. 1, p.67) notes that: “if we can predict accurately what others will do, we can adjust ourselves to their behaviour. If others know how to tell what we will do, they can adjust themselves to our behaviour”. Duck (1982) surmises interpersonal relating as trying to understand how other people construe events, that will in turn, lead to anticipate how other will behave.
This summarises the basic postulate and corollaries of Kelly’s theory of personal constructs. They describe a set of broad structures that develop and change slowly, provides people with their construct of self, which can be construed by other people, allowing for people to compare construct systems and to anticipate how others will think and behave, and therefore interact.

5.4 Person as Scientist

As construing is determined by people’s meaning making rather than definite or absolute meaning, and individual interpretation is based on how they experience events, it makes sense to expect that interpretations could change as people add to their history and diversity of experience. Landfield and Leitner (1980) note that all interpretations are not fixed, but rather, subject to revision. Therefore, constructs systems are not rigid, but rather can be adaptable and reactive to the experiences people have. People can revise their interpretations of old and new events, based on comparing them to a constantly developing set of meanings.

5.5 Construing

Construing involves placing an interpretation, making meaning of events (Kelly, 1955/1991). Interpretation usually compares interpretations of one event with others that have been experienced to determine to what extent the new event is similar to or different from interpretations of events experienced in the past. Landfield and Leitner (1980) described these processes as differentiation and integration, and indicate that construing is a uniquely bipolar process; something is either similar to something else, or different from it. These processes allow people to build up interpretations of new events based on how it is similar to and different from, interpretations of events in their
past. From these comparisons, people make anticipations of future events. The essential reason for construing is to be able to anticipate or provide a better understanding of future events (Landfield & Leitner, 1980).

5.6 Constructs and construct systems

Constructs are the “reference axes, upon which people project events in an effort to make some sense out of what is going on” (Kelly, 1970, p.13), and are ways to distinguish, group, and compare, aspects of events. As people experience life, they will develop complex systems of constructs, based on comparing and contrasting elements of multiple events, making anticipations and having them validated. From this vast array of knowledge, people develop construct systems – structured collections of interpretations drawn from a wide range of experiences, from which to assess and anticipate future events. Construct systems are based on structured collections of constructs.

A construct system is not simply a collection of independent thoughts or ideas. As Kelly (1955/1991) maintains in his fundamental postulate: “each person characteristically evolves, for his convenience in anticipating events, a construction system embracing ordinal relationship between constructs” (1955/1991a, p.32). A construct system has a rationale (convenience in anticipating events) and a structure (ordinal relationships between constructs) that guide people’s conduct (Mancuso & Adams-Webber, 1982: p.25). A construct system is ordered, with some constructs being more comprehensive than others, and some more important to people than others. People have hierarchies of importance and centrality. To change a higher level construct is to cause change in how people anticipate a broad range of events, and therefore how people behave, think and feel. Other constructs may be less important or more specific
than others. These are more peripheral constructs and changes to them do not cause alteration in the core structures of people.

The use of the term 'construct' and 'construct system' tend to imply a deliberate and conscious process. However, Kelly (1955/1991) described constructs as being either verbal or pre-verbal. Verbal constructs are those that we are aware of, can readily articulate, and are readily a part of the prediction and meaning-making process. Pre-verbal constructs are those that people use as part of meaning-making and anticipation yet may not be conscious of, or not have a language with which to easily articulate them (Kelly, 1995/1991). Instead of words, people may use symbols such as postures, objects, people or situations to represent their constructs. Such construing may be less definite and more cumbersome, requiring more interpretation, but they are symbols of construing all the same. In some occasions, there may be no symbol at all available, leaving people feeling, but not having the ability to describe the feelings and construing with the convenience of words. Without conscious awareness or the ability to articulate or understand them clearly, pre-verbal constructs may be more difficult to validate; however, they influence psychological processes in the same way as more verbal constructs and construct systems.

Kelly (1955/1991) described the process of comparing constructs as resulting in either validation or invalidation of the anticipations they have generated. Expectations people develop based on applying their understanding of their worlds are like hypotheses that can be either confirmed or disconfirmed.

While all constructs can provide validation or invalidation, Kelly (1955/1991) describes constructs in ways that indicate that some features of constructs may make validation or invalidation more likely. The first of these features is tightness of construing. Tightness refers to how precise a construct is, and how unvarying
constructs’ predictions. Tight constructs have very specific and unwavering meanings, while loose constructs can be applied with wide variation. Kelly (1955/1991) indicates that tighter constructs can be more easily tested, and therefore may more easily be either validated or invalidated than looser constructs. Conversely, looser constructs are more difficult to either validate or invalidate, as their definitions and applicability are much less clearly defined.

The range of convenience of constructs determines the range of events that can be provided meaning by one construct. Constructs with a wide range of convenience can incorporate and integrate a wider range of things or events than constructs with a narrow range of convenience, reducing how easily they may be invalidated. Therefore, the wider the range the range of convenience constructs have, the less likely invalidation is, and vice versa.

The permeability of constructs refers to constructs that can accept new elements or be applied to new situations for which they were not specifically designed. The greater the permeability of constructs, the more adaptable they are to new experiences, and the less likely invalidation.

Therefore, constructs that are tightly construed have a narrow range of convenience and low permeability, are more likely to be invalidated than constructs that are more loosely construed, have a greater range of convenience, and have less permeability.

Validation and invalidation involves testing the anticipations that people develop as a result of their existing construct systems. These are the experiments that people engage in when they act ‘as-scientists’. They develop hypotheses or predictions about their worlds, based on the meanings they make of the elements of their experiences, and then test these hypotheses through experience and engagement in their worlds. The
outcomes of their experiments are usually either validation or invalidation of their hypotheses. Where there is validation, the hypothesis is confirmed and can be applied with greater confidence in the future in predicting the outcome of events. Where there is invalidation, people need to revise either the process of testing their predictions or the predictions themselves. Revised constructs can again be tested, leading to new outcomes that can either validate or invalidate the new predictions. This process can be repeated over and over throughout life.

Over time, construct systems develop complexity as the number of events that people provide meaning to, also develop in number. As the complexity and number of constructs within a system increases, the likelihood of constructs becoming incompatible or clashing with each other will also increase. These clashes usually involve two or more constructs, developed in relative isolation to each other due to isolated experiences, seemingly resulting in inconsistent or incompatible predictions. These seemingly incompatible constructs are described by Kelly (1955/1991) as fragmented constructs. Kelly’s (1955/1991) Fragmentation Corollary holds that incompatible constructs can be held at the same time, provided that they only differ inferentially. However, where incompatibility between constructs occurs at more than an inferential level, the Fragmentation Corollary is exceeded, and the person will experience a disorder if they cannot resolve the incompatibility. Kelly (1955/1991) indicates that typically, fragmentation is resolved through the use of hierarchies of constructs (where the fragmentation is resolved by one construct assuming more importance than the other), or the use or development of superordinal constructs, that allows seemingly incompatible constructs to co-exist through their relationship of compatibility with a higher order construct.
5.7 Cycles of construing

Kelly described three cycles of construing by which people develop and test new constructs and incorporate events into their construct systems. These are the Creativity Cycle (Kelly, 1955/1991 & Kelly, 1980), the Circumspection-Pre-emption-Control (C-P-C) cycle (Kelly, 1955/1991 & Kelly, 1980), and the Experience Cycle (Kelly, 1980). The first of these cycles, the Creativity Cycle, describes a progression of tightening and loosening of constructs in order to try new ways of predicting and construing events in order to validate the constructs and expand their understandings. Tightening constructs refers to making predictions more exacting and unvarying – they become more specific in order to enable them to be more testable and predictable. The benefit of tightening constructs is that they can more readily be validated or invalidated. However, there is not much leeway to apply tight constructs to new situations – they can be brittle, either standing firm (being validated) or being shattered (being invalidated) easily by the outcome of experience. Loosening constructs refers to making predictions more varied and applicable to a wider range of applications while retaining their identity. The benefit of loosening constructs is that they can be applied to a wider range of circumstances with varying degrees of validation. They may require more effort to test and may have more questionable validation than tight constructs, but can be more adaptable. The Creativity Cycle allows for flexibility in trying new constructs – especially those that at first glance may seem to invalidate or clash with other constructs. Creativity involves suspending immediate decision-making about the construct. Engaging in the Creativity Cycle takes courage; but Leitner and Pfenninger (1994) note that it is necessary for people to allow their construing to become vague, elastic and wavering to provide what they describe as: “the fertile chaos necessary for reinventing” (p.124). Loosening of
construing is necessary for change, but to remain too loose is to create difficulty in being understood by others.

The second cycle, the C-P-C cycle, involves the three steps of Circumspection, Pre-emption, and Control. However, the aim is one of arriving at a decision. Circumspection involves being open to all possibilities that a situation may offer, being able to make and maintain a range of possible predictions from which to choose, rather than having exacting and tightly defined predictions. Pre-emption involves logically narrowing down this range of possible predictions based on what predictions about an event can be drawn from the existing construct systems, choosing one that seems to fit best. Control involves choice and commitment to one of the range of the possibilities. It involves control, decision making, and testing the pre-empted construct, resulting in either validation or invalidation of the chosen and tested construct.

The third cycle is the Experience Cycle. The five steps involve people proactively and deliberately experimenting to test constructs. The steps are: anticipation, investment, encounter, confirmation, and revision. Anticipation involves making predictions about the future based on existing constructs. Investment refers to how much people want to test their predictions. Sometimes people are keen to test their predictions and to do so is of great importance or urgency. However, at others there will be less interest, or the possibilities of the prediction will be relatively unimportant. Further, they may just not want to know through fear of the possibilities. Encounter, is mostly the scientific endeavour of assessing the adequacy of predictions by comparing them with the reality of experience of the world. Confirmation refers to the outcome of the experience of encounter – whether anticipations were validated or invalidated. Finally, during the revision stage, the original prediction is revised in the light of confirmation, with the prediction either being retained and incorporated into a revised
construct system to help future anticipations and predictions with perhaps even greater confidence; or rejected as invalid and continuing to require review. This process can be repeated, with invalidated predictions being replaced and revised again and again. Kelly (1970) describes peoples' experiences as not being assessed by the number of events they experience, but rather, the investments they make in anticipating, and the revisions following the outcome of their experiences.

5.8 Psychological disorders – not adapting to invalidation

Kelly defined a disorder as “any personal construction which is used repeatedly in spite of consistent invalidation” (1955/1991, Vol. 2, p.193). Psychological disorders occur when people’s anticipations of their worlds are not validated by their experiments and experience, yet they keep using them without varying or developing them in line with their experiences. There are several ways in which these disorders can develop.

Warren (1992) describes people who fail to complete the Creativity Cycle, the C-P-C cycle, or the Experience Cycle, in the face of invalidation of construct systems, as displaying disorder, as they fail to change their construing to avoid invalidation. Disorders of the Creativity Cycle are due to an inability or unwillingness to tighten and loosen construing, in order to try new ways of seeing things in ways that can be validated or invalidated. People may be stuck with constructs that are either too loose or too tight to incorporate new elements of constructs resulting from experience. Kelly (1955/1991) described constriction as a form of tightening of construing, whereby people reduce the boundaries of their perceptual fields, limiting themselves to only one issue at a time and avoiding any potential relationship between constructs and issues. Constriction is a process designed to avoid the anxiety of invalidation and fragmentation, by effectively seeing only one issue or construct at a time, and in
isolation of other constructs that may invalidate the first. This allows invalidating constructs to exist seemingly without anxiety and disorder. However, isolating construing, or limiting awareness of invalidation or fragmentation limits awareness of invalidation, and therefore also reduces the likelihood of people seeing any need to undertake the construct revision necessary to resolve the initial invalidation or fragmentation. Constriction is only a temporary fix to anxiety, and results in people’s world effectively shrinking and being firmly delineated, to avoid awareness of the invalidated or fragmented constructs.

Disorders related to the C-P-C Cycle involve not being open to all possibilities in a situation during circumspection, not closing on likely alternatives during pre­emption, and not being prepared to change constructs in the face of invalidation during the control phase. Disorders of the C-P-C cycle would be disorders of decision making – with people person unable to make decisions based on circumspection and pre­emption, or not being able to control the testing process.

With the Experience Cycle, disorders can result from failure to complete any of the five phases, with this inhibiting the completion of the whole cycle of learning from experiences. During the anticipation phase, people may not have, or may not develop, curiosity about predictions of events – they just let things happen without understanding or anticipation. During the investment phase, people might not get involved in wanting to validate a prediction – they may be unable or unwilling to engage in validation processes, and opt out. During the encounter phase, people may not get actively involved in anticipation or may not make predictions that are consistent with their construct systems or experience. During the confirmation phase, people may not accept disconfirmation obtained during an encounter, attempting instead to try to force the outcome to fit the prediction rather than accept the fallibility of their predictions.
Finally, during the revision phase, people may continue with, and justify, their old expectations despite invalidation arising from encounters.

As each of the cycles involves the development of new constructs, disorders involve the inability to develop new constructs - continuing to use old constructs despite invalidation. However, failure to develop new constructs may not necessarily be a problem. Disorders may only develop if people, who cannot develop new constructs, encounter events that invalidate their existing construct systems; and even then, the resulting invalidation or fragmentation would have to exceed the inferential level of incompatibility described as being tolerable in the Fragmentation Corollary.

Personal construct theory infers that the ongoing testing and development of constructs is the norm for people. Further, to not engage in these testing and validational processes leads to psychological disorders. Kelly (1955/1991) used the concepts of validation and invalidation to describe the two outcomes of anticipation and experimentation with the anticipation either validated or invalidated. However, Walker (2002) describes a third possible outcome; that of non-validation. Non-validation is viewed as non-engagement in the process of validation and may result in disorder if constructs are used despite them not being validated. Validation is most commonly avoided when people fear the possible outcome of engaging in testing their hypotheses. If people withdraw from, or refuse to engage in the Creativity Cycle, the C-P-C Cycle, or the Experience Cycle, they will be left only with their anticipations without any confirmation of the usefulness of their anticipations - the anticipations will not be validated or invalidated. However, people may prefer to maintain this uncomfortable state to the potentially more uncomfortable state of having their anticipations disconfirmed, and need to engage in cycles of transition. Specifically, Walker (2002) described nonvalidation in the experimentation process, when people circumspect
endlessly, rather than developing firm constructs, making only loose predictions rather than formulating testable hypotheses. They also act with hostility, trying to force the world to fit their loose predictions rather than making tighter constructs, misreading or ignoring other people's reactions rather than evaluating the outcome of their experiments, and being dogmatic rather than acting according to the outcomes they observe. The process of non-validation, like that of disorder described by Warren (2006), impedes the process of experimentation and adventure, avoiding the possible outcome of invalidation.

5.9 Emotions related to invalidation and transition

Kelly (1955/1991) argued that the outcome of constructs being invalidated by experiences results in the experience of emotions of transition. These emotions are indicators of the need to manage invalidation and will continue to exist for as long as invalidation remains unresolved. Further, the type of constructs that are invalidated will indicate the type of emotion that will result. Kelly (1955/1991) described the following as 'emotions of transition' (in this order), threat, fear, anxiety, guilt, aggressiveness, and hostility.

Kelly (1955/1991) described threat as: “the awareness of an imminent comprehensive change in core structures” (Kelly, 1955/1991, Vol. 1, p.391). Core structures are those that govern people's self-maintenance processes – they provide construing that is consistent with self and provide the degree of personal significance of events (Kelly 1955/1991). Therefore, a threat to core constructs is an imminent threat to change completely how a person views and makes sense of the world – leaving people without the ability to anticipate future events as meaningful to them, or in ways that are consistent with their construing of their own identities. Landfield and Leitner (1980)
note, that while changes to core-construing will have far-reaching implications, they are not always negative. However, it will result in dislodgement from a person’s central system of meaning, leaving the person vulnerable.

Fear, a lesser emotion, is: “the awareness of an imminent incidental change in core structures” (Kelly, 1995/1991, Vol. 1, p.391). This emotion is similar to threat in that it has a sense of immediacy and impacts on core construing. However, the change it may bring is less comprehensive, and may leave some aspects of construing and personal significance unchanged. Therefore, while the change is just as imminent and involves the same core construing as threat, the degree of change expected with fear is incidental, leaving much of the core constructs unchanged.

Kelly (1955/1991) described anxiety as: “the awareness that the events with which people are confronted lie outside the range of convenience of their construct systems” (1955/1991, Vol. 1, p.391). It is the awareness that existing constructs do not adequately apply to the world around (Landfield & Leitner, 1980). Anxiety requires awareness by people, of constructs in their construct systems, and of their applicability to making sense of the world. If construct systems are insufficient to fully make meaning out of an event, anxiety will result. McCoy (1977) adds that it is not just invalidation or awareness of invalidation that causes anxiety. Constructs must also be abandoned as inadequate, in the light of invalidation if there are no new constructs to replace them. While unpleasant, McCoy (1977 & 1981) argues that anxiety is a necessary precondition for making revisions in the construct system, as it is an indicator of peoples’ need for change. Anxiety is similar to threat, although constructs resulting in anxiety are lower in their hierarchies of constructs than threat; and whereas threat involves invalidation of core-construing, anxiety usually involves invalidation of non-core construing.
Kelly (1955/1991), described guilt, as: “the awareness of dislodgement of the self from one’s core role structure” (Vol. 1, p.391). This emotion results from people’s awareness that their sense of themselves is not what they believed it to be, they have not acted in accordance with their core role, or have done something that is perceived as being in direct contradiction to their central roles (Landfield & Leitner, 1980). Bannister (1977/2003) adds that guilt is not simply the result of people behaving in ways that defy social norms, but comes from having misread themselves. People may not readily recognize dislodgement. However, if they behave in ways that reflect these changes, they will come face to face with contradictions from their usual self, leaving themselves unsure of how to predict their future behaviour.

Hostility is defined by Kelly as: “the continued effort to extort validational evidence in favour of a type of social prediction which has already been recognized as a failure” (1955/1991, Vol. 1, p.391). People try to force their worlds to fit their predictions when those predictions have been invalidated by experience, often through anger or manipulation, rather than revising their invalidated hypotheses to suit the evidence that they have received by experience. Bannister (1977/2003) describes hostility as resulting from people being unwilling to face up to the need to change and develop new constructs in the face of invalidation. People may have not have palatable alternate theories, may have invested too much in existing constructs to abandon them easily, or be unable to tolerate the temporary chaos that abandoning existing construing would bring. In these cases, people may prefer to bully people, ‘cook the books’ and torment others in order to gain apparent validation for their construct systems threatened with invalidation. Cummins (2003) described hostility and anger as expressions of invalidation, indicating the need for change.
Kelly described aggressiveness as: "the active elaboration of one's perceptual field" (1955/1991, Vol. 1, p.391). He also described people who: "set up choice points in their lives" (1955/1991, Vol. 1, p.375), where they need to elaborate, decide and act. In personal construct theory aggressiveness is not viewed as negative, as it might be in general usage. Rather, aggressiveness is active and deliberate engagement in the processes of construing and reconstruing when needed to develop new constructs. Bannister (2003) describes aggression as risking commitment to the unknown, in order to undertake elaboration. In this regard, aggression is a sign of people's commitment to resolve disorder through reconstruing.

While Kelly (1955/1991) described these six emotions of transition, McCoy (1977) argues that only four (anxiety, threat, fear and guilt) are emotional states, with aggression and hostility described as behaviours that result from emotional states. McCoy (1977 & 1981) also describes a broader range of emotions of transition than Kelly, that include threat, fear, bewilderment, doubt, guilt, shame, contempt or disgust, anxiety, sadness, and anger. McCoy describes positive emotions as those arising from validation of construing and negative emotions as those arising from invalidation. While positive emotions can lead to mental health, and negative emotions can lead to disorder, they do not describe pleasure or distress respectively; but rather validation-seeking or invalidation, respectively. While the terms 'positive' and 'negative' often imply happiness and distress, they are not used in this way by McCoy. Further, it is not only validation that provides positive emotions; but the process of moving to resolve invalidation and integrate constructs, through reconstruing through the cycles of transition. This compliments Kelly's (1955/1991) definition of disorder as the continued use of constructs that have been invalidated by experience. Hence, mental health and
disorder, while linked to emotions of transition, are not intrinsically linked to pleasure or distress.

The full list of emotions described by McCoy (1977) include emotions related to core structures, non-core structures, fit of self and core structures, fit between own core structure and others, recognition of construct system functionality, and behaviours associated with emotions. Her list of emotions increases Kelly’s (1955/1991) original list of emotions of transition, to seventeen.

In describing behaviours associated with invalidation, McCoy (1977) follows Kelly’s (1955/1991) view that hostility is a process of trying to force validation without making changes in construing, while aggressiveness is the seeking out of elaboration to resolve invalidation. Mascolo and Mancuso (1992) describe emotions of transition as functioning to preserve functional equilibrium between events and construct systems. However, this equilibrium does not need to be perfect. The fragmentation corollary indicates that ‘inferential’ fragmentation can be tolerated (Kelly, 1955/1991), and Mascolo and Mancuso describe an ‘adaptive’ equilibrium between events and construct systems, where discrepancies between events and construct systems are reduced to a subjectively optimal level. Emotions of transition, therefore, lead to actions to reduce fragmentation and invalidation, which in turn, reduce the experience of emotions of transition.

In addition to the specific and discrete emotions of transition described, the disorder of depression could also be included as it involves emotional experiences in response to invalidation. Neimeyer (1985) describes constriction as one of three responses to invalidation, aiming at reducing the anxiety of invalidation through reducing the perception of boundaries of perception to such an extent as to have awareness of only specific elements, but not the relationships between them. The
process of constriction results in people developing highly polarized, construct systems. Constriction leads to them priming themselves to only extract negative information from experiences (including construing of the self), forming global and undiscriminating emotional judgments, and construing themselves as different to other people. Further, Neimeyer indicates that constriction can develop into depression. While using highly polarized construct systems, depressed people don’t only stick to one construct pole; rather they change poles frequently, as a result of ambivalence, or in order to order to constrict their system further (to avoid reconstruing). Neimeyer then indicates that negative self-construing correlates with the vegetative and emotional responses associated with depression (sleep disturbance and feeling sad). Therefore, while more complex than a single emotion, depression involves a significant experience resulting from invalidation, and indicating the need for reconstruing. As such, it appears the serve the same function as emotions of transition, and will be included along with them.

This provides a range of emotions related to invalidation which indicate a need for construct revision. If invalidation relates to core structures, threat and fear will result. Emotions related to invalidation of non-core structures include anxiety, bewilderment or doubt.

McCoy (1977 & 1981) indicates that emotions can relate just as much to validation of construing, with love and happiness the result of validation of core structures, and satisfaction and complacency the result of validation of non-core structures, with contentment the result of the awareness of this validation. So while emotions of transition are indicators of invalidation, positive emotions are indicators of validation.
Kelly’s (1955/1991) descriptions of specific emotions may differ from more generally accepted meaning of the same terms, and it may be that Kelly’s descriptions of emotions are focused on the processes that lead to emotions, rather than to the experiences of emotions. For example, Kelly describes guilt as: “the awareness of dislodgement of the self from one’s core role structure” (Vol. 1, p.391). It seems unlikely that people may actually experience or to describe experiencing dislodgement of their self for their core roles. Rather, they are more likely to experience a sense of responsibility and regret for committing a wrongdoing. However, the process leading to sensing a responsibility and regret for committing a wrongdoing may stem from awareness of a pre-verbal construct of dislodgement from their core roles. In this sense, Kelly’s description of emotions may be less focused on the experience of emotions, than on the processes leading up to the experience of the emotion.

Kelly’s (1955/1991) description of aggressiveness is also seemingly at odds with the more commonly usage of the term. Kelly describes aggression as: “the active elaboration of one’s perceptual field” (1955/1991, Vol. 1, p.391) and implies that aggressiveness is an essential process and indicator of for positive mental health. However, aggression is commonly recognized as: “the act or practice of attacking without provocation”, “beginning a quarrel or war”, “an unprovoked attack”, or as a psychological state including a “hostile or destructive tendency or behaviour”. These descriptions are clearly negatively constructs that appear manipulative and more indicative of disorder than positive mental health. However, this same reference also describes aggression as being: “self-assertive” and “forceful”. These last two definitions are more consistent with Kelly’s view.

These differences go beyond mere semantic differences and suggest that Kelly’s (1955/1991) usage of language regarding emotions may be tapping into different
constructs those in common usage, rather than simply being a different explanation for the experiences of people. In the case of guilt, Kelly appears to construing the process that leads to the experiences of an emotion, rather than describing the actual experience. With aggression, while Kelly appears to be describing an intent that is consistent with common usage, this consistency is very limited, and in general, the use by Kelly and general usage are at odds.

5.10 Optimal mental health in personal construct theory

Epting and Amerikaner (1980) describe optimal health as resulting from completion of the Experience Cycle. Optimal health does not sit as a mid-point between good and bad functioning and is not the norm. Rather, it is a lofty goal to achieve, akin to achieving a transcendence of self. Epting and Amerikaner consider that, in addition to the completion of Experience Cycles, a construct system that has developed hierarchically and has relatively stable core constructs (those that provide people with their sense of identity) and with little stress placed on them (with change only being necessitated in peripheral constructs) has optimal functioning.

Similarly, Walker and Winter (2005) reflect on the complexity of describing optimal functioning or good mental health. From this perspective, they summarise optimal health as the ability for people to engage in cycles as if they were scientists, testing and revising their construing based on whether or not their construing leads to validation when it is tested. Further, they note that the process of validation is interpersonal in nature, it is more complex than appears on the surface, and that validation varies in importance depending where people are developmentally. Kelly (1980) adds that people change themselves through experience. This indicates that it is the ability to change as a result of experience that is considered an indicator of mental
health. Further, change and mental health are viewed as unique ways of linking the past and present, with valid anticipations of the future.

As noted earlier, Kelly (1955/1991) viewed people as acting as if they were scientists, making predictions, testing the utility of these predictions, adjusting their knowledge base according to what they learned, and then making new predictions to test, based on this developed knowledge and anticipations. Important to this process, is whether or not people's anticipations are validated or invalidated as a result of their experiments in life. If predictions and anticipations are validated, meaning-making is confirmed, reinforcing the original construct. If predictions and anticipations are invalidated, people need for revision of their construing. This process requires them to be actively involved in the experimentation process – testing the anticipations they make. These processes may not be as overt and deliberate as scientists in their laboratories, but their outcomes help to revise and develop knowledge and predictions in the same way.

Leitner and Pfenninger (1994) consider that optimal functioning involves the ability to interact in intimate interpersonal relationships. They note that: “constructs are formed out of a dynamic interaction between the person and the world” (Leitner & Pfenninger, 1994, p.125), and cannot occur in a social vacuum. Therefore, the ability to interact with other people is essential for construing. Leitner and Pfenninger argue that there are nine aspects of interpersonal functioning that are essential for optimal functioning. These are discrimination, creativity, responsibility, openness, commitment, courage, forgiveness, and reverence. Leitner and Pfenninger contend that these aspects are an elaboration of empathy, or understanding of the construing of others, which could also be seen as the embodiment of the Sociality Corollary.
Mascolo and Mancuso (1992) describe mental health as an 'adaptive' equilibrium between events and construct systems, where discrepancies between events and construct systems are reduced to a subjectively optimal level. This means that people recognize invalidation when it occurs, and move toward resolving this and maintaining relative (but not necessarily complete) integration of constructs. They stress that mental health is a process of managing invalidation and moving toward integration, rather than only a state of achieving complete integration. This view of mental health is compatible with Kelly's (1955/1991) view of disorder, (which can be assumed to be at the opposite pole of a mental health – disorder continuum), where invalidated constructs are not addressed and replaced (and may not even be recognized), but maintained and repeatedly used, perpetuating the emotions of transition.

5.11 Conditions for the formation of new constructs

The three cycles of transition describe what happens when people revise or develop new constructs, with emphases on creativity, experience and decision making. Kelly (1955/1991) also describes the conditions that are favourable for the formation of new constructs along with conditions that are unfavourable; in other words those conditions facilitating or hindering engaging in the cycles of construing.

Favourable conditions include the use of fresh elements, experimentation, and the availability of validating data. New elements involve people having access to new experiences from which to derive new constructs, and might take the form of input from other people, or focusing on some aspect of a different construct that could be applied to the current situation. They involve being able to access different ideas from different sources. Experimentation is the ability to engage in the cycles of construing described above (Creativity, C-P-C, and Experience Cycles). People need to have knowledge of,
be willing to, and feel capable of, going through these cycles and what they require. Further, they need the tools and environment in which to undertake the experiments they need. People need data with which to validate their predictions. There is little benefit to undertaking the process of experimentation if the outcomes of the experiments are not known or cannot be known. Whether or not validating evidence is available is essential to determine whether people's anticipations can become constructs rather than just predictions.

Unfavourable conditions include threat, preoccupation with old material, and no 'laboratory' in which to change the cycles of revision. Threat is considered to be the most important of these processes, and involves incompatibility between new constructs and constructs high in the hierarchy, with consequences for an imminent and comprehensive change in people's core structures (Kelly, 1955/1991). Incompatibility with constructs high in the hierarchy will be comprehensive, and therefore, threatening. Threat may result in construct revision being deferred or denied, if the threat of comprehensive change is greater than the desire to review or develop new constructs. The threat of comprehensive change can limit people's willingness to engage in the process. Preoccupation with old material refers to not being open to new information or not having access to new information from which a new prediction could be developed and tested through experimentation. It could include being stuck with constructs that have been made redundant through experience, rather than being open to new ideas that might accompany new experiences. Being preoccupied with the old impedes acceptance or development of the new, or of engaging in the process of construct review and revision. As the laboratory is essential to scientists, so it is to people-as-scientists. A laboratory is a controlled place for people to test hypotheses. It must have the elements required to test out the predictions. As many of the hypotheses people make are social
hypotheses, based on what they predict people will do, the laboratory required to experiment, is a social laboratory.

In addition to these conditions, Epting and Amerikaner (1980) add that interpersonal relationships can facilitate or inhibit movement from loose to tight construing, and are therefore a condition related to completing the Creativity Cycle. They describe as important, the striving of people to see the world from the point of view of other, and of the gaining of new understanding from this process. Leitner and Pfenninger (1994) add that construing does not happen in a social vacuum, but relies on a dynamic interaction between people and their worlds to take place.

Tschudi and Rommetveir (1982) describe disorders as being problems of interpersonal relating. They maintain that: "disregard of others' constructions may be associated with untold terror" (p.261), and that psychologically: "failure to arrive at inter-subjectivity and shared social reality is at the heart of clinical problems" (p.249). These opinions indicate that the ability of people to access and use interpersonal relating to help their experimentation, validation, and reconstruing, are important conditions impacting on disorder or mental health in the face of experience.

5.12 Conclusion

This chapter provides a description of George Kelly's theory of personal constructs. The fundamental postulate, the underpinning stance, and the formal structure of the theory in its general usage, along with disorder, mental health and the process of recovery from disorder have been described. Having described personal construct psychology in general terms, I now move on to apply the theory to understand mental health and disorder in the aftermath of exposure to extremely stressful or traumatic events.
Chapter 6. A personal construct psychology model of maintaining mental health following potentially traumatic events.
In this chapter I apply Kelly’s theory of personal constructs to the understanding of mental health and psychological trauma. A personal construct model of maintaining mental health following psychological trauma, based on the work of Sewell, is presented and reviewed.

6.1 Propositions derived from personal construct theory and mental health following exposure to potentially traumatic events.

From the general theory of personal constructs and the specific applications of the theory to the fields of mental health and psychological trauma come several propositions that can be developed into hypotheses, operationalised, and tested.

I. **People form construct systems** that they use to establish stable predictions about future events and to understand new events. These processes develop with a variety of levels of awareness.

II. **Construct systems have hierarchies**, with constructs higher in the ordinancy having more importance than those lower in the hierarchy. The most important constructs (superordinate constructs) are those related to processes that govern self-maintenance.

III. Events usually considered to be potentially traumatic usually involve construing an imminent risk or confrontation with threatened death or personal safety, with a high level of awareness. Construing imminent death or safety involves construing processes that govern personal maintenance. Therefore, traumatic events are those that impact on ‘core-constructs’.

IV. The two main outcomes from initial comparisons between existing construct systems and constructs of traumatic events are: **validation of construing or**
fragmentation at no more that an inferential level; and invalidation of construing or fragmentation at more than an inferential level.

V. Validation will result in positive emotions, while invalidation or fragmentation will result in emotions of transition.

VI. Invalidation results in a range of emotions of transition, each reflecting different types and levels of constructs invalidated.

VII. Severe invalidation or fragmentation prevents comparison between trauma-specific construing, and construing of other events in existing construct systems. This prevents trauma specific constructs from becoming construed as a historical event. Rather, traumatic events are construed as ongoing and current events, with ongoing emotions of transitions. They are in effect, frozen in time, and continue to be construed as threatening events.

VIII. Comparisons between construing of events and existing construing systems may be an ongoing or repeated process, especially if there are new constructs of the event developed over time, or ongoing invalidation or fragmentation beyond an inferential level.

IX. Construct review and revision through successful engagement in cycles of transition (until invalidation or fragmentation is resolved) is the usual and mental healthy response to potentially traumatic events.

X. Disorder is the repeated use of constructs that have been invalidated or fragmented beyond the inferential level, or inability to successful complete cycles of transition when needed, and will be associated with the ongoing presence of emotions of transitions and the absence of positive emotions.

XI. The main cause of inability to complete cycles of transition following trauma, is constriction of construing. Constriction refers to narrowing of fields of awareness to
only focus on one at a time, of two or more invalidating or highly fragmented construct systems, in order to avoid the anxiety of awareness of the invalidation.

XII. Dilation of construing is necessary in order to resolve disorder by engaging in, and completing cycles of transition.

XIII. Interpersonal relating mediates successful completion of cycles of transition as a major condition for the formation of new constructs, and is therefore associated with mental health and disorder.

XIV. As core-construing (construing governing self-maintenance processes) is involved in potentially traumatic events, and core-construing is superordinal, it could be expected that ongoing invalidation or fragmentation of superordinal construing will result in disturbance in most subordinate areas of construing.

6.2 Personal construct theory and psychological trauma

Throughout this chapter I consider the definitions of traumatic events provided in Chapter 2 (from the DSM-IV and ICD-10). This includes people having experienced, witnessed or having been confronted by actual or threatened death, serious injury or threats to the physical integrity of self or other, combined with reactions including intense fear, helplessness and horror. Traumatic events threaten people’s existence, safety, and identity, either directly though experience, or through witnessing or being confronted by, or through identifying with other people’s experiences.

Butt (2006) indicates that the person-as-scientist metaphor means acting ‘as-if’. Therefore, good persons-as-scientists could act ‘as-if’ it were them that were experiencing what the victim they see or are confronted with is experiencing. Further, Kelly’s Commonality Corollary holds that: “to the extent that one person employs a construction of experience which is similar to that employed by another, his
psychological processes are similar to those of the other person” (1955/1991, Vol I: p.63). This corollary indicates that if people construe experiences of a traumatic event in similar ways to one another, they will have similar psychological processes and therefore, similar reactions to the event. When people identify with, and therefore employ similar construing of events, they can identify with the imminent comprehensive change of others, and therefore share the imminent nature of comprehensive change to core structures required for Kelly’s (1955/1991) description of threat.

