CHAPTER 1: INTRODUCTION

Post-traumatic stress symptoms (PTSS) which arise following involvement in a motor vehicle accident (MVA) are a significant clinical problem. MVAs are a common occurrence within western societies (Stewart & Lord, 2002) and PTSS are a common consequence of involvement (O'Donnell, Creamer, Bryant, Schnyer, & Shalev, 2003). MVA-related research efforts have increased in recent years (Blanchard et al., 2004) in an attempt to meet the increasing need for effective and efficient mental health care of MVA-related PTSS. These research efforts have also been bolstered by a more general surge in trauma research in the wake of high profile terrorist attacks around the world (Jordan et al., 2004; Marshall & Galea, 2004; Thomas, 2004).

Victims reporting trauma exposure significantly outnumber victims reporting PTSS following a MVA (Breslau et al., 1998; Yehuda, McFarlane, & Shalev, 1998). Predicting victims who develop PTSS, however, is difficult. This is due, at least in part, to a lack of understanding of the factors affecting the victim's risk of PTSS (Holeva & Tarrier, 2001). Consequently, research has expanded the search for risk factors affecting PTSS following a MVA (Blanchard et al., 2004) in order to better understand the mechanisms underlying the development and maintenance of chronic PTSS (Ursano, Fullerton, Epstein, Crowley, Tzu-Cheg, et al., 1999).

In line with previous research, the term post-traumatic stress disorder (PTSD) will be defined as clinically diagnosable post-traumatic stress disorder according to the DSM-IV criteria. The term post-traumatic stress symptoms will be abbreviated PTSS and will be defined in this study as post-traumatic stress symptoms that make up part of the diagnosis of PTSD. An individual exhibiting PTSS may or may not have fully diagnosable PTSD.

1.1   *Prevalence of MVAs*

Globally, MVAs are a major cause of death and serious injury. According to the World Health Organisation (2004), MVAs are currently ranked ninth for global diseases of burden, killing 1.2 million people and injuring a further 50 million people annually. Significantly, it is projected that MVAs will become the third ranked global disease of burden by 2020 (WHO, 2004).

The rate of deaths per 100,000 people caused by motor vehicle accidents in Australia is 8.7 (Australian Bureau of Statistics, 2006). Higher rates are reported in the United States of America (14.8), France (12.9) and New Zealand (10.3), whilst lower rates are reported in the United Kingdom (6.0), Japan (7.5) and Germany (8.3). This indicates that the number of deaths on Australian road is similar to that, per capita, in other developed nations.

The death toll in Australia in 2004 from motor vehicle accidents was 1596 people (ABS, 2006). The death toll however only tells part of the story of the motor vehicle accident burden. Beyond those who are killed, approximately 22,000 Australians each year sustain non-fatal injuries in motor vehicle accidents (ABS, 2006).

The economic cost of MVAs to the Australian community resulting from MVAs is significant (Chan, Air, & McFarlane, 2003). A recent Australian study (Mathews, 2005) showed that Australian road users who developed PTSD following a MVA had significantly less work potential than those without PTSD. It is therefore unsurprising that the cost to the Australian community due to MVAs is in excess of $A15 billion annually (Bureau of Transport and Regional Economics, 2000). Significantly, Australian research indicates that the cost associated with MVA victims who have undiagnosed PTSS is greater than for victims with PTSS who are identified and treated (Chan, et al., 2003). It is therefore critical, both for the MVA victim's psychological well-being and for the best provision of scarce

mental health resources, that MVA victims experiencing PTSS are efficiently identified and treated.

1.2   Prevalence of MVA-related PTSS

Involvement in a MVA is a leading cause of PTSS in western society (Blanchard et al., 2004; Stewart & Lord, 2002). There are significant individual differences, however, in response to trauma exposure amongst MVA victims (Murray, Ehlers, & Mayou, 2002). Some MVA victims experience no PTSS at all (Kilpatrick & Resnick, 1993), others experience PTSS which quickly dissipate (Jacobsen et al., 2002), whilst others still continue to experience PTSS for many years post-trauma (Harms, 2004).

Estimates of the prevalence of PTSS symptoms following a MVA vary widely (O'Donnell et al., 2003). For example, PTSD 1 year following a MVA has been reported to be in the order of 10% to 45% (Blanchard & Hickling, 2003). However, rates as low as 1% (Malt, 1988) and as high as 46% (Blanchard, Hickling, Taylor, Loos, & Gerardi, 1994) have been observed in MVA-related trauma populations.

The variation in reported prevalence figures has been attributed, in part, to measurement issues (Murray et al., 2002). The Diagnostic and Statistical Manual of Mental Disorders (DSM; American Psychiatric Association, 1994) PTSD criteria is the most widely accepted basis for diagnosing trauma symptoms (Ehlers, Mayou, & Bryant, 1998). The criteria, however, have altered with each successive DSM revision (Brewin, Andrews, & Valentine, 2000). These changes have created a source of measurement variability which limits the capacity for systematic comparisons and generalisations between studies (Brewin, Rose, & Kirk, 1999). Due to the minor changes between DSM-III-R (APA, 1987) and DSM-

IV (APA, 1994), studies of MVA victims diagnosed using both of these two latest sets of criteria will be reviewed.

There has also been minimal consistency in the time points following exposure when assessments are conducted (Murray et al., 2002). For example, PTSS were assessed 48 hours, 4 weeks and 6 months following the MVA (Murray et al., 2002), 1 week, 1 month and 4 months following the MVA (Shalev et al., 1998) and 1 month, 3 months, 6 months, 9 months and 1 year following the MVA (Ursano, Fullerton, Epstein, Crowley, Tzu-Cheg et al., 1999).

Evidence has emerged (McEwan, de Man, & Simpson-Housely, 2002; Ursano, Fullerton Epstein, Crowley, Tzu-Cheg et al., 1999) that certain time points following exposure are important in the development of PTSS. DSM-IV (APA, 1994) PTSD criteria indicates that 3 months post-trauma is the earliest point at which chronic PTSD can be diagnosed. Hence, many studies (e.g., Ehlers et al., 1998; Ursano, Fullerton, Epstein, Crowley, Tzu-Cheg et al., 1999) have assessed MVA victims at 3 months post-trauma. Similarly, 6 months is recognised as a significant time point for accurately diagnosing PTSS in MVA victims (Ursano, Fullerton, Epstein, Crowley, Tzu-Cheg et al., 1999).

The prevalence of PTSS was assessed using DSM-III-R criteria on 122 (58 female, 64 male) MVA victims 3 months and 6 months following their MVA (Ursano, Fullerton, Epstein, Crowley, Tzu-Cheg et al., 1999). Participants, at the time of their MVA, had a mean age of 35.59 years ($SD = 13.06$). Additional assessments were conducted at 1 month, 9 months and 1 year, providing important information about the presence of PTSS over the initial year following a MVA. Acute Stress Disorder (ASD) was present in 34.4% of victims at 1 month and PTSD was present in 25.3% of victims at 3 months. At 6 months 18.2% of victims had PTSD, at 9 months 17.4% had PTSD and at 1 year 14.0% had PTSD. This study

indicates that MVA victims with PTSD at 6 months are likely to have PTSD at 1 year, with only 4.2% of victims moving from PTSD to non-PTSD status between 6 months and 1 year.

A similar study of PTSS prevalence was conducted using DSM-III-R criteria on a sample of 132 (88 female, 44 male) MVA victims 6 months and 1 year following a MVA (Blanchard et al., 1996). PTSD was present in 17.4% of victims at 6 months. This figure differs by only 0.8% from the findings of Ursano, Fullerton, Epstein, Crowley, Tzu-Cheg et al. (1999). At 1 year, PTSD was present in 18.1% of victims, a difference of 4.1% from the findings of Ursano, Fullerton, Epstein, Crowley, Tzu-Cheg et al. (1999).

The prevalence of PTSS was assessed using DSM-IV criteria in 781 (359 female, 422 male) MVA victims 3 months and 1 year following their MVA (Ehlers et al., 1998). PTSD was present in 23.1% of victims at 3 months and 16.5% of victims at 1 year. Participants with PTSD at 3 months had a 50.3% chance of having PTSD at 1 year, whilst only 6.2% of victims ($N = 34$) who were non-PTSD at 3 months had PTSD at 1 year.

The prevalence of PTSS 1 month and 6 months following a MVA was assessed in 92 (61 male, 31 female) MVA victims who attended hospital following their MVA (Harvey & Bryant, 1998). ASD was present in 13% of victims 1 month following their MVA. PTSD was present in 25.4% of victims at 6 months. The rise in prevalence from 13% at 1 month to 25.4% at 6 months is explained by those victims with sub-clinical levels of PTSS at 1 month who developed full PTSD by 6 months. A sub-clinical level of ASD was present in 20.7% of victims at 1 month, 60% of whom had PTSD when assessed at 6 months. Only 4.3% of victims with neither ASD nor sub-clinical ASD at 1 month had PTSD at 6 months.

Assessing MVA victims 6 months following their MVA may be particularly valuable for making reliable judgements of long-term PTSS, as evidence suggests (Blanchard et al., 1996; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995) that most MVA victims who

recover from PTSD do so within 1 year of their MVA. As a result, 6 months post-MVA is a point at which MVA trauma victims are regularly assessed (Blanchard et al., 1996; Ehlers et al., 1998). Unfortunately, however, our understanding of the prevalence of PTSS beyond this point and particularly beyond 1 year is limited by an absence of longitudinal follow-up (Jacobsen et al., 2002; Ehlers et al., 1998). The available evidence indicates that the prevalence of PTSS and PTSD remains relatively stable in MVA victims between 1 year and 5 years following a MVA (Mayou, Tyndel, & Bryant, 1997).

PTSS were assessed in 111 (74 male, 37 female) MVA victims 3 months, 1 year and 5 years following their MVA (Mayou, et al., 1997). Victims ranged in age from 17 to 69 years ($M = 31$). PTSD was present in 9.9% of victims at 3 months, 7.2% at 1 year and 8.1% at 5 years. Whilst the actual number of PTSD cases changed by only 0.9% ($N = 1$) between 1 year and 5 years, the individual victims changed significantly. Victims in the sample who had PTSD 1 year following their MVA did not have PTSD 5 years following their MVA, whilst all victims, except one, who had PTSD 5 years following their MVA, did not have PTSD at either 3 months or 1 year. This study highlights the complex nature of PTSS following a MVA.

The classification of PTSS has also affected reported prevalence figures (Blanchard et al., 1994). Full PTSD and partial PTSD classifications have been used in many studies of PTSS in MVA victims (Hickling & Blanchard, 1992). The term "partial" PTSD is used to describe victims exhibiting many PTSD features without meeting the full criteria (Kulka et al., 1988). Partial PTSD is sometimes used in MVA trauma research as partial PTSD shortly after exposure can predict PTSS 18 months following exposure (Green, McFarlane, Hunter, & Griggs, 1993). The definitions of partial PTSD used in research on MVA victims has varied widely and the lack of a single consistently recognised definition of partial PTSD

makes comparisons between studies difficult (Harvey & Bryant, 1998). MVA victims who had two out of three of intrusion, avoidance or arousal on DSM criteria were classified as having partial PTSD in a study by Green et al. (1993). MVA victims who met the DSM-III-R criteria for cluster B (re-experiencing) and either cluster C (avoidance and numbing) or cluster D (hyper-arousal) were classified partial PTSD in a study by Blanchard et al. (1996). MVA victims who met the DSM-IV criteria for any two of criteria B, C and D were classified as partial PTSD in a study by Harvey and Bryant (1999).

It is important to assess all MVA victims in a sample at consistent time points following their MVA. For example, a study by Conlon, Fahy and Conroy (1999) conducted initial assessments a mean of 7 days following the MVA, however, assessments ranged from 3 days to 2 weeks following the MVA. The follow-up assessment was conducted a mean of 99 days following the MVA. The timing of the follow-up assessment however, ranged from 65 days to 210 days following the MVA. Whilst it was concluded that 9% of victims had PTSD at 3 months ($M = 99$ days) victims were assessed between 2 months and 7 months following their MVA. This conclusion is misleading and makes comparisons with other studies difficult.

In summary, there is marked variability in the reported prevalence of PTSS amongst MVA victims in the initial 12 months following a MVA (O'Donnell et al., 2003). It is reasonable to expect PTSD to be present in approximately 10% of victims 1 year following a MVA (Kuch, Cox, & Evans, 1996). MVA-related PTSD frequently remits within 1 year (Blanchard et al., 1996). Attempts to understand who is most likely to develop PTSS following a MVA and who does and does not remit from these PTSS have focused upon risk factors implicated in the development of PTSS.

1.3   Risk Factors for MVA-related PTSS

Trauma exposure was originally conceptualised as the single etiological agent in the development of PTSS (Halligan & Yehuda, 2000), however, it became clear in the early stages of trauma research that not all trauma victims developed chronic symptoms. This led to Foy, Sipprelle, Rueger and Carroll (1984) publishing some of the earliest research on risk factors for the development of PTSS. PTSD is not randomly distributed in the population as some MVA victims have a greater risk of developing PTSD than others (Yehuda & McFarlane, 1995). The need, therefore, is to identify and understand which risk factors effect the development of PTSS. The identification and understanding of these risk factors for PTSD is viewed as the key to accurate prediction of the development of PTSS (Yehuda & McFarlane, 1995).

Attempts to identify a common set of pre-trauma factors which predict PTSS across trauma populations have been unsuccessful (Brewin et al., 2000). Individual risk factors have been shown to be inconsistent across populations (Bremner, Southwick, & Charney, 1995). For example, some risk factors implicated in the development of PTSS in military samples do not predict the development of trauma within civilian populations (Brewin et al., 2000). As a result, research on risk factors in specific trauma populations, although at an early stage (Brewin et al., 2000), may be the best avenue to advancement of our knowledge in this area (Yehuda, 1999). An understanding of the risk factors involved in the development of PTSS is important to our understanding of the development and maintenance of PTSS. In addition, the ability to identify which factors predict remission of PTSS and which factors are associated with PTSS maintenance would be invaluable (Blanchard et al., 1996).

The existence of risk factors, other than trauma exposure, which predict PTSS, highlights the interactional nature of the etiological process (Sterling, Gwendolen, Vicenzino,

Kenardy, & Ross, 2005; Yehuda, 1999). Examining risk factors according to stages provides

the clearest picture of individual differences in the development of PTSS following a MVA

(King, King, Foy, Keane, & Fairbank, 1999). Risk factors arise from three distinct stages of

MVA experience: pre-accident risk factors, accident-related risk factors and maintaining

factors (King et al., 1999).

1.4   Cognitive Model of PTSD

A number of cognitive theories attempting to explain the development of PTSS have

been advanced over the past two decades (Brewin, Dalgleish, & Joseph, 1996). These

theories share certain core theoretical assumptions, particularly, the notion that victims bring

to the trauma experience a set of pre-existing beliefs and models of the world. Victims

attempt to assimilate information obtained during the traumatic experience with their existing

models, which are believed to lead to the various phenomena that characterise the post-

traumatic reaction. Unsuccessful information processing occurs when the victim is unable to

bring the current information into accord with their current models of the world. This can

subsequently lead to pathological post-traumatic reactions such as PTSD.

Cognitive theories of PTSD fall into two distinct categories (Brewin et al., 1996),

social-cognitive (i.e., Horowitz, 1986) and information processing (i.e., Foa et al., 1989).

Horowitz (1986) proposed that following trauma exposure there is a period of stunned

reaction followed by a period of information overload, in which the thoughts, memories, and

images of the trauma can not be reconciled with current schemas. Should subsequent

information processing efforts be unsuccessful the victim retains the partially processed

traumatic information in active memory without being fully integrated, thus leading to

chronic post-traumatic reactions. Foa and her colleagues' (1989; 1992) theory of PTSD

centres on the formation of a fear network in memory. This network encompasses stimulus information about the traumatic event and interoceptive information that links these stimulus and response elements. Activation of this network causes information in the network to enter consciousness (the intrusion symptoms of PTSD). Avoidance or suppression of this information leads to the cluster of avoidance symptoms.

Similar to Horowitz (1986), Foa and colleagues (1989; 1992) believe that successful resolution of the trauma can occur only by integrating the information in the fear network with existing memory structures. This process can be affected by factors such as the severity of the trauma experienced. An important aspect of this theory is its reference to the need for information which is incompatible with the trauma being necessary for successful information processing. This provides a framework for understanding the processes underlying the success of exposure-based treatments for PTSD, and also the role of social support as a vehicle for the provision of such information.

These theories are drawn together in Ehlers and Clark's (2000) cognitive theory of PTSD. Drawing heavily on the writing of earlier theorists (Brewin et al., 1996; Foa et al., 1989; Horowitz, 1997; Joseph, Williams, & Yule, 1997; Resick & Schnicke, 1993) this theory uses factors to explain the maintenance of chronic PTSD. This model suggests that chronic PTSD develops if survivors process the traumatic event in a way that creates a serious current threat. The model specifies three maintaining mechanisms. First, people with chronic PTSD show excessively negative appraisals of the trauma and/or its sequelae that lead to a sense of current threat. Second, the nature of the trauma memory explains the occurrence of re-experiencing symptoms. Third, the victims' appraisals motivate a series of dysfunctional behaviours and cognitive strategies (i.e., thought suppression) which are intended to reduce the sense of current threat, but maintain the problem by preventing change

in the appraisals and trauma memory, and/or lead to increases in symptoms. It is the negative appraisals which are believed to motivate the dysfunctional behaviours and cognitive strategies that are intended to reduce the sense of current threat, but actually maintain the disorder. Hence, survivors who do not recover naturally are often characterised by being unable to see the trauma as a time-limited event that does not have global negative implications for their future.

