

**KEY PREDICTORS OF POST-TRAUMA SYMPTOMATOLOGY IN
MILITARY PEACEKEEPING VETERANS**

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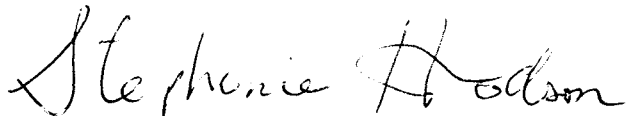
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This work has not submitted for a higher degree at any other university or institution.
The additional author on papers contained in Chapters 2, 3 and 4 of this thesis was
involved in the project at a supervisory level.


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CONTENTS

Summary	Page viii
Chapter 1: Introduction	1
Peacekeeping and the Potential for Traumatic Experiences	2
Rwanda the Deployment	5
Recognition of Post-trauma Symptomatology	7
An Etiological Framework for the Development of Chronic Symptomatology	12
Psychosocial Factors and Post-trauma Symptomatology	15
Limitations of Previous Research	20
Summary and Purpose of Thesis	24
Chapter 2: A Cross-sectional Study of the Effects of Social Support and Loneliness on Post-trauma Symptomatology in Military Peacekeepers	26
Abstract	27
Introduction	28
Method	36
Results	40
Discussion	47
Chapter 3: Posttraumatic Symptomatology and Vulnerability and Resiliency factors for Military Peacekeepers – A Longitudinal Perspective	52
Abstract	53
Introduction	54
Study One – Prediction to Three Years	57
Method	58
Results	62

Discussion	68
Study Two – Prediction to Six Years	69
Method	70
Results	71
Discussion	75
General Discussion	76
 Chapter 4: The Effect of Trauma History on Mission Specific Chronic Post-trauma Symptomatology in Military Peacekeepers	
– Inoculating or Sensitizing?	81
Abstract	82
Introduction	83
Method	86
Results	91
Discussion	97
 Chapter 5: General Discussion	101
Key Findings and Theoretical Implications	102
Practical Implications	106
Strengths, Limitations and Future Directions	109
Concluding Remarks	113
 References:	114
 Appendix A: Traumatic Stress Exposure Scale	138

TABLES

	Page
Chapter 2	26
Table 1: Descriptive Statistics	42
Table 2: Correlation Matrix for Variables included in Linear Regression Analyses	42
Table 3: Hierarchical Multiple Regressions to Predict Symptom Scores	44
Chapter 3	52
Table 1: Level of Trauma Reported	63
Table 2: Descriptive Statistics, Stability and Change Analysis	64
Table 3: Cross-sectional and Longitudinal Correlational Analysis	65
Chapter 4	81
Table 1: Univariate Analysis of Employment Category, Subsequent Deployment and Continued Service	92
Table 2: Correlation Matrix for Variables included in Linear Regression Analyses	93
Table 3: Hierarchical Multiple Regressions to Predict Symptom Scores	96

FIGURES

	Page
Chapter 1	1
Figure 1: Etiological Framework	13
Chapter 2	26
Figure 1: Theorised Model of the Mediational Role of Loneliness	35
Figure 2: Model of the Mediational Role of Loneliness	46
Chapter 3	52
Figure 1: Theorised Model for Three Years	67
Figure 2: Longitudinal Model for Three Years	67
Figure 3: Theorised Model for Six Years	74
Figure 4: Longitudinal Model for Six Years	74

SUMMARY

In Australia, the primary role of military personnel is defence of the nation; however, due to their specialised skills they are also asked to assist in United Nations peacekeeping missions and disaster relief. All of these duties have a high potential for exposure to traumatic events, which for some individuals could have long-term negative effects. In the literature to date, there has been a growing interest in types of potentially traumatic events and the nature of psychological reactions, but what is lacking is a comprehensive understanding of post-trauma factors that may impede or facilitate recovery. The focus of this research therefore, was to investigate key predictors that may have influenced the development of chronic trauma reactions in a sample of military personal who had been deployed on a peacekeeping mission, in order to provide directions for preventative management and screening strategies.

Several studies have shown a relationship between social resources and levels of post-trauma symptomatology. The first study was designed to test a model in which feelings of loneliness mediate both the effect of exposure to potentially traumatic events and social support in the development of chronic posttraumatic stress disorder (PTSD). To test this model 246 Australian Defence Force peacekeepers were surveyed after their return to Australia from duty in Rwanda. They completed measures of trauma exposure, general mental health, PTSD, social support, and loneliness. The model was partially support, with loneliness mediating the effect of support but not the level of trauma exposure. The findings were discussed in relation to theoretical and clinical implications.

Two prospective longitudinal studies were then utilised to replicate and extend the findings of the first study, by investigating the relationship between level of traumatic exposure and psychosocial factors measured at four months with chronic

posttraumatic distress at three and six years. Members from the second Australian military peacekeeping contingent that serviced in Rwanda were surveyed at four months, as well as three and six years post exposure. Measures of post-traumatic symptoms, level of exposure, social support, and loneliness revealed direct relationships for level of traumatic exposure and initial symptomatology, and indirect relationships for social support and loneliness in the prediction of chronic symptomatology. Modelling of the relationship between variable revealed two potential pathways to distress with loneliness mediating the impact of social support, as well as having a direct effect on the reporting of level of trauma exposures at six years.

The first three studies indicated that high rates of chronic posttraumatic symptomatology in military personnel exposed to multiple traumatic events over a six-month period on a peacekeeping mission might be related to perceived levels of traumatic exposure and feelings of loneliness at six years. However, the measurement of Rwanda related symptoms and predictive variables at six years might be confounded by the effect of exposure to other potentially traumatic events. Therefore in the final stage of the research, a cross-sectional study was conducted with 118 Rwanda veterans' to investigate the impact of other potentially traumatic events, subsequent deployments, employment category, and current service status. Results indicate that lifetime trauma exposure was not related to measures of chronic symptomatology, but that employment category and service status did affected symptomatology. The finds were discussed in relations to their impact on an inoculation versus sensitizing hypothesis to explain adaptation to potentially traumatic life experiences.

Overall the research demonstrated that both psychosocial variables and reported level of traumatic exposure are related the development and maintenance of chronic distress and should be considered for inclusion in any future screening protocol. The

findings make a contribution to our understanding of psychosocial variables by identifying loneliness as a potential mechanism that may mediate between social support and adaptive coping. These findings could have important implications for the organisational and clinical management of personnel after potentially traumatic experiences. Finally, the results draw attention to potential directions for further research, especially in the area of loneliness and social support, but to the impact of these variables on traumatic memory.

CHAPTER ONE

INTRODUCTION

‘When the Rwandan Patriotic Army made their main sweep of the area killing people, I stood in a bunker watching helplessly and in disbelief at what was occurring around us and not being able to help.’

‘At this stage they were working each other into a frenzy and when they were level with our bunker a lot of them cocked weapons and faced us. At that moment I firmly believed that we would be overrun and killed. My mate and I traded views on this matter and prepared to defend the bunker. It was the first time in my life that I believed I was going to die.’

‘Walking through the masses of dead and wounded overwhelmed with horror and disbelief, my section returned to the compound each man wide-eyed and pale. We all sat in silence.’

(Comments of Australian Defence Force Personnel on operational deployment, after the massacre in Kibeho, Rwanda; story by Sgt Graham McBean, 1995, Army Magazine, pp 34 - 43.)

Peacekeeping and the Potential for Traumatic Experiences

In Australia, the primary role of military personnel is defence of the nation; however, due to their specialised skills they are also asked to assist in United Nations peacekeeping missions and disaster relief (Rae, 1994). Since 1956, personnel have served on missions in Cambodia, the Western Sahara, Rwanda, Somalia, Israel, Mozambique, the Sinai, Bougainville, Papua New Guinea and East Timor (Schmidtchen, 1999). During these missions personnel have been required to restore

peace within and between nations, monitor peace agreements, deliver humanitarian aid, provide a secure environment for elections, and restore civil law (Schmidtchen, 1999). All of these duties have had a high potential for exposure to traumatic events that for some individuals could have long-term negative effects.

Increasingly, research into the effects of occupational trauma in military populations has focused on the psychological aftermath of these types of peacekeeping missions (e.g. Australians in Somalia (Ward, 1997); American peacekeeping missions to Somalia and Haiti (Fontana, Litz, & Rosenheck, 2000; Orsillo, Roemer, Litz, Ehlich, & Friedman, 1998); Americans in the former Yugoslavia (Bartone, Adler, & Vaitkus, 1998; Ehlich, Roemer, & Litz, 1997); Dutch in the former Yugoslavia (Bramsen, Dirkzwager, & van der Ploeg, 2000); Canadians in Rwanda (Rosebush, 1998); Japanese peacekeepers (Kodama, Nomura, & Ogasawara, 2000); Swedish peacekeepers in Bosnia (Johansson, 1997); British peacekeepers in the former Yugoslavia (Deahl et al., 2000); and New Zealand peacekeepers (MacDonald, Chamberlain, Long, Pereria-Laird, & Mirfin, 1998)). Ehlich et al (1997) argue that these types of missions may be more stressful than traditional combat roles, since personnel may be exposed to a more diverse range of potentially traumatic stimuli, some of which can be very unexpected. They cite the case study of an American soldier who had experienced life-threatening situations on operational deployment, but only developed severe trauma symptomatology after exposure to a situation where he was unable to alleviate the suffering of starving children.

Historical literature indicates that people have always been aware there can be potential long-term negative effects to intense traumatic experiences, particularly those involving combat. However, it has only been in this century that researchers have made serious advances in defining and understanding individuals' responses to trauma (de

Silva, 1999; Wilson, 1994; Yule, Williams, & Joseph, 1999). It is now acknowledged that individuals can suffer both acute and chronic reactions after experiencing potentially traumatic events, and that in some cases these reactions can have a very debilitating effect on an individual's life. The American Psychiatric Association (1994) defines a traumatic experience as:

‘ ... involving direct personal experience of an event that involves actual or threatened death or serious injury, or other threat to one's physical integrity; or witnessing an event that involves death, injury, or a threat to the physical integrity of another person; or learning about unexpected or violent death, serious harm, or threat of death or injury experienced by a family member or other close associate (Criterion 1A). The person's response to the event must involve intense fear, helplessness, or horror (Criterion 2)(APA, 1994, p. 424)’.

A comprehensive series of studies with American Somali peacekeeping veterans has shown that humanitarian missions can involve exposure to a range of potentially traumatic and chronic stressors (Litz, King, King, Orsillo, & Friedman, 1997), resulting in a third of the sample reporting clinical-level symptomatology on the Brief Symptom Inventory (Orsillo et al., 1998) and 8% meeting criteria for posttraumatic stress disorder (PTSD) fifteen weeks after returning home (Litz, Orsillo, Friedman, Ehlich, & et al., 1997). In one of the few published studies conducted with Australian peacekeepers, Ward (1997) found that at least one-fifth of the Australian Somalia veterans had significant levels of psychiatric morbidity 15 months after their return to Australia, rates that were double those of their non-veteran peers.

In the literature to date, there has been a growing interest in types of potentially traumatic events and the nature of psychological reactions, but what is lacking is a comprehensive understanding of post-trauma factors that may impede or facilitate recovery. The study of this area is important, as an improved understanding would contribute to the development of effective prevention and early intervention strategies (Dalglish, Joseph, & Yule, 2000; Joseph, 1999b).

The focus of this research, was to investigate predictors that may have influenced the development of chronic trauma reactions in a sample of military personnel who had been deployed on a peacekeeping mission, in order to provide direction for preventative management and screening strategies. At the time that the research was conceived, a contingent of Australian soldiers was serving on a peacekeeping mission to Rwanda, and the subsequent veteran group became the focus of the research. This first chapter describes the Rwandan deployment, provides a historical perspective on the recognition of post-trauma symptomatology, discusses a theoretical framework for the development of chronic problems, reviews current research into psychosocial predictors of distress, explores limitations of previous research and summarises the current research rationale.

The Rwandan Deployment

In August 1994, Australian Defence Force personnel deployed to a country that was attempting to come to grips with the aftermath of a civil war in which more than half a million Rwandans had been murdered and millions of people had been displaced. Rwanda had been torn apart by a brutal and horrific genocide in which the majority ethnic group, the Hutus, had attempted to exterminate a minority group, the Tutsis (Gourevitch, 1998). Aware of the potential for tragedy, the United Nations set up an unsuccessful program to promote peace in 1993 and, as soon as the war ended,

attempted to deal with the resulting humanitarian crisis by the formation of UNAMIR II (Pearn, 1995).

Australia was one of seventeen nations that contributed to the armed peacekeeping force. Over the period of a year two contingents were deployed, each for a six-month rotation. In total, 616 Australian service personnel went to Rwanda. The primary mission of the deployment was to provide medical support to the United Nations Peacekeeping Force. However, the Australian personnel were also involved in providing primary health care in the Displaced Persons Camps and to expatriate health workers for various international charities. The deployments were made up of both regular and reserve personnel from all three services. As the primary purpose of the mission was medical support, approximately one-third of each of the deployments was medical corps personnel. However, the achievement of their mission was only possible through the support of integrated logistic corps and the protection of an infantry rifle company (Pearn, 1995).

During their deployment they faced a range of challenges including exposure to human misery and grief on a massive scale, threat from landmines and attack. More than half of the members of the second contingent, for example, was rotated through the Kibeho refugee camp, where thousands of Hutu internally displaced persons (IDPs) were systematically killed on the 22nd of April 1995. Members of the early rotations to the Kibeho camp were eyewitnesses to the killing and provided medical care to the injured, while later rotations continued to treat the remaining IDPs and were witness to indescribable human misery. Additionally, as noted by COL John Pearn (1995) in his book *Reflections of Rwanda*, personnel faced the threat of contracting a contagious disease that had not been previously experienced by Australian forces on such a scale. He states that prior to the genocide approximately 30% of town-dwelling Rwandans

were HIV positive. This created a serious problem not only for the medical staff, but also for the other corps involved in rescue, resuscitation and transport of injured locals, as well as those involved in body handling and the creation of mass graves.

Psychological support to the contingent was provided in line with policy at the time. This support included group debriefing immediately before departing the country and a follow-up mail-out survey four months after returning home; this questionnaire included an option to request further assistance. Initially there were no psychological elements deployed with either contingent, but after the events at Kibeho a three-person stress management team deployed to conduct debriefing and counselling. One of the members of this team subsequently remained in country until the second contingent returned to Australia (Ward, 1997).

Recognition of Post-trauma Symptomatology

Evidence in historical literature illustrates that as long as man has been engaging in combat there have been traumatic reactions. For example, doctors in ancient Egypt documented hysterical reactions (Figley, 1993), and Shakespeare in King Henry IV describes soldiers returning from battle as experiencing symptoms including disturbing dreams and loss of sexual interest. Russian and British medical scholars in the 19th century wrote of the 'diseases of the soul' in men returning from battles in the Crimea and India (Saperstein & Saperstein, 1992).

Combat stress reactions were first recognised as a clinical entity in the 18th century during the American Civil War. Doctors at the time attributed symptoms of palpitations, chest pain, headaches, dimness of vision and giddiness in apparently physically fit young soldiers to a disturbance of the sympathetic nervous system. They called this disturbance 'Irritable Heart', 'Nostalgia' or 'Dacosta's Syndrome' (for

historical reviews see: Holden, 1998; Oei, Lim, & Hennessy, 1990; or Saperstein & Saperstein, 1992).

During the First World War doctors proposed a physiological explanation for casualties suffering from trauma reactions. This approach asserted that symptoms observed was the result of men being exposed to blast waves from exploding shells and being concussed at a neural level. Soldiers diagnosed with this condition were labelled as being 'shell-shocked'. However, this approach did not explain the large number of combat stress casualties who had never been exposed to exploding ordinance (de Silva, 1999; Grinker & Spiegel, 1945; Joseph, Williams, & Yule, 1997).

Unfortunately at this stage a common theme in all the explanations of reactions to trauma in the context of war was a belief that an individual who suffered a stress reaction after combat had pre-existing character and personality defects. Personnel unable to deal with the stress of battle were believed to be lacking in their fundamental make-up, and thus it was the individual who was flawed in some way whether psychologically or physically. These individuals as a result were referred to as weaklings, cowards, and malingerers. Instead of receiving treatment for their symptoms, they were often ridiculed, imprisoned, or even killed by their companions (for a detailed historical review see Holden, 1998). In the First World War, for example, soldiers were often shot for cowardice, court-martialled, or in extreme cases tied to the barbed wire fences that protected the trenches (Saperstein & Saperstein, 1992).

Freud in his work with soldiers suffering from traumatic nightmares after the First World War was one of the first authors to utilise the phrase 'war neurosis', to describe the symptoms soldiers reported to him after combat (Figley, 1993). Early psychodynamic models of trauma proposed that reactions were caused by energy overload which led to 'binding', 'discharging', or 'abreacting', as the ego worked to re-

establish homeostasis. Freud in his writings argued that war neurosis was the result of traumatic experiences breaking through the protective shield of the ego (Freud & Breuer, 1956; Freud, 1957, 1966; for a detailed review of Freud's contribution see: Wilson, 1994).

It was not until the middle of the 20th century and the Second World War that academic, medical, and military communities started to significantly reassess their perceptions of the effects of combat on an individual. During the Second World War, despite an extensive screening program, the American military discovered they still had very high rates of combat stress related casualties. For the first time it was acknowledged that prolonged exposure to traumatic events could result in stress or anxiety symptoms. During this period terms like 'combat stress', 'battle fatigue', 'combat exhaustion', and 'acute combat reaction', started to be utilised in relation to trauma casualties (for historical reviews see: Figley, 1993; Holden, 1998; Saperstein & Saperstein, 1992; or Yule, 1999).

Fortunately, in the latter part of the 20th century, severe stress reactions during or after combat were no longer treated as the fault of the individual. This change in thinking can be attributed to three factors: firstly, a far more sophisticated understanding of anxiety, stress disorders and psychopathology by mental health professionals; secondly, the epidemiological research information and knowledge/experience gained from conflicts in Vietnam, Israel and the Persian Gulf; and finally, the growing interest in studying the effect of traumas and disasters in civilian populations (Figley, 1993; Joseph et al., 1997; McFarlane, 2000b; Yule et al., 1999).

At the same time that veterans from conflicts like Vietnam were gaining a lot of interest, medical professionals and academics began to record that survivors of other

traumas also experienced long-term psychological symptoms, and that these symptoms were consistent with combat survivors (Joseph et al., 1997; Saperstein & Saperstein, 1992). Erichsen in 1866 had first documented the ongoing effect of disasters in his description of 'railway spine' (de Silva, 1999; Joseph et al., 1997; Trimble, 1981). However, it was research in the latter part of the 20th century that confirmed that there is consistent and identifiable symptomatology associated with exposure to traumatic events. This research was conducted with groups as varied as survivors of natural disasters (e.g. work after the Mount St Helen volcanic eruption by Shore, Vollmer, & Tatum, 1986), survivors of man-made technological disasters (for a summary see Weisaeth, 1994), victims of crime (and survivors of a multiple shooting, Creamer, Burgess, Buckingham, & Pattison, 1993; e.g. work after the Chowchilla kidnappings by Terr, 1983), sexual assault victims (work with female rape victims by Foa, Feske, Murdock, Kozac, & McCarthy, 1991), accident survivors (for a summary see Malt, 1994) and civilian emergency service personnel (eg. Mitchell & Everly, 1993).

This research into civilian reactions to disasters and trauma, in conjunction with the research into military conflicts, has contributed to a far greater understanding of the effect of trauma on individuals. However, not all individuals that experience an event develop symptomatology. What needs to be understood now are the vulnerability and resilience factors that determine why one individual will go on to develop extremely distressing symptoms, but another will show no signs of distress at all (Creamer et al., 1993; Joseph, 1999b; Litz, Gray, Bryant, & Adler, in press; McFarlane, 2000a).

DSM IV Criteria for PTSD - The fact that some individuals can experience long-term distressing symptoms was formally recognised when PTSD was included in the Diagnostic and Statistical Manual of Mental Disorders (it first appeared in DSM III) (Yule et al., 1999). The criteria for diagnosis have undergone a number of revisions as

the understanding of the disorder has improved over the last twelve years. In the current version, DSM IV, the disorder is specified by six criteria, including:

- A. The person has been exposed to a traumatic event in which they experienced, witnessed or were 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 other. Also that this experience involved intense fear, helplessness, or horror.
- B. The traumatic event is persistently re-experienced.
- C. There is a persistent avoidance of stimuli associated with the trauma.
- D. The individual experiences persistent symptoms of increased arousal.
- E. The duration of the disturbance is greater than one month.
- F. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning (APA, 1994).

In comparison to other disorders PTSD is quite common (Yule et al., 1999), occurring in one in twelve adults at some point in their life (Breslau, 2001). A recent epidemiological study in Australia utilising data from the 1997 National Survey of Mental Health and Wellbeing (NSMHW) estimated a twelve-month prevalence rate of 1.33% in the Australian community (Creamer, Burgess, & McFarlane, 2001). Data from the American National Comorbidity study revealed a lifetime prevalence of 7.8% (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995) and a twelve-month prevalence rate of 3.9% (Kessler et al., 1999).