In his two-volume work on the psychology of personal constructs, Kelly (1955/1991) did not provide a comprehensive account of psychological trauma, but described what appear to be accepted negative aspects of trauma such as people freezing in their tracks and reverting to, and applying, constructs that have been invalidated by previous experiences. Kelly (1955/1991) held that, as there are no intrinsic or absolute meanings to any event, traumatic events may be similar to other events in life, as opportunities for people to test their existing construct systems. Events considered by some people to be traumatic, can be validating to others, if they provide subjective documentation or proof of the validity of their existing construct systems.

A personal construct theory account specifically concerning psychological trauma was first proposed by Sewell (1996). Disorders following trauma were described as resulting from people being unable to develop or use overarching or superordinal constructs to integrate trauma-specific constructs and existing construct systems. Without superordinal constructs to overcome the fragmentation of seemingly incompatible and invalidating constructs, people can use two or more construct systems incompatible and mutually invalidating construct systems; one based on experience up until the event, and the other, based on the event itself. Whenever two or more mutually
incompatible and invalidating construct systems exist and are used, people will have
difficulty making meaning of experiences in their lives (and understand is what ways
they are similar to, and different from, other events in their lives) and making stable or
consistent anticipations of future events. They may alternate between construct systems
without continuity or consistency. Presumably, the higher in people’s hierarchy of
constructs that fragmentation or invalidation occurs, the greater the impact on people
will be.

Sewell, Cromwell, Farrell-Higgins, Palmer and Patterson (1996) developed this
concept, adding that recovery from PTSD is contingent on people developing and
integrating the trauma-related isolated construct subsystems into an entire construct
system. They tested this theory with Vietnam veterans, indicating that there were
differences with regard to the impairment of integration of construing between Vietnam
veterans with PTSD and controls. Veterans with PTSD were also unable to establish
hierarchies of construing that could resolve the fragmentation between trauma-related
construing and existing construct systems.

Cromwell, Sewell and Langelle (1996) noted that impairment of integration of
trauma-related constructs with existing construct systems was due to a lack of
associative or transitive propositions. Traumatic events produce constructs that are so
different to existing experience that people may not be able to develop the associative
constructs necessary to link trauma-specific constructs with their existing construct
systems; nor the superordinal or hierarchical constructs necessary to overcome
fragmentation. Without consistent construct systems that include trauma specific
constructs and existing construct systems, people cannot make meaningful, valid and
consistent stories of what happened to them. Further, they cannot compare or
distinguish traumatic events from other events that they have construed as past or
historic events. Without being linked to the constructs of time or past, traumatic events cannot be construed as past events and remain “frozen in time” (Cromwell, Sewell & Langelle, 1996: p.193) as ongoing current events. Finally, the lack of constructs necessary for people to make a valid and meaningful narrative of what happened to them during the traumatic event leads to intense anxiety.

Sewell and Williams (2001) view trauma as the inability of people to understand both the emergent and implicit poles of their constructs related to trauma and their existing constructs. Without understanding both poles, they cannot fully compare trauma related constructs with their existing construct systems and develop alternate narratives. Sewell and Williams argue that if their emergent poles of existing constructs system are invalidated by trauma, it is the understanding of the implicit poles of their existing construct systems, and the flexibility and complexity of these systems that will determine whether or not they can develop new constructs that integrate trauma-specific and existing construct systems. Unfortunately, people are often less aware of the implicit poles of their construing than they are of emergent poles, and less able to bring them to awareness and application. Without awareness of the flexibility or complexity of the implicit poles of their construing, people will be unable to fully develop narratives that make sense to them, of events and experiences or distinguish trauma experiences from everyday non-traumatic experiences. They will be left with the invalidated emergent poles of their construing - and the validated emergent poles of trauma related constructs - leaving them to react ‘as-if’ there were trauma all around. With only invalidated emergent construct systems, people are unable to establish the associative or transitive propositions; described by Cromwell, Sewell and Langelle (1996) as necessary to link constructs related to traumatic events and their existing construct system. They are left with invalidation that they cannot overcome.
To recover from trauma requires people to elaborate their construing, bringing to awareness and understanding the implicit poles of their construing, applying both poles to develop alternate stories of the event and the senses of themselves, and incorporate the existing construct systems and trauma specific construing.

Sewell and Williams (2001) developed this further, noting that traumatic experiences disrupt the way people construe all events, along with how they construe themselves and interpersonal relationships. They argue that while people need to be aware of, and understand, both emergent and implicit poles of their construing in order to make meaningful stories of their experiences, verbal behaviour (talking) is more associated with emergent poles rather than implicit poles. Therefore, people may favour the emergent pole of their construing and not be able to easily articulate implicit poles through verbal communication. Again, they note that it is people's ability to fully understand how trauma is similar to, and different from, other experiences in their lives that determine whether constructs can be integrated. Full understanding requires awareness and application of both emergent and implicit poles of their construing. Sewell and Williams are consistent with Kelly's (1955/1991) view that traumatic events do not have to always have negative effects, and that growth is a possible outcome from trauma; however, it requires elaboration of constructs systems through extending and reintegrating constructs related to the trauma and existing construct systems.

Sewell describes trauma as: “an extreme experience that cannot be construed in relation to other life experiences (that) often creates a fragmented trauma-related construct subsystem” (2003, pp.223-224). Without associative constructs, trauma-specific constructs are left isolated and stand-alone. This means that trauma-specific constructs and existing construct systems remain mutually exclusive with no means to link them to other experiences in people's lives. If this exclusivity leads to invalidation
of core construing (constructs that govern self-maintenance processes) or fragmentation of construing beyond an inferential level, the negative impact of trauma will be experienced.

Sewell (2003) describes people suffering PTSD as being stuck in the construal of experience around one or two core constructs (such as good versus bad or in-control versus out-of-control). Further, those with PTSD construe themselves and the world in ways that may be validated only by the experience of a specific event (a traumatic event), but not by the rest of the world or their experiences. What they learn about themselves and the world through traumatic experience differs from what they believed about themselves and the world prior to the event. This learning leads to alternating between conflicting construct systems, resulting in difficulty making confident and consistent predictions about themselves, their social interactions, and their future experiences. Sewell (2003), like Sewell, Cromwell, Farrell-Higgins, Palmer and Patterson (1996), contends that recovery relies on the ability of people to create new and varied hierarchically abstract relationships between trauma constructs and the rest of their construct systems.

Sewell (2005) adds to this account by defining trauma as a disruption in peoples’ construing of events and of themselves in two ways. Firstly, trauma impairs people’s ability to establish cause-and-effect relationships, leading to losses of predictiveness of causation in the future, and resulting in the experience of chaos and loss of control. Secondly, trauma disrupts peoples’ understandings and experiences of their social relationships and how they relate to other people. Sewell argues that when both are disrupted, people can be said to be traumatized. This model of trauma is based on outcomes to individuals and their social world, rather than on the being based on the types of events that could trigger these responses.
The essential features of the personal construct approach to psychological trauma presented is that people are unable to resolve significant fragmentation between existing construct systems and constructs developed from a specific traumatic event. The result is that people are invalidated as construers – they are unable to make meaningful and believable stories of themselves, their experiences and their social relating. Further, people may alternate between the extremes of their incompatible emergent poles, creating instability or inconsistency in anticipating and validating constructs. One outcome of the fragmentation between trauma-specific construing and existing construct systems results in trauma specific constructs is the inability to utilize the constructs of time, history or past that are used with existing construct systems. Without utilizing constructs of time, past and history with which to compare traumatic constructs, the event is left as an ongoing current event that continue to influences peoples’ prediction of their futures. People’s abilities to elaborate their constructs may be compromised by the relative dominance of the emergent poles of constructs related to the trauma constructs over the implicit poles of trauma constructs and inability to clearly bring into awareness the implicit poles or their constructs. To recover, or to integrate trauma specific construing, requires people to bring to awareness the implicit poles of their construing. This increases the likelihood of integration through the development of associative constructs and hierarchical connections between constructs.

6.3 Models in Personal Construct Psychology

Prior to developing a model of mental health and psychological trauma, standards by which such models can be judged should be clearly stated. In Chapter 4, I introduced standards for models of psychological trauma, derived from Horowitz (1997), Jones and Barlow (1990), and Brewin, Dalgleish and Joseph (1996). Standards
also exist for personal construct models, and should equally apply to a personal construct psychology model of psychological trauma. These two sets of standards interact with one another and provide the structural standards along with the experience-specific standards against which a personal construct model of extreme psychological stress can be judged.

6.3.1 Standards for personal construct models

Viney (2006) describes models as a set of conceptual propositions that enable clinicians to make generalizations from one client to another, and from one community to another. They prevent people from being overwhelmed by the complexity of theories, make theories accountable for real life situations and events, provide new ideas for practitioners, provide more appropriate and specific definitions of the concepts contained in a theory, check that information gathered is relevant to the theory, and help make predictions based on the theory.

In establishing these principles, Viney (2006) establishes six standards for personal construct models. Firstly, models must be firmly based in this theory. Secondly, models should be easy to comprehend and expressed using as few concepts as possible. Thirdly, models should be internally consistent without any propositions in conflict with others in the model. Fourthly, models should be parsimonious or frugal; (they should contain maximum information with the minimum of propositions). Fifthly, models should deal adequately with the psychological events of focus and whatever physical, psychological, historical and contextual events are relevant in applying the model. Finally, models should be comprehensive and specific; they should be broadly-based enough to include all relevant events, yet still be precise enough to use to make
valid predictions. These standards will be later applied to a personal construct theory model of mental health associated with psychological trauma.

Having posed a personal construct psychology model of mental health in the aftermath of potentially traumatic events, in this chapter, the model can now be validated against both sets of standards for models (one for models of psychological trauma, and the other for personal construct psychology models). This approach only treats the model as a theoretical model. I now move on to provide experimental data from people exposed to potential trauma, to validate the model as a practical and workable model, rather than as only a theoretical model.
Chapter 7. Study 2 - Testing the personal construct model of mental health and psychological trauma
Study 1 of this report provided a description of the experiences of people in the Navy who experienced a potentially traumatic event, highlighting both mental health and disorder, as short- and long-term responses. This study goes some way to develop understanding of what happens when disaster strikes. However, it does little to explain the processes behind these outcomes, or how these processes occur. To fully understand mental health and disorder in the aftermath of trauma requires understanding not only what happens, but also why. The models of mental health described in Chapter 4 provide some knowledge and understanding of the processes involved, but fall short of a full account of the range of experiences of people involved in potential trauma. The personal construct psychology model posed in Chapter 6 provides insight into a broad range of possible responses to potentially traumatic events. However, while the work of Sewell, upon which it is based, has been validated through experiment, the revised model has not. It is still a theoretical model. For this model to be validated, it must account for the actual experiences of people who have experienced potentially traumatic events.

I will now provide the opportunity for the model to move from a theoretical model, to a practical and validated model, through applying it to the experiences of some of the subjects in Sample 1. Sample 1 were described in Study 1 (Chapter 3 of this report), as Australian Navy personnel who were involved in fighting a fire at sea that resulted in the deaths of four of the crew. The event was considered to be of sufficient intensity and threat to be considered potentially traumatic, and a prevalence of indicated PTSD similar to that experienced by military personnel in war and peacekeeping operation, and by civilian disasters, was revealed. With this sample, I have established what happened to them. Now I move to try to understand why. To do this, I will apply the personal construct model posed in Chapter 6.
7.1 Aims and Research Questions.

This project will test the value of hypotheses derived from the propositions of the model posed in the previous chapter. These propositions are based on the theory of personal constructs provided in Chapter 5, along with the specific application of personal construct theory to mental health in the aftermath of potentially traumatising events. I examine participants’ experiences of exposure to psychological trauma and will further develop models of mental health and disorder in the face of exposure to trauma. I will address the following questions:

1. Are validation and invalidation of core construing (threat) associated with mental health following exposure to potentially traumatic events?
2. Is the presence of positive and negative emotions associated with mental health following exposure to potentially traumatic events?
3. Are disorders such as PTSD associated with constriction of construing?
3. Is social support associated with mental health following exposure to potentially traumatic events?

and;

4. How are people who maintain mental health after being exposed to potential trauma distinguished from those who develop disorder?

7.1.1 Hypotheses to be tested

Using the personal construct model of psychological trauma, the following hypotheses address the research questions:

1. Measures of threat will be negatively associated with measures of mental health;
2. Measures of positive emotions will be positively associated with measures of mental health, while measures of emotions of transition will be negatively associated with measures of mental health;

3. Measures of constriction of construing will be negatively associated with measures of mental health;

4. Measures of positive social support will be positively associated with measures of mental health.

7.2 Method

7.2.1 Design.

The first of the hypotheses will be operationalised through establishing associations between measures of threat and mental health. Construing related to threat will be measured using content analysis scales focusing on fears of death, mutilation, or separation, applied to narratives supplied by participants. Mental health will be measured using questionnaires assessing symptoms associated with post-traumatic mental health problems, with mental health indicated by lower scores on mental health questionnaires and disorder indicated by higher scores. It is hypothesized that measures of threat will be negatively associated with measures of mental health. Therefore, the operationalised Hypothesis 1 reads: the degree of threat, as measured by the analysis of narratives provided by participants by content analysis scales, will be negatively associated with the degree of mental health.

The second hypothesis will be operationalised through the establishment of associations between measures of positive emotions and emotions of transitions and measures of mental health. Positive emotions and emotions of transitions will be
measured using content analysis scales focusing on positive emotions and a range of emotions of transitions (namely: threat, anxiety, guilt, shame, hostility, and depression) applied to narratives provided by participants. Mental health will be measured using questionnaires assessing symptoms associated with post-traumatic mental health problems; mental health will be indicated by lower scores on mental health questionnaires and disorder indicated by higher scores. It is hypothesized that measures of positive emotions will be positively associated with measurements of mental health (as indicated by lower scores on mental health questionnaires), and emotions of transition will be negatively associated with measures of mental health. Therefore, the operationalised Hypothesis 2 reads: the degree of positive emotions derived from the analysis of narratives provided by participants by content analysis scales, will be positively associated with measures of mental health, while the degree of emotions of transitions, derived from the analysis of narratives provided by participants by content analysis scales, will be negatively associated with measures of mental health.

The third hypothesis will be operationalised by establishing an association between measures of constriction in construing, and measures of mental health. Constriction in construing will be measured using content analysis scales assessing depression (which is an indication of constricted construing). Mental health will be measured using questionnaires assessing symptoms associated with post-traumatic mental health problems. Mental health will be indicated by lower scores on mental health questionnaires and disorder indicated by higher scores. It is anticipated that measures of depression will be negatively associated with measures of mental health. Therefore, the operationalised Hypothesis 3 reads: the degree of constriction of construing, as measured by the analysis of narratives provided by participants by
content analysis scales assessing depression, will be negatively associated with measures of mental health.

The fourth hypothesis will be operationalised by establishing associations between measures of satisfying social relationships, and measures of mental health. Satisfying social relationships will be measured using content analysis scales assessing qualities of positively perceived social relationship, applied to narratives supplied by participants, focusing on social relationships. Mental health will be measured using questionnaires assessing symptoms associated with post-traumatic mental health problems. Mental health will be indicated by lower scores on mental health questionnaires and disorder indicated by higher scores. It is hypothesized that measures of positive social relationships will be positively associated with measures of mental health. Therefore, the operationalised Hypothesis 4 reads: the degree of social support, as derived from the analysis of narratives provided by participants by content analysis scales, will be negatively associated with measures of mental health.

7.2.2 Sampling

The ideal sample to study mental health in the face of trauma would comprise people who have been exposed to a potentially traumatic event that could be reasonably expected to produce disorder in those exposed (i.e.: there is a likelihood of producing PTSD) and have resulted in the full range of possible outcomes (mental health and disorder). Ideally, a sample should have approximately equal numbers of those with mental health and disorder. However, a sample containing all participants with either mental health or disorder would go a considerable way to testing some of the model. There should ideally be a time lag between event and assessment to allow for whatever cycles of transition have been necessary for the people involved or for disorder to be
apparent (repeated use of invalidated constructs implies some time). For research purposes, the ideal sample would have experienced the same or a similar event to reduce or limit possible variation due to different types of events or exposure.

An example of a suitable population that would have been exposed to a potentially traumatic event is the sample described in Study 1 (people who survived a multiple fatality, and raging fire that threatened a large Navy ship and resulted in PTSD for a considered proportion). All participants in this sample were all exposed to the same event; a fire in a Navy tanker at sea, that raged out of control for several hours, threatening the ship and all onboard at the time. With a threat to all and at least confrontation with actual and threatened death (the death of four of their shipmates), this incident (described in detail in Appendix A) would satisfy the definition of a trauma that could produce PTSD as described by the American Psychiatric Associations (1994) in the DSM-IV (people having experienced, witnessed or been confronted by an event that involved actual or threatened death, serious injury or a threat to the physical integrity of others. However, while the prevalence of indicated PTSD in Sample 1 was significant, it still only accounted for a minority of the Sample, and there is nothing like equal numbers of those with disorder and those displaying mental health (the majority of Sample 1 were not indicated for PTSD). Therefore, to utilise Sample 1 in Study 2, requires only examining those without disorder. To include unequal numbers of those with disorder and mental health would be to introduce an extraneous variable.

Participants in Study 2 are drawn from Sample 1 (Navy personnel who were in HMAS Westralia at the time of the fire on the 5 May 1998). Inclusion criteria are having participated in the Study 1, and not being indicated for PTSD at the four to six year screening. Those meeting these criteria, to be included in Study 2, will be defined as Sample 2.
All 48 people who participated in Study 1 were invited to participate in Study 2, by a letter inviting voluntary participation sent by the Director of the Australian Defence Force Psychology Organisation (a copy of the letter is contained in this report as Appendix D). Invitations were sent to the recorded address of current Navy personnel, and to the last known address, or address of next-of-kin, for those people who had left the Navy. People who had not responded to the initial mail-out within two months were sent a repeat copy of the letter inviting participation.

Sample 2 consists of twenty-eight people (29.8% of those involved in the fire and 58.3% of those involved in the review), who agreed to participate in Study 2. Of these, 22 yielded data suitable for analysis. Five potential participants provided incomplete data for analysis and were excluded. One participant was excluded as their score was considered to be an outlier (see Results, 7.3 for details). The final sample for Study 2 comprised 22 participants, made up of 17 males (77.27%) and five females (22.73%). The group's average age at the time of the fire was 27.59 years (SD=6.06), with an age range of 18-44 years. By military rank, the group comprises 10 junior sailors (45.45%), three senior sailors (13.64%), and nine officers (40.91%).

7.2.2.1 Representativeness of the sample

Table 8 compares the distribution by gender and rank of Sample 2 with the crew list of HMAS Westralia at the time of the fire, and with a wider Navy sample (from Rayner, 2005, n=1739). The trend in all three groups is that there are predominantly more males than females, and more junior sailors than either senior sailors or officers.

Table 8 indicates that the participants in Study 2 have a very similar gender distribution (i.e.: predominantly more males that females) to the population of HMAS Westralia at the time of the fire, and to that of the Navy in general. With regard to the
distribution of rank of participants in Study 2, both the crew of HMAS Westralia at the time of the fire, and the wider Navy sample displayed predominantly more junior sailors than either senior sailors or officers. Table 8 also displays a comparison of the average ages of the Study 2 sample and the crew of HMAS Westralia, at the time of the fire. This comparison shows that these mean ages are also virtually identical.

Table 8.

Comparison of the Gender Distributions of Sample 2, the Crew of HMAS Westralia at the Time of the Fire, and a Representative Navy Sample.

<table>
<thead>
<tr>
<th></th>
<th>Study 2 participants (n=22)</th>
<th>Westralia population (n=98)</th>
<th>RAN (n=1739)(^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>17 (77.3%)</td>
<td>73 (74.5%)</td>
<td>83.9%</td>
</tr>
<tr>
<td>Female</td>
<td>5 (22.7%)</td>
<td>25 (25.5%)</td>
<td>16.1%</td>
</tr>
<tr>
<td>Junior sailor</td>
<td>10 (45.5%)</td>
<td>60 (61.2%)</td>
<td>68.4%</td>
</tr>
<tr>
<td>Senior sailor</td>
<td>3 (13.6%)</td>
<td>18 (18.4%)</td>
<td>18.2%</td>
</tr>
<tr>
<td>Officer</td>
<td>9 (40.9%)</td>
<td>20 (20.4%)</td>
<td>13.5%</td>
</tr>
<tr>
<td>Age</td>
<td>27.6 years</td>
<td>27.4 years</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\)Rayner (2005)

Sample 2 can be seen to be generally representative of the crew of HMAS Westralia on the day of the fire, and of a large Australian Navy sample, with respect to age, gender, and rank distribution. Where Sample 2 and the wider Navy sample differ, is with regards to the dependent variable of this study – i.e.: reporting of mental health problems. The eligibility criteria for Study 2 (see section 7.2.2) is for participants to have experienced an event that would be regarded as sufficiently distressing to result in
disturbances such as PTSD, yet has not resulted in PTSD. Study 1 (Chapter 3) reports that the fire in HMAS Westralia resulted in a level of PTSD that is higher than community rates of PTSD and similar to high-risk groups, considerably higher than the base-rate of PTSD in a large Australian Navy sample, and similar to some military samples after exposure to war. The sample in Study 2 is a sub-set of this group, yet this sub-set satisfies the inclusion criteria for Study 2.

7.2.3 Measures

Two types of data will be gathered for this project. The first is measures of the independent variables (positive emotions, emotions of transition, and measures of interpersonal relating), while the second is measures dependent variable (mental health).

7.2.3.1 Measuring emotions

Content Analysis Scales applied to narratives supplied by participants were used to assess emotions. Content analysis scales are used because they provide an appropriate research methodology that is derived from the theory of personal constructs, and is therefore consistent with the theoretic approach described in Chapters 5 and 6.

Content analysis scales are a method of measuring people's psychological experiences or transient emotional states, through an analysis of the content of their speech (Gottschalk & Gleser, 1969, & Viney, 1983). The methodology is based on the assumption that the language in which people choose to express themselves contains information about the nature of their psychological states (Viney, 1993). Analysis yields quantifiable data and provides a rigorous scaled measurement of the meanings people form of the events they describe (Viney & Caputi, 2005/in press). While sharing some of the characteristics of content or thematic analysis, content analysis scales are
continuous scales that produce normally distributed scores amenable to statistical analysis (Viney & Caputi, 2005/in press).

Gottschalk and Hoigaard-Martin (1986) describe content analysis scales as: “combining the personal and subjective strengths of self-report measures with the objective and impartial strengths of the rating of the magnitude of psychological dimensions by independent observers” (p. 213).

The process of using content analysis scales begins with obtaining, recording and then transcribing into text, narratives from participants. While there are no exact instructions specified for individual content analysis scales, typical directions to participants provide limited guidance, emphasizing relatively free speech. An example of instructions for eliciting narratives appropriate to analysis by Content Analysis Scales is:

“I’d like you to talk to me for a few minutes about your life at the moment – the good things and the bad – what it is like for you. Once you have started I shall be here listening to you: but I’d rather not reply to any questions you may have until a five minute period is over. Do you have any questions you would like to ask now, before we start” (Viney, Rudd, Grenyer & Tych, 1995, p.7).

Narratives are recorded and transcribed into text which is prepared for analysis. The number of words used in the narratives is recorded and the text is broken into clauses. A clause is defined by Delbridge, Bernard, Blair, Butler, Peters & Yallop, (1997), as a group of words containing a subject and predicate that makes complete sense. Typical guidelines for the preparation of text are provided in Viney, Rudd, Grenyer and Tych (1995). Individual clauses are coded according to whether or not they match criteria clearly established for each scale (each scale having unique scoring
criteria). The number, and type of each coded clauses are recorded and converted into standard scores for subscales, and for the total scale. A formula for conversion differs for each scale used, although all take into consideration the number of words used in each narrative. The resulting quantitative score can be subjected to statistical analysis.

Viney (1983) and Viney and Caputi (2005/in press) describe content analysis scales as being developed through nine stages; namely (1) describing the state to be assessed precisely, and in all its dimensions; (2) defining the unit of content to be analysed; (3) specifying the content of communication from which the psychological state is to be inferred; (4) specifying cues that indicate the intensity of the state; (5) applying weightings to these cues; (6) including a Correction Factor to account for the length of the verbal communication; (7) deriving a score from applying the scale to samples of communication; (8) normalizing distributions; (9) collecting normative data.

In evaluating the use of content analysis scales, Viney (1983) notes that content analysis scales have applicability to a wide range of personality, developmental and social psychological issues, are useful for a range of verbal communication, including pre-existing recordings of data. Further, content analysis scales have been developed to measure a wide range of psychological states, including anxiety, hostility, social alienation – personal disorganisation (Gottschalk, Winget & Gleser, 1969), hope (Gottschalk, 1974), positive affect (Westbrook 1976), sociality (Viney & Westbrook, 1979), perceptions of self-determination of behaviour (described as origin and pawn by Westbrook and Viney 1980), psychosocial maturity (Viney, Rudd, Grenyer & Tych, 1995, and Viney & Tych, 1985), cognitive anxiety (Viney & Westbrook, 1976), and depression (Gottschalk & Hoigaard-Martin, 1986). In this study the following content analysis scales are used; Positive Affect Scale (Westbrook, 1976), Total Anxiety Scale (Gottschalk, Winget & Gleser, 1969), Gottschalk-Gleser Hostility Scale (Gottschalk,
Winget & Gleser, 1969), Cognitive Anxiety Scale (Viney & Westbrook, 1976), Depression Scale (Gottschalk & Hoigaard-Martin, 1986), and Sociality Scale (Viney & Westbrook, 1979).

There are ethical considerations for using content analysis scales with participants who have been exposed to potential trauma. Most importantly, because content analysis scales rate psychological states based on representations of constructs used in general language, they do not require direct discussion of an event. Without a need for participants to directly describe their experiences of an event, the process of data collection should minimize any possible re-traumatisation of participants through exposure to traumatic cues. Content analysis scales can yield effective measures, while participants are free to disclose as much or as little as they wish, and are only asked to describe their lives. This helps them maintain control over what information they provide and is in contrast to structured questionnaires that seek specific information and give less control over disclosure to participants. Content analysis scales are considered a method of data collection that avoids the potential harmful impact of re-traumatisation in research into psychological trauma.

Viney and Westbrook (1979) note that an advantage of content analysis scales is that they may be applicable in situations in which people are less fluent, less intelligent, or less persistent, than is ideal with other methods of research, and are applicable to verbalisations of varying lengths, obtained with a wider variety of instructions. They offer greater flexibility than measurement tools requiring adherence to strict rules of administration. This strategy is important in the field of psychological trauma, as it is reported that sufferers of PTSD may have difficulty with normal verbal expression of their condition and experiences. Van der Kolk and McFarlane (1996), van der Kolk (1996), and Kudler, Blank and Krupnick (2000), report that PTSD interferes with
sufferers' capacity to articulate how they are feeling and to utilize words and symbols to identify feelings - a condition described as alexithymia. Schnurr and Vielhauer (1999) add that experiencing alexithymia is associated with the avoidance and hyperarousal symptoms of PTSD. The use of content analysis scales may have specific application to psychological trauma. As noted, McFarlane and van der Kolk (1996) argue that methods that transform the subjective experience, in a rigorous manner, are required to fully understand trauma. This goal closely echoes the description of content analysis scales provided by Gottschalk and Hoigaard-Martin (1986).

Viney (1983) argues that the theoretical advantages of using content analysis scales in research include: that they can be applied particularly within a personal construct perspective; that they force a clarity of conceptualization; that they are based on internally consistent assumptions; and that they tap into less directly observable experiences. Viney (1983) further considers the practical advantages of content analysis scales in research to include no requirement for cumbersome equipment, the data-collection process is not time consuming, they are suitable for a wide range of applications, they can produce rich data with little intrusion or influence by the researcher, they are not significantly affected by socially-desirable responding or researcher bias, and that they are able to deal with ambivalence on the part of the participant.

Lebovits and Holland (1983) indicate that content analysis scale overcome some of the problems of self-report tests with patients who may distort their reporting of symptoms. Lebovits and Holland argue that content analysis of narratives is a useful and sensitive alternative to self-report tests of emotional states. They cite the use of content analysis scales with cancer patients, coronary care patients, and other medical patients. They conclude that content analysis scales demonstrate sensitivity to immediate mood
states, and that they avoid many of the pitfalls of self-report and observer rated measures. Further, Viney and Caputi (2005/in press) state that content analysis scales are generally less intrusive and have fewer demand characteristics than standardized questionnaires, as they assess the intended meanings of the participant, rather than endorsement or non-endorsement of items posed by the authors of questionnaires.

Viney (1983) notes that content analysis scales are limited to verbal communications, and ignore non-verbal communications. Therefore, they can only be as useful as the quality of the verbal samples provided and the ability of participants to express themselves verbally. Further, interpretations may be limited by a relatively narrow range of normative data. However, Gottschalk-Gleser (1969) and Viney and Caputi (2005/in press) describe content analysis scales as being applicable to written, as well as verbal communication.

The Gottschalk-Gleser Scales have been developed into a computer-scored and analysed version (Gottschalk, Bechtel, Buchman & Ray 2003, & Gottschalk and Bechtel 2002). This program (Psychiatric Content Analysis and Diagnosis or PCAD 2000) arranges narratives provided in written form into clauses, and then rates each using a customised dictionary. Weightings are applied to various classifications of clauses, and raw scores are automatically converted into standard scores that can be compared to normative data available in the scoring manual (Gottschalk and Bechtel, 2002). Gottschalk, at al (2003) note that the computer-scored version reduces the time required for training of raters, along with the time required to score the scales. Further, the computer scored version has consistent reliability, reducing the need for multiple raters to establish inter-rater reliability. Gottschalk, et al 2003 notes that the advantages of computerised administrations of content analysis scales are speed, objectivity, the
automatic scoring, and that the programs can be easily updated to include new
words, expression or jargon to be included in coding criteria.

I will now describe the specific content analysis scales to be used in Study 2.

7.2.3.1.1 Positive Emotion

Positive emotion will be measured using the Positive Affect Content Analysis
Scale (Westbrook, 1976). This scale scores references to emotions including admiration,
affection, amusement, joy, elation, love, happiness and hope. Westbrook indicates that
positive emotions are those: “usually considered pleasurable, agreeable or desirable as
opposed to negative affects that are considered unpleasant” (1976: p. 716). While this is
not strictly consistent with Kelly’s (1955/1991) or McCoy’s (1981) descriptions of
emotions - as being based on validation rather than pleasure - the positive emotions
described by Westbrook (1976) are similar to McCoy’s (1981) positive emotions related
to core construing (love, happiness, self-confidence and contentment). Therefore, the
Positive Affect Scale is considered to be an appropriate measure of positive emotions
related to transition and validation.

The Positive Affect Scale developed by Westbrook (1976) does not attempt to
identify individual positive emotions, providing only a single composite scale for
positive emotions. However, given McCoy’s (1981) definition of positive emotions as
indicators of validation or successful reconstruing, any positive emotion identified
should be consistent with validation, and therefore, optimal positive mental health.

The Positive Affect Scale has good inter-rater reliability, measures state, rather
than trait, variables, and has been used to assess positive affect as part of general mental
health, in people experiencing a range of mental health challenges. The coding rules
used with the Positive Affect Scale, along with examples of clauses to be coded, are
displayed in Appendix M, and the psychometric properties of the scale are detailed in Table 23 (Appendix K).

7.2.3.1.2 Threat

As described by Kelly (1955/1991), threat involves an attack on superordinal constructs necessary to govern self-maintenance processes of existence and identity. Threat will be measured using three subscales of the Gottschalk-Gleser Anxiety Scale, namely the Death Anxiety, Mutilation Anxiety and Separation Anxiety Subscales. The Gottschalk-Gleser Anxiety Scales have been used to measure threat in people undertaking psychotherapy (Viney, 1993), women recovering from breast cancer (Lane & Viney, 2005), people disclosing sexual assault (Carter 2004), and patients in palliative care (Viney, Walker, Robertson, Lilley & Ewan, 1994). The use of the Death Anxiety, Mutilation Anxiety and Separation Anxiety Sub-scales of the Anxiety Scale to measure threat to the construing of the physical self has been reported on by Viney (1993).

To measure threat, scores on the Death Anxiety, Mutilation Anxiety and Separation Anxiety subscales will be combined to form a single measure. Gottschalk and Gleser (1969) describe these subscales as measuring references in narratives to death, dying, threat of death, or anxiety about death, injury, tissue of physical damage, or anxiety about injury of threat of such, desertion, abandonment, ostracism, loss of support, falling, and loss of love object or threat of such loss. A combination of measures of references to death, injury and separation or isolation from others, is consistent with annihilation, which in turn, is consistent with Kelly’s construing threat as: “the awareness of an imminent comprehensive change in core structures” (Kelly,

The Total Anxiety Scale has acceptable to good inter-rater reliability. It correlates well with other measures of anxiety, and has been used to screen for anxiety and mental health in people from a range of mental health challenges. The coding rules and weightings for the Total Anxiety Scale are displayed in Appendix N (from which the specific rules for the Death Anxiety, Mutilation Anxiety and Separation Anxiety can be derived), and the psychometric properties of the Total Anxiety Scale are detailed in Table 24 (Appendix K).

7.2.3.1.3 Anxiety

Anxiety, the emotion resulting from an awareness of invalidation, will be measured using the Cognitive Anxiety Scale (Viney & Westbrook, 1976). This scale codes references in narratives that indicate an awareness by people of insufficient information to make meaning of events due to novel stimuli; extra constructs needed but not available; incongruous stimuli; responses needed but unavailable; and a high rate of stimulus presentation. Further, the Cognitive Anxiety Scale codes narratives according to whether the anxiety is experienced by the narrator, is experienced by others, or is expressed, but denied. While there are other content analysis scales that contain scales that purport to measure anxiety, the Viney and Westbrook (ibid) scale is much closer to Kelly’s (1955/1991) conceptualization of anxiety as the awareness by people of their construct systems being insufficient to make meaning of events.

While the Total Anxiety Scale (Gottschalk-Gleser, 1969) also measures anxiety, the description of the state in the Viney and Westbrook (1976) Cognitive Anxiety Scale
more closely approximates the definition of anxiety provided by Kelly (1955/1991), and will therefore be used in Study 2.

The Cognitive Anxiety has very good inter-rater reliability, and has been validated as a measure of transition and adapting to new experiences, with people from a range of mental health challenges. The coding rules for the Cognitive Anxiety Scale are presented in Appendix O, and the psychometric properties of the scale are detailed in Table 25 (Appendix K).

7.2.3.1.4 Guilt

Guilt will be measured using the Guilt Anxiety sub-scale of the Gottschalk-Gleser Total Anxiety Scale. The Guilt subscale measures references in narratives, to experiences of adverse criticism, abuse, condemnation, moral disapproval, guilt, or threat of any of these experiences. The coding rules and weightings for the Guilt Anxiety subscale of the Total Anxiety Scale are displayed in Appendix N (from which the specific rules for the Guilt Anxiety subscales can be derived), and the psychometric properties of the Total Anxiety Scale are detailed in Table 26 (Appendix K).