According to Ehlers and Clark (2000) there are a wide variety of different appraisals which can produce a sense of current threat. Survivors may over-generalize from the trauma event, or exaggerate the probability of further catastrophic events (i.e., another motor vehicle accident or being sexually assaulted again). These appraisals can in turn lead to such behaviours as avoiding driving after experiencing a road traffic accident because of an unrealistic belief about the likelihood of future accidents. Further the threat can be either external (e.g. the world is a dangerous place) or internal (e.g. a threat to one's view of oneself as a capable person who can achieve goals).

These negative appraisals also prompt a series of dysfunctional cognitive and behavioural responses that have the short-term aim of reducing distress but have the long-term effect of preventing cognitive change and therefore maintain the disorder. This explanation is supported by several cognitive models of PTSD that suggest that avoidance/emotional numbing or negative symptoms may be used as a defence against the distress caused by intrusive phenomena and therefore creates a short-term reduction in distress (Ehlers & Steil, 1995; McFarlane, 1992; Spurrell & McFarlane, 1995). However, this strategy is ultimately counterproductive as avoidance is thought to play a key role in maintaining intrusions (Ehlers & Steil, 1995).

A series of prospective longitudinal studies of trauma survivors and laboratory experiments supported the role of the three maintaining factors suggested in the model. The model has led to the development of a novel form of CBT, Cognitive Therapy for PTSD (Ehlers & Clark, 2000). Three randomised controlled trials showed that the treatment is highly acceptable to patients, and more effective than wait list or self-help instructions (Ehlers et al., 2003; 2005).

1.5 Pre-accident Risk Factors

Individual predispositions play an important role in a MVA victim's response to trauma exposure (Breslau, 2001). Consequently, research has examined characteristics of the victim prior to the MVA collectively termed pre-accident risk factors (Marmar et al., 1994). A number of pre-accident risk factors which relate to the MVA have been identified (Wang, Tsay, & Bond, 2005). These factors are important for two reasons. First, pre-accident risk factors are associated with an increased risk of trauma exposure and, second, these risk factors are associated with an increased likelihood of developing trauma symptoms following exposure. The two major pre-accident risk factors shown to influence MVA victims are psychiatric history and gender (Dougall, Ursano, Posluszny, Fullerton, & Baum, 2001).

1.5.1 Psychiatric History

A history of psychiatric disorder is a significant risk factor for PTSS following a MVA (Ehlers et al., 1998; McFarlane, 2000; Widows, Jacobsen, & Fields, 2000). MVA victims who report a personal history of psychiatric disorder are more likely to experience both acute and chronic PTSS than victims without a personal psychiatric history. Further, MVA victims with the most severe psychiatric histories tend to have the most severe PTSS

(Kuch, Cox, & Direnfield, 1995). A family history of psychiatric disorder has also been shown to predict trauma symptoms (Kuch et al., 1995). As a result research on MVA victims has generally assessed both the victim's personal and family history of psychiatric disorder. The victim's personal and family histories of psychiatric disorder are of significance as predictors of vulnerability and in addition they can also predict the likelihood of an individual being exposed to trauma (Breslau, 2001).

Recent research investigating both personal and family psychiatric history and trauma response (Ursano, Fullerton, Epstein, Crowley, Tzu-Cheg, et al., 1999) has focused on identifying which psychiatric disorders are most important. The most influential psychiatric disorders affecting MVA victim's PTSS status are prior PTSD, depression and anxiety.

A diagnosis of PTSD prior to a MVA is predictive of a diagnosis of PTSD following a MVA (Blanchard, Hickling, Taylor, & Loos, 1995; Breslau, Davis, & Andreski, 1995). One hundred and twenty-two MVA victims were assessed 1 month and 3 months following exposure (Ursano, Fullerton, Epstein, Crowley, Tzu-Cheg, et al., 1999). Prior PTSD was a significant risk factor. Victims with PTSD prior to their MVA were 8 times more likely to develop PTSD following exposure than were survivors without prior PTSD. A model which attempts to explain the observed increase in the likelihood of PTSS in victims with prior PTSD is the kindling model (Post, 1985). The kindling model suggests that alterations in brain functioning caused by the initial PTSD cause an increased sensitivity to subsequent trauma exposure. As a result victims exposed to prior trauma, especially if symptoms reach the criteria needed for a diagnosis of PTSD are more vulnerable than other victims to the development of PTSS following subsequent trauma exposure (Briere & Runtz, 1993; McEwan et al., 2002).

A history of major depression is also a risk factor for developing PTSS following various types of trauma, including MVA trauma (Shalev et al., 1998). In a sample of 211 (103 male, 108 female) MVA victims, 50% of those reporting a history of major depression developed PTSD, whilst 23% of victims reporting no history of major depression had PTSD (Blanchard, Hickling, Taylor, Loos, & Buckley, 1995). A history of major depression remains an important risk factor whether the victim has had one episode or a number of episodes of major depression (Shalev et al., 1998). Major depression is an important risk factor in both the acute and chronic stages of trauma response, with depression remaining an important predictor of PTSS severity 1 year following exposure (Shalev et al., 1998).

A history of anxiety disorder is another important risk factor for trauma symptoms following exposure (Ursano, Fullerton, Epstein, Crowley, Tzu-Cheg, et al. 1999). The role of prior anxiety on PTSS was assessed in a sample of 122 (64 male, 58 female) MVA victims (Ursano, Fullerton, Epstein, Crowley, Tzu-Cheg, et al. 1999). Prior anxiety disorder was found to increase the risk of both acute and chronic PTSS. Interestingly, there was no association between a family history of anxiety and PTSD, unlike a family history for depression and PTSD. For prior anxiety disorder the victim's personal history appears to be the only aspect affecting the development of PTSS. More recent research on workplace stress and trauma exposure indicates that prior trauma exposure reduces the victim's tolerance for subsequent stress (Takashilzutsu, Tsutsumi, Asukai, & Kawamura, 2004).

1.5.2   Gender

A gender difference has been observed in the prevalence of trauma symptoms amongst MVA victims (Breslau, Davis, Peterson, & Schultz, 1997; Ehlers et al., 1998). Whilst males are more likely than females to be exposed to trauma, females are more likely

to report PTSS than males (Seedat, Stein, & Carey, 2005) and these symptoms are more likely to be severe (Dougall et al., 2001). The greater impact of PTSS on females than males makes gender an important pre-accident risk factor following a MVA (Breslau et al., 1998).

There is a significant difference in the prevalence of PTSS between genders in the initial 6 months following a MVA. PTSS were assessed in 122 (64 males and 58 females) MVA victims 1 month, 3 months and 6 months following exposure based on DSM-III-R criteria (Ursano, Fullerton, Epstein, Crowley, Tzu-Cheg et al., 1999). One month following exposure 51.7% of females and 18.7% of males had ASD, whilst at 3 months, 30.6% of females and 20.0% of males had PTSD. At 6 months, 22.4% of females and 14.0% of males had PTSD. Similar gender differences have been found in other studies of MVA victims (e.g., Ehlers et al., 1998).

Gender differences in the prevalence of PTSS were assessed 3 months and 1 year following a MVA in 967 (522 male, 445 female) MVA victims (Ehlers et al., 1998). Three months following exposure, 28.9% of females and 18.2% of males had PTSD. At 3 months females reported the MVA as more frightening than males despite sustaining less severe injuries than males and being less likely to have been admitted to hospital as a result of the MVA. When assessed at 1 year, there was no significant difference in trauma symptoms between male and female victims.

It has been suggested that gender differences may be most significant in the acute stages following exposure (Ursano, Fullerton, Epstein, Crowley, Tzu-Cheg et al., 1999). Ursano and colleagues were the first to separate acute from chronic PTSD in MVA victims. The reasons for these gender differences are not clear and further research needs to be conducted to clarify the relationship between gender and acute and chronic PTSS. Understanding the nature of the gender difference in the experience of PTSS in the chronic

phase of the disorder would increase our understanding of the development of PTSS. The fact that this gender difference has not been reported earlier is believed to reflect the lack of longitudinal follow-up assessment of PTSS. In addition, the DSM-III-R classification of PTSD did not distinguish between acute and chronic PTSD (APA, 1987). It is only in the past decade that it has become clear that the expression of PTSS in the immediate aftermath of trauma is distinct from the chronic expression of PTSS. This aspect of the difference between genders highlights the complex nature of vulnerability to PTSS.

1.5.4   Summary of Pre-accident Risk Factors

Psychiatric history and gender are pre-accident risk factors recognised to increase the likelihood of developing PTSS following a MVA. Having a personal or family history of psychiatric disorder increases the likelihood of developing symptoms in the aftermath of exposure. The three primary aspects of prior psychiatric disorder investigated in relation to trauma victims are PTSD, major depression and anxiety. Gender has also been identified as a significant pre-accident risk factor. Despite males being more likely to be exposed to trauma, females are more likely to develop symptoms and these symptoms are more likely to be severe, particularly in the acute stage following trauma. Collectively, these risk factors influence the likelihood of trauma exposure and alongside the accident related and post-accident related aspects of the trauma experience, impact upon the development of trauma symptoms.

1.6   Accident-Related Risk Factors

Accident-related risk factors are those factors which occur at the time of the MVA and impact upon the individual's likelihood of developing PTSS. The severity of the MVA

can play a role in the development of PTSS (Yehuda, 1999). Trauma severity includes the level of exposure the individual was subjected to, the level of injury sustained and whether they were conscious or unconscious as a result of the accident. The individual's emotional response to the accident has also been shown to be important. Further, both the level of perceived threat to life and dissociation at the time of the accident has been shown to impact upon the individual's likelihood of developing symptomatology.

1.6.1   *Trauma Exposure and Severity*

Early studies on trauma were based upon the belief that trauma exposure alone was responsible for the onset of PTSS (Yehuda, 1999). It has become evident that trauma exposure alone is an inadequate predictor of the onset of PTSS (Brewin et al., 2000). Hence exploratory studies were conducted to identify additional risk factors which could account for individual differences in the development of PTSS (Yehuda & McFarlane, 1995).

The severity of a traumatic stressor has been found to be related to subsequent distress and differential post-exposure response, with an increase in severity causing an increase in the level of PTSS (Brewin et al., 2000). This relationship, described as a dose-relationship (March, 1993), has been observed in various trauma populations (Halligan, & Yehuda, 2000; Shalev et al., 1998), including MVA victims (Blanchard, Hickling, Mitnick et al., 1995). This relationship between trauma exposure and PTSS is not simple (Yehuda et al., 1998). There is inconsistent evidence to support the dose-response relationship in MVA victims (Ehlers et al., 1998). Some studies of MVA victims have found that trauma severity did not predict PTSS (Perry, Difede, Musngi, Frances, & Jacobsberg, 1992; Shalev, Peri, Canetti, & Schreiber, 1996).

It has been proposed that the relationship between trauma exposure and PTSS development may be better explained by a threshold effect rather than a dose-response relationship (Blanchard et al., 1996). The threshold effect takes into account the individual differences in the development of PTSS. A MVA victim with a low threshold could develop PTSS following a minor MVA, whilst a MVA victim with a high threshold could experience a severe MVA without developing PTSS. A significant strength of this theory is that it is able to explain why seemingly minor MVAs can sometimes result in considerable victim distress (Kuch, Cox, Evans, & Shuman, 1994).

1.6.2 Injury Severity

Injury severity, as measured by medical staff, attendant nurses and hospital admission data is a poor predictor of the development of PTSS. In a sample of MVA victims (Murray et al., 2002) injury severity was measured using the Abbreviated Injury Scale (AIS; American Association for Automotive Medicine, 1985) based upon the individual's medical notes. This method of measuring injury severity did not predict trauma symptoms in this sample. Similarly, no relationship was found between injury severity measured by the AIS and PTSS in a sample of 188 (60 female, 128 male) consecutively hospitalised MVA victims (Mayou, Bryant, & Duthie, 1993). In a similar sample of MVA victims (Ehlers et al., 1998), injury severity was measured by two separate methods, hospital admission data and a rating by the attendant nurse. It was found that MVA victims who were admitted to hospital were more likely to develop PTSS than victims who were not admitted but that this measure of injury severity was nevertheless weakly correlated with trauma symptoms. Injury severity as rated by the attendant nurse, however, was not shown to predict PTSS. These studies, in conjunction with additional research using MVA victims (Dougall et al., 2001; Koren,

Arnon, & Klein, 1999, Mayou & Bryant, 2001), indicate that injury severity rated by various

sources other than the victim themselves is a very poor predictor of subsequent PTSS.

Injury severity, as rated by the trauma victim, however, is significantly correlated

with PTSS (Murray et al., 2002). In this study injury severity, as rated by the MVA survivor

was found to be significantly correlated with PTSS both 1 month and 6 months following a

MVA. This finding supports the notion that the survivor's perception of their injuries may be

particularly important in the development of PTSS. Support for this conclusion is provided

by more recent research (Landolt, Vollrath, Timm, Gnehm, & Sennhauser, 2005) which

indicates that even minor crashes can evoke marked distress in some survivors. This study

indicated that a MVA victim can sustain minor injuries, but as a result of their perception of

those injuries, develop a significant level of PTSS. The reverse situation can however arise in

which the MVA victim sustains significant physical injuries, but due to their perception of

those injuries, develop few or no PTSS.

Several factors have been identified which can affect the MVA victim's perception of

their injuries. MVA victims have been shown to be more likely to develop PTSS if they

sustained visible injuries (Scottie, Mickey, & Forsyth, 1992), are injured in specific body

areas (e.g., the face; Fukunishi, 1999), or are permanently disfigured (Madianos, Papaghelis,

Ioannovich, & Dafni, 2001). Collectively, these studies highlight the significant influence of

psychological aspects of physical injury upon the development of PTSS. Weight of evidence

now appears to indicate that ratings of injury severity made by the victim themselves are the

most meaningful in terms of predicting subsequent level of PTSS.

On-going medical problems relating to the MVA are also associated with PTSS

(Ehlers et al., 1998). At 3 months post-MVA, 55.2% of victims who reported significant

physical health problems as a result of the MVA had PTSD, whilst at 1 year 74% of victims with significant physical health problems had PTSD.

It appears that long-term physical health problems may be more important than the original injury severity in the development of chronic PTSS (Blanchard & Hickling, 2003; Ehlers et al., 1998; Mayou et al., 1997). It has been suggested that this may be due to long-term physical problems exceeding the victim's coping resources, making it more difficult to overcome the trauma (Scottie et al., 1992). Physical health problems and particularly visible injuries can also provide reminders of the MVA, making it difficult for the victim to view the MVA as an event of the past (Jaycox, Marshall, & Orlando, 2003).

1.6.3   Unconsciousness

Being unconscious or amnesic for trauma exposure is a protective factor against the development of PTSS (Sbordone, 1991). In a sample of 188 (60 female, 128 male) MVA victims, amnesia for the accident was found to predict the absence of PTSS (Mayou et al., 1993). Whilst being unconscious or amnestic for the trauma is a protective factor, PTSD has been observed in victims who were unconscious or amnesic for the trauma exposure (Layton & Wardi-Zonna, 1995; Taylor, & Koch, 1995). It has been shown (Creamer, O'Donnell, & Pattison, 2005) that PTSD may develop following trauma despite amnesia for the event. It may therefore be important in clinical and research settings to carefully examine the extent of amnesia (Creamer et al., 2005).

Amnesia for the event raises doubts about the fulfilment of the DSM criteria for ASD and PTSD (APA, 1994). Criterion A requires the individual to 'experience' the traumatic event. Memory loss for the event raises questions about whether it was experienced or not. The experiencing of the traumatic event does appear to be related to the development of

subsequent PTSS. The difficulties associated with amnesia and DSM criterion A are highlighted in a study of heart attack victims (Ladwig, Schoefinius, & Dammann, 1999). It was found that those who were sedated at the time of their heart attack were five times less likely than victims who were not sedated to develop PTSS.

Within MVA populations inconsistent findings have been found regarding the likelihood of those that are unconscious following a MVA to develop PTSD (Ehlers et al., 1998). MVA victims who were unconscious during or immediately after their MVA were found to be significantly less likely to suffer PTSD (Mayou et al., 1993), whilst another investigation (Blanchard, Hickling, Taylor et al., 1996) found no relationship between unconsciousness and subsequent PTSS. Whilst the reasons for these inconsistent findings are unclear, it has become a consistent feature of the trauma literature in this area to screen for amnesia and unconsciousness (Kuch et al., 1995).

1.6.4   *Perceived Threat to Life*

Perceived threat to life is conceptualised as the victim's awareness that their life was at risk during the trauma (Blanchard, Hickling, Taylor et al., 1996; March, 1993; Van Driel & Op den Velde, 1995). Some individuals who are involved in minor MVAs report significant threat to life, whilst others involved in seemingly more severe MVAs report less perceived threat to life. These differences are due to individual difference in perception of threat to life (Taylor, & Koch, 1995).

Perceived threat to life consistently predicts PTSS and PTSD in MVA victims (Dougall et al., 2001; Ehlers, Mayou, & Bryant, 2003; McDermott & Cvitanovich, 2000). For example, in a study of 1,181 MVA victims perceived threat was significantly positively correlated with trauma symptoms and trauma symptom severity (Ehlers et al., 1998). This

study highlighted the association between perceived threat to life at the time of the accident

and chronic trauma symptoms. Perceived threat to life was associated with trauma symptoms

12 months following exposure.

1.6.5   Peri-traumatic Dissociation

There continues to be significant debate within the literature regarding how

individuals remember, or forget, their most horrific experiences (McNally, 2005). On one

hand, some researchers hold that overwhelmingly terrifying events are seemingly engraved in

memory and are seldom, if ever, truly forgotten (Pope, Olivia, & Hudson, 1999). In contrast,

others assert that the mind protects itself by banishing the most terrifying experiences from

awareness (Brown, Scheflin, & Hammond, 1998). Research efforts to further understand this

area have focused upon the dissociative experiences that individuals sometimes report during

a traumatic event, known as peri-traumatic dissociation (Brewin & Holmes, 2003).

