

A Longitudinal Study of Trauma, Social and Personality Factors as predictors of  
Post-Traumatic Stress Symptom Severity in Student Paramedics

by

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*Statement of Authorship*

Except where overt reference is made in the text of this manuscript, this body of work does not include information that has been published elsewhere or been removed in full or part from a thesis by which I have been eligible for or been awarded another degree or diploma. No individual's work has been used without appropriate acknowledgement in this report.

Signature: 

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# PTSS Severity in Student Paramedics

## Abstract

Previous research suggests student paramedics are among the professionals at highest risk for Post-Traumatic Stress Disorder (PTSD). However, little research has been conducted examining duty-related post-traumatic stress symptoms (PTSS) and clinical levels of PTSD in this population. The current study of 36 student paramedics undertaking university or job-based training is the first longitudinal investigation of PTSS and PTSD in this group. Adopting a vulnerability stance to traumatic stress, the study aimed to explore the predictive value of student paramedics' pre-operational and duty-related levels of trauma exposure, emotional empathy, perceived constraints in emotional social support, and attitude towards emotional expression to duty-related PTSS severity. It also aimed to ascertain if student paramedics undertaking two different training methods could be distinguished by these variables, and if differential duty-related negative changes occurred as a function of training group membership. All variables were assessed prior to students commencing any on-road ambulance duties, and were re-assessed after 6-months. Data showed that prior to commencing on-road ambulance duties university and job-based students were not distinguishable on the pre-operational measures. At 6-months follow-up, a duty-related vulnerability was observed, with both groups experiencing significant change in psychosocial functioning. The combined duty-related variables significantly predicted students' PTSS severity, accounting for 8% of the variance in PTSD scores. Students' pre-operational trauma exposure and symptomatology, and duty-related negative attitude towards emotional expression were significant and unique predictors of PTSS severity. These findings have important implications in terms of ambulance services' culture, recruitment and training procedures, and the development of PTSS preventative strategies targeting this vulnerable population.

## *Introduction*

### *1.1 Overview*

Research on post-traumatic stress in primary victims of trauma has been extensive. Among the areas investigated are the effects of rape, combat, physical assault, child abuse, motor vehicle accidents, torture, airplane crashes, earthquakes, hurricanes, floods, bombings, and terrorist attacks. Primary victims are not, however, the only victims of traumatic stress. "Victimization has a ripple effect, spreading the damage in waves out from the victims to all those with whom they have intimate contact" (Remer & Ferguson, 1995, p. 407). This process has been variously called *compassion fatigue*, *vicarious traumatization*, or *secondary traumatic stress*. As with primary trauma victims, secondary victims may also experience post-traumatic stress symptoms (PTSS), such as intrusive imagery and thoughts, avoidance and emotional numbing, hyper-arousal, somatisation, physical ailments, and alcohol and substance abuse (Carbonell & Figley, 1996; Figley, 1995). Although post-trauma reactions usually dissipate within a month of the initial incident (First & Tasman, 2004), for some secondary victims the symptomatology persists, causing clinically significant distress or impairment in their professional and/or personal functioning (American Psychiatric Association [APA], 2000). For these individuals, a diagnosis of Post-Traumatic Stress Disorder (PTSD) is often warranted (APA, 2000).

Among the secondary victims of traumatic stress who merit further study are student paramedics, yet empirical research on the prevalence rates and risk factors for duty-related PTSS and PTSD in this population is extremely scarce. To date, the author's previous research (Lowery & Stokes, 2005) appears to be the only study of PTSS severity in a single sample of student paramedics. This is a serious oversight, given that professional inexperience has been associated with higher levels of psychological

vulnerability in trainee body handlers (Jones, 1985; McCarroll, Ursano, Wright, & Fullerton, 1993), firefighters (Corneil, Beaton, Murphy, Johnson, & Pike, 1999), and police officers (Anshel, Robertson, & Caputi, 1997). In addition, Anshel et al. (1997) found the highest incidence and severity of PTSS in trainee police officers occurred during their first year of duty. However, no studies have attempted to ascertain how early in their career paramedics may be experiencing such difficulties.

Research on post-traumatic stress among experienced and trainee paramedics, police, firefighters, disaster workers, and other helping professionals informed the process of identifying the variables to be examined in the current study. These include: prior trauma history (Moran & Britton, 1994; Stephens, Long, & Miller, 1997); empathic engagement with victims (Figley, 1995; Regehr, Goldberg, & Hughes, 2002b); perceived emotionally constrained work and non-work social relationships (Clohessy & Ehlers 1999; Lowery & Stokes, 2005; van der Ploeg & Kleber, 2003); and emotional non-expression (Clohessy & Ehlers, 1999; Grevin, 1996; Lowery & Stokes, 2005).

The vulnerability perspective of traumatic stress considers repeated exposure to stressful events as a risk factor for the development of PTSD (Winkel, Blaauw, Sheridan, & Baldry, 2003). This model proposes that every stressful life-event depletes available internal and external coping resources and increases vulnerability to subsequent stress (Winkel et al., 2003), in turn increasing an individual's risk of psychological distress. Consistent with this approach are findings of higher levels of PTSS and PTSD in police (Otte, Neylan, Pole, Metzler, Best, Henn-Haase, Yehuda, & Marmar, 2005; Stephens et al., 1997; Stephens & Miller, 1998) and firefighters (Moran & Britton, 1994) with personal trauma histories prior to exposure to duty-related traumatic events. Similarly, a positive relationship has been found between emergency responders' length of service (e.g., repeated trauma exposure) and PTSS severity (Alexander & Klein, 2001; Marmar,

Weiss, Metzler, Delucchi, Best, & Wentworth, 1999; Regehr, Hill, Knott, & Sault, 2003). Also consistent are the findings of increased psychological distress in inexperienced workers directly involved in body handling duties (McCarroll, Ursano, & Fullerton, 1993, 1995; McCarroll, Ursano, Fullerton, Liu, & Lundy, 2002), and in workers exposed to duty-related traumatic events dissimilar to those previously experienced (Dougall, Herberman, Delahanty, Inslicht, & Baum, 2000). These findings have important implications in terms of student paramedics' psychological wellbeing, as general population data indicates the majority will enter the profession with a personal trauma history (Creamer, Burgess, & McFarlane, 2001), and their duties will dictate repeated exposure to a range of traumatic events that students are unlikely to have previously experienced, such as handling human remains.

Evidence also suggests that highly empathic people may be drawn to the helping professions (Elizur & Rosenheim, 1982). Although this trait allows workers to repeatedly carry out stressful duties with care and compassion, research suggests that empathic engagement with trauma victims can also deplete workers' coping resources, rendering them vulnerable to experiencing duty-related psychological distress (Birck, 2001; Carlier, Lamberts, & Gerson, 2000; Figley, 1995; Kassam-Adams, 1999). Further, findings of a significant relationship between emotional empathy and PTSD in trainee counsellors (Arvay & Uhlemann, 1996), junior medical interns (Firth-Cozens, 1987), and police recruits (Anshel et al., 1997), suggests student paramedics may also be at increased risk of developing empathy-related PTSS. It is also plausible to expect an associated decline in student paramedics' empathetic tendencies, as studies on experienced officers suggests students may increasingly rely on emotion-focused coping strategies (i.e., denial and emotional distancing) in order to deal with the distressing nature of their work (Alexander & Klein, 2001; Clohessey & Ehlers, 1999; Thompson & Suzuki, 1991). This relationship

has been observed in other helping professionals (Crabbe, Bowley, Boffard, Alexander, & Klein, 2004; Gudjonsson & Adlam, 1983), and has been associated with increased PTSS severity and rates of PTSD, in both experienced and novice workers (Crabbe et al., 2004; Stradling, Crowe, & Tuohy, 1993).

Emotional social support has been studied extensively as a coping resource that can mitigate the adverse psychological effects of environmental stressors (cf. Brewin, Andrews, & Valentine, 2000), and researchers have documented that the presence of stress, frequently considered as an index of need for support, is related to greater amounts of received assistance (Norris & Kaniasty, 1996; Southwick, Morgan, & Rosenberg, 2000). However, findings suggest that student paramedics' are likely to progressively perceive their emotional relationships with colleagues, family and friends as being constrained. This may further increase students' psychological vulnerability, as constraints in these coping resources have been shown to be significantly associated with increased levels of PTSS in experienced firefighters (Regehr et al., 2003), police (Burke, 1993), and paramedics (Beaton, Murphy, Pike, & Corneil, 1997). The available literature attributes the reported declines in work and non-work emotional support to a number of factors, including emergency workers' diminished emotional empathy, increased reliance on emotion-focused coping strategies (e.g., denial, withdrawal), a lack of access to sympathetic listeners, and/or negative reactions from support providers in response to the workers' duty-related traumatic experiences (Clohessy & Ehlers, 1999; McCarroll et al., 1993; Regehr, 2005; Robinson, 2002). Evidence also tentatively suggests the perceived loss of these coping resources may have a negative impact on student paramedics' attitudes towards emotional self-disclosure (Brown & Grover, 1998; Lowery & Stokes, 2005; McCarroll et al., 1993), further increasing their risk of experiencing duty-related PTSS and PTSD.

The willingness to express one's trauma related emotions could be considered an internal coping resource, as being prepared to talk about the situation allows the person to emotionally process the traumatic event and assimilate it into their life experiences (Horowitz, 1986, 2001). However, studies of emergency services personnel have found that this coping resource can be negatively impacted by duty-related experiences, resulting in these workers developing an aversion to emotional self-disclosure (Brown & Grover, 1998; Lowery & Stokes, 2005; McCarroll et al., 1993). Emergency workers frequently display negative attitudes toward emotional expression, due in part to their progressive duty-related reliance on emotion-focused coping strategies, an informal occupational culture of emotional "toughness", and perceived lack of emotional support from family and friends (Grevin, 1996; McCarroll et al., 1993; McFarlane, 1988; Sterud, Ekeberg, & Hem, 2006). Consistent with Horowitz's model of PTSD, avoiding discussions of traumatic work events has been shown to be associated with elevated psychological vulnerability in police (Stephens et al., 1997), and firefighters (McFarlane, 1988), and in both experienced (Clohessy & Ehlers, 1999) and student paramedics (Lowery & Stokes, 2005).

Although much has been written in isolation about these explanations of post-traumatic stress in emergency services personnel, the relative contribution of the variables in a single study of student paramedics has yet to be fully explored. In addition, to date, no study has been conducted in which student paramedics' psychological health, empathic tendency, emotional social support, or attitudes toward emotional expression have been assessed prior to commencing on-road ambulance duties, and then tracked for possible negative changes associated with routinely intervening in duty-related traumatic events. The current longitudinal study will address this oversight, and contribute to the small body of work seeking to expand our understanding of why high risk populations,



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such as student paramedics, appear to be particularly vulnerable to developing duty-related PTSS and PTSD.

## 1.2 *Post-Traumatic Stress Disorder (PTSD) – A Brief History*

Although not formally recognised as a diagnostic category until 1980, the symptoms of PTSD have been documented in many different ways as a response to traumatic events. For instance, references to nightmares and intrusive thoughts can be found in Samuel Pepys' diary of 1666, documenting the Great Fire of London (Daly, 1983). In recent times, the effects of traumatic events have been described in a variety of trauma specific ways, such as the 'concentration camp syndrome', the 'rape trauma syndrome', or the 'battered wife syndrome' (Herman, 1992). Symptoms of PTSD have also been described in the context of war-related traumas, such as 'soldiers heart' (a condition in which soldiers complained of cardiac symptoms in the presence of normal cardiac exam; Myers, 1915), 'shell shock' (thought to be due to brain trauma from exploding shells; Myers, 1915), and 'combat fatigue' (World Health Organisation, 1969).

In the aftermath of the First World War, the American Psychiatric Association (APA) described a formal classification of reactions to trauma by including the category 'Gross Stress Reaction' in the first edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-I; APA, 1952)*. This was described as 'a reaction to severe combat or civilian catastrophe that may progress to one of the neurotic reactions...If the reaction persists'. Later, *DSM-II (APA, 1968)* described reactions to trauma as a brief 'Transient Situational Disturbance'. However, the progressive development of the diagnostic category really only began during the 1970s, in the aftermath of the Vietnam War, where it was observed that combat veterans consistently reported patterns of psychological symptoms after combat trauma. PTSD received its first official mention in

the third edition of the *DSM* (*DSM-III*; APA, 1980), and was formally categorised as an anxiety disorder, defined by a consistent pattern of three PTSS clusters following exposure to all types of traumatic events. Consequently, PTSD was not trauma specific, and could arise in the context of an event ‘outside the range of usual human experience’ which led to the development of PTSS such as, (i) intrusive re-experiencing of the event, (ii) avoidance responses to reminders of the event and numbing of general responsiveness and, (iii) physiological reactivity, memory impairment, poor concentration, startle responses, and/or hyper vigilance.

The diagnosis of PTSD was further developed in the *DSM-IV* (APA, 1994) by introducing a subjective element into Criterion A (the experience of the traumatic event). With this development, an individual not only had to experience, witness or be confronted with an event that involved actual or threatened death, serious injury, or threat to the physical integrity of self or others (the stressor) but they also needed to have responded to such a stressor with either intense fear, helplessness and/or horror (the subjective element). Further, in recognition of just how frequent traumatic experiences were in people’s lives, the qualifying trauma no longer needed to be ‘outside the range of usual human experience’.

### 1.3 *Diagnosing PTSD*

According to the latest edition of the *DSM* (*DSM-IV-TR*; APA, 2000), a clinical diagnosis of PTSD can be made if an individual experiences:

- (i) Exposure to an event in which the person directly experienced, witnessed, or was confronted with actual or threatened death or serious injury, or threat to physical integrity of self or others and in which the person’s response involved intense fear, helplessness, and/or horror.

- (ii) At least one symptom of re-experiencing of the event. This may be experienced via dreams, visual flashbacks, intrusive thoughts and triggered cues (internal or external) to reminders of the event.
- (iii) At least three symptoms of avoidance of related stimuli and/or numbing of responsiveness. These may include avoidance of thoughts and behaviours related to the event, avoidance of activities, places or people, psychogenic amnesia, diminished interest in significant activities, emotional numbing, and detachment from others.
- (iv) At least two symptoms of increased physiological arousal. These may include irritability and anger outbursts, difficulty falling and staying asleep, concentration problems, hypervigilance and startle responses.

The *DSM-IV-TR* (APA, 2000) further requires that PTSS be present for at least 1-month following the event, cause clinically significant distress, and interfere with the individual's social and occupational functioning. PTSD can be diagnosed as acute (i.e., symptom duration is between 1 and 3 months) or chronic (i.e., symptom duration exceeds 3 months). Delayed onset PTSD may be diagnosed in cases where the onset of symptoms is at least 6 months after the original event.

#### 1.4 *Epidemiology of PTSD*

Studying the epidemiology of any disorder involves considering both the distribution and the determinants of its presence in the population (Last, 1983). Given the unique importance of the stressor criterion in PTSD, epidemiological research traditionally starts with a consideration of the range and prevalence of traumatic events, and the likelihood of developing PTSD because of primary or secondary exposure to such events. Also of

interest are the risk factors for exposure to trauma and the development of PTSS. The proceeding discussion will focus on each of these issues.

#### 1.4.1 *Range and prevalence of traumatic events in the general community*

Epidemiological research with a range of populations has found that exposure to a traumatic event is surprisingly common, with worldwide trauma exposure rates ranging from 25 to 92% for males, and 18 to 87% for females (Breslau & Davis, 1992; Breslau, Davis, Andreski, & Peterson, 1991; Breslau, Kessler, Chilcoat, Schultz, Davis, & Andreski, 1998; Norris, 1992; Stein, Walker, Hazen, & Forde, 1997; Perkonigg, Kessler, Stortz, & Wittchen, 2000). For instance, Kessler and colleagues' National Comorbidity Survey reported that from a representative (American) sample of 5,877 people aged 15 to 45 years, 61% of men and 51% of women had been exposed to a traumatic event at some point in their lives (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). This finding replicated those of an earlier longitudinal National Women's Study by Resnick, Kilpatrick, Dansky, Saunders, and Best (1993), which found that 69% of the 4,008 respondents reported exposure to a situation that would qualify as a traumatic event. An examination of Australian data yields similar results, with lifetime prevalence of trauma exposure found to be 65% for men and 50% for women (Creamer et al., 2001). Further, of the men who reported experiencing trauma, 38% had experienced only one event, 28% had experienced two, 16% experienced three, and 18% had experienced four or more traumatic events. For women, exposure to only one traumatic event occurred in 52% of respondents, 24% had experienced two exposures, 13% experienced three, and 12% had been exposed to four or more traumatic events.

The types of traumatic events most frequently experienced have been found to be relatively consistent. For instance, Australian and American studies (e.g., Breslau et al.,

1998; Creamer et al., 2001; Kessler et al., 1995) have reported a life threatening accident was experienced by 40% of respondents, 27% had experienced a natural disaster, almost 20% had been physically attacked at some point in their lives, and approximately 6% had been raped. Men reported greater levels of exposure to all such events, except for rape, which was experienced by a significantly higher proportion of women. Interestingly however, when compared to their American counterparts, Australian respondents reported greater levels of witnessing someone being badly injured or killed (34% vs. 54%, respectively), but lower levels of learning about trauma to others (62% vs. 22%, respectively).

The figures available for populations in developing countries show much higher levels of exposure to certain types of events. The International Federation of the Red Cross (IFRC, 2005) estimated that 2.5 billion people were affected by natural and technological disasters between 1995 and 2004. China with 1.29 billion people affected comprises 51% of the total, followed by India with 702 million (28%). Twelve other developing countries reported more than 10 million affected people. During the single year of 2004, nearly 146 million people were reportedly affected by disasters, with nine countries reporting more than 1 million affected.

War and terrorism are additional traumatic events with far reaching human consequences. Since World War II, there have been 228 armed conflicts recorded, 30 of which were active in 2004 (Harbom & Wallensteen, 2005), and according to Red Cross estimates, more than 100 million people lost their lives during the 20<sup>th</sup> century as a direct result of wars and conflicts (IFRC, 2001). War and political violence causes psychosocial health problems in those directly exposed to such events, and also traumatises those attempting to flee the situation. Overall, the number of refugees and internally displaced persons has increased from 15 million in 1980 to 35 million in 2003, peaking in 1994 at 43

million (Human Security Centre [HSC], 2005). Further, 90% of all war refugees are in developing countries, many amongst the poorest on earth (HSC, 2005). Finally, an alarming rise in significant international terrorist attacks has also been recorded, increasing from 20 incidents in 1982 that caused an estimated 1,000 casualties or deaths, to 180 in 2003 in which approximately 4,000 people were injured or killed (HSC, 2005).

Taken together, the above figures clearly indicate that direct or indirect exposure to traumatic events is surprisingly widespread, affecting millions of people annually. However, as the following discussion will show, exposure to such events and experiencing PTSS does not automatically lead to the development of PTSD.

#### 1.4.2 *Primary traumatisation: A risk factor for PTSS and PTSD*

It is estimated that approximately 50% to 84% (Creamer et al., 2001; Kessler et al., 1995; Vrana & Lauterbach, 1994) of the general population will be a primary (i.e., direct) victim of a traumatic event. However, data also shows that although experiencing a traumatic event can result in PTSS (a term used herein to denote a generic range of negative mental health outcomes rather than a homogenous construct), it does not always lead to the development of PTSD. The exact prevalence rate of PTSD in primary victims remains a matter of some debate, but is significantly lower than the trauma exposure rate. It is often difficult to undertake a comparison of findings across studies owing to different methodologies, the use of different diagnostic criteria that can narrow or broaden the range of possible stressors (e.g., *DSM-III* v. *DSM-IV*) while specifying the need for them to have a significant emotional or behavioural impact, and the reporting of lifetime versus current rates of the disorder.

Some earlier studies, such as the Epidemiologic Catchment Area Program, for example, found relatively low lifetime PTSD prevalence rates (based on *DSM-III* criteria)

of between 1.0% and 1.3% (Helzer, Robins, & McEvoy, 1987; Davidson, Hughes, Blazer, & George, 1991). Later research using *DSM-III-R* criteria has generally reported higher rates of prevalence. Breslau and colleagues, for example, in a study of 1,007 young adults (aged 21-30 years) from Detroit, found that 11% of women (31% of those exposed to trauma), and 6% of men (14% of those exposed to trauma) had a lifetime history of chronic PTSS, yielding an overall PTSD prevalence rate of 8.5% (Breslau et al., 1991). Similarly, 12% of respondents in the National Women's Study (18% of those exposed to trauma) were found to have a lifetime diagnosis of PTSD (Resnick et al., 1993). The National Comorbidity Survey by Kessler et al. (1995) found a PTSD lifetime prevalence of almost 8% in the total sample, with the rate for women being twice that of men (10.4% versus 5%, respectively). This study also indicated the chronic nature of PTSS in a significant minority, with little remission after 6 years. A mean PTSD prevalence rate of 7% was also reported by Norris (1992), with variations depending on the type of trauma the person was exposed to. The lowest rate (2%) was associated with combat and the highest rate (14%) with sexual assault.

Adopting the more recent *DSM-IV* criteria, Perkonigg et al., (2000) found that approximately 8% of a German community sample of 3,021 young people (aged 14 to 24) experienced a level of PTSS that fulfilled the criteria for a PTSD diagnosis. In a subsequent study of 125 of the original respondents, Perkonigg and colleagues reported that 57% of the sample with full *DSM-IV* PTSD at baseline had remained symptomatic for more than 3 years, fulfilling the criteria for either sub-threshold or full PTSD at 34-50 months follow-up (Perkonigg, Pfister, Stein, Höfler, Lieb, Maercker, & Wittchen, 2005). Of those who were experiencing PTSS at baseline (but did not meet a full PTSD diagnosis), 43% remained symptomatic. In a separate study of a Canadian community sample comprised of 1,002 adult respondents, Stein et al. (1997) found a current PTSD



prevalence rate of almost 4% (2.7% for women and 1.2% for men). Finally, the estimated 12-month prevalence rate of PTSD in a sample of 10,641 Australian respondents was found to be 1.3% (Creamer et al., 2001), considerably lower than that found in comparable North American studies, such as that by Kessler et al. (1995) who reported a 12-month prevalence rate of 3.9%. Contrary to previous findings, there was also little evidence of higher PTSD prevalence among Australian women, who recorded a prevalence rate of 1.4% compared to 1.2% for men (Creamer et al., 2001).

Studies of PTSS in specific populations of trauma victims have however, tended to yield higher prevalence rates of PTSD. For instance, 32% of rape victims in the National Women's Study had lifetime PTSD, and 12.4% had current (past 6 months) PTSD (Resnick et al., 1993). These findings are complimented by Rothbaum, Foa, Riggs, Murdock, and Walsh (1992), who found that 90% of rape victims met PTSS criteria for a diagnosis of PTSD within 2 weeks of rape, and approximately 50% continued to meet criteria 3-months later. Similarly, Kilpatrick, Saunders, Veronen, Best, and Von (1987) noted a lifetime rate of post-rape PTSD in women of 57%. In 16.5% of cases, the disorder was present 17 years after the initial assault. Other forms of sexual assault, such as molestation, have also been found to be associated with clinical levels of PTSS in both men and women. In the National Comorbidity Survey, for example, of the male respondents who endorsed molestation as their most upsetting trauma, 12.2% developed PTSD, compared with 26.5% of molested women (Kessler et al., 1995).

Consistently high rates of PTSD have also been recorded in natural disaster populations. In a recent study, Başoğlu, Kiliç, Şalcioğlu, and Livanou (2004) examined the prevalence of PTSD following the 1999 earthquake in Marmara, Turkey in which 17,127 people were killed, 44,000 were injured, and 250,000 buildings were damaged. Fourteen months post-disaster, a PTSD prevalence rate of 23% was found amongst 530

people randomly sampled from epicenter survivors, compared to 14% of 420 respondents who were living 100km away at the time of the earthquake. Ironson and colleagues assessed adults at 1 and 4 months after Hurricane Andrew, which occurred in America in 2001, and found that 33% experienced PTSS that met full diagnostic criteria for PTSD (Ironson, Wynings, Schneiderman, Baum, Rodriguez, Greenwood, Benight, Antoni, LaPerriere, Huang, Klimas, & Fletcher, 1997). In addition, the sample differed from laboratory controls on several physiological measures in the direction indicative of lower immune functioning. In a longitudinal study, McFarlane and Papay (1992) examined the incidence of PTSD in 469 Australian firefighters following the 'Ash Wednesday' bushfires. The authors reported that of the 16% diagnosed with PTSD immediately following the disaster, PTSS remained in 56% after 42-months, and when followed up 8-years later, 4% continued to attract a diagnosis of PTSD.

A classic work in the field of disaster effects is Gleser, Green, and Winget's (1981) study of the 1972 Buffalo Creek dam collapse which caused a devastating flood. Two years after the dam collapse, two thirds of the 380 adults and one third of the 273 children were evaluated as moderately or severely psychologically distressed, with generalized anxiety disorder (60% among adults, 20% among children) and major depressive disorder (70% and 25%, respectively) being the most prevalent mental health issues. Fourteen years later, Green, Lindy, Grace, and Leonard (1992) conducted a follow-up of 121 victims in order to ascertain probable PTSD, which had not been a *DSM* diagnosis at the time of the original study. Although PTSS in this population fluctuated with time, a 59% PTSD lifetime prevalence rate was found among victims, with 28% of survivors still meeting full PTSD criteria almost a decade and a half later.

Long-term psychological consequences have also been found in relation to combat exposure. The National Vietnam Veterans Readjustment Study is probably the most in-

depth investigation of combat related trauma exposure (Kulka, Schlenger, Fairbank, Jordan, Marmar, Weiss, & Grady, 1990), and found that 15% of all male veterans who were involved in active war operations experienced levels of PTSS that warranted a diagnosis of PTSD. An additional 11% suffered from sub-clinical levels of the disorder. Similarly, O'Toole and colleagues reported that approximately 20% of Australian Vietnam veterans have developed PTSD at some stage in the years following the war (O'Toole, Marshall, Grayson, Schureck, Dobson, French, Pulvertaft, Meldrum, Bolton, & Vennard, 1996). A more recent study by Vogt, Pless, King, and King (2005) examined the impact of deployment on mental health outcomes in a sample of 317 Gulf War I veterans, and found 20% were experiencing PTSS levels that met the full PTSD diagnostic criteria.

Consistently high rates of PTSS and PTSD have also been reported in prisoners of war, Holocaust survivors, and political refugees. Dikel, Engdahl, and Eberly (2005), for example, recruited 150 community-residing former World War II prisoners of war (European and Asian theaters of operation) and 10 from the Korean War. In this instance, it was found that increased trauma severity enhanced the likelihood of psychopathology; rates of PTSD in the most severely traumatised group (prisoners of war held by Japan) exceeded 80%. Of participants who had lifetime PTSD, 34% had no other lifetime *DSM-IV-TR* Axis I disorders (i.e., clinical disorders or other conditions that may be a focus of clinical attention). Joffe, Brodaty, Luscombe, and Ehrlich (2003) recruited 100 Holocaust survivors living in Sydney who had experienced several types of persecution, such as imprisonment in ghettos (60%), labor camps (52%), concentration camps (46%), and/or spent time in hiding (41%) and/or living on Aryan papers (17%). A high PTSD prevalence rate was also found for this study, with 39% of the sample experiencing PTSS

meeting all six of the *DSM-IV* diagnostic criteria, compared to 4% of those in an Australian/English-born control group.

Studies of political refugees have yielded similar figures. Jeon and colleagues examined the prevalence of PTSD in 454 North Koreans who had defected to South Korea between July 1998 and November 2000 (Jeon, Hong, Lee, Kim, Han, & Min, 2005). Of the traumatic events experienced by these individuals, the most frequently occurring was witnessing public executions, followed by hearing news of the death of a family member or relative due to starvation, witnessing a beating, and witnessing a punishment for political misconduct. Subsequent data analysis indicated that 29.5% of these individuals suffered from levels of PTSS that warranted a clinical PTSD diagnosis. This finding is in line with previously reported PTSD prevalence rates for refugees in different countries around the world, which range from 15% to 37% (Cardozo, Kaiser, Gotway, & Agani, 2003; Cheung, 1994; de Jong, Komproe, Van Ommeren, El Masri, Araya, Khaled, van de Put, & Somasundaram, 2001; Hauff & Vaglum, 1994; Mollica, Sarajlic, Chernoff, Lavelle, Vukovic, & Massagli., 2001; Silove, Steel, McGorry, & Mohan, 1998).

Finally, higher rates of PTSS and PTSD have been associated with traumatic events taking the form of life threatening illness or accident. The psychological sequelae of cancer and its treatment is a rapidly expanding area of research interest, with the evidence suggesting a significant number of those afflicted experience PTSS at levels warranting a diagnosis of PTSD. For example, PTSD prevalence rates associated with breast cancer have been found to range from 10% to 35% (Baider & DeNour, 1997; Bleicker, Pouwer, van der Ploeg, Leer, & Ader, 2000; Jacobsen, Widows, Hann, Androyskowski, Kronish, & Fields, 1998), and between 12% and 20% for a diagnosis of pediatric leukemia (Brown, Madan-Swain, & Lambert, 2003; Butler, Rizzi, &

Handwerger, 1996). Similar rates of PTSD have been reported in sufferers of multiple sclerosis (Chalfant, Bryant, & Fulcher, 2004; Scott, Allen, Price, McConnell, & Lang, 1996), severe acute respiratory syndrome (Wu, Chan, & Ma, 2005), burn victims (Ehde, Patterson, Wiechman, & Wilson, 2000; Van Loey, Maas, Faber, & Taal, 2003), and victims of motor vehicle accidents (Gillies, Barton, & Di Gallo, 2003; Salter & Stallard, 2004).

In summary, a wide body of evidence suggests that trauma exposure is common in the general population, and that PTSS and PTSD are prevalent sequelae of such exposure, increasing in prevalence with direct exposure to ‘high risk’ traumas such as rape, life threatening illness or accident, natural disasters, or combat. There is however another group of trauma victims, those who experience secondary traumatisation as a result of employment within the helping professions.

#### 1.4.3 *Secondary traumatisation: A risk factor for PTSS and PTSD*

Secondary traumatisation refers to the phenomenon of learning about another’s traumatic ordeal and experiencing traumatic stress, and is defined as “the natural, consequent behaviours and emotions resulting from knowledge about a traumatizing event experienced by a significant other....the stress resulting from helping or wanting to help a traumatized or suffering person” (Figley, 1995, p. 10). Consistent with primary traumatisation and the experiencing of PTSS, secondary traumatic stress reactions may include intrusive imagery and thoughts, avoidance and emotional numbing, hyper-arousal, somatisation, and alcohol and substance abuse (Figley, 1995). For secondary victims whose symptoms fail to remit, a clinical diagnosis of PTSD is also warranted (APA, 2000).

Many professionals risk secondary traumatisation through their contact with primary victims or material that contains graphic images of trauma. Fitzpatrick and Wilson's (1999) investigation of 71 abortion clinic workers, for example, revealed that 48% reported witnessing colleagues being pushed, shoved, or physically assaulted by protesters. In total, 21% of the sample reported PTSS consistent with a *DSM-IV* PTSD diagnosis. Of note however, was the finding that respondents witnessing the violence experienced a greater number of PTSS than the primary victims, explaining nearly 50% of the variation in symptom reporting. In addition, witnessing the violence remained a significant variable even after the effects of social support, life events, work history, and sociodemographic variables were controlled. Similar results were reported in a sample of 42 medical staff working within the Johannesburg Hospital Trauma Unit (Crabbe et al., 2004). In this instance, 17.5% of respondents were experiencing PTSD associated with exposure to incidents involving injured children, and victims of rape, sexual assault, fires, shootings, stabbings, and motor vehicle accidents.

Secondary traumatisation and high levels of PTSS and PTSD has also been found among mental health professionals. For instance, Birck (2001) observed high levels of PTSS in therapists working with torture survivors, and in a separate study of 100 psychotherapists, Kassam-Adams (1999) found nearly half reported levels of PTSS that suggested the need for clinical attention. In a sample of trauma counsellors, Arvay and Uhlemann (1996) found 14% had levels of PTSS similar to those reported in samples of outpatient PTSD clinics. A separate study of mental health workers who responded to the Oklahoma City Bombing, found 20.6% were exhibiting moderate to severe levels of PTSS, and 53.5% had moderate to extremely high risk of developing PTSD (Wee & Myers, 2002). Finally, Creamer and Liddle (2005) recruited 80 disaster mental health workers to examine the psychological impact of providing crisis intervention and grief

counselling to victims of the September 11 terrorist attacks. Client groups attended by these workers included survivors, family members of the injured and deceased, firefighters, police, construction workers, other relief workers, and military and flight crew/airport personnel. The results indicated that higher rates of PTSS and PTSD were significantly associated with increased periods of time spent working with child clients, firefighters (who suffered enormous losses in the attacks), or clients who discussed graphic material (e.g., encountering body parts in the rubble).

A wide body of evidence also exists highlighting the elevated levels of PTSS and PTSD in emergency services personnel, such as disaster rescue workers. For example, an empirical investigation undertaken by Weiss, Marmar, Metzler, and Ronfeldt (1995) of 154 emergency services personnel responding to a freeway collapse during the 1989 Loma Prieta earthquake in San Francisco, found that approximately 10% were exhibiting levels of PTSS consistent with a diagnosis of PTSD. Similarly, Epstein, Fullerton, and Ursano (1998) examined the incidence of secondary traumatisation in 355 military medical health care workers following an air disaster. In this instance, PTSD prevalence rates fluctuated from 7.5% of the sample at six months post-event, to 12.1% and 7.3% after 12 and 18 months, respectively. Consistent also are the findings of Ursano, Fullerton, and Koa's (1995) study of body handlers, which found a PTSD rate of 11% three months after exposure to disaster-related human remains. A recent study by Cetin, Kose, Ebrinc, Yigit, Elhai, and Basoglu (2005) comparing 434 non-professional and 154 professional soldiers involved in rescue efforts following the 1999 Marmara (Turkey) earthquake, found 27.7% of the non-professional rescuers experienced significantly elevated levels of PTSS compared with 10.4% of the professional control group. Finally, in the first study of its kind, 82 canine search and rescue handlers were recruited by Alvarez and Hunt (2005) to determine the impact of being deployed to 9/11 disaster sites.

Thirty-two canine handlers who were not deployed served as controls. Results indicated that 6 months post 9/11, deployed handlers experienced greater levels of PTSS than their non-deployed peers. Participants who reported experiencing fear, helplessness or horror at the time of deployment also reported higher levels of depression, anxiety and PTSD.

Other emergency services have also been the focus of extensive research. For example, an investigation by Wagner, Heinrichs, and Ehlert (1998) of secondary traumatisation in a representative sample of 318 professional German firefighters, found that 18.2% were experiencing PTSS at a level that met the criteria for a PTSD diagnosis. An additional 49.4% met criteria for a sub-clinical PTSD diagnosis. Secondary traumatisation was also examined in a more recent Australian study comprising 75 professional firefighters (Dean, Gow, & Shakespeare-Finch, 2003). Results indicated that 23% of these workers were experiencing varying degrees of PTSD. The majority of 31 British fire and rescue personnel surveyed by Haslam and Mallon (2003), also reporting experiencing duty-related PTSS. The most common symptoms were feeling emotionally upset when reminded of the traumatic event (55%), having upsetting thoughts or images about the event (32%), and having trouble falling or staying asleep (23%). Of those who reported that symptoms interfered with their life, the most common area was general satisfaction (55%), followed by family relationships (45%), and overall level of functioning (36%). Finally, Corneil et al. (1999) reported a PTSD prevalence rate of 39.5% in a sample of 828 American and Canadian firefighters exposed to traumatic work-related incidents.

Investigations of secondary traumatisation in police personnel have yielded similar results. A New Zealand study of 527 officers (Stephens et al., 1997) showed that traumatic events such as suicides, infant deaths and body recoveries, were significantly correlated with increased PTSS and PTSD. Similarly, Brown, Fielding, and Grover



(1999) conducted a factor analysis of operational stressors for 601 British police officers, and found that exposure to death and disaster, violence and injury, and sexual crimes were significantly associated with increased levels of psychological distress. In this instance, an average of 40% of respondents scored at or over the threshold value on the General Health Questionnaire (GHQ; Goldberg & Williams, 1988). Finally, Martin, McKean, and Veltkamp (1986) found that following exposure to duty-related traumatic events, 26% of American police officers reported PTSS meeting criteria for a PTSD diagnosis.

Paramedics, during the course of their duties, must also contend with a number of unique and potentially traumatic stressors, including exposure to incidents such as the death or serious injury of children, motor vehicle accidents, victims of violence and abuse, and confrontations with people in despair, all of which have been shown to be related to, and predictive of, PTSS and PTSD (e.g., Anshel et al., 1997; Haslam & Mallon, 2003; Ursano et al., 1995; Westerink, 1990).

#### 1.4.4 *Secondary traumatisation: A risk factor for PTSS and PTSD in paramedics*

One of the first studies recognising the effects of work-related stress in paramedics was conducted by Thompson and Suzuki (1991). Using the Impact of Event Scale (IES; Horowitz, Wilner, & Alvarez, 1979) and the General Health Questionnaire (GHQ; Goldberg & Hillier, 1979), a random sample of 40 experienced ambulance officers from the London Ambulance Service were found to have high PTSS scores on the intrusion scale of the IES and 60% showed signs of probable psychological distress as detected by the GHQ. An additional study of London paramedics by Rentoul and Ravenscroft (1993) found that 15% of frontline staff reported above threshold symptoms for PTSD, and 53% met criteria representative of recent mental disturbance. The British ambulance service

was also the subject of Clohessy and Ehlers' (1999) study in which 21% of a sample of 56 paramedics (including 2 trainees) met *DSM-III-R* criteria for PTSD as detected by the Post-traumatic Stress Symptom Scale (PSS; Foa, Riggs, Dancu, & Rothbaum, 1993), and 22% met GHQ screening criteria for psychiatric symptoms. Further, commonly attended incidents rather than major events were found to have a greater influence on paramedics' PTSS, and included dealing with cot death and other incidents involving children, distressed relatives, and dead or dying patients. Similarly, Alexander and Klein (2001) reported that from a sample of 110 Scottish paramedics, 30% recorded a high PTSS severity rating on the IES. Using the Posttraumatic Stress Disorder Checklist-Civilian Version (Weathers, Litz, Herman, Huska, & Keane, 1993), Berger and colleagues found that 20.6% of Brazilian ambulance officers were experiencing either high levels of PTSS or PTSD (Berger, Figueira, Maurat, Bucassio, Vieira, Jardim, Coutinho, Mari, & Mendlowicz, 2007).