However, PTSD is not the only possible chronic reaction to traumatic events. Other long-term psychological effects include major depression, generalised anxiety disorder, dissociative disorders, personality disorders and substance abuse (Bollinger, Riggs, Blake, & Ruzek, 2000; Ursano, Fullerton, & McCaughey, 1994; Yule et al., 1999). Major epidemiological studies have indicated that approximately 80% of individuals with PTSD have at least one other comorbid diagnosis (Kozaric-Kovacic & Kocijan-Hercigonja, 2001). Research from the NSMHW in Australia, has indicated a comorbidity rate of Axis 1 disorders with PTSD of 85% in men and 80% in women, and a rate of Axis 2 disorders with PTSD of 60% in men and 50% in women (Creamer et al., 2001).

An Etiological Framework for the Development of Chronic Symptomatology

van der Kolk, Hart and Burbridge (1995) argue that the element that distinguishes people who will develop a disorder from individuals who are able to cope is the inability of the individual to resolve intrusive reliving of the event, resulting in the development of maladaptive avoidance. McFarlane and Yehuda (1996) have proposed an etiological framework for the transition from distress to disorder. This model involves three stages: the acute response, chronic disorder and, finally, the adaptation to the chronic symptomatology.

This approach argues that in the first few months a strong emotional response involving both intrusive and avoidant symptoms is normal and in this acute stage can be adaptive. However, if distress generated by these symptoms is not resolved, an individual will move into the chronic stage. Previous research confirms that the predictive value of intrusive and avoidant symptoms immediately after the event for the development of chronic PTSD is variable (Shalev, 1996), but that this relationship

strengthens over time (Dalglish et al., 2000). McFarlane (1992) in a study of fire fighters found that intrusive symptoms at four months were highly predictive of subsequent PTSD at twenty-nine and forty-two months. This is supported by research testing cognitive models of PTSD that have demonstrated that distressing intrusive memories, if not dealt with, can result in a long-term disorder that is maintained by avoidance symptoms (Creamer, Burgess, & Pattison, 1992; Jones & Barlow, 1990).

This aetiology framework (see Figure 1) proposes that during all three phases there are both resiliency (or protective) factors and vulnerability (or risk) factors that will impact on the individual's ability to adapt to the traumatic stressor, by impacting on the individual's ability to deal with the distressing symptomatology. These include personality, coping style, other life events, family history, environmental responses, biological traits, past experience and the 'ability to recruit social networks' (McFarlane & Yehuda, 1996).

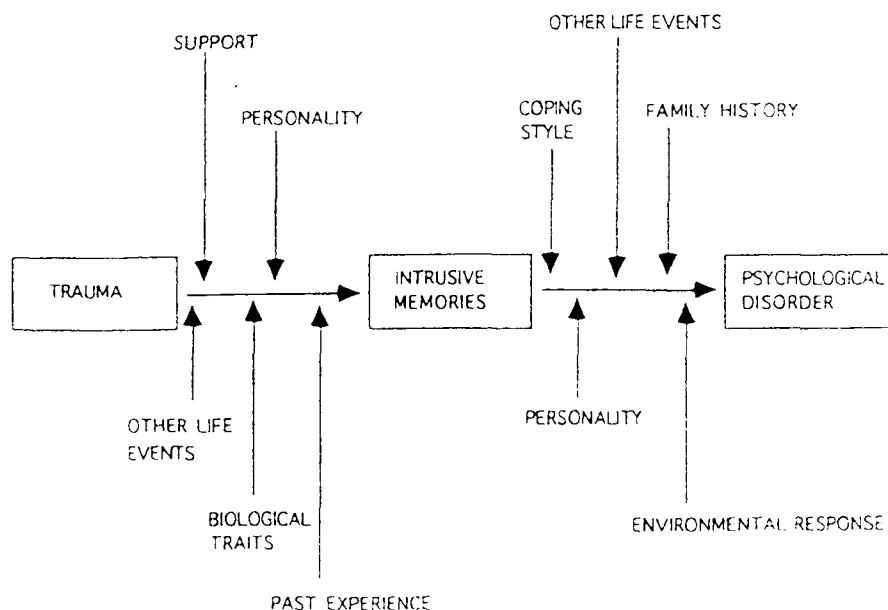


Figure 1: McFarlane and Yehuda's (1996, p. 157) Etiological Framework for the Transition from Distress to Disorder.

In the final stage of the model the role and level of exposure becomes less important than the distress and neurobiology generated by the chronic symptom cycle (McFarlane & Yehuda, 1996). The authors argue that these resilience and vulnerability factors will have a variable impact across the development of the disorder.

There is considerable evidence in the literature to support the inclusion of the resilience and vulnerability factors proposed in the etiological model. A recent meta-analysis of trauma literature by Brewin, Andrews, and Valentine (2000) to identify risk factors for posttraumatic stress in trauma exposed adult populations revealed a number of consistent pre-, peri-, and post-trauma factors. These included trauma severity, lack of education, youth, female gender, race, a prior psychiatric history, low socioeconomic status, other adverse childhood factors, previous trauma, family psychiatric history, childhood abuse, life stress and low intelligence.

King, King, Foy, Keane and Fairbank (1999) in a comprehensive study of adjustment in Vietnam veterans also found that pre-, peri-, and post-trauma factors all had an important role to play in the development of posttraumatic symptomatology. Based on their findings and consistent with McFarlane and Yehuda's (1996) model, they propose that pre-trauma factors (in particular low socioeconomic status, poor relationship with father, family instability and earlier trauma history) may result in reduced resources to deal with subsequent trauma. While in the post-trauma phase subsequent stressful life events may impact negatively on the resilience factors they identified (i.e. hardiness and functional support) (King, et al., 1998). They concluded that risk factors have to be considered within a temporal framework and that resilience-recovery variables involve a complex interplay (King, et al., 1999).

It was neither practical nor possible to test all the etiological factors proposed in McFarlane and Yehuda's (1996) conceptual framework or in the current literature.

Therefore the research in this thesis focused on the key area of post-trauma factors due to their central role in most crisis or disaster management strategies (McFarlane & van der Kolk, 1996) and the fact this is an area that can be modified by effective doctrine in a military environment. It should be noted that there were a number of organisational and military operational constraints that limited the number of variables that could be included in the research and the length of the resulting survey instrument.

Psychosocial Factors and Post-trauma Symptomatology

Consistent with McFarlane and Yehuda (1996) a number of authors have argued that an important approach to addressing issues of vulnerability and resilience in post-trauma reactions is the study of psychosocial factors or the social resources available to the individual (de Silva, 1999; Joseph et al., 1997; Litz et al., in press; Stephens, 1996; Yule et al., 1999). These factors are of particular importance, as they are modifiable and can be targeted in screening and acute interventions. This approach is particularly relevant in a military setting where the nature of the employment means that the individual is extremely likely to be exposed to traumatic events, but where effective doctrine and leadership can control the subsequent management.

Social support has been shown to play a role in prevention of both acute and chronic stress reactions and to play a role in general mental health (Brugha, 1995; Cohen & Wills, 1985; Lin, Dean, & Ensel, 1986; Solomon, Waysman, & Mikulincer, 1990). Additionally there is growing evidence to support its role in the development and maintenance of post-trauma symptoms (Bryant, Moulds, & Guthrie, 2001; Dalgleish et al., 2000; Fullerton, McCarroll, Ursano, & Wright, 1992; Jones & Barlow, 1990; Joseph, Andrews, Williams, & Yule, 1992; Solomon & Smith, 1994).

In a study with Israeli soldiers comparing the effects of social support, life events and locus of control Solomon, Mikulincer and Habershaim (1990) found that of these variables only social support significantly contributed to posttraumatic stress disorder (PTSD). A more recent study of 7,924 American soldiers after the Gulf War found that high ratings on scales reflecting peer bonding were predictive of less post-combat distress (Bartone, Gifford, Wright, Marlowe, & Martin, 1992). Similarly, a study of navy divers who recovered bodies after the TWA Flight 800 plane crash found that family phone contact was one of the highest rated coping factors. The authors' hypothesised that this support acted as an emotional buffer against exposure to traumatic stimuli as well as intense work demands (Leffler & Dembert, 1998).

When discussing social resources or support, care needs to be taken to clearly define the concepts under investigation. Social support is a multifaceted construct encompassing a number of related but distinct elements, including but not confined to: perceived versus received social support, structural versus functional support, social integration and social networks (Joseph, 1999b). However, fundamentally all of these variables deal with the individual's ability to access resources that will mitigate the effect of stressful events (Brewin, 1995; Brugha, 1995; Joseph, 1999b; Pierce, Sarason, Sarason, Joseph, & Henderson, 1996).

A key concept when studying the impact of social support in trauma research is between perceived and received social support (Joseph et al., 1992). A crucial element proposed in all major theoretical formulations to explain post-trauma symptoms is the effect of the opportunity to discuss the event, whether it is explained as a need to develop new schemas (Horowitz, 1986), or as a form of exposure or to allow cognitive integration of information (Bryant et al., 2001; Creamer et al., 1992; Foa & Meadows, 1997), or to emotionally process the event (Rachman, 1980). Dalglish, Joseph,

Thrasher, Tranah and Yule (1996) therefore argue that measurement of received support which includes the ability to discuss events in an emotionally supportive environment is more important than simply perceiving that the support is available if required.

Joseph et al. (1992) developed a measure of received or “crisis support” that has been shown to be predictive of post-trauma symptomatology in survivors of the Herald of Free Enterprise disaster and Jupiter Cruise Ship disaster (Dalglish et al., 2000; Joseph et al., 1992). However, to date this relationship has only been reported in samples exposed to discrete traumatic events (a disaster or armed robbery) rather than more severe multiple traumas (Dalglish et al., 1996; Richards, 2000).

Other authors argue that it is not enough to actually receive support but that ‘the “active ingredient”... that determines adjustment is the feeling of connectedness with others’. (Solomon, Waysman et al., 1990, p. 485). An individual’s connection with others can be determined utilising the concept of loneliness. Loneliness refers to an individual’s internal subjective state of dissatisfaction with their social network (both structural and intimate). It is a distressing state for the individual and is not related to the number of people in the social network (Peplau & Perlman, 1982; Rossmanith, 1995). Loneliness may include geographical aloneness or social isolation, but more importantly it incorporates the aversive and painful experience of not belonging, not feeling connected to others or not feeling valued by the social network (Rokach, 2001). The key feature of loneliness is the fact is a ‘painful’ and ‘not welcome’ state for the individual and has consequence that are detrimental to the individual’s emotional, physical and spiritual wellbeing (Rokach, 2001; Ernst & Cacioppo, 1998).

Empirical research across the lifespan has shown that social support and loneliness are separate constructs that have an inverse relationship, and suggests that they both may play a preventative role in the development of stress reactions (Joseph, 1999b;

Mahone & Yarcheski, 1992; Mahone, Yarcheski, & Yarcheski, 1998; Penninx et al., 1999). While loneliness is a very common presenting problem for mental health professionals it has received only limited attention in academic literature (Olds & Schwartz, 2000), especially in the area of trauma. Rook (1988) proposed that loneliness results from the interaction of person factor and situational constraints, and that this interaction is influenced by the changing circumstances in an individual's life.

Traumatic experiences have the potential to affect not only the structure of an individual's support network but also the individual's ability to interact with this support. Solomon, Mikulincer and Flum (1989) in a study with Israeli veterans found that veterans who were identified as suffering from PTSD two years after the 1982 Lebanon War, reported greater feelings of social alienation, and that the social network needed for buffering the war experiences was not available. They hypothesise that this alienation intensified the veteran's stress resulting in more chronic problems.

The UCLA Loneliness Scale is one of the most widely utilised measures in the research that has been conducted, especially with aged, ethnic, adolescent or bereaved populations (Harstone, 1993). A strength of the scale is that it does not directly measure states that an individual may label as lonely, but attempts to measure what a researcher would operationalise as lonely (Hartshorne, 1993). Thus the measure includes questions investigating feelings of isolation, abandonment and satisfaction with the individual's ability to socialise.

Solomon, Waysman, and Mikulincer (1990) utilised the UCLA Loneliness Scale in one of the few studies investigating the relationship between loneliness and post-trauma distress. This research with Israeli veterans found support for a model in which the level of psychiatric disturbance was related to levels of family support, and where this relationship is moderated by the association of perceived family/society support and

loneliness or connectedness with others (Solomon, Waysman, & Mikulincer, 1990). However, while the authors discuss the relationship between variables as a moderator, they conducted a mediational analysis (for a review of the difference, refer to Baron & Kenny, 1986). The research also utilised very specific measures of support focusing on the family and society, rather than a general measure like crisis support that conceptually also includes peers, friendships, and occupational networks.

Research with New Zealand police officers has highlighted the importance of support from peers and workplace attitudes to emotion in post-trauma reactions (Stephens, 1996). However, no further work has been done to further investigate the importance of loneliness in mediating social support in the area of trauma reactions. A number of authors discuss the impact of social isolation but little attention has been given to measuring the concept of loneliness (Shalev, 2000; Ursano, et al, 2000).

Conceptualising the process by which social support may be mediated is important, as in some circumstances social support can also have a negative impact on outcome, especially for women (Andrews & Brown, 1988; Hobfoll, Freedy, Green, & Solomon, 1996; Solomon, 1986). Work with Vietnam veterans and more recently Israeli combat soldiers (Shalev, 2000) has shown that joining a veteran peer group can allow individuals to normalise symptoms but in some instances may lead to re-exposure or further catastrophising of the event. Additionally, research with Vietnam veterans suggests that while a supportive spouse can help facilitate recovery, the effect of an unsupportive spouse is worse than being single (Kadushin, 1985).

A study of National Guard disaster workers who attended a major air disaster in Sioux City (US) found that talking about the event with social supports at two months was related to higher intrusive PTSD symptoms at seven months (Ursano, Fullerton, Vance, & Wang, 2000). It may be that the quality of the support is crucial. One way of

assessing this is to examine the level of dissatisfaction with social networks or degree of connection. Recent research into the accessing of support networks has shown that an important mediating variable may be how individuals feel in relation to other group members. For example, experienced disaster workers may seek support from peers while inexperienced workers are more likely to seek support from an intimate relationship (spouse or significant other) (McCarroll, Fullerton, Ursano, & Hermesen, 1996; Ursano et al., 2000).

Limitations of Previous Research

Requirement for Longitudinal Research - A common problem in the area of trauma research is the lack of understanding in how predictors vary over time (Friedman, 1999; McFarlane, 2000a). This limitation is the result of a reliance on cross-sectional research. However, research with disaster victims has shown that post-traumatic symptomatology can vary over time (Dagleish et al., 2000) and consequences may not be fully assessed at any single time point due to the potential for delayed onset (Litz, King et al., 1997; McFarlane, 1988; Yule et al., 1999).

Prospective studies with the Somali and Gulf war veterans demonstrate the importance of longitudinal studies. A consistent finding in cross-sectional research is the relationship between intensity and frequency of traumatic exposure and the development of symptomatology (Adler, Vaitkus, & Martin, 1996; Hodson & Rapee, 2002a; Lauterbach & Vrana, 2001; Michultka, Blanchard, & Kalous, 1998; O'Brien & Hughes, 1991). However, the research with groups of Somali (Roemer, Litz, Orsillo, Ehlich, & Friedman, 1998) and Gulf War veterans (Southwick, Morgan, & Charney, 1997) has indicated that reporting and recall of traumatic memory increases over time and that potentially there may be a systematic bias resulting from PTSD

symptomatology. While these are only preliminary findings in the area, they warrant further investigation as they call into question the practice in trauma research of treating self-report frequencies as objective measures of the event. Additionally they raise conceptual issues in relation to the consistency of traumatic memory as they suggest a complicated relationship between exposure, memory, and symptomatology (Roemer et al., 1998; Southwick, Morgan, & Charney, 1997).

Effect of Other Traumatic Experiences - Another potential limitation in current trauma research is the lack of control for the influence of other life trauma. Recent research by Bolton, Litz, Britt, Adler and Roemer (2001) found high rates of exposure to potentially traumatic events in personnel preparing to deploy on a peacekeeping mission. Of the 2,947 military personnel assessed, 74% indicated prior exposure to a potentially traumatic event and 6% reported clinically concerning levels of PTSD. These authors speculate that the consistent finding of a relationship between level of traumatic exposure and subsequent symptomatology in previous peacekeeping research may be inflated by individuals' prior trauma histories.

Currently there is conflicting evidence surrounding the effect of prior exposure on subsequent trauma exposure (Dougall, Herberman, Delahanty, Inslicht, & Baum, 2000), and only limited research in the area (Breslau, Chilcoat, Kessler, & Davis, 1999). Current evidence supports both a sensitising and inoculating effect. Research with emergency services personnel usually has suggested that multiple trauma exposures can result in an inoculating effect whereby the individual develops resilience over time (Hyttén & Hasle, 1989; Weiss, Marmar, Metzler, & Ronfeldt, 1995). However, this conclusion is based on findings that more experienced workers show lower rates of distress. It may be that individuals who are unable to cope self-select out of the employment area. Or alternatively, that the impact of multiple exposures is being

mitigated by selection, training or age (Brunet, Boyer, Rachman, Weiss, & Marmar, 2001; Leffler & Dembert, 1998).

Other research favours the alternative sensitisation hypothesis. Epidemiological work has shown a strong relationship between cumulative exposure and subsequent distress (Bolton et al., 2001; Kessler et al., 1995; Resnick, Yehuda, Pitman, & Foy, 1995). Previous studies with Vietnam veterans have shown that a history of prior childhood trauma was associated with the development of PTSD after combat exposure (Bremner, Southwick, Johnson, Yehuda, & Charney, 1993; Zaidi & Foy, 1994, King et al, 1999), and work with rape victims suggests that prior traumatic exposure is a risk factor for subsequent distress (Foa & Riggs, 1993). Similarly, more recent research with emergency workers after an airline disaster suggested that accumulation of a variety of potentially traumatic events appeared to sensitise workers to the disaster situation and to perpetuate chronic symptomatology over a twelve-month period (Dougall et al., 2000).

Work with a population of 2,181 participants in the Detroit area of the United States by Breslau, Chilcoat, Kessler and Davis (1999) has shown that previous exposure to trauma increased the PTSD effects of subsequent trauma. Additionally, this study identified that multiple events had a stronger effect than single and that the effect of being assaulted persisted over time with little change but the effects of exposure to other traumatic events decreased. Consistent with previous findings, they also found that the experience of some forms of assault in childhood was a major risk factor for distress after a traumatic event as an adult.

Therefore, longitudinal research in the area of post-trauma symptomatology may need to control for the confounding influence of prior or subsequent potentially traumatic exposure. It may be that the predictive value of level of traumatic exposure

and other predictors is being confounded by distress from other events. Additionally, if prior trauma does influence symptomatology then subsequent events in longitudinal research may also confound reported results, especially if these events occur on subsequent deployments.

Interestingly, research with American military personnel returning from peacekeeping service in the former Yugoslavia, found significantly higher PTSD and depression scores for personnel on their first deployment in comparison to personnel on their second or third deployment (Huffman, Adler, & Castro, 1999). This finding supports the possible inoculation effect rather than the sensitising hypothesis. However, the difference between the groups decreased as the length of deployment increased and this finding was with personnel deployed in a low-intensity and relatively stable environment. The effect could be very different for personnel deployed on missions with high levels of traumatic exposure in an unstable environment (Adler & Castro, 2001). Additionally, as discussed with emergency services personnel, it may be that personnel who coped previously are more likely to remain in the services and are subsequently redeployed. The possible effect of employment status is also worthy of further investigation.

A related area that has not been researched to date is the impact of employment category, especially in military populations. Different occupational groups are exposed to potential traumatic events as part of their training (medical personnel, for example). This controlled exposure may have an inoculation effect and influence why experienced personnel show less distress. Typically emergency services and military personnel report lower levels of distress than civilian samples (Hodson & Rapee, 2002). However, there has been very little research into the effects of exposure to potentially traumatic events on varying professional groups within these services.

Research is therefore needed into the effect of exposure to other potentially traumatic events on the reporting of chronic symptomatology for a specific event, to determine if these events confound or distort the reporting of symptomatology. Additionally, research is required into the possible sensitising effect of subsequent deployments and employment status, and the potentially inoculating benefit of employment category.

Summary and Purpose of Thesis

In summary, there is a need to know more about the role of psychosocial factors in the development and maintenance of chronic problems after exposure to potentially traumatic events, as this has the potential to allow the development of effective preventative management and screening strategies. This research needs to be longitudinal in nature to assess temporal effects and needs to control for the potentially confounding role of exposure to other potentially traumatic experiences. The general purpose of this research, therefore, was to investigate the effect of exposure to traumatic events during a United Nation peacekeeping deployment and to identify vulnerability and resiliency factors that would predict chronic distress. As it was not possible or practical in the research to investigate all potential predictive factors, the research focused on level of potentially traumatic exposure and psychosocial factors. It needs to be highlighted that the research in the thesis is applied and as such was limited by military operational constraints in terms of the number of variables that could be investigated.

As a result, the study summarised in chapter two is an investigation into the relationship between level of traumatic exposure, social resources and levels of post-trauma symptomatology. The study was designed to test a cross-sectional model in

which feelings of loneliness are proposed to mediate both the effect of exposure to potentially traumatic events and the ability to access social support in the development of chronic PTSD.

Chapter three describes two prospective longitudinal studies that extend the model developed in chapter two. These studies further investigated the relationship between level of traumatic exposure, psychosocial factors and PTSD symptomatology.