Peri-traumatic dissociation (PD) is one of the most robust predictors of PTSD in the

literature (Birmes et al., 2005; Jaycox et al., 2003; Marx & Sloan, 2005; Ozer, Best, Lipsey,

& Weiss, 2003) and can predict the development of PTSS independently of the level of

trauma exposure and general dissociative tendencies (Marmar et al., 1994). The alterations in

mental state and detachment from on-going experience typical of PD, is believed to create a

psychological context in which PTSS can and frequently does develop (Tampke & Irwin,

1999). PD involves a temporary breakdown in the relatively continuous and integrated

feelings of consciousness, memory, identity and perception of the environment (Spiegal &

Cardena, 1991). Symptoms of dissociation include feelings of de-realisation and de-

personalisation (Lynn & Rhue, 1994). Unlike fight or flight reactions in which the heart rate

normally rises, dissociation involves a decrease in heart rate (Griffin, Resick, Waldrop, &

Mechanic, 1997). The level of dissociative symptoms experienced by victims during and after trauma is believed to be related to the severity of the trauma, perceived threat to life and feelings of helplessness during the trauma (Birmes et al., 2005; Marx & Sloan, 2005). It has been suggested (Wagner & Linehan, 1998) that dissociation during and after a traumatic event serves to avoid particular aspects of the trauma in an attempt to cope with the experience. Similarly, research by Foa and Hearst-Ikea (1996) indicates that dissociative behaviour aims to avoid fully processing and experiencing unwanted emotions, thoughts and memories. Hence, in the aftermath of trauma exposure PD can serve to reduce unwanted thoughts as well as regulate the body's physiological responses by slowing the heart rate and breathing.

A study of 63 recently diagnosed cancer patients (Kangas, Henry, & Bryant, 2005) found heightened dissociative responses at the time patients received a diagnosis of cancer was a strong predictor of PTSS 6 months later. These findings accord with evidence of an association between PD responses and PTSS in a range of medical and non-medical trauma populations (Ehlers et al., 1998; Kangas et al., 2005).

A sample of 51 (31 male, 20 female) MVA and non-MVA trauma victims were assessed for PD 1 week and 6 months following exposure (Shalev et al., 1996). It was found that victims with PTSD at 6 months had higher levels of PD 1 week following exposure. PD predicted PTSS at 6 months over and above trauma severity, depression and anxiety and explained 29.4% of the variance in PTSS.

Similar findings of support for PD as a predictor of PTSS have been found in studies involving only MVA victims (Ehlers et al., 1998; Ursano, Fullerton, Epstein, Crowley, Vance et al., 1999). A sample of 122 (64 male, 58 female) MVA victims were assessed for PD 1 month and 3 months following their accident (Ursano, Fullerton, Epstein, Crowley,

Vance, et al., 1999). Those who scored high on PD were 4.12 times more likely to develop

PTSS 1 month after their MVA and 4.86 times more likely to develop PTSS 3 months after

their MVA than victims who reported little or no PD. It was concluded from this study,

which used a large sample of MVA victims, that PD is an important predictor of PTSS in

MVA victims.

Dissociative symptoms as a predictor of trauma symptoms have, however, received

some criticism (Harvey & Bryant, 1998; Marmar et al., 1994). It has been suggested that

dissociative symptoms possess a high negative predictive power but only moderate to high

positive predictive power. By this it is meant that victims who do not develop PTSS

generally do not exhibit acute dissociative symptoms, but a significant proportion of victims

who do develop PTSS do not experience acute dissociative symptoms. Hence, Harvey and

Bryant suggest that the absence of dissociative symptoms predicting the absence of trauma

symptoms over time may be the most valuable indicator of risk. These researchers also

suggest that the lack of predictive power of dissociation found for PTSS could reflect the

complexity of the relationship between dissociation and PTSS.

Criticism has also focused on the transient nature of dissociative symptoms (Spiegel

& Cardena, 1990). The nature of the dissociative symptoms is believed to be related to the

severity of the trauma. As a result, the severity of the MVA may be an important factor in

whether or not dissociation is a valuable risk indicator for the individual trauma survivor. It

has been noted that dissociative responses tend to be associated with more severe or

prolonged traumas (Zatzick, Marmar, Weiss, & Metzler, 1994).

Although acute dissociative symptoms are recognised as important precursors of

chronic PTSS (Marmar et al., 1994), they are not sufficient to consistently predict those who

are at risk of developing chronic PTSS (Murray et al., 2002). The uncertainty about the role

of PD in the transition from acute to chronic PTSS reflects the current level of understanding of the reasons behind the significance of PD more generally. Whilst PD is linked to subsequent maladjustment (Jaycox et al., 2003), factors which consistently predict PD itself are yet to be identified. There is some evidence that victims reporting high levels of PD may be more likely to have experienced a previous trauma, which may have lowered their threshold for subsequent dissociation (Chu & Dill, 1990). A better understanding of the predictors of dissociation would assist in understanding the role of PD in the development of PTSS (Jaycox et al., 2003).

PD is a better predictor of trauma outcome than a pre-accident tendency to dissociate (Murray et al., 2002). Using a prospective design, PD was found to predict PTSS over and above a pre-accident tendency to dissociate (Murray et al., 2002). Persistent dissociation after the MVA, however, was found to be the strongest predictor of trauma symptoms 1 month following exposure. Hence the significance of PD may be in putting victims at increased risk of persistent dissociation following the MVA, with those who continue to dissociate being at most risk of chronic PTSS. PD, as well as persistent dissociative symptoms following a MVA, appear to be important predictors of the development of PTSS (Murray et al., 2002).

Despite research indicating that PD may explain as much as 29.4% of the variance in the development of PTSS (Shalev et al., 1996), the relationship between PD and MVA-related PTSS has been infrequently examined (Ehlers et al., 1998). PD appears to be a promising variable in understanding the development of PTSS. Beyond directly explaining variance in trauma symptoms, a better understanding of PD and the interaction of PD with other variables implicated in the trauma experience would advance our understanding of the development of PTSS following MVA-related trauma (Ehlers et al., 1998). The role of PD

and persistent dissociation following a MVA in the development of PTSS requires further

investigation (Ehlers et al., 1998).

1.6.6   *Summary of Accident Related Risk Factors*

Accident-related factors associated with a MVA, including trauma exposure and

severity, injury severity, unconsciousness, perceived threat to life and peri-traumatic

dissociation, are significant predictors of the development of PTSS. Collectively the pre-

accident and accident-related risk factors discussed play an important role in the victim's

response following a MVA and explain a portion of the variance in the development of

PTSS.

Along with the pre-accident and accident stages of the MVA trauma experience are

the set of risk factors collectively termed maintaining factors. Pre-accident, accident and

maintaining factors collectively provide the complete picture of our current understanding of

factors influencing the likelihood of MVA victims developing and maintaining PTSS.

1.7   *Maintaining Factors*

Trauma research has focused primarily upon variables which explain the onset of

trauma symptoms (Ehlers & Steil, 1995). These variables, typically background and person

variables (Dougall et al., 2001), collectively explain only a modest portion of the variance in

trauma symptoms (Ehlers et al., 1998). It has also been observed, that for clinical treatment

purposes, background and person variables are rarely amenable to change (Dougall et al.,

2001). It appears that background and person variables may affect the trauma victim's initial

response to the traumatic event, but with time these influences may recede and other factors

such as psychosocial resources, both perceived and received, may influence the victim's on-

going ability to deal with the trauma (Dougall et al., 2001; Kangas et al., 2005). The

identification of factors implicated in the maintenance of PTSS may assist in improving the

accuracy with which PTSS can be predicted and may have significant implications for

clinical treatment (Ehlers & Steil, 1995). Maintaining factors affect the victim's propensity to

develop chronic PTSS following exposure (Breslau & Davis, 1992). Additional psychiatric

conditions which can develop in the aftermath of trauma exposure have predictive properties

for PTSS (Creamer, Burgess, & McFarlane, 2001). The conditions most commonly

investigated in MVA trauma victims have been accident phobia (Mayou et al., 1993) and

major depression (Shalev et al., 1998). Additionally, one dimension of human relatedness,

social support (Dougall et al., 2001), has been examined in detail within trauma populations.

Several aspects of social support have emerged as being particularly important within trauma

populations, namely emotional support, instrumental support and informational support

(Kamphuis, Emmelkamp, & Bartek, 2003). Also the victim's perceptions of the availability

of social support (King et al., 1999) and perceived social constraints (Manne, Duhamel, &

Redd, 2000) have been identified as being involved in the maintenance of PTSS.

1.7.1 Anxiety

The DSM-IV (APA, 1994) classifies PTSD as an anxiety disorder however; PTSD is

not the only form of anxiety disorder that can arise following exposure to trauma (Maes,

Nylle, Delmuire, & Attamura, 2000). Generalized anxiety disorder, panic disorder (Manne et

al., 2004), agoraphobia, simple phobia and specific phobia (Maes et al., 2000) have also been

observed in trauma victims. For MVA-related trauma victims the development of a phobia

appears to be a common consequence of trauma exposure (Kuch et al., 1994).

The development of PTSD, as well as other anxiety disorders following exposure to trauma, has been associated with the greater usage of maladaptive and ineffective coping strategies (Kennedy et al., 2000; Lowe, Norman, & Bennett, 2000). Coping is a construct which has received considerable research attention (Blalock & Joiner, 2000). Coping refers to the cognitive and behavioural efforts allocated to manage specific external and/or internal demands appraised as taxing or exceeding the individual's resources (Lazarus & Folkman, 1984). Coping strategies have been classified in a number of different ways. Lazarus and Folkman (1984) suggested that coping can be described as emotion-focused and problem-focused. Emotion-focused coping involves the individual attempting to adjust their emotions when faced with a stressor. This type of coping includes avoidance, distancing and self-blame. Problem-focused coping involves the individual engaging in behaviours in an attempt to overcome the stressor. These behaviours typically include seeking social support, confronting the problem and planning how to actively respond to the stressor. Coping has also been classified as active and passive as well as approach and avoidance (Suls & Fletcher, 1985). The various classifications of coping strategies reflect the different ways that coping has been defined and investigated (Carver, Scheier, & Weintraub, 1989). Whilst each of these classifications is utilised in the trauma literature, the most important distinction when investigating the development and particularly the maintenance of PTSS, is the adaptiveness or maladaptiveness of the coping strategy (Carver et al., 1989).

When an individual views a situation as being uncontrollable, they are more likely to engage in maladaptive coping strategies (Carver et al., 1989; Lazarus & Folkman, 1984). The use of maladaptive coping strategies has been shown to contribute to the risk of developing PTSS (Van Loey & Van Son, 2003). Denial and self-blaming are maladaptive coping strategies which have been shown to be associated with higher levels of PTSS in victims

following trauma exposure (Spaccarelli, 1994). The most comprehensively researched

maladaptive coping strategy in trauma populations and the maladaptive coping strategy most

consistently associated with greater PTSS in trauma victims is avoidant coping (Brand &

Alexander, 2003; Bryant, 1996). Avoidant coping refers to behavioural and cognitive

strategies aimed at distancing oneself from the trauma (Heckman et al., 2004). It has been

suggested (Chaffin, Wherry, & Dykman, 1997), however, that avoidant coping may buffer

the stress response immediately following trauma exposure, making it an adaptive trauma

reaction in the immediate aftermath of exposure.

The on-going use of avoidant coping is believed to interfere with the necessary

cognitive processing for the resolution of the trauma (Lazarus & Folkman, 1984). Victims

who continue to engage in avoidant coping over time are less likely to discuss the trauma

than victims who did not use avoidant coping (Meichenbaum, 1996). Avoidant coping has

been shown to mediate the impact of trauma exposure on the development of trauma

symptoms (Meichenbaum, 1996).

The effect of the long-term use of five dimensions of coping, problem-focused, health

and leisure orientated, social support seeking, avoidant and formal relaxation, were examined

in white collar workers (Rick & Guppy, 1994). The sample consisted of 675 (445 female,

230 male) workers ranging in age from 18 years to 61 years ($M = 34.40$). The use of avoidant

strategies in this non-trauma population was found to be significantly associated with coping

problems in response to stressors in the workplace. Those who used avoidant coping most

consistently over a long period of time reported lower levels of mental health and lower

levels of job satisfaction. Multiple regression analysis identified avoidant coping as the most

important predictor of decreased mental health and job satisfaction. It was concluded from

this study that the continued use of avoidant coping in response to stress is damaging to mental health and well-being.

The victim's assessment of the trauma, referred to as their appraisal, is associated with the coping strategy utilised (Lowe et al., 2003). The relationship between the victim's appraisal of the trauma, coping and anxiety level, was examined in a sample of 148 women (Lowe et al., 2003). The mean age of the women was 42.40 years (*SD* = 14.10). All participants had suspected breast cancer but were still uncertain about their cancer status. A total of 50 (33.8%) participants reported clinically significant levels of anxiety. It was shown that the woman's appraisal of the trauma was associated with her emotional response and the coping strategy employed. Participants who felt that they did not have the resources to cope with a diagnosis of cancer were the most likely to experience high anxiety levels. Anxiety levels were strongly related to emotional adjustment to a possible cancer diagnosis. A total of 8% of the variance in anxiety symptoms was explained by the victim's appraisal of the trauma. Avoidant coping and confrontation were the predominant methods of coping. Greater use of emotion-focused coping, including avoidant coping, was associated with higher levels of anxiety. The correlation between avoidant coping and anxiety ($r = .30, p < .001$) was highly significant. The findings highlight the importance of appraisal in the subsequent use of coping strategies.

Transactional theory (Lazarus & Folkman, 1984) describes the stages of the coping process. The first phase following a trauma, the appraisal phase, involves the victim making an assessment of the event. The second phase, on the basis of the appraisal involves the actual use of coping resources in response to the traumatic event. The coping strategy utilised is dependent on the victim's appraisal of the trauma and also the victim's perceived available

coping resources. There is a large body of empirical evidence to support transactional theory (Kuyken, Peters, Power, & Lavender, 1998).

An important aspect of the appraisal process is making an assessment of the controllability of the trauma. Gender differences have been observed in the perceived controllability of a traumatic experience (Sigmon, Stanton, & Snyder, 1995), with males reporting higher levels of controllability in stressful situations. This observed gender difference in trauma appraisal is believed to influence gender differences in the use of coping strategies.

Gender based differences in the use of coping strategies following trauma exposure have been reported widely in the literature (Sale, Guppy, & El-Sayed, 2000). Females are more likely to use social support to cope with trauma exposure than are men (Sale et al., 2000). Females are also more likely to use emotion-focused coping strategies (Ingledow, Hardy, Cooper, & Jemal, 1996). Coping style is believed to be a variable which operates differently in women and men as a result of gender differences in social processes (Blalock & Joiner, 2000).

The relationship between gender, negative life events, coping style and depressive and anxious symptoms was examined in a sample of 179 (72 male, 107 female) university students (Blalock & Joiner, 2000). High negative life event scores were found to be predictive of significant increases in depressive and anxious symptoms among females but not among males. Females endorsed greater use of cognitive avoidance coping than did males, whilst behavioural avoidance coping was found to be unrelated to changes in depressive and anxious symptoms. Cognitive avoidance coping and gender moderated the relationship between negative life events and depressive symptoms. Across a 3 week period, increased levels of anxious symptoms were predicted by a combination of female gender,

greater use of cognitive avoidance coping and high number of negative life events. The same effect was found for depressive symptoms. The results of this study indicate that cognitive avoidance coping is associated with increases in depressive and anxious symptoms under stressful conditions for women, but not for men. The reasons for this remain unclear, despite women having been found to use emotion-focused and avoidant coping more than men in a wide range of trauma populations (Blalock & Joiner, 2000). It has been suggested that there may be some basis for cultural explanations of this gender difference (Kessler et al., 1994). Further testing is needed in a range of trauma populations to better understand the relationship between coping and gender. The greatest value of understanding gender differences in the coping of trauma victims is due to the relationship between coping and anxiety, as anxiety is predictive of PTSS (Manne et al., 2004).

The predictive ability of anxiety symptoms at the time of trauma on chronic PTSS 18 months following exposure, was examined in 111 mothers ($M = 37.60$ years, $SD = 7.40$) whose children ($M = 8.20$ years, $SD = 5.40$) were undergoing a transplant as part of their cancer treatment (Manne et al., 2004). Approximately 20% of mothers had clinically significant levels of distress at the time of the transplant and when sub-threshold PTSD was included, nearly 33% of mothers reported significant PTSS. PTSD was present in 11.7% of mothers 18 months following the transplant and an anxiety disorder, either generalised anxiety disorder or panic disorder, was present in 8.1% of mothers at 18 months. Maternal age, length of the child's hospitalisation and anxiety symptoms, all emerged as factors predictive of clinical status at 18 months. Those with anxiety symptoms at 18 months reported significantly lower levels of mental health functioning than those without anxiety symptoms.

A form of anxiety disorder observed specifically in MVA victims is accident phobia (Mayou et al., 1993). An accident phobia is a specific phobia which can arise following involvement in a MVA. An accident phobia is characterised by three key features: (a) the presence of a specific phobia as outlined in DSM-IV (APA, 1994), (b) the onset and content of the phobia is related to an accident and (c) anxiety symptoms and avoidance behaviour centre around excessive fears of repetition of the accident (Kuch et al., 1994). Sufferers are likely to drive with excessive caution (e.g., excessively slowly on freeways) and avoid driving, particularly under conditions similar to the MVA (e.g., at night or in wet conditions). Accident phobia can also result in victims providing excessive warnings or directing the driver when a passenger (Taylor & Koch, 1995).