Similar figures were reported by Grevin (1996) for an American sample of 120 qualified, and 105 student paramedics, where it was found that 20% of experienced officers and 22% of students were categorised as showing clinical levels of PTSS as measured by the Posttraumatic Stress Disorder (PK) scale (Keane, Malloy, & Fairbank, 1984), a derivative of the second edition of the Minnesota Multiphasic Personality Inventory (MMPI-2; Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989). Of the 86 Canadian paramedics surveyed by Regehr et al. (2002a), 29% fell into the high or severe category of scores on the IES, and of those who had previously taken mental health stress leave, 40% reported PTSS at the high or severe level.

In a study of 123 ambulance workers in The Netherlands, van der Ploeg and Kleber (2003) reported that 12% indicated experiencing levels of PTSS that met the full PTSD diagnostic criteria, as assessed by the Dutch version of the IES. Consistent with previous

findings, the most stressful incidents attended were those involving dead children (25%), medical emergencies (23%), severe accidents or injuries (21%), acts of violence or threats (13%), and attempted suicides (10%). An elevated level of PTSS was also observed in a sample of 362 Swedish paramedics surveyed by Jonsson, Segesten, and Mattsson (2003). Using the IES and the Post Traumatic Symptom Scale (Holon, Sund, & Weiseath, as cited in Jonsson et al., 2003), Jonsson et al. found that of the 223 officers who reported experiencing duty-related traumatic events, 15.2% recorded IES scores indicating a likely diagnosis of PTSD. A further 12% were found to have moderately severe PTSS.

Investigations of Australian paramedics have yielded similar results. Lowery and Stokes (2005), for example, found that 79% of a sample of 42 Victorian rural student paramedics experienced varying degrees of duty-related PTSS. Of these, 5% were diagnosed as suffering from PTSD as assessed by the Posttraumatic Stress Diagnostic Scale (PDS; Foa, 1995). A further 17% recorded mild to moderate PTSS, but failed to meet *DSM-IV-TR* Criterion A requirements (i.e., did not recall feeling intense fear, helplessness, or horror at the time of the event). Consistent with previous findings, the most traumatic duty-related events experienced were death of a child (21.4%), accidents and multiple fatalities (9.5%), and particularly gruesome situations (9.5%). Finally, Robinson's (2002) study into the health and stress of 906 Victorian paramedics revealed a significant number were experiencing PTSS consistent with the *DSM-IV-TR* PTSD diagnostic criteria, including: sleep problems (41%), concentration difficulties (34%), flashbacks (28%), detachment from others (28%), incident related intrusive thoughts (25%), anger outbursts (23%), physiological responses (e.g., sweating, trembling) to reminders of the event (13%), and avoidance of reminding stimuli (10%).

Empirical evidence also suggests that student paramedics may be particularly susceptible to experiencing secondary traumatisation. Cydulka and colleagues (1994) revealed that paramedics that had been employed for less than one year were significantly more stressed than those who had been in the current position for six to eight years. Similarly, Shakespeare-Finch, Smith, Gow, Embelton, and Baird (2003) found that after 18-months of service, new recruits to the ambulance profession reported lower levels of posttraumatic growth than their more experienced counterparts.

Professional inexperience has also been found to be associated with higher levels of PTSS and PTSD in other helping professionals. For instance, Corneil et al. (1999) observed that a lower rank was associated with an increased risk of PTSD in American and Canadian firefighters. Similarly, studies of body recovery workers from the Jonestown mass suicide (Jones, 1985), and air disaster sites (McCarroll et al., 1993) have found novices reported greater levels of ongoing emotional distress than experienced workers. Higher levels of stress and anxiety have also been reported in younger, less experienced rehabilitation counsellors (Cranswick, 1997; Corrigan & McCracken, 1997), trauma therapists (Arvay & Uhlemann, 1996; Neumann & Gamble, 1995), and medical interns (Firth-Cozens, 1987). Finally, Anshel et al. (1997) reported that in a sample of Australian police, inexperienced officers suffered greater psychological impairment, with the highest incidence and severity of distress occurring in their first year of active duty.

There are however, important methodological issues that require the above results to be interpreted with some caution. Most notable is that the development of the IES (Impact of Event Scale) predated the publication of the *DSM-III* and the official adoption of PTSD in the nomenclature. Therefore, the scale was not based on any formal *DSM* diagnostic criteria, and as such, lacks a measure of the PTSD hyperarousal symptoms (Briere, 2004; Orsillo, Batten, & Hammond, 2001). Consequently, the IES does not

provide a complete assessment of a respondent's PTSS. An additional caveat applying to both the IES and PSS (Post-traumatic Stress Symptom Scale) is that all items on these scales are anchored to a specific stressor and as a result, accurate PTSS scores for those who have experienced multiple traumas may be difficult to obtain (Briere, 2004). There has also been some criticism of the MMPI-2 derived PK scale as the development and validation of the MMPI-2 was primarily undertaken with veteran samples, and may be more sensitive to war-related PTSS than to that arising from civilian events (Briere, 2004). It has also been suggested that the PK scale is better at discriminating trauma exposure, rather than PTSD, and that the wide variety of non-PTSD-like symptom items contained in the scale may produce "false positives" when applied to depressed or highly symptomatic individuals (Wetzel, Murphy, Simons, Lustman, North, & Yutzy, 2003). Finally, although student paramedics were included in some studies (e.g., Clohessy & Ehlers, 1999; Grevin, 1996; Lowery & Stokes, 2005; Robinson, 2002), the small student sample sizes used by Robinson, and Clohessy and Ehlers prevents a comprehensive analysis of these individuals.

It should also be noted that PTSD prevalence rates indicate that not every emergency responder exposed to traumatic events develops the disorder. Research has increasingly identified that posttraumatic growth can also ensue for workers following exposure to duty-related traumatic incidents, with the individual functioning at a higher level post-trauma than prior to the event (Linley & Joseph, 2004; Tedeschi, Park, & Calhoun, 1998; Tedeschi & Calhoun, 2004). Positive outcomes include applying professional skills to achieve meaningful outcomes, increased professional capability and sense of control over adverse events, and greater appreciation for family (Paton, 2006). Sustained positive benefits and posttraumatic growth has been reported in samples of rescue workers following exposure to a major rail accident (Anderson, Christensen, &

Petersen, 1991), the Oklahoma City bombing (North et al., 2002), and Marmara earthquake (Karanci & Acarturk, 2005), and in studies of experienced and trainee police officers (Burke, Shakespeare-Finch, Paton, & Ryan, 2006; Moran, 1999; Moran & Colless, 1995; Paton & Burke, 2007). Shakespeare-Finch and colleagues have also reported on the occurrence of posttraumatic growth in both seasoned ambulance personnel and new recruits (Shakespeare-Finch et al., 2003; Shakespeare-Finch, Gow, & Smith, 2005).

In explanation of these findings, it is proposed that when emergency workers are exposed to a critical incident the worker may also experience psychological disequilibrium and struggle to accommodate the new experience within their existing schemata (Paton, 2005). Whether a new state of equilibrium emerges or not (i.e., growth vs. PTSD) is a function of how the traumatic experience interacts with the resources mobilised by the individual in response to the event (Paton, 2005). Resources include personality and dispositional factors, such as coping style and capacity to manage distress; ability to positively re-frame negative experiences; the availability of role models who have exhibited adaptive rumination and positive change; and emotional support and expression (Calhoun & Tedeschi, 2004, 2006; Jackson, 2007; Paton, 2005; Shakespeare-Finch et al., 2005). Additional factors influencing posttraumatic growth include elements of the organisation itself (selection, procedures, practices, culture); the presence of ongoing trauma-related distress and the severity of the traumatic event, with suggestions that extreme emotional disruption may in fact lead to poor adaptation (Calhoun & Tedeschi, 1998; Carver, 1998).

Although it is important that we understand the factors that protect some individuals from developing PTSD, it remains equally important to determine the prevalence rates and exacerbating factors for the disorder in high risk populations.

Student paramedics are one such population, yet the author's previous study is the only one to have examined duty-related PTSD in a stand-alone sample of student officers (Lowery & Stokes, 2005). Further, no study has attempted to ascertain just how early in their career paramedics are at risk of developing duty-related PTSS and PTSD. This is despite the fact that student officers with PTSD go on to become experienced paramedics, who not only have to continue contending with the distressing nature of their duties, but also contend with their ongoing psychological distress.

The omission of student paramedics from the PTSD research literature is a serious oversight, particularly when the implicated risk factors are some of those known to hinder posttraumatic growth. Among the implicated risks are characteristics of the trauma itself (i.e., severity and frequency of exposure), and characteristics of the individual and environment, including a personal history of prior trauma (e.g., Andrews, Brewin, Rose, & Kirk, 2000; Breslau, Davis, & Andreski, 1995); high emotional empathy (e.g., Figley, 1995; Regehr et al., 2002b); a perceived lack of emotional social support (e.g., Beehr et al., 1990; Lowery & Stokes, 2005); and emotional non-expression (e.g., Bremner & Brett, 1997; Lowery & Stokes, 2005). It should be noted that the influence of these risk factors on student paramedics' psychological wellbeing will be concurrent. However, they are discussed here separately to more clearly articulate their influence.

### 1.5 *Prior Traumatisation: A Risk Factor for PTSS and PTSD*

There are two conflicting theoretical perspectives on the ramifications of prior traumatisation for an individual's psychological health if subsequently exposed to another traumatic incident; the *resilience/inoculation perspective* (Petrosino, Fellow, & Brensilber, 1997) and the *vulnerability perspective* (Winkel et al., 2003). Consistent with posttraumatic growth, (e.g., Calhoun & Tedeschi, 2004, 2006), the resilience/inoculation

perspective posits that a prior traumatic experience offers an opportunity for learning and developing coping strategies, so that when faced with a new traumatic event the individual is better prepared, and able to cope (Petrosino et al., 1997). Repeated exposure to a stressful event may also serve to normalise perceived threat and make the circumstances of unusual events more understandable (Anderson, 1968).

Evidence in support of the resilience/inoculation model comes from several sources. For example, Follette, Polusny, and Milbeck (1994) found that mental health professionals with a childhood history of physical or sexual abuse did not experience significantly more negative responses to child sexual abuse clients, when compared with those without such a history. Further, counsellors with a prior trauma history were found to utilise significantly more positive coping strategies.

Studies of emergency services personnel have yielded similar results. Beaton et al. (1999) for example, surveyed 220 firefighters and found that neither years of service nor traumatic incident exposure in the previous 6 months, predicted future changes in self-reports of PTSS. This finding compliments those of Hytten and Hasle (1989) who found that compared to their novice colleagues, experienced volunteer and professional firefighters reported lower levels of PTSS associated with attending a multi-fatality apartment fire. These investigators argued that years of service, training, and exposure to previous traumatic incidents made it easier for these “seasoned” firefighters to cope with this traumatic event. Similarly, Perrin and colleagues (2007) compared PTSD rates across different occupations involved in rescue/recovery work at the World Trade Centre site. PTSD prevalence rates were significantly lower among workers and volunteers in occupations more likely to have had prior disaster training or experience.

In a more recent study, Burke (cited in Paton & Burke, 2007) compared posttraumatic growth scores in groups of police recruits that differed in regard to their



pre-employment and operational experiences of traumatic incidents. The highest rate of posttraumatic growth was seen in officers with a pre-employment trauma history and no operational trauma exposure, followed by those with a prior history and exposure to operational trauma. These findings led Burke to conclude that prior traumatic experiences can 'prime' officers to interpret duty-related critical incidents in a way that promotes psychological resilience. Finally, Burke et al., (2006) found that in a sample of 94 newly recruited Australian police officers, those with a prior trauma history experienced greater posttraumatic growth than those without prior history.

Conversely, the vulnerability perspective - the focus of the current study - considers repeated exposure to stressful events as a risk factor for illness. It holds that every stressful life event depletes available coping resources and thereby increases vulnerability to subsequent stress (Winkel et al., 2003), in turn increasing an individual's risk of experiencing psychological distress and developing PTSD.

Evidence in support of the vulnerability stance comes from a wide variety of studies. For example, Goenjian, Najarian, Pynoos, Steinberg, Petrosian, Strakyan, and Fairbanks (1994) reported that individuals exposed to both the political violence in Azerbaijan and the earthquake in Armenia in 1988, recorded greater PTSS severity when compared to those exposed to only one of the events. Similarly, Goldberg, True, Eisen, and Henderson (1990) examined the impact of frequent traumatisation in a sample of 2,000 male monozygotic veteran twin pairs, reporting a nine-fold increase in the rates of PTSD among twins who experienced repeated combat, compared to those who did not serve in Vietnam. In an Australian study of 1161 Vietnamese refugees (Steel, Silove, Phan, & Bauman, 2002), individuals exposed to more than three traumatic events were found to have a heightened risk of mental illness (12%) compared to those with no trauma exposure (3%).

In a longitudinal study of 125 adolescents and young adults (aged 14 to 24 years), Perkonigg et al. (2005) found exposure to new traumatic events between baseline and follow-up measures was the most robust and significant difference between chronic PTSS sufferers and those in remission. A meta-analysis of predictors of PTSD (involving 23 studies and 5,308 participants) conducted by Ozer, Best, Lipsey, and Weiss (2003) found a statistically significant (although small) effect size for prior trauma history. On average, higher levels of the disorder were reported by those who experienced a traumatic event prior to the target stressor, than those who indicated they had not been previously exposed. In addition, the strength of the relationship between prior trauma and PTSD did not differ according to the type of sample studied (e.g., community, medical patients, or individuals seeking mental health services), nor by the time elapsed since the trauma, or method by which PTSS severity was assessed.

Support for the vulnerability perspective in emergency services personnel comes from Moran and Britton (1994) who surveyed 210 Australian volunteer state emergency service workers and firefighters. The authors found that after responding to a disaster, workers with a personal trauma history experienced higher levels of PTSS than those without history. Consistent also are the findings of Stephens and colleagues (1996, 1997, 1998) showing the number of traumatic events experienced either on or off duty by New Zealand police were correlated with PTSS severity, and that chronic experience of similar events predicted higher levels of distress. Similarly, Corneil (1995) reported a positive relationship between years of service (i.e., repeated trauma exposure) and level of PTSS in a sample of professional Canadian firefighters.

The cumulative effects of trauma were also examined by Dougall et al., (2000), who collected measures of the trauma history and psychological health of 108 workers actively involved in recovery duties following a major airline disaster. Stress levels were

expected to differ across four time periods on the basis of the similarity of prior trauma exposure to work at the crash site. The results showed that prior traumatic exposure “dissimilar” to that experienced at the site was associated with greater vulnerability to crash-related stress. That is, more distress and crash-related intrusions during the year following the disaster.

The negative impact of trauma exposure on the psychological health of body handlers has also been reported in several studies by McCarroll and colleagues (1993, 1995, 2002). In one such study, military personnel who had volunteered to handle human remains in Operation Desert Storm were compared to those who did not handle remains. It was found that those involved in body recovery duties reported significantly more intrusive and avoidant posttraumatic symptoms than those who did not undertake this work. Further, personnel who were inexperienced at handling remains had significantly higher intrusion, avoidance and total Impact of Event Scale scores than did those with prior experience (McCarroll et al., 1993). In a follow-up study, the authors reported that after more than one year, individuals who had handled human remains during wartime were at higher risk for PTSD symptoms than those who had not (McCarroll et al., 1995).

In a more recent study, McCarroll et al., (2002) examined the relationship between exposure to the dead and the development of somatic symptoms in 352 military men and women who worked in the mortuary that received the dead from Operation Desert Storm. The respondents were volunteers and nonvolunteers for assignment to the mortuary; some had prior experience in handling the dead and some did not. Workers’ levels of somatic symptoms were recorded as soon as they arrived for duty at the mortuary, and following the completion of their shift. Four independent exposure categories were created and ordered from the most exposure to no exposure to the remains.

When the individual exposure groups were compared, there were significant increases in somatization symptoms for the body handlers (who assisted with the processing of the bodies through the identification phase and who reported that they had personally handled one or more bodies) and the exposed by duty group (workers assigned to a mortuary duty, such as x-ray or handling personal effects, where it was almost certain they had seen a large number of bodies, but who reported they had personally handled none). No significant pre-post differences were observed in the group that had observed bodies being removed from transfer cases (but whose full-time job was outside the mortuary), or the unexposed group. Importantly, body handlers with preexposure levels of somatic symptoms reported higher postexposure somatic reactions, indicating that distress is present in anticipation of exposure to duty-related traumatic events (McCarroll et al., 2002). Available evidence shows that although some individuals are able to successfully cope with both initial and subsequent traumatisation, others are not. For the latter, difficulty coping with the initial trauma appears to result in residual stress, and indeed, research has shown that prior traumatisation increases vulnerability and the risk of experiencing PTSS and PTSD (e.g., Goenjian et al., 1994; Perkonig et al., 2005; Stephens et al., 1997, 1998). The findings of increased psychological vulnerability associated with exposure to traumatic events dissimilar to those previously experienced (Dougall et al., 2000), and in workers directly involved in handling human remains (McCarroll et al., 1993, 1995, 2002), also have important implications for student paramedics. Specifically, general population data indicates the majority of student paramedics will enter the profession with a personal trauma history (Creamer et al., 2001), and their duties will also dictate exposure to a range of traumatic events they are unlikely to have previously experienced, such as handling human remains. In

combination, these factors indicate that student paramedics may be particularly vulnerable to developing duty-related psychological distress.

#### 1.5.1 *Prior traumatisation: A risk factor for PTSS and PTSD in paramedics*

Gist and Woodall (2000) suggest that those who self-select to join the emergency services are aware prior to becoming operational that exposure to adverse incidents is an integral aspect of their duties, and therefore have some expectation of being involved in such situations. However, it could also be argued that although these workers may expect to be confronted by traumatic incidents, the reality of their duties cannot be fully realised until they are operational, and are exposed to the actual sights, sounds and smells of such events, along with the emotional distress of those they are seeking to assist.

Robinson's (2002) Australian study provides a clear illustration of the types of traumatic events that from their first day of operational duties, student paramedics can be frequently re-exposed to. Robinson found that of the 906 respondents, 78% (706) had rendered medical aid to children or infants within the past year, 14% (127) had confronted situations involving multiple fatalities of five or more victims, 31% (281) dealt with at least ten deceased people within a month, and 85% (770) had encountered particularly gruesome situations, such as decapitations and fatal shotgun head injuries.

Paramedics respond to more emergency calls than fire and police services combined (James & Wright, 1991), and are frequently the first personnel on the scene of a traumatic incident (Clohessy & Ehlers, 1999). During the period of 2005-2006, Australian ambulance service organisations attended 2.55 million incidents nationally, with 69% of these being high priority (i.e., life threatening) emergency incidents (Australian Bureau of Statistics, 2007). With a total workforce of approximately 12,000

operational paramedics, this equates to each officer being exposed to an annual average of 209 high priority cases (ABS, 2007).

Gist and Woodall (2000) have further argued however, that for most personnel in high-risk occupations, the encounter with adversity itself is not a source of threat or loss to the individual. Instead, it is perceived as a challenge in which officers can use their skills during encounters with the very situations they have been trained to manage. Undoubtedly, attending high priority cases does offer an opportunity for paramedics to utilise their clinical skills, however, studies show that the 'challenge' of repeated duty-related trauma exposure can also lead to psychological distress.

Consistent with the vulnerability model of PTSD, only 8% of the 906 paramedics in Robinson's (2002) study believed a single incident was responsible for their current post-trauma reactions, compared to 40% (362) who attributed them to the cumulative effects of duty-related traumatic events. Similarly, Alexander and Klein (2001) reported that 69% of Scottish paramedics believed they were never given sufficient time to recover emotionally between critical incidents, suggesting a vulnerability to prior trauma. Also consistent are several findings of a significant positive relationship between paramedics' length of service and increased PTSD symptomatology (e.g., Alexander & Klein, 2001; Jonsson et al., 2003; Mitchell & Dyregrov, 1993; Moran & Britton, 1994; Young & Cooper, 1999).

As student paramedics' clinical skills are learnt on-the-job, rather than perceiving duty-related traumatic incidents as a challenge (Gist & Woodall, 2000), it is highly likely that a substantial number would become overwhelmed by their duties, and experience a reduction in coping resources. This is particularly likely for those students exposed to traumatic incidents that are dissimilar to those previously experienced (Dougall et al., 2000), including handling the deceased (McCarroll et al., 1993, 1995, 2002), and as

Robinson's (2002) study showed, exposure to multiple fatalities is a common scenario for paramedics.

Several studies indicate that as a result of repeated duty-related trauma exposure, student paramedics may be particularly vulnerable to developing PTSD. For example, Grevin (1996) found that 22% of the 105 student paramedics included in her study were suffering from the disorder. A vulnerability to repeated duty-related trauma exposure can also be inferred from Shakespeare-Finch et al's., (2003) findings that when compared with more experienced officers, new recruits to the ambulance service reported lower levels of posttraumatic growth after 18-months of duty. Similarly, Cydulka and colleagues (1994) reported that paramedics with less than one year of experience were significantly more stressed than those with a longer length of service. Finally, Lowery and Stokes' (2005) study of student paramedics found that each student had attended an average of 20 emergency incidents during the previous month, and 79% were experiencing varying degrees of duty-related PTSS.

The exposure rate of student paramedics to duty-related traumatic events as reported by Lowery and Stokes (2005), is significantly higher than that reported in police recruits, where each officer attended an average of only 1.4 duty-related traumatic events during the entire year (Paton, Huddleston, & Stephens, cited in Paton, 2005). This significant disparity in trauma exposure rates may actually render student paramedics particularly vulnerable to experiencing duty-related psychological distress, rather than experiencing the posttraumatic growth or increased resilience reported in recruits to other emergency services (e.g., Burke, 2007; Burke et al., 2006; Paton & Burke, 2007). Supporting this argument, Marmar, Weiss, Metzler, Rondfelt, and Foreman (1996) found that paramedics reported higher PTSS severity compared with police and fire personnel who attended a freeway collapse. Further, higher levels of distress were associated with

less preparation for the critical incident. Consistent also is the fact that approximately 20% to 25% of all paramedics suffer from clinical levels of PTSD (Bennett, Williams, Page, Hood, & Woollard, 2004; Clohessy & Ehlers, 1999; Grevin, 1996; Thompson & Suzuki, 1991; Regehr et al., 2002a), which is significantly higher than the 10% found amongst police and firefighters (McFarlane, 1988; Weiss et al., 1995).

Studies of other emergency services personnel infer that entering the ambulance profession with a prior trauma history may further increase student paramedics' vulnerability to duty-related trauma exposure. Moran and Britton (1994) for example, found that after responding to a disaster, volunteer state emergency service personnel and firefighters with a personal trauma history also experienced higher levels of PTSS than those without history. Similarly, Burke et al's., (2006) study of police recruits showed those with a prior trauma history experienced greater psychological distress. Finally, Burke's study showed that police recruits with a trauma history at point of entry, experienced less posttraumatic growth after exposure to operational trauma, than did those with a prior trauma history and no operational trauma (cited in Paton & Burke, 2007).

Taken together these findings have important implications for the health of student paramedics entering a profession in which repeated exposure to traumatic events is high. If they begin work with unresolved trauma and depleted coping resources, they not only face the risk of exacerbated psychological distress, but may also have poorer performance and be among the first to seek early retirement (Stephens et al., 1997). Given that the lifetime prevalence rate of trauma exposure is 65% for Australian men, and 50% for women (Creamer et al., 2001), it is reasonable to expect that a significant number of student paramedics will in fact enter the profession with a prior trauma history. It is also reasonable to expect that upon entry to the profession, student paramedics are unlikely to



have already experienced the full range of traumatic events they will ultimately encounter during their training. This may further increase students' vulnerability to developing duty-related PTSD, as exposure to dissimilar events, such as body handling (McCarroll et al., 1993, 1995, 2002) has been linked to increased psychological distress (Dougall et al., 2000). In addition, the rate at which student paramedics are exposed to potentially traumatic events may place them at even greater risk of developing duty-related PTSD, when compared to recruits of other emergency services (e.g., Marmar et al., 1996; Weiss et al., 1995). However to date, no study has been conducted to determine the prevalence of student paramedics' pre-operational trauma history, or how prior trauma may contribute to duty-related PTSS severity and PTSD. In addition, no study has assessed student paramedics' psychological health prior to becoming operational in order to investigate the impact of frequent exposure to duty-related traumatic events.

Apart from entering the profession with a prior trauma history, evidence also implies a significant number of student paramedics may commence duties with a high level of emotional empathy, and this may further exacerbate the negative impact of duty-related traumatic stress.

### 1.6 *Emotional Empathy: A Risk Factor for PTSS and PTSD*

Emotional empathy is a basic or 'primitive' level of interpersonal relations whereby almost through a process of contagion, an individual responds with emotions similar to those of others who are present (Stotland, 1969). The relationship between empathic tendency and 'self-other' differentiation was examined by Corcoran (1982), using a 16-item self-report measure that rated emotional separation between the respondent and another in interpersonal relationships. Scores on the Emotional Empathic Tendency Scale (EETS; Mehrabian & Epstein, 1972) correlated significantly and

negatively with self-other differentiation, showing that more empathic persons were less able to differentiate their own feelings from those of others. These findings imply that individuals are at greater risk of developing psychological distress if another's trauma is felt as being one's own.

Heightened emotional empathy is also exhibited through prosocial behaviours and orientation. Rushton, Chrisjohn, and Fekken (1981), for example, recruited 200 university students, and instructed them to rate the frequency with which they engaged in 20 altruistic behaviours, such as donating money to charity, giving blood, or helping an elderly or handicapped stranger across a street. Results indicated that students high in emotional empathy exhibited significantly more altruistic behaviours than those who recorded low scores on this trait. Similarly, Van Ornum, Foley, Burns, DeWolfe, and Kennedy (1981) found higher emotional empathy scores in undergraduate students belonging to help-oriented campus organisations, when compared to those belonging to self-interested groups. Finally, Elizur and Rosenheim (1982) examined the empathic tendency of medical students in comparison to that of students in psychosocial professions (e.g., psychology, psychiatry, and social work), and undergraduates in other sciences (e.g., economics, physics, chemistry). Mean scores on the EETS (Mehrabian & Epstein, 1972) indicated that both the medical and psychosocial students reported higher levels of empathy than did students in the science groups. These findings suggest that more emotionally empathetic individuals may self-select professions with greater interpersonal and emotional interactions, thereby placing themselves at greater risk of exposure to trauma victims, and the possibility of experiencing PTSS.

On the basis of available literature, it appears that highly empathic individuals may gravitate towards professions that involve frequent trauma exposure, such as the emergency services. However, in professional relationships, high empathy may be

counterproductive, as these individuals are prone to being easily affected by others' emotional experiences, and at times, are unable to differentiate these experiences from their own (e.g., Corcoran, 1982). Consequently, highly empathic emergency responders may be at greater risk of developing work-related PTSS and PTSD.

#### 1.6.1 *Emotional empathy: A risk factor for PTSS and PTSD in paramedics*

Paramedics often develop strong bonds with the patients they are caring for, particularly in instances where there are prolonged times on scene (e.g., extrication of motor vehicle accident victims) (Mitchell & Dyregrov, 1993). However, due to a lack of research, it is only possible to conjecture about the relationship between paramedics' emotional empathetic tendencies and duty-related PTSS severity. An exhaustive examination of the research literature reveals Grevin's (1996) study as the only one to have included this personality trait. In this instance, paramedics' use of denial coping strategies mediated the relationship between emotional empathy and PTSS. Grevin proposed that a highly empathic person who does not tend to use denial as a coping strategy may be prone to experiencing PTSS while a highly empathic person who uses a lot of denial may be less likely to develop symptoms. Consistent with this stance, investigations of rescue workers and body handlers have noted that the least stressed used psychological defenses that involved the dehumanising of bodies, such as not looking at victims' faces or learning their names (McCarroll et al., 1993; Taylor & Frazer, 1982). However, as Grevin did not specifically examine the contribution that particular levels of empathy and denial (e.g., high or low) made to paramedics PTSS severity, the results do not support the proposition that increased use of denial coping strategies in highly empathic workers is a protective mechanism.

Research has shown that paramedics' use of denial does not protect them against the development of duty-related PTSS or PTSD. Alexander and Klein (2001), for example, found that although 80% of 110 paramedics surveyed refused to acknowledge distressing duty-related experiences or emotions, the majority of them claimed this approach was unhelpful, and indeed, 32% were suffering from PTSS. Further, a third of respondents commented on the need for better training and pre-incident briefings to help them cope with the emotional aspects of their duties. Similarly, paramedics in Regehr et al.'s (2002b) study described using the conscious process of emotionally distancing themselves so that they did not become emotionally attached to a victim or their family. However, 84% of the sample was also suffering from varying degrees of PTSS. Several other authors have also observed a significant positive relationship between paramedics' use of emotion-focused coping strategies (e.g., denial) and PTSS severity (e.g., Clohessy & Ehlers, 1999; Genest, Levine, Ramsden, & Swanson, 1990; Thompson & Suzuki, 1991).

Evidence of a relationship between heightened empathic tendencies in emergency responders and increased PTSS comes from several studies. Cetin et al. (2005), for example, reported higher levels of PTSD in earthquake rescuers who noted self or family-identification with victims, suggesting these individuals became emotionally engaged with another's distress to the point that they could feel as if it was their own. This finding compliments that of Ursano et al. (1999) who noted increased PTSS severity in disaster workers who emotionally identified with a deceased person in reference to a friend. Finally, Carlier et al. (2000) found situations in which police were confronted with the vulnerability of victims, such as in abuse or murder, were associated with higher rates of psychological distress.

Grevin (1996) also reported that both student and experienced paramedics scored low on emotional empathy. Contrary to previous suggestions of highly empathic individuals being attracted to the helping professions (e.g., Elizur & Rosenheim, 1982), Grevin proposed that low empathy may actually be a personality trait of paramedics. However, a limitation to this proposition is that most of the student officers in Grevin's study had some operational ambulance experience, and therefore an uncontaminated measure of their emotional empathy could not be obtained. In addition, the single measure of this trait prevented any investigation of possible changes in the students' emotional empathy. As the following comment from a spousal study indicates, paramedic duties appear to negatively influence this trait: "She had a very empathic personality. But because of what is happening in her job, she is changing....the longer she's there, the harder she becomes" (Regehr, 2005, p. 105).

Empirical evidence of individual changes in this trait is also available from studies of other helping professionals. Crabbe et al. (2004), for example, reported the majority of 42 hospital trauma unit staff felt their attitudes towards patients had changed from when they first began working in the unit, and they now felt less sympathetic. Furthermore, the majority believed this change was a consequence of serial exposure to critical work incidents. Similarly, Stradling et al. (1993) conducted a study involving male British police recruits and found that high levels of empathy at entry were significantly depressed on completion of their 2-year probationary period.

As the reported findings occurred in the presence of work-related traumatic stress, it could be argued that declines in emotional empathy reflect a worker's progressive reliance on emotion-focused coping strategies. According to Folkman and Lazarus (1988), this form of coping involves an internal process of taking steps to ease and regulate stressful emotions resulting from a negative event. Coping strategies typically

include emotional distancing in the form of social withdrawal, and the avoidance and denial of trauma emotions and experiences (Folkman & Lazarus, 1988). As previously discussed, paramedics frequently rely on avoidance and denial as a means of coping with the distressing nature of their work (e.g., Clohessy & Ehlers, 1999; Grevin, 1996; Regehr et al., 2002b). Moreover, these strategies have been found to be significantly associated with increased PTSS in these workers (e.g., Clohessy & Ehlers; Genest et al., 1990). Therefore, Grevin's finding of low emotional empathy in student paramedics may be better accounted for in terms of their progressive reliance on emotion-focused coping strategies, rather than an inherent lack of emotional empathy.

On the basis of available evidence, it is plausible to expect that prior to commencing on-road ambulance duties, student paramedics would typically exhibit average or above average levels of emotional empathy. Although this trait will allow students to carry out their duties with care and compassion, repeated empathic engagement with trauma victims may also deplete existing coping resources. Consequently, empathic engagement with patients may contribute to the initial onset of duty-related PTSS in this population. It is also reasonable to expect a decline in empathic tendency as students begin to adopt emotional self-distancing as an alternative means of coping with the distressing nature of their work (e.g., Regehr et al., 2002b). This in turn, may contribute to the exacerbation of students' PTSS. However, to date, these hypotheses have not been quantitatively investigated in a single-sample of student officers. Also overlooked is the possibility that changes in student paramedics' emotional empathy (e.g., increased emotional distancing) may contribute to constraints in their social relationships, and the loss of an additional coping resource.

### 1.7 *Perceived Social Constraints: A Risk Factor for PTSS and PTSD*

Social support has been studied extensively as a coping resource that can mitigate the adverse psychological effects of environmental stressors (cf. Brewin, Andrews, & Valentine, 2000) and it is documented that the presence of stress, frequently considered as an index of need for support, is related to greater amounts of assistance (Norris & Kaniasty, 1996; Southwick et al., 2000). Assistance may be provided in the form of informational support (e.g., advice or guidance), instrumental support (e.g., providing a direction resolution to the problem), social companionship, and/or emotional support (the focus of the current study) (Cohen & Wills, 1985). However, a number of writers have also noted that many stressful life events involve dramatic changes in the type and amount of social support an individual may receive (Campbell, Ahrens, Sefl, Wasco, & Barnes, 2001; Cordova, Cunningham, Carlson, & Andrykowski, 2001; Dyregrov, 2003; Schmidt & Andrykowski, 2004) and constraints in this valuable resource can occur for a myriad of reasons. Common constraints associated with a lack of emotional social support include, having support networks whose members say or do things that are perceived as being inappropriate or insensitive, outright negative reactions from others or a lack of access to people who are willing to lend a sympathetic ear (Dyregrov, 2003; Wortman & Lehman, 1985).

Dyregrov (2003) for instance, conducted in-depth interviews with 69 parents who lost a child to suicide, Sudden Infant Death Syndrome, or accident, and reported the majority of parents experienced a lack of emotional support through others' inappropriate or thoughtless remarks, such as, "it's not that bad", or "you can always have another baby." Some of the utterances also gave rise to long-term frustrations and could never be forgotten, such as, "As you had all the problems with your boy, this must also be a relief." In this instance, the parent had lost a child to suicide. The majority of parents also

experienced constraints in emotional support associated with the outright negative reactions from support providers. Reactions included having members of their social networks change direction, cross the street, or look the other way when they caught sight of the bereaved person. Diminished emotional support in the form of conversational avoidance was also commonly practiced by network members. This included support providers avoiding any conversations associated with death in general or about that particular death, or not referring to the deceased by name. The ramification of these emotionally constrained relationships was that parents were deprived of the opportunity to discuss their feelings and thereby process their grief with support providers (Dyregov, 2003), in turn, hindering their trauma recovery (Horowitz, 1986).

Schmidt and Andrykowski (2004) also found conversational avoidance to be associated with negative health outcomes in 210 breast cancer patients. The authors found that when participants perceived that family and friends did not want to discuss their cancer experience, or actively discouraged attempts at such discussion, they reported significantly more breast cancer-related distress, depression and anxiety. Further, these constraints served to increase cancer-related intrusive ideation, leading the authors to conclude that in an emotionally constraining environment, illness-related intrusions may occur but may not be adequately processed, resulting in chronic distress.

In a related but separate form of emotional social constraint, psychological defense mechanisms of social network members might lead them to act in undesirable ways. For instance, people might worry that a traumatic event that befell a friend could just as easily happen to them (Coates, Wortman, & Abbey, 1979). Consequently, potential support providers may attempt to maintain their own illusions of control and invulnerability by distancing themselves from the victim. In turn, victims are denied emotional support, intensifying the negative consequences of the trauma (Janoff-Bulman, 1992). Supporting



this proposal, studies conducted with victims of marital violence (Andrews & Brewin, 1990), rape (Campbell et al., 2001), and non-sexual assault (Andrews, Brewin, & Rose, 2003; Ullman & Filipas, 2001; Zoellner, Foa, & Bartholomew, 1999) have found others' negative reactions, such as emotional withdrawal, to be associated with victims' increased psychological distress.

It is evident that rather than mobilising emotional support, traumatic stressors can have a constraining effect on this valuable resource. In turn, emotionally constrained relationships can exacerbate individual levels of stress, and hinder the recovery process by preventing the discussion of trauma-related emotions (Horowitz, 1986, 2001). These findings are particularly relevant for student paramedics, as experienced officers frequently perceive their social relationships as being emotionally constrained, and report an associated psychological vulnerability.

#### 1.7.1 *Perceived social constraints: A risk factor for PTSS and PTSD in paramedics*

Due to the small body of existing research involving student paramedics, it is only possible to conjecture about the extent of perceived emotional social constraints in this population (e.g., Clohessy & Ehlers, 1999; Lowery & Stokes, 2005). However, studies of experienced paramedics and other emergency responders suggest that long-term emotional support from colleagues, family and friends may be difficult for these workers to obtain (e.g., Alexander & Klein, 2001; Beaton et al., 1997; Bennett et al., 2005; Regehr & Millar, 2007; Revicki & Gershon, 1996; van der Ploeg & Kleber, 2003).