Finally, the study discussed in chapter four employed a cross-sectional design at six years to investigate the possibly confounding role of prior trauma history in the reporting of symptomatology. This study also explored the impact of subsequent deployments, occupational experience and continued service.

The results of these studies will be presented in a series of self-contained papers. As a result, a degree of overlap between each of the chapters is inevitable.

CHAPTER TWO

A CROSS-SECTIONAL STUDY OF THE EFFECT OF SOCIAL SUPPORT AND LONELINESS ON POST-TRAUMA SYMPTOMATOLOGY IN MILITARY PEACEKEEPERS

Abstract

Several studies have shown a relationship between social resources and levels of post-trauma symptomatology. The present study was designed to test a model in which feelings of loneliness mediate both the effect of exposure to potentially traumatic events and social support in the development of chronic posttraumatic stress disorder (PTSD). To test this model, 246 Australian Defence Force peacekeepers were surveyed after their return to Australia from duty in Rwanda. They completed measures of trauma exposure, general mental health, PTSD, social support and loneliness. The model was partially supported, with loneliness mediating the effect of support but not the level of trauma exposure. The findings are discussed in relation to theoretical and clinical implications.

Over the last ten years, research into the effects of trauma on military populations has started to focus on the psychological aftermath of peacekeeping missions, for example Australians in Somalia (Ward, 1997); American peacekeeping missions to Somalia and Haiti (Fontana et al., 2000; Orsillo et al., 1998); Americans in the former Yugoslavia (Bartone et al., 1998; Ehlich et al., 1997); Dutch in the former Yugoslavia (Bramsen et al., 2000); Canadians in Rwanda (Rosebush, 1998); Japanese peacekeepers (Kodama et al., 2000); Swedish peacekeepers in Bosnia (Johansson, 1997); British peacekeepers in the former Yugoslavia (Deahl et al., 2000); and New Zealand peacekeepers (MacDonald et al., 1998).

Ehlich et al (1997) argue that these types of missions may be more stressful than traditional combat roles, since personnel may be exposed to a more diverse range of potentially traumatic stimuli, some of which can be very unexpected. They cite the case study of an American soldier who had experienced life-threatening situations on operational deployment, but only developed severe trauma symptomatology after exposure to a situation where he was unable to alleviate the suffering of starving children.

A comprehensive series of studies with American Somali peacekeeping veterans has shown that humanitarian missions can involve exposure to a range of potentially traumatic and chronic stressors (Litz, King et al., 1997), resulting in a third of their sample reporting clinical-level symptomatology on the Brief Symptom Inventory (Orsillo et al., 1998) and 8% meeting criteria for posttraumatic disorder (PTSD) fifteen weeks after returning home (Litz, Orsillo, Friedman, Ehlich, & et al., 1997). In one of the few published studies conducted with Australian peacekeepers, Ward (1997) found that at least one-fifth of the Australian Somalia veterans had significant levels of

psychiatric morbidity 15 months after their return to Australia, rates that were double those of their non-veteran peers.

In the literature there has been a growing interest in types of potentially traumatic events and the nature of psychological reactions, but what is lacking is a comprehensive understanding of post-trauma factors that may impede or facilitate recovery. An improved understanding of this area would contribute to the development of effective prevention and early intervention strategies (Dalglish et al., 2000). A number of authors have argued that an important approach to addressing issues of vulnerability and resilience in post-trauma reactions is the study of psychosocial factors or the social resources available to the individual (de Silva, 1999; Joseph et al., 1997; Stephens, 1996; Yule et al., 1999). These factors are of particular importance, as they are modifiable and can be targeted in screening and acute interventions. This approach is particularly relevant in a military setting where the nature of the employment means that the individual is extremely likely to be exposed to traumatic events, but where effective doctrine and leadership can control the subsequent management.

Social support has been shown to play a role in prevention of both acute and chronic stress reactions and to play a role in general mental health (Brugha, 1995; Cohen & Wills, 1985; Lin et al., 1986; Solomon, Waysman et al., 1990). Additionally there is growing evidence to support its role in the development and maintenance of post-trauma symptoms (Bryant et al., 2001; Dalglish et al., 2000; Fullerton et al., 1992; Jones & Barlow, 1990; Joseph et al., 1992; Solomon & Smith, 1994).

In a study with Israeli soldiers comparing the effects of social support, life events and locus of control, Solomon, Mikulincer and Habershaim (1990) found that of these variables social support was the only measure that significantly contributed to PTSD. A more recent study of 7,924 American soldiers after the Gulf War found that high ratings

on scales reflecting peer bonding were predictive of less post-combat distress (Bartone et al., 1992). Similarly, a study of navy divers who recovered bodies after the TWA Flight 800 plane crash found that family phone contact was one of the highest rated coping factors. The researchers hypothesised that this support acted as an emotional buffer against exposure to traumatic stimuli as well as intense work demands (Leffler & Dembert, 1998).

When discussing social resources or support, care needs to be taken to clearly define the concepts under investigation. Social support is a multifaceted construct encompassing a number of related but distinct elements, including but not confined to: perceived versus received social support, structural versus functional support, social integration and social networks (Joseph, 1999b). However, fundamentally all of these variables deal with the individual's ability to access resources that will mitigate the effect of stressful events (Brewin, 1995; Brugha, 1995; Joseph, 1999b; Pierce et al., 1996).

A key consideration when studying the impact of social support in trauma research is the distinction between perceived and received social support (Joseph et al., 1992). A crucial element proposed in all major theoretical formulations to explain post-trauma symptoms is the effect of the opportunity to discuss the event, whether it is explained as a need to develop new schemas (Horowitz, 1986), as a form of exposure, or to allow cognitive integration of information (Bryant et al., 2001; Foa & Meadows, 1997; Creamer et al., 1992), or to emotionally process the event (Rachman, 1980). Dalglish, Joseph, Thrasher, Tranah and Yule (1996) therefore argue that measurement of received support that involves the ability to discuss experiences in an emotionally supportive environment is more important than simply perceiving that the support is available if required.

Joseph, Andrew, William and Yule (1992) developed a measure of received or “crisis support” that has been shown to be predictive of post-trauma symptomatology in survivors of the Herald of Free Enterprise disaster and Jupiter Cruise Ship disaster (Dalglish et al., 2000; Joseph et al., 1992). However, to date this relationship has only been reported in samples exposed to discrete traumatic events (a disaster or armed robbery) rather than more severe multiple traumas (Dalglish et al., 1996; Richards, 2000).

Other authors argue that it is not enough to actually receive support but that the “active ingredient” that determines adjustment is the feeling of connectedness with others’. (Solomon, Waysman et al., 1990, p. 485). An individual’s connection with others can be determined utilising the concept of loneliness. Loneliness is an individual’s internal subjective state of dissatisfaction with their social network. It is a distressing state for the individual and is not related to the number of people in the social network (Peplau & Perlman, 1982; Rossmanith, 1995). Empirical research across the lifespan has shown that social support and loneliness are separate constructs that have an inverse relationship, and suggests that they both may play a preventative role in the development of stress reactions (Joseph, 1999b; Mahone & Yarcheski, 1992; Mahone et al., 1998; Penninx et al., 1999).

Solomon, Waysman, and Mikulincer (1990) in a study involving Israeli veterans of the Lebanon war (1982) provide support for a model in which level of psychiatric disturbance is related to levels of social support and where this relationship is moderated by loneliness. However, while the authors discuss the relationship between variables as a moderator, they conducted a mediational analysis (for a review of the difference, refer to Baron & Kenny, 1986). The research also utilised very specific measures of support focusing on the family and society, rather than a general measure

like crisis support that conceptually also includes peers, friendships and occupational networks.

Research with New Zealand police officers has highlighted the importance of support from peers and work-place attitudes to emotion in post-trauma reactions (Stephens, 1996). Interestingly, a study of Gulf War veterans by Southwick, Morgan and Rosenberg (2000) found no direct relationship between talking about experiences with family or friends and PTSD symptomatology, but talking about experiences was inversely related to feelings of personal inadequacy and alienation. However, they did not investigate the potential moderating role of alienation on PTSD symptomatology.

Conceptualising the process by which social support may be mediated is important, as in some circumstances social support can also have a negative impact on outcome, especially for women (Andrews & Brown, 1988; Hobfoll et al., 1996; Solomon, 1986). Work with Vietnam veterans and more recently Israeli combat soldiers (Shalev, 2000) has shown that joining a veteran peer group can allow individuals to normalise symptoms but in some instances may lead to re-exposure or further catastrophising of the event. Additionally, research with Vietnam veterans suggests that while a supportive spouse can help facilitate recovery, the effect of an unsupportive spouse is worse than being single (Kadushin, 1985).

A study of National Guard disaster workers who attended a major air disaster in Sioux City (US) found that talking about the event with social supports at two months was related to higher intrusive PTSD symptoms at seven months (Ursano et al., 2000). It may be that the quality of the support is crucial and a method of assessing this is the level of dissatisfaction with social networks or degree of connection. Recent research into the accessing of support networks has shown that an important mediating variable may be how individuals feel in relation to other group members. For example,

experienced disaster workers may seek support from peers while inexperienced workers are more likely to seek support from an intimate relationship (spouse or significant other) (Ursano et al., 2000; McCarroll et al., 1996).

van der Kolk, Hart and Burbridge (1995) argue that the element that distinguishes people who will develop a disorder from individuals who are able to cope is the inability of the individual to resolve intrusive reliving of the event resulting in the development of maladaptive avoidance. McFarlane and Yehuda (1996) have proposed an etiological framework for the transition from distress to disorder that includes the role of support and could incorporate the importance of connection to or satisfaction with social networks. This model involves three stages: the acute response, the chronic disorder and finally the adaptation to the chronic symptomatology.

This approach argues that in the first few months a strong emotional response involving both intrusive and avoidant symptoms is normal and at this stage can be adaptive. However, if the distress generated by these symptoms is not resolved an individual will move into the chronic stage. Previous research confirms that the predictive value of intrusive and avoidant symptoms immediately after the event for the development of chronic PTSD is variable (Shalev, 1996), but that this relationship strengthens over time (Dalgleish et al., 2000). McFarlane (1992) in a study of fire fighters found that intrusive symptoms at four months were highly predictive of subsequent PTSD at twenty-nine and forty-two months. This finding is supported by research testing cognitive models of PTSD that have demonstrated that distressing intrusive memories, if not dealt with, can result in a long-term disorder that is maintained by avoidant symptoms (Creamer et al., 1992; Jones & Barlow, 1990). In the final stage of the model the role and level of exposure become less important than the

distress and neurobiology generated by the chronic symptom cycle (McFarlane & Yehuda, 1996).

This aetiology framework (see Figure 1) proposes that during all three phases there are both resilience (or protective) factors and vulnerability (or risk) that will impact on the individual's ability to adapt to the traumatic stressor, by impacting on the individual's ability to deal with the distressing symptomatology. These include personality, coping style, other life events, family history, environmental responses, biological traits, past experience and the 'ability to recruit social networks' (McFarlane & Yehuda, 1996). The authors argue that these resilience and vulnerability factors will have a variable impact across the development of the disorder.

It is beyond the scope of this study to investigate all of the factors in McFarlane and Yehuda's (1996) etiological framework; however, a focus on the relationship between support, loneliness and PTSD symptomatology may further clarify the process. Loneliness became a key focus of the research to try and extend and replicate the promising work done previously by Solomon, Waysman, and Mikulincer (1990) with Israeli veterans. Loneliness is a concept with considerable theoretical promise but to date has been rarely researched (Olds & Schwartz, 2000). The theorised model summarised in Figure 1 draws together the findings of Joseph et al (1992) in relation to the role of support in disaster situations and the work of Solomon, Waysman and Mikulincer (1990) with Israeli veterans; to propose that the effect of the level of trauma experienced and the level of support (both received and marital) on intrusive and avoidant symptoms are mediated by the individual's internal distress or connection with support networks.

Consistent with previous cognitive models in the area it is proposed that intrusive symptoms will impact on avoidance (Creamer, Burgess, & Pattison, 1992; Jones &

Barlow, 1990). It also worth noting, that the level of trauma exposure should not affect the level of deployment support received or whether an individual is in an intimate relationship for this population, as the level of trauma being measured occurred overseas while the measures of support were four months after return to Australia. In the current population, therefore, you could hypothesis that support will be independent of the level of trauma, but that the level and quality of support will effect the subsequent adjustment.

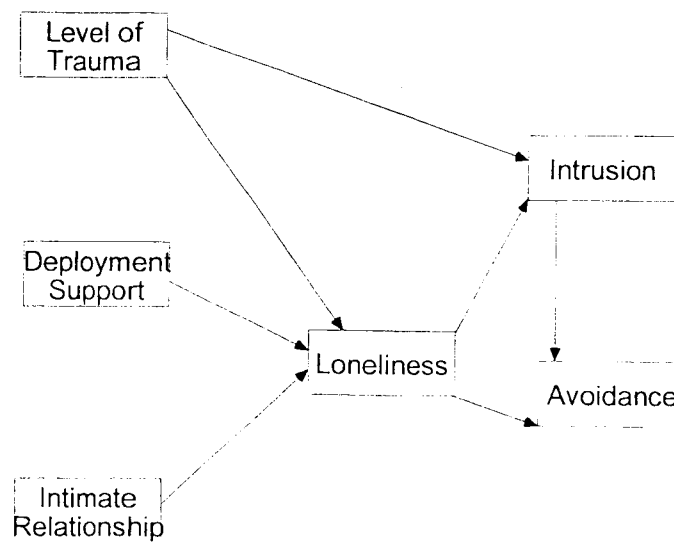


Figure 1: Theorised Model of the Meditational Role of Loneliness

The aim of this research was to investigate the levels of distress in Australian Defence Force personnel exposed to multiple traumas in a peacekeeping mission and to explore the relationship between this distress and post-deployment psychosocial factors. More specifically, we aimed to investigate the role that loneliness plays in mediating the relationship between social support and chronic intrusive and avoidant PTSD

symptomatology. The research attempted to replicate previous findings that poor crisis support and intimate a relationship are predictive of symptomatology and investigates the potentially mediating role of loneliness.

Method

The Mission

In 1994, Australia was one of seventeen nations that contributed to the United Nations armed peacekeeping force to assist the war-torn country of Rwanda. Half a million people had just perished in a brutal civil war in Rwanda and the country was extremely unstable. In all, 616 Australian Defence Force personnel served as part of two contingents, with each spending up to six months in country. During the deployments personnel faced a range of challenges including exposure to human misery and grief on a massive scale, threat from landmines or attack, and having to work with a population with extremely high rates of the human immuno-deficiency virus (HIV) (Pearn, 1995).

Study Design

The research was conducted after return from Rwanda as part of the Australian military's follow-up procedures for operational deployment. Of the 616 personnel deployed, contact details were available for 510. Two hundred and twenty surveys were mailed out to the first contingent twelve months after their return to Australia and 290 mailed out to the second contingent four months after their return. Eighty-five surveys were returned from the first contingent and 171 from the second, giving a total return rate of 49.8%. This rate was comparable to the 20-50% found in other trauma research (Kleber & Brom, 1992) Analysis indicated no significant between the two

groups on any of the dependant variables so they were collapsed into a single sample to maximise the power of the analysis. Eight cases were removed due to missing data, resulting in a sample of 246 cases

Measures

Questions were designed to capture demographic data including type of service (Army, Navy, Airforce), rank, gender and marital status.

General Mental Health - The level of general psychological/psychiatric 'wellness' was measured by the General Health Questionnaire – 12 (GHQ-12) (Goldberg, 1972). This has been found to be an effective measure of mental health in Australian community-based samples (Korten & Henderson, 2000).

Posttraumatic Symptoms - PTSD symptoms were measured by the Impact of Events Scale (IES) (Horowitz, Wilner, & Alvarez, 1979; Zilberg, Weiss, & Horowitz, 1982), a 15 item scale utilised widely in trauma research that assesses posttraumatic symptomatology for a specified life experience. Previous studies have demonstrated that the scale has good psychometric properties (Horowitz et al., 1979; Zilberg et al., 1982; Dalgleish et al., 2000; McDonald, 1997), and it is useful with military populations (Schwarzwald, Solomon, Weisenberg, & Mikulincer, 1987). Consistent with this research the scale in this sample had satisfactory internal reliability ($\alpha = .94$ for the total IES, .89 for the intrusion subscale and .92 for the avoidance subscale).

It should be noted that due to the fact that the IES was developed before the Diagnostic and Statistical Manual of Mental Disorders category of PTSD it only measures two of the current defining symptom clusters (intrusion and avoidance) (Joseph, 2000), but as a result is not affected by changes in the diagnostic criteria. Additionally, research has shown that the total IES score has adequate convergent

validity with the more recently developed Mississippi and MMPI PTSD scales (Amdur & Liberson, 2001) and has good sensitivity to PTSD (McFall, Smith, Roszell, & Malas, 1990; Neal, Busuttil, Rollins, Herepath, & et al., 1994). A cut-off score on the IES between 30 and 35 is considered a conservative estimate of likely PTSD (Harrison & Kinner, 1998; Neal et al., 1994). There is currently some debate in the literature about the stability of the subscales; however, the scales are reported here in their original format to maximise comparability with other populations (Amdur & Liberson, 2001; Andrews, Troop, Joseph, Hiskey, & Coyne, in press; Dalgleish et al., 2000; Joseph, 2000; McDonald, 1997). It should also be noted that a revised version of the IES with three subscales became available during the course of the research (Weiss & Marmar, 1997). However, the original measure was retained to allow longitudinal analysis of trends.

Level of Traumatic Exposure - Level of trauma exposure was measured by the Traumatic Stress Exposure Scale (TSES), which was developed specifically for this research. The scale was based on several generic stressor categories suggested by Green (1990b) and potentially traumatic events identified by clinicians, after psychologically debriefing the first contingent immediately before their return to Australia (for details see Hodson & Rapee, 2002b). Participants indicated the frequency of exposure to thirteen potentially traumatic events on a five-item scale (never, rarely, occasionally, often, very often), if the individual indicated never on the scale the event was judged not to have occurred. The mean of the responses to the thirteen items gave the overall score on this measure. Initial analysis of the scale's psychometric properties suggests adequate test-retest reliability ($r_s = .68$) over a three-week period, and sound criterion validity (Hodson & Rapee, 2001). The Cronbach's alpha for this sample was .78.

Social Support – Two measures were utilised to measure different aspects of social support. They assessed the received level of deployment support at time of survey and whether the individual was in relationship with a significant other.

The Crisis Support Questionnaire developed by Joseph, Andrew, Williams and Yule (1992) was utilised to measure the level of deployment support on return to Australia. This is a six-item questionnaire that measures the levels of support at time of survey. It was designed to assess the ability of individuals to discuss their experiences in an emotionally supportive environment (Joseph, 1999b). The authors initially only found moderate internal consistency ($\alpha = .69$), but cite good consistency ($\alpha = .80$) in a study with a larger sample (Joseph, 1991 cited in Joseph et al., 1992). There was a slight modification from the original scale in the current research, with the term 'deployment' being substituted for 'crisis' for ease of understanding of the research participants. However, analysis indicated that the measure maintained good internal consistency ($\alpha = .82$).

To determine whether individuals were in an intimate relationship, the marital demographic variable was recoded to a dichotomous variable. Individuals in a married, de facto, or long-term relationship were coded as being in an intimate relationship, and individuals indicating they were single, divorced, separated or widowed were coded as being without this specific type of structural support. There are other types of structural support that could have been measured in the research but the length of the survey was limited by military operational constraints.

Loneliness - The degree of internal distress or lack of connection with support was gauged from responses to the revised UCLA Loneliness Scale (Russell, Peplau, & Cutrona, 1980). This one of the most widely utilised and best researched tools for measuring loneliness available (Hartshorne, 1993) and was chosen for this study to

maximise the ability to extend the research of Solomon, Waysman, and Mikulincer (1990) with Israeli veterans. It is a twenty-item scale reflecting both satisfaction and dissatisfaction with social networks. It has sound psychometric properties with alphas typically reported as .90 or above (Hartshorne, 1993). A strength of the scale is that it does not directly measure states that an individual may label as lonely, but attempts to measure what a researcher would operationalise as lonely (Hartshorne, 1993).

Statistical Analyses

The analysis was conducted in three stages. The first stage involved descriptive statistics and correlation analysis to establish relationships between all key variables. In the second stage, three sequential regressions were utilised to determine whether social support and loneliness improved prediction of distress beyond that afforded by level of trauma exposure for general mental health and PTSD symptomatology. The contingent in which personnel were deployed was included in the first step of the regression to control for the influence of the different conditions the contingents experienced and timing of the surveys. Analysis was performed using SPSS Regression and SPSS Frequencies for evaluation of assumptions. Finally, AMOS 4.01 (Arbuckle & Wothke, 1999) was utilised to test the potential mediating role of loneliness in the development of chronic intrusive and avoidant PTSD symptomatology.

Results

The Sample

The sample was mainly comprised of Army personnel (92.2%) with very small numbers of Airforce (6.5%) and Navy (1.2%). There was a predominance of junior ranks (47.5%), individuals in intimate relationships (69.5%) and males (86.9%) in the

sample. However, information from military records indicated that these demographics are consistent with the population characteristics of the personnel who served with the contingents in Rwanda.