Accident phobia is believed to be more common in MVA victims than fully developed PTSD (Mayou et al., 1993). Accident phobia also tends to be particularly persistent (Kuch et al., 1995) and varies little in prevalence between 3 months and 1 year post-MVA. The actual incidence of accident phobia, however, appears to vary significantly depending upon the characteristics of the sample (Kuch et al., 1994). Within the general population, 20% or less of MVA victims report accident phobia (Slocum, 1981), whilst as many as 71% of MVA victims referred to an anxiety disorders clinic have an accident phobia (Kuch, 1989).

In a sample of 188 (128 male, 60 female) MVA victims ranging in age from 18 to 70-years, accident phobia was assessed at 3 months and 1 year following exposure (Mayou et al., 1993). Accident phobia was identified in 18% of victims at 3 months and in 15% of victims at 1 year. Hence there was a drop of just 3% in the incidence of accident phobia in the period between 3 and 12 months following exposure. There is evidence (Mayou, Simkin, & Threlfall, 1991) that accident phobia can remain present in up to one-third of trauma

victims beyond 6 years. As a result accident phobia may be implicated in the long-term

maintenance of PTSS following a MVA (Kuch et al., 1995). Whilst an accident phobia

appears to develop in a significant portion of MVA victims, only a few studies have reported

prevalence figures for accident phobia in MVA victims and no study has reported the portion

of variance in PTSS which may be explained by accident anxiety in MVA victims. An

accident phobia appears to be a significant potential outcome following a MVA and a better

understanding of accident anxiety upon PTSS and its interaction with other risk factors for

PTSS is needed.

1.7.2   Depression

Major depressive disorder is a common consequence of a MVA (Bleich, Koslowsky,

Dovel, & Lerer, 1997), highly correlated with PTSS (Galovski, Blanchard, Malta, &

Freidenberg, 2003) and the most commonly researched comorbid condition (Turton, Hughes,

Evans, & Fainman, 2001). Up to 53.2% of MVA-related PTSD diagnoses have been found to

involve a comorbid diagnosis of major depressive disorder (Hubbard, Realmuto, Northwood,

& Masten, 1995). It has become clear that the incidence of current major depressive disorder

is greater in trauma victims exhibiting PTSS than in trauma victims not exhibiting PTSS

(Blanchard, Hickling, Taylor et al., 1995) and these depressive symptoms are also more

likely to be greater in number and severity (Blanchard, Hickling, Barton et al., 1996; Maes et

al., 2000; Shalev et al., 1998). Although the incidence of PTSS and depressive symptoms are

greater in victims with more than one diagnosis, little is understood about the relationship

between PTSS and depressive symptoms following trauma exposure (O'Donnell, Creamer, &

Pattison, 2004).

There is evidence (Bleich et al., 1997; O'Donnell et al., 2004; Shalev et al., 1998) indicating that PTSS and depressive symptoms may be distinct trauma reactions, whilst other research (Golier, Yehuda, Schmeidler, & Siever, 2001) indicates that it remains unclear whether depressive symptoms observed in trauma victims are associated features of the trauma or a manifestation of a comorbid affective disorder. According to O'Donnell and colleagues (2004) these inconsistent findings may be explained by the possibility that depression is a separate construct in the acute phase, but not in the chronic phase following trauma. Whether depressive symptoms are 'secondary' to PTSS in that their onset follows that of the PTSS, or whether the onset of both disorders occurs simultaneously, is yet to be conclusively determined (Kessler et al., 1995). Nevertheless, depression is an important mediator of the occurrence of chronic PTSS (Freedman, Brandes, Peri, & Shalev, 1999). Hence, assessing depression in trauma victims following exposure is important as depressive symptoms and PTSS interact to significantly worsen prognosis (Shalev et al., 1998).

Trauma victims' depressive symptoms were examined over the initial year following a MVA (Freedman et al., 1999). Victims were 236 (123 female, 113 male) trauma victims admitted to a general hospital emergency room. Assessments were conducted 1 week ($M = 7.70$ days, $SD = 1.40$), 1 month ($M = 32.90$ days, $SD = 6.50$) and 4 months ($M = 117.70$ days, $SD = 23.40$) after their MVA. In addition, a 1 year follow-up assessment was conducted with 64 (31 male, 33 female) victims. Depression was a predictor of PTSS throughout the initial year following the victim's MVA. Depression measured 1 week following trauma exposure explained 19% of the variance in PTSS at 1 year. Depression measured at 1 month explained 38.6% of the variance in PTSS at 1 year. Depression measured at 4 months explained 56% of the variance in PTSS at 1 year. The results of this study and that of Harvey

and Bryant (1999) highlight the significance of depressive symptoms in the maintenance of PTSS over the first year following a MVA.

Research into the role of depression in trauma populations has attempted to focus on the relationship between depression and other variables which have been implicated in the maintenance of trauma symptoms (Elal & Krespi, 1999). The relationship between depression and social support was examined in 200 (124 male, 76 female) haemodialysis patients experiencing renal failure. The mean age of participants in this study was 39 years ($SD = 14.00$) and the mean duration of haemodialysis was 34 months ($SD = 27.10$). Depression has been found to be one of the best predictors of survival in haemodialysis patients (Burton, Kline, Lindsay & Heidenheim, 1986). The incidence of depression within the sample was high, with 42% of patients reporting clinically significant levels of depression and a further 33% reporting moderate depression. Only 25% of participants reported levels of depression within the normal range. Depression was found to predict social support. Perceived social support (perceived amount of social support), perceived availability of social support and satisfaction with perceived social support were all negatively related to depression. The results of this study are consistent with the wider literature (George, Blazer, Hughes, & Fowler, 1989), indicating that social support elements are associated with levels of depressive symptoms.

1.7.3   Human Relatedness

Human relatedness theory views people as relational beings who experience some degree of involvement with external referents, including people, objects, groups and natural environments (Hagerty & Patusky, 2003). It has been suggested that "relatedness is a functional behavioural system rooted in early attachment behaviours and patterns" (Hagerty,

Lynch-Sauer, Patusky, & Bouwsema, 1993, p. 292). Relatedness has been implicated in both

the reduction and the engenderment of anxiety. Social support and sense of belonging are two

aspects of human relatedness. Social support is a construct which has been extensively

researched in trauma and non-trauma populations (Maercker & Muller, 2004). Sense of

belonging has a much shorter history of empirical investigation, having only been clearly

defined and analysed over the last decade (Hagerty et al., 1993; Hagerty, Williams, Coyne, &

Early, 1996; Hagerty & Williams, 1999; Hagerty, Williams, & Oe, 2002). At present there is

a single study which has examined sense of belonging in a sample of trauma exposed

individuals (Bay, Hagerty, Williams, Kirsch, & Gillespie, 2002) and this study focused upon

depressive symptoms rather than PTSS. Sense of belonging is yet to be assessed in relation to

trauma symptoms other than depression (Bay et al., 2002).

1.7.3.1 Social Support

Social support is a coping resource which affects a trauma victim's appraisal of a

traumatic event (Crane & Constantino, 2003), hence, social support attenuates the stress

response following trauma (Kaslow et al., 1998; Stephens & Long, 1999). The notion that

social support can buffer the effects of stress, including traumatic stress (Solomon, Smith,

Robins, & Fischbach, 1987) and is a significant predictor of PTSS is not new (King et al.,

1999). Social support predicts the development of PTSS in a range of trauma populations

(Murphy, Lokan, Dimond, & Fan, 1998), including MVA victims (Holeva, Tarrier, & Wells,

2001).

The structure and function of social support has been extensively examined (Cohen &

Wells, 1985). Social support as a mental health construct has been defined and characterised

in a variety of ways (Leinonen, Solantaus, & Punamaki, 2003). There is no one accepted

definition of social support (Elal & Krespi, 1999), which causes difficulties in making comparisons between studies, particularly those which report only a global social support score (Holeva & Tarrier, 2001). The range of types and functions of social support that have been examined are reflected in the broad range of measures used to assess social support (Stephens & Long, 1999).

Social support can be broadly viewed as "the resources provided by other persons" (Cohen & Syme, 1985, p. 4). Thus, social support can be conceptualised in relation to a trauma victim as the victim's perception that another person or group provides helping behaviours which result in emotional benefits or gains in tangible materials (Bay et al., 2002). Whilst a global social support score is frequently reported in research on trauma populations (Kamphuis et al., 2003), it appears more meaningful to assess specific dimensions of social support. Emotional support, instrumental support, informational support and companionship support, are considered important dimensions of an individual's perceived available social support (Kamphuis et al., 2003).

Emotional support is the aspect of social support most consistently implicated in the development of PTSS (Joseph, Brewin, Yule, & Williams, 1993). Emotional support is also important in the recovery process following trauma (Horowitz, 1986), moderating between exposure to trauma and PTSS (Stephens & Long, 1999). Emotional support refers to other persons with whom one shares important matters and feelings (Leinonen et al., 2003). Trauma victims who perceive emotional support being available to them, specifically, the opportunity to talk about their traumatic experience and to express emotions connected with the trauma, report less PTSS (Willebrand, Kildal, Ekselius, Gerdin, & Andersson, 2001). In a study of 527 (469 male, 58 female) police officers (Stephens & Long, 1999) an association between emotional support and PTSS was observed. Police officers who reported more

emotional support being available reported less PTSS than officers reporting lower levels of perceived emotional support being available. Emotional support, like other forms of social support, is believed to assist in the cognitive processing of a traumatic event (Lepore, Silver, Wortman, & Wayment, 1996; Lepore & Helgeson, 1998). Cognitive processing occurs through emotional support, when others provide the victim with opportunities to express feelings and emotions about the trauma (Stephens & Long, 1999). Completing this process is believed to lead to the facilitation of adjustment to the traumatic event (Lepore & Helgeson, 1998).

Instrumental support has been shown to be an important protective factor against the development of PTSS following long-term exposure to stress (Leinonen et al., 2003). Instrumental support involves practical help, such as assistance with child care, domestic chores and financial aid. The primary providers of instrumental support for trauma victims are family and friends. Finally, informational support is also important following trauma exposure (Laakso & Paunonen-Ilmoner, 2002). Informational support can be provided in the form of advice, suggestions, guidance and factual information.

The role of emotional support, informational support and instrumental support was examined in a sample of 91 mothers who had experienced the death of a child (Laakso & Paunonen-Ilmoner, 2002). Each mother had lost a child under the age of 7 years and was assessed a minimum of 1 year following their child's death. Emotional support, informational support and instrumental support were found to influence the adjustment process. Emotional support consisted of being provided with the opportunity to discuss the death and grief with somebody else close to them who was willing to listen. Instrumental support involved assistance with funeral arrangements. The main providers of emotional support, informational support and instrumental support were partners and close family members. The

importance of the partner and close family was identified through interviews with the

participants. A weakness of this study was that no formal quantitative measure of partner

support was taken.

Social companionship (Timmerman, Emanuels-Zuurveen, & Emmelkamp, 2000) has

emerged as an important component of social support. Social companionship is measured in

relation to a particular referent, either spouse or significant other and measures such things as

shared interests and involvement (Timmerman et al., 2000). Given the qualitative findings of

the importance of partner support on the adjustment to trauma found in this sample, a

quantitative measure of social companionship would have been valuable. These aspects of

social support, emotional support, instrumental support, informational support and

companionship support have not been examined in MVA trauma victims. Examining these

specific aspects of social support would provide important new information about the role of

social support on the development of PTSS in MVA victims.

The notion that the individual's perception of their interactions and relationships is an

important factor impacting upon social support is not new (Antonucci & Israel, 1986). It is

only recently, however, that the significance of the perceived availability of social support, as

a distinct aspect of social support, has been recognised (Dougall et al., 2001). The perceived

availability of social support has been found to contribute to the development of PTSS

following a MVA (Dougall et al., 2001). The perceived availability of social support was

examined in 115 (62 male, 53 female) MVA victims over the first 1 year following their

MVA. Victims ranged in age from 18 years to 64 years ($M = 35.00$, $SD = 13.00$). Four

assessments were conducted. The first took place 2 weeks to 3 weeks after the accident;

follow-up assessments were conducted at 1 month, 6 months and 1 year. Perceived

availability of social support was not significant at 1 month but predicted trauma symptoms

at 6 and 12 months. Victims who perceived social support as being available to them were more likely to use adaptive coping strategies to actively seek social support than victims who did not perceive social support being available. Victims who perceived the availability of social support and actively sought social support were able to more effectively reduce their PTSS over time than other victims. The non-significance of perceived availability of social support at 1 month ($r = -.08$) may indicate that a time greater than 1 month is required before PTSS can be adequately assessed. The DSM-IV (APA, 1994) PTSD criteria indicates that 1 month (Criterion E) is the minimum period before a diagnosis can be made. A similar study examining perceived social support in burns victims (Perry, Difede, Musngi, Frances, & Jacobsberg, 1992) assessed participants 2 months, 6 months and 1 year. This study found that less perceived available social support predicted PTSS at each time point including 2 months. Collectively, these studies of two different trauma populations attest to the importance of perceived availability of social support in the maintenance of PTSS.

Avoidant thinking can influence the ability of social support to serve as a protective factor against the development and maintenance of PTSS and, as a result, avoidant thinking may serve to maintain PTSS (Jacobsen et al., 2002). The association between social support and avoidant thinking was examined in a sample of 53 (38 male, 15 female) cancer patients receiving an experimental treatment (Devine, Parker, Fouladi, & Cohen, 2003). Participants who ranged in age from 31 years to 76 years ($M = 53.40$) were assessed at three time points: prior to treatment, at the end of treatment and 1 month following treatment. Social support was negatively associated with distress and positively associated with mental health. There was a significant interaction between social support and avoidant thinking which predicted both distress and poorer mental health. Participants who reported lower social support were more likely to report higher levels of avoidant thinking than participants with high levels of

social support. The heightened use of avoidant coping strategies, such as denial, can further

exacerbate negative psychological outcomes (Manne et al., 2000).

Avoidant thinking has been linked with an important aspect of social support,

perceived social constraints (Lepore & Helgeson, 1998; Lepore et al., 1996; Manne et al.,

2000). Trauma victims with high levels of avoidant thinking are more likely to report high

levels of perceived social constraints (Lepore & Helgeson, 1998; Turton et al., 2001). The

impact of social constraints on social support was demonstrated in a study assessing the

perceived availability of social support on long-term adjustment to trauma exposure in

successfully completed cancer patients (Manne et al., 2000). Perceived social support and

perceived social constraint was assessed over the first 7 years following trauma exposure.

Perceived social constraint refers to how openly a victim feels they can discuss the trauma

experience with the most important person in their life, whom they nominated themselves, as

well as with other people around them. The stress associated with perceived social

constraints is believed to increase arousal and interfere with cognitive processing of the

trauma (Rachman, 1990). Participants were 72 mothers, ranging in age from 22 years to 58

years ($M = 39.00$), whose child had just successfully completed cancer treatment. High levels

of perceived social constraints and low levels of social support were associated with PTSS.

Perceived social support accounted for 14% of the variance in PTSS, whilst perceived social

constraints also accounted for 14% of the variance in PTSS. After controlling for age, 24% of

the variance in PTSS was explained by the combined influence of perceived global social

support and perceived social constraints. Given that PTSS were assessed over a 7 year period

these findings highlight the long-term consequences of trauma and the significant portion of

variance in PTSS explained by perceived social support and perceived social constraints

(Manne et al., 2000). The perceived social constraints variable used in this study measured

the victim's perception of the constraints in discussing the trauma with the most important

person in their life and also other family and friends. Family and friends were found to play a

critical role in the adjustment to the trauma experience, both in terms of social support and

social constraints. Despite explaining 14% of the variance in PTSS, perceived social

constraints have received little attention in trauma research (Manne et al., 2000).

Perceived social constraints can arise within families when a family member has been

killed or seriously injured and those who could provide a source of social support have been

equally distressed and debilitated by the trauma. This situation is termed a "social network

crisis" (Vachon & Stylianos, 1988). A social network crisis of this kind could occur in MVA

victims if several family members are involved in a MVA. Perceived social constraints may

cause victims to inhibit discussing the trauma experience and as a result suppress their

intrusive thoughts about the trauma. Inhibition, however, in response to negative social

reactions can heighten a trauma victim's emotional distress. The notion of inhibition

exacerbating emotional disturbance following traumatic events has been regularly described

(Freud, 1957; Harber & Pennebaker, 1992; Pennebaker, 1989). Disclosing the trauma is

viewed as a coping mechanism for processing the effects of trauma and avoiding the

development of PTSS (Pennebaker, Mayne, & Francis, 1997). A high level of perceived

social constraints may act in the same way as maladaptive coping strategies to inhibit

emotional processing by draining the victim's processing resources (Holeva et al., 2001). By

discussing a traumatic event it is thought that the victim can find meaning in their traumatic

experience (Tait & Silver, 1989). The social processing model of adaptation to traumatic

events proposed by Pennebaker (1989, 1993) attempts to integrate these findings. The social

processing model posits that the degree to which victims share their thoughts and feelings

about traumatic life experiences plays an important role in the development of PTSS. Social

constraints are recognised to cause increased difficulty in processing and adjusting to trauma

exposure (Lepore et al., 1996) leading to an inability to assimilate the experience. As a result,

the quality of a victim's social relationships has important implications for post-trauma

adjustment (Landolt et al., 2005). Perceived available social support, with little or no

perceived social constraints, can facilitate the processing of traumatic events and the victim's

emotional recovery. Given the significance of social support and perceived social constraints

in explaining a significant portion of variance (14% respectively; Manne et al., 2000) in the

development of PTSS, it may be valuable to assess both social support and perceived social

constraints in trauma exposed individuals (Devine et al., 2003).