Emergency services personnel work within an informal job culture of emotional toughness (e.g., Alexander & Klein, 2001; Bennett et al., 2005; Regehr et al., 2002b), and this ethos can constrain the provision of emotional social support in a number of ways. Most notably, it discourages the disclosure of one's real emotions, thus it is unlikely that

student paramedics will be able to access experienced colleagues who are willing and sympathetic listeners (Lowery & Stokes, 2005). Further, as experienced paramedics typically rely on emotion-focused coping strategies such as denial, in order to avoid reminders of their traumatic experiences (e.g., Clohessy & Ehlers, 1999; Grevin, 1996), they are unlikely to initiate emotion-based discussions of traumatic incidents with new recruits. Similarly, it is reasonable to expect that decreased emotional empathy in experienced paramedics (Grevin, 1996) would result in diminished acknowledgement of junior officers' emotional distress, and therefore reduced emotional support.

A recent internally conducted workplace survey of Victorian paramedics clearly illustrates the difficulties both experienced and student officers face in obtaining emotional peer support. For example, it was revealed the majority believed they worked within an oppositional and competitive environment, and felt they were expected to adopt several aggressive and/or passive (e.g., defensive) behaviours in order to 'fit' in (G. Sassella, personal communication, September 25, 2007). These behaviours included working against peers to be noticed, gaining status and influence by being critical of colleagues, shifting responsibility to others, avoiding being blamed for mistakes (e.g., covering up), conforming to workplace norms (e.g., emotional non-expression) by following the 'rules', and seeking others' approval (e.g., conforming to the 'rules').

Student paramedics may be further constrained in accessing emotional support from their experienced peers by the fact that they undertake formal assessments during training (M. Achkar, personal communication, March 3, 2003). That is, a fear of professional repercussions may result in students being reluctant to raise emotional issues which may be construed as signaling traumatic stress. In the event that student paramedics do seek out and find experienced colleagues willing to provide such support, consistent with Dyregrov's (2003) findings, evidence suggests the type of 'support'

offered may also be inadequate and/or involve insensitive comments. Robinson's (2002) qualitative analysis of paramedics' descriptions of the worst jobs they have attended illustrates this point. For instance:

"5 people killed in one accident...4 from the one family...2 decapitations in the car. The group manager gave us about an hour to recover...then we got called out again" (Robinson, 2002, p. 47).

"A friend who committed suicide and having my colleague laugh and say it's a pity it wasn't you" (Robinson, 2002, p. 48).

The psychological impact of paramedics perceiving their workplace as being emotionally non-supportive is well documented. For instance, Beaton et al. (1997) surveyed 253 experienced paramedics and found that almost half were dissatisfied with their coworkers' support. Furthermore, low emotional support was significantly related to increased PTSS and perceptions of occupational stressor levels. Elevated PTSS in paramedics was also reported by Clohessy and Ehlers (1999) under high stress/low emotional support conditions. Van der Ploeg and Kleber (2003) also found a general lack of workplace support, including emotional support, to be one of the best predictors of PTSS severity in their study of ambulance personnel. In a prospective study of ambulance officers by Revicki and Gershon (1996), it was found that low levels of emotional support from paramedics' work groups and supervisors predicted greater levels of work-related stress at six-month follow-up. Similarly, in an Australian study of 60 paramedics, Pisarski, Bohle and Callan (2002) found diminished emotional support from co-workers and supervisors was directly associated with increased psychological distress. More recently, Regehr and Millar (2007) noted paramedics' increased levels of stress, trauma and burnout were associated with a perceived work environment that was high in demand, low in control, and low in emotional support. Finally, Lowery and Stokes (2005)

found that student paramedics experienced a significant increase in psychological distress when they felt emotionally unsupported by their colleagues, and by association, were unable to confide in them. In addition, emotional workplace support was found to decrease as students' paramedic tenure increased; a finding also reported in experienced officers (e.g., Revicki & Gershon, 1996). It should be noted however, that as the majority of these studies were cross-sectional in design, conclusions could not be drawn concerning the casual direction of these results. It is possible the positive relationships found between constrained emotional social support and psychological distress simply reflected that individuals with greater PTSS felt more disgruntled about their work. Nonetheless, findings of greater psychological distress under conditions of low emotional peer support (e.g., Lowery & Stokes, 2005; Regehr & Millar, 2007; Sterud et al., 2006; van der Ploeg & Kleber, 2003) suggests that constrained workplace relationships increases a worker's vulnerability to work-related stress, particularly when the support offered is not appropriate for the needs elicited by the traumatic event (Cohen & Wills, 1985).

Regehr and colleagues (2002b) are among the few researchers who have investigated the impact of socially constrained relationships with family and friends on paramedics' psychological wellbeing. In a study of 86 experienced officers, the authors found a perceived lack of emotional support from non-work support providers was significantly associated with increased rates of mental health leave. Further, paramedics' use of emotional distancing as a coping strategy was found to significantly contribute to family members' negative feelings towards the relationship. As one paramedic noted, this strategy "tends to make [my] family feel like they don't mean something....I can't go back and forth [emotionally] and that's a problem..." (Regehr et al., 2002b, p. 510).

In a separate qualitative study, one respondent described the impact of a work-related traumatic event on the family. “When you find yourself living with somebody that is something of a mine field, you have to develop ways of not stepping on their mines....you have to kid-glove it all the time because you’re not sure whether they’re gonna go off” (Regehr, 2005, p. 106). To cope, many family members developed independent interests and friends, or tried to avoid highly emotional interactions with their partner, at times subjugating their own needs out of a “...fear of triggering or making things worse” (Regehr, 2005, p. 108).

Negative spill over at home was also reported by the majority of paramedics in Carrington, Stark, Bluehardt, and MacLennan’s (1999) study. For instance, more than half of the sample agreed they had become emotionally hardened by their work. A number of additional duty-related difficulties were also reported, including treating family members like impersonal objects, and workers taking their frustrations out on family and friends, even though they recognised they were not related to the problem. Finally, a small proportion of respondents noted that family members considered them to be unfeeling, and too dictatorial or authoritarian, and that their spouse felt that he/she came second to their job.

The findings of Regehr and colleagues (2002b, 2005), and Carrington et al., (1999) clearly illustrate the constraining effect that duty-related stress can have on paramedics’ domestic relationships. Further, it is reasonable to expect that given these constraints, paramedics may find it difficult to access family or friends who are always willing to lend a sympathetic ear (Wortman & Lehman, 1985), and provide continued emotional support.

Additional constraints to accessing non-work emotional support occurs when paramedics deliberately chose to not burden family and friends with the distressing details of their duties, or feel that those outside of the job will not understand (Alexander

& Klein, 2001; Carrington et al., 1999; Regehr et al., 2002b). Alternatively, constraints can occur as it is too difficult for the families of emergency services personnel to be “barraged” with the problems of the job on a daily basis (Graham, 1981). Regehr (2005) for example, found that although paramedics’ spouses wanted to be emotionally supportive, the gruesome and graphic details of their partner’s work resulted in discomfort, distress, and visual imagery of the event. Consequently, avoidance responses were triggered in many of these support providers, and they no longer wished to engage in such discussions (Regehr, 2005). Similarly, Carrington et al., (1999) reported a minority of paramedics believed their spouse had difficulty coping with the stresses of their job. Given the reciprocal nature of intimate relationships, it is highly likely that paramedics who feel unable to openly discuss duty-related emotions with family and friends would in turn, be reluctant to engage in future self-disclosure, adding further emotional constraint to these relationships.

Studies of other emergency responders would appear to support this, and have shown a relationship exists between a perceived lack of emotional support from non-work support providers and changes in workers’ attitudes towards emotional expression. McCarroll et al. (1993) for example, described body handlers’ first (and sometimes only) attempts to tell their spouses how they felt about their work. The authors reported that many of these responders were unlikely to repeat the experience, as they felt their spouse was unwilling to hear about their duties, or listen to their trauma-related emotions. Similarly, in a sample of 594 police officers, Brown and Grover (1998) found a significant relationship between low levels of perceived emotional social support from family and friends, and officers’ high levels of negativity towards emotional expression.

Taken together, evidence suggests that in the process of carrying out their duties, a significant number of student paramedics will also experience perceived constraints in the

amount of emotional social support they receive from colleagues, family and friends. Workplace constraints are likely to occur as experienced paramedics typically adhere to an informal ethos of emotional toughness as a way of coping with their duties (e.g., Alexander & Klein, 2001; Bennett et al., 2005; Regehr & Millar, 2007), and students will be working within this environment. Consequently, if students experience trauma-related difficulties, it is unlikely that they will also experience unconstrained emotional social support from their more qualified peers (e.g., Clohessy & Ehlers, 1999; Lowery & Stokes, 2005; Pisarski et al., 2002; Sterud et al., 2006; van der Ploeg & Kleber, 2003). Social relationships with family and friends may also become emotionally constrained, due in part to perceived negative responses from support providers, and a duty-related decline in students' emotional engagement and tolerance of others (e.g., Alexander & Klein, 2001; Carrington et al., 1999; Regehr, 2005; Regehr et al., 2002b). In turn, diminished work and non-work emotional social support may prevent student paramedics from effectively processing their trauma-related emotions, further exacerbating their duty-related psychological distress (Horowitz, 1986, 2001).

The reported findings of paramedics' lack of workplace emotional social support is of concern in light of the fact that new recruits to the trauma field are particularly vulnerable to secondary traumatisation if early and appropriate support is not provided (Lunn, 2000; Neumann & Gamble, 1995; Sexton, 1999). Furthermore, without emotional social support and access to role models who have successfully reframed traumatic incidents, posttraumatic growth studies show that student paramedics are likely to experience increased psychological vulnerability, rather than adaption (Calhoun & Tedeschi, 2004, 2006). However, to date, no study has assessed student paramedics' levels of perceived workplace emotional social support upon commencement of on-road ambulance duties, nor the relationship between students' initial levels of co-worker

emotional social support and duty-related PTSS severity. Also of concern is the suggested relationship between increased paramedic tenure, emotional social constraints with family and friends, and PTSS severity (e.g., Alexander & Klein, 2001; Regehr, 2002b). However, to date, no study has measured student paramedics' levels of perceived emotional constraints in their non-work social relationships prior to their commencement of on-road ambulance duties, and tracked these relationships over time for possible negative changes. Also overlooked is the contribution of any perceived changes in students' non-work emotional social support to duty-related PTSS severity.

Apart from directly impacting on paramedics' psychological health, evidence suggests that a perceived lack of emotional social support from colleagues, and/or family and friends, may also negatively influence student paramedics' attitudes towards emotional self-disclosure (e.g., Brown & Grover, 1998; Lowery & Stokes, 2005; McCarroll et al., 1993; Pisarski et al., 2002). In turn, emotional non-disclosure may increase students' risk of experiencing duty-related PTSS and PTSD by hindering the processing of traumatic events (Horowitz, 1986, 2001).

### 1.8 *Emotional Non-Expression: A Risk Factor for PTSS and PTSD*

Horowitz (1986, 2001) has proposed a stage theory of post-traumatic stress which suggests that traumatic events overwhelm the information processing system of the individual. Information that does not fit with the cognitive schemas that people use to interpret everyday events, but is stored as memories, must be reviewed over time to bring existing schemas and traumatic memories into alignment. Hence, the task for people with traumatic memories (i.e., those that do not fit existing schemas) is a gradual processing in which schemas are adjusted so that the new information is included. Those who cannot complete this process suffer from recurring denial and intrusive memories and the



accompanying psychological and physical toll that this process takes on the individual. Horowitz further proposed that the process of working through traumatic memories includes talking about the trauma and its related emotions, so that the experience can be assimilated.

In everyday life, people generally have a marked need to talk after they have experienced emotional events (Horowitz, 1986, 2001). Using methods as diverse as diary reporting of daily emotions, autobiographic recall of past emotional episodes, or the follow-up of critical emotional episodes, field studies showed that when people experience an emotion, they talk about it in 80% to 100% of cases (for reviews, see Rimé, Philippot, Boca, & Mesquita, 1992; Rimé, Finkenauer, Luminet, Zech, & Philippot, 1998). Experimental studies confirmed that exposure to an emotion-eliciting condition provokes an urge to talk about it (Lepore, Ragan, & Jones, 2000; Luminet, Bouts, Delie, Manstead, & Rimé, 2000; Mendolia & Kleck, 1993), and evidence from controlled studies has shown that expressing traumatic personal experiences can have beneficial effects on physical health, psychological well-being, immune functioning, anxiety, and depression (Pennebaker, Barger, & Tiebout, 1989; Pennebaker & Beall, 1986; Pennebaker, Hughes, & O'Heeron, 1987; Petrie, Booth, Pennebaker, Davison, & Thomas, 1995; Smyth, 1998).

There are times however, when it may be more adaptive to suppress rather than express emotion (Consedine, Magai, & Bonanno, 2002; Parrott, 1993). The ability to hide one's feelings is useful in some social situations (e.g., not showing fear while presenting a speech, minimising the expression of anger during conflict mediation) and has important evolutionary considerations in terms of the survival value of deception (de Waal, 1989; Trivers, 1985). In extremely adverse conditions, the ability to modulate the display of negative emotions can aid the recovery of normal functioning (Bonanno &

Keltner, 1997), help maintain and expand social networks (Coyne, 1976; Harber & Pennebaker, 1992), and facilitate close personal relationships (Levenson & Gottman, 1983). In a similar vein, emotion theorists have increasingly argued that the expression or suppression of emotion is not as important for adjustment as is the ability to flexibly express or suppress emotions according to the situation (Barrett & Gross, 2001; Bonanno, 2001; Bonanno, Papa, Lalande, Westphal, & Coifman, 2004; Consedine et al., 2002; Parrott, 1993).

Despite its potential usefulness, emotional suppression may also have serious psychological consequences if chronically relied upon. Studies of Vietnam veterans, for example, have shown that those who did not discuss their military experience were more likely to have a diagnosis of PTSD, when compared to veterans who spoke about their combat duty (Green, Grace, Lindy, Gleser, & Leonard, 1990; Schnurr, Ford, Friedman, Green, Dain, & Sengupta, 2000). Similarly, a lack of self-disclosure was significantly related to higher levels of PTSS in peacekeepers deployed to Somalia (Bolton, Glenn, Orsillo, Roemer, & Litz, 2003). Marmar, Weiss, Metzler, and Delucchi (1996) found that rescue workers who coped with critical incident trauma by emotional suppression, were at higher risk for acute dissociative responses, and levels of PTSS that warranted a diagnosis of PTSD. Similarly, emotional non-disclosure was associated with increased levels of PTSS and burnout in hospital trauma unit staff (Crabbe et al., 2004). Further, although more than half of the staff had tried to cope by keeping their thoughts and feelings to themselves, only 8% had found it a “very helpful” means of coping (Crabbe et al., 2004). Finally, in a longitudinal study of Australian firefighters, McFarlane (1988) reported higher levels of PTSD in workers who did not discuss their traumatic experiences when compared to those who did.

While emotional non-disclosure can be a personal preference (Pennebaker, 1993), evidence also suggests that expressivity can be negatively affected through external factors, such as social constraints. Pennebaker (1993) reported that in studies of three major events in the United States - the San Francisco earthquake, the Mt St Helens eruption and the Gulf War - the absence of a sympathetic listener significantly contributed to the number of distressing dreams victims had about the events. Similarly, a study of survivors of the Jupiter cruise ship disaster found increased rates of PTSD in individuals who did not discuss their traumatic experiences (Joseph, Andrews, Williams, & Yule, 1992). Further, this relationship was significantly associated with a progressive post-trauma decline in social support.

North and colleagues report similar results in firefighters who had actively participated in body excavation and/or removal from the Oklahoma City bomb site (North, Tivis, McMillen, Pfefferbaum, Cox, Spitznagel, Bunch, Schorr, & Smith, 2002). In this instance, professional intervention for mental health issues after the bombing was obtained by only 16% (29/181) of firefighters, and by only half (12/24) of those experiencing PTSS. Despite administrative provision of free treatment outside of the department, with assurances that confidentiality of those seeking treatment would be preserved, a general perception held that supervisors would learn of the worker's treatment and the information would be used adversely against their employment.

Avoiding discussion of traumatic work events has also been shown to be associated with elevated levels of PTSS and PTSD in samples of Australian (Anshel et al., 1997), British (Brown & Grover 1998; Progrebin & Poole, 1991), and New Zealand (Stephens et al., 1997) police. Most notably, higher levels of psychological distress were associated with an officer's negative attitude towards emotional expression as a result of a perceived lack of domestic social support, and an occupational culture of emotional toughness that

constrained colleague relationships (e.g., Brown & Grover, 1998; Stephens et al., 1997). Similarly, the findings of McCarroll et al. (1993) imply a relationship between body handlers' perception of constrained social relationships (e.g., lack of a sympathetic listener and fear of peer ridicule), reluctance to talk about duty-related traumatic events, and PTSS severity.

The implication of these findings for work-related trauma exposure is that the most effective method for the resolution of psychological distress is talking about the trauma and associated emotions. However, for many emergency responders the norm is to refrain from displays of emotions, due in part to a self-imposed emotional distancing (e.g., Marmar et al, 1996; North et al., 2002), and a perceived lack of work (e.g., Brown & Grover, 1998; North et al., 2002) and non-work social support (e.g., McCarroll et al., 1993). As a consequence, the aftermaths of traumatic work events are rarely discussed, the events remain unprocessed, and these workers risk experiencing duty-related PTSS and PTSD (Horowitz, 1986, 2001). In line with other emergency responders, paramedics are often reluctant to engage in emotional self-disclosure, and consequently are also at increased risk of developing duty-related psychological distress.

#### 1.8.1 *Emotional non-expression: A risk factor for PTSS and PTSD in paramedics*

As with other emergency responders, paramedics' professional socialisation requires them to control their affective responses to the human tragedies in which they are called to intervene, with their effectiveness being compromised if they fail to do so (Brown et al., 1999). Emotional control is therefore an important part of the paramedics' occupational identity, both in terms of the public's expectation and the demands of the informal work-place culture. Paradoxically, the individual's need for belongingness and

esteem support may be working against their need to effectively process a traumatic experience, in turn exacerbating their psychological distress (Stephens et al., 1997).

The extent of paramedics' self-imposed emotional non-expression was illustrated by Robinson's (2002) study. Only 37% of the 906 paramedics surveyed reported always "talk[ing] the trauma out" with someone else, and only 19% had consulted a mental health professional when experiencing work-related PTSS. Comments such as: "Even though I don't show it to anybody, I get upset by more minor things more often" (Robinson, 2002, p. 51), supports Horowitz's (1986, 2001) position that adopting an emotional distance may impede the trauma recovery process by preventing the discussion of trauma-related emotions.

Paramedics have also reported that a 'macho' work-place atmosphere often dissuades them from discussing their real concerns and fears (Regehr et al., 2002b). Thus, paramedics' displays of emotional control may also be influenced by external sources (Pennebaker, 1993). Alexander and Klein (2001), for example, noted that of the 90 paramedics who had encountered traumatic work events in the previous 6 months, concerns about confidentiality and career prospects were 'always' (64%) or at least 'frequent' (46%) deterrents to seeking personal help. Similarly, Lowery and Stokes (2005) found a fear of peer rejection contributed to student paramedics' reluctance to reveal their emotions to colleagues. This study also empirically showed for the first time that a perceived lack of colleague social support was significantly associated with negative changes in student paramedics' attitudes towards emotional expression, in turn, increasing their duty-related PTSS severity. This finding contradicts the implicit assumption in much research that individual differences in emotional expressivity are relatively stable over time. Instead, the results show that for some individuals, their usual coping resource of emotional expression can be negatively impacted by duty-related

events. Further, it supports Pennebaker's (1993) assertion that regulating distressing emotions is a personal characteristic that can be changed and reinforced through external pressure.

Some authors argue that emergency responders' frequent use of black humour may act as a coping resource by providing these workers with a means of emotional expression, and also serve a protective function by creating a sense of belonging, a unique identity, and a private means of communication (Alexander & Wells, 1991; Maslach & Pines, 1979). Palmer (1983) documented the use of black humour by paramedics, noting terms such as a "crispy critter" for someone who is fatally burned, or a "greenie" for a deceased person in various stages of decomposition. Although there is no direct evidence of this type of humour having a performance enhancing effect in these workers, paramedics have described the benefits of sharing and telling jokes with colleagues (Regehr et al., 2002b), claiming it helps them focus on the task at hand rather than the distressing reality of the event (Moran, 1990).

Despite paramedics' anecdotal evidence of the beneficial effects of humour, not everyone agrees it is a healthy form of coping. Kubie (1971), for example, expressed concern that humour suppresses anxiety, thereby preventing a person from processing distressing emotions. Consistent with this stance, Haig (1986) believes the overuse of humour is a form of denial, and is used to avoid dealing with problems. A similar stance is taken by Mulkay (1989) who views humour as a method of inaction and withdrawal. Further, White and Camarena (1989) found that although laughter reduced physiological measures of stress, it had much less effect in reducing psychological stress. Finally, Joyce (1989) has argued that emergency personnel use humour to hide their feelings from others, which could reflect a social concern rather than concern for the feelings themselves. Consistent with this stance, Rosenberg (1991) found that trainee paramedics

picked up occupational humour from more experienced emergency personnel, noting "that during the training experience...humour is handed on like a trait: it is learned" (p. 199). It could therefore be argued that paramedics' frequent use of black humour may reflect conformity to a professional culture that discourages the open expression of distressing emotions.

It should be noted that the observed failure of paramedics to confide their true emotions to colleagues might simply reflect individual deficits in emotional processing abilities, a lack of social skills or social inhibition, an underlying psychopathology, or a lack of awareness of their situation, rather than an inherent toughness ethic (Taylor, Bagby, & Parker, 1997). However, it is also plausible that regulating distressing emotions is an individual characteristic that can be reinforced externally through an informal occupational culture of emotional toughness (Pennebaker, 1993). Student paramedics may be particularly vulnerable to conforming to this ethic as they enter an unfamiliar environment in which their peers are extremely influential role-models. Further, their performance during this period is assessable (M. Achkar, personal communication, March 3, 2003), and their future careers may depend upon displays of being able to 'handle the job.'

Due to a lack of research, it is unknown what impact socially constrained emotional relationships with family and friends have on student paramedics' attitudes towards emotional expression. However, given that students' use of emotional self-disclosure as a form of coping can be negatively influenced by work-place social constraints (e.g., Lowery & Stokes, 2005), it is reasonable to expect that domestic emotional constraints would have a similar effect. As Regher's (2005) qualitative study indicated, the distressing nature of paramedic work results in some spouses actively avoiding discussions of their partners' duty-related trauma emotions. It is therefore

plausible to expect that student paramedics' family and friends may have similar reactions. In turn, students may feel obliged to regulate their emotional self-disclosure (Pennebaker, 1983), increasing their risk of developing duty-related PTSS. Brown and Grover's (1998) finding of a significant relationship between police officers' low levels of friend and family social support, negative attitudes towards emotional expression, and increased PTSS severity would appear to support this proposal.

Logic would suggest that prior to commencing on-road ambulance duties, student paramedics would typically display positive attitudes toward emotional expression, as they are yet to be exposed to traumatic work events, a workplace culture of emotional toughness, or negative reactions from family and friends to duty-related material. However, evidence indicates that with increased on-road experience, student paramedics' attitudes towards emotional expression are likely to become more negative, due in part to increasingly constrained emotional social relationships with work (e.g., Lowery & Stokes, 2005) and non-work (e.g., Regehr, 2005; Regehr et al., 2002b) support providers. In turn, students would be inhibited from discussing and processing duty-related traumatic events, placing them at greater risk of experiencing PTSS and developing PTSD (Horowitz, 1986, 2001).

To date, no study has examined levels of student paramedics' pre-operational attitudes towards emotional expression, and whether students' attitudes become increasingly negative, rendering them vulnerable to duty-related traumatic stress. Also overlooked is the impact of perceived emotionally constrained non-work social relationships on students' attitudes towards emotional expression and psychological well-being. The current study will also seek to provide additional support for the author's previous findings of a significant relationship between student paramedics' perceived



emotional social constraints with colleagues, negative attitude towards emotional expression, and PTSS severity.

### 1.9 *Summary and Current Study*

As Lowery and Stokes' (2005) recent study illustrated, during the course of their duties student paramedics are frequently exposed to a range of traumatic events shown to be related to, and predictive of, PTSS and PTSD in a substantial number of experienced officers (e.g., Clohessy & Ehlers, 1999; Thompson & Suzuki, 1981; Regehr et al., 2002a), and other emergency services personnel (e.g., Crabbe et al., 2004; Stephens et al., 1997; Wee & Myers, 2002). In occupations where exposure to trauma is high, previous trauma (professional or personal) has also been found to exacerbate the pathogenic impact of subsequent exposure (e.g., Moran & Britton, 1994; Stephens et al., 1997). This has important implications for student paramedics, as general population data indicates the majority will enter the profession with a prior trauma history (Creamer et al., 2001). In addition, they are unlikely to have already experienced the full range of potentially traumatic events they will ultimately encounter during their course of their duties, again placing them at increased risk of psychological distress (Dougall et al., 2000). Finally, professional inexperience is in itself a risk factor for duty-related PTSS and PTSD, as evident from studies of trainee police (e.g., Anshel et al., 1997), body handlers (e.g., McCarroll et al., 1993, 1995, 2002), and firefighters (e.g., Corneil et al., 1999).

Evidence also suggests that highly empathic individuals may be drawn to the helping professions (e.g., Elizur & Rosenheim, 1982; Van Ornum et al., 1981), and this trait has been found to be associated with increased levels of PTSS and PTSD in disaster rescuers (e.g., Cetin et al., 2005), police (e.g., Carlier et al., 2000), and body handlers (e.g., McCarroll et al., 1993). Furthermore, duty-related negative changes in helping

professionals' empathetic tendencies have been reported (e.g., Crabbe et al., 2004; Stradling et al., 1993; Regehr, 2005), with changes being attributed in part, to individuals' attempts to distance themselves from the distressing nature of their duties, and conformity to an informal workplace culture of "emotional toughness" (e.g., Fielding, 1986; North et al., 2002; Palmer, 1983). Reported changes in emotional empathy (i.e., increased emotional distancing) may then contribute to the perceived constraints in emotional social support often experienced by these workers (e.g., Brown & Grover, 1998; Regehr et al., 2002b; Regehr, 2005; Sterud et al., 2006).

Evidence suggests for example, that as emergency workers distance themselves from the distressing nature of their duties, they become less emotionally engaged with their support providers, who in turn, begin to distance themselves from the worker (e.g., McCarroll et al., 1993; Regehr et al., 2002). Alternatively, support providers may be the first to distance themselves through a reluctance to listen to the distressing nature of the worker's duties, in turn, the worker perceives a lack of emotional social support, and withdraws from future emotional interactions (e.g., McCarroll et al., 1993; Stephens et al., 1997). Numerous studies have shown that emergency services personnel frequently report having emotionally constrained relationships with colleagues, family and/or friends (e.g., Lowery & Stokes, 2005; Regehr, 2005; Roberts & Levenson, 2001; Stephens et al., 1997), and that these constraints exacerbate the psychological impact of work-related trauma (e.g., McCarroll et al., 1993; Regehr et al., 2003; Stephens et al., 1997; van der Ploeg & Kleber, 2003).

The most notable way in which social constraints can exacerbate duty-related trauma is by preventing the worker from accessing support providers in order to discuss trauma-related emotions. According to Horowitz (1986, 2001) this prohibits the successful processing of the event, in turn, increasing the individual's risk of developing PTSS.

Observations of elevated levels of PTSS in emergency workers, who reported low levels of workplace and domestic emotional social support, would appear to support this proposition (e.g., Brown & Grover, 1998; Clohessy & Ehlers, 1999; Regehr, 2002b; Regehr, 2005). Finally, evidence suggests that emotional social constraints can directly influence emergency workers' attitudes towards emotional expression. For example, Lowery and Stokes (2005) reported that a perceived low level of peer emotional social support contributed to PTSS severity in student paramedics, by directly influencing negative changes in students' attitudes toward emotional self-disclosure. This finding is consistent with previous studies, in which greater PTSS severity in police was associated with decreased emotional social support and an officer's negative attitude toward emotional expression (e.g., Brown & Grover, 1998; Stephens et al., 1997).

In conclusion, previous research indicates that a substantial number of student paramedics will enter the profession with a prior trauma history and no experience with some of the traumatic events they will encounter (e.g., handling human remains), placing them at increased risk of experiencing PTSS when re-exposed to duty-related traumatic events (e.g., Dougall et al., 2000; McCarroll et al., 1993, 1995, 2002; Stephens et al., 1997). Research also indicates that students may commence on-road ambulance duties with heightened emotional empathy, and this trait may prevent them from effectively disengaging from patients' emotional distress (e.g., Elizur & Rosenheim, 1982), in turn exacerbating their PTSS (e.g., Cetin et al, 2005). However, studies suggest a decline in this trait is likely as students adopt the alternative coping strategy of emotional disengagement and distance themselves from the distressing nature of their work (e.g., Alexander & Klein, 2001; Regehr, 2005), and become more immersed in a workplace culture of emotional toughness (e.g., North et al., 2002).

With increased emotional distancing, evidence also suggests that students are likely to experience diminished emotional social support from work and non-work support providers (e.g., Lowery & Stokes, 2005; Regehr et al., 2002). In turn, the inability to discuss trauma-related emotions with these support networks may prevent students from processing the event, increasing their psychological vulnerability (Horowitz, 1986, 2001). Finally, evidence indicates that student paramedics' coping resources may become further depleted as their attitudes towards emotional self-disclosure become increasingly negative, due in part to students' emotional distancing (e.g., Regehr et al., 2002), and to constrained emotional social support from their work and non-work (e.g., Lowery & Stokes, 2005; McCarroll et al., 1993) support providers, again increasing their risk of developing duty-related PTSS and PTSD (Horowitz, 1986, 2001).

#### 1.9.1 *Rationale for the current research*

Although a balanced approach to traumatic stress research is required in order to determine the factors that contribute to both posttraumatic stress and posttraumatic growth in emergency services personnel, it remains equally important to firstly fully investigate the pathogenic effects of duty-related trauma exposure in high risk populations that have been largely overlooked.

A review of the current literature reveals a dearth of research examining the vulnerability perspective of traumatic stress in a stand-alone sample of student paramedics (e.g., Lowery & Stokes, 2005), despite the fact that trainees are exposed to the same range of experiences and factors hypothesised to impact on the psychological well-being of seasoned officers (e.g., Clohessy & Ehlers, 1999; Lowery & Stokes, 2005; Robinson, 2002). Further, on the basis of general population data (Creamer et al., 2001), the majority of student paramedics will enter the profession with a prior trauma history,

and their duties will dictate exposure to a range of traumatic events they are unlikely to have previously experienced, such as handling human remains. In combination, these factors render student paramedics to being particularly vulnerable to developing duty-related PTSS and PTSD (Dougall et al., 2000; McCarroll et al., 1993, 1995, 2000).

An additional vulnerability comes from the fact that student paramedics learn their clinical skills on-the-job and are exposed to significantly higher rates of duty-related traumatic events (Lowery & Stokes, 2005) than recruits to other emergency services (Marmar et al., 1996; Paton et al., cited in Paton, 2005). Although student paramedics may enter the profession with an expectation of frequent exposure to traumatic incidents (Gist & Woodall, 2000), for some, the reality of their duties may diminish their coping resources, and increase their psychological distress. Apart from students' internal coping resources being diminished, such as their willingness to emotionally self-disclose (e.g., Alexander & Klein, 2001; Lowery & Stokes, 2005), research indicates student paramedics will also experience decreased emotional social support from work (e.g., Lowery & Stokes, 2005; Pisarski et al., 2002; Sterud et al., 2006) and non-work support providers (e.g., Carrington et al., 1999; Regehr, 2005), again increasing their risk of experiencing duty-related PTSS and PTSD.

Finally, recent changes to training methods in Australia have resulted in some states adopting 'university-based' training (e.g., lengthy blocks of university attendance typically interspersed with two blocks of clinical placements totalling six to eight weeks), whereas others have maintained a 'job-based' program (e.g., lengthy periods of full-time rostered ambulance duties interspersed with a total of four to eight weeks of university attendance throughout the year). Consequently, an investigation of these two groups allows an opportunity to examine the psychological impact of differential levels of exposure to the proposed factors.

Although student paramedics represent an ideal cohort in which to examine duty-related traumatic stress, no study has been conducted in which student paramedics' psychological health, emotional empathy, perceived emotional social support from family and friends, or attitudes towards emotional expression have been assessed prior to commencing either form of training, and tracked for possible duty-related negative changes. Nor has research investigated whether differential exposure to duty-related traumatic events and workplace culture of emotional toughness is required for negative changes to occur in students' psychosocial functioning.

Logic would suggest that prior to commencing on-road ambulance duties, significant psychosocial differences would not be detected between university and job-based student paramedics, as they are yet to be exposed to clinical duties or workplace culture. In contrast, once students begin to routinely intervene in duty-related traumatic incidents and become immersed within the ambulance culture, it is reasonable to expect corresponding negative changes in their psychosocial functioning would also be observed, with degree of change being greater for those students exposed to higher levels of the proposed contributing factors.

Finally, no study has examined the contribution of student paramedics' pre-operational and duty-related levels of trauma exposure, emotional empathy, perceived emotional constraints in work and non-work social relationships and attitudes towards emotional expression to duty-related PTSS severity in these workers. Nor has research attempted to ascertain how early in their career student paramedics may be experiencing duty-related psychological distress. The current study aims to address these limitations, and contribute to the small body of work seeking to expand our understanding of the onset and maintenance of duty-related PTSS and PTSD in the highly vulnerable population of student paramedics.

### 1.9.2 *Research aims and hypotheses*

*Aim One:* To investigate if the predictor variables of trauma exposure, PTSS severity, emotional empathy, perceived work (Time 2) and non-work (Time 1 and 2) social constraints, and attitude towards emotional expression can distinguish between student paramedics undertaking university and job-based training.

*Specific hypotheses:*

1. It is hypothesised that prior to commencing on-road ambulance duties, university and job-based student paramedics will not be distinguishable on the pre-operational (Time 1) predictor variables of trauma exposure, PTSS severity, emotional empathy, perceived non-work social constraints, and attitude towards emotional expression.
2. It is hypothesised that following the commencement of on-road ambulance duties, university and job-based student paramedics will be distinguishable on the duty-related (Time 2) predictor variables, with job-based students recording higher levels of duty-related trauma exposure, PTSS severity, perceived work and non-work social constraints and negative attitude towards emotional expression, and lower levels of emotional empathy when compared with university-based students.

*Aim Two:* To investigate possible changes in university and job-based student paramedics' trauma exposure, PTSS severity, emotional empathy, perceived work and non-work social constraints, and attitudes towards emotional expression over time.

*Specific hypothesis:*

3. It is hypothesised that when compared with university-based students, job-based students will exhibit greater duty-related (Time 2) increases in trauma exposure, PTSS severity, perceived work and non-work social constraints and negative attitudes towards emotional expression, and a greater decrease in emotional empathy.

*Aim Three:* To investigate the predictive value of student paramedics' pre-operational levels of trauma exposure, PTSS severity, emotional empathy, perceived non-work social constraints and attitudes towards emotional expression to duty-related PTSS severity in these workers, after controlling for the different training methods (i.e., university and job-based).

*Specific hypothesis:*

4. It is hypothesised that after controlling for the two training methods, a negative relationship will be found between student paramedics' pre-operational (Time 1) levels of perceived non-work social constraints and attitude towards emotional expression, and PTSS severity at Time 2. Positive relationships will be found between students' pre-operational levels of trauma exposure, trauma symptomatology and emotional empathy, and PTSS severity at Time 2.

*Aim Four:* To investigate the predictive value of student paramedics' duty-related levels of trauma exposure, emotional empathy, perceived work and non-work social constraints and attitude towards emotional expression to PTSS severity, after controlling for the differing training methods (i.e., university and job-based).



*Specific hypothesis:*

5. It is hypothesised that after controlling for the two training methods, a positive relationship will be found between student paramedics' duty-related (Time 2) levels of trauma exposure, perceived work and non-work social constraints and attitude towards emotional expression, and Time 2 PTSS severity. A negative relationship will also be found between students' duty-related (Time 2) emotional empathy and Time 2 PTSS severity.

*Aim Five:* To investigate the predictive value of the proposed interactions between student paramedics' duty-related trauma exposure and emotional empathy, emotional empathy and perceived work and non-work social constraints, and perceived work and non-work social constraints and attitude towards emotional expression to PTSS severity, after controlling for the differing training methods (i.e., university and job-based).

*Specific hypothesis:*

6. It is hypothesised that after controlling for the two training methods, student paramedics' duty-related (Time 2) PTSS severity will be predicted by Time 2 interactions between (1) increased trauma exposure and decreased emotional empathy, (2) decreased emotional empathy and increased perceived work and non-work social constraints, and (3) increased perceived work and non-work social constraints and negative attitude towards emotional expression.

## Method

### 2.1 *Participants*

The final sample was comprised of 36 Australian student paramedics who completed both the baseline (Time 1) and follow-up (Time 2) surveys. The baseline data from an additional 79 students could not be included in the final analyses, as these students failed to respond to the follow-up measure. All students were recruited prior to commencing any on-road ambulance duties. Students were recruited from Ambulance Services in Tasmania and Western Australia, and from Universities in Victoria, New South Wales and South Australia. Students completing training with ambulance services in Queensland, the Australian Capital Territory and Northern Territory were not available for recruitment as these organisations were committed to other research projects, and students' time constraints prevented their participation in the current study. The 25 university-based students were enrolled in a paramedic degree, and as part of their studies were required to complete 2 x 4-week blocks of on-road clinical placements over the course of the university-year (i.e., 2-months of on-road duties totalling 338 hours). The 11 job-based students were recruited from ambulance services, and as part of their training were required to undertake 4-shifts per week of on-road ambulance duties (i.e., 6-months of on-road duties totalling 1536 hours). The age range of the 36 participating students was 18 to 42 years. Participants of the study were younger ( $M = 25.22$ ,  $SD = 6.74$ ) than nonparticipants ( $M = 28.68$ ,  $SD = 6.66$ ),  $t(113) = 2.58$ ,  $p < .05$ , Cohen's  $d = .48$ ; and had been exposed to fewer pre-operational traumatic events ( $M = 1.86$ ,  $SD = 1.13$ ) than nonrespondents ( $M = 4.38$ ,  $SD = 2.87$ ),  $t(111) = 6.75$ ,  $p < .05$ , Cohen's  $d = 1.28$ . However, there was no significant difference between the participants and nonparticipants in gender, marital status, emotional empathy, attitude towards emotional expression, perceived emotional support from family and friends, and PTSS severity.