Levels of Trauma

On the TSES the sample reported experiencing high rates of potentially traumatic experiences, with an average of four events. For example, 94% reported seeing human degradation and misery on a large scale, 83% indicated that they believed they were in danger of being killed, 94% reported seeing dead bodies, 93% feared being injured and 80% feared they had been exposed to a contagious disease, toxic agent or injury. Consequently, there was only one individual in the sample who did not report at least one potentially traumatic experience (for further detail see Hodson, Ward, & Rapee, In Press; Hodson & Rapee, 2002b).

Levels and Predictors of Distress Reported

Descriptive statistics and bivariate correlations for all dependent and independent variables were computed and are summarised in Tables 1 and 2. A square root transformation was subsequently used for the measure of general mental distress due to a moderate positive skew, and logarithmic transformation was used on the measure of PTSD due to severe positive skew (Tabachnick & Fidell, 2001). With the use of a $p < .001$ criterion for Mahalanobis distance, two multivariate outliers were identified and removed. Independent variables correlated with the dependent variables in the expected directions and all variables were included in the subsequent regression analyses.

Table 1: Descriptive Statistics (N=246)

Variable	Mean	SD	Range	Possible Range
GHQ-12 - Likert	11.17	5.87	0-36	0-36
IES - Total	13.86	16.55	0-70	0-75
- Intrusion	7.02	8.09	0-35	0-38
- Avoidance	6.84	9.41	0-38	0-40
Traumatic Stress Exposure Scale	30.34	7.01	13-53	0-60
UCLA Loneliness Scale	35.79	11.99	20-69	0-80
Deployment Support	30.03	8.01	8-42	0-42

Table 2: Correlation Matrix for Variables included in Linear Regression Analyses

	GHQ	IES	IES	IES	TSES	UCLA	Deploy	Intimate
	-12	Tot	-I	-A	Lon	Support	Rel	
Pearson Correlation								
GHQ-12	1.00							
IES – Tot	.55**	1.00						
IES – I	.54**	.96**	1.00					
IES – A	.56**	.92**	.81**	1.00				
TSES	.18**	.24**	.25**	.23**	1.00			
UCLA Lon	.60**	.55**	.52**	.57**	.11	1.00		
Deploy Support	-.46**	-.53**	-.50**	-.50**	-.12	-.68**	1.00	
Intimate Rel	-.20**	-.15*	-.16*	-.14*	.04	-.24**	.04	1.00
Contingent	.10	.13*	.15*	.10	.05	-.01	-.04	.05

Note: GHQ-12=General Health Questionnaire -12; IES-Tot=Total Impact of Events Score; IES-I=Impact of Events Intrusion Subscale; IES-A=Impact of Events Avoidance Subscale; TSES=Traumatic Stress Exposure Scale; UCLA Lon=UCLA Loneliness Scale; Deploy Support=Deployment Support at time of survey; Intimate Rel= Intimate Relationship

*p< .05. **p<.01.

General Mental Health – Binary scoring of the GHQ-12 revealed a mean of 2.12 (SD 2.97). As summarised in Table 3, the combination of variables was significant in predicting general mental health as measured by the GHQ-12. Contingent in step one did not reliably improve R^2 . However, level of traumatic exposure in step two significantly predicted distress but only accounted for 4% of the variance, $R^2=.038$, $F(1, 245)=4.78$, $p < .01$. The addition of the loneliness and social support variables in step three increased the level of variance accounted for in the model to 39%, $R^2=.381$, $F(4, 245)=37.08$, $p < .001$, but only loneliness offered a unique contribution.

PTSD Symptoms – Utilising the conservative cut off of 35 for the IES, 13% of the sample was reporting clinical-level symptomatology. The sample mean on the IES was 13.86 (SD 16.55). The combination of trauma and psychosocial variables was significant in predicting intrusive PTSD symptoms as measured by the Intrusion Subscale of the IES (refer to Table 3). Overall, the model accounted for 37% of the variance, $R^2=.605$, $F(5, 245)=27.7$, $p < .001$. Contingent in step one significantly predicted distress but only accounted for 2% of the variance, $R^2=.022$, $F(1, 245)=5.51$, $p < .001$. Level of trauma exposure in step two also significantly predicted distress with a significant increase in the variance accounted for to 8%, $R^2=.081$, $F(2, 245)=10.76$, $p < .001$. In step three both loneliness and deployment support offered a unique contribution to the model.

Finally, the combination of variables was also significant in predicting avoidance PTSD symptoms as measured by the Avoidance Subscale of the IES (refer to Table 3). In step one inclusion of deployed contingent to the model did not reliably improve R^2 . Trauma exposure in step two significantly predicted distress but only accounted for 6% of the variance, $R^2=.060$, $F(2, 245)=7.70$, $p < .001$. The addition of the loneliness and social support variables increased the variance accounted for to 38%,

$R^2=.379$, $F(5, 245) = 29.283$, $p < .001$, but only loneliness offered a unique contribution.

Table 3: Hierarchical Multiple Regressions to Predict Symptom Scores

Variables		R	R Square	Beta Values Stepwise	Beta Values Total Model
GHQ-12					
Step 1	Contingent	.093	.009	.093	.081
Step 2	Trauma Exposure	.195	.038**	.171**	.110*
Step 3	Loneliness Deployment Support Intimate Relationship	.622	.387**		.504** -.094 -.079
IES – Intrusion					
Step 1	Contingent	.149	.022*	.149*	.129*
Step 2	Trauma Exposure	.285	.081**	.244	.185**
Step 3	Loneliness Deployment Support Intimate Relationship	.605	.366**		.303** -.259** -.091
IES – Avoidance					
Step 1	Contingent	.097	.009	.097	.077
Step 2	Trauma Exposure	.244	.060**	.224	.229**
Step 3	Loneliness Deployment Support Intimate Relationship	.616	.379**		.390** -.214** -.050

Note: Trauma Exposure = Traumatic Stress Exposure Scale; Loneliness = UCLA Loneliness Scale; Deployment Support = Deployment Support at time of Survey; Intimate Relationship = Presence of Significant Other; * $p < .05$. ** $p < .01$.

Mediational Model of Loneliness in the Development of Chronic PTSD

The hypothesised-mediating model of loneliness (summarised in Figure 1) was tested; this model was developed from the literature but also from the initial regression analysis. As loneliness became an endogenous variable, a square root transformation

was utilised, to ensure the multivariate normality and linearity assumptions were met. Maximum likelihood estimation was employed in all models, and consistent with suggestions by Bollen and Long (1993) a range of fit indices was utilised to determine the adequacy of model fit. Analysis of the hypothesised model did not provide an acceptable fit of the data, $\chi^2(7, N= 246) = 20.45, p=.005$ with a Goodness-of-Fit Index (GFI) of .974 and Tucker-Lewis Index (TLI) of .947 (due to the small numbers in the study the TLI is reported as it is robust in relation to sample size (Marsh, Balla, & McDonld, 1988).

Post hoc model modifications were performed to develop a better fitting and more parsimonious model. On the basis of theoretical considerations and modification indices two paths were deleted and a direct effect added between deployment support and intrusive symptomatology. The model provided an acceptable fit to the data, $\chi^2(8, N= 246) = 9.172, p=.33$, and was consistently supported by other fit indices: the GFI was .988, the TLI was .996, the Comparative Fit Index was .998, and Root Mean Square Error of approximation was .024 (for a description of indices see, Tabachnick & Fidell, 2001). Review of standardised direct effect between support and intrusion (.25) and the standardised indirect effect (.22) revealed that the pathways are equally important in the model. The squared multiple correlations for the endogenous variables were .49 for loneliness, .32 for intrusive symptoms and .67 for avoidant symptoms. The model including coefficients in standardised form is illustrated in Figure 2.

A final check on the impact of the distribution of the data in the model was investigated by conducting an analysis with untransformed variables utilising unweighted least squares analysis, as this approach takes into account deviations from normality (Anderson & Gerbing, 1988). The alternative analysis confirmed all

pathways and the only noteworthy difference was a stronger relationship between level of traumatic exposure and intrusive symptomatology ($Beta=.31$).

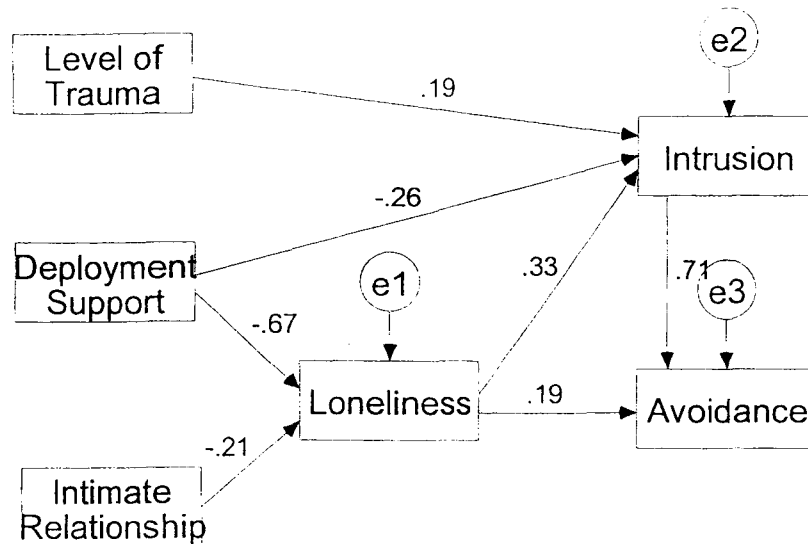


Figure 2: Model of the Meditational Role of Loneliness (showing standardised regression weights for significant paths).

Four theoretically relevant alternative models were tested to determine if they would provide a better fit for the data (Schumacker & Lomax, 1996). The first model stated that there are only direct effects from the variables (level of trauma, loneliness, social support variables) to the PTSD symptom variables, $\chi^2(6, N=246) = 173.12$, $p=.000$ with a GFI of .848 and TLI of .232. The second model stated that the social support variable mediated loneliness, $\chi^2(8, N=246) = 9.172$, $p=.33$ with a GFI of .953 and TLI of .876. The third model stated that loneliness mediated the social variables

but that there was also a direct effect between deployment support and avoidance symptoms, $\chi^2(8, N= 246) = 20.973$, $p=.007$ with a GFI of .973 and TLI of .955. Finally, loneliness mediated the social variables but there was also a direct effect between presence of an intimate relationship and intrusive symptoms, $\chi^2(8, N= 246) = 20.69$, $p=.008$ with a GFI of .973 and TLI of .956. None of these alternatives provided a better fit for the data.

Discussion

Consistent with previous research, the majority of the sample did not report significant PTSD symptomatology and were coping with the exposure to potentially traumatic events (Green, 1994; McFarlane & Yehuda, 1996). However, there was a subgroup reporting high levels of distress, with 13% of the sample reporting clinical level symptomatology. This is considerably higher than the 1.7% reported by Marshall and Deans (2001) for more recent peacekeeping missions and the 1.33% 12-month prevalence rate reported by Creamer et al. (2001) for the Australian population. While care must be taken in comparing rates due to differing measurement methods, the rate of PTSD in the Rwanda sample is clearly elevated.

Binary scoring of the GHQ-12 revealed a mean of 2.12 (SD 2.97), which is double the mean of 0.92 (SD 0.03) reported in the Australian National Survey of Mental Health and Well-Being for the general population (Korten & Henderson, 2000) and 1.05 (SD 1.97) reported by troops returning from more recent Australian peacekeeping missions (Deans, 2001). These results suggested elevated levels of psychological distress in the Rwandan veteran sample.

The current study supports previous findings that low deployment or 'crisis' support is related to PTSD symptomatology, and provides support for the argument that

a measure of support may be useful for clinicians as a screening tool (Dalgleish et al., 1996). However, unlike previous research with disaster and armed robbery samples that found only a relationship between support and intrusion symptoms (Joseph et al., 1992; Richards, 2000) or support and avoidant symptoms (Joseph, Yule, Williams, & Andrews, 1993; Dalgleish et al., 1996), support was predictive of both intrusion and avoidance in this sample. This relationship could be due to population characteristics (eg. gender bias) or characteristics of the trauma (eg. this population experienced multiple traumatic exposures over a six-month period).

There is currently a debate in the literature about the defining symptom clusters of the PTSD diagnosis and the stability of the factor structure of the original IES (Amdur & Liberson, 2001; Dalgleish et al., 2000; Joseph, 2000; McDonald, 1997). It may be that the clustering of symptoms confounds the current and previous findings and warrant replication and further investigation with alternative PTSD scales or more recently developed versions of the IES. Recently, Weiss and Marmar (1997) have developed a twenty-two item revised version of the IES for a longitudinal study of emergency services personnel that includes a subscale of hyperarousal. Additionally, Andrew, Troop, Hiskey and Coyne (in press) suggest that there could be two types of avoidance that need to be considered within the avoidance subscale.

While the results support the importance of determining the level of 'crisis' or deployment support, modelling of the relationship between the variables indicated the importance of also assessing the degree of connection to, or dissatisfaction, with support. The ability of support to act as a protective factor in this sample was mediated by internal perceptions of loneliness. Loneliness in the model was found not to mediate the level of trauma exposure but to mediate the effects of support (both received and intimate) in the development of intrusive and avoidant symptomatology. These findings

are consistent with previous research with Israeli soldiers (Solomon, Waysman et al., 1990). A direction for future research may be the role of feelings of guilt in relation to loneliness and accessing support. A major etiological factor in PTSD is feelings of guilt (Joseph, Hodgkinson, Yule, & Williams, 1993; Kubany, 1994). One possible cause of lack of dissatisfaction with support networks could be fear that others will judge their actions, and it may be these fears that result in individuals not utilising resources. In the context of the current research many of the Rwanda veterans express issues of guilt in relation to their inability to intervene when witnessing acts of violence (especially during the Kibeho massacre), and the fact that they feel they should of been allowed to helped save more of the civilian population. These feelings of guilt may have hindered their willingness to discuss events on return to Australian and in turn their feelings of connection with support networks.

A primary component of many acute intervention strategies are to encourage the accessing of social support networks (for a summary see Raphael, 2000), especially as support networks are far more readily available than professional services. However, these results suggest that an individual is not likely to benefit from support networks if they feel unconnected from them. It may be important for clinicians to assist in the identification of appropriate support and facilitate this connection.

This proposal is further supported by the finding that loneliness or internal distress plays arole in the ability of the individual to access support from an intimate partner. This finding is consistent with Kadushin's (1985) research with Vietnam veterans, which showed that the effect of an unsupportive spouse could be worse than being single. It may be worth exploring strategies that focus on educating spouses or significant others in normal responses to trauma and providing them with information on how to interact with a potentially traumatised individual, and investigating whether

such interventions can lead to a reduction in feelings of distress. This is particularly relevant in a military setting where the separation due to the deployment alone, without the additional confound of exposure to potentially traumatic events, can also have a significant impact on relationships (Adler & Castro, 2001).

Finally, the findings of a significant but low correlation between level of traumatic exposure and PTSD symptoms and the lack of a relationship between level of traumatic exposure and loneliness are consistent with the argument that by four months the level of exposure becomes less important than the distress and neurobiology generated by the symptom cycle (McFarlane & Yehuda, 1996). However, prospective research needs to be conducted to determine whether experience of the trauma itself results in this internal distress or disconnection. It may be those feelings of alienation and disconnection resulting from PTSD symptomatology could influence one's satisfaction with and utilisation of social support networks. Future research needs to resolve these issues surrounding potentially reciprocal relationships in the model. Shalve (2000) argues that for traumatised individuals the immediate response to trauma is a feeling of 'total loneliness' or isolation and that these feelings inhibit the individual's ability to seek support from their peers. The findings in this research support this position but are unable to determine the genesis of the process. This is a common problem in trauma research and the reason prospective studies are so desperately needed (Shalev, Peri, Rogel-Fuchs, Ursano, & Marlowe, 1998; McFarlane, 1996).

It is important to acknowledge the limitations of the current research. The reported findings are cross-sectional, retrospective and based on self-report measures, so care must be taken in interpreting casual inferences. Similar to research with other military samples care also must be taken in generalising to other populations (Ursano et al., 2000). Military populations are unique in that individuals have undergone a

psychological and intellectual screening process. They also may have a greater dependency on intimate relationships and peer networks, due to the mobile nature of Defence families and a lack of access to extended family networks.

Response rates are always a concern in trauma research due to the potential for response bias. Thompson (1991), for example, has argued that partial samples might underestimate the effect of disaster, suggesting that individuals with the most severe post-traumatic responses are the most likely not to reply. The small size in the study also did not allow cross-validation of the model, which would have significantly strengthened the confidence in the model as a reliable fit of the data (Tabachnick & Fidell, 2001). Therefore role of loneliness as a mediator between support and chronic PTSD symptoms needs to be replicated in other samples. Furthermore, the small number of women in the sample did not allow independent statistical analysis by gender. Fontana, Litz and Rosenheck (2000), when developing a model of the impact of combat and sexual harassment for the development of PTSD in Somali peacekeeping veterans, found considerable similarity but also important differences between genders. The proposed mediational model of loneliness may be more reflective of a male response.

Despite these caveats, the findings of the current research raise interesting directions for future research and have implications for the management of personnel following peacekeeping deployments. For some of the personnel, the deployment to Rwanda left memories and feelings with which they are still struggling to live. This research gives some insight into vulnerability and protective factors. It replicates previous research that has shown that psychosocial factors play a role in the development of chronic trauma symptomatology and suggests that loneliness plays a mediational role.

CHAPTER THREE

POST-TRAUMATIC SYMPTOMATOLOGY AND PREDICTORS OF DISTRESS FOR MILITARY PEACEKEEPERS – A LONGITUDINAL PERSPECTIVE

Abstract

Research into the relationship between level of traumatic exposure, social support, loneliness and post-trauma symptomatology suggests that it may be possible to identify predictors of chronic problems. This prospective longitudinal study investigated the relationship between level of traumatic exposure and psychosocial factors, measured four months after deployment, with chronic posttraumatic distress three and six years post deployment. Veterans from an Australian peacekeeping mission to Rwanda completed measures of post-traumatic symptoms, level of exposure, social support and loneliness. The research revealed direct relationships between for level of traumatic exposure and initial symptomatology and indirect relationships for social support and loneliness in the prediction of chronic symptomatology. Modelling of the relationship between variables revealed two potential pathways to distress, with loneliness mediating the impact of social support as well as having a direct effect on the self-reported level of trauma exposure at six years.

In Australia, the primary role of military personnel is the defence of the nation. However, Defence personnel are also asked to assist in United Nations peacekeeping missions and disaster relief, due to their specialised skills. Over the last ten years, research has started to focus on the psychological aftermath of these types of peacekeeping missions (Adler & Castro, 2001; Bartone et al., 1998; Fontana et al., 2000; Kodama et al., 2000; MacDonald, Chamberlain, Long, & Mirfin, 1999; Orsillo et al., 1998; Rosebush, 1998).

In one of the few published studies conducted with Australian peacekeepers, Ward (1997) found that at least one-fifth of the Australian Somalia veterans had significant levels of psychiatric morbidity fifteen months after their return to Australia, rates that were double those of their non-veteran peers. This is consistent with Hodson and Rapee (2002a), who found 13% of Rwandan veterans were reporting clinical level symptomatology within the first year of returning home.

A comprehensive series of studies with American Somali peacekeeping veterans has shown that humanitarian or peacekeeping missions can involve exposure to a range of potentially traumatic and chronic stressors (Litz, King et al., 1997). These researchers found that this exposure resulted in a third of the sample reporting clinical-level symptomatology on the Brief Symptom Inventory (Orsillo et al., 1998) and 8% meeting criteria for posttraumatic disorder (PTSD) fifteen weeks after returning home (Litz, Orsillo, Friedman, Ehlich, & et al., 1997).

While, these studies demonstrate that peacekeeping missions involving potentially traumatic events can result in distressing symptomatology for some individuals, they are limited by their cross-sectional approach. Research with disaster victims has shown that post-traumatic symptomatology can vary over time (Dalglish et al., 2000) and consequences may not be fully assessed at any single time point due to

the potential for delayed onset (Litz, King et al., 1997). This is a common problem in the field of trauma research (Friedman, 1999), where there is a comprehensive understanding of potential etiological variables (for a review see Brewin, Andrews, & Valentine, 2000 or King et al, 1999) but limited understanding of how these factors interact in the development and maintenance of chronic problems (Friedman, 1999; McFarlane, 2000a).

Subsequent prospective studies with the Somali and Gulf war veterans demonstrate the benefits of longitudinal studies. A consistent finding in cross-sectional research is the relationship between intensity and frequency of traumatic exposure and the development of symptomatology (Adler et al., 1996; Hodson & Rapee, 2002a; Lauterbach & Vrana, 2001; Michultka et al., 1998; O'Brien & Hughes, 1991). However, research with groups of Somali (Roemer et al., 1998) and Gulf War veterans (Southwick, Morgan, & Charney, 1997) has indicated that reporting and recall of traumatic memory increase over time and that there may be a systematic bias resulting from PTSD symptomatology. While these are only preliminary findings in the area, they call into question the practice in trauma research of treating self-report frequencies as objective measures of the event, raise conceptual issues in relation to the consistency of traumatic memory and suggest a more complicated relationship between exposure and symptomatology than originally theorised (Roemer, Litz, & Orsillo, 1997; Roemer et al., 1998; Southwick, Morgan, & Charney, 1997).