7.2.3.1.5 Shame

Shame will be measured using the Shame Anxiety subscale of the Gottschalk-Gleser Anxiety Scale. The Shame Anxiety subscale measures references in narratives to ridicule, inadequacy, shame, embarrassment, humiliation, overexposure of deficiencies or private details, or threat of such. The coding rules and weightings for the Anxiety Scale are displayed in Appendix M (from which the specific rules for the Guilt and Shame Anxiety subscales can be derived), and the psychometric properties of the Total Anxiety Scale are detailed in Table 22 (Appendix J).
7.2.3.1.6 Hostility

Hostility will be measured using the Gottschalk-Gleser Hostility Outwards Scale. This scale provides two subscales (Hostility Outward – Overt, and Hostility Outward – Covert), along with a Total Hostility Outward score. The Hostility Outward - Overt subscale measures themes in narratives related to the subject killing, fighting, injuring others or threatening to do so, robbing, abandoning others, causing suffering or anguish to people, animals, flora or inanimate objects, or threatening to do so, adversely criticizing, depreciating, blaming, expressing anger or dislike, self-depriving or disappointing others, or using hostile or cursing words or mentioning anger or rage. The Hostility Outward – Covert subscale measures references to the same themes, although the references are to someone other than the subject, acting in this way. The total score is a composite of these subscales.

The Hostility-Outward scale has good inter-rater reliability, has been correlated with some measures of mental health, and has been used to assess hostility and adjustment to change in people experiencing a range of mental health challenges, including hospital patients in crisis. The coding rules for the Hostility Scale – outward, are presented in Appendix P, and the psychometric properties of the scale are detailed in Table 26 (Appendix K).

7.2.3.1.7 Depression

Depression, a constriction in construing in response to invalidation or fragmentation, will be measured using the Gottschalk and Hoigaard-Martin Depression scale (Gottschalk & Hoigaard-Martin, 1986). This content analysis scale was developed specifically to assess depression; although another of the Gottschalk-Gleser content analysis scales (the Hostility Inward Scale), has also been used to measure depression
by Viney, Clarke, Bunn and Benjamin (1985), and Viney, Walker, Robertson, Lilley and Ewan (1994). The Gottschalk and Hoigaard-Martin Depression Scale comprises subscales measuring references in narratives to hopelessness, self-accusation (comprising guilt depression, shame depression and hostility directed inward), psychomotor retardation, somatic concerns, death and mutilation depression, separation depression, hostility directed outward, and produces a composite Total Depression score. The subscales are derived from other content analysis scales authored by Gottschalk, including the Hope Scale, the Anxiety Scale, and the Hostility Scale.

The Gottschalk and Hoigaard-Martin Depression scale has been used to assess depression in survivors of breast cancer (Lane & Viney, 2005), psychiatric outpatients (Gottschalk, Stein, & Shapiro, 1997), alcoholics, depressed adults and children, boys with attention deficit disorder, and psychiatric inpatients (Gottschalk & Hoigaard-Martin, 1986).

The Depression Scale has good inter-rater reliability, correlates well with other measures of depression, and has been used to assess people experiencing depression and adjustment to significantly stressful events. The coding rules and weightings for the Depression Scale are presented in Appendix Q and the psychometric properties of the scale are detailed in Table 27 (Appendix K).

Table 9 summarises the emotions to be measured and the content analysis scale used for each scale.
Table 9.

*Emotions and their Respective Measure for Study 2.*

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>Positive Affect Scale (Westbrook 1976)</td>
</tr>
<tr>
<td>Affect</td>
<td>Death, Mutilation and Separation subscales of the Anxiety Scale (Gottschalk, Winget and Gleser 1969)</td>
</tr>
<tr>
<td>Threat</td>
<td>Cognitive Anxiety Scale (Viney and Westbrook 1976)</td>
</tr>
<tr>
<td>Anxiety</td>
<td>Guilt Anxiety subscale of the Anxiety Scale (Gottschalk, Winget and Gleser 1969)</td>
</tr>
<tr>
<td>Guilt</td>
<td>Shame Anxiety subscale of the Anxiety Scale (Gottschalk, Winget and Gleser 1969)</td>
</tr>
<tr>
<td>Shame</td>
<td>Hostility Out subscale of the Hostility Scale (Gottschalk, Winget and Gleser 1969)</td>
</tr>
<tr>
<td>Hostility</td>
<td>Depression Scale (Gottschalk and Hoigaard-Martin 1986)</td>
</tr>
</tbody>
</table>

7.2.3.2 Measuring interpersonal relating

Interpersonal relating will be measured using the Sociality Scale (Viney & Westbrook, 1979). This content analysis scale measures references to four types of positive or rewarding interpersonal relating, namely; solidarity (people as resources), intimacy (people as source of social satisfaction), influence (people as power), and shared experience. In addition to the four subscales, the Sociality Scale provides a total Sociality Scale score. Further, the Sociality Scale assesses the role as reactor or initiator played by the speaker in their narratives, (Malins, Couchman, Viney & Grenyer, 2004). The Sociality Scale, with its focus on the quality of interpersonal relating, measures what Guay, Billette and Marchand (2006) describe as functional support, rather than structural support. Functional support refers to the quality and perception of how people perceive other people acting toward them, while structural support refers only to the existence and abundance of social relationships.
The Sociality Scale has good inter-rater reliability and has been validated as a measure of quality of interpersonal relationships with people experiencing significant adjustment issues. The coding rules for the Sociality Scale are presented in Appendix R and the psychometric properties of the scale are detailed in Table 30 (Appendix K).

7.2.3.3 Measuring post-traumatic mental health.

The measure used to assess post-traumatic mental health is the Posttraumatic Stress Disorder Check List – Civilian version (PCL-C). Detailed information on the PCL-C (a brief, self-report questionnaire to screen for post-traumatic stress disorder) is provided in Chapter 3. Optimal mental health is indicated by low scores on these indicators of symptoms, while poorer mental health and disorder is indicated by higher scores on this questionnaire. Scores above 50 generally indicate disorder (PTSD), although additional criteria are required to make a diagnosis of PTSD.

7.2.3.4 Psychometrics of the measures

Viney (1983) and Viney and Caputi (2005/in press) describe inter-rater reliability to be the most important reliability measure of content analysis scales. Having at least two independent assessors apply the coding rules of content analysis scales to narratives, and then comparing the results, should indicate the consistency of agreement in applying the scales, and whether errors have been made in the application of the scales. Where there is high agreement between two or more independent raters applying the same scales to the same narratives, reliability of the resulting analysis can be assumed. Viney and Caputi (2005/in press) and Gottschalk and Bechtel (2002) argue that an inter-rater reliability of at least .85 and .80 respectively should be the minimum acceptable level of inter-rater reliability for content analysis scales.
Validity of the content analysis scales used in Study 2 is primarily content validity, based on whether they actually measure what they purport to measure. A number of studies report on the use of the content analysis scales chosen for Study 2. A summary of the reported validity is displayed in is reported in Appendix J. The psychometric qualities of the PCL-C are reported on in Appendix I.

7.2.4 Procedure

As part of a larger study, participants were invited to complete a series of questionnaires regarding their experiences related to the fire in HMAS Westralia (a complete copy of the questionnaire is presented as Appendix I). The PCL-C and two questions designed to elicit narratives that would be suitable for analysis with content analysis scales were included in this series. The PCL-C was administered with standard instructions. The instructions to elicit narratives were a variation of the instructions typically used in eliciting narratives for use with content analysis scales, with participants asked to provide direct written responses, rather than eliciting verbal responses (that are usually recorded and transcribed into text prior to analysis).

Gottschalk and Bechtel (2002) indicate that while content analysis has usually been applied to verbal communication, some content analysis scales can equally readily be applied to written text as to spoken and then transcribed text. While noting a need for caution, they add that content analysis scales have been successfully applied to a wide range of written materials, including suicide notes, the written notes of a terrorist, and historical documents. Reports on the application of content analysis scales to written text such as the writings such as of Napoleon and Mahatma Gandhi were made by Gottschalk, Defrancisco, and Bechtel (2002) and Gottschalk and Bechtel (2005) respectively. The intent of the usual type of instructions for content analysis described
earlier is to elicit speech samples with only limited directions with an emphasis on relatively free speech. This same intent was carried into the instructions used to elicit written samples of narratives in this study. The exact instructions provided are contained in Appendix K. Two lined pages were provided for participants to write their responses. To encourage a further opportunity to provide a narrative, a second loosely structured question was provided and another lined page provided. There was no time limit imposed on participants. As can be seen by comparing these revised instructions to the typical instructions used to elicit narratives for use with content analysis scales described earlier, there is relatively little variation, and the intention of eliciting free speech with few specific directions is retained.

The PCL-C was scored in accordance with standard instructions. The narratives provided by participants were transcribed from handwritten form into text by a typist who was blind to the results of the PCL-C. The typist was paid to provide this specific service and had no other part in the study.

For the Gottschalk-Gleser scales, transcribed narratives were entered into the Gottschalk-Gleser Content Analysis Computerised Scoring System, known as Psychiatric Content Analysis and Diagnosis – 2000 program (PCAD 2000 program). This program automatically formats written narratives into clauses and scores them providing standardized scores for a range of available Gottschalk-Gleser Content Analysis Scales. Using a computerized scoring system eliminated the requirement for a measure of inter-judge reliability. These scores were also entered into an SPSS database for analysis.

For the Positive Affect, Cognitive Anxiety and Sociality Scales, the transcribed narratives were prepared manually, by breaking text into clauses, using the rules for outlined in Viney, Rudd, Grenyer and Tych (1995). Clauses were entered into prepared
scoring sheets with all identifying information removed and a code number assigned (known only to me, the principal researcher).

Research assistants who had no knowledge of the participants were employed to undertake the coding of narratives according to the instructions provided for the Positive Affect Scale (Westbrook 1976), the Cognitive Anxiety Scale (Viney & Westbrook, 1976) and the Sociality Scale (Viney & Westbrook, 1979). The use of blind raters is considered essential to ensure unbiased coding of narratives as I had been involved in the gathering of mental health measures. Three research assistants were employed to code the narratives. One rater was a male clinical psychologist, who had experience in content analysis, coding narratives, and working with Navy personnel. The two other raters were female PhD (Psychology) candidates, who also had experience in the use of content analysis and rating. I provided training in the use of the specific content analysis scales chosen for this project (Positive Affect Scale, Cognitive Anxiety Scale, and Sociality Scale).

The three raters applied the rules of each scale to code the narratives in separate sessions without other raters present. In advance, one rater (the male) was designated as a primary rater against which the raters would be compared to establish measures of inter-judge reliability. During the coding process, I provided generic coaching to the research assistance, in the application of the coding rules for each of the scales, but did not provide any specific advice or direction as to how any individual clauses or participants should be coded.

The raw scores obtained for each scale were converted into standard scores following the instructions and formulas provided in Westbrook (1976) (for the Positive Affect Scale), Viney and Westbrook (1976) (for the Cognitive Anxiety Scale), and Viney and Westbrook (1979) (for the Sociality Scale). The standard scores for the
Gottschalk-Gleser Scales and three other scales were entered into an SPSS database for analysis.

7.2.4.1 Ethical considerations

Ethics approval was sought and obtained from the University of Wollongong / Illawarra Area Health Service Human Research Ethics Committee and the Australian Defence Human Research Ethics Committee. Copies of letters of approval to conduct Study 2 are contained as Appendices B and C.

In considering ethical issues in undertaking research with people who have experienced psychological trauma, Newman and Kaloupek (2004) describe the importance of considering both the potential costs and potential benefits to the research and then comparing these to see if potential benefits outweigh costs.

With regard to possible benefits of conducting research into psychological trauma, Kilpatrick (2004) states that the information obtained from trauma research may be so important that to not undertake important research when it is needed, is equally an ethical problem as the potential costs.

With regard to the potential costs of conducting trauma research, Newman and Kaloupek (2004) indicate that 'retraumatisation' of people who have already experienced distress through exposure to traumatic events is the main concern. Levine (2004) also highlights the need for consideration of issues such as personal vulnerability of people who have experienced trauma.

Rosenstein (2004) and Collogan, Tuma, Dolan-Sewell, Borja and Fleischman (2004) also consider participant vulnerability, stating that they view the greatest ethical consideration in trauma research to be participants, who’s decision-making capacity may be impaired in vulnerable groups, being able to provide truly informed consent.
After having posed the potential harm of ‘retruamatisation’ in research into psychological trauma, Newman and Kaloupek (2004) also state that it is a common misconception that simply asking people to recall what happened to them may be as traumatic as the original experience. They contend that to confuse the two: “undermines efforts to balance the risks and benefits of research participation by exaggerating the risk aspect” (p. 390).

Similarly, after discussing potential risks to participants in trauma research, Levine (2004) contends that the definition of personal vulnerability has been extended too far and has ignored two important points. The first point is that exposure to a trauma should not define a group as vulnerable because it ignores individual differences and clusters people simply and describes them as vulnerable solely on the basis of having experienced the same event. Secondly, this definition ignores the concept of resilience – that some people exposed to trauma may not suffer psychological harm and may not be vulnerable.

Both Newman and Kaloupek (2004) and Levine (2004) argue for a need for cost-benefit analyses of psychological research into trauma, indicating that while risks may have been overstated, there is a need for care in undertaking research into psychological trauma. Newman and Kaloupek (2004) conclude by recognizing that there is no requirement for research to be totally risk-free, as long as researchers take reasonable measures to address the risks that research protocols address ethical considerations in the measurement procedures chosen, and researchers include a table of potential risks and benefits of research to be considered. Levine (2004) stresses the need for care in trauma research and proposes a checklist in planning research with people who have been exposed to trauma. This checklist includes: (1) whether the population is being exploited, (2) other kinds of interviews or research that the population may be
exposed to, (3) whether political and social turmoil are likely to affect participants’
ability to make informed choice, (4) whether children or adolescents are being selected,
(5) whether there is specific screening of the population to identify any participants who
may have impairments and who may be at particular risk, (6) whether consent is clear,
unambiguous and understood, (7) whether there are assistance plans for participants
who may experience difficulty, and (8) whether there is a procedure for informing
participants of the results of the research.

With regard to the possible benefits of Study 2, the aims are to better understand
the long-term impact of potentially traumatic events on groups of personnel, and to
understand the process of traumatisation, resilience to trauma and recovery from trauma; based on a personal construct theory model of psychological trauma. The
project will contribute to knowledge of psychological trauma and the applicability of
personal construct theory and research methodologies in the treatment and management
of people exposed to psychological trauma. This project will provide greater
understanding of the experience of people involved in the fire in HMAS WESTRALIA,
than Study 1 alone will. This should lead to a greater understanding of the psychological
impact on survivors, of fatal training accidents. This understanding can be used to
facilitate better health and personnel planning for accidents and in the circumstances of
other traumatic events such as war and war-like operations.

This research will also lead to better understanding of the process of trauma
generally and of the key mediating steps in the trauma process. This will hopefully lead
to future improvements in strategies to maximise conditions likely to lead to
maintaining mental health, or to the restoration of mental health, in similar people.

The checklist proposed by Levine (2004) and described in Section 4.3 of this
report was used in this research project. To the best of my knowledge, this population
has not undertaken any similar research. Informed choice will be provided by giving
potential participants information on the research project and the method of data
collection in writing at the time of invitation, with time to consider and discuss with
others prior to agreeing to participate. As all participants were employed in the Navy at
the time of invitation, an assumption of adequate intellectual functioning and decision-
making ability is made. The raw data required to be collected, summarized and analysed
for this research is provided by the owner of the data (the Australian Department of
Defence, ADF) rather than the subject of the data. The age of the population to be
studied at the time of the fire (May 1998) was 18-43, with an average age of 27.3 years,
and a modal age of 25 years. In 2005/2006 (the time of the study), the age range of the
population to be studied was 26-51 years. As noted earlier, the participants are all
maintaining employment in the Navy, providing a basic screen suggesting no or very
limited impairment.

The potential harm from Study 2 is considered minimal as the event has been the
subject of significant popular media coverage in the years since the fire so will be well
known to many people. This project has been reviewed and approved of by two ethics
committees. I am a Clinical Psychologist with experience working with people exposed
to traumatic events. Data collection will be conducted in psychology clinics or medical
centres, where there are available independent mental health professionals to provide
support to participants who require or request it. There is no direct means of informing
individual participants of the results of the research. However, it is intended to seek
publication of the results in relevant publications. While this approach may not fully
address all the points in Levine’s (2004) checklist, it addresses most, at least,
adequately. The project and method of data-collection are designed to be very low-risk
to the population and consistent with the aims of Kilpatrick (2004).
Newman and Kaloupek (2004) provide the opinion that ethical considerations of working with people exposed to psychological trauma should always be based on a cost-benefit basis. Ethical considerations for this project involved both the benefits as well as possible risks to participants.

Rayner and Viney (2003) reported that while the military has been a fertile field for the study of psychological trauma, much of this research has been undertaken with Army personnel, with only very limited research in the field of psychological trauma in Navy personnel. A strong bias toward only one of three main subgroups in the military (Navy, Army and Air-Force) would lessen the ability to generalize from the results of such research. There is also an imperative to study psychological trauma in the Navy based on a 2005 Senate Inquiry into Military Justice in the ADF where it was noted that:

"Navy has acknowledged that it lacked a good understanding of PTSD, but has expressed its willingness, and taken action, to obtain a better insight into the condition" (Commonwealth of Australia, 2005: p. 305).

This indicates an internal pressure to better understand psychological trauma within this population sub-group.

There is the potential benefit of this project in furthering knowledge of psychological trauma in a sub-group of the ADF with unique conditions of service, cultures and operating environments that can be used to maintain or improve the health and management of such personnel.

With regard to the possible costs of undertaking this project, Rosenstein (2004) and Collogan, Tuma, Dolan-Sewell, Borja and Fleischman (2004) view the greatest risks in trauma research to be whether truly informed decision-making capacity to consent to participate exists, especially when this consent may be impaired in vulnerable groups. Newman and Kaloupoek (2004) add that the possibility of
'retraumatisation' due to participants recounting traumatic events is also a significant risk in research into psychological trauma. In Study 2, I minimise the issue of retraumatisation by not asking for any direct discussion of traumatic events focusing only on participant's experiences since the event.

With potential gains with regards to information and understanding of trauma in an under-represented population sub-group; and potentials costs being minimized by eliminating retraumatising and seeking informed consent, I argue that the potential benefits considerably outweigh the very low risk of potential harm or exploitation of participants. Further, where there is potential harm, it is appropriately addressed. I argue that this project satisfies the ethical requirements of Newman and Kaloupek (2004), Levine (2004), and Kilpatrick (2004) for research involving personnel exposed to potentially traumatic events.

7.2.4.2 Statistical Analysis

The design of Study 2 measures associations between independent variables (measure of emotions and interpersonal relating) and dependent variables (measures of mental health). With only a single dependent variable measured used, univariate or descriptive statistics is the most appropriate form of statistical analysis to use (Tabachnick and Fidell 1989).

The assessed statistic of skewness for the PCL-C is 1.95. This falls outside the determined range of standard error for skewness for which normality of distribution could be considered to be indicated (-.62 to +.96). Further, the assessed statistic for kurtosis for the PCL-C is 4.87, which also falls outside the determined range of standard error for kurtosis which indicates normality of scores (-1.88 to +1.88). Specifically, the distribution of PCL-C scores appears to be positively skewed and leptokurtic. As
assumptions of normality of distribution cannot be made, non-parametric statistical analysis will be used with these measures.

The distribution of PCL-C data is presented in Table 10.

Table 10.

<table>
<thead>
<tr>
<th>Indicators of normality of distributions for PCL-C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (Std. Deviation)</td>
</tr>
<tr>
<td>27.61 (11.95)</td>
</tr>
<tr>
<td>Skewness (Std. error of Skewness)</td>
</tr>
<tr>
<td>1.95 (.48)</td>
</tr>
<tr>
<td>Kurtosis (Std. error of Kurtosis)</td>
</tr>
<tr>
<td>4.87 (.94)</td>
</tr>
</tbody>
</table>

The analysis of data to determine results was undertaken using SPSS version 11. Data analyses include establishing correlations between measures of mental health and measures of emotions and interpersonal relating; and a profile analysis of comparisons between obtained standard scores and normative data.

Both independent and dependent variables used in Study 2 are assessed for possible outliers. The guidance provided in Tabachnick and Fidell (1989), that potential outliers can be identified if they have z scores in excess of ±3 of their mean, will be applied to the sample.

With n=22 and 1-tail (as all hypotheses have an a priori direction of anticipated association), significant correlations will be established when p<.36, a=.05. Further, the size of the correlations can be interpreted using the descriptions provided by Cohen (1988). Correlations of ±.10 to ±.29 will be described as small associations, while correlations of ±.30 to ±.49 are described as medium associations, and correlations of ±.50 to 1.00 are described as large associations.
7.3 Results

7.3.1 Dependent variable

The range of PCL-C scores was 17 to 68, with a mean score of 27.61, SD=11.95. The scores on the dependent variable for all participants were scrutinized for outliers. Of the original sample of 23 participants, one participant's score on the PCL-C exceeded the mean for Sample 2 by more than three standard deviations, indicating that this case represented an outlier. The distribution of PCL-C scores is presented in a histogram at Figure 9, along with a superimposed normal curve.

Figure 9 Frequency histogram of individual PCL-C scores, with normal curve superimposed, for Study 2 participants

It can be seen in Figure 9 that one case is clearly at an extreme pole of the distribution and should be considered to be an outlier. Due to the small size of the sample, the inclusion of an outlier could weaken any associations derived from the rest of the sample. Further, this participant was also the only case to exceed the cutoff indicating PTSD, within the sample. This category of dependent variable scores is of
potential interest to a study of mental health, and is tempting to include any case representing a different category of mental health, there is no way of knowing whether a single case is truly representative of the category of disorder, or whether the case is an outlier within that category or even both categories of the dependent variable scores. For reasons of not wanting to weaken any associations made by including an outlier, when there is no way of knowing whether a single case is representative of another category of dependent variable category worthy of study, the case was considered to be an interesting artifact, but excluded from further analysis.

The exclusion of the one case of PTSD was necessary to remove the statistical noise generated by a clear outlier. Further, any relationship between the study variables in a clinical population could not be investigated using only one representative from that population. This exclusion did reduce the variability in the data and sample size, thereby reducing the power of the statistical analysis. However, this impact was minimal due to the use of nonparametric statistical analysis, and the exclusion of only one case which was a clear outlier (the reduction in statistical power would be significantly high if parametric statistics had been used).

The distribution of PCL-C scores in Study 2, revised by the removal of the outlier, has a range of 17 to 43, with a mean of 25.77, SD=8.27.

7.3.2 Independent variables

7.3.2.1 Inter-relater reliability of the measures of emotions and interpersonal relating used in Study 2

Miles and Huberman (1994) provide a method and formula for comparing independent samples of coding of the same material that considers both agreements and disagreements between judges. This formula (Miles and Huberman, 1994: p.64), is:
Reliability = \frac{\text{Number of agreements}}{\text{Total number of agreements} + \text{disagreements}}

This method was applied to the ratings of all clauses, for all 22 participants, for the Positive Affect Scale, the Cognitive Anxiety Scale, and the Sociality Scale. The results for the Study 2 sample are presented in full, in Table 11. These data indicate that the average inter-rater reliability for the Positive Affect Scale, the Cognitive Anxiety Scale, and the Sociality Scale, are 0.91, 0.88, and 0.92, respectively. These levels of inter-rater reliability exceed the acceptable standard described by Viney and Caputi (2005/in press) and Gottschalk and Bechtel (2002).

Inter-judge reliability was also determined using correlations to quantify the strength of the linear relationship between the total standardized scores for each content analysis scale by independent judges, for each participant by independent raters.

Spearman’s correlations were used to maintain consistency with the non-parametric statistics that will be used throughout this study. Spearman’s correlations for the Positive Affect Scale was determined at +.74 (p=0.00), indicating a large positive association between the standard score for the each judge on the Positive Affect Scale. Spearman’s correlation for the Cognitive Anxiety Scale was determined at +.55 (p=0.00), indicating a medium positive association between the standard scores for each judge for the Cognitive Anxiety Scale. Spearman’s correlation for the Sociality Scale was determined as +.74 (p=0.00), indicating a large positive association between the standard score for each judge on the Sociality Scale.
Table 11.

*Inter-judge reliability data for coding the Positive Affect, Cognitive Anxiety, and Sociality Scales.*

<table>
<thead>
<tr>
<th>Positive Affect Scale</th>
<th>Cognitive Anxiety Scale</th>
<th>Sociality Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agree</strong></td>
<td><strong>Disagree</strong></td>
<td><strong>Reliability</strong></td>
</tr>
<tr>
<td>1</td>
<td>25</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>28</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>26</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>35</td>
<td>3</td>
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<tr>
<td>5</td>
<td>50</td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td>44</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
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<td>8</td>
<td>30</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>49</td>
<td>6</td>
</tr>
<tr>
<td>10</td>
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<td>22</td>
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<td>1</td>
</tr>
<tr>
<td>23</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
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<td>67</td>
</tr>
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<table>
<thead>
<tr>
<th><strong>Agree</strong></th>
<th><strong>Disagree</strong></th>
<th><strong>Reliability</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>2</td>
<td>0.93</td>
</tr>
<tr>
<td>27</td>
<td>2</td>
<td>0.93</td>
</tr>
<tr>
<td>28</td>
<td>1</td>
<td>0.97</td>
</tr>
<tr>
<td>29</td>
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<td>1.00</td>
</tr>
<tr>
<td>37</td>
<td>1</td>
<td>0.97</td>
</tr>
<tr>
<td>52</td>
<td>5</td>
<td>0.91</td>
</tr>
<tr>
<td>46</td>
<td>2</td>
<td>0.96</td>
</tr>
<tr>
<td>36</td>
<td>6</td>
<td>0.86</td>
</tr>
<tr>
<td>32</td>
<td>0</td>
<td>1.00</td>
</tr>
<tr>
<td>47</td>
<td>8</td>
<td>0.85</td>
</tr>
<tr>
<td>11</td>
<td>2</td>
<td>0.85</td>
</tr>
<tr>
<td>45</td>
<td>3</td>
<td>0.94</td>
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<td>0.93</td>
</tr>
<tr>
<td>16</td>
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</tr>
<tr>
<td>27</td>
<td>3</td>
<td>0.89</td>
</tr>
<tr>
<td>23</td>
<td>1</td>
<td>0.96</td>
</tr>
<tr>
<td>23</td>
<td>1</td>
<td>0.96</td>
</tr>
<tr>
<td>22</td>
<td>1</td>
<td>0.96</td>
</tr>
<tr>
<td>33</td>
<td>5</td>
<td>0.87</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>675</td>
<td>94</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Agree</strong></th>
<th><strong>Disagree</strong></th>
<th><strong>Reliability</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>2</td>
<td>0.93</td>
</tr>
<tr>
<td>28</td>
<td>1</td>
<td>0.97</td>
</tr>
<tr>
<td>29</td>
<td>0</td>
<td>1.00</td>
</tr>
<tr>
<td>37</td>
<td>1</td>
<td>0.97</td>
</tr>
<tr>
<td>52</td>
<td>5</td>
<td>0.91</td>
</tr>
<tr>
<td>46</td>
<td>2</td>
<td>0.96</td>
</tr>
<tr>
<td>36</td>
<td>6</td>
<td>0.86</td>
</tr>
<tr>
<td>32</td>
<td>0</td>
<td>1.00</td>
</tr>
<tr>
<td>47</td>
<td>8</td>
<td>0.85</td>
</tr>
<tr>
<td>11</td>
<td>2</td>
<td>0.85</td>
</tr>
<tr>
<td>45</td>
<td>3</td>
<td>0.94</td>
</tr>
<tr>
<td>42</td>
<td>3</td>
<td>0.93</td>
</tr>
<tr>
<td>16</td>
<td>0</td>
<td>1.00</td>
</tr>
<tr>
<td>27</td>
<td>3</td>
<td>0.89</td>
</tr>
<tr>
<td>23</td>
<td>1</td>
<td>0.96</td>
</tr>
<tr>
<td>23</td>
<td>1</td>
<td>0.96</td>
</tr>
<tr>
<td>22</td>
<td>1</td>
<td>0.96</td>
</tr>
<tr>
<td>33</td>
<td>5</td>
<td>0.87</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>711</td>
<td>58</td>
</tr>
</tbody>
</table>

A third assessment of inter-judge reliability of the scores for the Cognitive Anxiety, Positive Affect and Sociality Scales, was performed by comparing the means of the standard scores for significant differences, using paired-sample t-tests, between two raters. The test statistics for the Positive Affect, Cognitive Anxiety, and Sociality Scales...
Scales were 0.70, -1.63, and 0.20 respectively. With df = 21 and p = .01, the critical value of t = 2.52. Therefore the null hypothesis (i.e.: the scores are the same) is not rejected and the scores obtained between more than one judge for these three scales, can be considered to be not significantly different (p = 0.01).

Three different methods of assessing inter-rater reliability for scores on the Positive Affect Scale, the Cognitive Anxiety Scale and the Sociality Scale, have been used. These methods indicate good inter-rater reliability, medium to large positive correlations between scores, and that the distributions of scores by independent judges are not significantly different. These findings reinforce a view that the scores obtained by the primary and secondary raters have acceptable inter-rater reliability and can be used with confidence.

7.3.2.2 Examples of narratives coded by content analysis scales for independent variables

Before presenting scores derived by content analysis scales, it can useful to get a feel for the type of information provided by participants and how clauses taken from these narratives are coded and scored via content analysis scales.

Examples of clauses (there may be more than one presented) from narratives provided by the Study 2 sample, that would be scored for the Positive Affect Scale include:

“(I) haven’t looked back. I coped with the fire by making it my goal to sail on HMAS Westralia once more. Doing this helped me discover it wouldn’t happen again, and I moved on”.
“My time in HMAS Manoora totally changed my perspective. I pulled myself out of my rut and absolutely loved it”.

“I found great pleasure in my work. I found that even though the work was hard at times, I could enjoy myself”.

“Like most careers, I have had highs and lows with the Navy; and whilst I may have done some thing differently over the past 8 years, I am satisfied and happy with the way my time in the Navy has eventuated”

Examples of clauses (again, there may be more than one presented) from narratives provided by the Study 2 sample that would be scored for subscales of the Total Anxiety Scales:

“The four who died; I believe that their number was up” (Death Anxiety regarding others)

“I am more concerned about how my experiences have impacted on those around me, particularly my wife, as she has had a harder time dealing with the fact that I could have died then, that I have” (Death Anxiety regarding others)

“Being sea-sick regularly didn’t help this” (Mutilation Anxiety regarding self)

“I have lost my father in the last month and this time to recover” (Separation Anxiety regarding self)
“I tried to leave the Navy, but got freaked out and posted back to HMAS Westralia” (Separation Anxiety regarding self)

“I have since learned that females can not get away with this, as opposed to my male classmates in other ships” (Guilt Anxiety regarding self)

“I blamed myself heavily for this, thinking I was always concerned with myself and not for her and out kids when they were there for me” (Guilt Anxiety regarding self)

“I seem to forget the simple chores of life” (Shame Anxiety regarding self)

Examples of clauses (again, there may be more than one presented) from narratives provided by the Study 2 sample, that would be scored for the Cognitive Anxiety Scale include:

“I reach my threshold before others” (an example of cognitive anxiety experienced by the self due to a high rate of presentation)

“My life hasn’t changed much at all since the fire; although it was a traumatic experience at the time” (cognitive anxiety expressed, but denied)

“I could never understand how they could ever go to war … so it makes me wonder how many are making it up.” (cognitive anxiety - incongruous stimuli/extra constructs needed)
“After the fire I was pretty confused about what was going on with my life” (cognitive anxiety - extra constructs needed)

“Its only when I think back that I feel I had a problem that no-one picked up on. I guess my command team did, but didn’t know how to fix it for me.” (cognitive anxiety experienced by others – extra construct needed)

Examples of clauses (again, there may be more than one presented) from narratives provided by the Study 2 sample, that would be scored for the Hostility Scale include:

“We have to take off the kid-gloves when recruiting and training our people” (Hostility outwards, overt)

“I don’t really trust what comes out of Canberra anymore” (Hostility outwards, overt)

“If they don’t like danger in their life, then they can work at the supermarket” (Hostility outward, covert)

Examples of clauses (again, there may be more than one presented) from narratives provided by the Study 2 sample, that would be scored for the Depression Scale include:
“Like everyone else I had problems with relationship, family, friends etc, and eventually broke up with my girlfriend at the time”

“After the fire I was pretty confused about what was going on with my life”

“Only been in the engine room once since it was rebuilt, and felt numb”

“I am tired of dealing with it”

Finally, examples of clauses (again, there may be more than one presented) from narratives provided by the Study 2 sample, that would be scored for the Sociality Scale include:

“Thank goodness for a good wife” (intimacy - receptor)

“I used my experiences onboard HMAS Westralia to improve the way I handle personnel” (influence – initiator)

“Personally, Navy support has been good. I believe there is a genuine corporate desire to prevent this from happening in the future. I know the Commanding Officer has expended significant time and energy since the fire dealing with crew and deceased’s family members.” (solidarity – receptor)

“My family still ask me about it, and I tell people about what I did on the day, and I tell what I did, which makes me feel good I think” (solidarity – receptor).
These narratives are coded and scored for each of the scales, providing a feel for the types of information provided by participants, and how narratives contribute to the scores for each of the content analysis scales. The results of content analysis of narratives provided by the Study 2 sample, using the content analysis scales listed in 7.2.3 are presented in the next section.

7.3.2.3 Emotions and interpersonal relating: normative contrasts.

The independent variables for Study 2 were measures of positive emotions (Positive Affect Scale), emotions of transition (subscales of the Total Anxiety Scale, Hostility Outward Scale, Cognitive Anxiety Scale, and Depression Scale), and interpersonal relating (Sociality Scale). The means and standard deviations of the independent variable are displayed in Table 12. Using the standard described by Tabachnick and Fidell (1989), no participant was indicated as an outlier.

Further to the total Sociality Scale score, the subscales that contribute to the total scale score, and which identify different types and directions of interpersonal relationships are presented in Table 13, and also presented in Figure 10, allowing a visual comparison of the relative contributions to the total Sociality Scale score of subscales measuring type of relationship.
Table 12.

*Mean standard scores and standard deviations, for Content Analysis Scale subscale and total scores for the Study 2 sample (n=22).*

<table>
<thead>
<tr>
<th>Scale</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Affect</td>
<td>1.45</td>
<td>0.47</td>
</tr>
<tr>
<td>Threat</td>
<td>2.12</td>
<td>0.38</td>
</tr>
<tr>
<td>Death Anxiety</td>
<td>0.73</td>
<td>0.24</td>
</tr>
<tr>
<td>Mutilation Anxiety</td>
<td>0.66</td>
<td>0.18</td>
</tr>
<tr>
<td>Separation Anxiety</td>
<td>0.73</td>
<td>0.23</td>
</tr>
<tr>
<td>Guilt Anxiety</td>
<td>0.77</td>
<td>0.37</td>
</tr>
<tr>
<td>Shame Anxiety</td>
<td>0.82</td>
<td>0.24</td>
</tr>
<tr>
<td>Cognitive Anxiety</td>
<td>2.01</td>
<td>0.86</td>
</tr>
<tr>
<td>Hostility Out Total</td>
<td>1.04</td>
<td>0.15</td>
</tr>
<tr>
<td>Overt</td>
<td>0.90</td>
<td>0.19</td>
</tr>
<tr>
<td>Covert</td>
<td>0.58</td>
<td>0.08</td>
</tr>
<tr>
<td>Total Depression</td>
<td>6.28</td>
<td>0.98</td>
</tr>
<tr>
<td>Sociality</td>
<td>0.85</td>
<td>0.45</td>
</tr>
</tbody>
</table>

Table 13.