## 2.2 *Measures*

Participants were asked to complete several self-report measures consisting of (a) general demographic questions, and (b) a series of self-report questionnaires. Survey 1 comprised a series of questions designed to obtain demographic information, and baseline measures of students' past trauma exposure, current post-traumatic stress symptoms (PTSS) (if present), emotional empathic tendency, the perceived presence or absence of socially constrained relationships with family and friends, and attitude towards emotional expression. Survey 2 contained the same measures as Survey 1, plus a measure of the number of Code 1 (e.g., life threatening/high stress) emergency cases students attended during the relevant assessment period, total weeks of on-road ambulance duties, and the perceived presence or absence of socially constrained relationships with work colleagues.

### 2.2.1 *Demographic Questionnaire*

The demographic section of survey 1 (Appendix A) asked respondents to provide their: (a) age; (b) gender; (c) marital status; (d) country of birth; and (e) type and duration of any paid or volunteer employment within the medical, trauma or emergency responder fields prior to commencing paramedic training. Survey 2 also asked respondents for their total weeks of operational ambulance experience (Appendix B) and branch location at time of follow-up assessment (Appendix C).

### 2.2.2 *Attitude Towards Emotional Expression Scale (ATEES)*

The ATEES (Joseph, Williams, Irwing, & Cammock, 1994) is designed to assess individual differences in cognitions and behaviours concerning emotional expression (Appendix C). The measure consists of 20 items, divided into four 5-item subscales: (1) beliefs about the meaning of emotional expression; (2) emotional behavioural style; (3)

beliefs about expressing emotions; and (4) beliefs about the consequences of expressing emotions. For each of the 20 items, participants were asked to indicate on a four-point Likert scale the response they most readily identified with, ranging from ‘*strongly agree*’ (4) to ‘*strongly disagree*’ (1). Item 9 is reversed scored. The four subscale scores are obtained by summing each of the scales corresponding items. A total scale score ranging from 20 to 80 is obtained by summing all items, with higher scores indicative of a more negative attitude towards emotional expression.

The ATEES has very good to excellent internal consistency with a Cronbach’s coefficient alpha of .81, and good convergent validity ( $r = -.46$ ) with the seeking social support scale from the Ways of Coping Questionnaire (Folkman & Lazarus, 1988). The Cronbach’s alpha of .77 in the current study indicates the ATEES is also a reliable measure of student paramedics’ attitudes towards emotional expression.

### 2.2.3 *Balanced Emotional Empathy Scale (BEES)*

The BEES (Mehrabian, 2000) is designed to assess individual differences in emotional empathic tendencies (Appendix D). The measure consists of 30 items devised to reduce “acquiescence bias.” Fifteen-items are positively worded such that agreement shows higher emotional empathy, with the remaining 15 items negatively worded such that disagreement shows higher emotional empathy. For each item participants were asked to indicate their level of agreement or disagreement using a 9-point scale ranging from +4 (*very strong agreement*) to -4 (*very strong disagreement*). A total score was computed for each participant by summing his/her responses to all 15 positively worded items and subtracting from this total the sum of his/her responses to all 15 negatively worded items. A positive score of 45 or above is indicative of higher emotional empathy.

The BEES has excellent internal consistency with a Cronbach's coefficient alpha of .87, and a Cronbach's alpha of .88 for the current study indicates the BEES is also a reliable measure of student paramedics' emotional empathy. The BEES also has very good convergent validity ( $r = .77$ ) with the original Emotional Empathic Tendency Scale (Mehrabian & Epstein, 1972), and higher BEES scores are associated with lower scores on the Maiuro, Vitaliano, and Cahn (1987) Aggression Scale ( $r = -.31$ ), and the Risk of Eruptive Violence Scale ( $r = -.50$ ; Mehrabian, 1997), and higher optimism scores on the Revised Optimism-Pessimism Scale ( $r = .31$ ; Scheier, Carver, & Bridges, 1994).

#### 2.2.4 *Posttraumatic Stress Diagnostic Scale (PDS)*

The PDS (Foa, 1995) assesses the three domains of response to traumatic stress as delineated in the *DSM-IV*: intrusion, avoidance and hyperarousal, along with impairment in functioning and symptom onset and duration (Appendix E). The PDS is comprised of 49 items divided into a 21-item traumatic event checklist; 5-item intrusion subscale; 7-item avoidance subscale; 5-item hyperarousal subscale; 9-item impairment of functioning checklist; and 2-items concerning symptom onset and duration. Minor modifications were made to the 21-item traumatic event checklist in order to include items specifically related to paramedic duties (e.g., multiple fatalities at a single site). On a 4-point Likert scale ranging from 0 (*never*) to 3 (*almost always*), respondents were asked to indicate how often each of the intrusion, avoidance and hyperarousal items had bothered them during the past month. An overall symptom severity score ranging from 0 (*non-PTSD*) to 51 (*severe PTSD*) is obtained by summing each of the three subscales. Level of functioning impairment ranges from 0 (*no impairment*) to 9 (*severe impairment*).

The PDS has excellent internal consistency with a Cronbach's coefficient alpha of .92 for the 17-items comprising the symptom severity score, and very good test-retest

reliability after an average interval of 16 days between administrations ( $r = .83$ ) (Foa, 1995). The Cronbach's alpha of .85 in the current study indicates the PDS is also a reliable measure of student paramedics' post-traumatic stress. The convergent validity is also very good and was determined by correlating the symptom severity scores obtained from the PDS with several established measures of PTSD psychological constructs (e.g., depression, intrusion, avoidance, and state and trait anxiety). Higher PDS scale scores were associated with greater depression on the Beck Depression Inventory ( $r = .79$ ; Beck & Steer, 1987); higher state ( $r = .73$ ) and trait ( $r = .74$ ) anxiety on the State-Trait Anxiety Inventory (Spielberger, 1983); and higher scores on the intrusion ( $r = .80$ ) and avoidance ( $r = .66$ ) subscales of the Impact of Event Scale (Horowitz et al., 1979).

### 2.2.5 *Perceived Social Constraints Scale (PSCS)*

The PSCS (Lepore, Silver, Wortman, & Wayment, 1996) consists of 10 items measuring the extent to which the social environment inhibits expression of thoughts and feelings regarding a traumatic or stressful event, and 2 items measuring how often the person wanted to, and actually did speak to others about the event (Appendix F). Five items assessing perceived social constraints were asked twice with respect to family members and friends in the respondent's life (Time 1 and Time 2), and once with respect to colleagues (Time 2). All items refer to experiences over the past week and are anchored by a 5-point scale (1 = *never* to 5 = *always*). A total score for each of the support types ranging between 5 and 25 was derived. An overall social constraint score was also obtained, ranging between 10 and 50 (Time 1), and 15 and 75 (Time 2). Higher scores on each of the support subscales and the total SCS indicate a greater degree of perceived social constraint (e.g., lack of emotional support). Respondents were also asked at Time 1 and Time 2 to indicate on a scale from 1 (*never/not at all*) to 5 (*always/a great*

*deal*) how often they had ‘wanted to talk’, and ‘actually talked’ to family and friends (Time 1 and Time 2) and colleagues (Time 2), about the traumatic event over the past week. A total score for each subscale (e.g., wanted to talk; actually talked) ranging between 2 and 10 (Time 1) and 3 and 15 (Time 2) was derived, with lower scores indicating less interest in wanting to talk to colleagues, family and friends, and/or deliberately choosing not to speak to these supports.

The SCS has very good internal consistency with a Cronbach’s coefficient alpha of .77, and high test-retest reliability after a period of 18-months between administrations ( $r = .81$ ) (Lepore et al., 1996). The Cronbach’s alpha of .79 in the current study indicates the SCS is also a reliable measure of student paramedics’ perceived social constraints.

#### 2.2.6 *Caseload*

To determine the frequency of which student paramedics were exposed to potentially traumatic operational incidents, respondents were asked to indicate the number of times they attended Code 1 case types (e.g., motor vehicle accidents, serious assaults, life threatening injuries, cot deaths) (Appendix G) during their last on-road clinical placement (university-based students) or during the previous month (job-based students). For all students this value was then divided by four, obtaining an average weekly duty-related trauma exposure rate. This figure was then multiplied by the total number of weeks each student had carried out on-road ambulance duties, and provided a total duty-related trauma exposure rate for the previous 6-months. In this way, students were not required to try and recall the total number of Code 1 incidents they had attended during this lengthy time period. This measure is derived from the author’s previous study of student paramedics in which Code 1 incidents were reported as being the most stressful to attend (Lowery & Stokes, 2005), and is based on the formal dispatch

protocols for emergency cases within the students' respective ambulances services. Code 1 cases are also the most commonly attended incidents by Australian paramedics (ABS, 2007).

### 2.3 *Procedure*

Formal approval for the current study was obtained from the University of Ballarat's, Human Research and Ethics Committee (Appendix H). Five-hundred and seventy-three Australian student paramedics who were yet to commence any on-road (i.e., practical) ambulance duties were invited to participate in the current study. Recruitment spanned the two year period of 2006 and 2007, and Ambulance Services and Universities from each State were approached. Student paramedics were asked to complete two self-report questionnaires (see Appendixes I and J for Time 1 and Time 2 Plain Language Statements, respectively) which the researcher forwarded in sealed packages to the participating organisations, where they were distributed to students. Students completed Survey 1 prior to commencing any on-road ambulance duties, and Survey 2 was completed 6-months later. Each survey took 20-30 minutes to complete, and was directly returned to the investigator via postage paid envelopes. The return of each questionnaire signified the student's consent to participate in the study. To retain students' anonymity, they were not required to reveal their name, address, or full date of birth. Instead the linkage of the two data sets was undertaken on the basis of a set of identifiers sufficiently complex as to provide a unique identifier (e.g., pet's name, house number, and year of birth), and this information was only known to the current researchers. The three identifiers were then assigned a case number to allow easier data entry at each survey phase. Of the initial 473 baseline surveys distributed (Time 1), 115 were returned over the two year period reflecting a response rate of just over 24%,



representing 87 university-based student paramedics, and 28 students employed by an ambulance service. Two of the Time 1 surveys were then excluded from the university group, as these respondents recorded baseline PTSS severity scores in the 'severe' range, reducing the likelihood of detecting duty-related psychological distress at follow-up. At Time 2, of the 113 students who could be asked to participate again, 36 did so (32%).

#### 2.4 *Data Analysis*

Hypotheses 1 and 2 were tested using discriminant function analyses (DFA) which maximised the differences between the two paramedic training groups. Whilst logistic regression answers the same questions as discriminant analysis, and is often the preferred statistical method due to flexibility in its assumptions (Tabachnick & Fidell, 2001), the ratio of independent variables to cases in the current study exceeded the general rule of logistic regression that there be no more than 1 independent variable for each 10 cases in the sample (Garson, 2006). DFA is however, a robust statistical method of analysis that also handles categorical as well as continuous variables (Sprinthall, 2000), and classifies cases into the values of a categorical grouping (or dependent) variable on the basis of a set of predictor (or discriminating/independent) variables. If DFA is effective for the data set, the classification table of correct and incorrect estimates yields a high percentage of cases correctly classified (Tabachnick & Fidell, 2001). For the current study, statistics were calculated using 'prior probabilities computed from group sizes' to determine the correct versus correct-by-chance classification rates. The cross-validation method of 'leave-one-out classification' was also used which allows classification to be based on the best possible fit to the existing data, and provides a better estimate of what the classification results would be in the total population of interest (Sprinthall, 2000).

The first analysis conducted was a sequential (or hierarchical) DFA. This method allowed the effect of age to be removed by entering this variable as a covariate (age was found to be significant during preliminary analyses), and also tested the hypothesis that student paramedics would not be distinguishable on the predictor variables prior to commencing their on-road ambulance duties under the differing training methods (Hypothesis 1). The grouping variable was university-based and job-based training, and the predictor variables were students' pre-operational (Time 1) scores for trauma exposure (i.e., exposure to any traumatic event), PTSS severity (i.e., the degree to which exposure-related psychological distress had been resolved), emotional empathy, perceived non-work social constraints and attitudes towards emotional expression. As the SPSS data analysis program does not provide convenient methods for entering predictors in priority order, Tabachnick and Fidell (2001) recommend a separate discriminant analysis be run for each step, the first with the highest priority variable, the second with the two highest priority variables entering simultaneously, and so on until all variables have been entered. Accordingly, age was entered separately in the first equation. Student age and the pre-operational predictor variables were then entered simultaneously in the second equation. The matrices of pooled within-group variances and covariances were compared via multivariate *F*-tests. A non-significant *F*-value for Step 2 would provide support for the hypothesis, indicating the two groups could not be distinguished on the set of predictor variables prior to commencing on-road ambulance duties (Tabachnick & Fidell, 2001).

A second sequential DFA was conducted to remove the effect of student age, and also test the hypothesis that student paramedics undertaking university-based and job-based training would be distinguishable on the duty-related (Time 2) predictor variables, with job-based students recording higher mean levels of duty-related trauma exposure,

PTSS severity, perceived work and non-work social constraints, and negative attitude towards emotional expression, and lower emotional empathy than university-based students (Hypothesis 2). A statistically significant *F*-test (Wilks' Lambda) for the comparison of matrices of pooled within-group variances and covariances at Step 2 would provide support for this hypothesis, indicating the two groups could be distinguished on the basis of the duty-related variables (Tabachnick & Fidell, 2001). The eigenvalue and corresponding canonical correlation provided a measure of the association between the two groups and the predictor variables (Tabachnick & Fidell, 2001). The unique contribution of each predictor variable to the discriminant function was determined by its standardised coefficient (Tabachnick & Fidell, 2001). The structure coefficients (i.e., pooled within-groups correlations) were used to determine the primary predictors in discriminating between the two groups (Tabachnick & Fidell, 2001). An examination of the corresponding classification table indicated the percent of cases correctly classified into the training groups on the basis of the predictor variables (Tabachnick & Fidell, 2001). A McNemar's repeated-measures chi-square was manually calculated to test the significance of any classification improvements (Tabachnick & Fidell, 2001). Additional support for this hypothesis would be shown by a significant *F*-test (Wilks' Lambda) for each of the duty-related predictor variables, indicating significantly different mean scores across the groups (Tabachnick & Fidell, 2001), with the greatest differences occurring in the job-based group.

A two-way mixed design, also called a split plot analysis of variance or SPANOVA (Coakes & Steed, 2001), was then separately conducted for each dependent variable to test the hypothesis that over time, job-based student paramedics would experience greater increases in trauma exposure, PTSS severity, perceived work and non-work social constraints and negativity towards emotional expression, and greater decrease

in emotional empathy, when compared with university-based students (Hypothesis 3). For this analysis, the separate scores for perceived work (Time 2) and non-work social constraints (Time 1 and Time 2) were combined to form a single measure of the perceived social constraints variable. The use of this combined variable allowed the analysis to be run and still retain the 1 degree-of-freedom that was required (i.e., the job-based group had 11 cases, and 10 variables were included in the SPANOVA) (Tabachnick & Fidell, 2001). The within-subjects independent variable was 'time' with two levels (pre-operational and duty-related), and the between-subjects independent variable was 'training group' (university and job-based). Student age was held constant by entering this variable as a covariate.

Initial support for this hypothesis would be obtained by a significant multivariate *F*-test for each dependent variable by training group interaction term, and significant univariate *F*-tests for the independent variables of time and training group. This would indicate that students' dependent variable scores changed significantly between the pre-operational and duty-related assessments, and that change varied according to training group membership (Tabachnick & Fidell, 2001). Partial eta squared statistics would indicate the proportion of the variance explained for each dependent variable by the time and training group independent variables (Tabachnick & Fidell, 2001). Independent (between-subjects) samples *t*-tests examining mean difference scores would provide further support. When compared with university-based students, significantly greater mean differences would be found for the job-based group on the dependent variables of trauma exposure, PTSS severity, total perceived social constraints, attitude towards emotional expression and emotional empathy.

Finally, the testing of hypotheses four to six was conducted using hierarchical multiple regression analyses. The first regression equation investigated the predictive

value of students' scores on the pre-operational (Time 1) independent variables to duty-related PTSS severity (dependent variable), after controlling for the different training methods (Hypothesis 4). The training group independent variable was entered in the initial step of the equation to control for its effect. To control for the effect of student age, this variable was also entered in the initial step. Research suggests a prior trauma history may exacerbate PTSS severity if re-traumatised (e.g., Ozer et al., 2003; Winkel et al., 2003), and therefore the number of traumatic events and associated PTSS severity experienced by students prior to commencing on-road ambulance duties were entered in the second step. The remaining independent variables of emotional empathy, perceived non-work social constraints, and attitude towards emotional expression were entered together in the final step.

After controlling for the two training groups, the second regression equation investigated the predictive value of the duty-related (Time 2) variables of trauma exposure, emotional empathy, perceived work and non-work social constraints, and attitude towards emotional expression, to duty-related PTSS severity (Hypothesis 5), and the theorised interactions among the duty-related independent variables and PTSS severity (Hypothesis 6). The training group and age independent variables were entered at Step 1 of the equation. The independent variables of duty-related trauma exposure, emotional empathy, and perceived work and non-work social constraints were entered together in Step 2. As the author's previous findings suggested that student paramedics' attitudes towards emotional expression may be the most important predictor of PTSS severity in this population (Lowery & Stokes, 2005), students' duty-related attitude scores were entered separately at Step 3. This allowed the author's earlier finding to be re-examined by investigating whether students' attitude towards emotional expression at 6-months follow-up, accounted for additional variance in PTSS severity after controlling

for the effects of the predictor variables entered in the previous steps. To prevent multicollinearity, each of the independent variables were centered (i.e., converted to deviation scores so that each variable had a mean of zero) and interaction terms were built (Tabachnick & Fidell, 2001), and entered in the final step of the equation to test the relationships proposed in hypothesis 6.

Initial support for the above hypotheses would be shown by a significant ANOVA *F*-value corresponding with the point of entry of the pre-operational or duty-related IVs, indicating the independent variables are predictive of students' PTSS severity (Tabachnick & Fidell, 2001). A significant adjusted  $R^2$  value for the independent variables entered at each step would provide additional support, and indicate the amount of variance in the dependent variable accounted for by the variable(s) inclusion in the equation (Tabachnick & Fidell, 2001). Significant  $\beta$ -weights (standardized regression coefficients) and semipartial correlations would then show the unique contribution of each independent variable and interaction term to students' PTSS severity at Time 2 (Tabachnick & Fidell, 2001). Finally, positive or negative correlations in the predicted directions between the independent variables, and independent variables and dependent variable, would indicate support for the hypothesised relationships (Tabachnick & Fidell, 2001).

Specifically, it was expected that after controlling for the two training methods and student age, an overall significant *F*-value and negative relationship would be found between students' pre-operational (Time 1) levels of perceived non-work social constraints and attitude towards emotional expression, and duty-related PTSS severity. A positive relationship would also be found between students' pre-operational levels of trauma exposure, PTSS severity and emotional empathy, and duty-related PTSS severity (Hypothesis 4). For hypotheses 5, it was expected that after controlling for students'

training groups and age, an overall significant  $F$ -value and positive relationships would be found between duty-related trauma exposure, perceived work and non-work social constraints and attitude towards emotional expression, and PTSS severity. A negative relationship would also be found between students' duty-related levels of emotional empathy and PTSS severity. Finally, for hypothesis 6, and on the basis of previous studies, it was expected that positive relationships would also be found between duty-related PTSS severity and the centered scores for the duty-related interaction terms of: (1) high trauma exposure and low emotional empathy; (2) low emotional empathy and high perceived work social constraints; (3) low emotional empathy and high perceived non-work social constraints; (4) high perceived work social constraints and negative attitude towards emotional expression; and (5) high perceived non-work social constraints and negative attitude towards emotional expression.

## Results

### 3.1 *Preliminary Analyses*

Prior to the main analyses all Time 1 and Time 2 variables were screened separately for each training group (i.e., university and job-based) to check for accuracy of data entry, missing values, and compliance with the univariate and multivariate assumptions applicable to each of the statistical methods to be used in the current study.

Statistics indicated there were no incorrect or missing values. Univariate checks of the Time 1 data revealed three outliers on the perceived non-work social constraints variable; two occurred in the university-based group, and one in the job-based. An inspection of the Time 2 data indicated one univariate outlier in both the university and job-based groups for the variables of: (1) perceived work social constraints, and (2) attitude towards emotional expression. As DFA, SPANOVA and multiple regression analyses are all highly sensitive to outliers (McLachlan, 2004; Pallant, 2005; Tabachnick & Fidell, 2001) each deviant case was assigned a raw score of one unit larger than the next most extreme score in the distribution (Tabachnick & Fidell, 2001). No further Time 1 or Time 2 outliers were detected.

Time 1 statistics also revealed an absence of skew and kurtosis in both training groups. Whilst statistics also revealed an absence of skew or kurtosis for the university group at Time 2, mild positive skewness and kurtosis was found for the job-based group on the 'code 1 cases' variable (skew = +4.09; kurtosis = +4.47). However, the non-normal distribution of this variable is to be expected, given that job-based students carry out rostered ambulance duties for a longer period of time than university-based students, and are therefore more likely to be exposed to greater levels of code 1 cases. As the code 1 values were legitimate representations of job-based students' levels of duty-related trauma exposure, this variable was not transformed to meet normality assumptions



(Tabachnick & Fidell, 2001). As DFA, SPANOVA and multiple regression analyses are robust to mild deviations from linearity, the raw data was used and where applicable, significance tests were interpreted at a more conservative alpha level (Pallant, 2005).

An examination of the Time 1 and Time 2 Shapiro-Wilks univariate tests of normality (used as sample size was less than 50) also revealed a Time 1 violation of this assumption in the university-based group for the variables of: (1) number of prior traumatic events ( $p = .005$ ), and (2) PTSS ( $p = .000$ ). The job-based group also violated this assumption for the Time 1 PTSS variable ( $p = .001$ ). A violation was also found in the university-based group for the Time 2 variables of: (1) perceived work social constraints ( $p = .029$ ), and (2) PTSS ( $p = .000$ ). No violations occurred for the job-based group in Time 2. These findings are to be expected given that rates of trauma exposure and PTSS development also vary markedly within the general population (e.g., Breslau et al., 1998; Brewin et al., 2000; Creamer et al., 2001). Further, reported levels of perceived work social support differ greatly among this population (e.g., Clohessy & Ehlers, 1999; Lowery & Stokes, 2005; Regehr et al., 2003). A visual inspection of these variables also indicated the majority of scores were within the centre range (Histogram), fell predominantly in a straight line (Normal Q-Q Plot), and were mostly assembled around zero with no obvious pattern to the clustering of points (Detrended Normal Q-Q Plot). On this basis, no transformations were conducted.

No multivariate outliers were detected for any variables using Mahalanobis distances,  $\chi^2_{(4)} = 18.47, p < .001$  (Time 1), and  $\chi^2_{(5)} = 20.52, p < .001$  (Time 2). No Time 1 or Time 2 cases were influential points as all Cook's values were less than one. In addition, none of the Time 1 or Time 2 variables had correlations in excess of .90, tolerance values of less than .10, or VIF values greater than 10, indicating an absence of singularity and multicollinearity. Inspection of residual scatterplots revealed no violations

of the assumption of normality, linearity, homoscedasticity and independence of residuals for measures at Time 1 or Time 2.

Finally, an independent samples *t*-test of the mean age of university ( $M = 22.08$ ,  $SD = 3.98$ ) and job-based students ( $M = 32.36$ ,  $SD = 6.33$ ) found a significant difference between the groups on this variable,  $t(14) = -4.97$ ,  $p = .0001$  (the reported *t*-value is for equal variances not assumed, as Levene's test for equality of variances was violated,  $F(34) = 6.58$ ,  $p = .01$ ). To determine if student age was also significantly associated with the Time 1 and Time 2 variables, a Spearman's Rank Order Correlation was conducted comparing the correlation coefficients for the two student groups (Pearson correlations could not be derived as the job-based group consisted of less than 20 cases, preventing testing of the statistical significance of the difference between the correlation coefficients) (Pallant, 2005). The results for university-based students found a significant negative correlation between student age and PTSS severity at Time 2 ( $r = -.45$ ,  $n = 25$ ,  $p < .05$ ). For job-based students, significant negative correlations were found between age and the Time 2 variables of perceived social constraints with family ( $r = -.69$ ,  $n = 11$ ,  $p < .05$ ) and friends ( $r = -.72$ ,  $n = 11$ ,  $p < .05$ ). On the basis of these findings, age was entered as a covariate in the subsequent analyses. No significant Spearman's rank order correlations were found between the remaining demographics and Time 1 or Time 2 variables.

### 3.2 Descriptive Statistics

The demographic data contained in Table 1 is for background information only, and shows the number and percentage (rounded up) of total respondents (25 university and 11 job-based student paramedics) by gender, marital status and country of birth. Fifty-six percent of the total sample was female, with a greater percentage belonging to

the university-based group (64%) than job-based (37%). Of the 44% of male respondents, 64% were undertaking job-based training, and 36% were university-based. The majority of university-based students were un-partnered, compared with the job-based group, who largely reported being in a relationship. For both training groups, the majority of students were born in Australia.

Table 1  
*Time 1 Gender, Marital Status and Country of Birth Demographic Information*

	Uni-based		Job-based		Total Sample	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<u>Gender</u>						
Male	9	36	7	64	16	44
Female	16	64	4	37	20	56
<u>Marital Status</u>						
Un-partnered	23	92	3	27	26	72
Partnered	2	8	8	73	10	28
<u>Country of Birth</u>						
Australia	22	88	9	82	31	86
Overseas	3	12	2	18	5	14

The data displayed in Table 2 is for background information only, and shows the baseline number and percentage (rounded up) of respondents by training group and total sample on the demographic variables of history of previous paid or volunteer trauma-related employment (e.g., nursing, SES volunteer, firefighter), pre-operational trauma exposure and number of prior traumatic events experienced, worst event experienced, and if the full criteria for a PTSD diagnosis was met. Fifty percent of the total sample had held previous employment in a field in which exposure to traumatic events was highly likely. Length of prior employment for job-based students was predominantly less than

one year or more than five years, and for university-based students, it was less than one year. The most common prior employment for both groups was as a first aid volunteer.

Eighty-six percent of students also reported a prior trauma history. Group data revealed the majority of job and university-based students had experienced two traumatic events prior to commencing on-road ambulance duties. The most commonly experienced traumatic events were serious accidents and unexpected death of an associate. Although 44% of the sample reported mild PTSS, none of the students met criteria for a full PTSD diagnosis as assessed by the Posttraumatic Stress Diagnostic Scale (Foa, 1995).

Table 2

*Time 1 (Pre-Operational) Trauma History Information*

	Uni-based		Job-based		Total Sample	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<u>Type of T-R Employment</u>						
Registered Nurse	--	--	1	9	1	3
Patient Transport Officer	2	8	2	18	4	10
Volunteer First-Aider	5	20	4	36	9	25
Firefighter	--	--	1	9	1	3
Surf Lifesaver	1	4	--	--	1	3
SES Volunteer	1	4	1	9	2	6
<u>Number of Events</u>						
1-2	15	60	5	46	20	55
3-4	7	28	4	36	11	31
<u>Worst Event</u>						
Serious Accident	5	20	1	9	6	17
Non-Sexual Assault	1	4	1	9	2	6
Sexual Assault	1	4	1	9	2	6
Killing/Injury (Other Person)	4	16	1	9	5	14

(table continued)

Table 2 (continued)

	Uni-based		Job-based		Total Sample	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<u>Worst Event</u>						
Unexpected Death (Associate)	2	8	4	36	6	17
Life Threatening Illness/Injury	3	12	--	--	3	8
Death of a Child	1	4	--	--	1	3
Other	5	20	1	9	6	17
<u>Full PTSD</u>						
Yes	--	--	--	--	--	--
No	25	100	11	100	36	100

Note. Uni-based = University-based students; T-R = Trauma-Related.

Table 3 shows the number and percent of respondents at 6-months follow-up (Time 2) by training group and total sample for number of Code 1 incidents attended during on-road ambulance duties, worst traumatic event experienced and if duty-related, and if met diagnostic criteria for full PTSD. Each university-based student attended an average of 20 Code 1 cases during the course of 2-months of clinical placements ( $M = 19.88$ ,  $SD = 6.39$ ), while job-based students attended an average of 80 Code 1 cases during 6-months of rostered ambulance duties ( $M = 80.18$ ,  $SD = 21.84$ ). Both groups noted serious accidents as the worst event experienced, with 78% attributing their exposure to on-road ambulance duties. Eighty-three percent of all students exhibited PTSS at follow-up, with 22% also meeting the full diagnostic criteria for PTSD, as assessed by the Posttraumatic Stress Diagnostic Scale (Foa, 1995). Of those diagnosed with PTSD, 75% reported mild symptoms, and a further 25% experienced moderate or moderately severe symptoms.

The means and standard deviations calculated for all scales and subscales at Time 1 and Time 2, and are presented in Tables 4 and 5, respectively. Values are reported

separately for university and job-based students, and show that at follow-up, both groups experienced increased mean scores for trauma exposure, PTSS severity, perceived social constraints and attitude towards emotional expression, and decreased emotional empathy.

Table 3

*Time 2 (Duty-Related) Trauma History Information*

	Uni-based		Job-based		Total Sample	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<u>Code 1</u>						
0-50	25	100	--	--	25	70
51-100 <sup>+</sup>	--	--	11	100	11	30
<u>Worst Event</u>						
Serious Accident	9	36	5	46	14	39
Non-Sexual Assault	--	--	1	9	1	3
Sexual Assault	1	4	--	--	1	3
Killing/Injury (Other Person)	5	20	2	18	7	20
Unexpected Death (Associate)	2	8	1	9	3	8
Life Threatening Illness/Injury	5	20	1	9	6	17
Death of a Child	1	4	1	9	2	5
Other	2	8	--	--	2	5
<u>Duty Related</u>						
Yes	18	72	10	91	28	78
No	7	28	1	9	8	22
<u>Full PTSD</u>						
Yes	5	20	3	27	8	22
No	20	80	8	73	28	78

Table 4

*Scale and Subscale Ranges, Means and Standard Deviations for all Pre-Operational (Time 1) Predictor Variables by Training Group*

Measure	Scale	University-based		Job-based	
	Range	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<u>Time 1</u>					
Pre-Exposure	0-12	1.76	1.01	2.09	1.38
PDS	0-51	1.56	2.10	1.73	2.24
Total Symptoms	0-17	1.44	1.98	1.55	2.07
Criteria A (traumatic event)	0-02	1.40	0.50	1.45	0.52
Criteria B (Re-Experiencing)	0-15	0.80	1.12	0.73	1.19
Criteria C (Avoidance)	0-21	0.60	1.04	0.82	1.40
Criteria D (Hyper-Arousal)	0-15	0.16	0.62	0.18	0.41
Criteria F (Impairment)	0-09	0.84	2.48	0.36	1.21
BEES	0-120 <sup>+/-</sup>	39.04	26.09	34.91	25.28
PSCS	10-50	16.56	4.37	16.18	5.88
Family	5-25	8.12	2.35	8.00	3.19
Friends	5-25	8.20	2.50	8.18	3.06
Wanted to Talk (Fam/Fri)	2-10	5.64	1.66	4.27	2.20
Actually Talked (Fam/Fri)	2-10	3.00	1.89	2.55	1.29
ATEES	20-80	38.36	6.87	42.45	5.39
Behaviour Style (Bottle-up)	5-20	10.64	2.78	11.82	2.68
Exp. Belief (Keep control)	5-20	10.24	2.57	10.82	1.40
Consequences (Rejection)	5-20	9.80	1.41	10.82	1.78
Exp. Meaning (Weakness)	5-20	7.32	2.32	9.00	1.90

*Note.* Pre-Exposure = number of traumatic events prior to on-road ambulance duties; PDS = Posttraumatic Stress Diagnostic Scale; BEES = Balanced Emotional Empathy Scale (positive scores 45+ = higher empathy); PSCS = Perceived Social Constraints Scale (higher score = higher constraints); Fam/Fri = family/friends; ATEES = Attitude Towards Emotional Expression Scale (higher score = negative attitude); Exp. Belief = students' beliefs on how emotions should be expressed; Exp. Meaning = students' beliefs on what expressing emotion means.

Table 5

*Scale and Subscale Ranges, Means and Standard Deviations for all Duty-Related (Time 2) Predictor Variables by Training Group*

Measure	Scale	University-based		Job-based	
	Range	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<u>Time 2</u>					
Code 1	0-105	19.88	6.39	80.18	21.84
PDS	0-51	2.80	3.24	4.36	3.11
Total Symptoms	0-17	2.64	3.01	3.73	2.37
Criteria A (Traumatic Event)	0-02	1.28	0.46	1.36	0.51
Criteria B (Re-Experiencing)	0-15	0.88	0.98	1.18	0.75
Criteria C (Avoidance)	0-21	1.36	1.82	2.09	2.43
Criteria D (Hyper-Arousal)	0-15	0.56	1.08	1.09	0.94
Criteria F (Impairment)	0-09	1.40	2.96	1.82	3.57
BEES	0-120 <sup>+/-</sup>	34.92	26.83	28.36	23.29
PSCS	15-75	30.12	6.97	29.27	6.67
Colleagues	5-25	8.68	2.14	9.00	2.93
Family	5-25	11.04	3.59	9.36	2.11
Friends	5-25	10.68	3.68	10.91	3.96
Wanted to Talk (Fam/Fri)	2-10	5.20	1.44	4.91	0.94
Wanted to Talk (Coll)	1-05	2.84	0.90	2.64	0.51
Actually Talked (Fam/Fri)	2-10	2.52	1.33	2.64	0.81
Actually Talked (Coll)	1-05	1.28	0.74	1.55	0.69
ATEES	20-80	41.64	6.21	44.00	3.95
Behaviour Style (Bottle-up)	5-20	11.32	1.99	11.91	1.81
Exp. Belief (Keep control)	5-20	11.24	1.98	11.18	1.40
Consequences (Rejection)	5-20	10.36	1.87	11.36	1.69
Exp. Meaning (Weakness)	5-20	8.52	2.04	9.36	2.06

*Note.* Code 1 = number of duty-related traumatic incidents; Fam/Fri = family/friends; Coll = colleagues.



### 3.3 *Predictors of Training Group Membership*

A sequential DFA tested hypothesis 1 which proposed that the pre-operational (Time 1) predictor variables of prior trauma exposure, PTSS severity, emotional empathy, perceived non-work social constraints and attitude towards emotional expression, would not distinguish between the two paramedic training groups. Student age was entered separately in the first step to remove the effect of this variable. The second step included the age variable and the Time 1 set of predictors. Table 6 shows that at Step 1, university and job-based student paramedics could be distinguished on the basis of mean age, Wilks'  $\Lambda = .49$ ,  $\chi^2(1) = 23.81$ ,  $p = .0001$ . The eigenvalue for this function was 1.04, accounting for 100% of the between-group variability. The canonical correlation of 0.71 indicated that 50% of the variance in the dependent variable (training group) was explained by the model. Cross-validated classification results showed that 80.6% of students were correctly classified on the basis of their age. Correct classification of university-based students was 22 of 25 cases, and for job-based students this value was 7 of 11 cases. Box's  $M$  test of homogeneity of covariance matrices was not violated,  $F(1, 2142) = 3.24$ ,  $p = .07$ .

Table 6 also shows that a significant association between the groups and combined independent variables was found at Step 2, Wilks'  $\Lambda = .41$ ,  $\chi^2(6) = 27.73$ ,  $p = .0001$ . The eigenvalue for this function was 1.45, accounting for 100 % of the between-group variability. The canonical correlation of 0.77 indicated that 59% of the variance in the training group dependent variable was explained by the model, an increase of 9% over Step 1. However, supporting hypothesis 1, there was no improvement from Step 1 in terms of the overall classification results when the pre-operational predictor variables of trauma exposure, PTSS severity, emotional empathy, perceived non-work social constraints and attitude towards emotional expression were included. Structure

coefficients were used to determine the contribution of each predictor to the overall discrimination between the groups, with standardised coefficients equal to or greater than 0.30 considered meaningful (Tabachnick & Fidell, 2001). Using this criterion, the primary predictor was student age (0.99), which was also statistically significant, Wilks'  $\Lambda = .49$ ,  $F(1, 34) = 35.20$ ,  $p = .0001$ . Attitude towards emotional expression and perceived non-work social constraints also met this criterion (0.59 and -0.53, respectively), however they were not statistically significant, and therefore student paramedics could not be distinguished on the pre-operational measures. Box's  $M$  test of homogeneity of covariance matrices was not violated,  $F(21, 1447) = 0.82$ ,  $p = .70$ . Table 6 shows the  $F$ -value, standardised coefficients (i.e., correlations) between predictors and the discriminant function (training groups), and correlations among predictors.

Table 6

*Results of Sequential Discriminant Function Analysis of Time 1 Predictor Variables*

Predictors	Standardised	Univariate	Correlations among Predictors					
	Coefficients	$F(1, 34)$	(1)	(2)	(3)	(4)	(5)	(6)
<u>Step 1</u>								
1. Age	1.00	35.20****	--	--	--	--	--	--
<u>Step 2</u>								
1. Age	0.99	35.20****	--					
2. Pre-Trauma	0.17	0.65	-.11	--				
3. PTSS	-0.13	0.05	-.05	.13	--			
4. Empathy	0.08	0.20	.11	-.48	-.17	--		
5. Attitude	0.59	3.06	-.08	.41	.20	-.41	--	
6. Constraints	-0.53	0.01	.18	.23	-.16	-.10	.50	--

*Note.* Pre-Trauma = number of prior traumatic events; Constraints = perceived non-work social constraints.  
\*\*\*\* $p < .0001$ .