1.7.3.2 Sense of Belonging

Belonging is viewed as a basic human need (Maslow, 1954). Maslow (1968)

emphasised the need to belong by placing it between basic needs such as food and water and

self-esteem and self-actualisation on his motivational hierarchy. Attachment theory (Bowlby,

1969, 1973) also emphasised the need to form and maintain relationships and, much earlier,

Freud (1930) indicated the human need for interpersonal contact. More recently it has been

suggested (Baumeister & Leary, 1995) that humans possess an innate, pervasive drive to

form and maintain lasting, positive interpersonal relationships. A lack of positive

interpersonal interactions may affect an individual's formulation of a personal identity,

personal development, social relationships, mental health and sense of belonging (Hagerty,

Lynch-Sauer, Patusky, Bouwsema, & Collier, 1992).

Sense of belonging has been described as a unique aspect of interpersonal relatedness,

different from other interpersonal relatedness phenomena, such as social support and

attachment (Hagerty et al., 1992). Sense of belonging is one aspect of a broad new theoretical

framework for relatedness in adulthood put forward by Hagerty et al. (1993). This theory

defines relatedness as "an individual's level of involvement with persons, objects, groups or

natural environments and the concurrent level of comfort or discomfort associated with that

involvement" (Hagerty et al., 1992; p. 173). Human relatedness is viewed as being

encapsulated within two dimensions; involvement – non-involvement and comfort –

discomfort, as well as four states: connectedness, disconnectedness, enmeshment and

parallelism (Hagerty et al., 1993). Involvement is associated with connectedness and

enmeshment, whilst non-involvement is associated with disconnectedness and parallelism.

Comfort is associated with connectedness and parallelism, whilst discomfort is associated

with disconnectedness and enmeshment.

Connectedness is viewed as a person's active involvement with another person,

object, group or environment, which results in the individual feeling a sense of comfort and

well-being in which anxiety-reduction occurs. This view of connectedness brings together the

works of Gilligan (1982) and Keller and Shaywitz (1986), who viewed connectedness as

participation or involvement in a relationship, with Bowlby's (1969) view of attachment,

which included an anxiety reduction element to satisfactory attachment in infants.

Disconnectedness, on the other hand, results from a lack of active involvement with another

person, object, group or environment, or involvement which leads to discomfort, anxiety and

a lack of sense of well-being. This state of relatedness is associated with loneliness (Weiss,

1974), social isolation (Anderson, 1981) and alienation (Dean, 1961).

Parallelism occurs when an individual experiences a lack of involvement with another

person, object, group or environment as comfortable and fostering of their sense of

wellbeing. An individual interacts in the same manner as an individual in a state of

disconnectedness but experiences the same positive perceptions of this interaction as an

individual in a connected state. Whilst a lack of involvement with others is viewed as

detrimental to psychological well-being, positive aspects have been identified. A lack of

involvement with others may contribute to creativity, rest and focused concentration

(Berezin, 1980) and can be a sign of maturity (Winnicott, 1965). It has also been suggested

that biological survival may be improved by a capacity to disengage and be inactive (Engel &

Schmale, 1972).

Enmeshment occurs when an individual is actively involved with other persons,

objects, groups, or environments but feels discomfort and anxiety. This state involves the

type of interaction characteristic of a state of connectedness but is experienced in a similar

manner to disconnectedness. Enmeshment is viewed as focusing upon the perceived

involvement and quality of the interchange between a person and a specific referent (Hagerty

et al., 1993). Enmeshment can result from coercion by others, the need for self-sacrifice, or

as a result of submission due to a lack of sense of self (Berlin & Johnson, 1989). Within

families enmeshment can occur due to a lack of differentiation and poor communication

(Bowen, 1978).

Every individual experiences some combination of these states for each and every

referent (Hagerty et al., 1993). Hence, an individual may be in a state of parallelism in

relation to one individual, whilst simultaneously being in a state of connectedness with

respect to another individual. This state, with regards to each referent, is not static but retains

a constant capacity for movement (Hagerty et al., 1993).

Analysis of the four states of relatedness indicated that four processes or social

competencies contribute to and comprised the various states of relatedness (Hagerty et al.,

1993). These states are: sense of belonging, reciprocity, mutuality and synchrony. Each is

seen to be implicated in the establishment and promotion of relatedness states. Sense of

belonging refers to the individual's involvement in a system or environment, so that they feel themselves to be an integral part of that system or environment (Hagerty et al., 1992). Reciprocity refers to the individual's perception of an equitable, alternating interchange with another person, object, group, or environment. Reciprocity involves a sense of complementarity. Mutuality is viewed as the individual's experience of real or symbolic shared commonalities of visions, goals, sentiments, or characteristics, which validate the individual's world view. Finally, synchrony involves the individual's experience of congruence with their internal rhythms and external interactions with persons, objects, groups, or environment.

Whilst anecdotal accounts of belonging within the literature are numerous, it is only in the past decade that the belonging construct has undergone concept analysis and been clearly defined (Hagerty et al., 1992, 1993, 2002). Sense of belonging is considered to represent "the experience of personal involvement in a system or environment so that person feels themselves to be an integral part of that system or environment" (Hagerty et al., 1992, p. 173). Since the development of a psychometrically sound instrument to measure sense of belonging (Hagerty & Patusky, 1995), evidence has accumulated attesting to the centrality of sense of belonging in sound psychological functioning (Hagerty & Williams, 1999; Hagerty, Williams, & Oe, 2002), most notably depression and suicidal ideation (Bailey & McLaren, 2005).

A number of antecedents of sense of belonging, which originate in childhood, have been found to influence adult levels of sense of belonging (Hagerty et al., 2002). In a sample of 362 (217 female, 145 male) university students, ranging in age from 18 to 72 years ($M =$ 26.20), sense of belonging was assessed along with 12 additional variables relating to childhood adversities. These variables were: finances, divorce, incest, homosexuality,

athletics, pregnancy, no father, no mother, father care, father overprotection and mother care. Finances, incest and homosexuality were found to be negatively related to sense of belonging, whilst all other variables were positively related to sense of belonging, including parental divorce. This finding that adult sense of belonging is actually higher in those who experienced parental divorce supports research by Stewart, Copeland, Chester, Malley and Barenbaum (1997) which found parental divorce has minimal long-term impact on children. The 12 childhood adversity variables collectively explained 25% of the variance in adult levels of sense of belonging. Of the 12 variables, 6 were directly related to parents and parenting. This finding, therefore, supports the wider literature attesting to the importance of parenting in the mental health and well-being of children. In line with attachment and object relationship theory, which views the child's perception that they are cared for as extremely important for later interpersonal interactions and functioning, these variables as antecedents of sense of belonging, support the notion that sense of belonging is an important mental health construct (Hagerty et al., 2002).

The significance of the individual's perception of their social interactions and relationships in the adjustment process following trauma (Antonucci & Israel, 1986) has been highlighted in social support research. Sense of belonging, which is related to the perceived availability of social support (Hagerty et al., 1996), is an important element in managing social relationships with others. Sense of belonging is a unique element of relatedness and can be viewed as one element among several that comprise social support processes (Hagerty et al., 1992, 1996). Social support and sense of belonging both represent measures of human relatedness, but do so at different levels. Social support measures relatedness to family and friends (Bay et al., 2002), whilst sense of belonging measures relatedness to family and friends, but also to the community, the nation and the individual's cultural group (Hagerty et

al., 1992; Kestenburg & Kestenburg, 1988). Sense of belonging is now viewed as necessary

for psychological well-being (Thompson-Fullilove, 1996) and social functioning (Hagerty et

al., 1996). A deficit in sense of belonging is associated with a history of psychiatric treatment

(Hagerty & Patusky, 1995) depression (Hagerty et al., 1996; Bailey & McLaren, 2005) and

anxiety (Lee & Robbins, 1998).

It has been suggested that sense of belonging may play a significant role in the

adjustment following trauma exposure (Perry et al., 1992). However, Perry and colleagues

defined sense of belonging in terms of belonging to a social network of family and friends,

rather than sense of belonging within the broader framework of relatedness, as defined by

Hagerty and colleagues (1992). The role of sense of belonging to the wider community on

the development of PTSS following exposure is yet to be investigated. Given the importance

of social support from family and close friends, sense of belonging may provide a source of

some of the unexplained variance in PTSS following trauma exposure. Examining sense of

belonging in this context may also assist in clarifying the processes of social support which

mediate responses to stress (Hagerty, et al., 1993).

Trauma research investigating sense of belonging is limited, at present, to a single

study investigating the role of psychosocial variables in subsequent depression following

traumatic brain injury (Bay et al., 2002). In a sample of 75 (39 male, 36 female) mild to

moderately brain injured trauma victims, 71% reported that a MVA was the mechanism of

injury and 64% reported being unconscious for less than one hour. Most MVA trauma

studies, as discussed earlier, screen for unconsciousness and amnesia (Ehlers et al., 1998). As

a result, a significant portion of this sample would not be included in mainstream MVA

trauma research. Participants were assessed within 25 months of their trauma: 30 within the

first 7 months post-trauma and 45 between 7 and 25 months post-trauma. Post-injury sense of

belonging was found to be inversely related to depressive symptoms and accounted for 54%

of the variance in depressive symptoms. When time since trauma exposure was added to

sense of belonging, 58% of the variance was explained. Social support was a significant

explanatory variable in a simple regression model, but when entered along with time since

trauma and sense of belonging, it was no longer significant. Collectively, perceived PTSS

and sense of belonging explained nearly 75% of the variance in depressive symptoms. These

findings appear to indicate that sense of belonging may be an important factor influencing

PTSS, given that a high level of sense of belonging compensated for the adverse affects of

trauma and served to reduce depressive symptoms following trauma. There is a need to

establish the role of sense of belonging in other trauma populations beyond traumatic brain

injury victims (Bay et al., 2002). Given the significance of other components of interpersonal

relatedness (Holeva et al., 2001) on MVA victims, sense of belonging may provide an

important source of the currently unexplained variance in the development of PTSS

following a MVA.

1.7.4   Summary of Maintaining Factors

A complex interplay of factors is believed to be responsible for the maintenance of

PTSS (Blanchard et al., 1996; Weiss, Marmar, Metzler, & Ronfeldt, 1995). Given that only a

modest portion of variance in PTSS can be explained by background and person variables

(Ehlers et al., 1998), the search has broadened in an attempt to explain a greater portion of

the variance in PTSS (Dougall et al., 2001). Investigations of the relationship between coping

strategies and anxiety have outlined important factors affecting trauma victims. Research

upon victim's appraisals of trauma (Lowe et al., 2003), as well as avoidant coping (Rick &

Guppy, 1994), have improved our understanding of PTSS and the gender differences

observed in trauma populations (Sale et al., 2000). Depression is a common consequence of

trauma exposure (Turton et al., 2001) and specifically MVA trauma (Bleich et al., 1997).

Whilst the precise relationship between PTSS and depressive symptoms remains poorly

understood, it is well established that victims reporting both PTSS and depressive symptoms

have a poorer prognosis than victims reporting symptoms of only one condition (Shalev et

al., 1998). Social support is also well established as a predictor of PTSS following trauma

exposure (King et al., 1999). Research has identified specific aspects of social support which

are most influential in the course of the development of PTSS (Kamphuis et al., 2003). As a

result, emotional support, informational support and instrumental support have been

recognised as specific factors which influence a trauma victim's perception of the social

support available to them.

Finally, perceived social constraints (Manne et al., 2000) have been identified as an

important maintaining factor in PTSS, due to restrictions on the cognitive processing of the

traumatic experience. Sense of belonging has also been discussed as an aspect of human

relatedness, theoretically related to social support (Hagerty et al., 1992) and may be a factor

in the maintenance of PTSS. Whilst the role of sense of belonging on PTSS has yet to be

investigated, there is evidence (Bay et al., 2002) that sense of belonging may be an important

predictor of depressive symptoms following trauma exposure. Given the importance of

human relatedness established through social support research on trauma victims, it is

proposed that sense of belonging may be an important additional predictor of PTSS following

a MVA.

1.8   Multi-factor trauma studies

Once a variable is established as a risk factor for developing PTSS, it is useful to understand what portion of variance this factor explains in the development of PTSS, both individually and in combination with other predictor variables. Limited research has thus far examined the proportion of variance in PTSS following a MVA explained by groups of risk factors (Ehlers et al., 1998). What evidence is available, however, indicates that the groups of risk factors thus far examined, whilst promising, explain only a modest portion of the variance in PTSS following a MVA.

The proportion of variance in PTSS explained by the combined influence of perceived threat to life and perceived injury severity was examined in a sample of MVA victims (Blanchard, Hickling, Mitnick et al., 1995). These two risk factors collectively explained 12.2% of the variance of PTSS.

A larger proportion of the variance in PTSS was accounted for in a study of 62 (39 male, 23 female) MVA victims ranging in age from 17 years to 61 years (*M* = 39.92, *SD* = 11.74; Harvey & Bryant, 1999). This study examined a range of risk factors including depression, psychiatric treatment history, prior traumas (including prior MVAs) and demographic variables. MVA victims who had sustained a traumatic brain injury were excluded from the study. Assessment took place between 2 days and 25 days (*M* = 6.61, *SD* = 5.71) following the MVA. The average length of hospitalisation was 7.02 days (*SD* = 6.36), indicating that the MVA had a significant physical impact upon many of the victims. Depression was shown to be a strong predictor of PTSS 1 month following the MVA, explaining 39% of the variance in PTSS. Additional variables found to predict PTSS in this sample were history of psychiatric treatment, history of PTSD and prior MVA. Collectively,

depression, history of psychiatric treatment, history of PTSD and prior MVA explained 61% of the variance in PTSS 1 month following the MVA.

A similar study included depression, PD, anxiety, trauma severity and a number of additional factors in a sample of 51 (31 male and 20 female) trauma victims, 1 week and 6 months following trauma exposure, to investigate the relationship between immediate and short-term responses and the development of PTSS (Shalev et al., 1996). PTSD was present in 25.5% of victims 6 months following exposure. Those with PTSD at 6 months had higher levels of PD 1 week following exposure than victims without PTSD at 6 months. Further, PD 1 week following exposure predicted PTSS 6 months following exposure over and above all other variables and explained 29.4% of the variance of trauma symptom severity. The victim's education level was also a significant predictor, explaining a further 7.25% of the variance. When age, trauma severity and anxiety were added to PD and education, the model collectively explained 43% of the variance in PTSS.

A study of 70 (51 female, 19 male) cancer patients observed an association between social support, avoidant coping and psychological distress (Jacobsen et al., 2002), with all factors predicting PTSS 8 months after exposure. A total of 30% of the variance in PTSS was explained by psychological distress. Social support explained an additional 6% of the variance and avoidant coping explained an additional 5% of the variance. This study found a significant interaction between social support and avoidant coping, which accounted for 7% of the variability in PTSS severity not explained by psychological distress, social support and avoidant coping.

Finally, the collective influence of sense of belonging and social support upon depressive symptoms was examined in a study by Hagerty and Williams (1999). Participants were 31 depressed individuals (20 females, 11 males) undergoing treatment for depression,

ranging in age from 21 years to 75 years ($M = 38.80$) and 379 university students (258

females, 121 males), ranging in age from 18 years to 72 years ($M = 26.00$). Using path

analysis, sense of belonging was found to be the strongest predictor of depressive symptoms.

Sense of belonging had a direct effect on depression whilst social support had an indirect

effect on depression. A model comprising sense of belonging, social support, loneliness and

conflict accounted for 64% of the variance in depressive symptoms.

1.9   Present Research

Social support has been implicated in the development of trauma symptoms in MVA

victims, however, only global measures of social support have been reported. A number of

specific aspects of social support, namely emotional support, instrumental support,

informational support and social companionship support have emerged as important

predictors of trauma symptoms among non-MVA trauma victims. Emotional support,

instrumental support, informational support and social companionship are yet to be assessed

in MVA victims. Similarly, sense of belonging is yet to be assessed in MVA victims, despite

research with traumatic brain injury victims indicating that sense of belonging may be an

important predictor of PTSS in a wide range of trauma populations.

Although research has linked a number of individual risk factors with the

development of PTSS in MVA trauma populations, few studies have investigated the

combined influence of multiple risk factors. The portion of variance in the development of

trauma symptoms explained by individual risk factors has been reported for a number of risk

factors affecting MVA victims, however, research on the portions of variance explained by

groups of risk factors collectively is limited. By examining a large group of risk factors

known to affect MVA victims, the relationships between these risk factors and the combined

influence of these risk factors can be assessed.

1.9.1   Aim 1: To establish the portion of variance associated with pre-accident risk factors in the development of PTSS and to investigate the relationships between these risk factors and PTSS

Although research has examined the influence of individual pre-accident risk factors on PTSS following MVA trauma, there is limited research which examines the portion of variance in the development of PTSS explained by a group of pre-accident risk factors.

1.9.1.1 Hypotheses

1.   It is predicted that the group of pre-accident risk factors will explain a significant portion of the variance in PTSS.

2.   It is predicted that there will be a relationship between gender and PTSS, with females reporting higher levels of PTSS.

3.   It is predicted that there will be a relationship between prior trauma and PTSS, with those reporting prior trauma having higher levels of PTSS.

4.   It is predicted that there will be a relationship between a personal history of depression and PTSS, with those reporting higher levels of prior depression having higher levels of PTSS.

5.   It is predicted that there will be a relationship between a family history of depression and PTSS, with those reporting higher levels of prior depression having higher levels of PTSS.

6.   It is predicted that there will be a relationship between personal history of anxiety and PTSS, with those reporting higher levels of anxiety within their family having higher levels of PTSS.

7.   It is predicted that there will be a relationship between family history of

anxiety and PTSS, with those reporting higher levels of anxiety within their

family having higher levels of PTSS.