*Mean Standard Score and Standard Deviation for Sample 2, for Subscales and Total Sociality Scale Scores.*

<table>
<thead>
<tr>
<th>Solidarity</th>
<th>Intimacy</th>
<th>Influence</th>
<th>Shared Exp</th>
<th>Reactor</th>
<th>Initiator</th>
<th>Reactor / Initiator</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS</td>
<td>0.45</td>
<td>0.48</td>
<td>0.21</td>
<td>0.31</td>
<td>0.46</td>
<td>0.33</td>
<td>0.46</td>
</tr>
<tr>
<td>SD</td>
<td>0.24</td>
<td>0.26</td>
<td>0.11</td>
<td>0.21</td>
<td>0.25</td>
<td>0.22</td>
<td>0.25</td>
</tr>
</tbody>
</table>
As the total Sociality Scale score is based on a composite of subscale scores, Figure 10 indicates the relative contribution of each sub-scale, to the total score. Figure 10 indicates that positive relationships based on solidarity and intimacy contribute relatively more to the total scale score (31.03% and 33.10% respectively), than do positive relationships based on Shared Experiences or Influence (14.48% and 21.38% respectively).

With regard to the perceived direction of their relationships, the Sociality Scale codes clauses as indicating subject as reactor, initiator, or either (no clear preference). Figure 11 displays the standardised scores for the Reactor, Initiator, and either Reactor or Initiator Subscales of the Sociality Scale. There is a significant difference (t = 1.72, p<.05) between the standard score for Initiator, and both Reactor and either Reactor or Initiator Subscales. This suggests a preference among the Study 2 sample to view positive relationships in terms of how they, as subjects, are related to by others, rather than in terms of how they relate to other people.
7.3.2.4 Post-trauma mental health.

The mean PCL-C score for the Study 2 sample was 25.77, SD = 8.28 and the range of scores was 17 - 43. The cutoff score of 50+ to indicate possible PTSD was not exceeded by any of the Study 2 participants and the distribution of scores did not indicate the presence of possible outliers.

7.4 Discussion

I will now provide interpretation to the normative results obtained from the Study 2 sample.

7.4.1 Interpreting content analysis scale scores: Some contrasts.

The distribution of scores for the independent variable reported can be compared against available normative data. From these comparisons, a profile of variation and significance of variation in scores obtained by the Study 2 sample can be made. The resulting Z-scores can be profiled.
In order to create Z-scores, it is first necessary to choose normative groups where more than one normative group for each scale exists, with this choice being based on the samples that most closely approximate the Study 2 sample demographics. The Study 2 sample can be summarized as predominant male, adult, with stable employment, and with no pre-existing obvious mental health disorders.

With regard to the Positive Affect Scale, comparative data is available for mothers, psychiatric patients, students, relocated women and students in transition (Westbrook, 1976), patients in a range of palliative care situations (Viney, Walker, Robertson, Lilley & Ewan, 1994), and adolescent offenders prior to group work, at completion of group work and at follow-up (Viney, Henry & Campbell, 2001), and medical patients admitted to hospital in crisis before and after crisis-intervention counselling, and at follow-up (Viney, Clarke, Bunn & Benjamin, 1985). I chose students (Westbrook, 1976) as most closely approximating Sample 2. I considered that mothers, relocated women, and medical patients were predominantly female samples, that adolescents were not similar to adults, that psychiatric patients had pre-existing disorders, and of the two student groups, the students in transition were experiencing a significant change in their employment or circumstances. The mean score Positive Affect score for students (Westbrook, 1976) is 0.70, SD = 0.25.

With regard to the Threat Scale, there is no comparative data available for the composite Threat score. However, data is available for comparative groups for the component subscales of the Anxiety Scale on which the Threat scores is based (the Death Anxiety, Mutilation Anxiety and Separation Anxiety subscales of the Total Anxiety Scale). Comparative group are male and female adults and children (Gottschalk & Bechtel, 2000). I chose male adult norms (Gottschalk & Bechtel, 2000) as this sample most closely approximates Sample 2. Children and female groups did not match Sample
The mean scores for male adults (Gottschalk & Bechtel, 2000) for the Death Anxiety, Mutilation Anxiety and Separation Anxiety subscales of the Anxiety Scale respectively are: 0.30, SD = 0.51; 0.36, SD = 0.55; and 0.30, SD = 0.46.

For the Cognitive Anxiety Scale, comparative data is available for university students, psychiatric inpatients, incoming students, new mothers, and relocated women (Viney & Westbrook, 1979), adolescent offenders before and after successful group therapy and at follow-up (Viney, Henry & Campbell, 2001), medical patients in crisis, before and after successful therapy and at follow-up, (Viney, Clarke, Bunn & Benjamin, 1985), and patients in a range of palliative care situations (Viney, Walker, Robertson, Lilley & Ewan, 1994). I chose university students as the group most closely approximating the Sample 2. Relocated women, new mothers, and medical patients in crisis were predominantly female samples, adolescent offenders were not adults, psychiatric patients had a pre-existing mental health problem, and patients in palliative care did not have stable employment, and so did not as closely approximate Sample 2. The mean Cognitive Anxiety Scale score for students (Viney & Westbrook, 1979) is 0.91, SD = 0.62.

For the Guilt, Shame and Hostility the available comparative groups included male and female adults and children (Gottschalk & Bechtel, 2000). For each of these scales, I chose the male adult norms (ibid) as the closest approximation to Sample 2. Female and children samples did not approximate Sample 2 as closely. The mean Guilt and Shame subscales of the Anxiety Scale for adult males (Gottschalk & Bechtel, 2000) are 0.31, SD = 0.49; and 0.42, SD = 0.57 respectively. The mean Hostility score for adult males (Gottschalk & Bechtel, 2000) is 0.70, SD = 0.36.
With regard to the Depression Scale, available comparative group include male and female adults and children (Gottschalk & Bechtel, 2000), women at the start, completion and at follow-up, for treatment for breast cancer (Lane & Viney, 2005). As previously, I chose male adult norms (Gottschalk & Bechtel, 2000) as the closest approximation to Sample 2. Female and children samples did not approximate Sample 2 as closely, and a depressed sample had a pre-existing mental health disorder. The mean Depression score for adult males (Gottschalk & Bechtel, 2000) is 5.48, SD = 1.87.

For the Sociality Scale, possible groups for comparison include street youth, successful university students, transitional students, external university students, relocated women, child-bearing women, relatives of medical emergency patients and hospitalised psychiatric patients, and relocated women (Viney & Westbrook, 1979), medical patients in crisis at admission, discharge and follow-up (Viney, Clarke, Bunn & Benjamin, 1985) and for patients in a range of palliative care situations (Viney, Walker, Robertson, Lilley & Ewan, 1994). I chose external university students, as most closely approximating Sample 2, as street youth were not adults, child-bearing women, relatives of medical emergency patients, relocated women, and medical patients, were predominantly female groups, while patients in palliative did not have stable employment, psychiatric patients had a pre-existing mental health disorder. Of the university students, I considered that transitional university students were not in stable employment, leaving successful university students and external students. Of these, I considered that external university students more closely approximated Sample 2. The mean Sociality scale score for external university students is 0.43, SD=0.23.

The normative data described above is detailed in Appendix S. The Z-scores for each participant in the Study 2 sample are presented in Table 16. The critical Z-score value to determine whether the Study 2 sample means were significantly elevated was
determined from normal curve tables for a two-tailed test (post-hoc comparison), at 
Z=1.96, a<0.05.

For the Threat score, an average Z-scores based on the three constituent 
subscales of the Total Anxiety scale (Death Anxiety, Mutilation Anxiety and Separation 
Anxiety) is as used. Table 14 displays the Z-score values, with these graphically 
represented in Figure 12. The mean Z-score for Positive Affect is significantly elevated 
(p<.05) and the mean Z-score for the Sociality is extremely close to being significantly 
elevated (1.93, p<.05 compared with 1.96, p<.05). Taking into consideration a possible 
effect due to the small number of participants in Sample 2, the elevation of the Z-score 
for the Sociality Scale is considered close enough to have reached significance. The 
mean Z score for the Cognitive Anxiety scale also approached, but did exceed, the 
critical value indicating significant elevation. However, as the elevation of the 
Cognitive Anxiety Scale did not as closely approach significance as did the elevation of 
the Sociality Scale, the elevation of the Cognitive Anxiety Scale is considered to have 
not reached significance.

Table 14

<table>
<thead>
<tr>
<th>Scale</th>
<th>Positive Affect</th>
<th>Threat</th>
<th>Anxiety</th>
<th>Guilt</th>
<th>Shame</th>
<th>Hostility</th>
<th>Depn</th>
<th>Sociality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z-score</td>
<td>3.01</td>
<td>0.77</td>
<td>1.77</td>
<td>0.94</td>
<td>0.69</td>
<td>0.14</td>
<td>0.43</td>
<td>1.93</td>
</tr>
</tbody>
</table>
Critical level for $p = 0.05$

Figure 12. Profile analysis of independent variable Z-scores from comparing Study 2 means to normative means. The dotted line represents the critical Z-score indicating significant elevation ($Z = 1.96$).

The contrasts generated in Figure 12 can be summarized as follows: The Study 2 mean scores for Positive Affect and Sociality were significant elevated above the means of comparative samples, while the Study 2 mean scores for Threat, Anxiety, Guilt, Shame, Hostility, and Depression were elevated, but not significantly elevated above the means of comparative samples.

These contrasts indicate that participants who maintain mental health report significantly elevated levels of positive emotions, no significant elevation in any emotions of transition, and significantly elevated levels of positive interpersonal relating. As these results are based solely on a mentally health group a full association between positive emotions and the full range of mental health cannot be extrapolated. However, there is nothing in these results which do not support Hypothesis 2, or Hypothesis 3. Therefore, while noting the limitations, it can be stated that these results provide limited support for Hypotheses 2 and 3 (positive emotions will be positively associated with ongoing mental health, while emotions of transition will be negatively...
associated with mental health; and that social support will be positively associated with mental health).

7.4.2 Relationships between independent and dependent Variable.

Possible linear associations between positive emotions, emotions of transition and interpersonal relating are also explored. As noted, normality of the distribution of PCL-C scores cannot be assumed, so non-parametric correlations (Spearman correlations) will be used. Table 15 displays Spearman correlations between independent variables (measure of positive emotions, emotions of transition, and interpersonal relating), and the dependent variable (post traumatic mental health). As mental health is indicated by low scores on the PCL-C, the direction of associations need to be reversed when interpreting these associations. For n=22 and one-tailed test (as the hypotheses are a-priori), the critical value of Spearman is Ps=.42, p =.05.

Table 15.

*Spearman Correlations between Positive Emotions, Emotions of Transition, and Interpersonal Relating, and PCL-C Score, for Sample 2 (n=22).*

<table>
<thead>
<tr>
<th>Positive Threat</th>
<th>Anxiety</th>
<th>Guilt</th>
<th>Shame</th>
<th>Hostility Out Total</th>
<th>Overt</th>
<th>Covert</th>
<th>Deprn</th>
<th>Sociality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affect</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ps</td>
<td>-0.42</td>
<td>0.19</td>
<td>-0.29</td>
<td>0.57</td>
<td>0.26</td>
<td>0.27</td>
<td>0.42</td>
<td>0.18</td>
</tr>
<tr>
<td>p</td>
<td>0.03</td>
<td>0.20</td>
<td>0.09</td>
<td>0.00</td>
<td>0.12</td>
<td>0.11</td>
<td>0.03</td>
<td>0.21</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.50</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.13</td>
</tr>
</tbody>
</table>

Table 17 displays significant associations (p<.05) between positive emotions, guilt, hostility out-overt, and depression, and post-traumatic mental health. Reversing the direction of association (as mental health is indicated by lower, rather than higher,
PCL-C scores), and using Cohen's (1988) descriptions of the size of the associations (correlations of +.10 to +.29 are small associations; correlations of +.30 to +.49 are medium associations; and correlations of +.50 to 1.00 are large associations), Table 17 indicates the following significant relationships:

1. A medium and positive association between positive emotions and post-traumatic mental health;
2. A large and negative association between guilt and post-traumatic mental health;
3. A medium and negative association between hostility out-overt, and post-traumatic mental health; and
4. A large and negative association between depression and post traumatic mental health.

The significant association between positive emotions, guilt, hostility, and depression, and post-traumatic mental health supports Hypothesis 2. The indication of only some associations between emotions of transitions and post-traumatic mental health, and the relative size of these associations support Hypothesis 4 (with the rank order of decreasing, but significant associations, being guilt, depression and hostility).

7.4.3 Describing the profile of Sample 2 using the model of trauma.

Firstly, positive affect is elevated, and there is a large and positive linear association between positive affect and mental health. Sample 2 experience more positive emotions than an appropriate comparison group. This is consistent with positive emotions indicating validation, or no fragmentation beyond an inferential level.

Secondly, threat is not elevated (compared to a male adult sample), and there is no significant linear association between threat and mental health. Given that the
description of the Threat scale (provided in 7.2.3.1.2), the results indicate that there is some elevation, although not a significant elevation, in references to death, injury and separation by the subject or in others, in Sample 2. Understanding the assumptions of Content Analysis Scales (that people project psychological states through the language they use), it can be assumed that there is no significant elevation in psychological states fixated on death, injury or separation from others, in Sample 2. This is consistent with the expectation of a sample for who no mental health problem are detected. A mentally healthy sample should not anticipate a repeat of a traumatic event (which would probably be construed by most people as threatening), which is, in turn, validated by their experience of no trauma over time. With no expectation of a repeat event and no experience of a repeat event, constructs of the trauma are not in conflict with superordinate construing (with the event becoming construed as historical, rather than current). This indicates that either disorder has not been present, or if he had, that it has been resolved. Given that the instructions to elicit narratives request participants to describe, “your life since the fire”, it is appropriate to assume that constructs represented in the narratives would be constructs related to the impact of the fire on their lives. Therefore, to imply that people are not reporting threat is to imply that constructs relating to death, mutilation or separation are unlikely to be superordinate in their construct systems or that they do not anticipate death, mutilation or separation in their imminent future. If a person anticipates that death, mutilation and separation will not be a part of their imminent future, and their experiences validate this, then the construct of threat is not part of a disorder. Given then disorders such as PTSD can be seen as fixations with death, mutilation and separation, measures of threat should be associated measures of disorder.
Thirdly, cognitive anxiety is elevated (but not significantly elevated), and there is a small and positive linear association between cognitive anxiety, and mental health. Some elevation in cognitive anxiety indicates that Sample 2 is experiencing some invalidation or fragmentation. However, that invalidation or fragmentation is not sufficient to result in disorder (as Sample 2 has no participants indicated for PTSD). If invalidation is at a level in people’s hierarchical construct system that can be resolved by a higher level in the hierarchy, or if that the level of fragmentation experienced does not exceed the inferential level; then invalidation or fragmentation (resulting in cognitive anxiety) can be tolerated without disorder. The non-significantly elevated level of threat indicates that there is no invalidation of construing at the most superordinal level (and therefore if there is invalidation, it is at a lower level in the construct hierarchy). Further, the low association between cognitive anxiety and PTSD suggests that while there may be some fragmentation, it may be at a low level. Kelly’s (1955/1991) Fragmentation Corollary indicates that inconsistencies in construing can be tolerated provided they do not exceed an inferential level. While the notion of inferential fragmentation is not clearly defined by Kelly, I argue that ‘significantly elevated above norm’, is a reasonable standard to determine whether an elevation exceeds the inferential level. If this standard is applied to Sample 2 mean Z scores, then the inferential level is not exceeded. As the question used to elicit narratives that have been rated to provide the Cognitive Anxiety score targeted the fire in HMAS Westralia, and life since, it can reasonably be assumed, that any Cognitive Anxiety resulting from this narrative, should be between constructs related to the fire and life since the fire, compared to existing construct systems before the fire. The Fragmentation Corollary may therefore provide guidance as to when trauma exists and when it is resolved, based on whether levels of fragmentation of existing construct systems and constructs related
to the incident, are elevated beyond an inferential level. For Sample 2, trauma may have existed, but now been resolved, as indicted by levels of Cognitive Anxiety not being significantly elevated above appropriate norms normative data.

Fourthly, there are non-elevated levels of guilt, combined with a large and negative linear association between guilt and mental health. While the non-elevated level of guilt across the sample is consistent with the finding of no disorder, the large association suggests that guilt may have been an issue for Sample 2, and that it has been resolved, with positive mental health as the outcome.

Kelly described guilt as: “the awareness of dislodgement of the self from one’s core role structure” (1955/1991, Vol. 1, p361). It is people’s awareness that their sense of themselves is not what they believed it to be, they have not acted in accordance with their core role, or have done something that is perceived by them as being in direct contradiction to their central roles (Landfield & Leitner, 1980). It is awareness by people that their behaviour is not consistent with their moral code or construing of their role. Kelly argues that guilt results from people’s self-perceptions of not having behaved in accordance with their role, rather than people construing others’ as constructions of their behaviour.

While Kelly (1955/1991) describes guilt as dislodgement of the self from one’s core role structure, this does not mean that guilt should be associated with threat (and they appear to be separate factors here). Tangney (1995) argues that guilt is a focus on a specific behaviour that could invalidate core identity, rather than invalidation of core identity itself. Lindsay-Hartz, De Rivera & Mascolo (1995) report that survivors of trauma often experience the emotion of guilt, as they take responsibility for the trauma. This is viewed as a conviction that they were responsible to prevent trauma, regardless of whether others would view the causation of the event in this way. They describe guilt
as functioning to both help preserve a sense of control in a seemingly out-of-control situation, and to preserve loyalty and validation of community-held moral beliefs, at the expense of personal distress.

Lindsay-Hartz, De Rivera and Mascolo (1995) describe four conditions that increase the likelihood of people construing themselves as guilty that can explain this phenomenon. People need to have a usual tendency to feel responsibility for preventing bad things from happening; people need to maintain a belief that they have or can control what happens around them; they can empathise with others; and they have a desire to honour personal and moral commitments. In addition to these considerations, Tangney (1995) adds that guilt is mostly to occur in the context of close, intimate relationships, rather than causal or peripheral relationships. The issues of personal responsibility, control, and moral commitments could be seen as general descriptors of a military sample, although this is speculative. The issues of empathy and intimate relationships are consistent with Sample 2, who report elevated levels of sociality; primarily resulting from solidarity and intimacy. Therefore, the outcome of non-elevated guilt in Sample 2 is consistent with positive mental health, and the large association between guilt and mental health suggests that it is the process of resolving guilt that accounts for the positive mental health. Guilt could be expected to be relevant to this sample, for whom issues of personal responsibility, control and moral commitment are to be expected, and for whom positive interpersonal relationships are very important.

Fifthly, there is no significant elevation in levels of shame, and no significant linear association between shame and mental health. The level of shame is consistent with positive mental health, and the lack of significant association indicates that shame has not been an issue for Sample 2. Shame, according to Lindsay-Hartz, De Rivera and
Mascolo (1995), is the awareness by people, of invalidation of other people’s construing of their role, rather than of a specific behaviour. That there is no significant association indicates that Sample 2 do not perceive negative appraisal of their roles and identity by other significant people.

As described by Tangney and Dearing (2002), guilt and shame are similar moral and negatively valanced emotions, and both involve construing failures or transgressions. However, they differ in some key dimension. Guilt focuses on failure or transgression by specific behaviours, while shame focuses on a broader failure of role or identity. Guilt also leads to the experience of tension, remorse and regret, with a need for action to restore or resolve the failure or transgression; while shame leads to feeling worthless and powerless, and a need to avoid other people. Further, guilt also is a construing of self, while shame is a construing of the construing of others. This involves a difference in internal versus external focus. Given the difference in the scope of the failure or transgression (guilt focuses on behaviour while shame focuses on role or identity), it would be expected that there would be a difference in the experience of distress associated with guilt and shame. With a more specific focus (i.e.: a specific behaviour) that would be lower in most peoples’ hierarchy of constructs, guilt generally results in less distress than shame. As the experience of guilt is more specific in focus, more likely to lead to action to resolve the failure or transgression, and is a less painful experience, than shame, it makes intuitive sense that it should be more easily resolved than shame.

Sixthly, while there is no significant elevation in hostility, and no significant association between total hostility out, there is a medium and negative linear association between hostility out-overt, and mental health. This lack of elevation of general hostility scores is consistent with the finding of positive mental health (as hostility should be
negatively associated with mental health). In the light of Cummins' (2003) and Bannister's (1977/2003) contentions that hostility and anger are expressions of invalidation and of need for change, and is the result of people being unwilling to face up to the need to change and develop new constructs in the face of invalidation, the linear association between hostility outward, overt, and mental health, can be interpreted that change was needed, and has also now taken place. Sample 2 may have experienced hostility outward - overt, but have resolved it, resulting in positive mental health. The difference between hostility out – overt (which refers to the subject expressing hostility) and hostility out – covert (which refers to someone other than the subject expressing hostility – perhaps toward the subject) reinforces that it is the subject is resolving hostility, rather than someone else. Kelly described hostility as: “the continued effort to extort validational evidence in favour of a type of social prediction which has already been recognized as a failure” (1955/1991, Vol. 2, p.391). Hostility is commonly interpreted as behaviour aimed at resolving invalidation of people’s anticipations of the world, though attempts to force or manipulate the world to change, rather than to revise their own anticipations. With this in mind, Sample 2 may have initially tried to force the world to change to resolve their invalidation. However, given the lack of elevation in hostility and the linear association with reports of mental health, it can be inferred that Sample 2 has resolved invalidation or fragmentation through construct revision and have no longer and need to engage in hostility outwards. An alternate explanation could be that, as a group, they have engaged in non-validation, avoiding the awareness of invalidation or fragmentation and seemingly continued with positive mental health. However, given the time passed since the incident, this explanation is less likely than a resolution of hostility outwards – overt.
The concept of hostility outwards is similar to that of anger or aggressive behaviour. An association between outward anger or aggressive behaviour, and PTSD in Vietnam veterans was made by Taft, Street, Marshall, Dowdall and Riggs (2007). More broadly, Orth and Wieland (2006) describe a substantial association between anger and hostile behaviour and PTSD, in a meta-analysis of 39 studies. They combine understanding of anger and hostility as the same construct, and while having similarity with Kelly’s (1955/1991) description of hostility, Orth and Wieland’s understand of anger and hostility appears to be more be specific than Kelly’s. However, the association between anger and PTSD is clearly articulated, with the direction of association consistent with Sample 2.

Seventhly, Sample 2 reports no elevation in depression, but a large linear association between depression and mental health. Neimeyer (1985) views depression as the result of constricted construing. Constriction serves to avoid the anxiety associated with invalidation or fragmentation, by narrowing the focus of construing to individual constructs, where the likelihood of construing the nature of invalidating or fragmented relationships between the constructs, is beyond awareness. That there is a large and negative association between depression and mental health indicates that constriction is negatively associated with mental health. Constriction of construing, especially of peoples’ social roles, was viewed by Klion and Pfeninger (1996) as the basis of PTSD in Vietnam veterans. They described young men whose first adult role was that of a soldier. These veterans learned roles that were highly appropriate to combat, but not to non-combat or civilian roles. Further, there was little opportunity or encouragement to adapt their roles to circumstances that changed dramatically once the war was over or they were no longer combat soldiers. To them, using their constrictive, preemptive, combat-appropriate construct systems in non-combat settings failed; yet
developing alternates was either too daunting a prospect, or they lacked the conditions likely to lead to change. The result was a suspension of integration of their combat role and non-combat roles, perpetuating invalidation or fragmentation.

This is consistent with my personal construct model of psychological trauma, where disorder is viewed as invalidation and fragmentation between existing construct systems and constructs related to a traumatic event, with a need for the development of new associative constructs to resolve invalidation or reduce fragmentation to an inferential level. Constriction would reduce the likelihood of people developing associative constructs, while the opposite of constriction, dilation, should increase the likelihood of people developing new constructs.

Sample 2 indicate positive mental health, suggesting that they have either not experienced invalidation or fragmentation (beyond an inferential level), between existing construct systems and trauma-specific construing; or they have resolved any invalidation or fragmentation. Given the significance of the event as a potentially traumatic event, it is likely that Sample 2 were challenged by the event, but have also developed appropriate associative constructs to avoid disorder. Whether any possible invalidation or fragmentation was resolved at the time, or during the years since, constriction would be expected to impede this process and dilation facilitate this process. The findings of Study 2 include a significant and negative association between depression and mental health supports this view.

Eighthly, Sample 2 report significant elevated levels of positive interpersonal relations, with this elevation primarily due to relationships involving solidarity and intimacy. There was no linear association between positive interpersonal relating and mental health. The existence of positive interpersonal relationships and positive mental health is expected, as positive interpersonal relating is necessary for conditions
favourable for the formation of new constructs. New constructs, especially associative ones that allow for integration between existing construing and constructs related to a traumatic event, are necessary to resolve invalidation or fragmentation and result in positive mental health. Kelly (1955/1991) describes the conditions favourable for the development of new constructs as the availability of fresh elements, validation, and having the opportunity to experiment. I argue that these conditions are predominantly interpersonal conditions.

Rowe (2005) observed that: “every interaction between people is laden with possibilities for validation and invalidation” (p.296). Kelly (1955/1991) describes the maturation process as a person moving from relatively simple and impermeable dependency constructs (dependent on only one or two people without choice, such as parents), to permeable constructs (more freedom to choose and discriminate dependencies, from a wider range of people and other resources, in order to satisfy different needs. Chiari, Nuzzo, Alfono, Brogna, D'Andrea, Di Battista, Plata and Stiffan (1994), describe maturation as people realising and conserving their existence and identity in a network of social relations. Dalton and Dunnett (1992) indicate that a healthy situation is when people disperse their dependencies around a number of different people, as this provides a range of co-scientists, with a range of different and discrete areas of expertise or interest with which to test their theories about themselves and their world.

Neimeyer and Neimeyer (1985) argue that the person-as-scientist metaphor relates to developing interpretations that are forged within a social context. Only by testing and retesting their constructions against the behaviour and attitudes of other people do individuals extend and define their understanding of interpersonal experience. Neimeyer and Neimeyer (1985) and Dalton and Dunnett (1992) describe the importance
of using other people as co-scientists or collaborators to help them in their scientific endeavours; by helping develop, test, re-test, and refine hypotheses that form superordinal constructs. Further, Sargent (1997) notes that scientific evidence, which forms the basis of people's construct systems, is socially constructed, as factual items used as evidence for a theory, are constructed through social negotiation. Viney, Clarke Bunn and Benjamin (1985) emphasise that the extent to which crises are effectively resolved is largely a function of the interpersonal supports available during the crisis. They propose that interpersonal relating in crisis have goals of helping recognize and work through emotions, and plan behaviour to cope. These, in turn, contribute to restructuring and re-construing, leading to growth. Specifically, in crisis, interpersonal relating aims at achieving low levels of anxiety and depression, and high levels of control and competence.

Two of Kelly's (1955/1991) eleven corollaries, focus on interpersonal relating. The Commonality and Sociality corollaries are viewed by Duck (1982) as carrying the weight of Personal Construct Theory's approach to social behaviour. The Commonality corollary holds that the degree of similarity of construing between people determines the degree to which their psychological processes are similar. Further, Duck (1982) indicates that the psychological similarity between people should be assessed by measuring the similarity of their construing. Given that Kelly's fundamental postulate is that "a person's processes are psychologically channelised by the ways in which he anticipates events" (1955/1991, Vol. 1, p.32-37), it stands that the degree of similarity in anticipation of events between people will determine the degree of commonality between them. Social support would therefore be based on commonality, or the degree to which peoples' construing and anticipations were similar.
The Sociality Corollary infers that the viability of social processes is determined by the degree to which people try to construe the construing process of others (Tschudi & Rommetveit, 1982). This indicates that simply having something in common with others is not enough. Rather, in order for social processes to be viable, there is a need to go beyond passively having similar construing, to be actively involved in the process of trying to construe other people’s construing of their worlds and events. Viney (1996) indicates that to be truly supportive, the attitudes and actions of others must validate the clients’ construct or view of themselves, and the event.

The nature of effective interpersonal relationships requiring active engagement is similar to the essence of the sharing, compatibility, and alignment of affect and knowledge-skill across the individual team members that Kozlowski (1998) describes as essential for effective social support in high stress environments in the military.

An association between interpersonal relating and trauma-related mental health was established in Study 2 (through the mean total Sociality Scale score being significantly elevated among the Sample 2, which reported no disorder in the aftermath of a potentially traumatic event). However, the association is not a linear one. It can be speculated that interpersonal relating may act as a buffer against the development of trauma, with a critical level required to overcome any the adverse outcome of an invalidational insult such as a potentially traumatic event. It may be that rather than a linear relationship, that there is either a sufficient level of effective and satisfying interpersonal relationships to develop the new constructs required, or not.

As failure to develop new constructs is consistent with Kelly’s (1955/1991) view of disorder, social relating, as a condition mediating the formation of new constructs, has an essential part to play in mental health. That Sample 2, with a high level of positive interpersonal relations, (especially those involving solidarity and
intimacy, rather than authority or simply sharing experiences), report positive mental health, despite their involvement in a potentially traumatising event, can be expected, because of their significantly elevated levels of perceived positive interpersonal relating.

The personal construct model of mental health following potential trauma proposes that elevated levels of social relating should be reported by participants who have experienced a potentially traumatic event, yet who have either not developed disorder, or resolved any disorder.

Kelly (1955/1991) described conditions both favourable and unfavourable to the development of new constructs. In Chapter 5, I argued that these conditions were largely based on interpersonal relating, suggesting that interpersonal relating could mediate the formation of new constructs. I also noted the views of Epting and Amerikaner (1980), that argument that interpersonal relationships can facilitate or inhibit movement from loose to tight construing and therefore mitigate progress in the Creativity Cycle. Further, Leitner and Pfenninger (1994) argue that construing does not happen in a social vacuum, but relies on a dynamic interaction between people and their worlds to take place. Tschudi and Rommetveir (1982) describe interpersonal relating as key to disorder and mental health. Finally, Walker (1996) viewed social relationships as necessary for evolving construct systems and for testing out discriminations, adding that interpersonal relating is a central aspect of personal construct psychology and of the process of developing and revising construct systems.

McFarlane and van der Kolk (1996) suggest that as long as social support networks remain intact, people are relatively well protected against even catastrophic stresses. They seek attachment to others, and validation about events and support from others is a vital aspect of preventing and treating post traumatic stress. Similarly, Davidson (1995), Creamer (1996), and Irving, Telfer & Blake (1997), contend that the
degree of social support directly contributes to coping and the relative risk of
developing PTSD. Grossman (1995) and Slusarcick (1999) add that social support is as
influential in determining the magnitude of stress related psychological injuries, as the
degree of trauma in the original incident. They, along with Davidons (1995), note that
the presence of social support acts to buffer PTSD, while the absence of it serves as a
vulnerability factor. Fairbank and Nicholson (1995) described Vietnam veterans with
PTSD as perceiving themselves as having progressively fewer social supports over time
than did control groups, suggesting that as social support drops, PTSD symptoms rise.

With regard to social support in the military, Manning (1994) noted that “one of
the enduring legacies of World War II military psychiatry was the recognition that the
incidence of psychiatric casualties in various units had more to do with characteristics
of the unit than with the characteristics of the casualties themselves” (p.2). He
contended that psychological breakdown in the battlefield involved a sudden change in
the relationship between soldiers and their primary group or team, with individuals
losing the sense of belonging to a powerful group, leaving them isolated, overwhelmed
and disorganised. This emphasis on interpersonal factor, rather than on individual
factors as the cause of disorder is also described by McCarroll, Jaccard & Radke (1991).
Glass (1955), noted that morale (group unity or group identification), leadership, and
communication, were the most influential factors in determining resistance to
breakdown, and that a group with these traits has relatively little non-effective
behaviour or psychiatric breakdown. In their study of Australia peacekeepers, Hodson,
Ward and Rapee (2003) reported a correlation between high posttraumatic systems and
loneliness, and social support.

King, King, Fairbank, Keane and Adams (1998) considered that for Vietnam
veterans, the development of PTSD was associated with three factors; namely the
degree of impact of the traumatic event, the personality of individuals involved, and the presence of meaningful social support. However, even much of what was described as personality factors involved was associated with the ability to develop meaningful social networks. King et al (1998) described both structural social support (the size and complexity of social networks) and functional social support (perceived emotional sustenance and instrumental assistance), with the opinion that functional social support would have more influence on the likelihood of a person developing PTSD in the aftermath of traumatic event, as its presupposed that if a person received emotional and instrumental assistance that also had a functioning social network. McCann & Pearlman (1990) and Janoff-Bulman (1983) note that simply caring about someone, or having an interest in them does not constitute helpful social support. People must be perceived to be of help by the sufferer in order to benefit. They indicate that many good-natured people can try to be supportive, but can actually hinder or harm the recovery process if they do not try to understand the person's subjective experience. Like Smith (1985) and Viney (1996), they indicate that to be truly supportive, the attitudes and actions of others must validate the clients' construct or view of themselves, and the event.

In their review of eight research reports, Guay, Billette and Marchand (2006) indicate that there is a very strong association between social support (especially functional social support) and PTSD, although they noted that research on the processes by which social support mediates PTSD, is still in its infancy. The personal construct psychology model and the findings of Study 2 go some way to answer Guay, at al’s (2006) call for more research into these processes.

From the information I have presented, a sample that have experienced a potentially traumatic event, yet who have maintained or restored mental health, should have elevated positive social relating. Social support should contribute directly to their
ability to develop new associative construct required to overcome invalidation or reduce fragmentation to an inferential level.

7.4.3.1 Summary

Sample 2 experienced an event likely to cause PTSD, and are drawn from a larger sample where about one in three were indicated for PTSD at any time since the fire, with one in six being indicated for PTSD longer-term. However, no one in Sample 2 reported symptoms at a significantly elevated level, or could be considered for a possible diagnosis of PTSD. This suggests that they either never developed disorder, or if they did, have resolved it in the four to six years since the fire, by developing new associative relationships to integrate them.

The presence of elevated levels of positive emotions is consistent with the experience of validation and integration of existing construct systems and constructs related to the fire, or at least no fragmentation in excess of an inferential level.

The presence of elevated levels of positive social relationships is also consistent with the conditions that mediate the development of new constructs necessary for resolution of disorder.

The presence of some non-significant elevation in Anxiety is expected, as some fragmentation can be tolerated as long as it does not exceed an inferential level.

There are linear relationships between Guilt, some aspects of Hostility, and Depression, and mental health. It can be speculated that these relationships indicate the type of issues that may have been resolved by Sample 2. These include issues related to participants' behaviour in relation to their moral code or core role, their need to actively engage in construct revision as opposed to trying to force the world to change in order to resolve invalidation or fragmentation, and constriction of construing.
7.4.4 Support for the hypotheses of Study 2

The specific hypotheses to be tested in Study 2 are:

1. Threat will be negatively associated with mental health;
2. Positive emotions will be positively associated with mental health, while emotions of transition will be negatively associated with mental health;
3. Constriction of construing will be negatively associated with mental health;
4. Positive social support will be positively associated with mental health.

Study 2 does not indicate any linear association between threat and mental health. Further, there is no significant elevation or declination in measures of threat compared to normative data. However, Sample 2 only represents one aspect of mental health, that of positive mental health. There were no participants in Sample 2 that reported the opposite spectrum of mental health; that of disorder. From the personal construct psychology model of mental health, threat can be expected to have more of a relationship with disorder, than with positive mental health, and if only one spectrum of mental health is measured, then threat may not be as apparent. While the results of Study 2 do not support Hypothesis 1, the range of mental health reported by Sample 1 may have been insufficient in range to result in a significant linear association between the two. There are no results in Study 2 that disconfirm Hypothesis 1.