A second direct DFA was run with the Time 2 variables of duty-related trauma exposure, PTSS severity, emotional empathy, perceived work and non-work social constraints and attitude towards emotional expression, as predictors of group membership. Student age was again entered separately at Step 1 to account for the discriminating effect of this variable. Age and the duty-related predictors were then entered simultaneously at Step 2. Table 7 shows the two paramedic training groups were distinguishable on the basis of mean age, Wilks'  $\Lambda = .49$ ,  $\chi^2(1) = 23.81$ ,  $p = .0001$ , accounting for 50% of the variance in the training group dependent variable. Almost 81% of students were correctly classified on the basis of this variable. Box's  $M$  test of homogeneity of covariance matrices was not violated,  $F(1, 2142) = 3.24$ ,  $p = .07$ . Supporting hypothesis 2, the entry of the duty-related independent variables at Step 2 also significantly distinguished between the two training groups, Wilks'  $\Lambda = .12$ ,  $\chi^2(7) = 64.08$ ,  $p = .0001$ . The eigenvalue for this function was 7.17, accounting for 100% of the between-group variability. The canonical correlation of 0.94 indicated that with the inclusion of the duty-related predictor variables 88% of the variance in the dependent variable (training groups) was explained by the model; an increase of 38% from Step 1. Structure coefficients were used to determine the contribution of individual predictors to the overall discrimination between the groups, with standardised coefficients equal to or greater than 0.30 considered meaningful (Tabachnick & Fidell, 2001). Using this criterion, the primary predictor was duty-related trauma exposure (0.98), which was also found to be statistically significant, Wilks'  $\Lambda = .18$ ,  $F(1, 34) = 164.36$ ,  $p = .0001$ . Student age also met this criterion (0.53), and was found to be statistically significant, Wilks'  $\Lambda = .49$ ,  $F(1, 34) = 35.20$ ,  $p = .0001$ . Box's  $M$  test was non-significant (at  $p < .001$ ),  $F(28, 1383) = 1.68$ ,  $p = .02$ , indicating homogeneity of covariance matrices. An examination of the classification table found the inclusion of the duty-related predictor variables

increased the correct classification rate to 97.2% (using cross-validated classification), compared to 55% correctly classified by chance alone, and 81% correctly classified on the basis of age. Correct classification of job-based students was 10 of 11 cases, compared to 3 cases by chance alone. All university students were correctly classified. The McNemar test of classification improvement from Step 1 to Step 2 was calculated and found to be greater than the critical chi-square value of 3.84 at the .05 alpha level,  $\chi^2 = 4.50$ . The *F*-value, standardised coefficients (i.e., correlations) between predictors and the discriminant function (training groups), and correlations among predictors are presented below.

Table 7

*Results of Sequential Discriminant Function Analysis of Time 2 Predictor Variables*

Predictors	Standardised	Univariate	Correlations among Predictors						
	Coefficients	<i>F</i> (1, 34)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>Step 1</u>									
1. Age	1.00	35.20****	--	--	--	--	--	--	--
<u>Step 2</u>									
1. Age	0.53	35.20****	--						
2. Code 1	0.98	164.36****	-.11	--					
3. PTSS	0.26	1.82	-.10	.00	--				
4. Empathy	-0.10	0.49	.08	-.04	-.22	--			
5. Attitude	-0.24	1.34	-.15	.21	.36	-.42	--		
6. W/Cons.	-0.20	0.14	-.09	.19	.04	-.07	-.13	--	
7. NW/Cons.	0.24	0.43	-.24	-.06	-.19	-.03	.13	.13	--

*Note.* W/Cons. = perceived work social constraints; NW/Cons.= perceived non-work social constraints.

\*\*\*\**p* < .0001.

Table 8 shows that at Time 2, job-based students recorded higher mean scores for duty-related trauma exposure (i.e., Code 1), PTSS severity, perceived work social constraints and attitude towards emotional expression, and lower mean emotional empathy, when compared with university-based students. However, only Code 1 incidents met statistical significance.

Table 8  
*Means and Standard Deviations for Time 2 Predictor Variables by Training Group*

	<u>Uni-Based</u>		<u>Job-Based</u>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Code 1	19.88	6.39	80.18	4.36
PTSS	2.80	3.24	4.36	3.11
Empathy	34.94	26.83	28.36	23.29
Attitude	41.64	6.21	44.00	3.95
W/Cons.	8.68	2.14	9.00	2.93
NW/Cons.	21.72	6.32	20.27	5.61

*Note.* Code 1= duty-related traumatic events; W/Cons. = perceived work social constraints; NW/Cons. = perceived non-work social constraints.

3.4 *Change in Variables from Time 1 to Time 2*

A series of split plot analysis of variance (SPANOVA) were conducted to test hypothesis 3, that over time, job-based students would experience greater negative changes on the dependent variables of trauma exposure, PTSS severity, emotional empathy, attitude towards emotional expression and *total* perceived social constraints when compared with the university-based students. The within-subjects independent variable was time of assessment (pre-operational and duty-related), and the between-subjects independent variable was training group (university and job-based). Student age was entered as a covariate to statistically adjust for differences on this variable. Due to

the number of comparisons to be conducted, a Bonferroni adjusted alpha level of .01 was used to judge statistical significance and control for Type 1 errors.

As hypothesised, a significant interaction was detected between time and training group for the dependent variable of trauma exposure at Time 2, with a large effect size, Wilks'  $\Lambda = .29$ ,  $F(1, 33) = 81.74$ ,  $p = .0001$ ,  $\eta^2 = 0.71$ . Figure 1 shows this interaction. A post-hoc independent samples *t*-test found that whereas the two training groups were exposed to similar levels of trauma at Time 1,  $t(34) = -0.81$ ,  $p = .42$ , at Time 2 the job-based students had been exposed to significantly more trauma than the university-based,  $t(34) = -8.99$ ,  $p = .0001$  (equal variances not assumed). The corresponding eta squared statistic was calculated, with a large effect size detected,  $\eta^2 = 0.70$ , indicating 70% of the variance in students' duty-related trauma exposure was explained by training method. No significant interactions were found between time and training group on the dependent variables of PTSS severity, emotional empathy, total perceived social constraints and attitude towards emotional expression. A significant main effect for training group was found for the dependent variable of trauma exposure with a large effect size,  $F(1, 33) = 93.56$ ,  $p = .0001$ ,  $\eta^2 = 0.74$ , indicating that job-based students were exposed to more trauma than the university-based. Significant and large within-subjects main effects were evident for time on the dependent variables of trauma exposure,  $F(1, 33) = 17.46$ ,  $p = .0001$ ,  $\eta^2 = 0.35$ , and total perceived social constraints,  $F(1, 33) = 13.70$ ,  $p = .001$ ,  $\eta^2 = 0.24$ , with both student groups experiencing a significant negative change in their perceptions of their social relationships at Time 2. No other significant between-or-within-subjects main effects for group or time were detected, and student age was non-significant in all analyses. Table 9 shows the Time 1 and Time 2 dependent variables and within-subjects mean scores, the between-subjects mean difference scores, standard

errors, and associated *t*-tests. No violations of Box’s *M* test of equality of covariance matrices and Levene’s test of homogeneity of variances occurred.

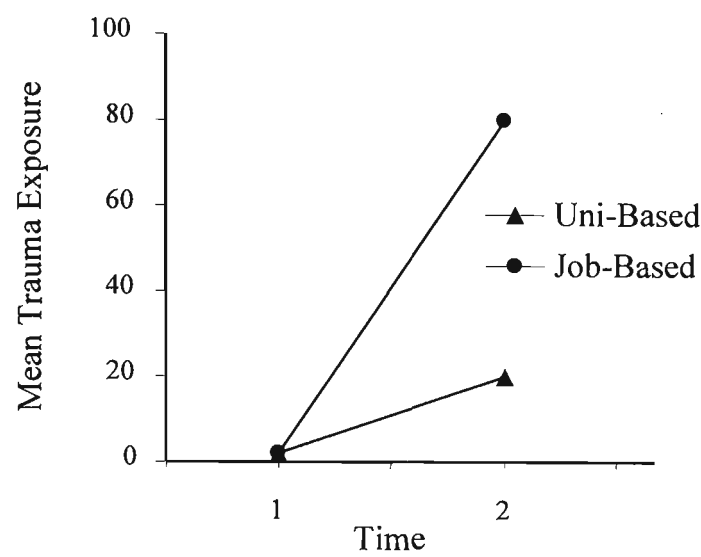


Figure 1. Interaction between time of assessment and training group for mean trauma exposure rates.

Table 9  
Means, Difference Scores, Standard Errors and *t*-values for all Pre-Operational and Duty-Related Variables

Variable	Uni <i>M</i>	Job <i>M</i>	Mean Difference	Standard Error	<i>t</i> -value
TraumaExpT1	1.76	2.09	0.33	.41	-0.81
TraumaExpT2	19.88	80.18	60.30	4.70	-8.99****
PTSST1	1.56	1.73	0.17	.78	-0.22
PTSST2	2.80	4.36	1.56	1.16	-1.35
EmpathyT1	39.04	34.91	4.13	9.36	0.44
EmpathyT2	34.92	28.36	6.56	9.35	0.70
ConstraintsT1	16.56	16.18	0.38	1.76	0.22
ConstraintsT2	30.12	29.27	0.85	2.49	0.34
AttitudeT1	38.36	42.45	4.10	2.34	-1.75
AttitudeT2	41.64	44.00	2.36	2.04	-1.16

*Note.* Uni = university-based; Job = job-based; T1 and T2 = time 1 and time 2; TraumaExp = trauma exposure; PTSS = PTSS severity; Empathy = emotional empathy; Constraints = total perceived social constraints; Attitude = attitude towards emotional expression.  
\*\*\*\* *p* < .0001.

### 3.5 *Time 1 Predictors of Duty-Related PTSS Severity*

A hierarchical multiple regression was conducted to test hypothesis 4, that after controlling for the different training methods, duty-related (Time 2) PTSS severity will be predicted by negative relationships with students' pre-operational (Time 1) levels of perceived non-work social constraints and attitude towards emotional expression, and positive relationships with prior trauma exposure, PTSS and emotional empathy. Table 10 displays the correlations, means and standard deviations of the regression variables. As hypothesised, entering the ambulance profession with a prior trauma history and PTSS were significantly associated with increased Time 2 PTSS severity. Contradicting the hypothesis, a more negative attitude towards emotional expression and decreased emotional empathy at Time 1 were significantly associated with higher PTSS severity at Time 2.

A separate analysis of the Time 1 independent variable of pre-exposure was then conducted to ascertain if there was a significant difference in the mean Time 2 PTSS severity scores for student paramedics with 'Low' prior trauma exposure (0-1 prior event) and 'High' prior trauma exposure (2 or more prior events). An independent-samples *t*-test with equal variances assumed, found a significant difference in Time 2 PTSS severity scores for students who had been exposed to 2 or more pre-operational traumatic events ( $M = 4.4$ ,  $SD = 3.52$ ) when compared with those exposed to fewer than 2 prior events ( $M = 1.23$ ,  $SD = 0.83$ );  $t(34) = -3.21$ ,  $p = .003$ . The magnitude of the differences in the means was large (eta squared = .23).



Table 10  
*Correlations, Means and Standard Deviations for Time 1(Pre-Operational) Multiple Regression Variables*

Variable	1	2	3	4	5	6	7	8
1. PTSS <sub>2</sub>	--							
2. Group <sup>a</sup>	.23	--						
3. Age	.09	.73****	--					
4. Pre-Exp.	.40***	.14	.02	--				
5. PTSS <sub>1</sub>	.40***	.04	-.01	.13	--			
6. Empathy	-.40***	-.08	.02	-.49***	-.17	--		
7. NW/Cons.	-.11	-.01	.11	.22	-.16	-.10	--	
8. Attitude	.40***	.29*	.15	.42***	.20	-.41***	.48***	--
<i>M</i>	3.28	0.31	25.22	1.86	1.61	37.78	16.28	39.61
<i>SD</i>	3.23	0.47	6.74	1.13	2.12	25.56	4.91	6.66

*Note.* Pre-Exp = number of prior traumatic events; NW/Cons. = perceived non-work social constraints.  
<sup>a</sup> 0 = university-based; 1 = job-based.  
\**p* < .05. \*\*\* *p* < .001. \*\*\*\* *p* < .0001.

Table 11 displays the independent variables at each step of the regression equation, the unstandardised (*B*) regression coefficients and standard error (*SE*), standardised regression coefficients ( $\beta$ ), squared semipartial correlations ( $sr^2$ ), and *t*-values.

Table 11  
*Hierarchical Regression Analysis of Pre-Operational Factors on Time 2 PTSS Severity*

Predictors	<i>B</i>	<i>SE</i>	$\beta$	$sr^2$	<i>t</i> -value
<b>Step 1:</b> <i>F</i> (2, 33) = 1.07, Adjusted <i>R</i> <sup>2</sup> = .00 ( <i>ns</i> )					
Group <sup>a</sup>	2.28	1.67	.33	.23	1.36
Age	-.07	.12	-.14	-.10	-0.60

(table continued)

Table 11 (continued)

Predictors	<i>B</i>	<i>SE</i>	$\beta$	<i>sr</i> <sup>2</sup>	<i>t</i> -value
<u>Step 2:</u> $F(2, 31) = 5.80$ , Adjusted $R^2 = .23^{**}$					
Group <sup>a</sup>	1.49	1.49	.21	.15	1.00
Age	-.03	.10	-.07	-.05	-0.31
Pre-Exposure	.94	.44	.33	.32	2.16*
PTSS	.54	.23	.35	.35	2.35*
<u>Step 3:</u> $F(3, 28) = 1.55$ , Adjusted $R^2 = .27$ ( <i>ns</i> )					
Group <sup>a</sup>	.40	1.57	.06	.04	0.36
Age	.02	.10	.04	.02	0.17
Pre-Exposure	.65	.50	.23	.19	1.30
PTSS	.37	.24	.24	.22	1.54
Empathy	-.02	.02	-.15	-.12	-0.85
NW/Con.	-.19	.12	-.28	-.22	-1.54
Attitude	.15	.10	.30	.21	1.47

*Note.* Pre-Exposure = number of prior traumatic events; NW/Con. = perceived non-work social constraints.  
<sup>a</sup> 0 = university-based; 1 = job-based.  
 $R^2 = .06$  for Step 1 (*ns*);  $\Delta R^2 = .26$  for Step 2 ( $p < .01$ );  $\Delta R^2 = .10$  for Step 3 (*ns*). *t*-value *df* = 35.  
\* $p < .05$ . \*\* $p < .01$ .

The data contained in Table 11 indicates that at Step 1, paramedic training method and student age were not predictive of duty-related PTSS severity. With the entry of pre-operational trauma exposure and associated symptomatology at Step 2, the combined variables made a significant contribution to the prediction of duty-related PTSS severity, explaining 23% of the variance. As hypothesised, prior trauma exposure and symptomatology were significant predictors of duty-related PTSS. The addition of emotional empathy, perceived non-work social constraints and attitude towards emotional expression at Step 3 did not result in a significant increment in the prediction of students'

duty-related PTSS severity. In the final model, none of the variables were significant predictors. Results indicate that on their own, prior trauma exposure and associated symptomatology are salient predictors of duty-related PTSS, but in combination with students' emotional empathy, perceived non-work social constraints and attitude towards emotional expression, their effect is diminished.

### 3.6 *Time 2 Predictors of Duty-Related PTSS Severity*

A final hierarchical multiple regression was conducted to investigate hypothesis 5, which proposed that after controlling for the two training methods, student paramedics' Time 2 PTSS severity would be predicted by positive relationships with duty-related levels of trauma exposure, perceived work and non-work social constraints and attitude towards emotional expression, and a negative relationship with emotional empathy. Hypothesis 6 was also examined with this analysis, and proposed that duty-related PTSS severity would also be predicted by significant interactions between increased trauma exposure and decreased emotional empathy, decreased emotional empathy and increased perceived work and non-work social constraints, and increased perceived work and non-work social constraints and negative attitude towards emotional expression.

Table 12 displays the correlations for the Time 2 variables used in the regression equation and shows that as predicted by hypothesis 5, increased PTSS severity at Time 2 was significantly associated with students' duty-related negative attitudes towards emotional expression. Contradicting hypothesis 6, none of the duty-related interaction terms were significantly associated with students' Time 2 PTSS severity.

Table 12  
*Correlations for Time 2 (6-Months Follow-Up) Multiple Regression Variables*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. PTSS <sub>2</sub>	--												
2. Group <sup>a</sup>	.23	--											
3. Age	.09	.71****	--										
4. Code 1	.21	.91****	.62****	--									
5. Empathy	-.24	-.12	-.03	-.12	--								
6. W/Con	.06	.06	-.02	.14	-.07	--							
7. NW/Con	-.21	-.11	-.25	-.13	-.02	.12	--						
8. Attitude	.39**	.20	.04	.26	-.43**	-.11	.10	--					
9. C1xE	.04	-.21*	-.35*	-.34*	-.04	-.04	.20	-.03	--				
10. ExW/C	-.02	-.06	-.10	-.04	.07	.13	-.06	-.00	-.18	--			
11. ExNW/C	.14	.13	.19	.19	-.24	-.05	.22	.38*	-.12	.28	--		
12. W/CxA	.06	-.20	-.02	-.22	-.00	-.06	.06	-.17	.14	-.42**	-.14	--	
13. NW/CxA	-.17	-.14	-.13	-.12	.45**	.06	.01	-.27	.05	-.13	-.42****	.22	--

*Note.* PTSS<sub>2</sub> = duty-related trauma symptoms; C1 = duty-related trauma exposure; E. = emotional empathy; W/Con. or W/C = perceived work constraints; NW/Con. or NW/C = perceived non-work social constraints; A. = attitude towards emotional expression.  
<sup>a</sup> 0 = university-based; 1 = job-based.  
\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*\*  $p < .0001$ .

Table 13 displays the independent variables for each step of the regression equation, along with the unstandardised regression coefficients ( $B$ ) and standard error ( $SE$ ), standardised regression coefficients ( $\beta$ ), squared semipartial correlations ( $sr^2$ ) and  $t$ -values. The data shows that at Step 1, paramedic training group and student age did not significantly contribute to the prediction of duty-related PTSS severity. Contradicting hypothesis 5, the duty-related independent variables of increased trauma exposure and perceived work and non-work social constraints, and decreased emotional empathy entered at Step 2, were not significant predictors of Time 2 PTSS severity. However, with

the additional entry of negative attitude towards emotional expression at Step 3, the combined variables made a significant contribution to the prediction of duty-related PTSS severity, explaining 8% of the variance. Further, a negative attitude towards emotional expression was a unique and significant contributor to increased duty-related PTSS severity. Contradicting hypothesis 6, none of duty-related interaction terms entered at Step 4 were significant predictors of Time 2 PTSS severity. In addition, a negative attitude towards emotional expression was no longer a significant predictor. This finding indicates that on its own, a negative attitude towards emotional expression is a salient predictor of duty-related PTSS in student paramedics, but in combination with the additional variables the effect is diminished.

Table 13  
*Hierarchical Regression Analysis of Time 2 Factors on Duty-Related PTSS Severity*

Predictors	<i>B</i>	<i>SE</i>	$\beta$	<i>sr</i> <sup>2</sup>	<i>t</i> -value
<u>Step 1:</u> <i>F</i> (2, 33) = 1.07, Adjusted <i>R</i> <sup>2</sup> = .00 ( <i>ns</i> )					
Group <sup>a</sup>	2.28	1.67	.33	.23	1.36
Age	-.07	.12	-.14	-.10	-0.60
<u>Step 2:</u> <i>F</i> (4, 29) = 0.80, Adjusted <i>R</i> <sup>2</sup> = -.02 ( <i>ns</i> )					
Group <sup>a</sup>	2.90	3.29	.42	.15	0.88
Age	-.10	.12	-.20	-.14	-0.79
Code 1	-.01	.05	-.12	-.05	-0.27
Empathy	-.03	.02	-.21	-.21	-1.21
W/Cons.	.07	.24	.05	.05	0.31
NW/Cons.	-.13	.10	-.24	-.22	-1.31

(table continued)

Table 13 (continued)

Predictors	<i>B</i>	<i>SE</i>	$\beta$	<i>sr</i> <sup>2</sup>	<i>t</i> -value
Step 3: <i>F</i> (1, 28) = 4.33, Adjusted <i>R</i> <sup>2</sup> = .08*					
Group <sup>a</sup>	3.61	3.13	.52	.19	1.15
Age	-.08	.12	-.16	-.11	-0.65
Code 1	-.04	.04	-.34	-.13	-0.81
Empathy	-.01	.02	-.04	-.04	-0.23
W/Cons.	.20	.24	.14	.13	0.83
NW/Cons.	-.15	.09	-.29	-.27	-1.68
Attitude	.23	.11	.40	.34	2.08*
Step 4: <i>F</i> (5, 23) = .37, Adjusted <i>R</i> <sup>2</sup> = -.03 ( <i>ns</i> )					
Group <sup>a</sup>	4.22	3.75	.61	.19	1.13
Age	-.12	.14	-.25	-.14	-0.84
Code 1	-.04	.05	-.25	-.15	-0.67
Empathy	.00	.03	.03	.02	0.13
W/Cons.	.24	.26	.17	.16	0.92
NW/Cons.	-.19	.11	-.35	-.31	-1.78
Attitude	.23	.12	.41	.32	1.87
Code1 x Emp.	.00	.00	.04	.04	0.21
Emp. x W/Cons.	.00	.01	.00	.00	-0.01
Emp. x NW/Cons.	.00	.01	.12	.09	0.52
W/Cons. x Att.	.06	.06	.23	.19	1.02
NW/Cons. x Att.	-.01	.02	-.09	-.05	-0.30

*Note.* Code 1 = duty-related trauma exposure; W/Cons = perceived work social constraints; NW/Cons = perceived non-work social constraints; Emp. = emotional empathy; Att. = attitude towards emotional expression.

<sup>a</sup>0 = university-based; 1 = job-based.  
*R*<sup>2</sup> = .06 for Step 1 (*ns*);  $\Delta R^2$  = .09 for Step 2 (*ns*);  $\Delta R^2$  = .11 for Step 3 (*p* < .05);  $\Delta R^2$  = .06 for Step 4 (*ns*).  
*t*-value *df* = 35.

\* *p* < .05.

3.7 Ancillary Analysis

Additional analysis of the Time 2 attitude towards emotional expression IV was undertaken, as this was the only IV found to be significantly correlated with Time 2 PTSS severity, and was also a significant and unique predictor at Step 3 of the regression equation. To ascertain which aspects of students' attitudes towards emotional self-disclosure may predict duty-related PTSS severity, a standard multiple regression analysis was run. The DV was Time 2 PTSS severity, and the simultaneously entered IV's were the four subscale scores for the Attitude Towards Emotional Expression Scale (ATEES; Joseph et al., 1994). The subscales reflected students' attitudinal beliefs regarding emotional behavioural style (e.g., bottle-up), and cognitions about the meaning (e.g., sign of weakness), consequences (e.g., social rejection) and expression (e.g., keep control) of emotions. Table 14 shows the correlations, means and standard deviations for the variables used in the regression equation, and shows that students' emotional behavioural style (e.g., bottle up) and beliefs regarding the expression of emotions (e.g., keep in control) were significantly correlated with duty-related PTSS severity.

Table 14  
*Correlations, Means and Standard Deviations for Time 2 ATEES Sub-Scales and Duty-Related PTSS Severity*

Variable	1	2	3	4	5
1. PTSS <sub>2</sub>	--				
2. Meaning (weakness)	.24	--			
3. Behaviour (bottle up)	.48**	.18	--		
4. Expression (keep control)	.30*	.53****	.29*	--	
5. Consequences (social rejection)	.14	.48***	.36*	.47**	--

*Note.* PTSS<sub>2</sub> = duty-related posttraumatic stress symptom severity; Meaning = beliefs regarding the meaning of emotional expression; Behaviour = beliefs regarding emotional behavioural style; Expression = beliefs regarding the expression of emotions; Consequences = beliefs regarding the consequences of expressing emotions.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ . \*\*\*\*  $p < .0001$ .

Table 15 displays the independent variables used in the regression equation, along with the unstandardised regression coefficients (*B*) and standard error (*SE*), standardised regression coefficients ( $\beta$ ), squared semipartial correlations ( $sr^2$ ) and *t*-values. Results show the combined independent variables made a significant contribution to the prediction of duty-related PTSS severity, explaining 19% of the variance. Students' emotional behavioural style was a unique and significant predictor of Time 2 PTSS severity.

Table 15  
*Regression Analysis of Time 2 ATEES Sub-Scale Scores on Duty-Related PTSS Severity*

Predictors	<i>B</i>	<i>SE</i>	$\beta$	$sr^2$	<i>t</i> -value
<hr/>					
<i>F</i> (4, 31) = 3.08, Adjusted $R^2$ = .19*					
Beliefs re: Meaning	.24	.30	.16	.12	0.82
Behavioural Style	.78	.28	.47	.43	2.82***
Beliefs re: Expression	.29	.34	.16	.13	0.87
Beliefs re: Consequences	-.30	.33	-.17	-.14	-0.93

*Note.* Beliefs re: meaning = beliefs regarding the meaning of emotional expression; Behavioural style = beliefs regarding emotional behavioural style; Beliefs re: expression = beliefs regarding the expression of emotions; Beliefs re: consequences = beliefs regarding the consequences of expressing emotions.  
\*  $p < .05$ . \*\*\*  $p < .001$ .

3.8 *Summary of Results*

Hypothesis 1 proposed that university-based and job-based student paramedics would not be distinguishable on the basis of their pre-operational levels of trauma exposure, symptom severity, emotional empathy, perceived non-work social constraints and attitude towards emotional expression. This hypothesis was supported by the DFA results which showed that none of the pre-operational predictor variables met statistical significance.



Hypothesis 2 proposed that university-based and job-based student paramedics would be distinguishable on the Time 2 predictors of duty-related trauma exposure, PTSS severity, emotional empathy, perceived work and non-work social constraints, and attitude towards emotional expression. Sequential DFA results partially support this hypothesis, showing that with the entry of the duty-related independent variables at Step 2, the two training groups could be significantly distinguished. Classification results showed 97.2% of students were correctly classified into their respective training groups and 88% of the variance in the training group dependent variable was accounted for by the model. Both attitude towards emotional expression and duty-related trauma exposure (i.e., Code 1 incidents) were found to be primary predictors of group membership, with the latter also meeting statistical significance.

Hypothesis 3 proposed that over time, job-based students would experience significantly greater increases in trauma exposure, PTSS severity, perceived work and non-work social constraints and negative attitude towards emotional expression, and decreased emotional empathy, when compared to university-based students. This hypothesis was partially supported by the SPANOVA results, which showed a significant interaction between time and training group for the dependent variable of trauma exposure. An independent-samples *t*-test found that whereas the two training groups were exposed to similar levels of trauma at Time 1, at Time 2 the job-based students had been exposed to significantly more trauma than the university-based.

Hypothesis 4 proposed that after controlling for the two training methods, duty-related PTSS severity would be predicted by positive relationships with students' pre-operational levels of trauma exposure, symptomatology and emotional empathy, and negative relationships with perceived non-work social constraints and attitude towards emotional expression. The hierarchical regression provided partial support for this

hypothesis. As expected, the entry of pre-operational trauma exposure and associated symptomatology at Step 2 made a significant combined contribution to the prediction of duty-related PTSS severity, explaining 23% of the variance. Also as expected, the regression equation found that prior trauma exposure and associated symptomatology were unique and significant predictors of students' duty-related PTSS severity. An independent-samples *t*-test found that students exposed to two or more pre-operational traumatic events also reported a significantly higher level of duty-related PTSS severity, than those exposed to fewer than two events. Contradicting this hypothesis, the entry of emotional empathy, and perceived non-work social constraints and attitude towards emotional expression at Step 3, did not result in a significant increment in the prediction of students' PTSS severity.

Hypothesis 5 proposed that after controlling for the two training methods, positive relationships would be found between student paramedics' Time 2 PTSS severity and duty-related trauma exposure, perceived work and non-work social constraints and attitude towards emotional expression, and a negative relationship would also be found between duty-related levels of PTSS severity and emotional empathy. Partial support was obtained for this hypothesis. As hypothesised, the hierarchical regression equation found the combined duty-related variables entered at Step 3 made a significant contribution to the prediction of PTSS severity, accounting for 8% of the variance. Also as hypothesised, a negative attitude towards emotional expression was a unique and significant predictor of duty-related PTSS severity. Contradicting this hypothesis, duty-related trauma exposure, emotional empathy and perceived work and non-work social constraints were not significant unique predictors of students' PTSS severity.

Finally, hypothesis 6 proposed that duty-related PTSS severity would also be predicted by significant interactions between students' increased duty-related trauma

exposure and decreased emotional empathy, decreased emotional empathy and increased perceived work and non-work social constraints, and increased social constraints and negative attitude towards emotional expression. This hypothesis was not supported by the hierarchical regression equation. The entry of the interaction terms at Step 4 did not result in a significant increment in the prediction of students' duty-related PTSS severity and none of the interactions were significant predictors.

## Discussion

### 4.1 *PTSS Severity in Student Paramedics*

This study utilised the vulnerability perspective of traumatic stress to investigate duty-related PTSS and PTSD in student paramedics. The vulnerability model proposes that every stressful or traumatic life-event depletes available coping resources, so that when re-exposed, the individual experiences a heightened level of distress and risk of developing PTSD (Winkel et al., 2003). It should be noted however, that this is the first longitudinal study of the vulnerability model in a stand-alone sample of 1<sup>st</sup> year student paramedics. It is also the first to include pre-operational measures of students' psychological health, emotional empathy, emotional social support and attitude towards emotional self-disclosure. Therefore, the results discussed here are tentative and require replication.

Consistent with general population findings, prior to commencing on-road ambulance duties 86% of the student paramedics reported a prior trauma history (e.g., Creamer et al., 2001; Kessler et al., 1995; Perkonigg et al., 2000), with exposure to two prior events being the most common occurrence for both university and job-based students. However, despite the majority of students being primary victims of traumatic

events, less than half (44%) experienced PTSS and none met the *DSM-IV-TR* (APA, 2000) criteria for a full PTSD diagnosis.

In contrast to the pre-operational findings, analyses of the duty-related measures revealed that PTSS levels had increased for both student groups, with 83% of the sample experiencing varying degrees of psychological distress within 6-months of commencing on-road ambulance duties. Of these, 25% reported experiencing PTSS at moderate to moderately severe levels. This finding is consistent with previous studies showing elevated levels of PTSS in trainee and experienced trauma therapists (e.g., Birck, 2001; Creamer & Liddle, 2005), rescue workers (e.g., Alvarez & Hunt, 2005; Cetin et al., 2005), firefighters (e.g., Dean et al., 2003; Haslam & Mallon, 2003); police (e.g., Brown et al., 1999; Stephens et al., 1997), hospital medical staff (e.g., Crabbe et al., 2004), and paramedics (e.g., Lowery & Stokes, 2005; Robinson, 2002).

The results also identified for the first time that student paramedics are at high risk of developing full PTSD within the first 6-months of commencing on-road ambulance duties. Data showed that at baseline assessment none of the students experienced a level of PTSS that met a PTSD diagnosis (APA, 2000). However, at 6-months follow-up, 22% of the sample met the full *DSM-IV-TR* (APA, 2000) criteria for clinical PTSD. The 95% Confidence Intervals for this prevalence rate are 11% and 39% (lower and upper limits, respectively). Further, diagnostic rates were similar for both university (20%) and job-based (27%) students. Of concern, is that the reported PTSD rate is consistent with that seen in studies of ambulance officers with lengthy on-road experience (e.g., Clohessy & Ehlers, 1999; Grevin, 1996; Lowery & Stokes, 2005; Regehr et al., 2002a). This indicates that within 6-months of entering the profession, student paramedics are experiencing levels of duty-related psychological distress comparable to that of their more qualified peers. This is consistent with Cydulka et al., (1994), who also reported that paramedics

with less than one year of service were more stressed than those with greater experience, and Anshel et al.'s. (1997) findings that police cadets were at greatest risk of developing duty-related PTSD within the first year of operational duties.

Supporting the vulnerability model of PTSD, which proposes that trauma exposure depletes coping resources (Winkel et al., 2003), this study identified for the first time, that student paramedics' pre-operational trauma exposure and unresolved trauma-related symptomatology were significant predictors of higher duty-related PTSS severity. This is consistent with previous findings of a positive relationship between prior trauma history and elevated levels of psychological distress in police (e.g., Stephens et al., 1997), firefighters (e.g., Corneil, 1995; Moran & Britton, 1994) and volunteer state emergency service personnel (e.g., Moran & Britton, 1994). In addition, this study also identified for the first time, that student paramedics' duty-related PTSS severity was heightened in those who entered the profession with a history of exposure to two or more traumatic events. This provides additional support for the vulnerability perspective of PTSD, indicating that repeated pre-operational trauma exposure rendered students vulnerable to experiencing increased psychological distress when subsequently exposed to duty-related traumatic events (Winkel et al., 2003).

Supporting previous paramedics studies (e.g., Alexander & Klein, 2001; Clohessy & Ehlers, 1999; van der Ploeg & Kleber, 2003), the majority of the current sample also attributed exposure to their worst traumatic event to carrying out on-road ambulance duties. Further, in combination with the other duty-related variables (i.e., decreased emotional empathy, increased perceived work and non-work emotional social constraints, negative attitude towards emotional expression), exposure to duty-related traumatic events (i.e., Code 1 incidents) also contributed to the amount of variance explained in students' duty-related PTSS severity. However, on its own, this factor was not a

significant predictor of duty-related PTSD, and the overall results did not support previous suggestions that repeated duty-related trauma exposure is predictive of paramedics' negative health outcomes (e.g., Alexander & Klein, 2001; Bennett et al., 2004; Clohessy & Ehlers, 1999; Regehr et al., 2002a). Instead, the data supports the author's previous research which found a non-significant relationship between Code 1 incidents and PTSS severity in student paramedics (Lowery & Stokes, 2005), and suggests it may be the initial exposure to a duty-related traumatic event that influences the onset of psychological distress in this population, rather than the frequency of exposure. In support of this, although the current sample of job-based student paramedics attended a significantly greater number of Code 1 incidents than did the university-based, they did not experience significantly higher rates of PTSD.

In contrast to previous findings of high emotional empathy in helping professionals, and suggestions this trait increases workers' psychological vulnerability (e.g., Carlier et al., 2000; Cetin et al., 2005; Ursano et al., 1999), this study identified that prior to commencing on-road ambulance duties, the majority of the job and university-based student paramedics exhibited below average empathic tendencies. This finding lends weight to Grevin's (1996) proposal that low emotional empathy may actually be a personality trait of paramedics. Providing support for this hypothesis, in the current study, student paramedics' emotional empathy was measured prior to duty-related trauma exposure, and therefore unlike Grevin's study, was uncontaminated by students' attempts to distance themselves from the distressing reality of their work. The data also indicated that decreased emotional empathy prior to commencing on-road ambulance duties was not significantly associated with students' pre-operational age, trauma history, perceived social constraints or attitude towards emotional expression. Therefore the presence of a personality characteristic is strongly suggested. Also suggestive of a personality trait, is

the finding that students' emotional empathy did not significantly decline once they were exposed to duty-related traumatic events. Whereas other studies have shown a substantial decrease occurred in helping professionals' empathic tendencies as a means of coping with their duties (e.g., Crabbe et al., 2004; Regehr, 2005; Stradling et al., 1993), this study found a stable pattern of lowered emotional empathy in both university and job-based student paramedics. Furthermore, it may be this inherent control of their affective responses that allows paramedics to effectively carry out their duties, and protects them against becoming emotionally connected to their patients.

Although it is plausible that lowered emotional empathy is adaptive for student paramedics in terms of carrying out their duties, this study suggests it is maladaptive in terms of their psychological health. A significant negative trend was observed between students' decreased pre-operational emotional empathy and increased duty-related PTSS severity. It is possible that student paramedics who enter the profession with lowered empathic tendencies (i.e., a tendency towards emotional withdrawal) may rely on emotion-focused (i.e., denial) coping strategies (Folkman & Lazarus, 1988), which may hinder the processing of duty-related traumatic events, and heighten their risk of psychological distress (Horowitz, 1986, 2001).

This study also identified that at 6-month follow-up, both the job and university-based student paramedics perceived their emotional relationships with non-work support providers to be significantly constrained. University-based students had less interest in talking to family and friends about duty-related events, than did job-based students, and reported having fewer conversations with these supports. Providing some insight into this finding is the unsolicited comment by one university student who wrote, "I felt I could not share everything with my family and friends as they have not worked on the road and were unaware of the working environment and the types of things that could be witnessed

on the road.” It is reasonable to expect this sentiment was echoed by other university-based students, as many emergency responders feel that those outside of the job will not understand how they feel (e.g., Alexander & Klein, 2001; Haslam & Mallon, 2003; McCarroll et al., 1993; Regehr et al., 2002b; Salston & Figley, 2003). In contrast, rather than being reluctant to talk to family and friends about duty-related events, job-based students turned to these support providers more often, and also reported engaging in more conversations with them. However, they still perceived these relationships to be more emotionally constrained than prior to commencing on-road ambulance duties, suggesting a diminished quality to these interactions.

Given findings that the content of emergency responders’ conversations can trigger avoidance behaviours in family and friends (e.g., McCarroll et al., 1993; Regehr, 2005), it is likely that for job-based students the same reactions were experienced, as they were exposed to a significant number of duty-related traumatic events. For these students it is probable that family and friends became progressively reluctant to fully engage in duty-related conversations, as they wished to avoid hearing the distressing and graphic nature of the students’ work. As a result, job-based students may have been unable to obtain the desired emotional support. Evidence also implies that in response to family and friends’ avoidance behaviours, job-based students were likely to have progressively censored the details of their conversations (e.g., Regehr et al., 2002b; Salston & Figley, 2003), in turn feeling dissatisfied with these interactions.