1.9.2   Aim 2: To investigate the portion of variance associated with accident-related

risk factors in the development of PTSS and to investigate the relationships between these

risk factors and PTSS

A number of accident-related risk factors have been individually examined in MVA

victims. Injury severity as perceived by the victim and on-going perceived physical health

problems are important predictors of PTSS. No study of MVA victims has examined the

collective influence of perceived injury severity, on-going physical health problems,

perceived threat to life and peri-traumatic dissociation on PTSS.

1.9.2.1 Hypotheses

1.   It is predicted that the group of accident-related risk factors will explain a

significant portion of the variance in PTSS.

2.   It is predicted that there will be a relationship between perceived injury

severity and PTSS, with those reporting higher levels of perceived injury

severity having higher levels of PTSS.

3.   It is predicted that there will be a relationship between recovery from physical

injuries and PTSS, with those reporting higher levels of physical recovery

having lower levels of PTSS.

4.   It is predicted that there will be a relationship between perceived threat to life

and PTSS, with those reporting higher levels of perceived threat to life having

higher levels of PTSS.

5.   It is predicted that there will be a relationship between peri-traumatic

dissociation and PTSS, with those reporting higher levels of peri-traumatic

dissociation having higher levels of PTSS.

1.9.3   Aim 3: To document the portion of variance associated with maintaining

factors in the development of PTSS and to investigate the relationships between these risk

factors and PTSS

The portion of variance in PTSS explained by accident phobia is yet to be

investigated, despite evidence that it is a common consequence of a MVA. There is also

limited research on the combined influence of multiple factors which individually have been

shown to be implicated in the development of PTSS. Psychosocial resources are important in

the trauma victim's on-going ability to deal with trauma exposure (Pole, Best, Metzler, &

Marmar, 2005). Whilst emotional support, informational support, instrumental support and

social companionship have been found to influence PTSS in trauma populations, no study

has measured these variables in MVA trauma victims. It is also important to understand the

individual and collective influences of these specific aspects of social support on PTSS. The

MVA victim's perception of the availability of social support is also important in influencing

the development of PTSS; however, the influence of perceived availability of social support

on PTSS when assessed alongside other social support factors is unknown. Similarly, the

influence of avoidant thinking combined with specific aspects of social support is not known.

Perceived social constraints, despite strong theoretical links to the development of PTSS

(Pennebaker et al., 1997) is also yet to be assessed in MVA victims. Finally, sense of belonging, which has been linked to the development of depressive symptoms in trauma victims, is yet to be investigated as a predictor of PTSS in MVA victims.

1.9.3.1 Hypothesis

1. It is predicted that the group of maintaining risk factors will explain a significant portion of the variance in PTSS.

2. It is predicted that there will be a relationship between anxiety and PTSS, with those reporting higher levels of anxiety reporting higher levels of PTSS.

3. It is predicted that there will be a relationship between depression and PTSS, with those reporting higher levels of depression reporting higher levels of PTSS.

4. It is predicted that there will be a relationship between emotional support and PTSS, with those reporting lower levels of emotional support reporting higher levels of PTSS.

5. It is predicted that there will be a relationship between informational support and PTSS, with those reporting lower levels of informational support reporting higher levels of PTSS.

6. It is predicted that there will be a relationship between social companionship and PTSS, with those reporting lower levels of social companionship reporting higher levels of PTSS.

7. It is predicted that there will be a relationship between instrumental support and PTSS, with those reporting lower levels of instrumental support reporting higher levels of PTSS.

8.	It is predicted that there will be a relationship between perceived

social constraints and PTSS, with those reporting higher levels of perceived

social constraints reporting higher levels of PTSS.

9.	It is predicted that there will be a relationship between sense of belonging and

PTSS, with those reporting lower levels of sense of belonging reporting

higher levels of PTSS.

1.9.4.1 Aim 4: To establish the combined portion of variance in PTSS explained by the

pre-accident risk factors, accident related risk factors and maintaining risk

factors on PTSS.

Aims 1, 2 and 3 seek to establish the amount of variance in PTSS accounted for by the

three groups of factors, namely pre-accident related risk factors, accident related risk factors

and maintaining factors, individually. The final aim of this research is to establish the amount

of variance in PTSS that the three groups of factors explain in combination.

*1.9.4.1	Hypothesis*

1.	It is predicted that the three groups of risk factors, pre-accident, accident-related

and maintaining risk factors will explain a significant portion of the variance in

PTSS.

CHAPTER 2: METHOD

2.1   Participants

Participants were 123 MVA survivors who had been in their accident in the past 12 months. The length of time since the accident ranged from 1 to 12 months ($M = 4.86$, $SD = 3.34$). A total of 45 males, aged from 20 to 78 ($M = 39.27$ years, $SD = 15.94$) and 78 females, aged from 18 to 69 ($M = 36.97$, $SD = 12.67$), participated in the study. Almost half of the sample 42.3% ($n = 52$), were single and 48.8% ($n = 60$) were partnered and 8.9% ($n = 11$) were separated or divorced. The highest level of education attained for 31.7% ($n = 39$) was secondary school, 19.5% ($n = 24$) a trade certificate or TAFE, 30.9% ($n = 38$) a university undergraduate degree and 17.9% ($n = 22$) a post-graduate university degree. A total of 57% ($n = 71$) of the sample were employed full-time, 22% ($n = 27$) part-time/casual, 7.3% ($n = 9$) retired and 13% ($n = 16$) were unemployed. The majority of participants (80.5%, $n = 99$) were drivers in their accident, 10.6% ($n = 13$) were car passengers and the remaining 8.9% ($n = 11$) were pedestrians, motor cyclists or cyclists. A total of 74% ($n = 90$) of participants were involved in a multiple vehicle MVA and the remaining 26% ($n = 33$) were involved in a single vehicle MVA. Following their MVAs almost half of the sample (43.1%, $n = 53$) attended hospital, whilst 19.5% ($n = 24$) of the total sample were admitted to hospital. The duration of hospitalisation ranged from 1 to 66 days ($M = 8.83$, $SD = 10.72$).

2.2   Measures

Participants were provided a questionnaire package consisting of a plain language statement, demographics questionnaire, eight self-report instruments and a reply paid envelope. The instruments were used to measure PTSS, peri-traumatic dissociation, social support, perceived social constraints, sense of belonging, depression and anxiety.

2.2.1   Plain Language Statement. The Plain Language Statement described the research being undertaken and invited the victim to volunteer. The plain language statement provided resources that the participant could access in the event of experiencing any distress during or after completing the questionnaire, including contact numbers of the researchers and Lifeline. Potential participants were informed that all participants remain anonymous at all times.

2.2.2   Demographics questionnaire. The demographics questionnaire required participants to report their age, gender, relationship status, education level, employment status, household income, prior traumas, personal psychiatric history and family psychiatric history. A series of questions also asked the participant about specific aspects of their motor vehicle accident, including the participant's involvement in the accident (e.g., the driver), the number of cars involved in the accident, whether the participant was hospitalised as a result of the accident and whether the participant thought that the accident was their responsibility.

Three further questions assessed the participant's perceived threat to life, perceived injury severity and recovery from physical injuries. Perceived threat to life was measured by asking the participant to rate how frightening the accident was on a scale ranging from 1 (not frightening) to 4 (very frightening). This method has been used to assess perceived threat to life in MVA victims by Ehlers et al. (1998). Perceived injury severity was measured by asking the participant to rate the degree of their injuries on a scale ranging from 1 'not at all' to 4 'a lot/very much'. This method has been used to assess perceived injury severity in MVA victims by Ehlers et al. (1998). Recovery from physical injuries was measured by asking participants how well they had recovered physically from their injuries on a scale

ranging from 1 'fully recovered' to 3 'major problems'. This method has been used to assess current physical problems in MVA victims by Mayou, Ehlers and Hobbs (2000).

2.2.3   *Post-traumatic Stress Disorder Questionnaire (PTSD-Q)*. The Post-traumatic Stress Disorder Interview (PTSD-I) is a 17-item measure designed to assist with the diagnosis of PTSD (Watson et al., 1991). In the present study, the PTSD-I was converted to a self-report questionnaire (PTSD-Q) consistent with the earlier work of Czarnocka and Slade (2000), with the motor vehicle accident, referred to as "the accident", specified as the 'traumatic event'. Items on the PTSD-Q directly relate to the criteria of the DSM-IV. The PTSD-Q records the frequency of post-traumatic stress symptoms and focuses upon intrusive, avoidant and hyper-arousal symptoms in accordance with DSM-IV (APA, 1994) criteria.

Items are rated on a scale ranging from 1 (*not at all*) to 7 (*always*). Scores of 4, labelled "commonly" and above are considered clinically significant. In accordance with DSM-IV a minimum of one intrusion, three avoidance and two hyper-arousal items are required for a diagnosis. Duration of symptoms is also assessed to fulfil the 4-week criteria.

The PTSD-I has been shown to have 92% concurrence with diagnostic categorisation systems based on DSM (Watson, Juba, Manifold, Kucala, & Anderson, 1991). The PTSD-I also has adequate psychometric properties in terms of test-retest reliability and internal consistency. In a sample of 264 female trauma victims, Cronbach's alpha was calculated to be .87 for the PTSD-Q (Czarnocka & Slade, 2000). In the present sample Cronbach's alpha was .96, indicating that the instrument had a high level of reliability for the purposes of the current research.

2.2.4   Impact of Events Scale (IES). The Impact of Event Scale (IES) is a 15-item

self-report questionnaire evaluating experiences of avoidance and intrusion associated with a

specific trauma (Horowitz, Wilner, & Alvarez, 1979). The IES is used extensively in trauma

research (Horowitz, Field, & Classen, 1993). The IES assesses intrusion and avoidance

symptoms of PTSD experienced over the past week. All items on the IES are phrased in the

first person. The IES scale consists of 7 items which measure intrusive symptoms (intrusive

thoughts, nightmares, intrusive feelings and imagery) and 8 items which measure avoidance

symptoms (numbing of responsiveness, avoidance of feelings, situations and ideas). These 15

items collectively provide a total subjective stress score. Higher scores on the IES indicate

more stressful impact associated with a specific trauma.

Respondents rated the items on a 4-point scale according to how often each has

occurred in the past 7 days. The 4 points on the scale were: 0 (*not at all*), 1 (*rarely*), 3

(*sometimes*) and 4 (*often*). The scores for the intrusive subscale range from 0 to 35, whereas

scores for the avoidance subscale range from 0 to 40. The sum of the two subscales is the

total stress score. Scores of 0-8 is within the sub-clinical range, 9-25 mild, 26-43 moderate

and 44 and higher severe. Although the IES does not permit diagnosis of PTSD along DSM-

IV-defined criteria, severity cut-off scores have been used to predict diagnostic status. A total

score of 20 or higher is considered to be likely to merit a diagnosis of PTSD (Hampton &

Frombach, 2000).

The IES has high total scale test-retest reliability (Corcoran & Fischer, 1994), with

the 1 week test-retest reliability for the total scale being reported to be *r* = .87 (Horowitz et

al., 1979). The split-half reliability of the total IES scale is .86 (Horowitz et al., 1979). The

internal consistency of the intrusion scale ranges from .86 to .89, whilst the avoidance

subscale is slightly higher at .89 to .90 (Horowitz et al., 1979). There is evidence to suggest

that the IES discriminates between traumatised and non-traumatised individuals (Corcoran &

Fischer, 1994). Cronbach's alpha for the IES total score in the current research was .94,

indicating a high level of reliability.

    2.2.5   Peri-traumatic Dissociative Experiences Questionnaire - Self-Report Version

(PDEQ-SRV). The Peri-traumatic Dissociative Experiences Questionnaire Self-Report

Version (PDEQ-SRV; Marmar, Weiss, & Metzler, 1998) is a 10-item instrument which

measures dissociative experiences at the time of the traumatic event. The PDEQ-SRV is a

valid and reliable self-report instrument for measuring peri-traumatic dissociation (Birmes et

al., 2005). The PDEQ-SRV assesses retrospective reports of derealisation, depersonalisation,

altered time perception and out of body experiences (Marmar, Weiss, & Metzler, 1997).

    Respondents were instructed to think back to "during the accident and immediately

afterward" in determining the extent to which they experienced dissociative symptoms. Items

on the PDEQ-SRV were rated on a 5 point scale, with higher scores indicating higher levels

of peri-traumatic dissociation. The 5 points on the scale were: 1 (*not at all true*), 2 (*slightly

true*), 3 (*somewhat true*), 4 (*very true*) and 5 (*extremely true*). The total score of the 10 items

was used to examine peri-traumatic dissociation.

    The PDEQ is strongly associated with measures of traumatic stress responding and

general dissociative tendencies (Marmar, Weiss, & Metzler, 1998). The PDEQ-SRV is

positively and significantly correlated with the Impact of Events Scale-Revised (Birmes et

al., 2005) and has good test-retest reliability ($r = .72$; 20-25 days; Birmes et al., 2005).

Internal consistency for the PDEQ-SRV has been shown to be high (Cronbach's alpha = .79;

Birmes et al., 2005). Cronbach's alpha for the PDEQ-SRV in the present sample was .88.

2.2.6   Perceived Social Constraints Scale (PSCS). The Perceived Social Constraints Scale (PSCS) is a 10-item instrument developed to assess the degree to which respondents felt their social relationships were strained and that they were constrained in discussing their trauma-related thoughts and feelings with others (Lepore et al., 1996). The PSCS includes 5 items, which are asked twice; once with respect to the "partner" and once with respect to "other people" in the respondent's life. All items refer to experiences over the past week and are anchored by a 5 point scale, ranging from 1 (*almost never*), through to 5 (*almost always*). A total score for the PSCS ranging between 10 and 50 is derived. Higher scores on the PSCS indicate a greater degree of social constraints.

For the present study the PSCS was modified to 5 items, which were asked only once with respect to 'all people' in the respondent's life. This modification was made in the present study to compensate for MVA victims without partners. The full PSCS was original designed to be used with pregnant women who had partners. The wording of questions in the PSCS was also modified for MVA victims. For example, item one in the PSCS was, "how often did you feel as though you had to keep your feelings about your baby's death to yourself because they made other people uncomfortable?" This item was modified to read, "how often did you feel as though you had to keep your feelings about the accident to yourself because they made other people uncomfortable?"

The internal consistency of the most important person scale, with a coefficient alpha of .76 and the other people scale, with a coefficient alpha of .78, are both adequate (Manne et al., 2000). The unified scale, combining both the "partner" and the "other people" scale also has adequate internal consistency as estimated by coefficient alpha ($\alpha = .77$ to $\alpha = .81$; Lepore et al., 1996). In the present study, the 'all people' scale had a Cronbach's alpha of .53, which indicates a low level of internal reliability.

2.2.7   Social Support Inventory (SSI). The Social Support Inventory (SSI) is a 20-item, self-report instrument which assesses perceived adequacy of social support (Timmerman et al., 2000). The SSI contains four subscales each with 5 items; emotional support, informative support, social companionship and instrumental support. Responses to the SSI are made in reference to either (1) partner or (2) other people. Items on the SSI were rated on a 4 point scale, with higher scores indicating higher levels of perceived adequacy of social support. The 4 points on the scale were: 0 (*not at all*), 1 (*rarely*), 3 (*sometimes*) and 4 (*often*). For the present study, all participants completed only the 20-item 'other people' version of the SSI which was modified to read 'people in my life'.

The SSI total score has high internal consistency ($\alpha = .93$) in trauma victims (Kamphuis et al., 2003). There is also support for the convergent and divergent validity of the SSI (Timmerman et al., 2000). The correlations between the SSI and the General Health Questionnaire (Goldberg & Hillier, 1979) are low, ranging from 0.18 (instrumental) to 0.30 (emotional). Also the correlations with the Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975) are low, ranging from 0.25 (instrumental) to 0.34 (emotional). These correlations indicate that perceived adequacy of social support is an independent construct when compared to distress and neuroticism. Cronbach's alpha for the present sample, using the modified 20 item 'other people' scale was .94, indicating a high level of reliability.

2.2.8   Sense of Belonging Instrument (SOBI). The Sense of Belonging Instrument (SOBI; Hagerty & Patusky, 1995) is a 33-item, self-report instrument that assesses sense of belonging via two separate scales; psychological state (SOBI-P) and antecedents (SOBI-A). The 18 questions of the psychological subscale measure an individual's experience of being valued, needed or important with respect to other people, groups or the environment. The 15

questions of the antecedent subscale were designed to assess precursors of sense of belonging which include energy for involvement and potential and desire for meaningful involvement. Participants rated each item on a four-point Likert scale. The 4 points on the scale were: 1 (*strongly disagree*), 2 (*disagree*), 3 (*agree*), 4 (*strongly agree*). A high score on the SOBI-P indicates that the individual feels valued, needed and accepted. A high score on the SOBI-A indicates that the individual perceives that he or she possesses the antecedents to sense of belonging: energy, potential and desire or motivation for meaningful involvement and potential for shared or complementary characteristics. Higher scores on the SOBI total score indicate that an individual has a high sense of belonging.

Both the SOBI-P and the SOBI-A appear to be valid and reliable measures of sense of belonging (Hagerty & Patusky, 1995). Coefficient alphas ranging from .91 to .93 have been reported for the SOBI-P and from .63 to .76 for the SOBI-A (Hagerty et al., 2002). Research using an Australian sample (McLaren, Jude, Hopes, & Sherritt, 2001) has reported higher reliability coefficients for both subscales of the SOBI (SOBI-P = .95 and SOBI-A = .82). Test-retest reliability over an 8 week period for university students has been reported to be r = .84 for the SOBI-P and r = .66 for the SOBI-A. The inter-scale correlation between the SOBI-P and the SOBI-A has been reported as r = .45 (Hagerty et al., 2002). Cronbach's alpha coefficients (SOBI-P; 0.92) and (SOBI-A; 0.77) have been reported in an Australian non-trauma sample (Kissane & McLaren, 2006). In the present sample Cronbach's alpha was 0.89 for the SOBI-P and 0.85 for the SOBI-A.