Study 2 indicates a significant and positive, linear association between positive emotions and mental health. Further, mean positive emotions scores are significantly elevated for Sample 2, who report only positive mental health. Study 2 indicates significant and negative, linear associations between some, but not all, emotions of transition, and mental health. Those emotions of transition that are associated with mental health are; guilt, hostility and depression. By decreasing order of association,
these are; guilt, depression and hostility out (overt). There are no significant associations between threat, anxiety, shame and hostility out (covert) and mental health. While there are limitations on the degree of support provided (due to the limited range of mental health in the sample), the results provide partial support for Hypothesis 2.

Study 2 indicates a significant and negative association between depression and mental health. In personal construct psychology, depression is construed as an indicator of constriction of construing; therefore, there is a significant and negative association between indicators of constriction of construing and mental health. Noting the limitation on strength of support due to the limited range of mental health included in the sample, the results provide partial support for Hypothesis 3.

Study 2 does not indicate a significant linear association between social support and mental health. However, Sample 2 contains only participants who report positive mental health, and the mean score for positive interpersonal relating is significantly elevated. This suggests some positive association between social support and mental health. Further, as Sample 2 does not have the full range of mental health possibilities, it may be that there was insufficient range in one measure, to result in a significant linear association between the two. The elevation in social support among a sample with positive mental health supports Hypothesis 4.

In summary, Study 2 partially supports Hypotheses 2, and 3, provides some support for Hypothesis 4, and no support for Hypothesis 1. However, Study 2 does not provide any disconfirming support for any hypothesis, and the limited support for some hypotheses may be attributable to the limited range of mental health reported by Sample 2.
7.4.5 Support for my proposed model of maintaining mental health in the face of potentially traumatic events.

I will now discuss results and interpretations of Study 2 in light of the propositions that comprise the model proposed in Chapter 6.

Firstly, Proposition II of the model holds that construct systems have hierarchies, and that the most important constructs are those related to processes that govern self-maintenance. Those who report positive mental health after potential trauma should not report threat, as is the case with Sample 2. Study 2 supports Proposition II.

Secondly, Proposition IV indicates that the outcomes of comparisons should be validation (resulting in positive emotions), invalidation (resulting in emotions of transition), or non-validation. Study 2 indicates that those with positive mental health report the presence of positive emotions and a lack of any significant elevation of emotions of transition. This supports Proposition IV.

Thirdly, Study 2 indicated a decreasing order of the degree of associations between guilt, hostility and depression, and mental health. This supports Proposition VIII.

Fourthly, Study 2 indicates that while the association between positive social relating and mental health is not a linear one, the mean scores of the sample (who reported no disorder) for positive interpersonal relating was significantly elevated. This indicates an association between the two, supporting Proposition IX.

Fifthly, Sample 2 reported significantly elevated scores on the measure of positive emotions. While one of the five measured emotions of transition appeared elevated, none achieved the level of a significant elevation. Further, there was no linear association established between emotions of transition and mental health. This supports Proposition X.
Study 2 provides support for five of the 11 propositions in the model. None of the propositions in the model appear to be contradicted by the findings of Study 2.

7.4.6 Assessing the model against the standards for personal construct models and models of psychological trauma

The model proposed in the propositions in Chapter 6 can be assessed against the six standards for personal construct models proposed by Viney (2006) and the standards derived from Horowitz (1997), Jones and Barlow (1990), and Brewin, Dalgleish and Joseph (1996).

7.4.6.1 Personal construct theory models.

With regard to Viney’s (2006) standards for personal construct models; the model is based on, and is consistent with, Kelly’s (1955/1991) theory of personal constructs, and Sewell’s application of personal construct psychology to psychological trauma. Rather than being a new model, it is an adaptation and extension of the model developed by Sewell. The model is intended to be easy to understand, through development from broad psychological experience, to experiences specific to psychological trauma. The propositions involve mostly common language usage and where specifics are used, they are explained. The model appears internally consistent. The model is proposed in 11 propositions, concisely containing a broad range of information. The model can be applied to all common responses to psychological trauma, ranging from no adverse response and maintaining positive mental health, through to ongoing and treatment-resistant disorders. Likewise, it should apply to all event types. While providing this comprehensiveness, the series of propositions are specific enough to make meaningful predictions. This description of the model as
proposed appears to satisfy the six standards for personal construct models proposed by Viney (2006).

7.4.6.2 Models of psychological trauma.

The usefulness of this model to the field of psychological trauma depends on to what extent it satisfies the standards for models of trauma stated in Chapter 4. These standards, derived from Horowitz (1997), Jones and Barlow (1990), and Brewin, Dalgleish and Joseph (1996), are:

1. There are characteristic symptoms of PTSD;
2. Responses can range from normal to abnormal, with a range of severity;
3. Symptoms can be enduring;
4. Disorder may have a delayed onset;
5. Symptoms can be phased, and worked through to resolution;
6. Pre- and post-event characteristics influence responses; and
7. Models should be testable.

The characteristic symptoms of PTSD can be explained through the personal construct psychology model. The desire to seek stability in anticipations leads people to constantly review those constructs that are in conflict, or where there is instability in anticipation. Traumatic events are the result of fragmentation beyond an inferential level, between construing related to the traumatic event and existing construct systems. Fragmentation or invalidation will result in constant reviews of constructs in an attempt to reconcile the fragmentation and integrate constructs. This leads to the intrusive re-experiencing of events, and an ongoing process of comparing this to how the person anticipated life and events prior to the trauma.
Both the avoidance symptoms in PTSD, and delayed onset PTSD, can stem from constriction. Kelly (1955/1991) notes that when faced with events that cannot be easily assimilated into existing construct systems, people can respond in three ways. The first is to resolve the invalidation and fragmentation through construct revision and the formulation of new constructs that resolve invalidation or reduce fragmentation to no more than an inferential level. The second is to live with the anxiety for a while. The third is to postpone the revision of constructs, by effectively ignoring the invalidation or fragmentation.

Kelly (1955/1991) describes this third process, that of constriction, as people drawing in the boundaries of their perceptual fields in order to minimize awareness of the incompatibility of constructs. Neimeyer describes constriction as a: "temporary respite from the relentless process of reconstructing our outlooks" (1985, p 84), by cutting down the field of construing to a manageable size. The effect of constriction in trauma is achieved by either: focusing only on pre-trauma construct systems and ignoring all aspects of the trauma-specific construing; or focusing only on trauma-specific construing, and ignoring pre-trauma construct systems. This process of dealing with only one issue at a time, and refusing to be drawn into comparisons or relationships between the two, effectively delays the anxiety of invalidation and fragmentation. Most importantly, constriction delays the process of construct revision and cycles of transition that could create new associative constructs and resolve the invalidation or fragmentation.

People can use their pre-trauma constructs and post-trauma constructs, even if they are incompatible. However, they can’t use both at the same time, as this would expose them to the invalidation and fragmentation they are seeking to avoid.
Constriction is a temporary fix, with the temporary gain of avoiding the anxiety or invalidation, while maintaining the appearance of resolution.

More than being a temporary delay, constriction can lead to great problems than those the person seeks to avoid. Firstly, constriction can develop into depression, with its highly polarised construing, its tendency to extract only negative information about experiences, and emotional and vegetative features. Secondly, constriction does not resolve invalidation and fragmentation. It merely avoids its awareness and consequences.

However, the process may result in possibly greater validation for each individual view, increasing the degree of anxiety that will be experienced if constriction is not maintained. Constriction can delay the effects of invalidation and fragmentation, but the short-term benefits of delaying or avoiding anxiety comes at the cost of greater and more insurmountable anxiety, later. Neimeyer (1985) notes that constriction can only begin once people experience considerable invalidation. In the case of trauma, constriction could be the result of failure in the process of assimilation of trauma-specific construing and existing construct systems in the immediate aftermath of traumatic events. It is a response to initial anxiety stemming from invalidation or fragmentation that would present as resolution; yet is actually a process to avoid the comparison that led to invalidation or fragmentation. The longer it is held onto, the greater the potential harm (when people's construing becomes dilated enough to have to face the incompatibility or fragmentation brought about by the trauma).

Constriction is also involved in the emotional numbness, or symptoms of depression, of PTSD. Neimeyer (1985) notes that constriction becomes depressive when spontaneous elaboration is curtailed. Further, constriction of construing results in construct systems increasingly tailored to extracting negative, rather than positive
information from experiences; highly polarizing constructs; global and undiscriminating emotional judgments; and self perceptions as being different from others.

The symptoms of arousal in PTSD are a physical manifestation of threat and anxiety. Threat is the immediate and intimate risk of annihilation, and anxiety is the awareness of the need for construct revision. The physical manifestation of these is potential for action, as most people would anticipate a need for action to resolve either.

My model predicts that once people develop awareness of invalidation and fragmentation beyond an inferential level, the experience of threat and anxiety will continue to exist until either new constructs are developed to resolve the invalidation, or existing constructs become permeable enough to accept new information from trauma-related construing. As both are curtailed by constriction, the disorder can be long-lasting.

The phased nature of symptoms results from the cycles of transition. Cycles of transition are processes that develop in stages, leading to resolution. Each stage in the cycles of transition requires different processes and produces different outcomes, providing the different phases of recovery. People can move toward resolution but become stuck in the process, suspending recovery until the blockage can be moved through.

Pre-event characteristics such as perceived sense of control and coping, contribute to both existing construct systems with which to compare trauma-specific constructs, along with determining the permeability and range of convenience of existing construct systems. This contributes directly to whether existing construct systems are invalidated by the experience of trauma, or whether fragmentation occurs. Post-event characteristics such as social support provide favourable or unfavourable
conditions for the development of new constructs that could integrate existing construct
systems and trauma-specific construing, or resolve fragmentation.

Finally, the propositions from the model have been tested by this study. The
process of comparing existing construct systems and trauma-specific construing cannot
be directly observed; however, the experience of these processes, and the emotions that
signify the processes, can be reported and observed. Emotions or transition such as
threat, anxiety, guilt, shame, hostility, shame and depression, and the characteristics of
social support have been tested and measured. Assessing construct systems and
constructs related to trauma is undertaken in personal construct psychology; although
the same problems of post-hoc assessments exist in personal construct psychology as
they do for any other field of research in psychological trauma.

From this analysis, my personal construct psychology model of psychological
trauma proposed appears to satisfy all the standards for models of psychological trauma,
derived from Horowitz (1997), Jones and Barlow (1990), and Brewin, Dalgleish and
Joseph (1996). Having established this as a useful and viable model of psychological
trauma, I have now tested the model and established its viability and usefulness.

7.4.7 Clinical Implications of the Findings

Study 2 reveals several factors that appear as key determinant to maintaining
positive mental health in the face of potential trauma, for this sample. These key factors
can be used to determine management plans for people who, in the future, may be
exposed to trauma. Study 2 highlighted issues related to guilt, hostility, depression, and
social support.

Firstly, there was a large and inverse association between guilt and positive
mental health. Therefore, the clinical implication is that guilt needs to be resolved to
maintain mental health in the aftermath of potentially traumatic events. Guilt is conceptualised as the awareness by people, that their sense of themselves is not what they believed it to be, they have not acted in accordance with their core role; or have done something that is perceived as being in direct contradiction to their central roles (Landfield & Leitner, 1980). Therefore, interventions should target people’s comparisons between their behaviours during and after a potentially traumatic event, and their construing of their core role, seeking to resolve any contradictions. Such interventions would involve bringing to awareness construing of behaviour during and after an event, along with cores roles of moral codes, and addressing any invalidation or fragmentation.

One type of therapy based in personal construct therapy that may be useful to resolve guilt, is Kelly’s (1955/1991) fixed-role therapy. The aim of fixed role therapy is for people to experiment with different behaviours and interpersonal relating than those which have led to disorders. By doing so, people come to accept that there are alternate ways of construing themselves and their worlds; opening up one of the basic principles of personal construct therapy; that of constructive alternativism.

If guilt is based on people construing others construing them as behaving in ways that are contrary to their core role structure, finding alternate ways of construing their roles or behaviours would be essential for resolving guilt.

Kelly (1955/1991) describes fixed-role therapy as beginning with people providing a self-characterisation; always written in the third person, as-if describing the role of a character in a play or describing the person to a friend. A therapist reads through this self-characterisation to identify constructs, and then develops an alternate characterisation; again, similar to a description of a character in a play. The constructs chosen for the fictional characterisation are not simply the opposite of those expressed
in the original characterisation. Rather, novel constructs, or ones that are orthogonal to those expressed in the original self-characterisation, are used. Thus, constructs in the fictional characterisation are not the opposite of those in the original characterisation; rather, they are different and present potentially a different aspect of the character that the client has never even contemplated.

The client is then encouraged to act out 'as-if' they were the fictional character for a fixed period of time; such as for two-weeks. They continue in therapy during this time, tuning and testing their understanding of the new character and their role. The aim is not to define how the person is to behaviour permanently, but to appreciate constructive alternativism and to free themselves from being 'stuck' with construing that is invalidated. The role developed by the therapist is not the one they have to take on; in fact, Kelly (1955/1991) suggests that if the person wants to take on the role at the expense of accepting that the role represents their control over their construct system, he may develop an alternative character for them to try for several weeks more. The awareness of constructive alternativism is more important that the example used to create this awareness.

Fixed role therapy can give people an opportunity to experiment with alternate core roles, and interactions with other people. Bannister (2003) indicates that people might find that other behave differently toward them in their secret enactment of the fixed role, receiving new evidence of both what roles are possible, but also how other people might respond to them. The essence of fixed-role therapy, according to Bannister (2003) is to help people realise that their personalities are to a significant extent, their own inventions, and subject to reinvention and change. In other words, they are not stuck with the personalities that they may have seen as failing them, leading to disorder.
Fixed-role therapy is a practical means of engaging in the cycles of transition described by Kelly (1955/1991) for resolving invalidation or fragmentation.

While Kelly (1955/1991) did not define fixed-role therapy specifically for guilt, guilt involves how people construe themselves and their behaviour, how they construe other people construing their behaviour, and how they construe their core roles. Like all disorder, guilt also involves people repeatedly using constructs that are invalidated by their experiences. Therefore, the opportunity to experiment with new construing of behaviour, others construing, and core roles, and the possibility of freeing themselves from the invalidated construing and to accepting alternate ways to behave and interact with others, should be highly beneficial. The aim of fixed-role therapy for guilt would be to create alternate constructs with which to anticipate how the person will behave in the future, and how they may be construed by others, compared to how they construe their core role structure.

Secondly, there was a medium and inverse association between hostility directed outwards, and mental health. Therefore, the clinical implication is that hostility directed outwards needs to be resolved, to maintain mental health in the aftermath of potentially traumatic events. Hostility refers to people trying to resolve invalidation or fragmentation by manipulating the world to change, in order to avoid having to revise their existing construct systems. Interventions to resolve hostility would necessitate people becoming aware of their construct systems and of the invalidation created by potentially traumatic events; and then seeking to resolve this through construct revision, rather than hostility. It would involve taking responsibility for, and being committed to, construct revision; or the development of new associative constructs that would resolve invalidation.
Thirdly, there was a large and inverse association between depression and positive mental health. Therefore, the clinical implication is that depression needs to be resolved, to maintain mental health in the aftermath of potentially traumatic events. Depression is conceptualised in personal construct theory as an indicator of constriction of construing. Constriction, in turn, is conceptualised as a shrinking of people’s perceptual fields, in order to avoid awareness of invalidation and fragmentation. Interventions that encourage people to dilate, or broaden the range of their construing, should be encouraged. However, given that constriction may have been employed to avoid facing invalidation and fragmentation, people may well need support to help them tolerate facing the invalidation and fragmentation that would be necessary to dilate their construing.

Finally, positive social support was significantly elevated in Sample 2, who had maintained positive mental health. Therefore, while not a simple linear relationship, the clinical implication is that social support should be maximized, to maintain mental health in the aftermath of potentially traumatic events. In particular, relationships based on solidarity (resources), and intimacy (social satisfaction), should be encouraged. Interpersonal relating may be a key component to all the clinical implications previously described. The development of new and associative construing, necessary to resolve invalidation and fragmentation, relies on social relating. By providing the opportunity for new information, validation and a laboratory in which to experiment, while reducing pre-occupation with old material, invalidation and threat; social relating can mitigate new construct development, and therefore resolution of disorder. Therefore, interventions that work to maximize social relations based on providing new information, that validate those involve, and encourage and support experimentation,
while minimizing pre-occupation with old material, invalidation and threat, or at least shaping social relating in these directions, should be encouraged.

7.4.7.1 Support for the clinical findings

The emphasis on social support in planning for managing people exposed to traumatic events is supported by the findings of Hodson, Ward and Rapee (2003) and Creamer and Forbes (2003). They argue that social support should be planned for in the deployment of military personnel, during deployment, and in the time following deployment.

The centrality of social support to post traumatic mental health is emphasized in guidelines for the management of people exposed to traumatic events, by the Australian Centre for Posttraumatic Mental Health (2007), the UK National Institute for Clinical Excellence (2005) and the US National Centre for Post Traumatic Stress Disorder (2004). They state that lack of effective social support is a risk factor for the development of PTSD; that access to and use of social support should be investigated in initial screening and assessment of people exposed to trauma; that social support is associated with recovery from trauma; that addressing needs for social support should be a part of psychological first-aid for people exposed to traumatic events; and that social support should be maximized for people who develop PTSD.

Similarly, the Australian Centre for Posttraumatic Mental Health’s (2007), the UK National Institute for Clinical Excellence’s (2005) and the US National Centre for Post Traumatic Stress Disorder’s (2004) treatment guidelines for PTSD also describe feelings of guilt as common, stemming from forced impossible choices, and experiences of humiliation experienced during and following traumatic events. Further, guilt is viewed as a precursor to anger and aggressive behaviour, and as a feature that prolongs
mental health problems in the aftermath of trauma. Therefore, managing and resolving guilt is viewed as an important treatment factor.

Study 2 highlighted issues related to guilt, hostility, depression, and social support. From a personal construct theory perspective, these issues could be construed as resolving inconsistencies between how people view themselves and their moral code, with their behaviour during and after a traumatic event; resolving to make changes in their own meaning-making of the event and their lives, rather than trying to force the world to change in order to maintain consistency; dilating their construing of the event and their role in it through reconstruing; and seeking others with whom they can experiment and reconstrue with through receiving new information, validation, a safe and non-threatening social laboratory in which to experiment and reconstrue, and who will help them avoid pre-occupation with old material.

The Australian Centre for Posttraumatic Mental Health (2007), the UK National Institute for Clinical Excellence (2005), and the US National Centre for Post Traumatic Stress Disorder (2004) all advocate cognitive therapy as first line treatments for PTSD. Cognitive therapy is described in each of the sets of guidelines. The Australian Centre for Posttraumatic Mental Health states that cognitive therapy:

"helps the individual to identify, challenge and modify any biased and distorted thoughts and memories of their traumatic experience, as well as any subsequent maladaptive or unhelpful beliefs about themselves and the world they may have developed" (2007, p27).

The UK National Institute for Clinical Excellence states that cognitive therapy involves:

"the identification and modification of misinterpretations that lead the patient to overestimate threat. In PTSD, this threat stems from interpretations of the
trauma and its aftermath ... By discussing the evidence for and against the interpretations, and by testing out the predictions derived from the interpretations with the help of the therapist, the patient arrives at more adaptive conclusions. The patient is encouraged to drop behaviours and cognitive strategies that prevent a disconfirmation of the negative interpretations, e.g. excessive precautions to prevent further trauma or excessive rumination about what one could have done differently during the event.” (2005, p53).

Finally, the US National Centre for Post Traumatic Stress Disorder describes cognitive therapy as:

“educating patients on the relationships between thoughts and emotions, exploring common negative thoughts held by trauma survivors, identifying personal negative beliefs, developing alternative interpretations or judgments, and practicing new thinking” (2004, p38).

These processes appear to involve people bringing to awareness the meanings they ascribe to traumatic events, assessing the usefulness of these meanings, and revising the meanings as necessary. I argue that these processes are consistent with the processes of construct revision through the cycles of transition described in personal construct theory. The three cycles of transition described in Chapter 5 involve bringing to awareness construing that is invalidated or fragmented. The Creativity Cycle involves progressively tightening and loosening construing in order to try new ways of predicting and construing events in order to validate the constructs and expand their understandings. The C-P-C Cycle involves being open to all possibilities that a situation may offer, being able to make and maintain a range of possible predictions from which
to choose, rather than having exacting and tightly defined predictions, logically narrowing down this range of possible predictions based on what predictions about an event can be drawn from the existing construct systems, and choosing and being committed to one that seems to fit best. Finally, the Experience Cycle involves making predictions about the future based on existing constructs, investing in the process of construct revision, assessing the adequacy of predictions with the reality of experience of the world, confirming or disconfirming the outcome of the experience of encounter, and revising the process if needed.

There are significant differences between cognitive behavioural therapy and personal construct psychotherapy; most notably that cognitive behavioural therapy is more objective and dictated by the therapist, while personal construct psychotherapy is more subjective and client-centred. However, both may share similar therapeutic tools and goals at times and there can be overlap between the two.

Specific approaches to personal construct therapy that may apply to the treatment of people with PTSD already exist. Klion and Pfenninger (1996) described a personal construct psychology therapy for PTSD that has aims to interweave past, present and future into an integrated, consistent, and acceptable story of war veterans lives. Similarly, Oades and Viney (2000) describe an experience cycle methodology that has been successful in producing significant construct revision.

Prolonged or repeated exposure to memories of the trauma increases the likelihood that people will have to bring into their awareness, the invalidation or fragmentation they have been avoiding through constriction. While exposure would result in increased emotions of transition, awareness of the invalidation or fragmentation is a necessary first step toward engagement in the cycles of transition necessary to resolve the invalidation or fragmentation.
The need for prolonged exposure may be to overcome the resilience to reconstruing that people with disorder have developed. Engaging in construct construing takes courage and the ability to tolerate the seeming chaos that Leitner and Pfenninger (1994) describe as necessary for reconstruing. Constructs related to trauma, or of existing construct systems, may have a range of levels of conscious awareness, including those that are pre-verbal. In these cases, people may either not have conscious awareness of the constructs, or not have symbols, such as language, with which to articulate them. Without conscious awareness or ability to symbolize constructs, people may have no awareness of the invalidation or fragmentation that is at the heart of their disorder. Repeated or prolonged exposure may be necessary for people to eventually bring to awareness or articulation, the construct invalidation or fragmentation that had led to disorder, and to open up the way for engagement in the cycles of transition and recovery of mental health. Social relating may be necessary to help people tolerate the distress of awareness of invalidation and fragmentation.

There is a great deal of similarity, or at least consistency, between the clinical implications for the management of people exposed to traumatic events derived from the personal construct model of mental health and trauma, and the guidelines from the Australian Centre for Posttraumatic Mental Health (2007), the UK National Institute for Clinical Excellence (2005), and US National Centre for Post Traumatic Stress Disorder (2004). While the guidelines do not endorse the model upon which Study 2 is based, they endorse clinical practice, with which Study 2's clinical implications are wholly consistent.
7.4.8 Limitations of Study 2

7.4.8.1 Limitations related to the sample

A clear limitation with this study concerns the size and scope of the sample used. A sample size of 22 limits the confidence of the results, and limits the application of statistical analyses that can be conducted with the data. Along with the size of Sample 2, there are limitations on the ability to generalize from the sample. Firstly, there is a gender bias in the sample, with significantly more males than female. Secondly, the sample is a military sample that has experienced a specific work-related accident. These factors limit the ability to generalize the findings.

Further, while it is inferred that perceived positive social relating is associated with mental health in Sample 2, the limits of the sample reduce the confidence of this finding. It may be that elevated levels of perceived social relating is a feature of military personnel in general, rather than just a feature of those with positive mental health. This would need to be confirmed with a control sample.

7.4.8.2 Limitations due to the scope of the study

The scope of the data-set also limits the confidence in the conclusions that can be drawn. All participants were considered to be those displaying good mental health in the aftermath of a traumatic event and this study tests only the applicability of the model to participants who display good mental health. To fully test the model, it should also be applied to participants with the full range of possible post-trauma mental health outcomes, including disorder. This study initially included invitations to participants with a broader range of mental health outcomes; however, of the group who were invited to participate (n=48 and with nine who would have been considered to not report
good mental health), 23 agreed to participate, and only one of these did not report good mental health. For this study, I considered it important to control for the type of incident, and focus on a cohort who all experienced the same event. Hence the decision to focus exclusively on participants reporting good mental health was made on the basis of the availability of participants, rather than a theoretical decision. While this may limit the scope of the study, the study retains the important focus on mental health, rather than disorder. I speculate that a sample with a wider range of mental health than reported in Sample 2 would result in greater support for the hypotheses posed for Study 2.

A further consideration in the scope of the study was that it was limited to only one event (fire at sea) and one type of participant (predominantly males in the Navy). While the description of the event provided fits comfortably into the conceptualization of potential trauma, the specifics may not be frequently encountered. This may limit the degree to which results can be generalized, and some caution should be used in comparing the results with other samples.

The one proposition of the model that was not confirmed by Study 2 may be more a feature of the limited sample, than failure of the model. Proposition III is that events usually considered to be potentially traumatic usually involve construing an imminent risk or confrontation with threatened death or personal safety, with a high level of awareness. Construing imminent death or safety involves construing processes that govern personal maintenance. Therefore, disorder should be associated with threat. While there was no association between threat and mental health, Sample 2 only included participants who had maintained mental health. Therefore, it is speculative to draw confirmation from a sample that did not include disorder. If the sample included participants with disorder, the findings would be more directly relevant. Therefore, the limitations of the sample may not have provided a valid test of this proposition.
Only the presence of PTSD has been used to define mental health in the aftermath of exposure to trauma. While PTSD may be a highly applicable disorder, it may be far from the only one likely to impact on people exposed to potentially traumatic events.

A limitation of the study related to the measures used and the ethical standards adhered to. As noted in 7.2.4.1, there can be ethical problems associated with trauma focused research, if the measures used result in exposure to cues of the original event that may be distressing to participants, where there is limited consent, and where the research does not produce meaningful results. The choice of only one type of measure of independent variables (Content Analysis Scales) may limit the scope of data provided. However, the use of this type of measure has significant advantages over other types of measure, with regard to the ethical considerations noted with this particular sample. The use of Content Analysis Scales does not require exposure to trauma related cues with this sample, as the exposure criteria for PTSD with this sample can be assumed. All participants are free to engage in as much description of the original event as they want, with the instructions to elicit narratives not requiring direct discussion of the original event (although it is accepted that the original event provides the context for their narratives). Further, as measures of psychological states are based primarily on the language used by participants, direct references to the original event are not required (as the context of narratives is directed at their lives since the fire). Applying Content Analysis Scales to narratives related to participants’ lives since the fire, provides a rich understanding of the psychological processes of the participants. Therefore, the use of Content Analysis Scales results in few ethical issues while producing rich and meaningful data. These benefits significantly outweigh the few limitations of these measures.
7.4.8.3 Emotions not in the model

I used content analysis scales to assess threat, anxiety, guilt, hostility, shame, and depression. However, there are no readily available measures for fear and aggression that could have been used to round out Kelly’s (1955/1991) list of emotions of transition. A measure of fear may be redundant, as Kelly’s construct of fear is subordinate to threat. Therefore, a measure of fear may only be necessary if constructs of trauma are subordinate to threat. Given that it is anticipated that trauma impacts on core construing, it is predicted that threat should be a more important construct that would subsume any measures of fear. While there is also no direct measure of aggression, there is a measure of positive emotions. Kelly’s (1955/1991) definition of aggression was that of a positive approach to engaging in the process of construing and reconstruing. McCoy (1981) argues that success in the process of construing and reconstruing will be indicated by the presence of positive emotions. Therefore, while there are no direct measures of aggression, there are measures of positive emotions, which are conceptualised by McCoy (1981) as indirect evidence of the presence of aggression.

As noted, the limitations of the sample impact on what propositions could be validly tested. A more comprehensive understanding of the model could have been made if both the scope of the sample and the emotions measured were broadened.

7.4.9 Strengths of Study 2.

7.4.9.1 Focus on mental health rather than disorder – leading to implications for care

The studies by Sewell, from which the model of mental health in the face of trauma was developed, focused more on the development of disorder, rather than the
maintenance or development of mental health. However, studies that focus on disorder can only infer what need to be done to prevent or treat traumatic stress. This study provides direct support for specific directions by focusing on those who display long-term mental health, despite their exposure to potentially traumatic events, and implies pathways that may lead to the maintenance of positive mental health in the aftermath of potentially traumatic events. As such, this study has more direct relevance to clinical practice, than studies that focus on disorder.

7.4.9.2 Ethical methodology for trauma

A significant ethical concern for research into psychological trauma is the possibility of re-traumatisation, and the need to balance this issue against the possible gains of the research. The approach taken in this study was to determine involvement in an event defined as potentially traumatic by description of the event from a board of inquiry, eliminating the need to question individual participants about their experiences. While the Board of Inquiry may have had the potential to cause re-traumatisation, this project did not. Further, rather than asking participants to describe specific symptoms, the approach using narratives that later could be analysed through content analysis scales, allowed participants to describe their experiences in whatever words they chose to. This approach still yielded meaningful results, based on the assumption of content analysis, that the language people chose to use in narratives can reveal aspects of their psychological state. Without direct reference to the event and with control over the information they report, the approach I adopted in Study 2 is ethically sound, yet effective.
7.4.9.3 Standardised exposure

That all participants experienced the same event is considered a strength of this study. Many studies into trauma rely on multiple events in order to obtain a pool of participants large enough to draw conclusions from. This introduces event-type as a potentially confounding variable. Study 2 yielded a sample pool large enough to draw conclusion from, with all participants having experienced the same event. While there may still be some variation in exposure within the participant pool in Study 2, all participants were on the same ship, therefore all at risk if the fire could not be controlled and all were involved in fighting the fire. In this situation, the potential impact of a possible confounding variable due to the event is significantly reduced.

7.4.10 Further Research

The confidence in findings of this study could be increased through repeating the study with a larger sample size, preferably a sample that included participants who maintained mental health, along with those who developed disorder. This would be necessary to test more of the proposed model (which explains both positive mental health and disorder, in both the short and long-terms).

While controlling for the type of traumatic event was an important feature of this study, a future study could include a broader range of traumatic events, to expand the applicability of the model.

With the implication that high levels of interpersonal relating, as measured by the Sociality Scale, may mitigate against the impact of high levels of emotions of transition and result in positive mental health, it would be important to measure this effect with a sample that report disorder. Future studies could also focus on the possible mitigating effects of interpersonal relating in much more depth than this study allowed.
If Study 2 were considered as the basis of further study, then the significant findings of interpersonal relating based on perceived receiving of intimacy and resource based relationships would be most important. Further study could also include measurement of a broader range of emotional states, both positive and negative, in order to indicate mental health and disorder.

Also following from Study 2 is a need to explore the possible association between the emotions of transition of guilt, hostility and depression. Specifically, it is important to know whether the profile of associations generated from Sample 2 is unique to this sample, or can be repeated with other samples. This would have important implications for validation of the model, along with important implications for validating strategies for the management of people exposed to potentially traumatising events.

Probably the greatest imperative for future study to come from this study is to apply the approach to a sample with includes participants with both disorder and positive mental health. This would allow for greater testing of the hypotheses and propositions in the model than could have been achieved by only using participants who have maintained positive mental health.
Chapter 8. Synthesis of the two studies of prevalence of trauma in the Navy, and the testing of a personal construct model of maintaining mental health.
8.1 Major findings of the two studies concerning mental health following potentially trauma, in the Navy

Symptoms sufficient to indicate PTSD were reported by about one-third of a sample of the crew of HMAS Westralia four months following the fire. This number dropped to about one-quarter by 11 months, and to about one-sixth by four to six years. The majority of people involved did not display disorder at any time, and for those that did initially, about half recovered to the extent that they no longer indicated PTSD by four to six years. Only one participant indicated developing a disorder over time that was not indicated earlier. If this was a possible example of delayed onset PTSD, it indicates that this variant of the condition occurs in a minority of (12.5% of the those with indicated PTSD at some time since the fire). These prevalence rates contribute to the understanding of PTSD in the Navy.

At four to six years, over half the participants were indicated for general psychological distress, and about one-quarter with possible alcohol misuse.

There is no indication of any significant association between gender and rank, and indications of disorder (PTSD, general psychological distress or alcohol problems) at any of the three screening (four months, eleven months or four to six years). While the overall prevalence of disorder reduced over time, most individuals maintained their status as either indicated for disorder, or as maintaining mental health, at the three times when measurements were taken - up to six years.

The prevalence of indicated PTSD in Sample 1 assessed at four to six years after the fire was more than ten times that of an established background rate in an Australian Navy population, and more than twice the prevalence of Australian Navy personnel involved in the 1991 Gulf War. It was about seventy-five percent of the prevalence of
PTSD in British Army veterans of the Falklands War (measured five years after the war), and in civilian oil rig workers 10 years after they survived a large fatal fire at sea.

The prevalence of general psychological distress and alcohol problems, assessed four to six years after the fire was about the same as an Australian Navy sample taken 10 years after the 1991 Gulf War; and about the same as a sample of US Army, male veterans recently returned from Iraq and Afghanistan. Variations in prevalence of general psychological distress and alcohol problems with time, could not be made in the same way as for PTSD, due to the single, cross-sectional method of assessment.

Sample 2 comprised a subset of Sample 1. They are a sub-set of people exposed to an event that produced rates of PTSD similar to war and large scale disaster, yet either maintained good mental health in the four to six years after the event, or restored it by four to six years after the event.

For people exposed to potential trauma, yet who displayed good mental health in the long term, there was no observed association between threat and mental health. For people exposed to potential trauma, yet who displayed good mental health in the long term, positive emotions are positively associated with mental health, while some emotions of transition are negatively associated with mental health.

Some emotions of transition (guilt, hostility, and depression) are more significantly and negatively associated with mental health than others (such as threat, anxiety, and shame, which were not significantly associated with mental health).

For people exposed to potential trauma, yet who displayed good mental health in the long term, there was a significant association between resolving guilt, and mental health. For people exposed to potential trauma, yet who displayed good mental health in the long term, there was a significant association between resolving hostility, and mental health. For people exposed to potential trauma, yet who displayed good mental
health in the long term, there was a significant association between resolving depression, and mental health.

For people exposed to potential trauma, yet who displayed good mental health in the long term, positive social support (especially relationships based on resources and intimacy) is positively associated with mental health. Social support appears to be a condition leading to maintaining or restoring mental health.

Three of the four hypotheses of Study 2 were supported, and none were disconfirmed.

8.2 Clinical implications of the findings of the two studies concerning mental health following potentially trauma, in the Navy

From the findings of the two studies, the following clinical implications can be drawn. The fire in HMAS Westralia was different to every day experiences, for those most involved. The prevalence of disorder in those exposed to the fire in HMAS Westralia is significantly higher than baseline rates. The mental health outcome to this incident is similar to those from war or disaster. This indicates that people exposed to similar events under similar circumstances in the future, should be considered at higher risk than the general Navy population, of developing disorder.