One of the most interesting findings regarding students’ perceived emotional constraints in their non-work social relationships was that rather than exacerbating duty-related psychological distress, greater emotional constraint was associated with decreased PTSS severity. This is inconsistent with the current study’s proposal and previous research showing that a lack of access to this coping resource negatively impacts on an



individual's psychological health (e.g., Andrews et al., 2003; Janoff-Bulman, 1992; Schmidt & Andrykowski, 2004). Instead, it suggests a level of non-work emotional social constraint may be needed for paramedics to effectively process trauma-related emotions. The cognitive processing model of PTSD described by Creamer and others (Creamer, 1995; Creamer, Burgess & Pattison, 1990) offers a possible explanation.

According to the cognitive processing model (Creamer, 1995; Creamer et al., 1990), alternating between tolerable levels of painful memories and their avoidance allows gradual integration of the event's subjective meaning into the pre-event's memory network. Applying this model to the current sample, it is reasonable to expect that family and friends wanted to support students as much as possible. However, students reported a decreased desire to talk to family and friends about duty-related traumatic events, and this may have protected them from receiving levels of emotional support that could have exceeded their needs, thus preventing them from effectively alternating between experiencing their intrusive memories and avoiding them.

Both university and job-based student paramedics also perceived their work-place relationships to be significantly emotionally constrained. Although both student groups reported wanting to talk to their colleagues at various times about a distressing duty-related event, neither group actually engaged in these conversations as much as they would have liked. When compared with university-based students, job-based students also reported having less interest in talking to colleagues about duty-related traumatic events, and engaging in fewer conversations. Further, when university and job-based students did speak to their experienced peers about their duty-related emotions, both groups reported feeling dissatisfied with these interactions.

These findings are of particular concern, given that previous studies of emergency services personnel, including paramedics, have shown a lack of colleague emotional

social support can exacerbate the impact of duty-related traumatic events (e.g., Clohessy & Ehlers, 1999; Lowery & Stokes, 2005; van der Ploeg & Kleber, 2003) and hinder posttraumatic growth (e.g., Paton, 2005; Shakespeare-Finch et al., 2005). Consistent with these findings, the current data also showed that student paramedics were vulnerable to experiencing increased duty-related PTSS severity when they were unable to cope with their duty-related feelings by accessing emotional social support from their more experienced peers. The fact that university-based students only attended an ambulance branch for 4-weeks at a time, but also perceived their work relationships as being emotionally constrained, is also cause for concern. This implies that students are experiencing constrained emotional social support in the work-place almost immediately upon entry to the profession. It could be argued however, that as it takes time to form collegiate relationships, constraints for these students may have arisen out of students not feeling confident and comfortable enough to confide their concerns. However, given that job-based students continually worked out of the same ambulance branch for 6-months, which is more than enough time to form supportive bonds, and still reported significantly constrained emotional social relationships suggests a problematic work-place environment.

Evidence shows that ambulance services are institutions of conformity, with a culture of 'emotional toughness' that negatively impacts on work-place relationships (e.g., Palmer, 1983; Regehr, 2005; Robinson, 2002; Sassella, 2007). For example, this culture discourages the disclosure of one's real emotions, and as a consequence, student paramedics were likely to be restricted in accessing emotional support from their more experienced colleagues (e.g., Clohessy & Ehlers, 1999; Lowery & Stokes, 2005). In addition, as experienced paramedics have been found to typically adhere to this ethos

(e.g., Clohessy & Ehlers, 1999; Robinson, 2002) the type of emotional support offered to the students was unlikely to be beneficial.

In support of these proposals, the author's previous study of student paramedics (Lowery & Stokes, 2005) found that although students confided in their qualified peers they did not feel emotionally supported. This also appears to have occurred in the current sample of student paramedics, as indicated by students' reports of feeling dissatisfied when they engaged in emotion-based conversations with their experienced colleagues, and reluctance to re-engage. Furthermore, job-based students who were more immersed in the ambulance culture also reported more dissatisfaction with these relationships and less interest in engaging in emotion-based conversations with colleagues, when compared with the university-based group. However, it is also possible that with more immersion within the ambulance culture, job-based students' need for belongingness and esteem support (Stephens et al., 1997) resulted in these students conforming to their peers' toughness ethic, and this may also have contributed to their dissatisfaction and disinterest in these relationships.

Previous research has also shown that approximately 20% of all paramedics experience clinical levels of PTSD (e.g., Alexander & Klein, 2001; Clohessy & Ehlers, 1999; Lowery & Stokes, 2005; van der Ploeg & Kleber, 2003), and therefore the current sample of student paramedics were highly likely to encounter experienced officers who were suffering from the disorder. This would also negatively impact on students' access to work-place emotional social support. For example, paramedics report that detachment from others and irritability are two of the most commonly experienced PTSD symptoms (e.g., Robinson, 2002; Regehr et al., 2002b; Regehr, 2005), and both of these would make it difficult for student paramedics to emotionally engage their experienced peers. Secondly, as experienced paramedics' typically rely on the psychological defense

mechanisms of denial and avoidance in order to cope with the distressing nature of their duties (e.g., Alexander & Klein, 2001; Clohessy & Ehlers, 1999; Regehr, et al., 2002b), they are unlikely to engage in emotion-based conversations with student paramedics. This would also severely restrict students' access to role models who have successfully reframed traumatic work events; an important element for posttraumatic growth (Calhoun & Tedeschi, 2004, 2006; Jackson, 2007). Lastly, exposure to duty-related traumatic events is a routine part of the job for experienced officers, and as a result, they are less likely to recognise a student's need for emotional support (Winkel et al., 2003). This is particularly relevant for job-based students, as their extended periods of on-road ambulance duties would mean their experienced colleagues would expect them to be able to 'handle the job'.

Finally, this study identified for the first time, that student paramedics may enter the profession with a negative attitude towards emotional expression, which is then reinforced through duty-related experiences. Prior to commencing on-road ambulance duties, both the university and job-based students recorded an attitude towards emotional self-disclosure that bordered on negative, and held a high belief that emotions should be 'bottled-up.' Furthermore, students' pre-operational decreased emotional empathy was significantly associated with their negative attitudes towards emotional expression. As both characteristics reflect emotional distancing, these findings suggest an inherent reluctance in paramedics to emotionally engage. However, this reluctance may place student paramedics at immediate risk of experiencing duty-related psychological distress, as indicated by the significant positive relationship detected between students' pre-operational negative attitudes towards emotional expression and increased duty-related PTSS severity. It would appear that by not utilising emotional self-disclosure as a coping strategy for duty-related traumatic events, students are inhibiting the effective processing

of critical incidents and as a result, the trauma-related information remains in active memory (Horowitz, 1986, 2001).

Evidence suggests that duty-related negative changes in paramedics' attitudes towards emotional expression also occur (e.g., Alexander & Klein, 2001; Lowery & Stokes, 2005; Regehr et al., 2002b). In support of this, at 6-month follow-up, data showed that both student groups recorded increased negativity towards emotional self-disclosure, as assessed by the Attitude Towards Emotional Expression Scale (Joseph et al., 1994). Further, although both university and job-based students still held the belief that emotion should be 'bottled up', both groups now also held a significant belief that their emotions should be 'kept under control'.

Some authors have attributed documented changes in paramedics' attitudes towards emotional expression to repeated duty-related trauma exposure (e.g., Alexander & Klein, 2001; Clohessy & Ehlers, 1999; Regehr et al., 2002b). Consistent with this explanation, a trend towards a positive relationship between Code 1 incidents (i.e., duty-related traumatic events) and negative change in attitude towards emotional expression was also observed in the current study. Other researchers have proposed that constraints in workplace emotional social support and associated informal culture of 'emotional toughness', also negatively influence paramedics' attitudes (e.g., Alexander & Klein, 2001; Lowery & Stokes, 2005; Regehr et al., 2002b; Robinson, 2002). It is possible the current sample of student paramedics were also influenced by these factors. For example, despite seeking emotional support from their experienced colleagues, both university and job-based students reported feeling dissatisfied with these interactions, and reported seeking this support less often than they would have liked to. Further, both groups held a significant duty-related belief that they should keep their emotions under control.

The reported negative change in student paramedics' attitudes towards emotional expression is consistent with Pennebaker's (1993) assertion that regulating distressing emotions is a personal characteristic that can be changed and reinforced through external pressure. Of most concern is the inference that once exposed to the duty-related environment, student paramedics deliberately stop using emotional self-disclosure as a coping resource, thereby increasing their vulnerability to duty-related traumatic stress (Horowitz, 1986, 2001; Winkel et al., 2003). The current finding of a significant relationship between students' duty-related negative attitudes towards emotional expression and increased PTSS severity would appear to support this, as does the author's previous research, in which the same relationship was found (Lowery & Stokes, 2005).

In summary, this study found the majority of the current sample of university and job-based student paramedics entered the profession with a prior trauma history and unresolved trauma-related symptomatology. Further, these variables were significant predictors of duty-related PTSS severity, suggesting a pre-operational vulnerability to subsequent trauma exposure (Winkel et al., 2003). Moreover, students who entered the profession with a history of exposure to two or more traumatic events also experienced greater duty-related psychological distress. The data also identified that the majority of students commenced on-road duties with below average emotional empathy, and an attitude towards emotional expression that bordered on negative. Trends between students' duty-related PTSS severity and pre-operational levels of emotional empathy and attitude towards emotional self-disclosure were also observed. This suggests an inherent emotional distancing in this population that translates into reluctance to emotionally self-disclose, thereby hindering students from effectively processing duty-related traumatic events (Horowitz, 1986, 2001).

The duty-related data also identified for the first time that student paramedics have a significant risk of experiencing severe PTSS within the first 6-months of on-road ambulance duties, and 22% of the current sample were diagnosed with PTSD. Both university and job-based student paramedics experienced a duty-related negative change in their attitude towards emotional expression, and significant negative changes were also observed in both groups on the variables of trauma exposure and perceived non-work emotional social constraints. Both student groups also reported a perceived lack of workplace emotional social support, and felt dissatisfied with colleague interactions after seeking to discuss trauma-related emotions with their more experienced peers. The combined duty-related variables of increased trauma exposure, negativity towards emotional expression and perceived non-work emotional social constraints, along with a perception of high workplace emotional social constraints, and decreased emotional empathy, were significant combined predictors of increased duty-related PTSS severity. Finally, a duty-related negative attitude towards emotional expression was also a significant and unique predictor of PTSS severity.

#### 4.2 *Implications of Current Findings*

The current results have particular relevance to ambulance services in terms of monetary and manpower costs. A main finding of this study was that both university and job-based student paramedics experienced significant duty-related changes in PTSS severity within the first 6-months of on-road ambulance duties, and 22% of the sample also met the full *DSM-IV-TR* (APA, 2000) criteria for a clinical diagnosis of PTSD. This finding has serious ramifications for ambulance services, as evidence shows the cumulative effect of duty-related stressors in paramedics is associated with high levels of absenteeism (Mitchell & Dyregrov, 1993), mental health stress leave (Regehr et al.,

2002a), early ill-health and burnout retirements, and premature mortality (Young & Cooper, 1999). Given that the current sample of student paramedics were experiencing psychological distress within such a short period, it is reasonable to expect that with continued employment, the cumulative effect of carrying out their duties will result in a number of these students prematurely leaving the profession.

The current findings also have implications in terms of ambulance services' recruitment procedures. As previously noted, the majority of the current student paramedics reported a prior trauma history consistent with general population findings. Therefore, ambulance services could expect a high rate of prior trauma exposure in each new student intake. However, students' pre-operational levels of trauma exposure and unresolved symptomatology also significantly predicted their increased duty-related PTSS severity, with greater exposure and symptomatology being significantly associated with greater duty-related psychological distress. It has been argued that early identification of pre-existing risk factors is needed to provide effective prevention and intervention for individuals who are at risk of developing trauma-related disorders (Heinrichs, Wagner, Schoch, Soravia, Hellhammer, & Ehlert, 2005). On this basis, it would benefit ambulance services to screen potential recruits for a prior trauma history, including the number of prior traumatic events experienced and any residual PTSS. Screening for personality factors shown to influence posttraumatic growth could also be included, such as extraversion, agreeableness, openness and conscientiousness (e.g., Shakespeare-Finch et al., 2005; Tedeschi & Calhoun, 1996). Students identified as being particularly vulnerable to subsequent trauma exposure, either through prior traumatic experiences or non-resilient personality traits, could be offered counselling to help resolve their residual trauma (where applicable), and/or be closely monitored during their first year of duties, so that interventions can be quickly implemented to minimise the



negative impact of their work. However, as student paramedics are likely to fear professional repercussions with such interventions, it would be pertinent to develop peer group programs specifically designed for student paramedics, with designated mentors who are trained in delivering mental health interventions. Ideally these mentors would not be employed by the students' ambulance service.

The finding of increased pre-operational psychological vulnerability, coupled with findings of significant negative changes in students' duty-related psychological health and interpersonal functioning, indicates ambulance services would also benefit from implementing resilience training programs. These programs should be delivered to both student and seasoned paramedics, and encompass training specifically designed to enhance officers' abilities to impose meaning on the duty-related traumatic experience, and their personal reactions to it (Paton, 2005). It is suggested that training to build this aspect of resilience should address three areas (Inzana, Driskell, Salas, & Johnston, 1996; Paton, 1994). First, it should include procedural issues, such as ensuring officers have realistic outcome and performance expectations, and learn to differentiate personal and situational constraints on effective response. Second, it should provide systematic exposure to the sights, sounds and smells of traumatic duty-related events (e.g., use morgue visits, review accounts of experienced personnel and specially prepared training videos), and include education on what constitutes normal emotional reactions and feelings under atypical situations. Third, training should develop officers' interpretive processes, for example, by developing individual and group procedures to review experiences as learning opportunities that enhance future competence.

Finally, the current sample of student paramedics perceived their workplace relationships to be lacking in emotional social support. Further, although students reported wanting to talk to their experienced peers about duty-related emotions, they were

often dissatisfied with these interactions, and were often reluctant to re-engage. It is well documented that paramedics' perceived lack of workplace emotional support can exacerbate the negative impact of duty-related traumatic events, and that an informal workplace culture of emotional toughness contributes to these constraints (e.g., Beaton et al., 1997; Clohessy & Ehlers, 1999; Lowery & Stokes, 2005; Regehr et al., 2003). It is therefore time for ambulance services to seriously address this inherent toughness ethic.

Logic would suggest the most effective way to achieve this aim would be to survey both student and experienced paramedics and determine what is happening in their workplace relationships with fellow workers as well as supervisors/managers, why they are reluctant to engage in emotion-based communications and their suggestions for breaking down this culture. Ambulance services could then develop programs designed to enhance peer relationships and communications based on the specific needs and recommendations of their workers. Periodic surveys would allow the effectiveness of implemented programs to be assessed and where necessary, amended.

Ambulance services could also address the problems associated with an inherent toughness ethic by implementing formal training protocols across the entire organisation (e.g., upper and middle management, branch managers, supervisors, student and experienced paramedics). Training could focus on the relationship between the organisational social environment and employee coping, with an emphasis on the fact that social support can assist employee resilience in three significant areas (Heaney, House, Israel, & Mero, 1995). First, social support can help an employee modify a stressful/traumatic situation in order to deal with the problem itself (problem-focused); second, social support can help an employee develop a new perspective on a stressful/traumatic situation by reinforcing or changing ideals (positive reappraisal); third, the provision of social support can decrease the amount of psychological distress

associated with a stressful/traumatic situation (community emotional support) (Heaney et al., 1995).

With successive groups of student and experienced paramedics, and managers and supervisors completing specialised training, over time, structured programs focusing on building resilience and an emotionally support environment is likely to assist in breaking down the work-place culture of 'emotional toughness' that exists within this profession, and instead replace it with a cohesive culture which advocates emotional self-disclosure and sustains workers' psychological wellbeing.

#### 4.3 *Limitations of Current Findings*

In spite of two-years of recruitment efforts, the sample of student paramedics in this study was relatively small, in turn limiting the study's ability to detect small effect sizes. This may explain the minimal amount of variance accounted for in students' PTSS severity by the combined duty-related variables. Using the conventional alpha level of 0.05 to control for Type I errors, post-hoc power analyses for the multiple regression *F*-tests found achieved power for small effects was 0.10 (2 predictors), 0.08 (6 predictors), 0.14 (7 predictors), and 0.08 (12 predictors). The study's ability to detect medium effect sizes was less constrained, and achieved power was 0.50 (2 predictors), 0.37 (6 predictors), 0.61 (7 predictors), and 0.31 (12 predictors).

It should be noted that as a specific number of student paramedics are undertaking 1<sup>st</sup> year training at any one time, sample sizes are unavoidably limited, and in research on the consequences of traumatic/critical incidents the response rate is often low (van der Ploeg & Kleber, 2003). This in turn restricts the likelihood of achieving the standard preferred power of 0.80 or greater. However, many published studies have been shown to have a much lower power than 0.80, and it has been argued that what behavioural

researchers need is the possibility to plan rationally the level of alpha, taking into account the available sample size and required effect (Faul, Erdfelder, Lang, & Buchner, 2007; Hinton, 2004). Compromise power analyses (Erdfelder, 1984 as cited in Faul et al.) have been designed especially for this purpose. In compromise power analyses, researchers specify the size of the effect to be detected, the maximum possible sample size, and the ratio  $q = \beta/\alpha$  which defines the relative seriousness of committing both a Type I and Type II error (Faul et al.). Given these specifications, an optimum critical value for the test statistic and the associated alpha and beta values are computed. This optimum critical value is a rational compromise between the demands for a low alpha risk and a large power level, given a fixed sample size, a fixed effect size, and an error ratio of  $q$  (Faul et al.). Of course, compromise power analyses can result in unconventional significance levels greater than  $\alpha = 0.05$  (in the case of small samples or effect sizes), however, it can be argued that the benefit of balanced Type I and Type II error risks often offsets the costs of violating significance level conventions (*cf.* Gigerenzer, Krauss, & Vitouch, 2004). To illustrate this point, by applying compromise power analyses to the multiple regression  $F$ -tests in the current study (using  $q = 1$  to control equally for Type I and Type II error risks), it was found the study's power to detect a small effect size increased dramatically to 0.56 (2 predictors), 0.54 (6 predictors), 0.57 (7 predictors), and 0.54 (12 predictors). Similarly, the study's power to detect medium effect sizes increased to 0.78 (2 predictors), 0.73 (6 predictors), 0.82 (7 predictors), and 0.71 (12 predictors). These findings support the argument that if researchers continue to stick to standard alpha levels (e.g., 0.05) and, at the same time, face difficulties in increasing a study's effect and sample size, a stable low level of statistical power is the unavoidable consequence (Faul et al.).

An additional limitation is the self-report nature of the study which prevented the opportunity to compare students' responses with more objective measures of their psychological and interpersonal functioning. The study was also restricted in distinguishing between respondents who had no prior personal trauma and those who did, but refrained from reporting it. Similarly, tendencies for paramedics to project 'macho' images of themselves may have led some respondents to minimise or deny their duty-related psychological difficulties. A further caveat to interpreting these findings is the possibility that the observations drawn may be biased by survey non-respondents, both at baseline and follow-up. For instance, it is unknown if baseline nonresponders were typical of the wider population of interest, or if students who failed to complete the follow-up survey were the most distressed. However, it should also be noted that nonresponse analyses showed that although nonparticipants at follow-up had been exposed to significantly more pre-operational traumatic events than responders, they did not differ on the baseline levels of PTSS severity, and no diagnoses of full PTSD were made for either group. In addition, there was no significant difference between nonresponders and responders on the pre-operational measures of emotional empathy, willingness to emotionally self-disclose and perceived emotional support from family and friends. Therefore a low response rate at follow-up does not appear to have created bias and weakened the current study's validity.

Finally, to the author's knowledge, this is the first longitudinal study of student paramedics, and the first to assess students' pre-operational trauma histories, personality traits and social relationships and track these for duty-related negative changes, and onset of PTSD in this population. Therefore, the representativeness of the sample and the generalisability of the current findings to other student paramedics remain to be determined. However, given that the author studied a sample of student paramedics that

was relatively homogeneous in terms of their pre-operational trauma histories and psychosocial functioning, it is especially noteworthy that significant duty-related psychopathology was observed amongst both university and job-based students. On this basis, it is suggested that the current sample of student paramedics may be representative of the larger trauma-affected student paramedic population.

#### 4.4 *Conclusion and Future Research*

These limitations notwithstanding, this study showed that prior to commencing on-road ambulance duties university and job-based students could not be distinguished on the pre-operational measures of trauma exposure and symptomatology, emotional empathy, perceived social constraints and attitude towards emotional expression. However at 6-month follow-up, significant group and individual differences in student paramedics' personality characteristics, social relationships and psychological health were apparent. In terms of the longitudinal relationships between the variables and students' PTSS severity, the duty-related factors of Code 1 incidents, decreased emotional empathy, high levels of perceived emotional constraints in work and non-work social relationships, and negative attitude towards emotional expression were found to be significant combined predictors of psychological distress, accounting for 8% of the variance in PTSD scores.

The current findings indicated for the first time that student paramedics are most vulnerable to developing duty-related PTSS and PTSD within the first 6-months of their career. Further, undertaking university-based training did not protect students from the negative impact of carrying out ambulance duties, despite being exposed to significantly fewer duty-related traumatic events. Significantly contributing to student paramedics' psychological vulnerability is entering the profession with a prior trauma history and

current symptomatology. It appears from the current results, that student paramedics' prior traumatic experiences diminish students' coping resources and exacerbate the negative impact of duty-related re-traumatisation (Winkel et al., 2003). This may be particularly true for students who enter the profession with a history of exposure to two or more traumatic events, as greater pre-operational trauma exposure was significantly associated with greater duty-related PTSS severity.

Supporting the authors' previous study (Lowery & Stokes, 2005), a duty-related negative attitude towards emotional expression was also a significant predictor of increased duty-related PTSD. Therefore, it can be confidently concluded that this factor plays an important role in the onset and maintenance of duty-related psychological distress in this population. It was also identified that within 6-months of commencing on-road ambulance duties, both university and job-based students had experienced significant duty-related negative changes in their perception of the degree of emotional social support they received from family and friends. This result was echoed in relation to workplace emotional social support, with both groups reporting significant duty-related constraints in this coping resource. Finally, this study was the first to identify that both university and job-based students entered the profession with below average empathic tendencies, and to provide support for Grevin's (1996) proposal that low emotional empathy may actually be a personality trait of paramedics.

The current findings suggest several lines of future research. Of particular interest is the question of whether the observed below average emotional empathy is a personality trait of this population, as originally proposed by Grevin (1996), and suggested in this study. Further research is also required to determine if lowered emotional empathy is a personality trait that reflects a reliance on emotion-focused coping strategies. This could be explored by obtaining baseline measures of student paramedics' emotional empathy

and coping styles to ascertain if the proposed relationship exists between these variables and if found, the impact of this relationship on duty-related PTSS severity. Also of interest is whether individuals with a negative attitude towards emotional expression may also be particularly drawn to the paramedic profession. Similarly, a greater examination of the relationship between student paramedics' pre-operational decreased emotional empathy and increased negativity towards emotional self-disclosure would be beneficial. Both of these characteristics reflect an emotion-focused coping style that may reduce distress in the short-term (Folkman & Lazarus, 1988), however if an avoidant coping style is a personality trait of paramedics, it may hinder students' processing of duty-related traumatic events and increase their psychological vulnerability (Horowitz, 1986, 2001). The finding that duty-related trauma exposure contributed to the onset of PTSD in the current student paramedics, but frequency of duty-related trauma exposure did not, also opens a line of enquiry. Future research would benefit from a comparative analysis of the types of traumatic events students had experienced prior to, and during operational duties. This would provide valuable information as to whether duty-related PTSS severity is being influenced by students' exposure to work-related traumatic events that are dissimilar to those previously experienced (Dougall et al., 2000), and if so, which event(s) exert the most influence.

This study examined the impact that a perceived lack of emotional social support from family, friends and colleagues had on student paramedics' psychological health. However, it did not examine the relationship between students' perceptions of emotional support from supervisors and upper management, and PTSS severity. Future research could include a measure of these variables to determine if student paramedics' psychological wellbeing is also influenced by these factors. As the current study also only measured students' perceived level of workplace emotional support after 6-months of on-



road duties, it would be useful to determine at what point student paramedics may actually be experiencing these constraints. Future research could therefore assess workplace emotional social support immediately upon students' commencement of on-road ambulance duties, and track this for negative change.

It would also be valuable to determine if student paramedics' seek different types of social support from family, friends and colleagues. For instance, apart from emotional support, Cohen and Wills (1985) propose that psychological distress can be reduced or exacerbated in the presence or absence of: (a) informational support (e.g., advice or guidance); (b) social companionship; and (c) instrumental support (e.g., providing a direct resolution to the problem). Similarly, future research would benefit from a closer investigation of the content of university and job-based students' conversations and interactions with their work and non-work support providers when they seek emotional support by disclosing their duty-related thoughts and feelings. For example, are disclosures met with positive and validating verbal and physical responses, or negative and nonvalidating reactions from support providers? In a similar vein, the current study found that greater emotional constraints in students' non-work social relationships were associated with decreased PTSS severity. Consequently, future studies would benefit from the inclusion of a quantitative measure of received emotional support. This would help determine if there is an optimal level of emotional assistance that is required from family and friends for students to effectively process duty-related traumatic events, and reduce their risk of developing PTSS and PTSD.

This was the first longitudinal study to examine the combined predictive value of duty-related trauma exposure, emotional empathy, perceived work and non-work emotional social constraints and attitude towards emotional expression, to PTSS severity in student paramedics, and therefore requires replication. If subsequent studies utilising

larger samples of student paramedics also find the combined variables account for a minimal percent of duty-related PTSS severity, it would suggest that other psychosocial factors not examined here may play significant roles in the increased psychological distress reported in this population. Such factors may include students' emotional intelligence, social skills, pre-existing psychopathologies, level of education, personality dispositions (e.g., neuroticism, antagonistic), and/or aspects of their work and domestic environments other than a perceived absence of emotional support.

It has been suggested for example, that emergency workers' perceptions of the organisational culture and processes, such as not being informed about important decisions or taking part in decision making processes, inflexible organisational practices and 'red-tape', a lack of autonomy, and an autocratic managerial style may be stronger predictors of PTSD in emergency services personnel than are traumatic incidents (Bennett et al., 2005; Burke & Paton, 2006; Paton, Smith & Stephens, 1998; Stephens, 1996; van der Ploeg & Kleber, 2003). However, the contributory role of such organisational factors to student paramedics' PTSS severity within the 1<sup>st</sup> year of their careers is yet to be examined.

Finally, given the high degree of variability in how individuals respond after exposure to traumatic events, future research would benefit from studies in which simultaneous measures of student paramedics' posttraumatic growth/resiliency and posttraumatic stress/vulnerability were obtained. This would assist our understanding of why student paramedics exposed to similar types of duty-related traumatic events go on to experience very different psychological outcomes. It is possible that posttraumatic growth/posttraumatic stress reactions interact with prior personal vulnerability/resiliency. That is, those who are psychologically more resilient at the outset of exposure to a traumatic event are able to retain their sense of coping efficacy and gain meaning from

the event, whereas those with prior psychological vulnerability become overwhelmed (Hobfoll, Tracy, & Galea, 2006).

Experience has demonstrated that the PTSS and PTSD detected in a significant number of the current sample of student paramedics will have a significant impact, not only on the individual worker, but also on their family and friends, ambulance organisation, and the general community. The symptoms of post-traumatic stress are known to be associated with significant adjustment problems in the professional and personal settings, including impaired physical and mental health, decreased quality of life, relationship breakdowns, drug and alcohol abuse/dependence, and suicide (Kessler et al., 1995; Schonfeld et al., 1997; Zayfert, Dums, Ferguson, & Hegel, 2002). It is fitting then that greater attention is given to identifying the factors involved in the onset and maintenance of psychological distress in student paramedics, given that this highly vulnerable population has been largely overlooked in the research literature. By determining the point at which student paramedics are most vulnerable to duty-related psychological distress, and gaining a thorough understanding of the contributing risk factors, our attention can then be given to the development and timely implementation of effective PTSS and PTSD intervention programs. In turn, these workers will be afforded the opportunity to have healthy and productive personal and professional lives, free of the adverse effects of being repeatedly exposed to trauma-producing work-related incidents.

## References

- Alexander, D. A., & Klein, S. (2001). Ambulance personnel and critical incidents: Impact of accident and emergency work on mental health and emotional well-being. *British Journal of Psychiatry*, 178, 76-81.
- Alexander, D. A., & Wells, W. (1991). Reactions of police officers to body-handling after a major disaster: A before and after comparison. *British Journal of Psychiatry*, 159, 547-555.
- Alvarez, J., & Hunt, M. (2005). Risk and resilience in canine search and rescue handlers after 9/11. *Journal of Traumatic Stress*, 18, 497-505.
- Ambulance Service of New South Wales. (2005). *2004/05 Annual report summary* [On-Line]. Available: <http://www.asnsw.health.nsw.gov.au/docs/ar2005sum.pdf>
- American Psychiatric Association. (1952). *Diagnostic and statistical manual of mental disorders* (1<sup>st</sup> ed.). Washington, DC: Author.
- American Psychiatric Association. (1968). *Diagnostic and statistical manual of mental disorders* (2<sup>nd</sup> ed.). Washington, DC: Author.
- American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders* (3<sup>rd</sup> ed.). Washington, DC: Author.
- American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3<sup>rd</sup> ed., rev.). Washington, DC: Author.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4<sup>th</sup> ed.). Washington, DC: Author.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4<sup>th</sup> ed., rev.). Washington, DC: Author.
- Andersen, H. S., Christensen, A. K., & Petersen, G. O. (1991). Post-traumatic stress reactions amongst rescue workers after a major rail accident. *Anxiety Research*, 4,

245-251.

Anderson, J. W. (1968). Cultural adaptation to threatened disaster. *Human Organization*, 27, 298-307.

Andrews, B., & Brewin, C. R. (1990). Attributions of blame for marital violence: A study of antecedents and consequences. *Journal of Marriage and the Family*, 52, 757-767.

Andrews, B., Brewin, C. R., & Rose, S. (2003). Gender, social support, and PTSD in victims of violent crime. *Journal of Traumatic Stress*, 16, 421-427.

Andrews, B., Brewin, C. R., Rose, S., & Kirk, M. (2000). Predicting PTSD symptoms in victims of violent crime: The role of shame, anger, and childhood abuse. *Journal of Abnormal Psychology*, 109, 69-73.

Anshel, M. H., Robertson, M., & Caputi, P. (1997). Sources of acute stress and their appraisals and reappraisals among Australian police as a function of previous experience. *Journal of Occupational and Organizational Psychology*, 70, 337-357.

Arvay, M. J., & Uhlemann, M. R. (1996). Counsellor stress in the field of trauma: A preliminary study. *Canadian Journal of Counselling*, 30, 193-210.

Association of Chief Ambulance Officers. (1990). *Ambulance 2000: Proposals for the future development of the ambulance service*. Ringwood: Author.

Australian Bureau of Statistics. (2007). *Report on Government Services 2007* [On-Line]. Available: <http://www.pc.gov.au/gsp/reports/rogs/2007/emergencymanagement/chapter08.pdf>

Baider, L., & DeNour, A. (1997). Psychological distress and intrusive thoughts in cancer. *Journal of Nervous and Mental Disease*, 185, 346-348.

Barrett, L. F., & Gross, J. J. (2001). Emotional intelligence: A process model of emotion representation and regulation. In T. J. Mayne & G. A. Bonanno (Eds.), *Emotions: Current issues and future directions* (pp. 286-311). New York: Guilford Press.

- Başıoğlu, M., Kiliç, C., Şalcioğlu, E., and Livanou, M. (2004). Prevalence of posttraumatic stress disorder and comorbid depression in earthquake survivors in Turkey: An epidemiological study. *Journal of Traumatic Stress, 17*, 133-141.
- Beaton, R., Murphy, S., Johnson, C., Pike, K., & Corneil, W. (1999). Coping responses and posttraumatic stress symptomatology in urban fire service personnel. *Journal of Traumatic Stress, 12*, 293-308.
- Beaton, R., Murphy, S. A., Pike, K. C., & Corneil, W. (1997). Social support and network conflict in firefighters and paramedics. *Western Journal of Nursing Research, 19*, 297-314.
- Beck, A. T., & Steer, R. A. (1987). *Beck Depression Inventory manual*. San Antonio, TX: The Psychological Corporation.
- Beehr, T. A., King, L. A., & King, D. W. (1990). Social support and occupational stress: Talking to supervisors. *Journal of Vocational Behavior, 36*, 61-81.
- Bem, S. L. (1974). The measurement of psychological androgyny. *Journal of Consulting and Clinical Psychology, 42*, 155-162.
- Bennett, P., Williams, Y., Page, N., Hood, K., & Woollard, M. (2004). Levels of mental health problems among UK emergency ambulance workers. *Emergency Medicine Journal, 21*, 235-236.
- Bennett, P., Williams, Y., Page, N., Hood, K., Woollard, M., & Vetter, N (2005). Associations between organizational and incident factors and emotional distress in emergency ambulance personnel. *British Journal of Clinical Psychology, 44*, 215-226.
- Berger, W., Figueira, I., Maurat, A. M., Bucassio, E. P., Vieira, I., Jardim, S. R., et al. (2007). Partial and full PTSD in Brazilian ambulance workers: Prevalence and impact on health and on quality of life. *Journal of Traumatic Stress, 20*, 637-642.
- Birck, A. (2001). Secondary traumatization and burnout in professionals working with

torture survivors [On-Line]. Available: <http://www.fsu.edu/trauma/art2v7i2.htm>

Bleicker, E. M. A., Pouwer, F., van der Ploeg, H. M., Leer, J. J., & Ader, H. J. (2000).

Psychological distress two years after diagnosis of breast cancer; frequency and prediction. *Patient Education and Counseling*, 40, 209-217.

Bolton, E. E., Glenn, D. M., Orsillo, S., Roemer, L., & Litz, B. T. (2003). The

relationship between self-disclosure and symptoms of posttraumatic stress disorder in peacekeepers deployed to Somalia. *Journal of Traumatic Stress*, 16, 203-210.

Bonanno, G. A. (2001). Emotion self-regulation. In T. J. Mayne & G. A. Bonnano (Eds.),

*Emotions: Current issues and future directions* (pp. 251-285). New York: Guildford Press.

Bonanno, G. A., & Keltner, D. (1997). Facial expressions of emotion and the course of

conjugal bereavement. *Journal of Abnormal Psychology*, 106, 126-137.

Bonanno, G. A., Papa, A., Lalande, K., Westphal, M. & Coifman, K. (2004). The

importance of being flexible: The ability to both enhance and suppress emotional expression predicts long-term adjustment. *Psychological Science*, 15, 482-487.

Breslau, N., & Davis, G. C. (1992). Posttraumatic stress disorder in an urban population

of young adults: Risk factors for chronicity. *American Journal of Psychiatry*, 152, 671-675.

Breslau, N., Davis, G. C., & Andreski, P. (1995). Risk factors for PTSD related traumatic

events: A prospective analysis. *American Journal of Psychiatry*, 152, 529-535.

Breslau, N., Davis, G. C., Andreski, P., & Peterson, E. (1991). Traumatic events and

posttraumatic stress disorder in an urban population of young adults. *Archives of General Psychiatry*, 48, 216-222.

Breslau, N., Kessler, R. C., Chilcoat, H. D., Schultz, L. R., Davis, G. C., & Andreski, P.

(1998). Trauma and posttraumatic stress disorder in the community: The 1996 Detroit

- Area Survey of Trauma. *Archives of General Psychiatry*, 55, 626-632.
- Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology*, 68, 748-766.
- Briere, J. (2004). *Psychological assessment of adult posttraumatic states: Phenomenology, diagnosis, and measurement* (2<sup>nd</sup> ed.). Washington DC: American Psychological Association.
- Brown, J., Fielding, J., & Grover, J. (1999). Distinguishing traumatic, vicarious and routine operational stressor exposure and attendant adverse consequences in a sample of police officers. *Work & Stress*, 13, 312-325.
- Brown, J., & Grover, J. (1998). The role of moderating variables between exposure to stressors and being distressed in a sample of police officers. *Personality and Individual Differences*, 24, 181-185.
- Brown, R. T., Madan-Swain, A., & Lambert, R. (2003). Posttraumatic stress symptoms in adolescent survivors of childhood cancer and their mothers. *Journal of Traumatic Stress*, 16, 309-318.
- Buckley, T. C., Blanchard, E. B., & Hickling, E. J. (1996). A prospective examination of delayed onset PTSD secondary to motor vehicle accidents. *Journal of Abnormal Psychology*, 105, 617-625.
- Buckley, T. C., Blanchard, E. B., & Hickling, E. J. (1998). A confirmatory factor analysis of posttraumatic stress symptoms. *Behaviour Research and Therapy*, 36, 1091-1099.
- Burke, R. (1993). Work-family stress, conflict, coping, and burnout in police officers. *Stress Medicine*, 9, 171-180.
- Burke, K. J., & Paton, D. (2006). Predicting police officer job satisfaction: Traditional versus contemporary models of trauma in occupational experience. *Traumatology*, 12,



189-197.

Burke, K. J., Shakespeare-Finch, J., Paton, D., & Ryan, M. (2006). Characterizing the resilient officer: Individual attributes at point of entry to policing. *Traumatology, 12*, 178-188.

Butcher, J. N., Dahlstrom, W. G., Graham, J. R., Tellegen, A., & Kaemmer, B. (1989). *Minnesota Multiphasic Personality Inventory (MMPI-2). Manual for administration and scoring*. Minneapolis: University of Minnesota Press.