2.2.9   *Beck Depression Inventory-II (BDI-II).* The Beck Depression Inventory-II (BDI-II) was used to measure the existence and severity of depressive symptoms (Beck, Steer, & Brown, 1996). The 21 item self-report BDI-II has been adapted from the earlier BDI

(Beck, Rush, Shaw, & Emery, 1979) to more closely reflect the current depression criteria of the DSM-IV (APA, 1994). The BDI-II is suitable for adolescents and adults aged 13 to 80 years. The BDI-II covers affective, cognitive, motivational, behavioural and biological symptoms. Each BDI-II item relates to a particular symptom of depression and is arranged as four statements in increasing severity. Participants were asked to respond to each item as it relates to the way they have felt for the past two weeks.

Each of the 21 items on the BDI-II is summed to give a single score for the BDI-II. Each item is rated on a four-point scale ranging from 0 to 3. On two items (16 and 18) there are seven options to indicate either an increase or decrease in appetite and sleep. Higher scores indicate higher levels of depressive symptoms. A total score of 0-13 is considered within the minimal range, 14-19 is mild, 20-28 is moderate and 29-63 is severe.

The BDI-II has stronger psychometric properties than the BDI. The BDI-II is able to differentiate depressed from non-depressed patients. The BDI-II has coefficient alphas (α = .92 for outpatients and α = .93 for university students) which are higher than those for the BDI-IA (α = .86). The BDI-II also has high one week test-retest reliability of 0.93 (Beck et al., 1996). The construct validity of the DBI-II has been improved from the earlier DBI-IA. The correlation between the BDI-IA and the BDI-II is (r = .93, p < .001). The mean scores in two sub-samples of outpatients (n = 191) were 18.92 (SD = 11.32) and 21.88 (SD = 12.69 for the BDI-IA and the BDI-II respectively (Beck et al., 1996). In this sample Cronbach's coefficient alpha was 0.94.

2.2.10 Accident Fear Questionnaire (AFQ). The Accident Fear Questionnaire (AFQ) is a specific and sensitive inventory for MVA-related fears and anxiety (Kuch et al., 1995). The AFQ explores the experience of the accident and of related anxiety with 10 items

requiring yes/no responses. A further 10 items relate to fear and avoidance. Respondents indicate how much they would avoid particular situations such as "driving on certain roads" and "riding with certain drivers". These items are rated on an 8 point Likert scale, ranging from 1 (*would not avoid it*) to 8 (*always avoid it*). Scores on the AFQ range from a minimum of 10 to a maximum of 80.

The fear and avoidance items of the AFQ have good internal consistency ($\alpha = 0.89$). Higher scores indicate higher levels of accident related fear and anxiety. The questionnaire views accident phobia as involving the presence of simple phobia symptoms (interference with normal routine) and the presence of PTSD symptoms B and C (intense distress during exposure and avoidance of situations reminiscent of the MVA. For the present sample Cronbach's alpha was 0.84.

2.3   Procedure

The Transport Accident Commission was initially approached to assist in gaining a random sample of MVA victims. The Transport Accident Commission is the major public organisation assisting, researching and advocating for MVA victims. Unfortunately, the Transport Accident Commission declined to assist with this research. Gaining access to this organisation's database of people involved in MVAs in the past 12 months would have allowed for a large and random sample to be obtained. Without this organisation's assistance, Australian adult MVA victims were recruited via alternative means over a 10 month period. A number of methods were utilised in order to obtain as diverse a sample as possible. Road trauma support groups were informed of the study and requested to inform their clients of the study. A press release was sent to various media outlets which gained newspaper coverage in

a number of rural and regional newspapers. Information about the study was also placed on the University of Ballarat website.

A telephone directory search was conducted for smash repair centres, psychologists, social workers, osteopaths, general medical practitioners, counsellors, chiropractors and physiotherapists in each state and territory of Australia. Those listed with an e-mail address were sent information about the study and the inclusion/exclusion criteria for the participants. A letter providing the same information as via e-mail was posted to a further 500 smash repair centres, 200 physiotherapists and 200 chiropractors who did not have telephone directory listed e-mail addresses. Finally, a letterbox drop was conducted to 12,000 homes in metropolitan, regional and rural Victoria.

Participants were required to be 18 years of age or older at the time of their accident to be included in the study. Consistent with previous research examining the trauma experiences of MVA victims (e.g., Layton & Wardi-Zonna, 1995) those who reported being unconscious during or immediately after the accident or amnesic for the accident, were excluded from the study. The order of the self-report instruments was counterbalanced and randomly distributed. Counterbalancing of self-report instruments was used to protect participants' responses from order effects (Shaughnessy & Zechmeister, 1994). All participants were required to have been involved in a motor vehicle accident within the 12 month period prior to completing the questionnaire.

A total of 735 questionnaires were distributed for an overall response rate of 16.73% ($n = 123$). A large portion of questionnaires were distributed to MVA victims through third parties such as motor smash repairers, physiotherapists and psychologists. This may have affected the response rate and it is impossible to know how many of the 735 questionnaires were actually distributed to MVA victims.

2.4   *Data Analysis*

The current study employed two dependent variables to measure trauma, the PTSD-Q total score and the IES total score. A total of seventeen independent variables were examined from the pre-accident, accident and maintenance stages. The pre-accident variables were: prior trauma history, personal history of depression, personal history of anxiety, family history of depression and family history of anxiety. The accident variables were: perceived injury severity, recovery from physical injuries, perceived threat to life and PD. The maintenance variables were: anxiety, depression, emotional support, informational support, social companionship, instrumental support, perceived social constraints and sense of belonging.

A multiple analysis of variance (MANOVA) was used to test for the effect of questionnaire order on the variables measured. Pearson's correlation coefficients were calculated to investigate the relationships between all variables to be used in the linear regression analysis.

The hypotheses were tested using a series of hierarchical multiple regression analyses. The pre-accident risk factors were examined first, then the accident-related risk factors, followed by the maintaining factors. Finally, one further analysis was conducted which combined the risk factors from each of the three classifications; pre-accident, accident and maintaining. For each aim of the study a hierarchical multiple regression was used with PTSD-Q as the dependent variable and then repeated using IES as the dependent variable. For each regression gender was entered at Step 1 and the variables of interest (e.g., pre-accident) were entered at Step 2. Gender was analysed as a covariate as there were insufficient participants in the study to analyse gender separately.

According to Hair, Anderson, Tatham and Black (1995) the minimum ratio of observations to independent variables for a regression analysis should be 5 to 1. In order to increase the reliability and generalisability of the findings this ratio should be increased as close to the desirable level of 15 to 1 as possible. For the present study this implies that a regression analysis could be performed on as few as 85 cases, whilst 255 cases would be optimal.

Support for the use of a ratio of 5 to 1 is also provided by Bentler and Chou (1987). These researchers indicate that a regression analysis can be conducted with 5 observations per independent variable. These researchers do, however, concur with the wider literature, which suggests that a good rule of thumb is 15 cases per predictor in a standard multiple regression analysis (Stevens, 1996).

Whilst there are numerous methods and formulae within the literature to guide researchers to the minimum number of cases necessary to perform multiple regression analysis it is evident that using a lower ratio decreases the probability of detecting difference or association (Cohen & Cohen, 1975). Hence, Loehlin (1992) suggests the general recommendation is to obtain more data whenever possible. The consequences of using smaller samples include more convergence failures (the software cannot reach a satisfactory solution), improper solutions (including negative error variance estimates for measured variables), lowered accuracy of parameter estimates and, in particular, standard errors (Loehlin, 1992).

CHAPTER 3: RESULTS

Data obtained from completed questionnaires were analysed using the Statistical

Package for the Social Sciences (SPSS) for Windows Version 14.0.1. A significance level of

.05 was employed for all analyses conducted. Results are presented, following the initial

analysis, in the order of the aims of the study.

3.1   Initial Analysis

3.1.1   *Data Screening.* On initial data screening, missing values were detected for

some of the instruments. To obtain summed values for scales, a pro-rated method was used

(see Green, Salkind, & Akey, 2000). This method is useful for scales with few missing items,

but is inadequate for scales missing numerous values. This technique was employed as no

participant had more than one missing value on any one scale. There were no missing values

on any categorical variables. Data screening indicated acceptable levels of skew for each of

the psychological measures and thus no transformations were conducted.

3.1.2   *Assumption Testing.* Prior to testing individual hypotheses, testing was

conducted to ensure there were no violations of assumptions for the statistical tests

employed, as recommended by Coakes and Steed (1999) and Tabachnick and Fidell (1996).

For the multiple analysis of variance (MANOVA) used to ensure there were no

significant questionnaire order effects on the variables, two assumptions were tested. A

MANOVA can not be conducted if there are outliers in the data or if there are significant

violations of homogeneity of variance. Histograms indicated that there were no outliers in the

sample and there were no significant violations of homogeneity of variance (Tabachnick &

Fidell, 1996).

For the multiple linear regression analyses, scatterplots, histograms and normal probability plots were examined to ensure assumptions were met. Scatterplot analysis indicated that the linearity and homogeneity of variances assumptions were met for the sample. Similarly, histograms and normal probability plots of residuals also indicated no assumption violations (Coakes & Steed, 1999).

3.1.3 *Counterbalancing.* The order of the questionnaires was counterbalanced using twenty randomly selected versions. Results of the MANOVA indicated that there was no effect of questionnaire order on the variables of interest in the study, *Wilks' Λ* = .90, $F(285, 1034) = 0.75$, $p > .05$, $\eta^2 = .003$.

3.1.4 *Descriptive Statistics.* Psychiatric history risk factor responses are presented in Table 1. Mean scores, standard deviations and minimum and maximum observed scores for the current sample are presented in Table 2.

Table 1

Descriptive Statistics for the Psychiatric History Risk Factors

Variable	Yes		No	
	N	*%*	*N*	*%*
Prior Trauma	45	36.58	78	63.42
Personal History of Depression	44	35.77	79	64.23
Personal History of Anxiety	56	32.52	67	67.48
Family History of Depression	56	45.53	67	54.47
Family History of Anxiety	54	43.90	69	56.10

Table 2

Descriptive Statistics for the Psychological Measures

Variable	M	SD	Minimum	Maximum
PD	21.11	19.11	10	45
Anxiety	18.18	15.29	0	57
Depression	10.60	10.15	0	43
Emotional Support	14.20	3.18	6	20
Informational Support	13.62	2.65	7	20
Social Companionship	13.62	2.65	7	20
Instrumental Support	13.71	2.88	6	20
Perceived Social Constraints	11.62	2.95	5	20
Perceived Social Support	54.68	10.87	29	82
Perceived Injury Severity	2.01	0.79	1	4
Recovery from Physical Injuries	1.61	0.61	1	3
Perceived Threat to Life	2.89	0.98	1	4
Sense of Belonging	75.64	12.47	53	118
IES	28.75	11.05	15	53
PTSD-Q	42.36	21.14	17	96

3.1.5 *Pearson Correlations*

Correlation coefficients were calculated to investigate the relationships between all variables to be used in the linear regression analyses. Results are shown in Table 3. The two dependent variables, PTSD-Q and IES, were shown to be highly positively correlated, indicating that as PTSD-Q scores increased so too did IES values.

PTSD-Q scores were correlated with eight of the risk factors. Higher PTSD-Q scores were associated with having a personal history of depression and higher levels of perceived threat to life, PD, anxiety, depression and perceived social constraints, poor recovery from physical injuries and lower levels of sense of belonging.

IES scores were correlated with the same eight variables as PTSD-Q scores. IES was correlated with having a personal history of depression, higher levels of perceived threat to life, PD, anxiety, depression and perceived social constraints, poor recovery from physical injuries and lower levels of sense of belonging.

Table 3

Pearson Correlations between All Risk Factors and Dependent Variables

Variables	1	2	3	4	5	6	7	8	9	10
1. Gender[a]	-	.07	-.19*	-.09	-.24**	-.09	.13	.05	-.09	.02
2. Prior Trauma[b]		-	.19*	.16	.17	.25**	.06	.14	.22*	.08
3. Personal History of Depression[c]			-	.31**	.39**	.10	.11	.03	.39**	.35**
4. Personal History of Anxiety[d]				-	.31**	.32**	-.16	.07	.09	.02
5. Family History of Depression[e]					-	.38**	-.05	.12	.16	.11
6. Family History of Anxiety[f]						-	-.02	.11	.11	.11
7. Recovery from Physical Injuries							-	.33**	.29**	.23*
8. Perceived Threat to Life								-	.45**	.29**
9. PD									-	.49**
10. Anxiety										-
11. Depression										
12. Emotional Support										
13. Instrumental Support										
14. Informational Support										
15. Social Companionship										
16. Perceived Social Constraints										
17. Sense of Belonging										
18. PTSD-Q										
19. IES										

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Table 3 continued.

Pearson Correlations between All Risk Factors and Dependent Variables

Variables	11	12	13	14	15	16	17	18	19
1. Gender [a]	-.03	-.03	-.24**	-.10	-.07	-.16	-.06	.05	.02
2. Prior Trauma [b]	.09	.02	.05	.02	-.06	.09	.01	.16	.05
3. Personal History of Depression [c]	.36**	.01	.04	.07	.05	.25**	.35**	.39**	.29**
4. Personal History of Anxiety [d]	.13	.01	-.05	.01	-.05	.11	.04	.12	.09
5. Family History of Depression [e]	.21*	.02	-.04	-.07	-.06	.07	.09	.14	.03
6. Family History of Anxiety [f]	.05	.02	-.12	-.08	-.06	.08	.00	.09	.08
7. Recovery Physical Injuries	.34**	-.11	-.13	-.11	-.09	.32**	.17	.39**	.37**
8. Perceived Threat to Life	.19*	-.06	-.07	-.05	-.15	.25**	.17	.37**	.38**
9. PD	.45**	-.06	-.09	-.02	-.04	.53**	.43**	.62**	.59**
10. Anxiety	.54**	-.19*	-.06	-.08	-.14	.48**	.47**	.62**	.49**
11. Depression	-	.25**	-.19*	-.19*	-.12	.57**	.67**	.72**	.58**
12. Emotional Support		-	.75**	.69**	.75**	-.26**	-.30**	-.17	-.14
13. Instrumental Support			-	.75**	.68**	-.21*	-.27**	-.15	-.15
14. Informational Support				-	.67**	-.14	-.22*	-.08	-.05
15. Social Companionship					-	-.16	-.17	-.16	-.06
16. Perceived Social Constraints						-	45**	.58**	.48**
17. Sense of Belonging							-	.56**	.44**
18. PTSD-Q								-	.76**
19. IES									-

Note. n = 123

[a] 1 = female, 2 = male. [b] 1 = yes, 2 = no. [c] 1 = yes, 2 = no. [d] 1 = yes, 2 = no. [e] 1 = yes, 2 = no. [f] 1 = yes, 2 = no.

p < .05, two tailed. **p* < .01, two tailed.

3.2   *Aim 1: To establish the portion of variance in PTSS explained by the pre-accident*

       risk factors and to investigate the relationship between pre-accident risk factors and

       PTSS.

       Two hierarchical multiple regression analyses were conducted to examine the portion of variance in PTSS explained by the pre-accident factors. Results of the regression with PTSD-Q scores as the dependent variable are presented in Table 4. Overall, the pre-accident risk factors accounted for 14% of the variance in PTSD-Q scores. The beta-values indicated that only personal history of depression contributed significantly to the model. The part correlation squared for personal history of depression indicated that it explained 13% of the variance in PTSD-Q scores. Results indicate that having a personal history of depression was associated with higher PTSD-Q scores.

       Results of the regression with IES as the dependent variable are presented in Table 5. Overall, the pre-accident risk factors accounted for 6% of the variance in IES scores. The beta-values indicated that only personal history of depression contributed significantly to the model. The part correlation squared for personal history of depression indicated that it explained 9% of the variance in IES scores. Results indicate that having a personal history of depression was associated with higher IES scores.

Table 4

Summary of Hierarchical Regression Analysis for Pre-accident Risk Factors with PTSD-Q as the Dependent Variable

Variable	*pr*	*B*	*SE B*	*β*	*t*	*sr²*
Step 1 [R^2 = .00, adjusted R^2 = .00, $F(1, 121)$ = 0.26, $p > .05$]						
Gender[a]	.05	2.02	3.97	.05	0.51	.00
Step 2 [ΔR^2 = .18, adjusted R^2 = .14, $F(5, 116)$ = 4.97, $p < .001$]						
Gender[a]	.13	5.42	3.86	.12	1.40	.01
Prior Trauma[b]	.06	1.03	1.49	.06	0.69	.00
Personal History of Depression[c]	.37	7.58	1.75	.42***	4.33	.13
Personal History of Anxiety[d]	-.03	-0.57	1.82	-.03	-0.32	.00
Family History of Depression[e]	-.02	-0.32	1.55	-.02	-0.21	.00
Family History of Anxiety[f]	.06	1.01	1.53	.06	0.66	.00

Note. pr = partial order correlations; *B* = unstandardised slope parameter; *SE B* = standard error of Beta; *β* = standard slope parameter; *sr²* = partial correlation squared. [a] 1 = female, 2 = male. [b] 1 = yes, 2 = no. [c] 1 = yes, 2 = no. [d] 1 = yes, 2 = no. [e] 1 = yes, 2 = no. [f] 1 = yes, 2 = no.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 5

Summary of Hierarchical Regression Analysis for Pre-accident Risk Factors with IES as the

Dependent Variable

Variable	*pr*	*B*	*SE B*	*β*	*t*	*sr²*
Step 1 [R^2 = .00, adjusted R^2 = .00, $F(1, 121)$ = 0.07, $p > .05$]						
Gender[a]	.02	.56	2.08	.02	0.23	.00
Step 2 [ΔR^2 = .11, adjusted R^2 = .06, $F(5, 116)$ = 2.76, $p < .05$]						
Gender[a]	.07	1.75	2.10	.07	0.83	.00
Prior Trauma[b]	-.02	-0.21	0.82	-.02	-0.26	.00
Personal History of Depression[c]	.31	3.34	0.96	.35**	3.45	.09
Personal History of Anxiety[d]	-.01	-0.10	0.99	-.01	-0.10	.00
Family History of Depression[e]	-.11	-1.00	0.85	-.13	-1.19	.01
Family History of Anxiety[f]	.10	0.94	0.83	.11	1.13	.01

Note. pr = partial order correlations; *B* = unstandardised slope parameter; *SE B* = standard error of Beta; *β* = standard slope parameter; *sr²* = partial correlation squared. [a] 1 = female, 2 = male. [b] 1 = yes, 2 = no. [c] 1 = yes, 2 = no. [d] 1 = yes, 2 = no. [e] 1 = yes, 2 = no. [f] 1 = yes, 2 = no.
*p < .05. **p < .01. ***p < .001.