While disorders such as PTSD are associated with traumatic events, the people who develop long-term disorder are in the minority, while those who maintain positive mental health in the long-term, are in the majority. Resilience to avoid developing disorder at as early as four months after a potentially traumatic event, seems to be the most common outcome for those involved. Therefore, interventions that restore mental health will not be necessary for all people exposed to potential trauma. Given that most of those who were indicated for PTSD at four to six years were also indicated for PTSD
at four months, interventions to relieve PTSD symptoms should be targeted at those who are symptomatic in the months following a potentially traumatic event.

Limited recovery from disorder takes place over time. For those in Sample 1 who developed disorder in the months following a traumatic event, about half reduced their symptoms to sub-clinical levels. Recovery appears to occur more in the months following disorder, rather than years. Therefore, interventions aiming to maintain or restore mental health would be more appropriate earlier, than later.

There are significant associations between guilt, hostility and depression, and mental health. This highlights the need for all people to resolve issues of guilt (construing of their behaviour are comparing favourably to their own moral code or self-expectations), and hostility (examining their own construing and engaging in cycles of transition when needed, rather than trying to force the world to fit into their invalidated or fragmented construing). Further, depression, which indicates a constriction of construing, also needs to be resolved, presumably by loosening or dilating of construing (such as by engaging in, and completing the Creativity Cycle). All people exposed to trauma could benefit from engaging in the process of reviewing and identifying invalidation or fragmentation beyond an inferential level, construing related to their behaviours, roles and expectations of self.

Positive social relating is associated with mental health. People exposed to potential trauma should ensure that they maintain and increase positively perceived social relating (in particular relationships that are perceived as resourceful and intimate to the subject), in order to maximize conditions favourable to the development of new constructs (ones that provide fresh ideas, validation, and a social laboratory in which to experiment and engage in cycles of transition), and minimize conditions unfavourable to the development of new constructs (ones that threaten, that allow or encourage
Content analysis scales are effective research tools for psychological trauma. Study 2 is the first known study to utilize content analysis scales specifically for research into maintaining mental health following trauma. As a personal construct theory-based measurement, they are highly consistent with the model, which is based in the same theoretical framework. However, this research also highlights the applicability of content analysis scales to be used alongside, and integrate with, objective measures, and provides encouragement for their application in research into psychological trauma outside a personal construct psychology framework. Further, content analysis scales have significant ethical benefits and sensitivities for trauma based research.

The proposed personal construct psychology model of mental health in the face of potentially traumatic events is partially supported by these findings, and can be tentatively used as a clinical guide to understand the experiences of people exposed to potentially traumatic events. The model is consistent with standards for Personal Construct Psychology models, and standards for models of trauma.

8.3 The aims of the two studies concerning mental health following potentially trauma, in the Navy

The aims of the two studies were to assess the prevalence and extent of psychological trauma and distress, in personnel who survived a potentially traumatic event, namely the fire in HMAS Westralia; and test the value of hypotheses derived from the propositions of my model.

The first aim was met by conducting Study 1 that established and compared rates of indicated PTSD, general psychological distress, and alcohol misuse, in Navy
survivors of a fatal fire at sea. Data for indicated PTSD was available at three different times since the fire, and allowed good comparison with other military and non-military personnel. The first aim was fully met.

The second aim was met by first testing my personal construct model of maintaining mental health and psychological trauma. The model of maintaining mental health was tested using a sub-set of participants from Study 1, who had been exposed to a potentially traumatic event, yet had either maintained or restored positive mental health in the long term. Participants in Study 2 provided narratives that were analysed using content analysis scales to measure emotions of transition, social relating and constriction of construing. The results provided a valid means of testing some aspects of the model. While not all propositions of the model could be fully tested by this sample, the model, as a whole, was tested through the resulted of Study 2, and this aim was achieved.

The two studies work together to provide an understanding of what can happen following trauma (Study 1), why this happens (Study 2), and then provides the opportunity for speculation on approaches to the future management of people exposed to potentially traumatic events. The aim of advancing the understanding of psychological trauma through the development of a model of maintaining mental health in the aftermath of exposure to potentially traumatic events and testing of this model has been achieved.

8.4 Limitations of the studies.

Limitations due to the relative small size of the two samples, the focus on only one event type, and a narrow range of mental health responses in Sample 2, limit, to
some extent, the confidence of the findings, the ability to generalize from the findings and the degree to which the model could be tested and validated.

8.5 Further studies recommended

Studies that include navy samples and that are longitudinal to explore how disorders such as PTSD develop and change over time are required to compliment the existing knowledge of PTSD (which is focused more on other samples, and which tends to be more cross-sectional in methodology).

More studies that explore the processes leading to long-term mental health are needed to compliment the vast number that focus only on the outcome of disorder.

The application of Personal Construct Theory to the field of psychological trauma has great potential to understanding the processes behind mental health in general, and should be pursued. The models proposed by Sewell and proposed in this thesis require further development. This is an area ripe for further research.

Research that applies models to samples from a wide range of backgrounds and who have experienced a wide range of potentially traumatic events is necessary to fully test models, to increase the ability to draw generalizations from trauma-based research, and most importantly, to lead to validated interventions to maximise mental health outcomes in those exposed.

8.6 Summary of the thesis and concluding comments

I developed this research with the aim of advancing the understanding of mental health in the aftermath of exposure to potentially traumatic events. I started with a literary review focusing on the description and history of PTSD in a military context.
I then moved to illustrate the potential impact of PTSD in a military sample, by describing a case study of navy personnel who survived a major fire at sea that resulted in the deaths of four of the crew. The prevalence of PTSD, general psychological distress and alcohol problems were revealed through both cross-sectional and longitudinal methodologies, and then discussed. While this type of prevalence case-study following traumatic events in a military context is common, the focus on Navy personnel and the maritime and naval context is far less common.

From here, I moved to begin an understanding of the intra-personal processes that influence the mental health of people who have experienced events such as the fire in HMAS Westralia. I provided another literary review and critique, this time of the existing major theoretical models of PTSD and how such models can be evaluated. I content that while all existing models of PTSD explain some aspects of mental health in the aftermath of exposure to traumatic events, none fully or satisfactorily explain the processes that result in the wide range of experiences reported in the literary reviews and in Study 1.

To address this shortcoming, I turned to Personal Construct Theory. One of the main underpinnings of Personal Construct Theory is the uniqueness of individual construing of events, and understanding and accounting for the processes that lead to a both a wide range of individual and collective responses to life’s experiences. I first describe Personal Construct Theory in general, and then focus on how it can be applied to the field of psychological trauma. While Personal Construct Theory has been applied to explain post-traumatic responses, I argue that to date, this application has been limited, and that the full potential of Personal Construct Theory to explain and help understand the processes behind post-traumatic responses is far from being realized. To this end, I proposed a Personal Construct Theory model of PTSD, developing the
existing work and model of Sewell, which was, in turn, developed from Kelly's theory of personal constructs. The model I proposed expands Sewell's model in two ways. Firstly, I accounted for both maintaining mental health as well as developing disorder in response to potential trauma. Secondly, the model accounts for the processes by which disorder or mental health is maintained over time, and how disorder can be resolved and mental health restored. I argue that a model that includes both mental health and disorder is necessary to fulfill standards for models of psychological trauma. Further, this model more easily leads to implications for strategies to intervene with people exposed to potentially traumatic events in the future, in order to maximize optimal mental health. I see these as natural developments of the original model proposed by Sewell.

Study 2 tests the model proposed. As the sample is limited only to those who have maintained positive mental health rather than those with disorder, the study is limited and cannot test all aspects of the proposed model. However, Study 2 affirms those aspects of the model that it can test, and does not disconfirm any. Further, with the long term maintenance or restoration of mental health as the most likely outcome from exposure to traumatic events, Study 2 is more representative of more people exposed to traumatic events than studies that focus solely on those with disorder. This is not to say that Sample 2 did not experience an event likely to result in disorders such as PTSD. Study 1 provided the context for Study 2, and indicated that more than a third of those involved in the fire in HMAS Westralia were indicated for PTSD at some time since the fire, and nearly one in six of those involved in the fire, were indicated for PTSD at four to six years since the fire. This prevalence is similar to sample involved in major combat such as was experienced in the Vietnam War. Sample 2 may have been limited by self-selection; with only those not experiencing disorder being willing to participate.
However, this does not limit the applicability of the model; only the extent to which it has been tested by this particular sample.

Finally, I drew clinical implications from the model. My objective is to take what can be learned from the model, and consider how this might be applied in the future, to lead to strategies that avoid or relieve disorder in people who may be exposed to potentially traumatic events.

Thus, the two studies can be synthesized to understand what can typically happen following exposure to potentially traumatic events to understand the processes involved and what influences them; and finally, how this understanding could potentially be applied in the future to improve the mental health outcomes of people involved in similar events. While Study 2 determines what processes work to maintain mental health following exposure to trauma, it is Study 1 that sets the scene and provides the most meaning to Sample 2, by defining the sample. Each of the two studies stands on its own. However, when the data from these two studies is synthesized, it provides a much broader understanding of the experience of those who have experienced potential trauma, along with the processes involved in achieving this outcome. The synthesis of the two studies leads to insights into what processes should be encouraged for people exposed to future potentially traumatic events, in order to maximize the likelihood of maintaining mental health.

While disorder is often of greatest clinical interest to those who work in the field of psychological trauma, I argue that the processes that help maintain positive mental health in the face of potentially overwhelming events, should take this place. People who are exposed to potential trauma, yet either maintain positive mental health or restore positive mental health, should be of greatest interest to clinical psychologists, as they have achieved the resilience or the restoration of mental health that clinical
psychologists should ultimately hope for in all their charges. People who maintain positive mental health have construct systems that can tolerate the disruption potentially traumatic events, or have the flexibility of construing to integrate constructs of traumatic events that threaten to invalidate or fragment their construing, and they have the motivation and conditions that allow them to engage in the cycles of construing. How they achieve this, or take the steps to do so, is what clinical psychologists need to understand to help people exposed to potential trauma. The studies presented in this report help in this process.

Firstly, people need to have conscious awareness of their construing related to trauma, and whether this construing invalidates, or is fragmented with, their existing construct systems. Secondly, they need to resolve issues related to their behaviour and role in events with their moral codes. Thirdly, acceptance of their responsibilities to review their own construing to resolve invalidation and fragmentation, rather than trying to force the world to change, is important. Fourthly, people need to be able to, and to tolerate, dilating their construing of potential trauma, and of their existing construct systems, in order to resolve invalidation or fragmentation. Finally, to undertake these steps, positive social relating, based on perceived resources and intimacy, appears essential.
References


Appendix A. Executive Summary of the report of the Board of Inquiry into the fire in HMAS Westralia.
Report of the Board of Inquiry into the fire in HMAS WESTRALIA on 5 May 1998

EXECUTIVE SUMMARY

(Photograph courtesy the West Australian newspaper)
REPORT OF FIRE IN HMAS WESTRALIA ON 5 MAY 1998

1. In accordance with the Maritime Commander's instructions an inquiry into the circumstances surrounding the fire in the main machinery space of HMAS WESTRALIA on 5 May 98 has now been completed.

2. The inquiry was conducted in HMAS STIRLING from 11 - 22 May 98, HMAS PENGUIN from 25 - 29 May 98 and again in STIRLING from 2 June - 17 July 98. The members of the Board visited WESTRALIA on a number of occasions including 9 and 12 May 98.

3. Members of the Board of Inquiry are:

   Commodore Richard Lamacraft, RAN (President)
   Christopher William Filor, PSM, Inspector Marine Accidents
   Captain Russell Bryan Schedlich, RAN
   Assistant Chief Officer Lindsay Cuneo, Fire and Rescue Service of WA
   Commander Edward George Walsh, CSC RANR

4. The Board was directed by its terms of reference to investigate all the relevant circumstances surrounding the fire in WESTRALIA on Tuesday, 5 May 98, the death of personnel in that fire and the injury of other members of the ship's company. The Board was directed that the inquiry should include, but not be limited, to:

   (1) the cause of the fire and the manner in which it was fought;
   (2) all the circumstances relevant to the death and injury of personnel;
   (3) the involvement of the ship's company including their training and competence;
   (4) the materiel state of WESTRALIA at the time of the fire; and,
   (5) the involvement of other naval units and external agencies.

5. As the Board became aware of important safety issues that required immediate attention, these were raised with the Maritime Commander. Four issues were raised, these were:

   a. use of flexible fuel hoses in certain circumstances:
   b. escape training using emergency life support respiratory devices:
   c. firefighting re-entry procedures after CO2 drenching: and
   d. HMAS WESTRALIA compartment escape routes.
EXECUTIVE SUMMARY

SUMMARY OF THE INCIDENT

6. Prior to the ship sailing from Fleet Base West on 5 May 98, WESTRALIA had undergone an assisted maintenance period for about 6 weeks. During this period, members of the ship's company of WESTRALIA in conjunction with Fleet Intermediate Maintenance Authority and the ship's contractor, ADI Limited, carried out maintenance work. The work included the fitting of new flexible fuel hoses to the ship's main engines by a subcontractor under the direction of ADI Limited.

7. Trials were conducted with the ship alongside the wharf on 22 April 98. The ship sailed on 29 April 98 and conducted a series of sea trials, both whilst under way and at anchor. On 1 May, WESTRALIA returned to Fleet Base West. Final preparations for an overseas deployment were conducted on Monday, 4 May 98.

8. At 0900 on 5 May 98, WESTRALIA sailed from Fleet Base West for the Western Australia Exercise Area to rendezvous with HMA Ships SUCCESS, DARWIN and ADELAIDE. WESTRALIA proceeded north through Cockburn Sound to Gage Roads.

9. At about 1030, when about 2½ miles east of the Fairway Buoy in the Deepwater Channel, a fuel leak was noticed in the area of the number 9 cylinder on the inboard side of the port main engine. It was a significant leak, with fuel was emerging under pressure in a manner similar to a garden hose.

10. The leak was reported to the machinery control room and on inspection, it was initially thought that the fuel might be leaking from a banjo bolt in the vicinity of number 9 or 10 cylinders. The port main engine was shut down to enable repairs to be carried out and personnel in the main machinery space set up some fire fighting equipment. The standing sea fire brigade mustered in the machinery control room.

11. At about 1035, fire broke out in the main machinery space. Personnel saw the fire start on the outboard side of the starboard main engine. A "woofing" sound was heard in the machinery control room and a flame and black smoke appeared through a cable duct near an urn on the port side.

12. A fire report was made to the bridge and emergency stations was sounded. A brief inspection of the main machinery space through the door of the machinery control room revealed thick black smoke and flames. Visibility was severely limited. Four people escaped from the main machinery space into the machinery control room. Three of the personnel were injured and were initially treated by the ship's emergency medical organisation and later assisted by medical staff from SUCCESS, STIRLING and the Sea Training Group.

13. The fire was intense, causing rapid smoke build up and extreme heat. Despite some heroic but unsuccessful firefighting efforts, the atmosphere in the main machinery space soon became inadequate to support life. Electrical cabling on the deckhead over the fire was quickly damaged (Figure 1) with a consequent loss of services, including some communications.
14. The starboard main engine was shut down and electrical power to the main machinery space isolated. The emergency generator started automatically. The machinery control room was evacuated at 1038. One minute later, the Engineering Officer recommended to the Commanding Officer that the main machinery space be drenched with carbon dioxide (CO₂). One person was thought to still be in the machinery space and the recommendation was not accepted at that time.
15. After the machinery control room evacuation, the emergency power circuits were subject to severe voltage fluctuations, probably as a result of fire damage in the main machinery space. Power to the gyro compass and the communications centre was lost. After these initial problems, the power supply to the navigation equipment, including the radars, was stabilised.

16. The ship's situation was communicated to Fleet Base West via a mobile telephone at 1045. Maritime Headquarters West notified RAN ships in the Western Australian exercise area shortly after.

17. At 1050, a hose team entered the main machinery space from the fridge flat to fight the fire. After making a successful entry despite intense heat and thick smoke, the team was withdrawn to allow the CO₂ drench to be activated. This occurred at 1101. In the intervening period, pipes were made for a number of missing personnel.

18. The drench was remotely initiated but some of the CO₂ bottles failed to discharge and were discharged manually seven minutes later. The boundary of the main machinery space was monitored for hot spots and the conclusion reached that the fire had not been extinguished. At 1126, hose team 2 entered the main machinery space via the fridge flat to attack the fire again.

19. The first external assistance, a boat from STIRLING, arrived alongside at 1143, and transferred a medical officer and a CPOMED. At the same time, the Sea King helicopter from SUCCESS landed another medical officer and medical and firefighting equipment.

20. At 1151, hose team 3 relieved hose team 2 and continued fighting the fire from the top plates of the main machinery space. Foam was pumped into the space through the funnel at 1153. At 1206, the hose team discovered the body of LSMT Meek on the top plates adjacent to the port ladder to the middle plates. Hose team 1 relieved hose team 3 at 1210 and progressed down to the middle plates and fought the fire from there. They found the bodies of MIDN Pelly, POMT Smith and ABMT Carroll prior to reporting at 1232 that the fire was extinguished.

21. At 1218, HMA Ships SYDNEY, DARWIN and ADELAIDE were seen approaching on the starboard side. Within two minutes of that, the Fleet Base West tug TAMMAR passed a line to the forecastle. The tow commenced with the ship about 150 metres from a shoal. The towline parted at about 1250.

22. The civilian tug WAMBIRI which operates out of the Port of Fremantle, had been standing by WESTRALIA since about 1220. She connected up at 1314, despite some difficulties on WESTRALIA's forecastle in handling the heavy towing hawser. The tow then resumed.

23. At 1250, a medical team in breathing apparatus entered the main machinery space to formally assess and identify the four bodies. All were declared deceased by the medical officer from SUCCESS. Five injured personnel were medevaced to St John of God Hospital in the Perth suburb of Murdoch at 1350. One additional person was treated on board for smoke inhalation and there were a number of personnel similarly affected who did not seek treatment.
24. The four deceased personnel were extricated from the main machinery space over the period from about 1515 to 1730. This task was undertaken by ship's staff, the two medical officers, medical personnel from SYDNEY, DARWIN, STIRLING and the Sea Training Group.

25. The ship berthed at Fleet Base West at 1811. At about 1830, a Reserve legal officer, a Disaster Victim Identification Team¹, and a forensic pathologist boarded the ship. A comprehensive inspection of the main machinery space was conducted. Photographs were taken, as well as a video film. Police conducted formal identification procedures of the four deceased, and a number of flexible fuel hoses were photographed and taken into custody by the Reserve legal officer. Further inspections of the main machinery space were conducted by police officers from the Arson Squad on the following day.

THE MANNER IN WHICH THE FIRE WAS FOUGHT

26. The fire was fought in three basic stages using sequentially, 'first aid' extinguishers, the fixed main machinery space fire smothering system and hoses equipped with water wall and foam nozzles. The fire was overhauled and extinguished, reflecting favourably on the tenacity of the hose teams and the effectiveness of hose team training. The direct attack on the fire was supplemented by boundary cooling and, later, the introduction of foam through the funnel door.

27. Following the report of the fuel leak from the inboard side of the port main engine, an attack hose with a foam nozzle was laid out on the middle plates. A 90 litre foam extinguisher was also made ready. By 1033, the standing sea fire brigade had mustered in the main switchboard room, but were not committed to the main machinery space. Foam was not laid on top of the leaked fuel.

28. When the fire erupted at 1035, the Engineering Officer of the Watch alerted the bridge and emergency stations was immediately piped. In the main machinery space, sailors attempted to fight the fire using 'first aid appliances'. The fire, however, was too fierce and the use of extinguishers was ineffectual. The prepared hose and nozzle was not used.

29. The crew went to their emergency stations dressed in coveralls, anti-flash hoods and gloves. The Engineer and support staff manned damage control headquarters. The aft and forward damage control section bases were established. Almost immediately after the machinery control room was evacuated, the Engineer advised the Commanding Officer to C02 drench the main machinery space. The Commanding Officer declined as he was concerned that the missing personnel may still be alive within the main machinery space.

30. Hose teams were organised and dressed in Fearnought suits and open circuit compressed air breathing apparatus. Smoke boundaries were established, fuel isolated and ventilation closed down. At 1050, a hose team entered the main machinery space through the fridge flat aft on 1 deck, using standard firefighting techniques for fighting major fires. At 1100, when it was clear that any person within the main machinery space could not have

¹ Representing the WA State Coroner - Comprising Officers from the WA Police Arson Squad, the Emergency Operations Unit and the Forensic Division
survived, the Commanding Officer approved the release of the CO\textsubscript{2} drench. At about 1101, the hose team was withdrawn to allow the CO\textsubscript{2} fixed smothering system to be operated.

31. The CO\textsubscript{2} was released from the fire control room on 01 deck. Due to a malfunction in the CO\textsubscript{2} release system, only 50-65 per cent of the bottles were activated. About seven minutes later, the remaining bottles were released manually. During this time, boundary cooling was maintained around the main machinery space perimeter.

32. At 1126, about 15 minutes after the manual release of the CO\textsubscript{2}, the second of the three fire teams re-entered the space to fight the fire. The three hose teams fought the fire over the following hour, and during that time the four fatalities were located. The fire was reported as extinguished at 1232.

33. The Board cannot say whether the CO\textsubscript{2} extinguished the fire or not. The decision to re-enter the main machinery space to fight the fire, after only fifteen minutes was, however, premature and showed a lack of understanding of the way in which a fire extinguishing system using oxygen depletion works. This lack of understanding increased the risk to the ship and the hose teams.

34. While there is much to commend in the way the ship’s company fought the fire, the Board is concerned at a number of important issues which are discussed in detail in the body of the report. The most significant issue was the lack of understanding by key personnel of the ship’s CO\textsubscript{2} system.

**EXECUTIVE SUMMARY**

TRAINING AND COMPETENCE

35. All members of the ship’s company contributed, in some way or other, in successfully overcoming the major main machinery space fire and in providing good medical care to the casualties sustained.

36. Containment of the fire and major fire fighting efforts to combat it were ultimately successful. The requirement for boundary cooling was well understood although containment of the forward boundary of the fire (the bulkhead between the main machinery space and aft pump room) was slow to be set up. Firefighting teams from both forward and aft damage control section bases conducted major firefighting competently and with vigour.

37. Ventilation control was not well understood. The ship had developed a standard operational procedure which involved closing both the supply and exhaust ventilation to the main machinery space in the event of a fire. Although appropriate as preparation for use of the CO\textsubscript{2} drench, it prevented heat and hot gases from escaping, thus increasing the dangers and difficulties faced by personnel re-entering the main machinery space to conduct search and rescue and firefighting.

38. Ship knowledge, particularly of emergency systems, displayed by some officers and senior sailors when giving evidence, was less than satisfactory.

39. Documentary evidence received by the Board indicate that 20-25\% of the crew had not received all the required pre-joining training for their billets. Additionally, approximately 10\% of the crew were not in-date for damage control training.
40. The ship had progressed annual continuation training satisfactorily, although some training serials were not carried out as realistically as they might have been. Some important damage control training serials had not been practiced regularly. Escape drills, particularly using emergency life support respiratory devices, had not been regularly practiced.

MEDICAL RESPONSE TO THE INCIDENT

41. Of the four personnel who escaped from the main machinery space after the outbreak of the fire, three suffered smoke inhalation, two of them also sustaining burns to their hands. These personnel were treated initially by the two medical sailors and the Ship’s Medical Emergency Team (SMET) members in the starboard boat space and then moved to RASCO (replenishment control station). They were assessed and stabilised by the two medical officers who embarked and then left in the care of the SMET members whilst the medical staff attended to matters in the vicinity of the main machinery space. Two other personnel became casualties, both suffering acute situational reactions. Five casualties were medevacced by Sea King helicopter, without medical escort. One other member of the ship’s company presented with mild smoke inhalation, was treated on board and returned to duty. There is evidence that other personnel suffered mild smoke inhalation but did not present for treatment.

42. The clinical management of the casualties was most satisfactory under the circumstances. The overall medical management of the incident suffered from the fact that no member of the medical organisation maintained the overall coordination and resource management role. This resulted in the casualties treated in RASCO being left in the care of the SMET members, their requirements for the medevac being inadequately considered, and it being conducted without a medical escort of any kind.

43. There were no evident deficiencies in the clinical skills and training of any of the personnel involved in treatment of casualties. The SMET members in particular displayed a high level of skill and professionalism, noting the essentially part-time nature of their role.

THE DEATH AND INJURY OF PERSONNEL

44. The four personnel who died in the incident did so from acute carbon monoxide poisoning resulting from smoke inhalation. Based on the rapidity of fire development and the production of smoke within a large but confined space, and acting the reported levels of carboxyhaemoglobin in each of the deceased, it can be concluded that all were unconscious within five minutes of the outbreak of the fire, and died within ten minutes, well before the CO₂ drench.

Cause of Death

45. The Board finds that the causes of death were as follows:

   e. Midshipman Megan Anne Pelly L154029 Date of Birth 8 December 1975 - Died accidentally from acute carbon monoxide poisoning due to smoke inhalation in the main machinery space of HMAS
EXECUTIVE SUMMARY

WESTRALIA off the coast of Western Australia in the vicinity of Perth at approximately 1045 on 5 May 98.

f. Petty Officer Shaun Damian Smith S138258 Date of Birth 27 November 1968 - Died accidentally from acute carbon monoxide poisoning due to smoke inhalation in the main machinery space of HMAS WESTRALIA off the coast of Western Australia in the vicinity of Perth at approximately 1045 on 5 May 98.

g. Leading Seaman Bradley John Meek S147321 Date of Birth 16 July 1972 - Died accidentally from acute carbon monoxide poisoning due to smoke inhalation in the main machinery space of HMAS WESTRALIA off the coast of Western Australia in the vicinity of Perth at approximately 1045 on 5 May 98.

h. Able Seaman Phillip John Carroll S155254 Date of Birth 17 June 1974 - Died accidentally from acute carbon monoxide poisoning due to smoke inhalation in the main machinery space of HMAS WESTRALIA off the coast of Western Australia in the vicinity of Perth at approximately 1045 on 5 May 98.

EXTERNAL ASSISTANCE

46. WESTRALIA did not make any general emergency or urgency broadcast to alert other shipping and civilian authorities. Although the Port of Fremantle was only seven nautical miles away, the Fremantle Port Authority was not asked for help or resources. The fact that the Port had significant firefighting resources on almost immediate call, was not known to the command team in WESTRALIA.

47. WESTRALIA received prompt and effective support from SUCCESS, ADELAIDE, ANZAC, DARWIN, SYDNEY and STIRLING, which were able to provide assistance within 70 minutes of the outbreak of the fire. This large number of assets was well coordinated by ADELAIDE. Each request for support made by WESTRALIA was met quickly and safely.

48. Prompt and effective additional medical support was provided by STIRLING (MO and CPOMED4), SUCCESS (MO), ADELAIDE (WOMED), SYDNEY (POMED4 and ABMED3), and DARWIN (ABMED3). Additional medical equipment (Thomas packs, intravenous fluids and oxy-viva sets) was also provided.

49. St. John of God Hospital, Murdoch, was well placed to receive the casualties by air, triage, resuscitate and stabilise them, and, if it had proven necessary, transfer them to more sophisticated treatment facilities in central Perth. St. John’s Ambulance provided two ambulances on site to cater for the possible need for transfer to another hospital.

Critical Incident Stress Management

50. A major critical incident stress management activity swung into operation very shortly after the fire was extinguished. Ships in company and STIRLING provided peer support members, chaplains, psychologists and social workers who all provided on-site
support. Members of WESTRALIA’s crew, and members from other ships who had assisted on board WESTRALIA, were targeted.

51. An informal ‘de-fusing’ was undertaken through the CO addressing the ship’s company on return to Fleet Base West on the evening of the incident. An information session was conducted for the whole ship’s company at STIRLING on 6 May, and group ‘de-briefing’ was conducted at STIRLING on 7 and 8 May. This de-briefing focused on each individual’s recounting of their activities and was done in groups of about 30 personnel who had shared similar experiences on the day. The feedback from ship’s company was mostly favourable, although some felt it was of little use and others attended against their will.

52. There was some suggestion that de-briefing conducted before personnel had had the opportunity to record their recollection of events, may have exacerbated the process of ‘contamination’ of evidence that can occur through witnesses discussing matters among themselves.

Assistance to families

53. A comprehensive attempt to inform the next of kin of personnel on board was generally highly successful, with some families receiving more than one contact from authorities. The Personal Services Officer WA, the Defence Community Organisation and STIRLING provided significant assistance to families during and in the days following the incident. Briefings, and wharfside facilities for all, and travel and accommodation arrangements for the relatives of the casualties, were all provided expeditiously and effectively.

54. There were some difficulties with notification of the next of kin of the fatalities. Although they were informed early about the missing personnel, the intense media interest on the day resulted in the announcement of the deaths, but without names, before all of the next of kin received official confirmation.

55. There was a significant chaplaincy effort involving on board provision of support during the day, and on subsequent days for both the injured and the relatives of the casualties.

FIREFIGHTING AND SAFETY EQUIPMENT

56. Although the fire fighting effort was successful, the report details equipment problems with breathing apparatus, protective clothing and safety equipment. The Board has made a number of observations and detailed recommendations of a fleet wide nature on these issues.

MATERIEL STATE OF THE SHIP

57. When WESTRALIA sailed there were a number of deficiencies in the materiel state of the ship. The two serious deficiencies, the flexible supply and return fuel hoses and the CO₂ system, were not readily apparent. At that time, the flexible fuel lines gave no sign of any inherent flaw. The condition of the CO₂ system, and particularly the tension of
the operating wires, would only have been apparent to an expert on close inspection. At 0900 on 5 May 98 there was no obvious materiel deficiency that should have prevented the ship from sailing.

CAUSES OF THE FIRE

Source of fuel and ignition

58. The fire was caused by fuel spraying under pressure from a hole in a newly fitted flexible fuel hose (Figure 2) on the starboard main engine coming into contact with a hot machinery component. A contributing factor to the size of the fire was probably fuel that spilt some minutes earlier from a similar leak from a hose on the port main engine. The supply of fuel to the fire was reduced by the prompt shut down of the starboard engine; the isolation of electrical power to the fuel boost pump and the operation of the remote fuel shut off valves. There is a possibility that fuel draining from the return line fed the fire for some time, albeit at a much reduced rate.

EXECUTIVE SUMMARY

59. Testing of the failed and other fuel hoses clearly demonstrated that the steel braiding wires had failed due to fatigue after less than 40 hours operation. The failed hoses had approximately 50 adjacent wires in 5 to 7 braids fractured leaving the internal teflon tube unsupported.

Spill Pulse Pressure

60. What caused the flexible fuel lines to fatigue? Diesel engines with jerk pumps are known to be prone to pressure pulses in the fuel system. The most likely source of the fatigue loading was the action of the injector pump which releases spill pressure pulses into the supply and return lines of the low pressure fuel system, with the magnitudes of high but uncertain peak value. The presence of these pulses is well known by the engine
manufacturer and the International Maritime Organisation. There was no consultation with relevant experts by the contractor, subcontractor or ship’s staff. Lloyd’s Register of Shipping approval of the intended arrangements was not obtained as required in order to maintain the ship’s certification, and as requested by the ship.

HOW THE FLEXIBLE FUEL HOSES CAME TO BE FITTED

61. The new flexible fuel hoses were fitted by a subcontractor to ADI Limited during March and April 98. The flexible fuel hose change to the main engines was a configuration change which bypassed the prescribed processes. It was not approved by appropriate authorities and did not comply with Lloyd’s Register of Shipping requirements. Although the hoses were capable of withstanding the expected static system pressure, the arrangement was poorly engineered and the design did not take into account dynamic considerations.

RAN CONFIGURATION MANAGEMENT

62. There were some suggestions to the Board that avoidance of the formal configuration change process is widespread within the RAN. Although no real evidence of widespread abuse was presented, the issue is of sufficient concern to suggest that a review of the process is warranted.

QUALITY ASSURANCE

63. The principal organisations involved in the fuel hose work (ADI Limited, Enzed and Ordering Authority Western Australia) were all accredited to a quality standard. Evidence presented to the Board showed that the quality management systems in place were either inadequate or inadequately implemented to prevent the provision of a non-conforming product.

64. Part of the problem seems to be due to a lack of rigour by both external and internal quality auditors. The Board suggests that Defence may obtain better value for money in the longer term by contracting the accrediting and auditing organisations directly, to ensure absolute independence and minimise any possible conflict of evidence.

SYSTEM SAFETY MANAGEMENT

65. The Board has attempted to take a broad view of the causes of the accident and look at system issues as well as the specifics of the flexible hoses. The weaknesses exposed in evidence are symptomatic of wider problems within the RAN and ADI Limited.

66. The lack of knowledge displayed by some personnel is not so much a reflection on them personally but is an indication of an inadequate system. The inadequacies principally relate to training and selection of key personnel.
EXECUTIVE SUMMARY

67. Safety management on a system basis is best practice. The Board suggests that a disciplined, systematic approach to safety be more closely embraced.

COMCARE

68. Comcare requested that the Board address certain occupational health and safety issues not specifically covered by the terms of reference (Comcare letter dated 11 May 98). These are covered in section 14 of the report.

69. A cooperative relationship was established between the Board and Comcare representatives. In his opening address, counsel assisting the Board invited Comcare and any other interested person, to bring forward any questions which they wanted counsel to raise; Comcare availed themselves of this request on one occasion. All requests by Comcare to the Board for copies of documents provided to the Board have been met.

RECOGNITION OF PERSONNEL

70. The Board concluded that among many exceptional performances on the day of the fire, some personnel should be singled out for special mention and recognition. The proposals relating to such recognition are in section 15 of the report.

PRINCIPAL FINDINGS

71. The fire in HMAS WESTRALIA on 5 May 1998 was caused by diesel fuel from a burst flexible hose spraying onto a hot engine component and then igniting. The hose was one of a number of new flexible hoses supplied by the ship’s support contractor, ADI Limited, to replace the original rigid pipes. In the Board’s view, the hoses were not properly designed and were unfit for the intended purpose.

72. A change of this type should have been processed through the RAN configuration change process as well as being approved by the ship’s classification society, Lloyds Register. Both processes were bypassed, largely as a result of ignorance and incompetence. Key personnel within the RAN, and more particularly ADI Limited, were not adequately trained or qualified for the responsibilities placed on them. Regardless of the scrutiny that was avoided by bypassing these approval processes, ADI Limited should have taken steps to ensure that a safe, properly engineered product was supplied for a demanding application; it demonstrably failed to do so.

73. The four personnel who died in the fire did so as a result of acute carbon monoxide toxicity consequent upon inhalation of fire fumes. From the rapid increase in the magnitude of the fire and consequent production of smoke and fumes, the Board is able to conclude that incapacitation occurred within five minutes and death within 10 minutes of the outbreak of the conflagration and well before the CO₂ drench.

74. The dangerous and difficult fire in the main machinery space of WESTRALIA was fought heroically and effectively by the ship’s crew. There were many acts of bravery and exceptional performances on the day. The Board has identified a number of personnel
in the recommendations whom it believes should be singled out for special recognition. The choice has been difficult.

75. WESTRALIA received excellent support from a wide variety of sources and it was most welcome but not used to its full potential. The ship's crew can take great pride in the fact that they saved their ship. Tragically, nothing further could have been done by them to save their shipmates.

76. The Board's many recommendations have been drafted with the clear aim of preventing a re-occurrence and making life at sea safer. Unfortunately, there can be no guarantees that fire can be totally avoided in what is inherently a dangerous environment.