Butler, R., Rizzi, L., & Handwerger, B. (1996). Brief report: The assessment of post-traumatic stress disorder in pediatric cancer patients and survivors. *Journal of Pediatric Psychology, 21*, 499-504.

Calhoun, L. G., & Tedeschi, R. G. (2004). The foundations of posttraumatic growth: New considerations. *Psychological Inquiry, 15*, 93-102.

Calhoun, L. G., & Tedeschi, R. G. (1998). Posttraumatic growth: Future directions. In R. G. Tedeschi, C. L. Park, & L. G. Calhoun (Eds.), *Posttraumatic growth: Positive changes in the aftermath of crisis* (pp. 215-238). Mahwah, NJ: Lawrence Erlbaum Associates.

Calhoun, L. G., & Tedeschi, R. G. (2006). The foundations of posttraumatic growth: An expanded framework. In L. G. Calhoun & R. G. Tedeschi (Eds.), *Handbook of posttraumatic growth: Research and practice* (pp. 1-23). Mahwah, NJ: Erlbaum.

Campbell, R., Ahrens, C. E., Sefl, T., Wasco, S. M., & Barnes, H. E. (2001). Social reactions to rape victims: Healing and hurtful effects on psychological and physical health outcomes. *Violence and Victims, 16*, 287-302.

Carbonell, J. L., & Figley, C. R. (1996). When trauma hits home: Personal trauma and the family therapist. *Journal of Marital and Family Therapy, 22*, 53-58.

Cardozo, B. L., Kaiser, R., Gotway, C. A., & Agani, F. (2003). Mental health, social

- functioning, and feelings of hatred and revenge of Kosovar Albanians one year after the war in Kosovo. *Journal of Traumatic stress*, 16, 351-360.
- Carlier, I., Lamberts, R., & Gersons, B. (2000). The dimensionality of trauma: A multi-dimensional comparison of police officers with and without posttraumatic stress disorder. *Psychiatric Research*, 97, 29-39.
- Carrington, J., Stark, C., Bluehardt, M., & MacLennan, R. (1999). Emergency Medical Services Questionnaire Pilot Study [On-line]. Available: [http://www.uregina.ca/~starkc/emsreport\\_1.html](http://www.uregina.ca/~starkc/emsreport_1.html)
- Carver, C. S. (1998). Resilience and thriving: Issues, models and linkages. *Journal of Social Issues*, 54, 245-266.
- Cetin, M., Kose, S., Ebrinc, S., Yigit, S., Elhai, J. D., & Basoglu, C. (2005). Identification and posttraumatic stress disorder symptoms in rescue workers in the Marmara, Turkey, Earthquake. *Journal of Traumatic Stress*, 18, 485-489.
- Chalfant, A. M., Bryant, R. A., & Fulcher, G. (2004). Posttraumatic stress disorder following diagnosis of multiple sclerosis. *Journal of Traumatic Stress*, 17, 423-428.
- Cheung, P. (1994). Post-traumatic stress disorder among Cambodian refugees in New Zealand. *Journal of Social Psychiatry*, 40, 17-26.
- Clohessy, S., & Ehlers, A. (1999). PTSD symptoms, response to intrusive memories and coping in ambulance service workers. *British Journal of Clinical Psychology*, 38, 251-265.
- Coakes, S. J., & Steed, L. G. (2001). *SPSS analysis without anguish*. Queensland: John Wiley & Sons Australia, Ltd.
- Coates, D., Wortman, C. B., & Abbey, A. (1979). Reactions to victims. In I. H. Frieze, D. Bartal, & J. S. Carroll (Eds.), *New approaches to social problems* (pp. 21-52). San Francisco, CA: Jossey-Bass.

- Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin*, 98, 310-357.
- Collins, S. (2001). What about us? The psychological implications of dealing with trauma following the Omagh bombing. *Emergency Nurse*, 8, 9-13.
- Consedine, N., Magai, C., & Bonanno, G. A. (2002). Moderators of the emotion inhibition-health relationship: A review and research agenda. *Review of General Psychology*, 6, 204-238.
- Coombs, R. H., & Goldman, L. (1973). Maintenance and discontinuity of coping mechanisms in an intensive care unit. *Social Problems*, 20, 342-355.
- Corcoran, K. J. (1982). An explanatory investigation into self-other differentiation: Empirical evidence for a monistic perspective on empathy. *Psychotherapy: Theory, Research and Practice*, 19, 63-68.
- Cordova, M. J., Cunningham, L. L. C., Carlson, C. R., & Andrykowski, M. A. (2001). Social constraints, cognitive processing, and adjustment to breast cancer. *Journal of Consulting and Clinical Psychology*, 69, 706-711.
- Corneil, W. (1995). Traumatic stress and organizational strain in the fire service. In L. Murphy, J. Hurrell, Jr., S. Sauter, & G. Keita (Eds.), *Job stress interventions* (pp. 185-198). Washington, DC: APA Press.
- Corneil, W., Beaton, R., Murphy, S., Johnson, C., & Pike, K. (1999). Exposure to traumatic incidents and prevalence of posttraumatic stress symptomatology in urban firefighters in two countries. *Journal of Occupational Health Psychology*, 4, 131-141.
- Corrigan, P. W., & McCracken, S. G. (1997). *Interactive staff training: Rehabilitation teams that work*. New York: Plenum Press.
- Coyne, J. C. (1976). Depression and the responses of others. *Journal of Abnormal Psychology*, 85, 31-52.

- Crabbe, J. M., Bowley, D. M. G., Boffard, K. D., Alexander, D. A., & Klein, S. (2004). Are health professionals getting caught in the crossfire? The personal implications of caring for trauma victims. *Emergency Medicine Journal*, 21, 568-572.
- Cranswick, K. (1997). Burnout: A study of level of burnout and factors responsible for burnout in rehabilitation workers. *Journal of Rehabilitation Administration*, 21, 119-134.
- Creamer, M. (1995). A cognitive processing formulation of posttrauma reactions. In R. J. Kelber, C. R. Figley, & B. P. R. Gersons (Eds.), *Beyond trauma: Cultural and societal dynamics* (pp. 55-74). New York: Plenum.
- Creamer, M., Burgess, P., & McFarlane, A. C. (2001). Post-traumatic stress disorders: Findings from the Australian National Survey of Mental Health and Well-being. *Psychological Medicine*, 31, 1237-1247.
- Creamer, M., Burgess, P., & Pattison, P. (1990). Cognitive processing in post-trauma reactions: Some preliminary findings. *Psychological Medicine*, 20, 597-604.
- Creamer, T. L., & Liddle, B. J. (2005). Secondary traumatic stress among disaster mental health workers responding to the September 11 attacks. *Journal of Traumatic Stress*, 18, 89-96.
- Cydulka, R. K., Emerman, C. L., Shade, B., & Kubincanek, J. (1994). Stress levels in EMS personnel: A longitudinal study with work-schedule modification. *Academic Emergency Medicine*, 1, 240-246.
- Daly, R. J. (1983). Samuel Pepys and post traumatic disorder. *British Journal of Psychiatry*, 143, 64-68.
- Davidson, J. R., Hughes, D., Blazer, D. G., & George, L. K. (1991). Post-traumatic stress disorder in the community: An epidemiological study. *Psychological Medicine*, 21, 713-721.

- Dean, P. G., Gow, K. M., & Shakespeare-Finch, J. (2003). Counting the cost: Psychological distress in career and auxiliary firefighters. *The Australasian Journal of Disaster and Trauma Studies*, 1, 1-20.
- de Jong, J. T., Komproe, I. H., Van Ommeren, M., El Masri, M., Araya, M., Khaled, N., et al. (2001). Lifetime events and posttraumatic stress disorder in 4 postconflict settings. *Journal of the American Medical Association*, 286, 555-562.
- de Waal, F. (1989). *Peacemaking among primates*. Cambridge, MA: Harvard.
- Dikel, T. N., Engdahl, B., & Eberly, R. (2005). PTSD in former prisoners of war: Prewar, wartime, and postwar factors. *Journal of Traumatic Stress*, 18, 69-77.
- Dougall, A. L., Herberman, H. B., Delahanty, D. L., Inslicht, S. S., & Baum, A. (2000). Similarity of prior trauma exposure as a determinant of chronic stress responding to an airline disaster. *Journal of Consulting and Clinical Psychology*, 68, 290-295.
- Dymond, R. F. (1949). A scale for measurement of empathic ability. *Journal of Consulting Psychology*, 14, 127-133.
- Dyregrov, K. (2003). Micro-sociological analysis of social support following traumatic bereavement: Unhelpful and avoidant responses from the community. *Omega*, 48, 23-44.
- Edhe, D. M., Patterson, D. R., Wiechman, S. A., & Wilson, L. G. (2000). Post-traumatic stress symptoms and distress 1 year after burn injury. *Journal of Burn Care and Rehabilitation*, 21, 105-111.
- Elizur, A., & Rosenheim, E. (1982). Empathy and attitudes among medical students: The effects of group experience. *Journal of Medical Education*, 57, 675-683.
- Epstein, R. S., Fullerton, C. S., & Ursano, R. J. (1998). Posttraumatic stress disorder following an air disaster: A prospective study. *American Journal of Psychiatry*, 155, 934-938.

- Eysenck, H. J., & Eysenck, S. B. G. (1975). *Manual of the Eysenck Personality Questionnaire*. London: Hodder & Stoughton.
- Faul, R., Erdfelder, E., Lang, A.G., & Buchner, A. (2007). G\*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39, 175-191.
- Favaro, A., Rodella, F. C., Colombo, G., & Santonastaso, P. (1999). Posttraumatic stress disorder and major depression among Italian Nazi concentration camp survivors: A controlled study 50 years later. *Psychological Medicine*, 29, 87-95.
- Fielding, N. G. (1986). Evaluating the role of training in police socialization: A British example. *Journal of Community Psychology*, 14, 319-330.
- Figley, C. R. (1995). Compassion fatigue as secondary traumatic stress disorder: An overview. In C. R. Figley (Ed.), *Compassion fatigue: Coping with secondary traumatic stress disorder in those who treat the traumatized* (pp. 1-19). New York: Brunner/Mazel.
- First, M. B., & Tasman, A. (2004). *DSM-IV-TR mental disorders: Diagnosis, etiology & treatment*. West Sussex: John Wiley & Sons, Ltd.
- Firth-Cozens, J. (1987). Emotional distress in junior house officers. *British Medical Journal*, 295, 533-536.
- Fitzpatrick, K. M., & Wilson, M. (1999). Exposure to violence and posttraumatic stress symptomatology among abortion clinic workers. *Journal of Traumatic Stress*, 12, 227-242.
- Foa, E. B. (1995). *Posttraumatic Stress Diagnostic Scale manual*. Minneapolis: National Computer Systems, Inc.
- Foa, E. B., Riggs, D. S., Dancu, C. V., & Rothbaum, B. O. (1993). Reliability and validity of a brief instrument for assessing post-traumatic stress disorder. *Journal of*

*Traumatic Stress*, 6, 459-473.

Folkman, S., & Lazarus, R. S. (1988). Coping as a mediator of emotion. *Journal of Personality and Social Psychology*, 54, 466-475.

Follette, V. M., Polusny, M. M., & Milbeck, K. (1994). Mental health and law enforcement professionals: Trauma history, psychological symptoms, and impact of providing services to child sexual abuse survivors. *Professional Psychology: Research and Practice*, 25, 275-282.

Garson, G. D. (2006). Logistic regression [On-Line]. Available: <http://www2.chass.ncsu.edu/garson/pa765/logistic.htm>

Genest, M., Levine, J., Ramsden, V., & Swanson, R. (1990). The impact of providing help: Emergency workers and cardiopulmonary resuscitation attempts. *Journal of Traumatic Stress*, 3, 305-313.

Gigerenzer, G., Krauss, S., & Vitouch, O. (2004). The null ritual: What you always wanted to know about significance testing but were afraid to ask. In D. Kaplan (Ed.), *The SAGE handbook of quantitative methodology for the social sciences* (pp. 391-408). Thousand Oaks, CA: Sage.

Gillies, M. L., Barton, J., & Di Gallo, A. (2003). Follow-up of young road accident victims. *Journal of Traumatic Stress*, 16, 523-526.

Gist, R., & Woodall, S. J. (2000). There are no simple solutions to complex problems. In J. M. Volanti, D. Paton, & C. Dunning (Eds.), *Posttraumatic stress intervention: Challenges, issues and perspectives* (pp. 81-96). Springfield IL: Charles C Thomas.

Gleser, G., Green, B., & Winget, C. (1981). *Prolonged psychological effects of disaster: A study of Buffalo Creek*. New York: Academic Press.

Goenjian, A. K., Najarian, L. M., Pynoos, R. S., Steinberg, A. M., Petrosian, P., Setrakyan, S., et al. (1994). Posttraumatic stress reaction after single and double trauma. *Acta*

- Psychiatrica Scandinavica*, 90, 214-221.
- Goldberg, D. P., & Hillier, V. F. (1979). A scaled version of the General Health Questionnaire. *Psychological medicine*, 9, 139-145.
- Goldberg, D.P., & Williams, P. (1988). *A user's guide to the General Health Questionnaire*. Windsor: NFER-Nelson.
- Goldberg, J., True, W. R., Eisen, S. A., & Henderson, W. G. (1990). A twin study of the effects of the Vietnam War on posttraumatic stress disorder. *Journal of the American Medical Association*, 263, 1227-1232.
- Graham, N. K. (1981). How to avoid a short career. *Journal of Emergency Medical Services*, 6, 25-31.
- Gravetter, F. J., & Wallnau, L. B. (1996). *Statistics for the behavioral sciences* (4<sup>th</sup> ed.). St Paul, MN: West Publishing Company.
- Green, B. L., Grace, M. C., Lindy, J. D., Gleser, G. C., & Leonard, A. (1990). Risk factors for PTSD and other diagnosis in a general sample of Vietnam veterans. *American Journal of Psychiatry*, 147, 729-733.
- Green, B. L., Lindy, J. D., Grace, M. C., & Leonard, A. C. (1992). Chronic posttraumatic stress disorder and diagnostic comorbidity in a disaster sample. *Journal of Nervous and Mental Disease*, 180, 70-76.
- Grevin, F. (1996). Posttraumatic stress disorder, ego defense mechanisms, and empathy among urban paramedics. *Psychological Reports*, 79, 483-495.
- Grigsby, D. W., & McKnew, M. A. (1988). Work-stress burnout among paramedics. *Psychological Reports*, 63, 55-64.
- Gudjonsson, G. H., & Adlam, K. R. C. (1983). Personality patterns of British police officers. *Personality and Individual Differences*, 4, 507-512.
- Haig, R. A. (1986). Therapeutic uses of humor. *American Journal of Psychotherapy*, 40,



543-553.

- Harber, K. D., & Pennebaker, J. W. (1992). Overcoming traumatic memories. In S. A. Christianson (Ed.), *The handbook of emotion and memory: Research and theory* (pp. 359-387). Hillsdale, NJ: Erlbaum.
- Harboom, L., & Wallensteen, P. (2005). Armed conflict and its international dimensions, 1946-2004. *Journal of Peace Research*, 42, 623-635.
- Haslam, C., & Mallon, K. (2003). A preliminary investigation of post-traumatic stress symptoms among firefighters. *Work & Stress*, 17, 277-285.
- Hauff, E., & Vaglum, P. (1994). Chronic post-traumatic stress disorder in Vietnamese refugees: A prospective community study of prevalence, course, psychopathology and stressors. *Journal of Nervous and Mental Disease*, 182, 85-90.
- Heaney, C., House, J., Israel, B., & Mero, R. (1995). The relationship of organizational and social coping resources to employee coping behavior: A longitudinal analysis. *Work and Stress*, 9, 416-431.
- Heinrichs, M., Wagner, D., Schoch, W., Soravia, L. M., Hellhammer, D. H., & Ehlert, U. (2005). Predicting posttraumatic stress symptoms from pretraumatic risk factors: A 2-year prospective follow-up study in firefighters. *American Journal of Psychiatry*, 162, 2276-2286.
- Helmuth, T. A., & Steinitz, E. M. (1978). Death of an infant: Parental grieving and the failure of social support. *Journal of Family Practice*, 66, 785-790.
- Helzer, J. E., Robins, L. N., & McEvoy, L. (1987). Post-traumatic stress disorder in the general population: Findings of the Epidemiologic Catchment Area Survey. *New England Journal of Medicine*, 317, 1630-1634.
- Hinton, P.R. (2004). *Statistics explained* (4<sup>th</sup> ed.). New York: Routledge.
- Hobfoll, S. E., & London, P. (1986). The relationship of self-concept and social support to

- emotional distress among women during war. *Journal of Social and Clinical Psychology, 4*, 189-203.
- Hobfoll, S. E., Tracy, M., & Galea, S. (2006). The impact of resource loss and traumatic growth on probable PTSD and depression following terrorist attacks. *Journal of Traumatic Stress, 19*, 867-878.
- Horowitz, M. J. (1986). *Stress response syndromes* (2<sup>nd</sup> ed.). Northvale, NJ: Jason Aronson.
- Horowitz, M. J. (2001). *Stress response syndromes* (4<sup>th</sup> ed.). Northvale, NJ: Jason Aronson.
- Horowitz, M., Wilmer, N., & Alvarez, W. (1979). Impact of Event Scale: a measure of subjective stress. *Psychosomatic Medicine, 41*, 209-218.
- Huddleston, L. M., Paton, D., & Stephens, C. (2006). Conceptualizing traumatic stress in police officers: Preemployment, critical incident, and organizational influences. *Traumatology, 12*, 170-177.
- Human Security Centre. (2005). *Human Security Report 2005* [On-line]. Available: <http://www.humansecurityreport.info/index>
- Hytten, K., & Hasle, A. (1989). Firefighters: A study of stress and coping. *Acta Psychiatrica Scandinavica Supplement, 355*, 50-55.
- International Federation of Red Cross and Red Crescent Societies. (2001). *World Disasters Report 2001* [On-line]. Available: <http://www.ifrc.htm>
- International Federation of Red Cross and Red Crescent Societies. (2005). *World Disasters Report 2005* [On-line]. Available: <http://www.ifrc.htm>
- Inzana, C. M., Driskell, J. E., Salas, E., & Johnston, J. H. (1996). Effects of preparatory information on enhancing performance under stress. *Journal of Applied Psychology, 81*, 429-435.
- Ironson, G., Wynings, C., Schneiderman, N., Baum, A., Rodriguez, M., Greenwood, D., et al. (1997). Posttraumatic stress symptoms, intrusive thoughts, loss, and immune

function after Hurricane Andrew. *Psychosomatic Medicine*, 59, 128-141.

Jackson, C. A. (2007). Posttraumatic growth: Is there evidence for changing our practice?

[On-Line]. Available: <http://www.trauma.massey.ac.nz/issues/2007-1/jackson.htm>

Jacobson, P., Widows, M., Hann, D., Androyskowski, M., Kronish, L., & Fields, K. (1998).

Posttraumatic stress disorder symptoms after bone marrow transplantation for breast cancer. *Psychosomatic Medicine*, 60, 366-371.

James, A., & Wright, P. L. (1991). Occupational stress in the ambulance service.

*Journal of Managerial Psychology*, 6, 13-22.

Janoff-Bulman, R. (1992). *Shattered assumptions: Towards a new psychology of trauma*.

New York: Free Press.

Jeon, W.T., Hong, C. H., Lee, C. H., Kim, D. K., Han, M., & Min, S. K. (2005).

Correlation between traumatic events and posttraumatic stress disorder among North Korean defectors in South Korea. *Journal of Traumatic Stress*, 18, 147-154.

Jerusalem, M., Kaniasty, K., Lehman, D. R., Ritter, C., & Turnbull, G. J. (1995).

Individual and community stress: Integration of approaches at different levels. In S. E. Hobfoll & M. W. de Vries (Eds.), *Extreme stress and communities: Impact and intervention* (pp. 105-129). London: Kluwer Academic Press.

Joffe, C., Brodaty, H., Luscombe, G., & Ehrlich, F. (2003). The Sydney holocaust study:

Posttraumatic stress disorder and other psychosocial morbidity in an aged community sample. *Journal of Traumatic Stress*, 16, 39-47.

Jones, D. R. (1985). Secondary disaster victims: The emotional effects of recovering and identifying human remains. *American Journal of Psychiatry*, 142, 303-307.

Jonsson, A., Segesten, K., & Mattsson, B. (2003). Post-traumatic stress among Swedish ambulance personnel. *Emergency Medicine Journal*, 20, 79-84.

Joseph, S., Williams, R., Irwing, P., & Cammock, T. (1994). The preliminary

development of a measure to assess attitudes towards emotional expression.

*Personality and Individual Differences*, 16, 869-875.

Joseph, S., Andrews, B., Williams, R., & Yule, W. (1992). Crisis support and psychiatric symptomatology in adult survivors of the Jupiter cruise ship disaster. *British Journal of Clinical Psychology*, 31, 63-73.

Joseph, S., Williams, R., & Yule, W. (1997). *Understanding post-traumatic stress. A psychosocial perspective on PTSD and treatment*. New York: Wiley Press.

Joyce, D. (1989, September). Why do police officers laugh at death? *The Psychologist*, pp. 379-381.

Karanci, N. A., & Acarturk, C. (2005). Post-traumatic growth among Marmara earthquake survivors involved in disaster preparedness as volunteers. *Traumatology*, 11, 307-322.

Kassam-Adams, N. (1999). The risks of treating sexual trauma: Stress and secondary trauma in psychotherapists. In B. H. Stamm (Ed.), *Secondary traumatic stress: Self-care issues for clinicians, researchers, & educators* (2<sup>nd</sup> ed., pp. 50-74). Lutherville, MD: Sidran Press.

Keane, T., Malloy, P., & Fairbank, J. (1984). Empirical development of an MMPI subscale for the assessment of combat-related posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology*, 52, 888-891.

Keppel, G. (1991). *Design and analysis: A researcher's handbook* (3<sup>rd</sup> ed.). Englewood Cliffs, NJ: Prentice Hall.

Kessler, R. C., & McLeod, J. D. (1985). Social support and psychological distress in community surveys. In S. Cohen & S. L. Syme (Eds.), *Social support and health* (pp. 19-40). San Diego, CA: Academic Press.

Kessler, R. C., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C. B. (1995). Post-

- traumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry*, 51, 8-19.
- Kilpatrick, D. G., Saunders, B. E., Veronen, L. J., Best, C. L., & Von, J. M. (1987). Criminal victimization: Lifetime prevalence, reporting to police, and psychological impact. *Crime and Delinquency*, 33, 478-489.
- Kubie, L. (1971). The destructive potential of humor in psychotherapy. *American Journal of Psychotherapy*, 172, 861-866.
- Kuch, K., & Cox, B. J. (1992). Symptoms of PTSD in 124 survivors of the holocaust. *American Journal of Psychiatry*, 149, 337-340.
- Kulka, R. A., Schlenger, W. E., Fairbank, J. A., Jordan, B. K., Marmar, C. R., Weiss, D. S., et al. (1990). *Trauma and the Vietnam War generation: Report of findings from the Vietnam veterans readjustment study*. New York: Brunner/Maze.
- Larson, R., & Almeida, D. (1999). Emotional transmission in the daily lives of families: A new paradigm for studying family process. *Journal of Marriage and the Family*, 61, 5-20.
- Last, J. M. (1983). *A dictionary of epidemiology*. New York: Oxford University Press.
- Lepore, S. J., Ragan, J. D., & Jones, S. (2000). Talking facilitates cognitive-emotional processes of adaptation to an acute stressor. *Journal of Personality and Social Psychology*, 78, 499-508.
- Lepore, S. J., Silver, R. C., Wortman, C. B., & Wayment, H. A. (1996). Social constraints, intrusive thoughts, and depressive symptoms among bereaved mothers. *Journal of Personality and Social Psychology*, 70, 271-282.
- Levenson, R. W., & Gottman, J. M. (1983). Marital interaction: Physiological linkage and affective exchange. *Journal of Personality and Social Psychology*, 45, 587-597.
- Linley, P. A., & Joseph, S. (2004). Positive change following trauma and adversity: A

- review. *Journal of Traumatic Stress*, 17, 11-21.
- Lowery, K., & Stokes, M. A. (2005). Role of peer support and emotional expression in posttraumatic stress disorder in student paramedics. *Journal of Traumatic Stress*, 18, 171-179.
- Luminet, O., Bouts, P., Delie, F., Manstead, A. S. R., & Rimé, B. (2000). Social sharing of emotion following exposure to a negatively valenced situation. *Cognition and Emotion*, 14, 661-688.
- Lunn, J. (2000). How long is too long at the sharp end? Critical incident staffing: Prevention is better than cure. *Australian Journal of Emergency Management*, Winter 2000, 48-53.
- Maiuro, R. D., Vitaliano, P. P., & Cahn, T. S. (1987). A brief measure for assessment of Anger and aggression. *Journal of Interpersonal Violence*, 2, 166-178.
- Marmar, C. R., Weiss, D. S., Metzler, T. J., & Delucchi, K. (1996). Characteristics of emergency services personnel related to peritraumatic dissociation during critical incident exposure. *American Journal of Psychiatry*, 153, 94-102.
- Marmar, C. R., Weiss, D. S., Metzler, T. J., Delucchi, K. L., Best, S. R., & Wentworth, K. A. (1999). Longitudinal course and predictors of continuing distress following critical incident exposure in emergency services personnel. *Journal of Nervous and Mental Disease*, 187, 15-22.
- Marmar, C. R., Weiss, D. S., Metzler, T. J., Rndfelt, H. M., & Foreman, C. (1996). Stress responses of emergency services personnel to the Loma Prieta earthquake 880 freeway collapse and control traumatic incidents. *Journal of Traumatic Stress*, 9, 63-85.
- Martin, C. A., McKean, H. E., & Veltramp, L. J. (1986). Post traumatic stress disorder in police working with victims: A pilot study. *Journal of Police Science and*

*Administration, 14*, 98-101.

Maslach, C.I., & Jackson, S. (1979). Burned out cops and their families. *Psychology Today, 12*, 59-62.

Maslach, C., & Jackson, S. E. (1981). The measurement of experienced burnout. *Journal of Occupational Behavior, 2*, 99-113.

Maslach, C., & Pines, A. (1979). Burnout: The loss of human caring. In A. Pines & A. Maslach (Eds.), *Experiencing social psychology*. New York: McGraw-Hill.

McCaan, L., & Pearlman, L. A. (1990). Vicarious traumatization: A framework for understanding the psychological effects of working with victims. *Journal of Traumatic Stress, 3*, 131-149.

McCarroll, J. E., Ursano, M. D., & Fullerton, C. S. (1993). Symptoms of posttraumatic stress disorder following recovery of war dead. *American Journal of Psychiatry, 150*, 1875-1877.

McCarroll, J. E., Ursano, M. D., & Fullerton, C. S. (1995). Symptoms of PTSD following recovery of war dead: 13-15 month follow-up. *American Journal of Psychiatry, 152*, 939-941.

McCarroll, J. E., Ursano, M. D., Fullerton, C. S., Liu, X., & Lundy, A. (2002). Somatic symptoms in Gulf War mortuary workers. *Psychosomatic Medicine, 64*, 29-33.

McCarroll, J. E., Ursano, M. D., Wright, K. M., & Fullerton, C. S. (1993). Handling bodies after violent death: Strategies for coping. *American Journal of Orthopsychiatry, 63*, 209-214.

McFarlane, A. C. (1988). The longitudinal course of posttraumatic morbidity: The range of outcomes and their predictors. *Journal of Nervous and Mental Disease, 176*, 30-39.

McFarlane, A. C., & Papay, B. M. (1992). Multiple diagnoses in posttraumatic stress disorder in the victims of a natural disaster. *Journal of Nervous and Mental Disease,*

180, 498-504.

McLachlan, G. J. (2004). *Discriminant analysis and statistical pattern recognition*. New York: Wiley-Interscience.

Mehrabian, A. (1977). Individual differences in stimulus screening and arousability. *Journal of Personality*, 45, 237-250.

Mehrabian, A. (1997). Relations among personality scales of aggression, violence, and empathy: Validation evidence bearing on the Risk of Eruptive Violence Scale. *Aggressive Behavior*, 23, 433-445.

Mehrabian, A. (2000). *Manual for the Balanced Emotional Empathy Scale (BEES)*. (Available from Albert Mehrabian, 1130 Alta Mesa Road, Monterey, CA 93940).

Mehrabian, A., & Epstein, N. (1972). A measure of emotional empathy. *Journal of Personality*, 40, 525-543.

Meldrum, L., King, R., & Spooner, D. (2002). Secondary traumatic stress in case managers working in community mental health services. In C. R. Figley (Ed.), *Treating compassion fatigue* (pp. 39-56). New York: Brunner-Routledge.

Mendolia, M., & Kleck, R. E. (1993). Effects of talking about a stressful event on arousal: Does what we talk about make a difference? *Journal of Personality and Social Psychology*, 64, 283-292.

Metropolitan Ambulance Service. (2005). *Strategic Plan Draft 2005-2007*. Melbourne: Author.

Mitchell, J. T., & Dyregrov, A. (1993). Traumatic stress in disaster workers and emergency personnel: Prevention and intervention. In J. P. Wilson & B. Raphael (Eds.), *International handbook of traumatic stress syndromes* (pp. 905-914). New York: Plenum Press.

Mollica, R. F., Sarajlic, N., Chernoff, M., Lavelle, J., Vukovic, I. S., & Massagli, M. P.



- (2001). Longitudinal study of psychiatric symptoms, disability, mortality, and emigration among Bosnian refugees. *Journal of the American Medical Association*, 286, 546-554.
- Moran, C. C. (1990). Does the use of humour as a coping strategy affect stresses associated with emergency work? *International Journal of Mass Emergencies and Disasters*, 8, 361-377.
- Moran, C. C. (1999). Recruits' prediction of positive reactions in disaster and emergency Work. *Disaster Prevention and Management*, 8, 177-183.
- Moran, C., & Britton, N. (1994). Emergency work experience and reactions to traumatic incidents. *Journal of Traumatic Stress*, 7, 575-585.
- Moran, C., & Colless, E. (1995). Positive reactions following emergency and disaster responses. *Disaster Prevention and Management*, 4, 55-61.
- Mulkay, M. (1989). *On humour, its nature and its place in modern society*. Cambridge, UK: Polity Press.
- Myers, C. S. (1915). A contribution to the study of shell shock. *Lancet*, 1, 316-320.
- Neal, L. A. (1994). The pitfalls of making a categorical diagnosis of post traumatic stress disorder in personal injury litigation. *Medicine, Science and the Law*, 34, 117-122.
- Neumann, D. A., & Gamble, S. J. (1995). Issues in the professional development of psychotherapists: Counter-transference and vicarious traumatization in the new trauma therapist. *Psychotherapy*, 32, 341-347.
- Newman, M., & Lee, D. A. (1997). Diagnosis, intervention and treatment A: Diagnosis. In D. Black, M. Newman, J. Harris-Hendricks, & G. Mezey (Eds.), *Psychological trauma: A developmental approach* (pp. 219-229). London: Gaskell.
- Norris, F. H. (1992). Epidemiology of trauma: frequency and impact of different potentially traumatic events on different demographic groups. *Journal of Consulting*

and *Clinical Psychology*, 60, 409-418.

Norris, F. H., & Kaniasty, K. (1996). Received and perceived social support in times of stress: A test of the social support deterioration deterrence model. *Journal of Personality and Social Psychology*, 71, 498-511.

North, C. S., Tivis, L., McMillen, J. C., Pfefferbaum, B., Cox, J., Spitznagel, E. L., et al. (2002). Coping, functioning, and adjustment of rescue workers after the Oklahoma City bombing. *Journal of Traumatic Stress*, 15, 171-175.

Orsillo, S. M., Batten, S. V., & Hammond, C. (2001). Acute Stress Disorder and Posttraumatic Stress Disorder: A brief overview and guide to assessment. In M. A. Antony, S. M. Orsillo, & L. Roemer (Eds.), *Practitioner's guide to empirically based measures of anxiety* (pp. 245-306). New York: Kluwer Academic/Plenum Publishers.

O'Toole, B. I., Marshall, R. P., Grayson, D. A., Schureck, R. J., Dobson, M., French, M., et al. (1996). The Australian Vietnam veterans' health study: III. Psychological health of Australian Vietnam veterans and its relationship to combat. *International Journal of Epidemiology*, 22, 331-339.

Otte, C., Neylan, T., Pole, N., Metzler, T., Best, S., Henn-Haase, C., et al. (2005).

Association between childhood trauma and catecholamine response to psychological stress in police academy recruits. *Biology Psychiatry*, 57, 27-32.

Ozer, E. J., Best, S. R., Lipsey, T. L., & Weiss, D. S. (2003). Predictors of posttraumatic stress disorder and symptoms in adults: A meta-analysis. *Psychological Bulletin*, 129, 52-73.

Pallant, J. (2005). *SPSS survival manual* (2<sup>nd</sup> ed.). Crows Nest, NSW: Allen & Unwin.

Palmer, C. E. (1983). A note about paramedics' strategies for dealing with death and dying. *Journal of Occupational Psychology*, 56, 83-86.

Parrott, W. G. (1993). Beyond hedonism: Motives for imbibing good moods and for main-

- taining bad moods. In D. M. Wegner, & J. W. Pennebaker (Eds.), *Handbook of mental control* (pp. 278-308). Englewood Cliffs, NJ: Prentice-Hall.
- Paton, D. (1994). Disaster relief work: An assessment of training effectiveness. *Journal of Traumatic Stress, 7*, 275-288.
- Paton, D. (2005). Posttraumatic growth in protective services professionals: Individual, cognitive and organizational influences. *Traumatology, 11*, 335-346.
- Paton, D. (2006). Critical incident stress risk in police officers: Managing resilience and vulnerability. *Traumatology, 12*, 198-206.
- Paton, D., & Burke, K. J. (2007). Personal and organizational predictors of posttraumatic adaptation and growth in police officers [On-Line]. Available: <http://www.ac.nz/issues/2007-1/paton-burke.htm>
- Paton, D., Smith, L. M., & Stephens, C. (1998). Work-related psychological trauma: A social psychological and organisational approach to understanding response and recovery [On-Line]. Available: <http://www.massey.ac.nz/~trauma/issues/1998-1/paton1.htm>
- Pearlman, L. A., & Saakvitne, K. W. (1995). *Trauma and the therapist: Counter-transference and vicarious traumatization in psychotherapy with incest survivors*. New York: Norton.
- Pennebaker, J. W. (1993). Putting stress into words: Health, linguistic and therapeutic implications. *Behaviour Research and Therapy, 31*, 539-548.
- Pennebaker, J. W., Barger, S. D., & Tiebout, J. (1989). Disclosure of traumas and health among holocaust survivors. *Psychosomatic Medicine, 51*, 577-589.
- Pennebaker, J. W., & Beall, S. K. (1986). Confronting a traumatic event: Toward an understanding of inhibition and disease. *Journal of Abnormal Psychology, 95*, 274-281.

- Pennebaker, J. W., Hughes, C. F., & O'Heeron, R. C. (1987). The psychophysiology of confession: Linking inhibitory and psychosomatic processes. *Journal of Personality and Social Psychology*, 52, 781-779.
- Pennebaker, J. W., Mayne, T. J., & Francis, M. E. (1997). Linguistic predictors of adaptive bereavement. *Journal of Personality and Social Psychology*, 72, 863-871.
- Perkonig, A., Kessler, R. C., Stortz, S., & Wittchen, H-U. (2000). Traumatic events and post-traumatic stress disorder in the community: Prevalence, risk factors and comorbidity. *Acta Psychiatrica Scandinavica*, 101, 46-59.
- Perkonig, A., Pfister, H., Stein, M. B., Höfler, M., Lieb, R., Maercker, A., et al. (2005). Longitudinal course of posttraumatic stress disorder and posttraumatic stress disorder symptoms in a community sample of adolescents and young adults. *American Journal of Psychiatry*, 162, 1320-1327.
- Perrin, M. A., DiGrande, L., Wheeler, K., Thorpe, L., Farfel, M., & Brackbill, R. (2007). Differences in PTSD prevalence and associated risk factors among World Trade Center disaster rescue and recovery workers. *American Journal of Psychiatry*, 164, 1385-1394.
- Petrie, K. J., Booth, R. J., Pennebaker, J. W., Davison, K. P., & Thomas, M. G. (1995). Disclosure of trauma and immune response to a hepatitis B vaccination program. *Journal of Consulting and Clinical Psychology*, 63, 787-792.
- Petrosino, A. J., Fellow, S., & Brensilber, D. (1997). Convenient victims: A research note. *Criminal Justice Policy Review*, 8, 405-420.
- Pisarski, A., Bohle, P., & Callan, V. J. (2002). Short communication: Extended shifts in ambulance work: influences on health. *Stress and Health*, 18, 119-126.
- Progrebin, M. R., & Poole, E. D. (1991). Police and tragic events: The management of emotions. *Journal of Criminal Justice*, 19, 395-403.

- Quittner, A. L., Glueckauf, R. L., & Jackson, D. N. (1990). Chronic parenting stress: moderating versus mediating effects of social support. *Journal of Personality and Social Psychology*, 59, 1266-1278.
- Regehr, C. (2005). Bringing the trauma home: Spouses of paramedics. *Journal of Loss and Trauma*, 10, 97-114.
- Regehr, C., Goldberg, G., Glancy, G. D., & Knott, T. (2002a). Posttraumatic symptoms and disability in paramedics. *Canadian Journal of Psychiatry*, 47, 953-958.
- Regehr, C., Goldberg, G., & Hughes, J. (2002b). Exposure to human tragedy, empathy, and trauma in ambulance paramedics. *American Journal of Orthopsychiatry*, 72, 505-513.
- Regehr, C., Hill, J., Knott, T., & Sault, B. (2003). Social support, self-efficacy and trauma in new recruits and experienced firefighters. *Stress and Health*, 19, 189-193.
- Regehr, C., & Millar, D. (2007). Situation critical: High demand, low control, and low support in paramedic organizations. *Traumatology*, 13, 49-58.
- Remer, R., & Ferguson, R. A. (1995). Becoming a secondary survivor of sexual assault. *Journal of Counseling & Development*, 73, 407-413.
- Rentoul, R., & Ravenscroft, T. (1993). Managing post traumatic stress in the emergency services. *Disaster Management*, 5, 199-201.
- Resnick, H. S., Kilpatrick, D. G., Dansky, B. S., Saunders, B. E., & Best, C. L. (1993). Prevalence of civilian trauma and posttraumatic stress disorder in a representative national sample of women. *Journal of Consulting and Clinical Psychology*, 61, 984-991.
- Revicki, D.A., & Gershon, R. R. (1996). Work-related stress and psychological distress in emergency medical technicians. *Journal of Occupational Health Psychology*, 1, 391-396.