It is worth noting that while the level or frequency of trauma exposure is the most consistent predictor of distress in trauma research, there is usually only a moderate correlation, suggesting that there are other vulnerabilities or etiological variables that play a role in the development of symptomatology (Lauterbach & Vrana, 2001; Litz, Orsillo, Friedman, Ehlich, & Batres, 1997). Consistent with the literature, Hodson and

Rapee (2002a) found a significant but weak relationship between level of trauma exposure and posttraumatic symptomatology in a study of Rwandan peacekeeping veterans, but additionally found a strong relationship between loneliness or feelings of dissatisfaction with support networks and distress. This research, however, was only cross-sectional and gave no insight into temporal relationships or the impact on subsequent distress or recall of traumatic memories.

McFarlane and Yehuda (1996) have proposed an etiological framework for the development of chronic posttraumatic symptomatology. This model proposes that, during the initial period following the trauma, there are a number of vulnerabilities and resiliency factors that impact on the development of a chronic problem by impacting on the individual's ability to cope with distressing symptomatology or emotions. Hodson and Rapee (2002a) argue that loneliness or connection with support networks is one of these vulnerabilities. The identification and understanding of the longitudinal course of these vulnerabilities are important in the development of effective screening and acute intervention programs. Currently many programs routinely recommend accessing support networks (for a summary see Raphael, 2000). However, previous research with Rwandan veterans suggests that, for social support to be of value, in some cases access may need to be facilitated and appropriate support identified.

Therefore the aim of the present research was to investigate the role of level of traumatic exposure, social support and loneliness in the development of posttraumatic symptomatology at three and six years as measured by Horowitz's Impact of Events Scale. Specifically, consistent with the results of Hodson and Rapee (2002b) it was predicted that level of trauma, deployment support and loneliness at four months would remain predictive of posttraumatic symptomatology at three and six years.

Furthermore, it was predicted that loneliness would mediate social support at three and

six years and that loneliness at six years would remain predictive of symptomatology after accounting for previous distress. Finally, the research attempted to replicate previous findings that recall of symptomatology is not consistent over time and may be influenced by symptom severity. The comparison of the four-month with the three-year data is summarised in Study 1 and the comparison of the fourth-month data with the six-year data is summarised in Study 2.

Study 1 – Prediction to Three Years

In 1994, Rwanda was torn apart by a brutal and horrific genocide resulting from a civil war (Gourevitch, 1998). Australia was one of seventeen nations that contributed to the armed peacekeeping force set up by the United Nations to deal with the resulting humanitarian crisis. Over the period of a year two contingents were deployed, each for a six-month rotation. The primary mission of the deployment was to provide medical support to the United Nations Peacekeeping Force. However, the Australian personnel were also involved in providing primary health care in the Displaced Persons Camps and to expatriate health workers for various international charities (Pearn, 1995).

The second contingent, the focus of this post-deployment research, left for Rwanda on 19 February 1995 and returned to Australia on 24 August 1995. During their deployment they faced a range of challenges including exposure to human misery and grief on a massive scale, threat from landmines or attack, and having to work with a population with very high rates of the human immuno-deficiency virus (HIV). Additionally, during this deployment, more than half the contingent was rotated through the Kibeho refugee camp, where thousands of Hutu internally displaced persons (IDPs) were systematically killed on the 22nd of April 1995. Members of the early rotations to the Kibeho camp were eyewitnesses to the killing and provided medical care to the

injured, while later rotations continued to treat the remaining IDPs and were witness to indescribable human misery (Pearn, 1995).

The first study was an investigation into potential post-deployment factors at four months that would predict distress resulting from witnessing these events. Specifically, a model was tested in which it was predicted that level of traumatic exposure, deployment support, loneliness and symptomatology at four months would predict posttraumatic symptoms and levels of loneliness at three years, with loneliness mediating the effects of support but not the level of traumatic exposure.

Method

Study Design

This study was part of an ongoing investigation into the effects of operational deployment on Rwandan veterans (Hodson et al., in press). At the first time point of interest in this study, subjects completed a mail-out survey four months after their return to Australia. In the administration they completed a battery of self-report questionnaires which included measures of: Rwandan-related posttraumatic symptomatology, the level of traumatic exposure experienced while on deployment, levels of social support and feelings of loneliness. The three-year data point was also a mail-out survey. The measures administered of interest to the analysis assessed current level of Rwandan-related posttraumatic symptomatology and feelings of loneliness.

Participants

Two hundred and ninety personnel from the second contingent were sent a survey at the four-month data point. One hundred and seventy-one personnel (60%)

responded at four months and 67 (23%) at three years, of which 66 cases could be matched across the two time points and contained no missing data.

Participants had a mean age of 29.76 (5.76) years at the time of deployment and 90% of the sample was male. Fifty-one percent were Private or Corporal equivalents, 19% were Sergeant or Warrant Officer equivalents and 30% were Officers. On the deployment 29% had served in the Medical Company, 34% had served in the Infantry Company, 17% had served with Operational Support and 20% in Headquarter Elements. Independent *t*-tests and chi-squared analysis revealed that the sample in study one was not significantly different from the original 290 personnel surveyed on any demographic variables.

Measures

Questions were designed to capture demographic data including age at the time of deployment, marital status, rank, unit type and gender.

Posttraumatic Symptoms - the Impact of Events Scale (IES), (Horowitz et al., 1979; Zilberg et al., 1982) measured PTSD symptoms. It is a fifteen-item scale utilised widely in trauma research that assesses posttraumatic symptomatology for a specified life experience. Previous studies have demonstrated that the scale has good psychometric properties (Horowitz et al., 1979; Zilberg et al., 1982; Dalglish et al., 2000; McDonald, 1997), and it is useful with military populations (Schwarzwald et al., 1987).

It should be noted that due to the fact that the IES was developed before the Diagnostic and Statistical Manual of Mental Disorders PTSD category, it only measures two of the current defining symptom clusters (intrusion and avoidance) (Joseph, 2000). However, research has shown that the total IES score has adequate convergent validity

with the more recently developed Mississippi and MMPI-PTSD scales (Amdur & Liberson, 2001) and has good sensitivity to PTSD (McFall et al., 1990; Neal et al., 1994). A cut-off score on the IES between 30 and 35 is considered a conservative estimate of likely PTSD (Neal et al., 1994) (Harrison & Kinner, 1998). There is currently some debate in the literature about the stability of the subscales; however, the scales are reported here in their original format to maximise comparability with other populations (Amdur & Liberson, 2001; Andrews et al., in press; Dalgleish et al., 2000; Joseph, 2000; McDonald, 1997).

Level of Traumatic Exposure - Level of trauma exposure was measured by the Traumatic Stress Exposure Scale (TSES), which was developed specifically for this research. The scale was based on several generic stressor categories suggested by Green (1990b) and potentially traumatic events identified by clinicians, after psychologically debriefing the first contingent immediately before their return to Australia (refer to Appendix 1). Participants indicated the frequency of exposure to thirteen potentially traumatic events on a five-item scale (never, rarely, occasionally, often, very often), if the individual indicated never on the scale the event was judged not to have occurred. The mean of the responses to the thirteen items gave the overall score on this measure. Initial analysis of the scale's psychometric properties suggests adequate test-retest reliability ($r_s = .68$) over a three-week period and sound criterion validity (Hodson & Rapee, 2001). The Cronbach's alpha for this sample at four months was .81 and at six years was .82.

Loneliness - - The degree of internal distress or lack of connection with support was gauged from responses to the revised UCLA Loneliness Scale (Russell, Peplau, & Cutrona, 1980). This one of the most widely utilised and best researched tools for measuring loneliness available (Hartshorne, 1993) and was chosen for this study to

maximise the ability to extend the research of Solomon, Waysman, and Mikulincer (1990) with Israeli veterans. It is a twenty-item scale reflecting both satisfaction and dissatisfaction with social networks. It has sound psychometric properties with alphas typically reported as .90 or above (Hartshorne, 1993). A strength of the scale is that it does not directly measure states that an individual may label as lonely, but attempts to measure what a researcher would operationalise as lonely (Hartshorne, 1993).

Social Support - Two measures were utilised to measure different aspects of social support. They were the received levels of deployment support at time of survey and whether the individual was in relationship with a significant other.

The Crisis Support Questionnaire by Joseph, Andrew, Williams and Yule (1992) was utilised to measure the level of deployment support. This is a six-item questionnaire that measures the levels of support at time of survey. It was designed to assess the ability of individuals to discuss their experiences in an emotionally supportive environment (Joseph, 1999b). The authors initially only found moderate internal consistency ($\alpha = .69$), but cite good consistency ($\alpha = .80$) in a study with a larger sample (Joseph, 1991, cited in Joseph et al., 1992). There was a slight modification from the original scale in the current research, with the term 'deployment' being substituted for 'crisis' for ease of understanding of the research participants. However, analysis indicated that the measure maintained good internal consistency ($\alpha = .82$).

To determine whether individuals were in an intimate relationship, the marital demographic variable was recoded to a dichotomous variable. Individuals in a married, de facto, or long-term relationship were coded as being in an intimate relationship and individuals indicating they were single, divorced, separated or widowed were coded as being without this specific type of structural support. There are other types of structural

support that could have been measured in the research but the length of the survey was limited by military operational constraints.

Statistical Analyses

The analysis was conducted in three stages. The first stage involved descriptive statistics and t-test to determine how representative the sample was of the original population and to investigate changes over time. Correlation analysis was then utilised to establish relationships between all independent variables at four months and the dependent variables at three years, as well as to determine the stability of dependent measures over time. Analysis was performed using SPSS Regression and SPSS Frequencies for evaluation of assumptions. Finally, AMOS 4.01 (Arbuckle & Wothke, 1999) was utilised to model the role of loneliness, social support and level of traumatic exposure in the development of posttraumatic symptoms at three years. Only the total IES score was utilised in the final analysis as the small sample size did not allow modelling of both intrusive and avoidant symptomatology.

Results

Levels of Trauma

On the TSES, the sample reported experiencing high rates of potentially traumatic experiences (refer to Table 1). All participants reported at least one potentially traumatic event with an average of four events.

Level of Distress and Changes Over Time

A t-test revealed that both Rwandan-related PTSD symptomatology and feelings of loneliness remained stable over the three years, and notably did not decrease (refer to

Table 2). A stability analysis for the measures was performed by examining the correlation between the score on each test at different time points, where stability is the degree to which the ordering of individual cases remains stable over time (Dalglish et al., 1996). These analysis revealed significant relationships over time for the IES and UCLA Loneliness Scale (refer to Table 2).

Table 1: Level of Traumatic Exposure Reported

	Study 1 (N=66)	Study 2 (N=75)	
	4 mths	4 mths	6 yrs
Potentially Traumatic Events	%	%	%
In danger of being killed	70.1	75.3	87.3
In danger of being injured	90.6	92.2	94.9
Had to handle dead bodies	66.2	69.2	70.9
Saw dead bodies	93.9	94.9	97.5
Visited refugee camps	80.3	81.0	83.5
Witnessed a hostage situation	28.8	27.8	35.4
Involved in a hostage situation	19.7	23.1	23.1
Witness a motor vehicle accident	74.2	70.9	58.2
Involved in a motor vehicle accident	9.2	9.0	15.2
Heard of a close friend or co-worker being injured or killed	69.7	67.1	72.2
Present when a close friend or co-worker was injured or killed	22.7	15.4	22.8
Fear of exposure to a contagious disease, toxic, agent or injury	78.8	86.1	83.3
Witness to human degradation and misery on a large scale	97.0	96.2	91.0

Table 2: Descriptive Statistics, Stability and Change Analysis

Variable	Stability (r)		Mean 4 mths (SD) N=66 1 yr sample	Mean 3 yr (SD) N=66 1 yr sample	Mean 4 mths (SD) N=79 6 yr sample	Mean 6 yrs (SD) N=79 6 yrs sample	Change (repeated t) 4 mths - 3yr
	3 yr	6yrs					
IES - Total	.56**	.36**	12.41 (13.42)	13.44 (16.80)	12.73 (15.22)	17.38 (18.34)	-.57
IES - Intrude	.41**	.37**	6.74 (7.31)	7.02 (7.73)	6.56 (7.62)	8.94 (9.18)	-.27
IES - Avoid	.62**	.33**	5.67 (6.99)	6.42 (9.85)	6.18 (8.20)	8.44 (9.75)	-.79
Trauma Exposure	-	.62**	16.18 (6.92)	-	16.42 (7.22)	18.71 (7.62)	-
Loneliness	.34**	.42**	36.47 (11.08)	37.13 (13.44)	34.73 (11.05)	39.44 (12.86)	-.38
DS	-	-	29.90 (8.17)	-	28.77 (7.94)	-	-

Note: IES=Impact of Events; IES – Intrude =Impact of Events Intrusion Subscale; IES – Avoid =Impact of Events Avoidance Subscale; Trauma E
Loneliness=UCLA Loneliness Scale; DS=Deployment Support

*p<.05. **p<.01.

Table 3: Cross-sectional and Longitudinal Correlational Analysis

Three Years (N=66)					Six Years (N=75)				
	IES- Total	IES- Intrude	IES- Avoid	Lonely		IES- Total	IES- Intrude	IES- Avoid	Lonely Trauma
Pearson Correlations - Cross-sectional Analysis									
Three Years					Six Years				
IES – Total	1.00				IES – Total	1.00			
IES – Intrude	.97**	1.00			IES – Intrude	.99**	1.00		
IES – Avoid	.90**	.80**	1.00		IES – Avoid	.96**	.92**	1.00	
Lonely	.42**	.40**	.49**	1.00	Lonely	.63**	.63**	.62**	1.00
Trauma	-	-	-	-	Trauma	.35**	.33**	.34**	.15 1.00
Pearson Correlations - Longitudinal Analysis									
Four months									
IES – Total	.49**	.43**	.53**	.22	IES – Total	.34**	.34**	.31**	.30** .02
IES – Intrude	.48**	.42**	.49**	.19	IES – Intrude	.29*	.30**	.26*	.26* -.04
IES – Avoid	.46**	.39**	.53**	.19	IES – Avoid	.38**	.37**	.35**	.33** .13
Trauma	.31*	.33**	.24	.05	Trauma	.34**	.32**	.35**	.26* .62**
Lonely	.25*	.20	.30*	.34**	Lonely	.17	.18	.14	.43** -.13
DS	-.29*	-.29*	-.29*	-.26*	DS	-.12	-.15	-.07	-.30** .05
IR	-.06	-.03	-.08	-.17	IR	.13	.13	.12	.01 .20

Note: IES-Total = Total level of Self Reported Rwanda Related PTSD; Trauma= Total on the Traumatic Stress Exposure Scale; Lonely=UCLA Loneliness Scale; DS=Deployment Support Scale; *p< .05. **p<.01.

Predictors of Distress

Bivariate correlations for the dependent and all independent variables were computed and are summarised in Table 3. Logarithmic transformations were performed for the means of the IES and UCLA Loneliness Scale due to severe positive skew (Tabachnick & Fidell, 2001). Analysis revealed a significant correlation between

posttraumatic symptoms, level of trauma exposure, loneliness and deployment support measured at four months and subsequent posttraumatic symptoms at three years. Only the presence of an intimate relationship at four months was not related to posttraumatic symptoms at three years. There was also a strong relationship between the level of loneliness at three years and posttraumatic symptoms at three years.

Modelling Predictors at Three Years

The hypothesised model derived from previous research with Rwandan veterans (Hodson et al., in press), theoretical considerations and the current correlational analysis (summarised in Figure 1) were tested. No multivariate outliers were identified and transformations had ensured multivariate normality and linearity assumptions were met. Maximum likelihood estimation was employed in all models and, consistent with suggestions by Bollen and Long (1993), a range of fit indices was utilised to determine the adequacy of model fit. Analysis of the hypothesised model provided a good fit of the data, $\chi^2(12, N=66)=7.22, p=.84$, with a Goodness-of-Fit Index (GFI) of .97, Tucker-Lewis Index (TLI) of 1.08 (this index is particularly robust in relation to sample size (Marsh et al., 1988)), Comparative Fit Index (CFI) of 1.00 and Root Mean Square Error of Approximation (RMSEA) of .00.

A non-significant path between loneliness at four months and posttraumatic symptoms at three years was removed as a post hoc modification. The model (summarised in Figure 2) resulted in a slight loss in fit, but was still a good representation of the data, $\chi^2(13, N=66)=8.76, p=.79$, across all indices: the GFI was .96, the TLI was 1.06, the CFI was 1.00, and RMSEA was .00. The squared multiple correlations for the endogenous variables were .28 for PTSD at four months, .36 for

posttraumatic symptoms at three years, .56 for loneliness at four months and .12 for loneliness at three years.

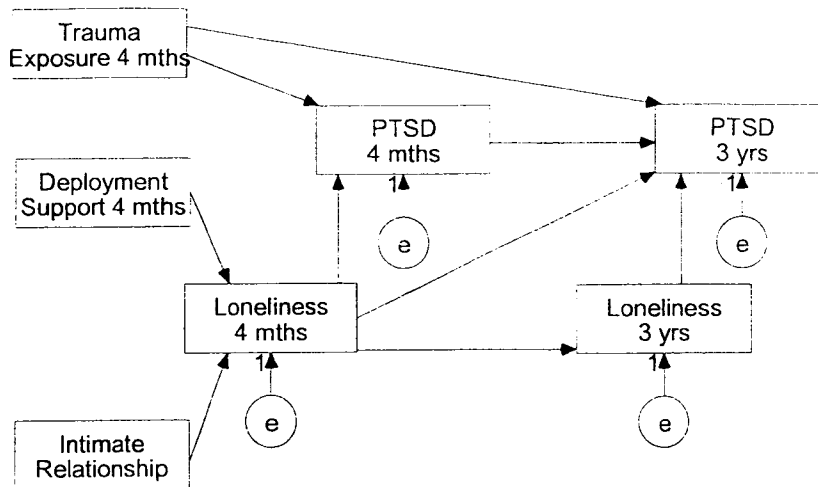


Figure 1: Theorised Longitudinal Model (showing standardised regression weights for significant paths)

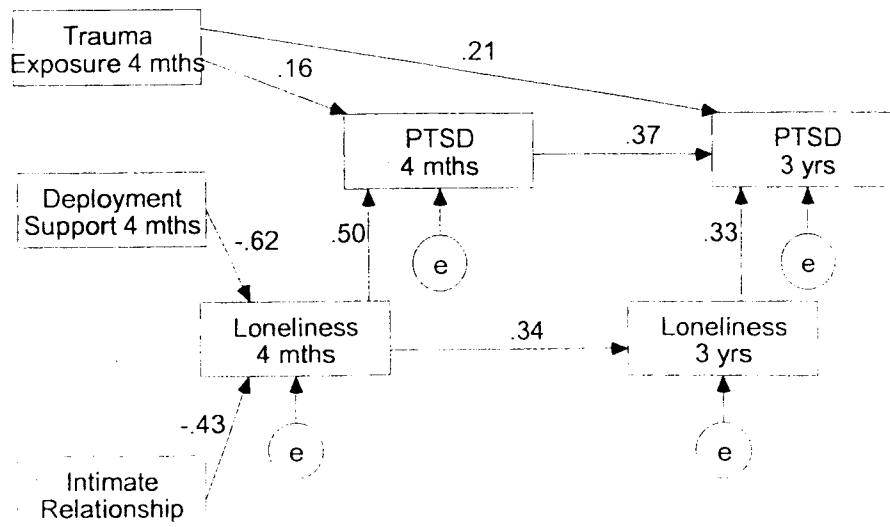


Figure 2: Longitudinal Model (showing standardised regression weights for significant paths)

A final check on the impact of the distribution of the data in the model was investigated by conducting an analysis with untransformed variables utilising unweighted least squares analysis, as this approach takes into account deviations from normality (Anderson & Gerbing, 1988). The alternative analysis confirmed all pathways and the only noteworthy difference was a stronger relationship between level of traumatic exposure and posttraumatic symptomatology at four months and three years ($Beta=.27$ and $.24$ respectively).

In line with recommended procedures for modelling, two theoretically relevant alternative models were tested to determine if they would provide a better fit for the data (Schumacker & Lomax, 1996). The first model stated that there are only direct effects from deployment support and intimate relationships to posttraumatic symptoms at four months and three years and that they are not mediated by loneliness, $\chi^2(13, N=66)=8.76, p=.79$, with a GFI of .96, TLI of 1.06, CFI of 1.00, and RMSEA of .00. The second model stated that loneliness is mediated by deployment support and an intimate relationship, $\chi^2(11, N=66)=60.92, p=.00$, with a GFI of .84, TLI of .11, CFI of .53, and RMSEA of .26. Neither of these alternative models provided a better fit for the data.

Discussion

The Rwandan veterans reported a range of potentially traumatic stimuli and consistent with previous research with this sample reported high levels of posttraumatic symptomatology as measured by the IES (Hodson & Rapee, 2002a). Of particular interest is the fact that symptomatology did not decrease over the three-year period but had a non-significant upward trend.