RECOMMENDATIONS

77. The Board has made 114 recommendations. The most important, as far as WESTRALIA is concerned, are associated with the main engine fuel supply, the fixed firefighting system, escape routes from the main machinery space and training of personnel. On a RAN wide basis, the recommendations of most significance are those relating to configuration management, the use of fixed firefighting systems and the training and selection of personnel for key positions.
AUTHORISATION

The President and Members of the Board of Inquiry into the fire in HMAS WESTRALIA on 5 May 98 confirm that we unanimously support the findings, conclusions and recommendations presented in this executive summary, and volume 1 of the official report.

L. Cuneo  
Assistant Chief Officer,  
Fire and Rescue Service of WA  
Member

C.W. Filor  
Inspector of Marine Accidents,  
Commonwealth Department of Workplace Relations and Small Business  
Member

E.G. Walsh  
Commander, RAN  
Member

R.B. Schedlich  
Captain, RAN  
Member

R. Lamacraft  
Commodore, RAN  
President

26 August 1998
Appendix B. Approval to undertake project from the University of Wollongong/Illawarra Area Health Service Human Ethics committee.

INITIAL APPLICATION APPROVAL
In reply please quote: HE05/264
Further Enquiries Phone: 4221 4457

28 November 2005

Mr Stephen Rayner
9 Royce Avenue
Croydon 2131

Dear Mr Rayner

I am pleased to advise that the Human Research Ethics application referred to below has been approved.

Ethics Number: HE05/264
Project Title: A personal construct theory exploration of the impact of psychological trauma among navy personnel
Name of Researchers: Mr Stephen Rayner
Approval Date: 15 November 2005
Expiry Date: 14 November 2006

This certificate relates to the research protocol submitted in your original application as modified in your letter of 11/11/05. As a condition of approval, the Human Research Ethics Committee requires that researchers immediately report:
- proposed changes to the protocol including changes to investigators involved
- serious or unexpected adverse effects on participants
- unforeseen events that might affect continued ethical acceptability of the project

You are also required to complete monitoring reports annually and at the end of your project. These reports are sent out approximately 6 weeks prior to the date your ethics approval expires. The reports must be completed, signed by the appropriate Head of School, and returned to the Research Services Office prior to the expiry date.

Yours Sincerely,

Dr Garry Hoban
Chairperson
Human Research Ethics Committee

cc: Prof. Linda Viney. Psychology
Appendix C. Approval to undertake project by the Australian Defence Human Research Ethics Committee.

Dear Mr Rayner

AUSTRALIAN DEFENCE HUMAN RESEARCH ETHICS COMMITTEE
(ADHREC) PROTOCOL 404/05: "A PERSONAL CONSTRUCT THEORY EXPLORATION OF THE IMPACT OF PSYCHOLOGICAL TRAUMA AMONG NAVY PERSONNEL."

1. Thank you for providing the requested amendments to your protocol, which have been cited and approved by the Executive. ADHREC has now cleared your project to proceed. Please note that ethical clearance from ADHREC does not automatically confer access to ADF personnel; this will have to be sought from the relevant military commanders.

2. Your protocol has been allocated ADHREC Protocol Number 404/05, and this number should be quoted in all correspondence. Your protocol has been approved for a period of three years. If your research is to continue over the three-year approval time, ADHREC approval for an extension is to be sought in writing.

3. ADHREC requires you to provide six-monthly progress reports are required, the first being due on 25 April 2006. ADHREC's compliance with the NHMRC National Statement on Ethical Conduct in Research Involving Humans requires that your progress reports include, where applicable, comment on: the security of your records; compliance with the approved consent procedures and documentation; and compliance with any other special conditions that ADHREC may have required.

4. If your protocol requires any modification, ADHREC approval must be sought in writing, detailing all modifications required.

5. For Clinical trials, ADHREC is to be notified in writing of all Serious Adverse Events within 72 hours of the event occurring.

6. For completeness, would you please sign the enclosed researcher's agreement and return it to me at your convenience. I have also enclosed ADHREC's Guidelines for Volunteers, a copy of which is to be given to each study participant.

Mr Stephen Rayner
Psychology
Balmoral Naval Hospital
HMAS PENGUIN - Middle Head Road
MOSMAN NSW 2088

Defending Australia and Its Defence Force
7. The Committee wishes you well with your research. Please contact me if I can be of any assistance.

Yours sincerely,

DR R.A LANDY
Executive Secretary
Australian Defence Human Research Ethics Committee
CP2-7-068
Campbell Park Offices
CANBERRA ACT 2600

Tel (02) 62663837
Fax (02) 62664982
E-mail: ADHREC@defence.gov.au

01 October 2007

Annex:
A. ADHREC Researchers Agreement
B. ADHREC Guidelines for Volunteers
REQUEST FOR ACCESS TO PSYCHOLOGY FILES FOR RESEARCH PURPOSES

1. In Sep 2002 the Maritime Commander sponsored a project to undertake a mental health review of all serving RAN personnel from HMAS WESTRALIA during the fatal fire in May 1998. This review was overseen by LEUT Steve Rayner, a reserve Clinical Psychologist, who also conducted the majority of screening and interviews.

2. During the review process, many personnel expressed an interest that some research be undertaken to understand the longer-term psychological impact of the fire on personnel involved. As Clinical Psychologist, Balmoral Naval Hospital, Mr Steve Raynor has commenced a research project to both better understand the impact of the fire on WESTRALIA personnel, and develop a model of psychological trauma and key mitigating factors, using information from those involved in the fire. This project will be jointly undertaken by the ADF Mental Health Strategy and the University of Wollongong, where Mr Rayner is studying toward a Doctorate of Clinical Psychology.

3. In order to undertake this project, Mr Rayner would like to access the psychology files of personnel who undertook screening between 2002 and 2005. Mr Rayner does not require the involvement of any person other than to grant permission to access and copy data (test results, questionnaire answers and narratives) contained in individual's psychology records. Mr Rayner, as principal researcher, will copy data, removing all personally identifying information (retaining demographic information such as gender, rank-group, age, and department). This data will then be subject to analysis. A report indicating and discussing the impact of the fire degree of traumatic stress and the process of psychological trauma will be produced. The more data made available by personnel, the better the outcome of the report.

4. All that is required of personnel is to grant permission for the principal researcher to access their psychology files to extract a copy of data for analysis. This project will be subject to ethical scrutiny by the Australian Defence Human Research Ethics Committee (ADHREC) and the University of Wollongong's Human Research Ethics Committee.

5. Your part in the Study.
   - Participants are asked to grant access to their psychological files to extract data related to their involvement in the fire in WESTRALIA. This is the only requirement of participants.
• Participation in the study is entirely voluntary; there is no obligation to take part in the study, if you choose not to participate there will be no detriment to your career or future health care;

• You may withdraw at any time with no detriment to your career or to your future health care;

6. Risks of participating. The reminder of the incident, the awareness of its impact on yourself and others and the awareness of this study are the only risks to participants. As you are only granting access to existing files, there is no additional interviewing or intrusion required. Therefore, it is anticipated that there should be little discomfort to participants.

7. On duty. Australian Defence Force members will be considered 'on duty' during participation (that is, while considering participation and completing this consent process).

8. Statement of Privacy. Information on ADF Psychology files is “PSYCHOLOGY-CONFIDENTIAL” and stored accordingly. Information used in this study will be extracted and stored under the same conditions. As data is copied from ADF Psychology files, all personally identifying information (name, number, date of birth etc) will be replaced by the chief researcher with a simple and unique code number to ensure anonymity especially during interaction with other research personnel (although demographic details such as age, gender, rank-grouping and department will be retained to help understand the experience of the fire on different groups). The key to this code will be classified “PSYCHOLOGY-CONFIDENTIAL” and stored accordingly. No-one other than the chief researcher will have access to this code.

Information used in this study will be used for the purpose of this study only and no other, without the express permission of the individual.

9. Contact Details for this study.

Chief Investigator
Mr Stephen Raynor
Clinical Psychologist
Balmoral Naval Hospital
Middle Head Road
Mosman NSW 2088
Tel: 02 9960 0534
E-Mail: Stephen.raynor1@defence.gov.au

Academic Supervisor
Associate Professor Linda Viney
Dept of Psychology
University of Wollongong
Northfields Avenue
Wollongong NSW 2522
Tel: 02 4221 4699
E-Mail: lvincy@uow.edu.au
10. Should you have any complaints or concerns about the manner in which this project is conducted, please do not hesitate to contact the researchers in person, or you may prefer to contact the Australian Defence Human Research Ethics Committee at the following address:

Executive Secretary
Australian Defence Human Research Ethics Committee
CP2-7-66
Department of Defence
CANBERRA ACT 2600
Telephone: (02) 6266 3837
Facsimile: (02) 6266 4982
Email: ADHREC@defence.gov.au

A J COTTON
COL
DFPO
CP2-5-056
1 Dec 05
Appendix E. Impact of Events Scale – Revised (IES-R)

**IMPACT OF EVENT SCALE-REVISED**

*Instructions:* The following is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you during the past 7 days with respect to the disaster. How much were you distressed or bothered by those difficulties?

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>A little bit</th>
<th>Modestly</th>
<th>Quite a bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Any reminder brought back feelings about it.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>I had trouble falling asleep.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Other things kept making me think about it.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>I felt irritable and angry.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>I avoided letting myself get upset when I thought about it or was reminded of it.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>I thought about it when I didn’t mean to.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>I felt as if it hadn’t happened or wasn’t real.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>I stayed away from reminders about it.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>Pictures about it popped into my mind.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>I was jumpy and easily startled.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>11</td>
<td>I tried not to think about it.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>12</td>
<td>I was aware that I still had a lot of feelings about it, but I didn’t deal with them.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>13</td>
<td>My feelings about it were kind of numb.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>14</td>
<td>I found myself acting or feeling like I was back at that time.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>15</td>
<td>I had trouble falling asleep.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>16</td>
<td>I had waves of strong feelings about it.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>17</td>
<td>I tried to remove it from my memory.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>18</td>
<td>I had trouble concentrating.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>19</td>
<td>Reminders of it caused me to have physical reactions such as sweating, trouble breathing, nausea, or a pounding heart.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>20</td>
<td>I had dreams about it.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>21</td>
<td>I felt watchful and on guard.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>22</td>
<td>I tried not to talk about it.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Appendix F. Posttraumatic Check List – Civilian version (PCL-C)

**PSYCHOLOGY-IN-CONFIDENCE (after first entry)**

**SYMPTOMS QUESTIONNAIRE (PCL-C)**

**DIRECTIONS:**
Below is a list of problems and complaints that people sometimes have in response to stressful life experiences. Please read each one and then indicate how much you have been bothered by that problem in the past month.

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>A little bit</th>
<th>Moderately</th>
<th>A lot</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Repeated disturbing memories, thoughts or images of a stressful experience from the past?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Repeated, disturbing dreams of a stressful experience from the past?</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3. Suddenly acting or feeling as if a stressful experience from the past were happening again (as if you were reliving it)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Feeling very upset when something reminded you of a stressful experience from the past?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Having physical reactions (e.g., heart pounding, trouble breathing, sweating) when something reminded you of a stressful experience from the past?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Avoiding thinking about or talking about a stressful experience from the past or avoiding having feelings related to it?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Avoiding activities or situations because they reminded you of a stressful experience from the past?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Trouble remembering important parts of a stressful experience from the past?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Loss of interest in activities that used to enjoy?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Feeling distant or cut off from other people?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Feeling emotionally numb or being unable to have loving feelings for those close to you?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Feeling as if your future somehow will be cut short?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Trouble falling or staying asleep?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Feeling irritable or having angry outbursts?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Having difficulty concentrating?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Being 'supersensitive' or watchful or on guard?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Feeling jittery or easily startled?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**OFFICE USE ONLY**

<table>
<thead>
<tr>
<th>X1</th>
<th>X2</th>
<th>X3</th>
<th>X4</th>
<th>X5</th>
</tr>
</thead>
</table>

**PSYCHOLOGY-IN-CONFIDENCE (after first entry)**
Appendix G. General Health Questionnaire – 28 item version

**THE GENERAL HEALTH QUESTIONNAIRE**

*GHQ 28*

David Goldberg

Please read this carefully.

We should like to know if you have had any medical complaints and how your health has been in general, over the past few weeks. Please answer ALL the questions on the following pages simply by underlining the answer which you think most nearly applies to you. Remember that we want to know about present and recent complaints, not those that you had in the past.

It is important that you try to answer ALL the questions.

Thank you very much for your co-operation.

<table>
<thead>
<tr>
<th>Have you recently</th>
<th>Better than usual</th>
<th>Same as usual</th>
<th>Worse than usual</th>
<th>Much worse than usual</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 - been feeling perfectly well and in good health?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2 - been feeling in need of a good tonic?</td>
<td>Not at all</td>
<td>No more than usual</td>
<td>Rather more than usual</td>
<td>Much more than usual</td>
</tr>
<tr>
<td>A3 - been feeling run down and out of sorts?</td>
<td>Not at all</td>
<td>No more than usual</td>
<td>Rather more than usual</td>
<td>Much more than usual</td>
</tr>
<tr>
<td>A4 - felt that you are ill?</td>
<td>Not at all</td>
<td>No more than usual</td>
<td>Rather more than usual</td>
<td>Much more than usual</td>
</tr>
<tr>
<td>A5 - been getting any pains in your head?</td>
<td>Not at all</td>
<td>No more than usual</td>
<td>Rather more than usual</td>
<td>Much more than usual</td>
</tr>
<tr>
<td>A6 - been getting a feeling of tightness or pressure in your head?</td>
<td>Not at all</td>
<td>No more than usual</td>
<td>Rather more than usual</td>
<td>Much more than usual</td>
</tr>
<tr>
<td>A7 - been having hot or cold spells?</td>
<td>Not at all</td>
<td>No more than usual</td>
<td>Rather more than usual</td>
<td>Much more than usual</td>
</tr>
</tbody>
</table>

| B1 - lost much sleep over worry?                       | Not at all        | No more than usual | Rather more than usual | Much more than usual  |
| B2 - had difficulty in staying asleep once you are off? | Not at all        | No more than usual | Rather more than usual | Much more than usual  |
| B3 - felt constantly under strain?                    | Not at all        | No more than usual | Rather more than usual | Much more than usual  |
| B4 - been getting edgy and bad-tempered?              | Not at all        | No more than usual | Rather more than usual | Much more than usual  |
| B5 - been getting scared or panicky for no good reason? | Not at all        | No more than usual | Rather more than usual | Much more than usual  |
| B6 - found everything getting on top of you?           | Not at all        | No more than usual | Rather more than usual | Much more than usual  |
| B7 - been feeling nervous and strung-up all the time?  | Not at all        | No more than usual | Rather more than usual | Much more than usual  |
Have you recently

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>More so than usual</th>
<th>Same as usual</th>
<th>Rather less than usual</th>
<th>Much less than usual</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1 — been managing to keep yourself busy and occupied?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C2 — been taking longer over the things you do?</td>
<td>Quicker than usual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C3 — felt on the whole you were doing things well?</td>
<td>Better than usual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C4 — been satisfied with the way you’ve carried out your task?</td>
<td>More satisfied</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C5 — felt that you are playing a useful part in things?</td>
<td>More so than usual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C6 — felt capable of making decisions about things?</td>
<td>More so than usual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C7 — been able to enjoy your normal day-to-day activities?</td>
<td>More so than usual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Not at all</th>
<th>No more than usual</th>
<th>Rather more than usual</th>
<th>Much more than usual</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1 — been thinking of yourself as a worthless person?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D2 — felt that life is entirely hopeless?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D3 — felt that life isn’t worth living?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D4 — thought of the possibility that you might make away with yourself?</td>
<td>Definitely not, I don’t think so</td>
<td></td>
<td></td>
<td>Has crossed my mind</td>
<td>Definitely have</td>
</tr>
<tr>
<td>D5 — found at times you couldn’t do anything because your nerves were too bad?</td>
<td>Not at all</td>
<td></td>
<td></td>
<td>Rather more than usual</td>
<td>Much more than usual</td>
</tr>
<tr>
<td>D6 — found yourself wishing you were dead and away from it all?</td>
<td>Not at all</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D7 — found that the idea of taking your own life kept coming into your mind?</td>
<td>Definitely not, I don’t think so</td>
<td></td>
<td></td>
<td>Has crossed my mind</td>
<td>Definitely has</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>TOTAL</th>
</tr>
</thead>
</table>

---

M. D. Goldberg & The Institute of Psychiatry, 1981

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Published by Michael J. Goldberg, 1381
The Institute of Psychiatry, 46-50 Howard Road, London W10 5AB

This is an excerpt from The Institute of Psychiatry's publication, "Feeling Well Again," which provides guidance on recognizing and managing mental health issues.
Appendix H. Alcohol Use Disorder Identification Test (AUDIT)

**ALCOHOL QUESTIONNAIRE**

In answering the following questions, please remember that a standard drink contains 10 g of pure alcohol. Each of these is a standard drink: 1 mid-strength can of beer, 1 glass of wine, 1 glass of sherry, 1 nip of spirits.

<table>
<thead>
<tr>
<th>Question</th>
<th>Never</th>
<th>Once a month or less</th>
<th>2 to 4 times a week</th>
<th>2 to 3 times a week</th>
<th>4 or more times a week</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How often do you have a drink containing alcohol?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. How many standard drinks (see above) containing alcohol do you have on a typical day when you are drinking?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. How often do you have six or more drinks on one occasion?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. How often during the last 3 months have you found that you were not able to stop drinking once you had started?</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>5. How often during the last 3 months have you failed to do what was normally expected of you because of drinking?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. How often during the last 3 months have you needed a drink in the morning to get yourself going after a heavy drinking session?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. How often during the last 3 months have you had a feeling of guilt or remorse after drinking?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. How often during the last 3 months have you been unable to remember what happened the night before because you had been drinking?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Have you or someone else been injured as a result of your drinking?</td>
<td></td>
<td>Yes, but not in the last 3 months</td>
<td>Yes, during the last 3 months</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Has a relative, a friend, a doctor or other health professional been concerned about your drinking or suggested you cut down?</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>11. Do you think you presently have a problem with drinking?</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>12. In the next 3 months, how difficult would you find it to cut down or stop drinking?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PSYCHOLOGY-IN-CONFIDENCE (after first entry)**
Appendix I. Psychometric properties of the IES-R, the PCL-C, the GHQ-28 and the AUDIT.

Table 16.

*Psychometric Properties of the IES-R.*

<table>
<thead>
<tr>
<th>Psychometric and Reference</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IES-R internal consistency</strong></td>
<td></td>
</tr>
<tr>
<td>Weiss &amp; Marmar (1997)</td>
<td>.92 for Intrusion, .85 for avoidance, and .89 for hyperarousal.</td>
</tr>
<tr>
<td>Asukai, Kato, Kawamura, Kim, Yamamoto, Kishimoto, Miyake and Nishizono-Maher (2002).</td>
<td>Internal consistency of the whole scale, and three subscales of a Japanese-language version ranged from 0.80 to 0.95.</td>
</tr>
<tr>
<td>Creamer, Bell and Failla (2003)</td>
<td>High internal consistency for the whole scale (Cronbach’s alpha=0.96) and internal consistency between scales ranging from 0.52 to 0.94.</td>
</tr>
<tr>
<td><strong>IES-R test-retest reliability</strong></td>
<td></td>
</tr>
<tr>
<td>Weiss &amp; Marmar (1997)</td>
<td>At five months, intrusion subscale = .94, avoidance subscale = .89 &amp; hyperarousal subscale = .92</td>
</tr>
<tr>
<td>Asukai, Kato, Kawamura, Kim, Yamamoto, Kishimoto, Miyake and Nishizono-Maher (2002).</td>
<td>Spearman’s rank correlation coefficient of r=.86, p=.0001, over administration of the questionnaire over a two week period, indicating good test-retest reliability.</td>
</tr>
<tr>
<td><strong>IES-R predictiveness</strong></td>
<td></td>
</tr>
<tr>
<td>Creamer, Bell and Failla (2003)</td>
<td>Sensitivity 0.91; specificity 0.82; positive predictive power of 0.90; negative predictive power of 0.84.</td>
</tr>
<tr>
<td>IES-R validity</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------</td>
</tr>
<tr>
<td>Brandes, Ben-Schachar, Gilboa, Bonne, Freedman &amp; Shalev (2002)</td>
<td>Distinguished between high and low PTSD symptoms in recent trauma survivors.</td>
</tr>
<tr>
<td>Hull, Alexander &amp; Klein (2002)</td>
<td>Used to measure PTSD symptoms in UK survivors of a fatal oil platform fire 10 years after the event.</td>
</tr>
<tr>
<td>Creamer, Bell and Failla (2003)</td>
<td>Correlation with PCL of .84</td>
</tr>
<tr>
<td>Ohtani, Iwanami, Kasai, Yamasue, Kato, Sasaki and Kato (2004)</td>
<td>Used to assess PTSD symptoms in victims of 1995 Sarin Gas attack of Tokyo subway. Significant correlation between IES-R scores and the Clinician Administered PTSD Scale (CAPS), a structured interview to diagnose PTSD (for current PTSD, r=0.521, p&lt;0.01 and for lifetime PTSD, r=0.418, p&lt;0.05).</td>
</tr>
<tr>
<td>Hughes, Cameron, Eldridge, Devon, Wessely &amp; Greenberg (2005)</td>
<td>Used to screen for mental health in UK military personnel before and after deployment to Iraq in 2004.</td>
</tr>
</tbody>
</table>
Table 17.

*Psychometric Properties of the PCL-C.*

<table>
<thead>
<tr>
<th>Psychometric and Reference</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PCL-C internal consistency</strong></td>
<td></td>
</tr>
<tr>
<td>Keane, Newman &amp; Orsillo (1997)</td>
<td>Cronbach’s alpha = .86</td>
</tr>
<tr>
<td><strong>PCL-C predictiveness</strong></td>
<td></td>
</tr>
<tr>
<td>Newman, Kaloupek &amp; Keane (1996)</td>
<td>Sensitivity of .82, specificity .83</td>
</tr>
<tr>
<td>Keane, Newman &amp; Orsillo (1997)</td>
<td>Excellent sensitivity .94, but poor specificity .48</td>
</tr>
<tr>
<td>Andrykowski, Cordova, Studts &amp; Miller (1998)</td>
<td>In cancer patients, sensitivity and specificity for cutoff of 50 was .60 and .99, and sensitivity and specificity for cutoff of 30 was 1.00 and .83.</td>
</tr>
<tr>
<td>Ventureyra, Yao, Cottraux, Note and De Mey-Guillard (2002)</td>
<td>Sensitivity and specificity for cutoff of 50 was .84 and .90, and for cutoff of 44 was .97 and .87.</td>
</tr>
<tr>
<td>Lang, Laffaye, Satz, Dresselhaus and Stein (2003)</td>
<td>Very high sensitivity (.94), tolerable specificity (.68) and lowest rate of false negatives, was raw score of 28-30 - with female military veterans.</td>
</tr>
<tr>
<td><strong>PCL-C test-re-test reliability</strong></td>
<td></td>
</tr>
<tr>
<td>Ventureyra, Yao, Cottraux, Note and De Mey-Guillard (2002)</td>
<td>Test-retest reliability over 1-2 weeks was .80</td>
</tr>
<tr>
<td>Ruggiero, Del Ben, Scotti and Rabalais (2003)</td>
<td>Test-retest reliability was established for 1 hour (.92, p&lt;.001), 1 week (.88, p&lt;.001) and 14 days (.68, p&lt;.001).</td>
</tr>
<tr>
<td>Study</td>
<td>Findings</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Forbes, Creamer and Biddle (2001)</td>
<td>Used to measure change in PTSD symptoms in Australian Vietnam veterans. Correlations between the PCL and the Clinician Administered PTSD Scale (CAPS - described as the ‘gold standard’ in assessing PTSD) ranged from .30 (p&lt;.001) to .62 (p&lt;.001).</td>
</tr>
<tr>
<td>Ventureyra, Yao, Cottraux, Note and De Mey-Guillard (2002)</td>
<td>Successfully identified PTSD in mostly female adult patients seeking hospital treatment for trauma related symptoms.</td>
</tr>
<tr>
<td>Creamer, Bell and Failla (2003)</td>
<td>Correlation with IES-R of .84</td>
</tr>
<tr>
<td>Ruggiero, Del Ben, Scotti and Rabalais (2003)</td>
<td>Correlations between total scores on the PCL-C and the IES was .77 (p&lt;.001) and between total scores on the PCL-C and MSC, .82 (p&lt;.001).</td>
</tr>
<tr>
<td>Rayner (2003)</td>
<td>Used to screen for PTSD in Australian Navy personnel</td>
</tr>
</tbody>
</table>
Table 17 continued.

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steindl, Young, Creamer &amp; Crompton (2003)</td>
<td>Used to measure current, specific PTSD symptoms in male combat veterans predominantly from the Vietnam war.</td>
</tr>
<tr>
<td>Black &amp; White (2005)</td>
<td>Used item score of 3 or more to determine DSM-IV diagnosis of PTSD in cancer survivors.</td>
</tr>
</tbody>
</table>
Table 18.

*Psychometric Properties of the GHQ-28.*

<table>
<thead>
<tr>
<th>Psychometric and Reference</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHQ-28 predictiveness</td>
<td></td>
</tr>
<tr>
<td>Goodchild and Duncan-Jones (1985)</td>
<td>Using CGHQ rather than GHQ scoring increases sensitivity (from 73.5% to 84.0%), specificity (from 76.4% to 80.2%), and produced a more normal distribution of GHQ scores than the traditional scoring system (where the distribution is skewed).</td>
</tr>
<tr>
<td>Koeter, van den Brink &amp; Ormel (1989)</td>
<td>Sensitivity for patients with and without chronic complaints of 1.00, and misclassification rate of .27 for patients with chronic complaints of .27 and .25 for patients without chronic complaints.</td>
</tr>
<tr>
<td>Goldberg &amp; Williams (1991)</td>
<td>Reports 12 studies claiming sensitivity ranging from .44 to 1.00 (median .86) and specificity ranging from .74 to .93 (median .82)</td>
</tr>
<tr>
<td>Richard, Lussier, Cagnon &amp; Lamarche (2004)</td>
<td>GHQ scoring appropriate for assessing transient conditions, while CGHQ scoring more appropriate to assessing chronic conditions</td>
</tr>
<tr>
<td>Whaley, Morrison, Payne, Fritschi &amp; Wall (2005)</td>
<td>Using CGHQ scoring rather than GHQ scoring increases sensitivity (from 61% to 85%) and marginally improvement specificity (when comparable sensitivity in maintained).</td>
</tr>
<tr>
<td>GHQ-28 test-retest reliability</td>
<td></td>
</tr>
<tr>
<td>Goldberg &amp; Williams (1991)</td>
<td>Reported at .90 for stroke patients, after 8 months.</td>
</tr>
</tbody>
</table>
Table 18 continued.

<table>
<thead>
<tr>
<th>GHQ-28 validity</th>
<th>Report three studies comparing GHQ-28 reports to interview measures of morbidity, with correlations ranging from .67 to .83 (median .76).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goldberg &amp; Williams (1991)</td>
<td>Distinguishes family of Vietnam veterans from controls</td>
</tr>
<tr>
<td>Westerink &amp; Giarratano (1999)</td>
<td>Used to assess nonspecific mental morbidity among civilians</td>
</tr>
<tr>
<td>Cardozo, Vergara, &amp; Gotway (2000)</td>
<td>Kosovar Albanians, following the 1998 war in Kosovo. GHQ-28 scores distinguished internally displaced people from those not displaced.</td>
</tr>
<tr>
<td>Hull, Alexander &amp; Klein (2002)</td>
<td>Used to assess general psychopathology in UK survivors of a fatal oil platform fire 10 years after the event.</td>
</tr>
</tbody>
</table>
### Psychometric Properties of the AUDIT

<table>
<thead>
<tr>
<th>Psychometric and Reference</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AUDIT internal consistency</strong></td>
<td></td>
</tr>
<tr>
<td>Daeppen, Yersin, Landry, Pecoud and Decrey (2000)</td>
<td>internal validity .85, reliability .8</td>
</tr>
<tr>
<td>Babor, Higgins-Biddle, Saunders, Maristela &amp; Monteiro (2001)</td>
<td>describes inter-item reliability at .86</td>
</tr>
<tr>
<td><strong>AUDIT predictiveness</strong></td>
<td></td>
</tr>
<tr>
<td>Saunders, Aasland, Babor, de la Fuente, &amp; Grant (1993)</td>
<td>Sensitivity and specificity for hazardous consumption / recurrent intoxication was .97 and .78 respectively; for abnormal drinking behaviour, .96 and .81 respectively; for alcohol related problems in the last year, .95 and .85 respectively; and for a combined index of hazardous and harmful alcohol use was .92 and .94.</td>
</tr>
<tr>
<td>Conigrave, Hall and Saunders (1995)</td>
<td>Australian primary health care settings. Using a cutoff of 8+, they detected 94.9% of participants with current social or medical problems related to alcohol (specificity 87.9%), 93.6% with hazardous alcohol intake (specificity 80.6%), and 97.0% with frequent drinking likely to result in intoxication (specificity 78.3%).</td>
</tr>
<tr>
<td>Babor, Higgins-Biddle, Saunders &amp; Monteiro (2001)</td>
<td>Sensitivity in the mid-.90s and specificities averaging in the .80s, primary health care patients from six countries.</td>
</tr>
<tr>
<td>Reinert and Allen (2002)</td>
<td>Sensitive and specific, performing at a level at least comparable to, if not higher than, other scales. Is relatively free of cultural bias, and is reliable, valid and practical</td>
</tr>
</tbody>
</table>
Table 19 continued.

<table>
<thead>
<tr>
<th>AUDIT test-retest reliability</th>
<th>Retest reliability over 6 weeks was .88 (p&lt;0.001).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Babor, Higgins-Biddle, Saunders &amp; Monteiro (2001)</td>
<td>91% of all respondent were classified the same way as either high risk or not high risk at administrations one month apart.</td>
</tr>
<tr>
<td>Selin (2003)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AUDIT validity</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Daeppen, Yersin, Landry, Pecoud and Decrey (2000)</td>
<td>AUDIT maintained good psychometric properties when imbedded into a broader health screen and reinforced the use of a cutoff score of 8+ to indicate problematic drinking.</td>
</tr>
<tr>
<td>Babor, Higgins-Biddle, Saunders, Maristela &amp; Monteiro (2001)</td>
<td>Large correlations with other measures of alcohol abuse (.88 with MAST, and .78 with CAGE).</td>
</tr>
<tr>
<td>Kypri, McGee, Saunders, Langley, and Dean, (2002)</td>
<td>AUDIT more appropriate for clinical screening than large population sampling due to interpretations of questions.</td>
</tr>
<tr>
<td>Rumpf, Hapke, Meyer and John (2002)</td>
<td>AUDIT more appropriate for clinical screening than large population sampling due to interpretations of questions.</td>
</tr>
<tr>
<td>Forbes, Bennett, Biddle, Crompton, McHugh, Elliot &amp; Creamer (2005)</td>
<td>Used to assess alcohol use and therapeutic improvement after treatment, in Australian Vietnam veterans, and peacekeepers.</td>
</tr>
</tbody>
</table>
Appendix J. Comparison of mental health in Westralia survivors, with similar samples who experienced potentially traumatic events.

Table 20.

*Rates of PTSD in Westralia survivors compared with similar samples.*

<table>
<thead>
<tr>
<th>Study</th>
<th>Measurement</th>
<th>Sample</th>
<th>Rate of PTSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Westralia</td>
<td>IES-R 4 months</td>
<td>military - navy</td>
<td>38.64%</td>
</tr>
<tr>
<td></td>
<td>IES-R 11 months</td>
<td>military - navy</td>
<td>30.36%</td>
</tr>
<tr>
<td></td>
<td>PCL-C 4-6 years</td>
<td>military - navy</td>
<td>16.00%</td>
</tr>
<tr>
<td>APA (DSM-IV)</td>
<td></td>
<td>general population</td>
<td>1-14%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>high risk community</td>
<td>3-58%</td>
</tr>
<tr>
<td>Berg, Grieger and Spira (2005)</td>
<td>IES-R 7 months</td>
<td>military - navy</td>
<td>9%</td>
</tr>
<tr>
<td>Grieger, Fullerton and Ursano (2003)</td>
<td>IES-R</td>
<td>general population</td>
<td>14%</td>
</tr>
<tr>
<td>Rayner (2005)</td>
<td>PCL-C</td>
<td>military navy</td>
<td>1.40%</td>
</tr>
<tr>
<td>McKenzie, Ikin, McFarlane, Creamer, Forbes, Kelsall, Glass, Ittak, and Sim (2004)</td>
<td>PCL-S 10 years</td>
<td>military navy war</td>
<td>7.90%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>military navy control</td>
<td>4.6%</td>
</tr>
<tr>
<td>Barrett, Doebbeling, Schwartz, Voelker, Falter, Woolson and Doebbeling (2002)</td>
<td>PCL 10 years</td>
<td>military army combat</td>
<td>3.40%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>military army control</td>
<td>1.40%</td>
</tr>
<tr>
<td>Kang, Natelson, Mahan, Lee and Murphy (2003)</td>
<td>PCL 10 years</td>
<td>military army war</td>
<td>12.10%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>military army control</td>
<td>4.30%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>military navy war</td>
<td>7.70%</td>
</tr>
</tbody>
</table>
Table 20 continued

<table>
<thead>
<tr>
<th>Study</th>
<th>Duration</th>
<th>Exposure</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>O'Brien and Hughes (1991)</td>
<td>5 years</td>
<td>military army war</td>
<td>22%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>military army</td>
<td></td>
</tr>
<tr>
<td>Hodson, Ward and Rapee (2003)</td>
<td></td>
<td>peacekeeping</td>
<td>15%</td>
</tr>
<tr>
<td>Litz, Gray and Bolton (2003)</td>
<td></td>
<td>military peacekeeping</td>
<td>8%</td>
</tr>
<tr>
<td>Litz, Orsillo, Friedman, Ehlich and Batres</td>
<td></td>
<td>army peacekeeping</td>
<td>8%</td>
</tr>
<tr>
<td>(1997)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hull, Alexander and Klein (2002)</td>
<td>10 years</td>
<td>civilian oil rig workers</td>
<td>21%</td>
</tr>
</tbody>
</table>
Table 21.

*Rates of general psychological distress in Westralia survivors compared with similar samples.*

<table>
<thead>
<tr>
<th>Study</th>
<th>Measurement</th>
<th>Sample</th>
<th>Rate of general psychological distress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Westralia</td>
<td>GHQ-28 (CGHQ)</td>
<td>Military - navy</td>
<td>54.17%</td>
</tr>
<tr>
<td>McKenzie, Ikin, McFarlane, Creamer,</td>
<td>GHQ-12 10 years</td>
<td>Military navy war</td>
<td>39.60%</td>
</tr>
<tr>
<td>Forbes, Kelsall, Glass, Ittak, and Sim (2004)</td>
<td>GHQ-60 5 years</td>
<td>Military army war</td>
<td>23.44%</td>
</tr>
<tr>
<td>Chung, Easthope, Chung and Clark-Carter (1999)</td>
<td>GHQ 6 months</td>
<td>Civilian</td>
<td>52%</td>
</tr>
<tr>
<td>Hull, Alexander and Klein (2002)</td>
<td>GHQ-28 10 years</td>
<td>workers</td>
<td>44%</td>
</tr>
</tbody>
</table>
Table 22.