- Rimé, B., Finkenauer, C., Luminet, O., Zech, E., & Philippot, P. (1998). Social sharing of emotion: New evidence and new questions. In W. Stroebe, & M. Hewstone (Eds.), *European review of social psychology* (Vol. 9, pp. 145-189). Chichester, UK: Wiley.
- Rimé, B., Philippot, P., Boca, S., & Mesquita, B. (1992). Long-lasting cognitive and social consequences of emotion: Social sharing and rumination. In W. Stroebe, & M. Hewstone (Eds.), *European review of social psychology* (Vol. 3, pp. 225-258). Chichester, UK: Wiley.
- Roberts, N., & Levenson, R. (2001). The remains of the workday: Impact of job stress and exhaustion on marital interactions in police couples. *Journal of Marriage and the Family*, 63, 1052-1067.
- Robinson, R. (2002). *Follow-up study of health and stress in ambulance services in Victoria, Australia 2002. Report 1: Paramedics and their partners*. Melbourne: Victorian Ambulance Crisis Counselling Unit.
- Rodgers, L. M. (1998). A five year study comparing early retirements on medical grounds in ambulance personnel [sic] with those in other groups of health service staff. Part II: Causes of retirements. *Occupational Medicine*, 48, 119-132.
- Rosenberg, L. (1991). A qualitative investigation of the use of humor by emergency personnel as a strategy for coping with stress. *Journal of Emergency Nursing*, 17, 197-203.
- Rothbaum, B. O., Foa, E. B., Riggs, D. S., Murdock, T., & Walsh, W. (1992). A prospective examination of post-traumatic stress disorder in rape victims. *Journal of Traumatic Stress*, 5, 455-475.
- Rural Ambulance Victoria. (2004). *Annual Report 2004*. Ballarat: Author.
- Rushton, J. P., Chrisjohn, R. D., & Fekken, G. C. (1981). The altruistic personality and the self-report altruism scale. *Personality and Individual Differences*, 2, 293-302.

- Salston, M-D., & Figley, C. R. (2003). Secondary traumatic stress effects of working with survivors of criminal victimization. *Journal of Traumatic Stress, 16*, 167-174.
- Salter, E., & Stallard, P. (2004). Posttraumatic growth in child survivors of a road traffic accident. *Journal of Traumatic Stress, 17*, 335-340.
- Schachter, S. (1959). *The psychology of affiliation*. Stanford, CA: Stanford University Press.
- Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of the Life Orientation Test. *Journal of Personality and Social Psychology, 67*, 1063-1078.
- Schmidt, J. E., & Andrykowski, M. A. (2004). The role of social and dispositional variables associated with emotional processing in adjustment to breast cancer: An internet-based study. *Health Psychology, 23*, 259-266.
- Schnurr, P. P., Ford, J. D., Friedman, M. J., Green, B. L., Dain, B. J., & Sengupta, A. (2000). Predictors and outcomes of post-traumatic stress disorder in World War II veterans exposed to mustard gas. *Journal of Consulting and Clinical Psychology, 68*, 258-268.
- Scott, T. F., Allen, D., Price, T. R. P., McConnell, H., & Lang, D. (1996). Characterization of major depression symptoms in multiple sclerosis patients. *Behaviour Research and Therapy, 36*, 135-147.
- Sexton, L. (1999). Vicarious traumatising of counsellors and effects on their workplaces. *British Journal of Guidance & Counselling, 27*, 393-403.
- Shakespeare-Finch, J. E., Gow, K., & Smith, S. (2005). Personality, coping and post-traumatic growth in emergency ambulance personnel. *Traumatology, 11*, 325-334.
- Shakespeare-Finch, J. E., Smith, S. G., Gow, K. M., Embelton, G., & Baird, L. (2003). The prevalence of post-traumatic growth in emergency ambulance personnel.

*Traumatology*, 9, 58-70.

Silove, D., Steel, Z., McGorry, P., & Mohan, P. (1998). Trauma exposure, postmigration stressors, and symptoms of anxiety, depression, and posttraumatic stress in Tamil asylum-seekers: Comparison with refugees and immigrants. *Acta Psychiatrica Scandinavica*, 97, 175-181.

Smyth, J. M. (1998). Written emotional expression: Effect sizes, outcome types, and moderating variables. *Journal of Consulting and Clinical Psychology*, 66, 174-184.

Solomon, Z. (1995). *Coping with war-induced stress: The Gulf War and the Israeli response*. New York: Plenum.

Southwick, S. M., Morgan, C. A., & Rosenberg, R. (2000). Social sharing of Gulf War experiences: Association with trauma-related psychological symptoms. *Journal of Nervous and Mental Disease*, 188, 695-700.

Spielberger, C. D. (1983). *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.

Spinhall, R. C. (2000). *Basic statistical analysis (6<sup>th</sup> ed.)*. Boston, MA: Allyn & Bacon.

Stamm, B. H. (1997). Work-related secondary traumatic stress. *PTSD Research Quarterly*, 8, 1-8.

Steel, Z., Silove, D., Phan, T., & Bauman, A. (2002). Long-term effect of psychological trauma on the mental health of Vietnamese refugees resettled in Australia: A population-based study. *Lancet*, 360, 1056-1062.

Stein, M. B., Walker, J. R., Hazen, A. L., & Forde, D. R. (1997). Full and partial posttraumatic stress disorder: Findings from a community survey. *American Journal of Psychiatry*, 154, 1114-1119.

Stephens, C. (1996). Debriefing, social support and PTSD in New Zealand Police: Testing a multidimensional model of organisational traumatic stress [On-Line].



Available: <http://www.massey.ac.nz/~trauma/issues/1997-1/cvs1.htm>

- Stephens, C., Long, N., & Miller, I. (1997). The impact of trauma and social support on posttraumatic stress disorder: A study of New Zealand police officers. *Journal of Criminal Justice*, 25, 303-314.
- Stephens, C., & Miller, I. (1998). Traumatic experiences and post-traumatic stress disorder in the New Zealand Police. *Policing*, 21, 178-191.
- Sterud, T., Ekeberg, Ø., & Hem, E. (2006). Health status in the ambulance services: A systematic review. *BMC Health Services Research*, 6, 1-10.
- Stotland, E. (1969). Exploratory investigations of empathy. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 4, pp. 20-53). New York: Academic Press.
- Stradling, S. G., Crowe, G., & Tuohy, A. P. (1993). Changes in self-concept during occupational socialization of new recruits to the police. *Journal of Community & Applied Social Psychology*, 3, 131-147.
- Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4<sup>th</sup> ed.). Needham Heights, MA: Allyn & Bacon.
- Taylor, A. J. W., & Frazer, A. G. (1982). The stress of post-disaster body handling and identification. *Journal of Human Stress*, 8, 4-12.
- Taylor, S., Kuch, K., Koch, W. J., Crockett, D. J., & Passey, G. (1998). The structure of posttraumatic stress symptoms. *Journal of Abnormal Psychology*, 107, 154-160.
- Tedeschi, R. G., & Calhoun, L. G. (2004). Posttraumatic growth: Conceptual foundations and empirical evidence. *Psychological Inquiry*, 15, 1-18.
- Tedeschi, R., G., Park, C. L., & Calhoun, L. G. (1998). Posttraumatic growth: Conceptual issues. In R. G. Tedeschi, C. L. Park, & L. G. Calhoun (Eds.), *Posttraumatic growth: Positive changes in the aftermath of crisis* (pp. 1-22). Mahwah, NJ: Lawrence

Erlbaum Associates.

Thompson, A., & Bolger, N. (1999). Emotional transmission in couples under stress.

*Journal of Marriage and the Family*, 61, 38-48.

Thompson, J., & Suzuki, I. (1991). Stress in ambulance workers. *Disaster Management*, 3, 193-197.

Trivers, R. L. (1985). *Social evolution*. Boston, MA: Addison-Wesley.

True, W. R., Goldberg, J., & Eisen, S. A. (1988). Stress symptomatology among Vietnam veterans: Analysis of the Veterans Administration Survey of Veterans II. *American Journal of Epidemiology*, 128, 85-92.

Ullman, S. E., & Filipas, H. H. (2001). Predictors of PTSD symptom severity and social reactions in sexual assault victims. *Journal of Traumatic Stress*, 14, 369-389.

Ursano, R. J., Fullerton, C. S., & Koa, T-C. (1995). Longitudinal assessment of post-traumatic stress disorder and depression following exposure to traumatic death. *Journal of Nervous and Mental Diseases*, 183, 36-43.

Ursano, R. J., Fullerton, C. S., Vance, K., & Koa, T-C. (1999). Posttraumatic stress disorder and identification in disaster workers. *American Journal of Psychiatry*, 156, 353-359.

Ursano, R. J., Grieger, T. A., & McCarroll, J. E. (1996). Prevention of posttraumatic stress: Consultation, training, and early treatment. In B. A. Van der Kolk, A. C. McFarlane, & L. Weisaeth (Eds.), *Traumatic stress: The effects of overwhelming experience on mind, body, and society* (pp. 441-462). New York: Guilford Press.

van der Ploeg, E., & Kleber, R. J. (2003). Acute and chronic job stressors among ambulance personnel: Predictors of health symptoms. *Occupational and Environmental Medicine*, 60, 40-46.

Van Loey, N. E. E., Maas, C. J. M., & Taal, L. A. (2003). Predictors of chronic post-

- traumatic stress symptoms following burn injury: Results of a longitudinal study. *Journal of Traumatic Stress*, 16, 361-369.
- Van Ornum, W., Foley, J. M., Burns, P. R., DeWolfe, A. S., & Kennedy, E. C. (1981). Empathy, altruism, and self-interest in college students. *Adolescence*, 16, 799-808.
- Vaux, A. (1988). *Social support: Theory, research, and intervention*. New York: Praeger.
- Vogt, D. S., Pless, A. P., King, L. A., & King, D. W. (2005). Deployment stressors, gender, and mental health outcomes among Gulf War I veterans. *Journal of Traumatic Stress*, 18, 115-127.
- Vrana, S., & Lauterbach, D. (1994). Prevalence of traumatic events and post-traumatic psychological symptoms in a nonclinical sample of college students. *Journal of Traumatic Stress*, 7, 289-302.
- Wagner, D., Heinrichs, M., & Ehler, U. (1998). Prevalence of symptoms of posttraumatic stress disorder in German professional firefighters. *American Journal of Psychiatry*, 155, 1727-1732.
- Weathers, F., Litz, B. T., Herman, D., Huska, J. A., & Keane, T. M. (1993). The PTSD Checklist (PCL): Reliability, validity and diagnostic utility. Paper presented at the Ninth Annual Meeting of International Society for Traumatic Stress Studies, San Antonio, TX.
- Wee, D. F., & Myers, D. (2002). Stress responses of mental health workers following disaster: The Oklahoma City bombing. In C. R. Figley (Ed.), *Treating Compassion fatigue* (pp. 57-84). New York: Brunner-Routledge.
- Weiss, D. S., Marmar, C. R., Metzler, T. J., & Ronfeldt, H. M. (1995). Predicting symptomatic distress in emergency services personnel. *Journal of Consulting and Clinical Psychology*, 63, 361-368.
- Westerink, J. (1990). Stress and coping mechanisms in young police officers. *Australian*

- Police Journal*, 44, 109-113.
- Wetzel, R. D., Murphy, G. E., Simons, A. D., Lustman, P., North, C. S., & Yutzy, S. H. (2003). What does the Keane PTSD scale of the MMPI measure?: Repeated measurements in a group of patients with major depression. *Psychological Reports*, 92, 781-786.
- White, S., & Camarena, P. (1989). Laughter as a stress reducer in small groups. *Humor*, 2, 73-79.
- Williams, D. G. (1982). Weeping by adults: Personality correlates and sex differences. *The Journal of Psychology*, 110, 217-226.
- Winkel, F. W. (1999). Repeat victimization and trauma-susceptibility: Prospective and longitudinal analyses. In J. J. M. Van Dijk, R. G. H. Van Kaam, & J. Wemmers (Eds.), *Caring for crime victims* (pp. 207-221). New York: Criminal Justice Press.
- Winkel, F. W., Blaauw, E., Sheridan, L. & Baldry, A. C. (2003). Repeat criminal victimization and vulnerability for coping failure: A prospective examination of a potential risk factor. *Psychology, Crime & Law*, 9, 87-95.
- Winkel, F. W., & Vrij, A. (1998). Who is in need of victim support?: The issue of accountable and empirically validated selection and victim referral. *Expert Evidence*, 6, 23-41.
- Wortman, C. B., & Lehman, D. R. (1985). Reactions to victims of life crises: Support attempts that fail. In I. G. Sarason & B. R. Sarason (Eds.), *Social support: Theory, research, and application* (pp. 463-489). Dordrecht, Netherlands: Martinus Nijhoff.
- Wu, K. K., Chan, S. K., & Ma, T. M. (2005). Posttraumatic stress, anxiety, and depression in survivors of severe acute respiratory syndrome (SARS). *Journal of Traumatic Stress*, 18, 39-42.
- Yehuda, R., Kahana, B., Southwick, S. M., & Giller, E. L. (1994). Depressive features in

holocaust survivors with post-traumatic stress disorder. *Journal of Traumatic Stress*, 7, 699-704.

Young, K. M., & Cooper, G. L. (1999). Stress in ambulance personnel. In J. Firth-Cozens & R. L. Payne (Eds.), *Stress in health professionals: Psychological and organizational causes and interventions* (pp. 119-131). Brisbane, QLD: John Wiley & Sons Ltd.

Zayfert, C., Dums, A. R., Ferguson, R. J., & Hegel, M. T. (2002). Health functioning impairments associated with posttraumatic stress disorder, anxiety disorders, and depression. *Journal of Nervous and Mental Diseases*, 190, 233-240.

Zoellner, L. A., Foa, E. B., & Bartholomew, D. B. (1999). Interpersonal friction and PTSD in female victims of sexual and nonsexual assault. *Journal of Traumatic Stress*, 12, 689-700.

Appendix A

STUDENT PARAMEDIC HEALTH & STRESS BASELINE SURVEY

This is an anonymous questionnaire. Please ensure that you do not write your name or any other comments that will make you identifiable on the attached questionnaire. By completing the questionnaire you are consenting to take part in this research. As such you should first read the enclosed Plain Language Statement carefully as it explains fully the intention of this project.

INSTRUCTIONS

The following questions will require you to either write or mark a number or letter which best describes your answer. It is okay if you do not want to answer a particular question. Leave it blank and go on to the next one. Please try to work through the questions as quickly as possible. The entire survey will take approximately 20-30 minutes to complete. Please note that it is important that this survey be completed BEFORE you start any 'on-road' ambulance duties.

SECTION A GENERAL INFORMATION

1. Age at last birthday (in years) .....
2. Sex      Male ☐      Female ☐
3. Marital status (tick *one* box which best describes your current situation)
- Single ☐      Married or living together ☐      Separated ☐  
Divorced ☐      Widowed ☐
4. Were you born in?      Australia ☐      Overseas ☐
5. Have you previously worked on a paid or volunteer basis in the medical, trauma or emergency responder fields? .....YES/NO
6. If yes, what position did you hold? .....
7. How long were you employed in this position? .....

In order to accurately match your replies with the follow-up survey please provide the following information (confidentiality assured):

PET'S NAME .....  
HOUSE NUMBER .....  
YEAR OF BIRTH .....

Appendix B

STUDENT PARAMEDIC HEALTH & STRESS FOLLOW-UP SURVEY

This is an anonymous questionnaire. Please ensure that you do not write your name or any other comments that will make you identifiable on the attached questionnaire. By completing the questionnaire you are consenting to take part in this research. As such you should first read the enclosed Plain Language Statement carefully as it explains fully the intention of this project.

ONLY complete this survey if you ALSO completed Survey # 1

INSTRUCTIONS

The following questions will require you to either write or mark a number or letter which best describes your answer. It is okay if you do not want to answer a particular question. Leave it blank and go on to the next one. Please try to work through the questions as quickly as possible. The entire survey will take approximately 20-30 minutes to complete. Please note that it is important that this survey be completed BEFORE you start any 'on-road' ambulance duties.

SECTION A      GENERAL INFORMATION

1. Age at last birthday (in years) .....
2. Sex      Male ☐      Female ☐
3. Marital status (tick *one* box which best describes your current situation)  

Single ☐      Married or living together ☐      Separated ☐

Divorced ☐      Widowed ☐
4. Were you born in?      Australia ☐      Overseas ☐
5. Have you completed any operational (on-road) ambulance duties? .....YES/NO
6. If yes, how many weeks of operational (on-road) duties have you done? .....

To ACCURATELY MATCH your replies with SURVEY 1 it is ESSENTIAL you provide the SAME ANSWERS to the following information even if some details have changed (confidentiality assured):

PET'S NAME .....  
HOUSE NUMBER .....  
YEAR OF BIRTH .....

Appendix C

SECTION B                      EMOTIONAL EXPRESSION

People have different attitudes towards expressing their emotions. For EACH attitude, please mark the response you most readily identify with.

	Strongly Agree	Agree	Disagree	Strongly Disagree
1. Turning to someone else for advice or help is an admission of weakness.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I think getting emotional is a sign of weakness.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. It is shameful for a person to display his or her weaknesses.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. People will reject you if they know your weaknesses.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. If a person asks for help it is a sign of weakness.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. When I'm upset I bottle up my feelings.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. When I'm upset I usually try to hide how I feel.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I seldom show how I feel about things.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. When I get upset I usually show how I feel.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I don't feel comfortable showing my emotions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. I think you should always keep your feelings under control.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. I think you ought not to burden other people with your problems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. You should always keep your feelings to yourself.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. You should always hide your feelings.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. I should always have complete control over my feelings.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



SECTION B Cont...

	Strongly Agree	Agree	Disagree	Strongly Disagree
16. I don't think other people understand my feelings.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Other people will reject you if you upset them.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. If I express my feelings I'm vulnerable to attack.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. My bad feelings will harm other people if I express them.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. If other people know what you are really like, they will think less of you.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Appendix D

### SECTION C

### EMOTIONS

Please use the following scale to indicate the degree of your agreement or disagreement with each of the statements below. Record your numerical answer to EACH statement in the space provided preceding the statement. Try to describe yourself accurately and in terms of how you are generally (that is, the average of the way you are in most situations – not the way you are in specific situations or the way you would hope to be).

- +4 = very strong agreement
- +3 = strong agreement
- +2 = moderate agreement
- +1 = slight agreement
- 0 = neither agreement nor disagreement
- 1 = slight disagreement
- 2 = moderate disagreement
- 3 = strong disagreement
- 4 = very strong disagreement

- \_\_\_\_ 1. I very much enjoy and feel uplifted by happy endings.
- \_\_\_\_ 2. I cannot feel much sorrow for those who are responsible for their own misery.
- \_\_\_\_ 3. I am moved deeply when I observe strangers who are struggling to survive.
- \_\_\_\_ 4. I hardly ever cry when watching a very sad movie.
- \_\_\_\_ 5. I can almost feel the pain of the elderly who are weak and must struggle to move about.
- \_\_\_\_ 6. I cannot relate to the crying and sniffing at weddings.
- \_\_\_\_ 7. It would be extremely painful for me to have to convey very bad news to another.
- \_\_\_\_ 8. I cannot easily empathise with the hopes and aspirations of strangers.
- \_\_\_\_ 9. I don't get caught up easily in the emotions generated by a crowd.
- \_\_\_\_ 10. Unhappy movie endings haunt me for hours afterward.
- \_\_\_\_ 11. It pains me to see young people in wheelchairs.
- \_\_\_\_ 12. It is very exciting for me to watch children open presents.
- \_\_\_\_ 13. Helpless old people don't have much of an emotional effect on me.
- \_\_\_\_ 14. The sadness of a close one easily rubs off on me.

SECTION C Cont...

- +4 = very strong agreement
- +3 = strong agreement
- +2 = moderate agreement
- +1 = slight agreement
- 0 = neither agreement nor disagreement
- 1 = slight disagreement
- 2 = moderate disagreement
- 3 = strong disagreement
- 4 = very strong disagreement

- \_\_\_\_\_ 15. I don't get overly involved with friends' problems.
- \_\_\_\_\_ 16. It is difficult for me to experience strongly the feelings of characters in a book or movie.
- \_\_\_\_\_ 17. It upsets me to see someone being mistreated.
- \_\_\_\_\_ 18. I easily get carried away by the lyrics of love songs.
- \_\_\_\_\_ 19. I am not affected easily by the strong emotions of people around me.
- \_\_\_\_\_ 20. I have difficulty knowing what babies and children feel.
- \_\_\_\_\_ 21. It really hurts me to watch someone who is suffering from a terminal illness.
- \_\_\_\_\_ 22. A crying child does not necessarily get my attention.
- \_\_\_\_\_ 23. Another's happiness can be very uplifting for me.
- \_\_\_\_\_ 24. I have difficulty feeling and reacting to the emotional expressions of foreigners.
- \_\_\_\_\_ 25. I get a strong urge to help when I see someone in distress.
- \_\_\_\_\_ 26. I am rarely moved to tears while reading a book or watching a movie.
- \_\_\_\_\_ 27. I have little sympathy for people who cause their own serious illnesses (e.g., heart disease, diabetes, lung cancer).
- \_\_\_\_\_ 28. I would not watch an execution.
- \_\_\_\_\_ 29. I easily get excited when those around me are lively and happy.
- \_\_\_\_\_ 30. The unhappiness or distress of a stranger are not especially moving for me.

Appendix E

SECTION D

STRESS

The questions in this section ask you about current experiences and past exposure to traumatic incidents. It is okay if you do not want to answer any questions in this section.

Part 1

Below is a list of traumatic events. Please mark the box NEXT to ALL of the events that have either happened to you OR you have witnessed.

Please tick YES or NO box to indicate if this event occurred whilst you were carrying out ambulance duties.

	YES	NO
1. <input type="checkbox"/> Serious accident, fire, or explosion (e.g., industrial, farm, car)	<input type="checkbox"/>	<input type="checkbox"/>
2. <input type="checkbox"/> Natural disaster (e.g., hurricane, flood, bushfire)	<input type="checkbox"/>	<input type="checkbox"/>
3. <input type="checkbox"/> Particularly gruesome situations (e.g., decapitation, severe burns)	<input type="checkbox"/>	<input type="checkbox"/>
4. <input type="checkbox"/> Non-sexual assault (e.g., mugged, physically attacked, stabbed)	<input type="checkbox"/>	<input type="checkbox"/>
5. <input type="checkbox"/> Sexual assault (e.g., rape, attempted rape, or molested)	<input type="checkbox"/>	<input type="checkbox"/>
6. <input type="checkbox"/> Killing or serious injury of another person	<input type="checkbox"/>	<input type="checkbox"/>
7. <input type="checkbox"/> Sudden unexpected death of an associate	<input type="checkbox"/>	<input type="checkbox"/>
8. <input type="checkbox"/> Life threatening illness or injury	<input type="checkbox"/>	<input type="checkbox"/>
9. <input type="checkbox"/> Held captive, imprisoned, tortured, or kidnapped	<input type="checkbox"/>	<input type="checkbox"/>
10. <input type="checkbox"/> Multiple fatalities at a single site	<input type="checkbox"/>	<input type="checkbox"/>
11. <input type="checkbox"/> Death of a child (e.g., cot death, infanticide)	<input type="checkbox"/>	<input type="checkbox"/>
12. <input type="checkbox"/> Other traumatic event	<input type="checkbox"/>	<input type="checkbox"/>

13. If you marked Item 12, please specify the traumatic event below.

IF YOU MARKED ANY OF THE ITEMS ABOVE, PLEASE CONTINUE. IF YOU MARKED NONE PLEASE STOP HERE.

Part 2

If you marked more than one traumatic event in Part 1, please mark the box next to the event that **BOTHERS** you the **MOST**. If you marked only one traumatic event in Part 1, mark the same one below. Please tick **YES** or **NO** box to indicate if the event that bothers you the most occurred whilst you were carrying out ambulance duties.

	YES	NO
<input type="checkbox"/> Accident	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Disaster	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Particularly gruesome situation	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Non-sexual assault	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Sexual assault.	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Killing/serious injury of another person.	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Unexpected death of an associate.	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Life threatening illness/injury.	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Held captive, imprisoned, tortured, or kidnapped.	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Multiple fatalities.	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Death of a child.	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Other.	<input type="checkbox"/>	<input type="checkbox"/>

Below are several questions about the traumatic event that bothers you the most.

How long ago did the traumatic event happen? (mark **ONE**)

- ☐ Less than 1 month
- ☐ 1 to 3 months
- ☐ 3 to 6 months
- ☐ 6 to 12 months
- ☐ 1 to 3 years
- ☐ 3 to 5 years
- ☐ More than 5 years

**Part 2 Cont...**

Please circle Y (YES) or N (NO) for EACH of the following questions.

During this traumatic event:

- Y   N   Were you physically injured?
  
- Y   N   Was someone else physically injured?
  
- Y   N   Did you think that your life was in danger?
  
- Y   N   Did you think that someone else's life was in danger?
  
- Y   N   Did you feel helpless?
  
- Y   N   Did you feel terrified?

Part 3

Below is a list of problems that people sometimes have after experiencing a traumatic event. Please read each one carefully and circle the number (0 – 3) that best describes how often that problem has occurred IN THE PAST MONTH. Rate EACH problem with respect to the traumatic event you rated as the most bothersome in Part 2.

	Never	Sometimes	Often	Almost Always
1. Intrusive thoughts about the traumatic event.	0	1	2	3
2. Dreams or nightmares about the traumatic event.	0	1	2	3
3. Acting or feeling as if the event was happening again.	0	1	2	3
4. Distress following exposure to reminders of the event.	0	1	2	3
5. Physical reactions, e.g., sweating, heart racing, trembling, when reminded of the event.	0	1	2	3
6. Avoid thinking, talking, or having feelings about the event.	0	1	2	3
7. Avoid activities, people, or places that remind you of the event.	0	1	2	3
8. Unable to remember all or part of the event.	0	1	2	3
9. Less interest (pleasure) in activities you once enjoyed.	0	1	2	3
10. Feeling distant or cut off from people around you.	0	1	2	3
11. Emotional numbing (e.g., unable to have loving feelings).	0	1	2	3
12. Feeling as if your future plans or hopes will not come true.	0	1	2	3
13. Trouble falling or staying asleep.	0	1	2	3
14. Feeling irritable or having fits of anger.	0	1	2	3
15. Trouble concentrating.	0	1	2	3
16. Being constantly on guard.	0	1	2	3
17. Feeling jumpy or easily startled.	0	1	2	3

Part 3 Cont...

18. How long have you experienced the problems that you reported above? (circle ONE)

- 1 Less than 1 month
- 2 1 to 3 months
- 3 More than 3 months

19. How long after the traumatic event did these problems begin? (circle ONE)

- 1 Within 1 month
- 2 1 to 3 months
- 3 3 to 6 months
- 4 6 or more months

Part 4

Indicate below if the problems you have rated in Part 3 have interfered with ANY of the following areas of your life DURING THE PAST MONTH. Circle Y (YES) or N (NO).

- Y N Work
- Y N Household chores and duties
- Y N Relationships with friends
- Y N Fun and leisure activities
- Y N Study
- Y N Relationships with your family
- Y N Sex life
- Y N General satisfaction with life
- Y N Overall level of functioning in all areas of your life



Appendix F

SECTION E SOCIAL SUPPORT

In this section you are asked to think of colleagues, family members, or friends you turned to for support following a traumatic operational-related (e.g., 'on-road') incident. Please use the following scale to indicate the degree of support you received from EACH of your support providers, and record your numerical answer in the space preceding each statement (answer in regards to the 'on-road' incident that bothered you the most).

1 = Never      2 = Almost Never      3 = Occasionally      4 = Almost Always      5 = Always

During the PAST WEEK:

1. How often did you feel you had to keep your feelings about the traumatic event to yourself because they made the following people uncomfortable?

- \_\_\_\_\_ Colleagues
- \_\_\_\_\_ Family (e.g., spouse/partner/parents/siblings)
- \_\_\_\_\_ Friends

2. How often did you feel that you could discuss your feelings about the traumatic event with the following people when you wanted to?

- \_\_\_\_\_ Colleagues
- \_\_\_\_\_ Family
- \_\_\_\_\_ Friends

3. When you talked about the traumatic event, how often did the following people give you the idea they didn't want to hear about it?

- \_\_\_\_\_ Colleagues
- \_\_\_\_\_ Family
- \_\_\_\_\_ Friends

SOCIAL SUPPORT Cont...

1 = Never    2 = Almost Never    3 = Occasionally    4 = Almost Always    5 = Always

During the PAST WEEK:

4. How often did you feel the following people let you down by not showing you as much care and concern as you would have liked?

- \_\_\_ Colleagues
- \_\_\_ Family
- \_\_\_ Friends

5. How often have the following people really got on your nerves?

- \_\_\_ Colleagues
- \_\_\_ Family
- \_\_\_ Friends

6. During the past week, how often have you ever wanted to talk about the traumatic event with?

- \_\_\_ Colleagues
- \_\_\_ Family
- \_\_\_ Friends

Please use the following scale to indicate your answer for the next question.

1 = Not At All    2 = A Little    3 = Quite A Bit    4 = Very Often    5 = A Great Deal

7. During the past week, how often did you actually talk with the following people about the traumatic event?

- \_\_\_ Colleagues
- \_\_\_ Family
- \_\_\_ Friends

Appendix G

SECTION F                      OPERATIONAL DUTIES

Please provide the number of times you attended the following case type during the past month OR whilst completing your last on-road clinical placement (if you are not sure, please make an estimated guess).

CODE 1 (e.g., Highest Priority/Time Critical/Life Threatening)

Please tick the box that best represents your branch type during your most recent on-road ambulance duties.

Metropolitan    ☐

Rural    ☐

Both    ☐

THANK YOU FOR TAKING THE TIME TO PARTICIPATE

## Appendix H



### Human Research Ethics Committee (HREC)

Research & Graduate Studies Office

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#### HUMAN RESEARCH ETHICS EXTENSION APPROVAL FORM

**Principal Researcher/Supervisor:** S McEwan

**Associate/Student Researcher/s:** K Armstrong

**School:** Behavioural & Social Sciences & Humanities

**Ethics Approval has been granted for the extension to the following project:**

**Project Number:** A06-037

**Project Title:** An investigation of the relationships of trauma, social, and personality factors with potential post-traumatic stress disorder in student paramedics

**For the period:** 12/5/2006 to 20/12/2007

*Please quote the Project No. in all correspondence regarding this application.*

#### **PLEASE NOTE:**

A final report for this project must be submitted to the HREC Executive Officer on:  
**20 January 2008**

Signed:.....  
(Executive Officer, HREC)

Date: **18 December 2006**

## Appendix I



### UNIVERSITY OF BALLARAT PLAIN LANGUAGE STATEMENT

**PROJECT TITLE:** *The impact of trauma, social support, emotional expression and empathy on compassion fatigue in student paramedics.*

**PRINCIPLE RESEARCHER:** Dr Siobhan McEwan (C. Psych., MAPS, CCLIN)  
**RESEARCHER:** Kim Armstrong (BA Psych Hons.)

Dear Student,

Starting a new career can be exciting but stressful. Yet little is known about how student paramedics cope during their first year of active ambulance duties. This is the first time a study has been undertaken to assess the health of student paramedics during this potentially stressful training period, and your participation will provide valuable information to help protect the health and wellbeing of paramedics, both domestically and internationally.

My name is Kim Armstrong and I am completing a Doctorate of Clinical Psychology degree at the University of Ballarat in Victoria. As part of my degree, I am undertaking a research project under the supervision of Dr Siobhan McEwan, a senior lecturer in the school of Behavioural & Social Sciences & Humanities. I am studying the role that 'on-road' ambulance duties, social support, emotional expression and empathy play in the psychological health of student paramedics during this phase of training. As a student paramedic you are invited to participate in this research.

Should you agree to do so, participation will include:

- Responding to this initial survey which asks about your past exposure to traumatic incidents, your tendency to experience the emotions of others (e.g., "I very much enjoy and feel uplifted by happy endings"), and the way in which you usually express your emotions (e.g., "When I'm upset I bottle up my feelings").
- Responding to a follow-up survey in 6-months time which will include the initial survey questions, plus new questions asking if you felt constrained talking to others about a distressing work-related event (e.g., "When you talked about the traumatic event, how often did co-workers give you the idea they didn't want to hear about it?").

Surveys will be distributed by your course lecturers, taking 20-30 minutes to complete. If you consent to participate it would be appreciated if you would **return this survey in the reply paid envelope**. Individuals who have been exposed to traumatic events commonly experience symptoms that include concentration difficulties, reliving the event, sleep/eating disturbances, anxiety and/or depression. This survey asks questions about these kinds of symptoms and whether you have experienced or witnessed any trauma. Questions may "cue" someone who has experienced trauma, resulting in the re-experiencing of these symptoms. If you experience any distress during or following the completion of this survey or at any time following participation in this study, please contact the Principal Researcher, Dr Siobhan McEwan, a clinical psychologist at (03) 5327-9619, your work or university counseling service, or Lifeline on 131114 for confidential referrals or help with any issues that may have arisen.

There are no questions that will identify you in any way. **Both surveys will be treated in the strictest confidence.** The surveys you complete will be matched by three codes unique to yourself. This is done so we can follow changes in you over time and use this to predict health and stress outcomes in student paramedics. Access to this information **will not be given to any Ambulance Service or to your University**, and only the aggregated results will be published in scientific or academic journals, or presented in the dissertation and summary of findings provided to interest parties. Upon completion of the study, all data will be secured in a locked cabinet in the School of Behavioural & Social Sciences & Humanities, University of Ballarat for a minimum period of **FIVE** years from the date of publication and then destroyed.

You are free to withdraw from the study at any time prior to the return of the questionnaire without adverse academic or professional consequences. If you have any questions, or would like to be informed of the aggregate research results, please contact the Principle Researcher, Dr Siobhan McEwan, School of Behavioural & Social Sciences & Humanities on telephone number (03) 5327-9619.

*Should you (i.e. the participant) have any concerns about the conduct of this research project, please contact the Executive Officer, Human Research Ethics Committee, Research & Graduates Studies Office, University of Ballarat, PO Box 663, Mt Helen VIC 3353. Telephone: (03) 5327 9765; Fax (03) 5327 9602.*

## Appendix J



### UNIVERSITY OF BALLARAT PLAIN LANGUAGE STATEMENT

**PROJECT TITLE:** *The impact of trauma, social support, emotional expression and empathy on compassion fatigue in student paramedics.*

**PRINCIPLE RESEARCHER:** Dr Siobhan McEwan (C. Psych., MAPS, CCLIN)

**RESEARCHER:** Kim Armstrong (BA Psych Hons.)

### STUDENT PARAMEDIC FOLLOW-UP HEALTH & STRESS SURVEY

Dear Student,

Earlier this year you received the first of two surveys designed to assess the health and stress of student paramedics during the first year of on-road ambulance duties. Enclosed is the final survey for this study.

The enclosed survey will take 20-30 minutes to complete. If you consent to participate it would be appreciated if you would **return this survey in the reply paid envelope**. Individuals who have been exposed to traumatic events commonly experience symptoms that include concentration difficulties, reliving the event, sleep/eating disturbances, anxiety and/or depression. This survey asks questions about these kinds of symptoms and whether you have experienced or witnessed any trauma. Questions may "cue" someone who has experienced trauma, resulting in the re-experiencing of these symptoms. If you experience any distress during or following the completion of this survey or at any time following participation in this study, please contact the Principal Researcher, Dr Siobhan McEwan, a clinical psychologist at (03) 5327-9619, your work or university counseling service, or Lifeline on 131114 for confidential referrals or help with any issues that may have arisen.

There are no questions that will identify you in any way. **This survey will be treated in the strictest confidence.** To allow us to match your current and previous responses, **please put the SAME coded information you used for the earlier survey** on the cover sheet of the attached questionnaire (**even if some of the details have now changed**). Access to this information **will not be given to any Ambulance Service/University**, and only the aggregated results will be published in scientific or academic journals, or presented in the dissertation and summary of findings provided to interest parties. Upon completion of the study, all data will be secured in a locked cabinet in the School of Behavioural & Social Sciences & Humanities, University of Ballarat for a minimum period of **FIVE** years from the date of publication and then destroyed.

You are free to withdraw from the study at any time prior to the aggregation of the final data without adverse academic or professional consequences. If you have any questions, or would like to be informed of the aggregate research results, please contact the Principle Researcher, Dr Siobhan McEwan, School of Behavioural & Social Sciences & Humanities on telephone number (03) 5327-9619.

I would like to take this opportunity to thank you for participating in this study. The information you have contributed expands our understanding of the impact of on-road ambulance duties on student paramedics' health and relationships, and is of great importance to Ambulance Services both domestically and internationally.

Good luck with the rest of your training, and I wish you well in your future paramedic careers!

*Should you (i.e. the participant) have any concerns about the conduct of this research project, please contact the Executive Officer, Human Research Ethics Committee, Research & Graduates Studies Office, University of Ballarat, PO Box 663, Mt Helen VIC 3353. Telephone: (03) 5327 9765; Fax (03) 5327 9602.*