The proposed model was partially supported, with level of traumatic exposure and posttraumatic symptomatology predicting distress at three years. There was, however, only an indirect relationship between loneliness at four months and posttraumatic symptoms at three years, through loneliness at three years. It is important to note that, consistent with the hypothesised model, loneliness at four months mediated the effects of support (both deployment and intimate) and that there was a significant relationship between loneliness at three years and posttraumatic symptoms at three years. Thus, while loneliness is not a direct predictor of chronic distress it seems to have an impact on the maintenance of symptoms.

The strong cross-sectional relationship between loneliness and posttraumatic symptoms at both four months and three years supports our earlier proposal that when screening for PTSD symptomatology, clinicians need to consider not only the level of trauma and current symptomatology, but the perceived connection with, and feelings towards, current social networks (Hodson & Rapee, 2002a).

Study Two – Prediction to Six Years

Thompson (1991) has argued that care must be taken in interpreting results from partial samples in trauma research as they might underestimate the effect of disaster, as he proposes that individuals with most severe post-traumatic responses are likely not to reply. A concern in the early stages of this research was that individuals remaining in the service would be the easiest to track and therefore most likely to remain in the sample, while the individuals with the most severe symptomatology were the most likely to discharge. Therefore rather than simply following up the 78 personnel from the three-year time point, a search for the original 290 personnel was conducted at six years, in order to maximise the ability to generalise findings and minimise sample bias.

This resulted in a sample of 118 personnel (41%), 80 (28%) of whom could be matched across the four month and six-year time points; of these 55 had participated in the first study.

The focus of this current study was to replicate and extend the findings from three years to six years. Specifically, a model was proposed in which loneliness at four months would influence posttraumatic symptoms at six years and would mediate the effect of social support. Finally, the research attempted to replicate previous findings that recall of traumatic exposure is not consistent over time and may be influenced by symptom severity, while investigating the potential impact of social variables on this relationship.

Method

Participants

Participants in study two had a mean age of 29.87 (6.11) years and 85% of the sample was male. Forty-six percent were Private or Corporal equivalents, 23% were Sergeant or Warrant Officer equivalents and 31% were Officers. On the deployment 34% had served in the Medical Company, 21% had served in the Infantry Company, 18% had served in Operational Support and 26% in Headquarter Elements. Independent *t* tests and chi-squared analysis revealed no significant differences between the samples in study one or two on these demographic variables. There was also no significant difference between the means of the samples on any of the dependent or independent measures given at four months.

Procedure

The only change in the methodology for the six-year time point from the three-year data collection was the inclusion of additional measures. The addition of relevance to this analysis was the re-inclusion of the TSES. Additionally the same strategy for analysis of the data was employed in study one as study two.

Results

Levels of Trauma

At four months both samples reported the same levels of traumatic exposure (refer to Table 2). However, there was a significant difference between the levels of traumatic exposure in the second study between four months and six years, with participants reporting more events at six years (refer to Tables 1 & 2).

Level of Distress and Changes Over Time

T-tests also revealed that both Rwandan-related PTSD symptomatology and feelings of loneliness significantly increased from four months to six years, while analysis of the subscales suggested that the increase was in intrusive symptoms (refer to Table 2). A stability analysis for the measures revealed significant relationships over time for the IES, UCLA Loneliness Scale and Traumatic Stress Exposure Scale (refer to Table 2).

Of note in the cross-sectional correlational analysis is the very high correlation at six years between intrusive and avoidant symptoms.

Predictors of Distress

Bivariate correlations for the predictor variables at four months and six years with the outcome variable at six years were computed and are summarised in Table 3. As in study one, a logarithmic transformation was used on the IES and UCLA Loneliness Scale due to severe positive skew. PTSD symptoms and trauma exposure at four months were related to six-year PTSD symptoms. Loneliness at four months was correlated with loneliness at six years and loneliness at six years was strongly related to PTSD symptoms at six years. Of note was the significant correlation between trauma exposure at six years and PTSD symptoms at six years, especially in light of the increase in reporting of traumatic exposure over the time period.

Modelling Predictors at Six Years

The hypothesised model derived from study one, theoretical considerations and correlational analysis (summarised in Figure 3) were tested. One multivariate outlier was identified and removed. Maximum likelihood estimation was employed in all models. Analysis of the hypothesised model provided an acceptable fit of the data, $\chi^2(16, N=79)=23.05$, $p=.11$, with a GFI of .93, TLI of .93, CFI of .96 and RMSEA of .08.

Post hoc modifications were performed to develop a better fitting and more parsimonious model. Three non-significant paths were removed from the model and on the basis of theoretical considerations and modification indices two paths included (from loneliness at four months to level of trauma exposure at six years and from level of trauma exposure at four months to loneliness at six years). The model (summarised in Figure 4) resulted in a good fit of the data, $\chi^2(17, N=79)=15.26$, $p=.58$, across all indices: the GFI was .96, the TLI was 1.02, the CFI was 1.00, RMSEA was .00 and all

paths were significant. The squared multiple correlations for the endogenous variables were .25 for PTSD at four months, .47 for PTSD at six years, .55 for loneliness at four months, .21 for loneliness at six years and .43 for level of trauma exposure at six years.

To further explore the relationship between trauma exposure and PTSD symptomatology a non-recursive model in which a feedback loop between PTSD symptomatology and trauma exposure was included. This analysis had the additional advantage of allowing investigation of the effect of the small sample size, as it produces a stability index. If the model is stable the sample is large enough to produce accurate estimates of the regression weights (Arbuckle & Wothke, 1999). The resulting model was stable and an adequate fit of the data, $\chi^2(16, N=79)=12.448, p=.71$, with a GFI of .96, TLI of 1.03, CFI of 1.00, and RMSEA of .00. Most noteworthy in the model was a non-significant path from PTSD symptoms to level of trauma exposure ($Beta=.01$) but a significant path from trauma exposure to PTSD ($Beta=.24$).

Two theoretically relevant alternative models were tested to determine if they would provide a better fit for the data. Due to the unforeseen relationship between loneliness and trauma exposure the possible relationships between these variables were further explored. The first model stated that there were direct effects from loneliness at four months to trauma exposure at four months and loneliness at six years to trauma exposure at six years, $\chi^2(15, N=79)=11.15, p=.74$, with a GFI of .97, TLI of 1.04, CFI of 1.00, and RMSEA of .00. The second model tested the alternative possibility that there were direct effects between trauma exposure at four months and loneliness at four months and trauma exposure at six years and loneliness at six years, $\chi^2(15, N=79)=11.49, p=.72$, with a GFI of .96, TLI of 1.04, CFI of 1.00, and RMSEA of .00. Both of these alternative models provided a better fit for the data. However, none of the additional pathways were significant.

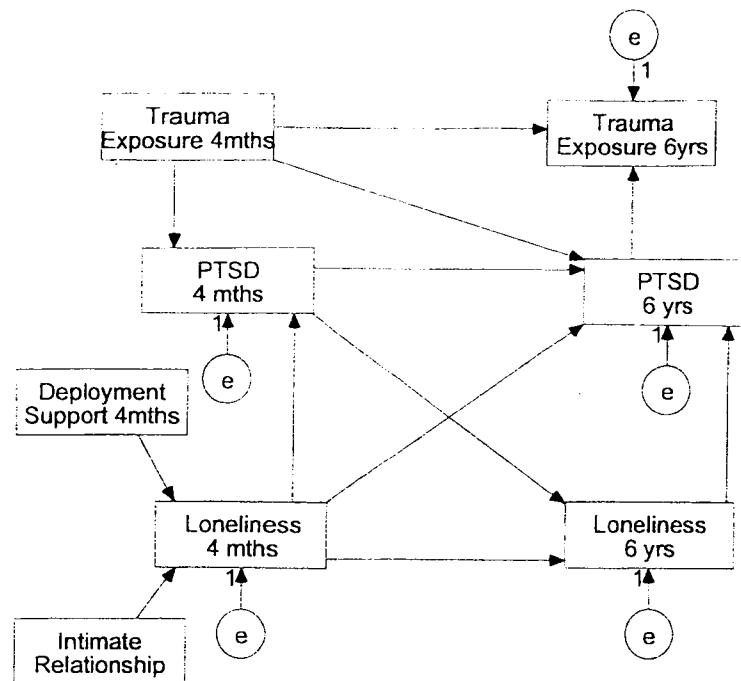


Figure 3: Theorised Longitudinal Model (showing standardised regression weights for significant paths).

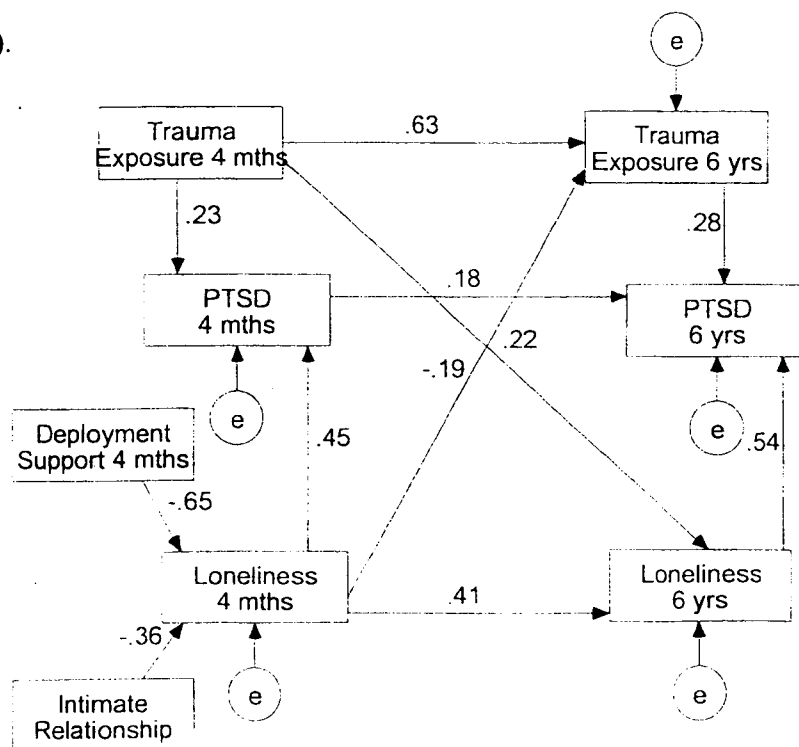


Figure 4: Longitudinal Model (showing standardised regression weights for significant paths).

Discussion

Descriptive statistics indicated that the level of posttraumatic symptomatology measured by the IES increased significantly from four months to six years. There is considerable variation in literature when reporting levels of longitudinal distress (MacFarlane & Yehuda, 1996; Yule et al., 1999). Some populations show a decrease in PTSD symptoms over time, for example, disaster victims (Dalglish et al., 1996), fire fighters (McFarlane, 1992) and armed robbery victims (Richards, 2000). While other populations maintain high levels of distress, for example, rape victims (Kilpatrick, Saunders, Veronen, Best, & Von, 1987) and survivors of the Buffalo Creek dam collapse (Green, Grace, Lindy, Gleser, & et al., 1990a).

One possible explanation for these differing results is the nature of the stressors being measured. Previous epidemiological research has indicated that the type of traumatic event impacts on subsequent PTSD symptomatology (Breslau, 1998; Creamer et al., 2001). In this instance the increase in symptoms over time may be a function of the severity of the stressors and the fact that this research is investigating the impact of multiple traumatic events over a six-month period in an environment of chronic stress.

Alternatively modelling of variables suggested that the increase in symptomatology may be at least partially explained by an increase in the reporting of traumatic experiences and that recall may be facilitated by involvement in social networks. Of particular note was a significant increase in the reporting of level of traumatic exposure and the fact that this increase was significantly correlated with an increase in symptomatology. This potential instability in the reporting of traumatic memory was first document by McFarland (1988) in his work with fire fighters. Modelling revealed that reported traumatic exposure predicts symptomatology but that symptomatology does not increase the reporting of events. This finding supports the

traditional unidirectional relationship between level of traumatic exposure and symptomatology, but also supports recent proposals (e.g. Roemer et al., 1997) that the relationship cannot be explained by a simple dose-response theory, as the reporting of traumatic memory is not a constant. However, it needs to be highlighted that the small number of variables in the current model limits the strength of this finding in the research. It may be that there are a variety of unassessed third variables that account for the changes reported (e.g. treatment seeking status or compensation situation). Further work needs to replicate the current findings before any firm conclusion can be drawn.

Related to this is the unexpected but noteworthy finding in the model of a negative relationship between feelings of loneliness at four months and level of traumatic exposure at six years. This finding suggests that within the sample there are two potential pathways to posttraumatic symptoms. In the first path, lack of connection with support leads to greater feelings of dissatisfaction with social networks and subsequent symptomatology, while in the second path accessing support may trigger increased processing of traumatic material, which in turn leads to increased symptomatology.

General Discussion

The modelling of variables in the two studies replicated and extended previous work by Hodson and Rapee (2002a) investigating the role of psychosocial variables and level of traumatic exposure in the development and maintenance of chronic symptomatology. Longitudinal analysis indicated that in the development and maintenance of chronic PTSD symptoms there are two possible pathways to distress and highlighted the danger in advocating unqualified use of support networks. In the first pathway lack of connection with support leads to greater feelings of isolation and

dissatisfaction with social networks, which in turn was significantly related to PTSD symptomatology.

Alternately, in the second path a strong connection with support may trigger an increase in the processing of traumatic material, which in turn leads to increased symptomatology. The second path is consistent with research with Vietnam veterans and Israeli combat soldiers (Shalev, 2000) that has shown that joining a veteran peer group can generally allow individuals to normalise symptoms but in some instances may lead to re-exposure or further catastrophising of the event. It is also consistent with a study of National Guard disaster workers who attended a major air disaster in Sioux City (US), where talking about the event with social supports at two months was related to higher intrusive PTSD symptoms at seven months (Ursano et al., 2000). These findings highlight the potential for social support to be both a protective and risk factor in the development and maintenance of chronic problems.

The finding that psychosocial factors can have both a positive and negative impact on symptomatology has theoretical implications as it suggests that social support needs to be considered as having the potential to increase both vulnerability and resilience. This needs to be incorporated into etiological models in the area. (e.g. see McFarlane & Yehuda, 1996; Joseph, 1999b). The role of loneliness in mediating between variables in this research also highlights the importance of not only identifying potential risk factors but also the mechanism by which they influence adaptive processes (Litz et al., in press).

The research also demonstrates the importance of conceptualising risk factors and mechanism within a temporal framework. At least in this population, psychosocial factors in the first twelve months acted in a protective role but by six years had the potential to be both a positive and negative influence. Joseph (1999b, p. 77) suggests

that, similar to research in the area of coping and stress, it may be possible to conceptual support as ‘an unfolding process’ requiring different types of support at different stages of the adaptive process.

While the predictive value of PTSD symptomatology for chronic distress was not a primary focus of the research, it needs to be acknowledged that similar to other longitudinal research (Koren, Arnon, & Klein, 2001; Michultka et al., 1998), the strongest longitudinal predictor of distress at both three and six years was the level of PTSD symptomatology at four months. Therefore any screening or acute intervention protocol for chronic distress in troops returning from deployment, needs to include psychosocial factors, reported level of traumatic exposure and PTSD symptomatology.

In addition, it is worth highlighting the increasing correlation over the six years between intrusive and avoidant symptomatology. Previous research with disaster survivors has suggested that, at least initially, both intrusion and avoidance symptomatology are dissociated (Dalglish et al., 2000; Williams, Hodgkinson, Joseph, & Yule, 1995). However, the current results add support to previous authors suggesting that these factors become increasingly interrelated over time (Zilberg et al., 1982). In turn, this finding raises questions regarding the consistency of the two-factor structure of the IES over time. There is considerable debate in the literature about the defining symptom clusters of the diagnosis of PTSD and the stability of the factor structure of the IES (Amdur & Liberson, 2001; Dalglish et al., 2000; Joseph, 2000; McDonald, 1997). It may be that the current and previous finding are confounded by the current clustering of symptoms and warrant replication and further investigation with alternative PTSD scales or with more recently developed versions of the IES (Weiss, 1997).

A primary limitation of both studies was the small sample sizes. While the numbers are consistent with other published longitudinal studies (Kleber & Brom, 1992), findings can only be treated as exploratory and this limits the scope of the analyses. The small sample size did not allow cross-validation of the model, which would have significantly strengthened the confidence that the model is a reliable fit of the data (Tabachnick & Fidell, 2001). The current findings would also be strengthened through replication in larger populations that allowed cross-validation and modelling of specific types of symptomatology (i.e. intrusion, avoidance and hyperarousal).

Care also must be taken in interpreting inferences as all the measures were self-report and there was no measure of support or loneliness before the deployment. It may be that individuals were dissatisfied prior to the deployment or that loneliness is strongly related to personality constructs such as neuroticism (McFarlane, 1989). Additionally, prospective research needs to be conducted to determine whether experience of the trauma itself results in this internal distress or disconnection. It may be those feelings of alienation and disconnection resulting from PTSD symptomatology could influence one's satisfaction with and utilisation of social support networks. Future research needs to resolve these issues surrounding potentially reciprocal relationships in the model. Finally, the findings may not generalise beyond military populations (Ursano et al., 2000) due to the potential for organisational bias (e.g. gender and intellectual profile) and future studies need to examine similar models in non-military populations.

Despite these qualifiers, the findings of the current research raise interesting directions for future research and may have implications for the management of personnel following deployments. These studies provide the first longitudinal analysis of Australian military peacekeepers and demonstrate factors at four months post

deployment that are predictive of long-term symptomatology and that should be considered in any acute interventions or screening processes.

CHAPTER FOUR

THE EFFECT OF TRAUMA HISTORY ON MISSION-SPECIFIC CHRONIC POST- TRAUMA SYMPTOMS IN MILITARY PEACEKEEPERS – INOCULATING OR SENSITISING?

Abstract

Previous research has indicated that high rates of chronic post-traumatic symptomatology in military personnel exposed to multiple traumatic events over a six-month period on a peacekeeping mission may be related to perceived levels of traumatic exposure and feelings of loneliness at six years. However, the measurement of Rwanda-related symptoms and predictive variables at six years might be confounded by the effect of exposure to other potentially traumatic events. A cross-sectional study was conducted with 118 Rwanda veterans to investigate the impact of other potentially traumatic events, subsequent deployments, employment category and current service status. Results indicated that lifetime trauma exposure was not confounding measures of chronic symptomatology, and that employment category and status affected symptomatology. The findings are discussed in relation to their impact on an inoculation versus sensitising hypothesis to explain adaptation to potentially traumatic life experiences.

Research has shown high rates of post-trauma distress in Australian military peacekeepers who served with a mission to Rwanda (Hodson & Rapee, 2002a, 2002b). These findings are consistent with other military peacekeeping research where veterans exposed to potentially traumatic events while on deployment show significant levels of distress (Ward, 1997; Litz, King et al., 1997). However, the findings in these studies may be distorted by the cumulative effect of traumatic exposure across the individual's lifetime.

Recent research by Bolton, Litz, Britt, Adler and Roemer (2001) found high rates of exposure to potentially traumatic events in personnel preparing to deploy on a peacekeeping mission. Of the 2,947 military personnel assessed, 74% indicated prior exposure to a potentially traumatic event and 6% reported clinically concerning levels of PTSD. These authors speculate that the consistent finding of a relationship between level of traumatic exposure and subsequent symptomatology in previous peacekeeping research may be inflated by individuals' prior trauma histories.

Currently there is conflicting evidence surrounding the effect of prior exposure on subsequent trauma exposure (Dougall et al., 2000), and only limited research in the area (Breslau et al., 1999). Current evidence supports both a sensitising and inoculating effect. Research with emergency services personnel usually has suggested that multiple trauma exposures can result in an inoculating effect whereby the individual develops resilience over time (Hyttén & Hasle, 1989; Weiss et al., 1995). However, this conclusion is based on findings that more experienced workers show lower rates of distress. It may in fact be that individuals, who are unable to cope, self-select out of the employment area, or alternatively, that the impact of multiple exposures is being mitigated by selection, training or age (Brunet et al., 2001; Leffler & Dembert, 1998).

Other research favours the contrasting sensitisation hypothesis. Epidemiological work has shown a strong relationship between cumulative exposure and subsequent distress (Bolton et al., 2001; Kessler et al., 1995; Resnick et al., 1995). Previous studies with Vietnam veterans have shown that a history of prior childhood trauma was associated with the development of PTSD after combat exposure (Bremner et al., 1993; Zaidi & Foy, 1994), and work with rape victims suggests prior traumatic exposure is a risk factor for subsequent distress (Foa & Riggs, 1993). Similarly, more recent research with emergency workers after an airline disaster suggested that accumulation of a variety of potentially traumatic events appeared to sensitise workers to the disaster situation and to perpetuate chronic symptomatology over a twelve-month period (Dougall et al., 2000).

Work with a population of 2,181 participants in the Detroit area of the United States by Breslau, Chilcoat, Kessler and Davis (1999) has shown that previous exposure to trauma increased the PTSD-eliciting effects of subsequent trauma. Additionally, this study identified that multiple events had a stronger effect than single events and that the effect of being assaulted persisted over time with little change, but the effects of exposure to other traumatic events decreased. Consistent with previous findings, they also found that the experience of some forms of assault in childhood was a major risk factor for distress after a traumatic event as an adult.