*Rates of alcohol disorders in Westralia survivors compared with similar samples.*

<table>
<thead>
<tr>
<th>Study</th>
<th>Measurement</th>
<th>Sample</th>
<th>Rates of alcohol problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Westralia</td>
<td>AUDIT 4-6 years</td>
<td>military – navy</td>
<td>29.17%</td>
</tr>
<tr>
<td>McKenzie, McFarlane, Creamer, Ikin, Forbes, Kelsall, Clarke, Glass, Ittak and Sim (2006)</td>
<td>AUDIT 10 years</td>
<td>military navy war</td>
<td>25.70%</td>
</tr>
<tr>
<td>Erbes, Westermayer, Engdahl and Johnsen (2007)</td>
<td>AUDIT recent</td>
<td>military army war</td>
<td>27%</td>
</tr>
<tr>
<td>Mills, Teeson, Ross &amp; Peters, 2006</td>
<td></td>
<td>general population</td>
<td>24.10%</td>
</tr>
</tbody>
</table>
Appendix K. Psychometric properties of the Positive Affect Scale, the Total Anxiety Scale, the Cognitive Anxiety Scale, the Hostility – Outward Scale, the Depression Scale, and the Sociality Scale.

Table 23.

**Psychometric Properties of the Positive Affect Scale.**

<table>
<thead>
<tr>
<th>Psychometric and Reference</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Affect – Inter-rater Reliability</td>
<td>Westbrook (1976)</td>
</tr>
<tr>
<td>Positive Affect - Validity</td>
<td>Westbrook (1976)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Viney, Walker, Robertson, Lilley &amp; Ewan (1994)</td>
</tr>
<tr>
<td></td>
<td>Viney, Henry &amp; Campbell (2001)</td>
</tr>
<tr>
<td></td>
<td>Foster &amp; Viney (2006)</td>
</tr>
</tbody>
</table>
Table 24.

**Psychometric Properties of the Total Anxiety Scale.**

<table>
<thead>
<tr>
<th>Psychometric and Reference</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Anxiety Scale – Inter-rater Reliability</strong></td>
<td></td>
</tr>
<tr>
<td>Gottschalk-Gleser (1969)</td>
<td>.84 to .90 (Total Score)</td>
</tr>
<tr>
<td></td>
<td>.74 to .93 (Anxiety Subscales)</td>
</tr>
<tr>
<td></td>
<td>.75 to .79 (Guilt Anxiety Subscale)</td>
</tr>
<tr>
<td></td>
<td>.67 to .90 (Shame Anxiety Subscale)</td>
</tr>
<tr>
<td>Viney (1993)</td>
<td>.71 to .96</td>
</tr>
<tr>
<td><strong>Total Anxiety Scale - Validity</strong></td>
<td></td>
</tr>
<tr>
<td>Gottschalk-Gleser (1969)</td>
<td>Correlates with psychiatric rating scales</td>
</tr>
<tr>
<td></td>
<td>Correlates with self-report measures of anxiety</td>
</tr>
<tr>
<td></td>
<td>Distinguishes between psychiatric/patients and medical / psychiatrically healthy sample</td>
</tr>
<tr>
<td></td>
<td>Distinguishes between hypertension and non-hypertension patients</td>
</tr>
<tr>
<td>Viney &amp; Manton (1973)</td>
<td>Distinguishes between students and psychiatric patients</td>
</tr>
<tr>
<td>Gottschalk, Stein &amp; Shapiro (1997)</td>
<td>Total score correlates with total SCL-90 Anxiety scores</td>
</tr>
<tr>
<td></td>
<td>Some subscales correlates with SCL-90 Anxiety and Depression subscales</td>
</tr>
<tr>
<td></td>
<td>Correlates with MMPI lie scale</td>
</tr>
<tr>
<td></td>
<td>Guilt subscale correlates with MMPI depression, hysteria, hypocondriasis and schizophrenia subscales</td>
</tr>
<tr>
<td></td>
<td>Shame subscale correlates with MMPI paranoia subscale</td>
</tr>
<tr>
<td>Lane and Viney (2005)</td>
<td>Responsive to effective therapy for breast cancer</td>
</tr>
</tbody>
</table>
Table 25.

**Psychometric Properties of the Cognitive Anxiety Scale.**

<table>
<thead>
<tr>
<th>Scale and Reference</th>
<th>Inter-rater reliability coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cognitive Anxiety - Reliability</strong></td>
<td></td>
</tr>
<tr>
<td>Viney &amp; Westbrook (1976)</td>
<td>.93-.99 (two independent raters)</td>
</tr>
<tr>
<td></td>
<td>.71-.79 (four independent raters)</td>
</tr>
<tr>
<td><strong>Cognitive Anxiety - Validity</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Positive correlation with socioeconomic status</td>
</tr>
<tr>
<td></td>
<td>Positive correlation with anxiety and hostility</td>
</tr>
<tr>
<td>Westbrook (1976)</td>
<td>inwards, &amp; ambivalent hostility</td>
</tr>
<tr>
<td>Viney (1980)</td>
<td>Discriminate people in novel and incongruous experiences from those in relatively unchanging situations</td>
</tr>
<tr>
<td>Viney, Clarke, Bunn &amp; Benjamin (1985)</td>
<td>Associated with state anxiety, but not trait anxiety</td>
</tr>
<tr>
<td></td>
<td>Negative association with positive affect</td>
</tr>
<tr>
<td>Viney, Henry &amp; Campbell (2001)</td>
<td>Associated with transitions in life</td>
</tr>
<tr>
<td></td>
<td>Distinguishes between patients in crisis who receive counseling support and those that do not</td>
</tr>
<tr>
<td>Foster &amp; Viney (2006)</td>
<td>Associated with immediate gains from group-work with offender adolescents, but not with long term gains</td>
</tr>
<tr>
<td></td>
<td>Responsive to successful group work for women experiencing menopause</td>
</tr>
</tbody>
</table>
Table 26.

*Psychometric Properties of the Hostility-Outward Scale.*

<table>
<thead>
<tr>
<th>Scale and Reference</th>
<th>Inter-rater reliability coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hostility – Outward - Reliability</strong></td>
<td></td>
</tr>
<tr>
<td>Gottschalk-Gleser (1969)</td>
<td>.79 to .98</td>
</tr>
<tr>
<td><strong>Hostility Outward - Validity</strong></td>
<td></td>
</tr>
<tr>
<td>Gottschalk &amp; Gleser (1969)</td>
<td>Distinguished between schizophrenic and autistic patients</td>
</tr>
<tr>
<td></td>
<td>Responsive to experimental manipulation</td>
</tr>
<tr>
<td>Viney, Clarke, Bunn &amp; Benjamin (1985)</td>
<td>Responsive to successful intervention with patients in crisis</td>
</tr>
<tr>
<td>Gottschalk, Stein &amp; Shapiro (1997)</td>
<td>Correlates with some MMPI subscales</td>
</tr>
<tr>
<td>Viney, Henry &amp; Campbell (2001)</td>
<td>Responsive to successful intervention with offender adolescents</td>
</tr>
</tbody>
</table>
Table 27.

*Psychometric properties of the Depression Scale.*

<table>
<thead>
<tr>
<th>Scale and Reference</th>
<th>Inter-rater reliability coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression Scale – Reliability</td>
<td></td>
</tr>
<tr>
<td>Gottschalk &amp; Hoigaard-Martin (1986)</td>
<td>≥0.85</td>
</tr>
<tr>
<td>Depression Scale – Validity</td>
<td></td>
</tr>
<tr>
<td>Gottschalk &amp; Hoigaard-Martin (1986)</td>
<td>Correlates with Zung, Beck and Hamilton scales of depression</td>
</tr>
<tr>
<td>Gottschalk, Stein &amp; Shapiro (1997)</td>
<td>Correlates with SCL90 scores for anxiety, phobic anxiety, and paranoid ideation.</td>
</tr>
<tr>
<td>Lane and Viney (2005)</td>
<td>Responsive to successful intervention for breast cancer</td>
</tr>
<tr>
<td></td>
<td>Distinguishes depressed patients, from non-depressed, and alcoholic patients</td>
</tr>
<tr>
<td>Foster &amp; Viney (2006)</td>
<td>Responsive to successful group work for women experiencing menopause</td>
</tr>
</tbody>
</table>
Table 28.

 prop & Properties of the Sociality Scale.

<table>
<thead>
<tr>
<th>Scale and Reference</th>
<th>Inter-rater reliability coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sociality Scale – Reliability</strong></td>
<td></td>
</tr>
<tr>
<td>Viney and Westbrook (1979)</td>
<td>.96 (Total Scale)</td>
</tr>
<tr>
<td></td>
<td>.85 to .97 (Subscales)</td>
</tr>
<tr>
<td><strong>Sociality Scale – Validity</strong></td>
<td></td>
</tr>
<tr>
<td>Viney and Westbrook (1979)</td>
<td>Independent of gender, age and socioeconomic status</td>
</tr>
<tr>
<td></td>
<td>Negatively correlated with anxiety and anger.</td>
</tr>
<tr>
<td></td>
<td>Positive correlation with people experiencing positive interpersonal relationships</td>
</tr>
<tr>
<td></td>
<td>Positive correlation with people with intrinsic need for relationships</td>
</tr>
<tr>
<td></td>
<td>Predicts good rehabilitation in people with chronic illnesses.</td>
</tr>
<tr>
<td>Viney, Walker, Robertson, Lilley &amp; Ewan (1994)</td>
<td>Discrimination on sub-scales, between patients dying in palliative care and hospitals</td>
</tr>
<tr>
<td>Malins, Couchman, Viney &amp; Grenyer (2004)</td>
<td>Responsive to interventions aimed at improving interpersonal relationships in aged care workers.</td>
</tr>
</tbody>
</table>
Appendix L. Questionnaire to gather data used in the studies.

PSYCHOLOGY-IN-CONFIDENCE (after first entry)

INFORMATION SHEET

MENTAL HEALTH SUPPORT TO PERSONNEL INVOLVED IN
THE FIRE IN HMAS WESTRALIA, MAY 1998

On 18 Sep 02, the Maritime Commander initiated a program of offering follow up mental health support to personnel involved in the fire in HMAS WESTRALIA in May 1998. The program's primary aim is to support individual serving personnel, by providing screening for ongoing psychological injuries in personnel involved in the fire, providing mental health consultation and coordinating any indicated clinical services. A secondary aim is to collect information that could be used to assess the overall recovery of the personnel involved in the fire in WESTRALIA by summarising data received.

To achieve these aims, all serving personnel involved in the fire in WESTRALIA will be approached. All personnel will be asked to complete a series of questionnaires to screen for problems and assess recovery. The results of the screening will be provided to participants at individual interviews with a psychologist held soon after. During these interviews additional information about psychological injuries and mental health will be provided. These interviews will also be an opportunity for personnel to discuss any area of concern they have, and/or arrange and counselling or further mental health support if requested. The Fleet medical Officer has tasked LEUT Stephen Rayner, RANR, a clinical psychologist, to coordinate this program.

Information gathered will remain in-confidence and where information is collected for possible summary assessment, no identifying details of any individual will be used.

I have read this information sheet.

I grant permission for Navy to collect information for possible anonymous summary / comparative analysis.

RANK: ___________ INITIALS: ________________
SURNAME: __________________ DOB: __________
PMKEYS NO: __________________ GENDER: M / F [MCM 002]
CONTACT NUMBER: __________________

PSYCHOLOGY-IN-CONFIDENCE (after first entry)
PSYCHOLOGY-IN-CONFIDENCE (after first entry)

Section 2

This section helps understand your life since the fire:

"I'd like you to write a short story about your life since the fire in WESTRALIA up to the moment; the good things and the bad; what it's been like for you. Try to write for about 10 minutes or so; maybe write a page or two, and try to write it all in one sitting. Don't spend too much time worrying about what you have written - the flow of ideas is more important than being 'perfect'. Just write a short story about your life at the moment, the good things and the bad; what it's like for you."
Please write anything else you would like to about the process of either coping with the fire or recovering from any problems you experienced, or anything else significant about any of your experience since the fire that you think might help understand how you or other people who have had similar experience cope or recover, and might help you or others.
Appendix M. Coding rules with coded examples for the Positive Affect Scale (Westbrook, 1976).

<table>
<thead>
<tr>
<th>Direct statement of the subject experiencing positive affect.</th>
<th>Descriptions of situation or events which imply that the subject experienced positive affect.</th>
<th>Description of others which imply that the subject experienced positive affect. (not just a positive evaluation)</th>
<th>Statement which imply positive affect but do not clearly fall into the other category. (implies positive affect or uses colloquial expression)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;I was happy (thrilled, excited, delighted, pleased, over-joyed)&quot;.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;I love to be home with the family&quot;.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;I enjoyed walking through the streets&quot;.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;We were very proud parents&quot;.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;Having guests was lots of fun&quot;.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;It's great having my own apartment&quot;.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;It was good news to find that I had passed the examination&quot;.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;It was terrific at the concert&quot;.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;The great night came&quot;.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;That's the pretty part of being in hospital, all the fuss and flowers and presents&quot;.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;New York is an exciting place&quot;.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;My wife is wonderful.&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anna is a satisfying companion&quot;.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;We smiled and kissed&quot;.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;I wouldn't change him for anything&quot;.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;It's been well and truly worth it&quot;.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;I'd have 10 babies if they were all going to turn out like him&quot;.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;The doctor did his job well&quot;.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;My husband was very helpful&quot;.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Positive affect is NOT scored when the subject makes a positive statement about negative stimuli ceasing or lessening.

DO NOT score

"I was looking forward to getting labor over and done with".

"I’m glad I won’t have to go through that again".

DO score

"I am looking forward to watching her grow up".

"I was glad they could come".

Good is a word which may or may not imply positive affect. Good is NOT scored if it implies a job well done, good behaviour, or health.

DO NOT score

"I was real good after I had the operation".

"The doctor was good in managing my blood pressure".

"He’s a good child, so I have no problems".

DO score

"I have good memories of my stay".

"It gave me a good feeling".

"It was a really good start".

"It’s been good since I came home".

We had good times together.
Appendix N. Coding rules and weighting for scores, for the Total Anxiety Scale

(Gottschalk & Bechtel, 2002).

1. Death anxiety -- references to death, dying, threat of death, or anxiety about death experienced by or occurring to:
   a. self (3).
   b. animate others (2).
   c. inanimate objects (1).
   d. denial of death anxiety (1).

2. Mutilation (castration) anxiety -- references to injury, tissue or physical damage, or anxiety about injury or threat of such experienced by or occurring to:
   a. self (3).
   b. animate others (2).
   c. inanimate objects destroyed (1).
   d. denial (1).

3. Separation anxiety -- references to desertion, abandonment, ostracism, loss of support, falling, loss of love or love object, or threat of such experienced by or occurring to:
   a. self (3).
   b. animate others (2).
   c. inanimate objects (1).
   d. denial (1).

4. Guilt anxiety -- references to adverse criticism, abuse, condemnation, moral disapproval, guilt, or threat of such experienced by:
   a. self (3).
   b. animate others (2).
   d. denial (1).

5. Shame anxiety -- references to ridicule, inadequacy, shame, embarrassment, humiliation, overexposure of deficiencies or private details, or threat of such experienced by:
   a. self (3).
   b. animate others (2).
   d. denial (1).
6. Diffuse or nonspecific anxiety -- references by word or phrase to anxiety and/or fear without distinguishing type or source of anxiety:
   a. self (3).
   b. animate others (2).
   d. denial (1).
Appendix O. Coding rules and coded examples of text for the Cognitive Anxiety Scale (Viney & Westbrook, 1976).

<table>
<thead>
<tr>
<th>Ca (Cognitive Anxiety, experienced by the <strong>self</strong>, as a result of)</th>
<th>Cb (Cognitive Anxiety, experienced by others(s), as a result of)</th>
<th>Cd (Cognitive Anxiety, <strong>expressed but denied</strong>, as a result of)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Novel stimuli</strong></td>
<td><strong>Novel stimuli</strong></td>
<td><strong>Novel stimuli</strong></td>
</tr>
<tr>
<td>(Not having been through it before), “I wondered what would happen”.</td>
<td>“All first mothers are a little bit anxious (about how they’ll get on)”.</td>
<td>“I had no thoughts about what it would be like/ (doing it for the first time)”.</td>
</tr>
<tr>
<td>“I’m not used to doing that”.</td>
<td>“It’s a novelty (for her to be in the teacher’s position)”.</td>
<td>“I wasn’t scared/ (although it was all new)”.</td>
</tr>
<tr>
<td>“All the courses here are a bit different”.</td>
<td>“He was faced with a new experience”</td>
<td></td>
</tr>
<tr>
<td><strong>Extra constructs needed</strong></td>
<td><strong>Extra constructs needed</strong></td>
<td><strong>Extra constructs needed</strong></td>
</tr>
<tr>
<td>“(You get things)/ you don’t expect”.</td>
<td>“She doesn’t seem to be very sure of herself”.</td>
<td>“(even though I was anxious)/ I felt/ I knew it all”.</td>
</tr>
<tr>
<td>“(I asked them)/ What is happening?”</td>
<td>“You don’t know / (what you are talking about)”.</td>
<td>“I wasn’t worried/ (I knew / I had time to work it out)”</td>
</tr>
<tr>
<td>“I didn’t know the first thing about it”.</td>
<td>“It’s not knowing what to expect”.</td>
<td></td>
</tr>
<tr>
<td><strong>Incongruous stimuli</strong></td>
<td><strong>Incongruous stimuli</strong></td>
<td><strong>Incongruous stimuli</strong></td>
</tr>
<tr>
<td>“The visits to the doctor sometimes left me a bit mystified”.</td>
<td>“(all the little things went wrong)/ that she didn’t understand about”.</td>
<td>“(things didn’t fit)/ but she didn’t worry about them”.</td>
</tr>
<tr>
<td>“I will never work out why (because I had never done anything to her in my life)”.</td>
<td>“It didn’t fit in with his beliefs”.</td>
<td>“It wasn’t so ridiculous”.</td>
</tr>
<tr>
<td>“It was a strange sensation”.</td>
<td>“He was amazed/ (at the way things turned out)”.</td>
<td></td>
</tr>
<tr>
<td>High rate of stimulus presentation</td>
<td>Unavailable responses</td>
<td>Unavailable responses</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>----------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>“It’s a bit bewildering/(things coming so fast)”.</td>
<td>“She wonders/ (what on earth she should do)”.</td>
<td>“(I didn’t know what to do)/ but I didn’t fuss”.</td>
</tr>
<tr>
<td>“I find a couple of lecturers a bit hard to follow”.</td>
<td>“It’s an absolute fluke/ (if you find a book)”.</td>
<td>“Not knowing what to do doesn’t worry him”.</td>
</tr>
<tr>
<td>“Suddenly the room was full of people”.</td>
<td>“He was not sure/ (what to do about it)”.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>High rate of stimulus presentation</th>
<th>High rate of stimulus presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>“She’s lying back there, nonplussed”.</td>
<td>“(everything was happening at once)/ but I just relaxed”.</td>
</tr>
<tr>
<td>“Tutorials put a great amount of pressure on her”.</td>
<td>“(there’s a lot of work)/ but I’m not discouraged by that”.</td>
</tr>
<tr>
<td>“He couldn’t believe it/ (things happened so fast)”.</td>
<td></td>
</tr>
</tbody>
</table>

NB: Identify whether there is any amplification, emphasis or repetition within a construct (eg: ‘very upset’, or ‘overwhelmed, quite overwhelmed’).
Appendix P. Coding rules and examples for scoring the Hostility Outward Scale

(Gottschalk & Bechtel, 2002).

<table>
<thead>
<tr>
<th>Thematic Categories</th>
<th>Thematic Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(I) Hostility Outward -- Overt</strong></td>
<td><strong>(II) Hostility Outward -- Covert</strong></td>
</tr>
<tr>
<td>a3 Self killing, fighting, injuring other individuals or threatening to do so.</td>
<td>a3 Others (human) killing, fighting, injuring other individuals or threatening to do so.</td>
</tr>
<tr>
<td>b3 Self robbing or abandoning other individuals, causing suffering or anguish to others, or threatening to do so.</td>
<td>b3 Others (human) robbing or abandoning, causing suffering or anguish to other individuals, or threatening to do so.</td>
</tr>
<tr>
<td>c3 Self adversely criticizing, depreciating, blaming, expressing anger, dislike of other human beings.</td>
<td>c3 Others adversely criticizing, depreciating, blaming, expressing anger, dislike of other human beings.</td>
</tr>
<tr>
<td>a2 Self killing, injuring or destroying domestic animals, pets, or threatening to do so.</td>
<td>a2 Others (human) killing, injuring or destroying domestic animals, pets, or threatening to do so.</td>
</tr>
<tr>
<td>b2 Self abandoning, robbing, domestic animals, pets, or threatening to do so.</td>
<td>b2 Others (human) abandoning, robbing, domestic animals, pets, or threatening to do so.</td>
</tr>
<tr>
<td>c2 Self criticizing or depreciating others in a vague or mild manner.</td>
<td>c2 Others (human) criticizing or depreciating other individuals in a vague or mild manner.</td>
</tr>
<tr>
<td>d2 Self depriving or disappointing other human beings.</td>
<td>d2 Others (human) depriving or disappointing other human beings.</td>
</tr>
<tr>
<td>e2 Others (human or domestic animals) dying or killed violently in death-dealing situation or threatened with such.</td>
<td>e2 Others (human or domestic animals) dying or killed violently in death-dealing situation or threatened with such.</td>
</tr>
<tr>
<td>f2 Bodies (human or domestic animals) mutilated, depreciated, defiled.</td>
<td>f2 Bodies (human or domestic animals) mutilated, depreciated, defiled.</td>
</tr>
<tr>
<td>a1 Self killing, injuring, destroying, robbing wildlife, flora, inanimate objects or threatening to do so.</td>
<td>a1 Wildlife, flora, inanimate objects, injured, broken, robbed, destroyed or threatened with such (with or without mention of agent).</td>
</tr>
<tr>
<td>b1 Self adversely criticizing, depreciating, blaming, expressing anger or dislike of subhuman, inanimate objects, places, situations.</td>
<td>b1 Others (human) adversely criticizing, depreciating, blaming, expressing anger or dislike of subhuman, inanimate objects, places, situations.</td>
</tr>
</tbody>
</table>
c1 Self using hostile words, cursing, mention of anger or
tage without referent.
c1 Others angry, cursing without reference to cause or
direction of anger; also instruments of destruction not
used threateningly.
d1 Others (human, domestic animals) injured, robbed,
dead, abandoned or threatened with such from any
source including subhuman and inanimate objects,
situations (storms, floods, etc.).
e1 Subhumans killing, fighting, injuring, robbing,
destroying each other or threatening to do so.
f1 Denial of anger, dislike, hatred, cruelty, and intent
to harm.
Appendix Q. Coding rules for the Depression Scale (Gottschalk & Betchel, 2002).

<table>
<thead>
<tr>
<th>Content Categories and Scoring Symbols</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Hopelessness.</td>
<td></td>
</tr>
<tr>
<td>1. References to not being or not wanting to be or not seeking to be the recipient of good fortune, good luck, God's favor or blessing.</td>
<td>1</td>
</tr>
<tr>
<td>2. References to self or others not getting or receiving help, advice, support, sustenance, confidence, esteem (a) from others; (b) from self.</td>
<td>1</td>
</tr>
<tr>
<td>3. References to feelings of hopelessness, losing hope, despair, lack of confidence, lack of ambition, lack of interest; feelings of pessimism, discouragement (a) others; (b) self.</td>
<td>1</td>
</tr>
<tr>
<td>II. Self-accusation</td>
<td></td>
</tr>
<tr>
<td>A. Guilt depression. References to adverse criticism, abuse, condemnation, moral disapproval, guilt, or threat of such experienced by:</td>
<td></td>
</tr>
<tr>
<td>a. Self</td>
<td>3</td>
</tr>
<tr>
<td>b. Others</td>
<td>2</td>
</tr>
<tr>
<td>c. Denial</td>
<td>1</td>
</tr>
<tr>
<td>B. Shame depression. References to ridicule, inadequacy, shame, embarrassment, humiliation, overexposure of deficiencies or private details, or threat of such experienced by:</td>
<td></td>
</tr>
<tr>
<td>a. Self</td>
<td>3</td>
</tr>
<tr>
<td>b. Others</td>
<td>2</td>
</tr>
<tr>
<td>c. Denial</td>
<td>1</td>
</tr>
<tr>
<td>C. Hostility directed inward</td>
<td></td>
</tr>
<tr>
<td>1a. References to self attempting or threatening to kill self, with or without conscious intent.</td>
<td>4</td>
</tr>
<tr>
<td>1b. References to self wanting to die, needing or deserving to die.</td>
<td>4</td>
</tr>
<tr>
<td>2a. References to injuring, mutilating, disfiguring self or threats to do so, with or without conscious intent.</td>
<td>3</td>
</tr>
<tr>
<td>2b. Self-blaming, expressing anger or hatred to self, considering self worthless or of no value, causing oneself grief or trouble, or threatening to do so.</td>
<td>3</td>
</tr>
<tr>
<td>3a. References to self needing or deserving punishment, paying for one's sins, needing to atone or do penance.</td>
<td>2</td>
</tr>
<tr>
<td>3b. Adversely criticizing, depreciating self; references to regretting, being sorry or ashamed for what one says or does; references to self mistaken or in error.</td>
<td>2</td>
</tr>
<tr>
<td>3c. References to feelings of deprivation, disappointment, lonesomeness.</td>
<td>2</td>
</tr>
<tr>
<td>4a. References to feeling disappointed in self, unable to meet expectations of self or others.</td>
<td>1</td>
</tr>
<tr>
<td>4b. Denial of anger, dislike, hatred, blame, destructive impulses from self to self.</td>
<td>1</td>
</tr>
<tr>
<td>4c. References to feeling painfully driven or obliged to meet one's own expectations and standards.</td>
<td>1</td>
</tr>
</tbody>
</table>
### III. Psychomotor Retardation

References to general retardation and slowing down in thinking, feeling, or action.

### IV. Somatic Concerns

- **A. Hypochondriacal Component.** References to bodily malfunctioning or physical problems in total body or any parts or systems.
- **B. Sleep Disturbances.** References to any disturbances in sleeping.
- **C. Sexual Disturbances.** References to sexual malfunctioning of any kind, including menstrual disturbances or complaints.
- **D. Gastrointestinal Disturbances.** References to appetite disturbances, changes in bowel habits, abdominal discomforts.
- **E. General Somatic Symptoms.** Including heaviness in limbs, back, or head, backaches, headaches, muscle aches, loss of energy, fatigability, and loss of weight.

### V. Death and Mutilation Depression

A. Death Depression. References to death, dying, threat of death, or anxiety about death experienced by or occurring to:

- **a. Self.**
- **b. Animate Others.**
- **c. Inanimate Objects.**
- **d. Denial of Death Anxiety.**

B. Mutilation Depression. References to injury, tissue or physical damage, or anxiety about injury or threat of such experienced by or occurring to:

- **a. Self.**
- **b. Animate Others.**
- **c. Inanimate Objects Destroyed.**
- **d. Denial.**

### VI. Separation Depression

References to desertion, abandonment, ostracism, loss of support, falling, loss of love or love object, or threat of such experienced by or occurring to:

- **a. Self.**
- **b. Animate Others.**
- **c. Inanimate Objects.**
- **d. Denial.**
### VII. Hostility

#### A. Hostility outward -- overt.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>Self killing, fighting, injuring other individuals or threatening to do so.</td>
<td>3</td>
</tr>
<tr>
<td>1b</td>
<td>Self robbing or abandoning other individuals, causing suffering or anguish to others, or threatening to do so.</td>
<td>3</td>
</tr>
<tr>
<td>1c</td>
<td>Self adversely criticizing, depreciating, blaming, expressing anger, dislike of other human beings.</td>
<td>3</td>
</tr>
<tr>
<td>2a</td>
<td>Self killing, injuring or destroying domestic animals, pets, or threatening to do so.</td>
<td>2</td>
</tr>
<tr>
<td>2b</td>
<td>Self abandoning, robbing, domestic animals, pets, or threatening to do so.</td>
<td>2</td>
</tr>
<tr>
<td>2c</td>
<td>Self criticizing or depreciating others in a vague or mild manner.</td>
<td>2</td>
</tr>
<tr>
<td>2d</td>
<td>Self depriving or disappointing other human beings.</td>
<td>2</td>
</tr>
<tr>
<td>3a</td>
<td>Self killing, injuring, destroying, robbing wildlife, flora, inanimate objects or threatening to do so.</td>
<td>1</td>
</tr>
<tr>
<td>3b</td>
<td>Self adversely criticizing, depreciating, blaming, expressing anger or dislike of subhuman, inanimate objects, places, situations.</td>
<td>1</td>
</tr>
<tr>
<td>3c</td>
<td>Self using hostile words, cursing, mention of anger or rage without referent.</td>
<td>1</td>
</tr>
<tr>
<td>1a</td>
<td>Self killing, fighting, injuring other individuals or threatening to do so.</td>
<td>1</td>
</tr>
</tbody>
</table>

#### B. Hostility outward -- covert.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>Others (human) killing, fighting, injuring other individuals or threatening to do so.</td>
<td>3</td>
</tr>
<tr>
<td>1b</td>
<td>Others (human) robbing or abandoning, causing suffering or anguish to other individuals, or threatening to do so.</td>
<td>3</td>
</tr>
<tr>
<td>1c</td>
<td>Others adversely criticizing, depreciating, blaming, expressing anger, dislike of other human beings.</td>
<td>3</td>
</tr>
<tr>
<td>2a</td>
<td>Others (human) killing, injuring or destroying domestic animals, pets, or threatening to do so.</td>
<td>2</td>
</tr>
<tr>
<td>2b</td>
<td>Others (human) abandoning, robbing, domestic animals, pets, or threatening to do so.</td>
<td>2</td>
</tr>
<tr>
<td>2c</td>
<td>Others (human) criticizing or depreciating other individuals in a vague or mild manner.</td>
<td>2</td>
</tr>
<tr>
<td>2d</td>
<td>Others (human) depriving or disappointing other human beings.</td>
<td>2</td>
</tr>
<tr>
<td>2e</td>
<td>Others (human or domestic animals) dying or killed violently in death-dealing situation or threatened with such.</td>
<td>2</td>
</tr>
<tr>
<td>2f</td>
<td>Bodies (human or domestic animals) mutilated, depreciated, defiled.</td>
<td>2</td>
</tr>
</tbody>
</table>
3a. Wildlife, flora, inanimate objects, injured, broken, robbed, destroyed or threatened with such
(with or without mention of agent).

3b. Others (human) adversely criticizing, depreciating, blaming, expressing anger or dislike of
subhuman, inanimate objects, places, situations.

3c. Others angry, cursing without reference to cause or direction of anger; also instruments of
destruction not used threateningly.

3d. Others (human, domestic animals) injured, robbed, dead, abandoned or threatened with such
from any source including subhuman and inanimate objects, situations (storms, floods, etc.).

3e. Subhumans killing, fighting, injuring, robbing, destroying each other or threatening to do so.

3f. Denial of anger, dislike, hatred, cruelty, and intent to harm.
Appendix R. Coding rules and examples for the Sociality Scale (Viney & Westbrook, 1979).

Solidarity (Sa):
In this type of relationship people are construed as resources. References to one person (people) in a supportive or nurturant relationship with another (other) are scored. They may imply that they are working towards a common commitment or goal or aiding in a mutual attainment, or merely inclusion and integration.

Intimacy (Sb):
In this type of relationship people are construed as sources of personal satisfaction. References to one person (people) attracting another (others) are scored. They may imply intimacy, empathy, fellowship, affection, friendliness, sociability or efforts to maintain a close interpersonal relationship.

Influence (Sc):
In this type of relationship people are considered as sources of power. Reference to one person (people) influencing another (others) are scored. They may imply status differences or asymmetrical acts of control or assertion.

Shared Experience (Sd):
References to one person (people) relating to another (others) but the nature of their shared experience in not clear; i.e. it cannot be coded unambiguously in one of the three categories above.

Sal (reactor)
"They gave me painkillers".
"The group does help me".
"I thought my ankle was broken. The ambulance man rubbed it for a while".

Sbl (reactor)
"Someone did want me after all".
"I appreciate the love of my family".
"People were very friendly toward me".

Sc1 (reactor)
"He told me to go back to work".
"She asked me to move over".
"How long will the doctor keep me here?"

Sd1 (reactor)
"He could have married me".
"She looked up at me".
"I was brought up in a church-centred family".

Sa2 (initiator)
"I stayed with my mother / when my father died".
"I can work well with those people".

Sb2 (initiator)
"I was going with this boy".
"They are very entertaining people".
"Those children really interest me".

Sc2 (initiator)
"I asked them / would they not cook day and night".
"I had some trouble getting a removalist to come".
"I pushed her into the car".

Sd2 (initiator)
"I was going to take my friend along".
"I belong to AA".
"I teach handicapped children".
Sa3 (reactor / initiator)  
“It is up to us / whether we get better (both scored)”. 
“We called a taxi driver to take us into the city”. 
“My parents took us for a holiday”.

Sb3 (reactor / initiator)  
“We like Joe”. 
“My parent can’t wait to see us when we go home”. 
“Their attitude made us feel good”.

Sc3 (reactor / initiator)  
“We had to come home when we were told”. 
“We were able to get the committee to pass the motion”. 
“My boss had us clock in”.

Sd3 (reactor / initiator)  
“We had very limited musical knowledge”. 
“Then it happened to us”. 
“All of us were sleepy, even me”.

“My friends and I like to play bowls”.

NB: Only interactions with people that acknowledge some personal involvement in the interaction are scored. ‘We didn’t go to work that day’ is not coded; however, ‘we couldn’t go to work that day’ is (shared experience).

Relationships with supernatural or fantasy figures are NOT coded (such as ‘God’).

Generalisations are not scored (‘you need to mix with other people’ or ‘there is always someone around to help’).
Appendix S. Normative data for content analysis scales.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Sample</th>
<th>n</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positive Affect Scale</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Westbrook (1976)</td>
<td>Mothers</td>
<td>200</td>
<td>1.22 (0.46)</td>
</tr>
<tr>
<td></td>
<td>Psychiatric patients</td>
<td>29</td>
<td>0.69 (0.31)</td>
</tr>
<tr>
<td></td>
<td>Students</td>
<td>32</td>
<td>0.70 (0.25)</td>
</tr>
<tr>
<td></td>
<td>Relocated women</td>
<td>27</td>
<td>0.99 (0.44)</td>
</tr>
<tr>
<td></td>
<td>Students in transition T1 (beginning transition)</td>
<td>48</td>
<td>0.89 (0.45)</td>
</tr>
<tr>
<td></td>
<td>Students in transition T2</td>
<td>48</td>
<td>0.98 (0.50)</td>
</tr>
<tr>
<td></td>
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<tr>
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<td>(0.34)</td>
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<tr>
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<td>(0.55)</td>
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<td>Mutilation Anxiety adult female</td>
<td>0.28</td>
<td>(0.51)</td>
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<td>(0.63)</td>
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<td></td>
<td>Separation Anxiety adult male</td>
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<td>(0.46)</td>
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<tr>
<td></td>
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<td>(0.78)</td>
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<td></td>
<td>Separation Anxiety child female</td>
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<td>(0.55)</td>
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<td>Scale</td>
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<td>Benjamin (1985)</td>
<td>Medical patients admitted to hospital in crisis after crisis-intervention counselling</td>
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<td>Medical patients admitted to hospital in crisis at follow-up after crisis-intervention counselling</td>
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