Researchers are increasingly investigating the longitudinal course of risk factors for posttraumatic symptomatology and how these factors vary over time (for a review see McFarlane & Yehuda, 1996; Yule et al., 1999). However, these studies rarely control for the confounding influence of prior or subsequent potentially traumatic exposure. It may be that the predictive value of level of traumatic exposure and other vulnerabilities is being confounded by distress from other events. Hodson and Rapee

(2002b), for example, have found a relationship between the reported level of traumatic exposure and feelings of loneliness. It may be that feeling dissatisfied with, or unconnected from, social networks is not only related to experiences in Rwanda but also influenced by other traumatic events.

Additionally, if prior trauma does influence symptomatology then subsequent events in longitudinal research may also confound reported results, especially if these events occur on in a deployed environment. Interestingly, however, research by Huffman, Adler and Castro (1999) with American military personnel returning from the peacekeeping service in the former Yugoslavia found significantly higher PTSD and depression scores for personnel on their first deployment in comparison to personnel on their second or third. However, the difference between the groups decreased as the length of deployment increased and this finding was with personnel deployed in a low-intensity environment and in a relatively stable environment. The effect could be very different for personnel deployed on missions with high levels of traumatic exposure in an unstable environment. Additionally, as discussed with emergency services personnel, it may be that personnel who coped previously remain in the services and are subsequently redeployed. The possible effect of employment status is also worth investigating.

A related area that has not been researched to date is the impact of employment category, especially in military populations. Different occupational groups are exposed to potential traumatic events as part of their training (medical personnel, for example). This controlled exposure may in fact have an inoculation effect and influence why experienced personnel show less distress. However, other aspects of the experience of different occupational groups such as attitude, type of training, or degree of perceived control may also influence subsequent traumatisation. Typically, emergency services

and military personnel report lower levels of distress than civilian samples (Hodson & Rapee, 2002b). However, there has been very little research into the effects of exposure to potentially traumatic events on different professional groups within these services.

Therefore the aim of this study was to conduct an exploratory analysis into the effect of exposure to other potentially traumatic events on the reporting of chronic symptomatology for a specific event. Primarily, the study attempted to investigate whether other potentially traumatic events confound or distort the reporting of Rwanda-related symptomatology at six years. This was achieved by assessing whether the previous findings of Hodson and Rapee (2002b) (that level of traumatic exposure and feelings of loneliness are predictive of distressing symptomatology) were confounded by exposure to non-Rwanda traumatic events. Assessed symptomatology included PTSD symptoms, general mental health and alcohol abuse. Additionally, an analysis was conducted to explore the possible sensitising effect of subsequent deployments and employment status, and the potentially inoculating benefit of employment category.

Method

The Mission

Australia was one of seventeen nations that contributed to the United Nations armed peacekeeping force to assist the war-torn country of Rwanda. Half a million people had just perished in a brutal civil war in Rwanda and the country was extremely unstable. In all 616 Australian Defence Force personnel served as part of two contingents, each spending up to six months in country. The second contingent, the focus of this research, left for Rwanda on 19 February 1995 and returned to Australia on 24 August 1995. Previous research with this population has shown that these individuals faced multiple potentially traumatic experiences including: fearing death

and injury, seeing and handling dead bodies, exposure to contagious diseases and toxic agents, involvement in hostage situations, and witnessing human misery on a massive scale (for a detailed description see Hodson & Rapee, 2002b).

Procedure

This study formed part of a longitudinal investigation into the effects of operational deployment on Rwandan veterans (Hodson et al., in press). Similar to previous time points, participants completed a mail-out survey. The battery of self-report questionnaires included measures of: Rwandan-related PTSD symptomatology, current level of general mental health, alcohol use, the level of traumatic exposure experienced while on deployment, life-time level of trauma exposure (excluding Rwanda), and current feelings of loneliness.

Participants

Three hundred and twelve personnel from the second contingent were sent the survey, to which 117 responded, a return rate of 37%. Participants had a mean age of 28.84 (6.04) years at time of deployment and 87% of the sample was male. Twenty-four percent were Private or Corporal equivalents, 52% were Sergeant or Warrant Officer equivalents and 24% were Officers. On the deployment 32% had served in the Medical Company, 29% had served in the Infantry Company, 16% had served in Operational Support and 23% in Headquarter Elements. Independent t-tests and chi-squared analysis revealed that the sample matched the original 312 personnel surveyed on all demographic variables.

Measures

Questions were designed to capture demographic data including: age at time of deployment, rank, gender, employment category, current status of service (serving or discharged), the number of subsequent deployments and unit type.

PTSD – Post-trauma symptomatology was measured by the Impact of Events Scale (IES) (Horowitz et al., 1979; Zilberg et al., 1982), a fifteen-item scale utilised widely in trauma research that assesses posttraumatic symptomatology for a specified life experience. Previous studies have demonstrated that the scale has good psychometric properties (Horowitz et al., 1979; Zilberg et al., 1982; Dalgleish et al., 2000; McDonald, 1997) and is useful with military populations (Schwarzwald et al., 1987). Consistent with previous research the scale in this sample had satisfactory internal reliability (Cronbach's alpha = .95 for the total IES, .92 for the intrusion subscale and .90 for the avoidance subscale).

It should be noted that, due to the fact that the IES was developed before the Diagnostic and Statistical Manual of Mental Disorders PTSD category, it only measures two of the current defining symptom clusters (intrusion and avoidance) (Joseph, 2000). However, research has shown that the total IES score has adequate convergent validity with the more recently developed Mississippi and MMPI PTSD scales (Amdur & Liberson, 2001) and has good sensitivity to PTSD (McFall et al., 1990; Neal et al., 1994). A cut-off score on the IES between 30 and 35 is considered a conservative estimate of likely PTSD (Neal et al., 1994; Harrison & Kinner, 1998). There is currently some debate in the literature about the stability of the subscales; however, the scales are reported here in their original format to maximise comparability with other populations (Amdur & Liberson, 2001; Andrews et al., in press; Dalgleish et al., 2000; Joseph, 2000; McDonald, 1997).

General Mental Health - The level of general psychological/psychiatric 'wellness' was measured by the General Health Questionnaire – 12 (GHQ-12) (Goldberg, 1972). This measure that has been found to be an effective measure of mental health in Australian community-based samples (Korten & Henderson, 2000).

Alcohol Use - The AUDIT, a screening instrument developed by the World Health Organisation, was utilised to determine alcohol use (Saunders, Aasland, Amundsen, & Grant, 1993; Saunders, Aasland, Babor, de la Fuente et al., 1993). A score above eight indicates hazardous or harmful alcohol use and accurately predicts DSM-III-R or ICD-10 criteria for alcohol dependence (Allen, Litten, Fertig, & Babor, 1997).

Level of Traumatic Exposure - Level of trauma exposure was measured by the Traumatic Stress Exposure Scale (TSES), which was developed specifically for this research. The scale was based on several generic stressor categories suggested by Green (1990b) and potentially traumatic events identified by clinicians, after psychologically debriefing the first contingent immediately before their return to Australia (for details see Hodson & Rapee, 2002b). Participants indicated the frequency of exposure to thirteen potentially traumatic events on a five-item scale (never, rarely, occasionally, often, very often), if the individual indicated never on the scale the event was judged not to have occurred.. The mean of the responses to the thirteen items gave the overall score. Initial analysis of the scale's psychometric properties suggests adequate test-retest reliability ($r_s = .68$) over a three-week period and sound criterion validity (Hodson & Rapee, 2001). The Cronbach's alpha for this sample was .78.

Lifetime Trauma Exposure - The Traumatic Life Events Questionnaire (TLEQ) is a brief self-report measure that assesses exposure to twenty potentially traumatic events (Kubany et al., 2000). Research with a number of different populations has shown the questionnaire to have good temporal stability and strong validity (Kubany et

al., 2000). The measure assesses both frequency of events (DSM-IV stressor criterion A1) and reactions of intense fear, helplessness or horror (DSM-IV stressor criterion A2). However, only the frequency scale was utilised in this research in order to allow comparability with the Traumatic Stress Exposure Scale that only assesses frequency of events. It is important to note that participants were instructed to exclude experiences from Rwanda.

Loneliness - - The degree of internal distress or lack of connection with support was gauged from responses to the revised UCLA Loneliness Scale (Russell, Peplau, & Cutrona, 1980). This one of the most widely utilised and best researched tools for measuring loneliness available (Hartshorne, 1993) and was chosen for this study to maximise the ability to extend the research of Solomon, Waysman, and Mikulincer (1990) with Israeli veterans. It is a twenty-item scale reflecting both satisfaction and dissatisfaction with social networks. It has sound psychometric properties with alphas typically reported as .90 or above (Hartshorne, 1993). A strength of the scale is that it does not directly measure states that an individual may label as lonely, but attempts to measure what a researcher would operationalise as lonely (Hartshorne, 1993).

Statistical Analyses

The analysis was conducted in three stages. The first stage involved descriptive statistics and independent *t*-tests to determine differences between the key demographic variables (employment category, current status and subsequent deployments). A correlation analysis was then conducted to establish relationships between variables. Finally, sequential regressions were utilised to determine whether level of reported traumatic exposure in Rwanda or feelings of loneliness remained significant predictors of distress, after controlling for the effect of lifetime traumatic exposure and to

investigate any potential interaction. Analysis was performed using SPSS Regression and SPSS Frequencies for evaluation of assumptions.

Results

Levels of Distress

Twenty-six percent of the sample had discharged from military service at time of survey. As summarised in Table 1, independent *t*-tests revealed significantly higher symptomatology in personnel who had left the services on the measures of general mental health, PTSD symptomatology and feelings of loneliness, but not for lifetime trauma exposure, reported traumatic exposure in Rwanda and alcohol use.

Forty-nine percent of the sample had been deployed at least once since returning from service in Rwanda. However, there was no significant difference between this group and individuals who had not been on a subsequent deployment on any of the outcome measures.

Finally, 30% of the sample was Infantry, 27% was Medical and 57% were from a mixture of other corps. A comparison of Medical and Infantry revealed significant differences between the two employment categories on measures of psychopathology (refer to Table 1). Infantry personnel reported higher total IES scores, higher avoidant symptomatology and higher alcohol use, but no differences in the levels of Rwanda or lifetime traumatic exposure.

Table 1: Univariate Analysis of Employment Category, Subsequent Deployment and Continued Service

	Infantry N=65	vs Medical N=65	t	Deployed N=115	vs Not Deployed N=115	t	Serving N=114	vs Discharged N=114
GHQ - 12	12.94 (7.12)	10.37 (4.35)	-1.80	11.34 (5.08)	12.30 (7.1)	.81	10.88 (4.74)	14.97 (7.12)
IES-Total	25.53 (20.24)	15.46 (18.32)	-2.14*	16.87 (15.15)	19.74 (21.70)	.79	15.80 (16.72)	27.1 (20.24)
IES - Intrusion	13.34 (10.33)	8.57 (9.96)	-1.93	9.02 (7.72)	10.25 (11.20)	.66	8.17 (8.44)	14.57 (10.33)
IES - Avoidance	12.19 (10.88)	6.89 (9.09)	-2.17*	7.84 (8.18)	9.49 (11.32)	.87	7.62 (9.03)	12.53 (10.88)
AUDIT	11.40 (7.48)	7.35 (8.44)	-2.07*	8.85 (6.65)	8.06 (7.80)	-.57	8.06 (6.34)	9.21 (7.48)
TLEQ	4.76 (2.81)	5.43 (2.86)	.99	4.62 (2.94)	5.15 (2.74)	1.00	5.01 (2.93)	4.383 (2.81)
TSES	22.36 (5.96)	19.85 (8.21)	-1.43	19.92 (7.27)	18.97 (7.35)	-.69	20.12 (6.98)	17.47 (5.96)
Lonely	41.51 (14.71)	38.47 (12.30)	-.92	39.42 (13.08)	38.75 (13.28)	-.27	37.41 (11.92)	43.98 (14.71)

Note: GHQ-12=General Health Questionnaire – 12; IES-Tot=Total Impact of Events; IES-I=Impact of Events Intrusion Subscale; IES-A=Impact of Event Avoidance Subscale; TSES=Traumatic Stress Exposure Scale; UCLA Lonely=UCLA Loneliness Scale; AUDIT=Alcohol Scale; TLEQ=Traumatic Life Events Scale; TSES=Traumatic Stress Exposure Scale

Table 2: Correlation Matrix for Variables included in Linear Regression Analyses

	GHQ	IES	IES	IES	AUDIT	TLEQ	TSES	Lonely	Employ	
Deploy	-12	Tot	- I	- A						
Pearson Correlation										
GHQ-12	1.00									
IES – Tot	.60**	1.00								
IES – I	.60**	.97**	1.00							
IES – A	.61**	.95**	.88**	1.00						
AUDIT	.34**	.15	.20*	.15	1.00					
TLEQ	.14	.21*	.21*	.24*	.03	1.00				
TSES	.21*	.36**	.34**	.34**	.19*	.22*	1.00			
Lonely	.58**	.65**	.65**	.67**	.18	.15	.13	1.00		
Employ	.19	.25*	.25*	.26*	.30*	-.12	.17	.11	1.00	
Deploy	-.05	.04	.05	.01	.09	-.09	.06	.03	.11	1.00
Service	-.25**	-.16	-.19*	-.15	-.02	.03	.16	-.22*	.19	.34**

Note: GHQ-12=General Health Questionnaire – 12; IES-Tot=Total Impact of Events; IES-I=Impact of Events Intrusion Subscale; IES-A=Impact of Events Avoidance Subscale; AUDIT=Alcohol Scale; TLEQ=Traumatic Life Events Scale; TSES=Traumatic Stress Exposure Scale; Lonely=UCLA Loneliness Scale; Employ=Employment Category; Deploy=Subsequent Deployment; Service=Status of Service; *p< .05. **p<.01.

Predictors of Distress

Bivariate correlations for the predictor variables with the outcome variables were computed and are summarised in Table 2. A square root transformation was used for the measures of general mental health and alcohol use, due to a moderate positive skew, while a logarithmic transformation was utilised for the intrusive and avoidant subscales of the IES due to severe positive skew (Tabachnick & Fidell, 2001). One case was removed due to missing data, but no outliers were identified. The correlational analysis revealed significant relationships between PTSD symptomatology

and both reported lifetime traumatic events and traumatic events in Rwanda. These relationships were explored further in the subsequent sequential regression analyses. However, it should be noted that only the demographic variable of current service status (i.e. serving or discharged) was included in the regressions analysis. Subsequent deployment was not significant so there was no need to control for this variable. Employment category was significantly correlated to a number of the symptom measures, but the smaller sample size ($N=66$) would have affected the power of the analysis.

General Mental Health - Utilising likert scoring the sample had a mean of 11.91 (SD 6.34) on the GHQ-12. As summarised in Table 3, the combination of variables was significant in predicting general mental distress as measured by the GHQ-12. Employment status in step one resulted in a significant change in R^2 , but only accounted for 4% of the variance, $R^2=.039$, $F(1, 116) = 4.70$, $p<.05$. Lifetime traumatic exposure in step two did not result in a significant increase in R^2 and did not uniquely contribute to the variance explained in the model. However, the addition of Rwandan-related exposure increased the variance accounted for to 10% , with a significant increase in R^2 and a unique contribution to the variance, $R^2=.101$, $F(3, 116) = 4.24$, $p<.05$. Similar to lifetime trauma, the interaction between lifetime traumatic exposure and traumatic exposure in Rwanda in step four did not reliably improve R^2 . In the final step, the addition of loneliness resulted in the model accounting for 37% of the variance, but only loneliness and traumatic exposure in Rwanda offered a unique contribution in this step of the model, $R^2=.372$, $F(5, 116) = 13.17$, $p<.000$.

PTSD Symptomatology - Twenty percent of the sample scored above the cut off of 35, indicating potentially clinically concerning symptomatology. The total mean

score on the IES was 18.56 (SD 19.27), with a mean of 9.74 (9.9) on the intrusive subscale and 8.82 (SD 10.15) on the avoidance subscale.

Overall, the model predicted 50% of the variance in intrusive symptomatology, $R^2=.495$, $F(5, 116) = 21.79$, $p<.000$ (refer to Table 3). Employment status in step one did not reliably increase R^2 . Lifetime traumatic exposure in step two significantly predicted distress but only accounted for 5% of the variance, $R^2=.049$, $F(2, 116) = 2.91$, $p<.05$. The addition of reported level of traumatic exposure in Rwanda increased the variance accounted for to 15%, a significant increase, $R^2=.148$, $F(4, 116) = 4.88$, $p<.001$. However, the interaction between lifetime and Rwanda trauma exposure did not uniquely contribute to the model. In the final step of the model with all variables entered, only level of reported exposure in Rwanda and feelings of loneliness offered unique contributions.

Similar results were obtained for avoidant symptomatology. Overall, the model accounted for 53% of the variance, $R^2=.531$, $F(5, 116) = 25.12$, $p<.000$ (refer to Table 3). Employment status did not offer a unique contribution in step one. Lifetime trauma exposure offered a significant contribution but again only accounted for 6% of the variance, $R^2=.061$, $F(2, 116) = 3.69$, $p<.05$. In step three, the addition of reported traumatic exposure in Rwanda increased the variance accounted for to 16%, $R^2=.161$, $F(3, 116) = 7.2$, $p<.000$. However, the interaction between lifetime and Rwanda trauma exposure did not uniquely contribute to the model. In step five with all variables entered, only reported exposure in Rwanda and feelings of loneliness offered unique contributions.

Alcohol Use - The sample had a mean of 8.38 on the Audit and 46% scored above the cut-off that indicates harmful or hazardous drinking. Overall, the combination of variables only accounted for 6% of the variance, with only Rwandan

traumatic exposure significantly increasing R^2 ; however, it did not offer unique contribution to the total model (refer to Table 3).

Table 3: Hierarchical Multiple Regressions to Predict Symptom Scores

Variables		R	R Square	Beta Values Stepwise	Beta Values Total
Model					
General Health Questionnaire-12					
Step 1	Employment Status	.198	.039*	.198*	.125
Step 2	Lifetime Trauma Exposure	.235	.055	.126	-.002
Step 3	Rwandan Traumatic Exposure	.318	.101*	.224*	.157*
Step 4	Life * Rwandan	.345	.119	.134	.117
Step 5	Loneliness	.610	.372**	.525**	.525**
Impact of Events Scale – Intrusion					
Step 1	Employment Status	.088	.008	.088	.003
Step 2	Lifetime Trauma Exposure	.221	.049*	.203*	.054
Step 3	Rwandan Traumatic Exposure	.384	.148*	.327**	.240**
Step 4	Life * Rwandan	.385	.149	.030	.012
Step 5	Loneliness	.704	.495**	.614**	.614**
Impact of Events Scale – Avoidance					
Step 1	Employment Status	.093	.009	.093	.003
Step 2	Lifetime Trauma Exposure	.246	.061*	.229*	.077
Step 3	Rwandan Traumatic Exposure	.401	.161**	.329**	.239**
Step 4	Life * Rwandan	.402	.162	.035	.016
Step 5	Loneliness	.729	.531**	.633**	.633**
Audit					
Step 1	Employment Status	.025	.001	-.025	-.018
Step 2	Lifetime Trauma Exposure	.042	.002	.034	-.045
Step 3	Rwandan Traumatic Exposure	.194	.038*	.197*	.184
Step 4	Life * Rwandan	.231	.053	.126	.121
Step 5	Loneliness	.273	.074	.152	.152

Note: * $p < .01$. ** $p < .001$.

Discussion

In this sample exposure to other potentially traumatic events across the lifetime did not confound the reporting of chronic symptomatology from a peacekeeping mission. While there was a small relationship between lifetime traumatic events and Rwandan-related PTSD intrusive and avoidant symptomatology at six years, regression analysis indicated this relationship was not significant when Rwandan-related symptomatology and feelings of loneliness were added to the model. Research with this population has indicated high levels of distress that have significantly increased over time, and has also indicated that the self-reported level of traumatic exposure in Rwanda and feelings of loneliness are predictive of this distress (Hodson & Rapee, 2002b). The current research study suggests that previous findings have not been inflated by lifetime traumatic exposure.

The findings in this study did not support a sensitising hypothesis. Exposure to lifetime traumatic events did not uniquely contribute to chronic Rwanda related symptomatology. This differs from the work by Breslau, Chilcoat, Kessler and Davis (1999), which showed that previous exposure to trauma increased the PTSD effects of subsequent trauma. However, these authors also found that for most trauma (with the exception of trauma involving assault) the impact decreases as a function of time. Current literature on risk factors indicates that their influence varies over time (Hodson & Rapee, 2002b; McFarlane & Yehuda, 1996). Therefore the impact of lifetime traumatic exposure might be important in acute symptomatology, but not in chronic at six years. The results in this research need to be replicated in other populations, but especially in the acute phase of distress.

Alternatively, it may be that sensitisation only occurs when the two traumas are related to the same attribution processes. That is, they are similar enough to influence

an individual's perceptions of controllability and predictability or their underlying schemas about living in a 'safe world' (Creamer et al., 1993; Joseph, 1999a; Joseph, Yule, & Williams, 1993; Kusher, Riggs, Foa, & Miller, 1992). It may be that in this veterans sample the experiences in Rwanda did not impact on schemas related to safety here in Australia, and the personnel deployed to an area where they expected to be witness to extreme levels of human misery.

Analysis also revealed high levels of alcohol use in the group. Forty-six percent of the sample indicated hazardous levels of drinking, which is higher than the 37% reported by Conigrave, Hall and Saunders (1995) in an Australian sample of ambulatory care patients. This hazardous drinking was not well explained by traumatic exposure or feelings of loneliness. While alcohol abuse is a common comorbid disorder with PTSD (Calhoun et al., 2000; Jacobsen, Southwick, & Kosten, 2001; Keane & Wolfe, 1990), it has a different genesis in this population and different predictors for intrusive and avoidant symptomatology. The findings are consistent with a study involving 4,072 twins who served in the American military during the Vietnam era (McLeod et al., 2001). This study identified different environmental factors that predicted PTSD symptomatology and alcohol use.

Volpicelli et al (1999) have proposed an aetiology model of comorbid alcohol use with PTSD, in which the origin is a function of endorphin withdrawal and the desire to numb emotional distress. This aetiology model is consistent with research with disaster victims suggesting survivors utilised alcohol to reduce feelings of distress (Joseph, Yule, Williams, & Hodgkinson, 1993). Additionally, current research with Australian military veterans from a range of other peacekeeping operations has also indicated hazardous levels of alcohol use (Deans, 2001), suggesting these results may be more

indicative of a general problem in the military populations (both serving and veteran) that is worthy of further investigation.

Being subsequently deployed did not report significantly increased symptomatology. This finding is consistent with the work with American peacekeepers deployed to the former Yugoslavia, where subsequent deployments were not predictive of increased distress (Huffman et al., 1999).

However, participants who had discharged from the military did show significantly more symptomatology than serving personnel. This may reflect individual's self-selection or personnel being medically discharged due to symptomatology. Of particular interest is the significant relationship between discharge and loneliness or dissatisfaction with support networks. This is consistent with anecdotal evidence, with Vietnam veterans indicating that some do not experience significant symptomatology in terms of war-related traumatic experiences until they leave the support of their peers in the military. Alternatively, the findings could indicate that individuals in the military experiencing less support and greater isolation are more likely to discharge. In light of the highly predictive value of loneliness in distress (Hodson & Rapee, 2002b), this relationship warrants further investigation.

Finally there were significant differences between the employment categories of medical and infantry. While this finding could also be explained by the impact of differing environments on return and the fact that the medical personnel did tend to be older and of a higher rank, it could also be due to the different roles of these personnel in Rwanda. All questionnaires that were sent out as part of the Rwanda veteran research included a section for additional comments. A consistent theme in this section from Infantry personnel was their frustration at their inability to act. During the deployment the role of the Infantry was to protect Australian medical personnel. This

meant that during the deployment the Infantry had to witness human misery (including for some the massacre of thousands of people) but were unable to intervene, while the medical personnel were able to provide assistance to the local population and at least help save some lives. Feelings of helplessness have been shown to be an important risk factor in the development of post-trauma symptomatology (Joseph, Yule, Williams, & Hodgkinson, 1994; Raphael, 1986). These findings suggest that the utility of the inclusion of a helplessness scale in any post-screening battery or measure of trauma experienced is worthy of further research.

In interpreting the results care needs to be taken to remember that Rwandan veterans were exposed to multiple potentially traumatic events over a six-month period. The results may have been very different if the same research was conducted with personnel deployed to a low-intensity environment. Adler & Castro (2001) in work with American veterans argue that care must be taken in generalising across deployments as each has unique and varying levels of stressors (both chronic and traumatic). Similarly, care must be taken in generalising beyond military populations (Ursano et al., 2000) due to potential organisational bias (gender and intellectual profile, for example). Finally, all the measures were self-report and the two measures of trauma only assessed frequency of traumatic exposure not the subjective impact (i.e. whether fear or horror was experienced).

Taking into account the cautions outlined above, this research suggests that for chronic symptomatology lifetime traumatic exposure is not a confounding variable and does not appear to 'sensitise' an individual to later post-trauma reactions. However, these findings need to be replicated, especially for acute symptomatology before any final conclusions can be drawn. The research also highlighted the potentially predictive role of loneliness as a potential vulnerability in chronic symptomatology.

CHAPTER FIVE

GENERAL DISCUSSION

Key Findings and Theoretical Implications

The research showed that Australian military peacekeepers that deployed to Rwanda were exposed to multiple potentially traumatic events, some of which included witnessing human degradation and misery on a large scale, seeing dead bodies, and fear of injury or death. Data revealed that most personnel coped with this exposure, but one in five were still experiencing significant levels of distress six years after the deployment. These high levels of distress are consistent with previous major longitudinal studies that have demonstrated that exposure to trauma can have a long-term impact on an individual's psychological wellbeing (Green et al., 1990a; Holen, 1991; Kilpatrick et al., 1987; McFarlane & Yehuda, 1996).

In this sample the traumatic events were shown to impact on both general psychological wellbeing and PTSD symptomatology. These high rates of distress in the Rwandan veteran population emphasise the need to develop effective preventative and acute intervention strategies. A strategy to achieve this is through identification of key predictors of post-deployment distress.

The current research suggests that psychosocial variables can act as predictors. The results indicated that the ability to discuss experiences in an emotionally supportive environment (deployment or crisis support) and the presence of an intimate relationship (romantic partner) could act as both a risk and protective factor for the development of subsequent distress. This is consistent with previous research, which has suggested either a supportive (i.e. Solomon & Smith, 1994) or detrimental role for support (i.e. Hobfoll et al., 1996). Furthermore, the research suggests that loneliness or internal subjective feelings about satisfaction with support operate as a mediating variable between social support and distress.

McFarlane and Yehuda's (1996) aetiological model for the development of PTSD asserts that the importance of risk or protective factors is in their influence on the individual's ability to deal with the immediate emotional distress and any subsequent chronic symptomatology. Creamer (1993) suggested that vulnerability factors are best conceptualised as pre-existing variables that in combination with the trauma are more likely to lead to distress. Examples include personality variables, biological vulnerabilities, past or family history of psychiatric illness, other life events and a prior history of traumatic exposure (Creamer et al., 1993; Green et al., 1990b; Joseph, Mynard, & Mayall, 2000; McFarlane, 1999). In contrast, resilience variables occur after the trauma and include coping strategies, attributions, attitudes towards emotional expression and support variables (Jones & Barlow, 1990; Joseph, 1999a; Pennebaker, 1993; Regehr, Hill, & Glancy, 2000).

Within this conceptualisation social support should be a resilience or protective factor. However, similar to the current findings with Rwandan veterans, research with survivors of a multiple shooting suggests that social support can act as both a vulnerability and resilience factor (Creamer et al., 1993). The shooting survivors' research found that in the short term the most distressed individuals were the most likely to seek support, but also that good social support was predictive of less distress. Interestingly, they also found that a positive attitude to support had a significant relationship with a positive outcome.

A key variable in further understanding this dual role for support may be a better understanding of personality as a vulnerability factor. Bramsen (2000) in a study of Dutch peacekeepers has found that the personality traits of negative affectivity and psychopathology are unique predictors of post-deployment symptomatology. It may be that feelings of loneliness or internal perceptions of satisfaction are more related to an

ongoing personality style than a function of the external exposure to the trauma.

Considering the predictive value of loneliness in terms of both general mental health and PTSD symptomatology, this could be an important area of future research.

The primary feature of all models of posttraumatic symptomatology is the actual traumatic event. However, this and other studies have shown that the reporting of level of traumatic events is not stable and at least in this sample may be related to the degree of contact with support networks (French, 1997; Roemer et al., 1997; Southwick, Morgan, & Charney, 1997; Southwick, Morgan, Nicolaou, & Charney, 1997). This potential instability in the reporting of traumatic memory was first documented by McFarland (1988) in his work with fire fighters. While self-report measures may not be a valid measure of exposure to, or intensity of, a traumatic experience due to inconsistencies in traumatic memories, the amount a person remembers may still be important as a resiliency factor.

The findings in this research suggest that self-reported level of traumatic exposure varies over time and is predictive of levels of subsequent distress. It may be that some support encourages maintenance of the traumatic memory and in the group setting could result in vicarious re-traumatisation. Solomon (2001) when discussing the impact of secondary traumatisation likens the effect of the traumatised individual on social supports to throwing a stone in a pond. The ripples can only be considerably greater when a number of stones are thrown in together. However, the small number of variables in the current model limits the strength of this finding in the research. It may be that there are a variety of unassessed third variables that account for the changes reported (e.g. treatment seeking status or compensation situation). Further work needs to replicate the current findings before any firm conclusion can be drawn.

A key vulnerability that is attracting increasing attention in the literature is the impact of prior traumatic exposure on posttraumatic symptomatology after a subsequent event. Currently there is conflicting evidence for whether prior or lifetime trauma sensitises individuals to greater distress or whether it has a resiliency or inoculating effect. Current evidence supports both a sensitising and inoculating hypothesis (Bolton et al., 2001; Breslau et al., 1999; Brunet et al., 2001; Dougall et al., 2000; Kessler et al., 1995; Leffler & Dembert, 1998; Resnick et al., 1995; Weiss et al., 1995). It was only possible in the current research to investigate the influence of prior exposure to trauma on chronic and not acute symptomatology. Current research did not support a sensitising hypothesis, which is consistent with recent research with police officers (Hodgin, Creamer, & Bell, 2001). These authors argue that in a service environment impersonal and predictable traumatic exposure is less likely to result in symptomatology.

Finally, a key finding consistent with other longitudinal research (Koren et al., 2001; Michultka et al., 1998) is the highly predictive value of assessed symptomatology. While all other vulnerability and resiliency factors affect the level of this variable its highly predictive role needs to be remembered in any screening or intervention protocol.

The current research adds to our understanding of resiliency and vulnerability and has the potential for practical applications. However, what is really needed in the area is a large prospective longitudinal study, including pre-traumatic, peri-traumatic and post-traumatic variables that would allow us not only to identify risk factors but the mechanisms by which they influence symptomatology.

Practical Implications

Given the specialised population and small sample sizes in the current research, care must be taken when interpreting the current findings due to the resulting lack of stability in the coefficients derived from the analysis. The findings need to be replicated with larger and more diverse populations. However, with this limitation in mind, the results are consistent with emerging research in the area and suggest areas that could be considered in both clinical and organisational settings.

Clinical Implications - A primary component of many acute intervention strategies is to encourage the accessing of social support, particularly as support networks are more readily available than professional service networks (for a summary see Raphael, 2000). However, the results in this research and previous research is that this could have both positive and negative consequences and facilitation of positive support could be a focus of psycho-educational or clinical interventions. Litz, Gray, Bryant and Adler (in press) argue that early intervention strategies need to systematically assess the range of social resources available and determine the past history of utilising these resources. Additionally, an assessment needs to be made of the impact of the trauma event on existing support networks, as the event may have comprised these supports (Joseph, 1999b; Robinson & Mitchell, 1993). In a military environment this needs to include an assessment of the impact of the event on both the military unit and family structures, due to the fact that on deployment peers are the primary form of support but on return to Australia this often transfers back to the family as contact with other deployment members decreases (Schmidtchen, 1999).

From his work with disaster victims Joseph (1999b) has suggested both behavioural and cognitive interventions. The behavioural intervention involves the clinician assisting the individual in presenting a coping style that is most likely to result

in supportive behaviour from networks. He also suggests that cognitive work needs to focus on attributional issues like guilt and shame that may be inhibiting the individual from seeking support. For example, major etiological factors in PTSD are feelings of guilt or shame (Steven Joseph et al., 1993; Kubany, 1994). One possible cause of feelings of dissatisfaction with support networks could be fear that others will judge their actions, and it may be these fears that result in individuals not utilising resources. In the context of the current research, many of the Rwanda veterans express issues of guilt in relation to their inability to intervene when witnessing acts of violence (especially during the Kibeho massacre), and the fact that they felt they should have been allowed to help save more of the civilian population. These feelings of guilt may have hindered their willingness to discuss events on return to Australia and in turn their feelings of connection with support networks.

An important strength of an approach focusing on psychosocial factors is the tailoring of the intervention to the individual. A major criticism of past structured acute intervention strategies (in particular critical incident stress debriefing) has been the fact that they may force individuals to utilise unfamiliar coping strategies at a time of crisis (Raphael, 2000). This is a situation that at best may be unhelpful, and at worst could cause harm (Raphael & Wilson, 2000).

Currently most personnel returning from operational deployment in the Australian Defence Force receive an individual 'return-to-Australia' briefing (dealing with stressors from the deployment but also family reintegration issues) immediately before leaving the country and a screening interview four months after return. A psychologist or appropriately trained psychological support staff conducts these interventions. Current knowledge in the field, consistent with the current research findings suggest that there are risk factors that can be screened for in these interviews

that may be predictive of chronic distress. From the findings in the current research, elements that could be considered for further investigation and possible inclusion in screening protocols include: the individuals' perception of level of trauma experienced (which includes both A1 and A2, DSM-IV stressor criterion and potentially a measure of feelings of helplessness at the time of the event), a measure of loneliness, a measure of crisis or deployment support and a measure of current symptomatology. It needs to be remembered though that the purpose of screening is not for diagnostic purposes but to facilitate identification of personnel requiring additional or specialised assistance (Litz et al., in press). High scores in a screen are only indicative of potential problems and the aim of the clinician should be to facilitate a more adaptive adjustment process.

Organisational Implications - The suggestion that positive social support is preventative in the development of traumatic symptoms may have organisational implications, as it suggests that a focus should be the development and maintenance of cohesive support networks for unit. For example, a focus of future research could be the impact of deploying soldiers in formed units versus the effect of deploying as single individuals. It may be that where possible units or formations should be utilised for deployments, as these groups are more likely to have established social support networks. It is also more likely that these groups would remain together for a period on return to Australia, and would be better equipped to provide positive post-deployment social support. Schmidtchen (1999) in qualitative research of the peacekeeping experience has confirmed the importance of this post-deployment contact in assisting individuals to readjust and integrate their experience.

However, this current research has highlighted the fact that contact also has the potential to become a risk factor; the potential for magnification of grievances, for example. A potentially useful organisational intervention might be the provision of a

network with professional input and facilitation. Just one possibility is the establishment of an official peacekeeping website that could facilitate discussion and contact between individuals but can also provide psycho-education and counselling.

Another area worth exploring further is education of spouses or significant others in normal responses to trauma and provision of information on how to interact with a potentially traumatised individual, and whether such interventions can lead to a reduction in feelings of distress and greater feelings of connection with support networks. This is particularly relevant in a military setting where the separation due to the deployment alone, without the additional confound of exposure to potentially traumatic events, can also have a significant impact on relationships (Adler & Castro, 2001).

Strengths, Limitations and Future Directions

It is important to acknowledge both the strengths and limitations of the current research. In terms of research into peacekeeping populations, this was a unique opportunity to investigate personnel deployed on a mission involving multiple traumatic stressors. Additionally it is the only longitudinal study that has been conducted with Australian peacekeepers and one of the few peacekeeper studies that has investigated six-year symptomatology. However, similar to research with other military and trauma populations, the research had practical and theoretical limitations that must be considered when interpreting results. These limitations, though, provide an important guide for future research.

A major strength of the research was the ability to access factors across time, allowing the assessment of temporal effects and confirming their utility in this type of research. Additionally, a definite strength of the study was the emphasis on a high

response rate at six years. Thompson (1991) has argued that care must be taken in interpreting results from partial samples as they might underestimate the effect of disasters, as he proposes that individuals with most severe post-traumatic responses are likely not to reply. Kadushin, C. (1981) in a study of Vietnam veterans fifteen years after the war, found that one-third of the sample suffering from PTSD had never sought help. A concern in the early stages of this research was that individuals remaining in the service would be the easiest to track and therefore most likely to remain in the sample, while the individuals with the most severe symptomatology were the most likely to be discharged. Therefore rather than simply following up the 78 personnel from the three year time point, a search for the original 290 personnel was conducted at six years, in order to maximise the ability to generalise findings and minimise sample bias. The importance of this approach was confirmed in the cross-sectional six-year analysis, which revealed significant differences in symptomatology between serving and discharged personnel.

In terms of limitations, care must be taken when generalising the current findings to other deployment, as the results may have been very different if the same research was conducted with personnel deployed to a low-intensity environment (Adler & Castro, 2001). Care also needs to be taken in generalising beyond military populations, since these individuals have undergone rigorous psychological and intellectual screening processes and undergone common training (Ursano et al., 2000). Military populations may also have a greater dependency on intimate relationships and peer networks, due to the mobile nature of Defence families and a lack of access to extended family networks. Therefore current findings need to be replicated across deployments of varying intensity and in non-military populations.

A major consideration that needs to be addressed in future research is the lack of pre-deployment data. Without this information care needs to be exercised when interpreting causal inference. To illustrate this point, an area for further research is investigation into the degree to which reported levels of loneliness may in fact be a function of personality. The lack of pre-deployment data did not allow assessment of the degree to which the findings on the loneliness scale were a stable feature of the individual's cognitive coping style (Joseph, 1999b) or had been influenced by the stressors of the deployment (Adler & Castro, 2001).

The one way this information could be collected is through the use of comprehensive mental health screen policies in organisations routinely exposed to potentially traumatic experiences (Paton & Smith, 1995). The practical implementation of this type of process is fraught with ethical and organisational difficulties. However, this approach may be necessary to facilitate the development of effective prevention and treatment interventions. The Australian Defence Department is currently developing a mental health-screening process that will track individuals from the moment of enlistment to discharge.

Additionally, it is important not just to rely on grouped self-report data. Consideration needs to be given to qualitative or focus group approaches that could considerably expand our understanding of the individual adaptation process. The current research and literature review in the area of psychosocial factors highlights the range of issues we still don't understand. These more individualised styled approaches may give direction to the larger mental health screening programs.

Another limitation that needs to be foremost when interpreting results from the current is the fact that the small sample sizes in the research did not allow cross validation of models, which would have significantly strengthened the confidence that

they were a reliable fit of the data (Tabachnick & Fidell, 2001). Additionally, the small sample size did not allow the testing of reciprocal pathways in the models developed. For example, an important potential reciprocal relationship that needs to be further clarified is between loneliness and PTSD. It may be those feelings of alienation and disconnection resulting from PTSD symptomatology could influence one's satisfaction with and utilisation of social support networks. The current findings need to be replicated with larger samples. Finally, the small number of women in the samples did not allow independent statistical analysis by gender. Fontana, Litz and Rosenheck (2000), when developing a model of the impact of combat and sexual harassment for the development of PTSD in Somali peacekeeping veterans, found considerable similarity but also important differences between genders. The reported mediational model of loneliness may be more reflective of a male response.

Finally, as discussed previously, researchers need to focus on the development of reliable measures of potentially traumatic exposure and investigate further the relationship between traumatic exposure and traumatic memory. At present the development of reliable measures of trauma exposure has significantly lagged behind the development of measures to assess the effects of traumatic events (Kubany et al., 2000). There are very few measures that attempt to measure traumatic event exposure and those that do have been subjected to minimal psychometric evaluation (Goodman, Corcoran, Turner, Yuan, & Green, 1998; Keane, Newman, & Orsillo, 1997; Norris & Riad, 1997; Solomon, Keane, Newman, & Kaloupek, 1996).

Future research needs to focus on developing reliable and valid measures of trauma exposure, especially in light of the predictive value of this variable. The Traumatic Stress Exposure Scale (TSES) developed for this research was predictive of chronic distress and may provide the base for the development of a potential measure.

However, the results reported in this research only relate to the perceived frequency of trauma exposure and not the subjective experience of fear or horror. Recent work by Breslau and Kessler (2001) on the stressor criterion defined in DSM-IV has suggested that the non-reporting of a subjective experience of fear or horror may be useful as an early screen for individuals with very low probability of developing PTSD. Therefore, any future measure needs to include this criterion as well as be generic enough to be used in a range of operational settings.

Concluding Remarks

In conclusion, this thesis has made a contribution to the understanding of the effect of deployment on peacekeeping missions involving multiple traumatic experiences. First and foremost, it has demonstrated that both psychosocial variables and reported level of traumatic exposure are related to the development and maintenance of chronic distress and should be considered for inclusion in any future screening protocol. Furthermore, it has made a contribution to our understanding of psychosocial variables by identifying loneliness as a mechanism that mediates the between social support and adaptive coping. These findings have implications for the organisational and clinical management of personnel after potentially traumatic experiences. Finally, the results draw attention to potential directions for further research, especially in the area of loneliness and social support but also in the area of traumatic memory.

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APPENDIX A

Traumatic Stress Exposure Scale

While thinking about your service in Rwanda, please indicate which of the following you experienced.

EVENT	Never (x0)	Rarely (x1)	Occas- ionally (x2-5)	Often (x6-10)	Very Often (x11+)
How often were you in danger of being killed?					
How often were you in danger of being injured?					
How often did you have to handle dead bodies?					
How often did you see dead bodies?					
How often did you visit the refugee camps?					
How often did you witness a hostage situation?					
How often were you involved in a hostage situation?					
How often did you witness a motor vehicle accident?					
How often were you involved in a motor vehicle accident?					
How often did you hear of a close friend or co-worker who had been injured or killed?					
How often were you present when a close friend or co-worker was injured or killed?					
How often did you fear that you had been exposed to a contagious disease, toxic agent or injury?					
How often were you witness to human degradation and misery on a large scale?					
Were there any events that you found to be traumatic but that are not listed above? Yes/No (If yes please specify)					