3.3   *Aim 2: To investigate the portion of variance in PTSS explained by the accident-*

related risk factors and to investigate the relationships between these risk factors and

PTSS.

Two Hierarchical Multiple Regression Analyses were conducted to examine the

portion of variance in PTSS explained by the accident factors. Results of the regression with

PTSD-Q as the dependent variable are presented in Table 6. Overall, the accident risk factors

accounted for 40% of the variance in PTSD-Q scores. The beta-values indicated that only PD

contributed significantly to the model. The part correlation squared for PD indicated that it

explained 23% of the variance in PTSS. Higher levels of PD were associated with higher

levels of PTSS.

Results of the regression with IES as the dependent variable are presented in Table 7.

Overall, the accident risk factors accounted for 36% of the variance in IES scores. The beta-

values indicated that only PD contributed significantly to the model. The part correlation

squared for PD indicated that it explained 19% of the variance in IES scores, with higher

levels of PD being associated with higher levels of IES scores.

Table 6

Summary of Hierarchical Regression Analysis for Accident Risk Factors with PTSD-Q as the

Dependent Variable

Variable	*pr*	*B*	*SE B*	*β*	*t*	*sr²*
Step 1 [R^2 = .00, adjusted R^2 = .00, $F(1, 116)$ = 0.07, $p > .05$]						
Gender[a]	.05	2.34	4.05	.05	0.58	.00
Step 2 [ΔR^2 = .42, adjusted R^2 = .40, $F(4, 112)$ = 20.39, $p < .001$]						
Gender[a]	.08	2.66	3.21	.06	0.83	.00
Perceived Injury Severity	.07	2.09	2.78	.08	0.75	.00
Recovery from Physical Injuries	.14	5.36	3.55	.16	1.51	.01
Perceived Threat to Life	.03	0.49	1.86	.02	0.26	.00
PD	.53	1.26	0.19	.55***	6.64	.23

Note. pr = partial order correlations; *B* = unstandardised slope parameter; *SE B* = standard

error of Beta; *β* = standard slope parameter; *sr²* = partial correlation squared. [a] 1 = female, 2 =

male.

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

Table 7

Summary of Hierarchical Regression Analysis for Accident Risk Factors with IES as the

Dependent Variable

Variable	*pr*	*B*	*SE B*	*β*	*t*	*sr²*
Step 1 [R^2 = .00, adjusted R^2 = .00, $F(1, 116)$ = 0.04, $p > .05$]						
Gender[a]	.02	0.45	2.12	.02	0.21	.00
Step 2 [ΔR^2 = .39, adjusted R^2 = .36, $F(4, 112)$ = 17.53, $p < .001$]						
Gender[a]	.03	0.49	1.73	.02	0.28	.00
Perceived Injury Severity	.05	0.88	1.51	.06	0.58	.00
Recovery from Physical Injuries	.12	2.42	1.92	.14	1.26	.01
Perceived Threat to Life	.09	1.02	1.00	.08	1.02	.01
PD	.45	0.59	0.10	.49***	5.84	.19

Note. pr = partial order correlations; *B* = unstandardised slope parameter; *SE B* = standard error of Beta; *β* = standard slope parameter; *sr²* = partial correlation squared. [a] 1 = female, 2 = male.

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

3.4   *Aim 3*: *To document the portion of variance in PTSS explained by the maintaining*

   factors and to investigate the relationships between these risk factors and PTSS.

   Two Hierarchical Multiple Regression Analyses were conducted to examine the

portion of variance in PTSS explained by the maintaining risk factors. Results of the

regression with PTSD-Q as the dependent variable are presented in Table 8. Overall, the

maintaining risk factors accounted for 63% of the variance in PTSD-Q scores. The beta-

values indicated that anxiety, depression, social companionship and perceived social

constraints contributed significantly to the model. The part correlation squared indicated that

anxiety explained 4%, depression explained 8%, social companionship explained 2% and

perceived social constraints explained 2% of the variance in PTSD-Q scores. Anxiety,

depression and perceived social constraints were all positively correlated with PTSD-Q

scores, indicating that higher levels of each risk factor were associated with higher levels of

PTSD-Q scores. Social companionship was negatively correlated with PTSD-Q scores,

indicating that lower levels of social companionship was associated with higher levels of

PTSD-Q scores.

   Results of the regression with IES as the dependent variable are presented in Table 9.

Overall, the maintaining risk factors accounted for 38% of the variance in IES scores. The

beta-values indicated that anxiety and depression contributed significantly to the model. The

part square correlation indicated that anxiety explained 3% and depression explained 5% of

the variance in IES scores. Results indicate that higher levels of anxiety and depression were

associated with higher IES scores.

Table 8

Summary of Hierarchical Regression Analysis for Maintaining Risk Factors with PTSD-Q as the Dependent Variable

Variable	*pr*	*B*	*SE B*	*β*	*t*	*sr²*
Step 1 [R^2 = .00, adjusted R^2 = .00, $F(1, 121)$ = 0.00, $p > .05$]						
Gender[a]	.05	2.02	3.97	.05	0.51	.00
Step 2 [ΔR^2 = .65, adjusted R^2 = .63, $F(8, 113)$ = 26.69, $p < .001$]						
Gender[a]	.18	5.12	2.62	.12	1.95	.01
Anxiety	.33	0.36	0.09	.26***	3.73	.04
Depression	.43	0.90	0.18	.43***	5.11	.08
Emotional Support	.22	1.63	0.68	.24*	2.37	.02
Informational Support	.14	1.13	0.73	.14	1.55	.01
Social Companionship	-.20	-1.36	0.62	-.19*	-2.20	.02
Instrumental Support	-.12	-0.93	0.72	-.13	-1.29	.01
Perceived Social Constraints	.25	1.45	0.52	.20**	2.78	.02
Sense of Belonging	.13	0.18	0.13	.11	1.36	.01

Note. pr = partial order correlations; *B* = unstandardised slope parameter; *SE B* = standard error of Beta; *β* = standard slope parameter; *sr²* = partial correlation squared. [a] 1 = female, 2 = male.

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

Table 9

Summary of Hierarchical Regression Analysis for Maintaining Risk Factors with IES as the

Dependent Variable

Variable	pr	B	$SE\ B$	β	t	sr^2
Step 1 [$R^2 = .00$, adjusted $R^2 = .00$, $F(1, 121) = 0.07$, $p > .05$]						
Gender[a]	.02	0.56	2.08	.02	0.27	.00
Step 2 [$\Delta R^2 = .42$, adjusted $R^2 = .38$, $F(8, 113) = 10.40$, $p < .001$]						
Gender[a]	.09	1.81	1.77	.08	1.02	.01
Anxiety	.23	0.17	0.07	.23*	2.54	.03
Depression	.28	0.37	0.12	.34**	3.08	.05
Emotional Support	.08	0.38	0.46	.11	0.82	.00
Informational Support	.11	0.59	0.49	.14	1.19	.01
Social Companionship	.03	0.13	0.42	.04	0.32	.00
Instrumental Support	-.16	-0.86	0.49	-.23	-1.77	.02
Perceived Social Constraints	.17	0.66	0.35	.18	1.88	.02
Sense of Belonging	.04	0.04	0.09	.05	0.46	.00

Note. pr = partial order correlations; *B* = unstandardised slope parameter; *SE B* = standard error of Beta; *β* = standard slope parameter; *sr²* = partial correlation squared. [a] 1 = female, 2 = male.

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

3.5   *Aim 4: To establish the portion of variance in PTSS explained by the combination of pre-accident, accident-related and maintaining risk factors.*

Two Hierarchical Multiple Regression Analyses were conducted to examine the portion of variance in PTSS explained by the pre-accident, accident-related and maintaining factors combined. Results of the regression with PTSD-Q as the dependent variable are presented in Table 10. Overall, the risk factors accounted for 65% of the variance in PTSD-Q scores. The beta-values indicated that four risk factors, PD, anxiety, depression and social companionship, contributed significantly to the model. The part correlation squared indicated that PD explained 2%, anxiety 2%, depression 6% and social companionship explained 1% of the variance in PTSD-Q scores. Higher levels of PD, depression, anxiety and lower levels of social companionship were associated with higher PTSD-Q scores.

Results of the regression with IES as the dependent variable are presented in Table 11. Overall, the risk factors accounted for 44% of the variance in IES scores. The beta-values indicated that PD and depression contributed significantly to the model. The part correlation squared indicated that PD explained 4% and depression explained 5% of the variance in IES scores. Higher levels of PD and depression were associated with higher IES scores.

Table 10

Summary of Hierarchical Regression Analysis for All Risk Factors with PTSD-Q as the

Dependent Variable

Variable	*pr*	*B*	*SE B*	*β*	*t*	*sr²*
Step 1 [R^2 = .00, adjusted R^2 = .00, $F(1, 116)$ = 0.34, $p > .05$]						
Gender[a]	.05	2.34	4.05	.05	0.58	.00
Step 2 [ΔR^2 = .70, adjusted R^2 = .65, $F(17, 99)$ = 13.52, $p < .001$]						
Gender[a]	.16	4.63	2.83	.11	1.63	.01
Prior Trauma[b]	.01	0.13	1.02	.01	0.13	.00
Personal History of Depression[c]	.09	1.33	1.35	.07	0.98	.00
Personal History of Anxiety[d]	.04	0.45	1.25	.02	0.36	.00
Family History of Depression[e]	-.03	-0.36	1.04	-.02	-0.34	.00
Family History of Anxiety[f]	-.00	-0.01	1.03	.00	-0.01	.00
Perceived Injury Severity	.08	1.68	2.19	.06	0.77	.00
Recovery from Physical Injuries	.05	1.36	2.84	.04	0.48	.00
Perceived Threat to Life	.06	0.87	1.53	.04	0.57	.00
PD	.24	0.45	0.18	.19*	2.43	.02
Anxiety	.23	0.24	0.10	.18*	2.36	.02
Depression	.41	0.82	0.19	.40***	4.44	.06
Emotional Support	.18	1.26	0.71	.19	1.77	.01
Informational Support	.13	0.93	0.73	.12	1.27	.01
Social Companionship	-.20	-1.29	0.63	-.19*	-2.05	.01
Instrumental Support	-.09	-0.64	0.74	-.09	-0.87	.00
Perceived Social Constraints	.13	0.75	0.56	.11	1.33	.01
Sense of Belonging	.09	0.13	0.14	.08	0.95	.00

Note. pr = partial order correlations; *B* = unstandardised slope parameter; *SE B* = standard error of Beta; *β* = standard slope parameter; *sr²* = partial correlation squared. [a] 1 = female, 2 = male. [b] 1 = yes, 2 = no. [c] 1 = yes, 2 = no. [d] 1 = yes, 2 = no. [e] 1 = yes, 2 = no. [f] 1 = yes, 2 = no.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 11

Summary of Hierarchical Regression Analysis for All Risk Factors with IES as the

Dependent Variable

Variable	*pr*	*B*	*SE B*	*β*	*t*	*sr²*
Step 1 [R^2 = .00, adjusted R^2 = .01, $F(1, 116)$ = 0.04, $p > .05$]						
Gender[a]	.02	0.45	2.12	.02	0.21	.00
Step 2 [ΔR^2 = .53, adjusted R^2 = .44, $F(17, 99)$ = 6.53, $p < .001$]						
Gender[a]	.01	0.15	1.85	.01	0.08	.00
Prior Trauma[b]	-.10	-0.68	0.67	-.08	-1.03	.01
Personal History of Depression[c]	.04	0.30	0.88	.03	0.34	.00
Personal History of Anxiety[d]	.04	0.34	0.82	.03	0.42	.00
Family History of Depression[e]	-.17	-1.16	0.68	-.15	-1.70	.01
Family History of Anxiety[f]	.09	0.60	0.67	.07	0.89	.00
Perceived Injury Severity	.03	0.45	1.44	.03	0.31	.00
Recovery from Physical Injuries	.05	1.02	1.86	.06	0.55	.00
Perceived Threat to Life	.17	1.70	1.00	.15	1.70	.01
PD	.29	0.36	0.12	.30**	3.03	.04
Anxiety	.11	0.07	0.07	.09	1.05	.01
Depression	.31	0.39	0.12	.36**	3.19	.05
Emotional Support	-.02	-0.09	0.47	-.03	-0.19	.00
Informational Support	.08	0.40	0.48	.09	0.84	.00
Social Companionship	.07	0.27	0.41	.07	0.66	.00
Instrumental Support	-.10	-0.48	0.48	-.13	-1.00	.01
Perceived Social Constraints	.00	0.00	0.36	.00	0.01	.00
Sense of Belonging	-.02	-0.02	0.09	-.02	-0.18	.00

Note. pr = partial order correlations; *B* = unstandardised slope parameter; *SE B* = standard error of Beta; *β* = standard slope parameter; *sr²* = partial correlation squared. [a] 1 = female, 2 = male. [b] 1 = yes, 2 = no. [c] 1 = yes, 2 = no. [d] 1 = yes, 2 = no. [e] 1 = yes, 2 = no. [f] 1 = yes, 2 = no.

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

CHAPTER 4: DISCUSSION

The present study assessed a range of risk factors for the development of PTSS and found that only a small number of risk factors significantly contributed to the prediction of PTSS. This finding has significant implications for the development of a brief psychological instrument which can be given to MVA survivors to identify those at increased risk of developing PTSS.

This study extended previous research in two distinct ways. First, by examining a broader range of risk factors in combination than previous studies new information was gained about the unique variance of individual risk factors when additional risk factors are also considered. Second, five human relatedness variables, emotional support, informational support, instrumental support, social companionship support and sense of belonging were examined as potential predictors of PTSS in MVA victims for the first time.

Discussion of the results is presented in the order of the original aims and hypotheses, before consideration is given to the implications and limitations of the study and recommendations for future research.

4.1   *Aim 1 – The variance in PTSS explained by the pre-accident risk factors and the*
        relationship between pre-accident risk factors and PTSS

The group of pre-accident risk factors consisted of gender, prior history of trauma, personal history of depression, personal history of anxiety, family history of depression and family history of anxiety. This group of risk factors accounted for 14% of the variance in trauma symptoms in PTSD-Q scores and 6% in IES scores. Five of the six variables, specifically gender, prior history of trauma, personal history of anxiety, family history of

depression and family history of anxiety, were not significant predictors of PTSS. When the six variables comprising the pre-accident risk factors group were examined in combination the only factor that was significant in predicting the development of PTSS was a personal history of depression. In the current sample a personal history of depression explained 13% of unique variance in PTSD-Q scores and 9% in IES scores. This indicates that victims who reported experiencing higher levels of depression prior to their accident were more likely to report higher levels of PTSS in the aftermath of their accident than victims who reported experiencing lower levels of depression prior to their accident. The results therefore support the hypothesis that victims with higher levels of depression prior to their MVA would have higher levels of PTSS following their MVA.

The hypothesis that a personal history of depression would predict PTSS with those reporting higher levels of levels of depression reporting greater PTSS was supported. There is strong evidence in the trauma literature to suggest that a history of depression is related to an increased vulnerability to PTSS following a traumatic experience (Shalev et al., 1998). The reasons for this relationship are poorly understood (Bleich et al., 1997). There is debate within the literature about whether PTSS and depressive symptoms are distinct trauma reactions (Golier et al., 2001). It may be that some individuals who developed depressive symptoms prior to their MVA did some due to a psychological vulnerability related to the same vulnerability to develop PTSS following their MVA. Whilst there needs to be further investigation into the relationship between depression which develops both before and after exposure to trauma and PTSS, it is clear that assessing personal history of depression and current depressive symptoms in trauma victims following exposure is important, as

depressive symptoms and PTSS interact to significantly worsen prognosis (Shalev et al., 1998).

The hypothesis that a family history of depression would also predict PTSS was not supported. This finding that personal but not family history of depression predicts PTSS does not support the findings of Ursano, Fullerton, Epstein, Crowley, Tzu-Cheg and colleagues (1999), which indicated that a family history as well as a personal history of psychiatric disorder is significant. Family history of depression in the current sample was measured by the victims self-report of their knowledge relating to other family members having experienced depressive symptoms. It may be that this form of assessment of family history of depression was not adequate to capture the influence of family history of depression on the victims PTSS. Alternatively, family history of depression may tap only a family's genetic tendency to depressive symptomatology and hence be relevant to the victims PTSS only indirectly. Those victims with a family history of depression are more likely to have a personal history of depression which is in turn important in the development of PTSS.

The finding that gender was not a significant predictor of PTSS in the current sample is inconsistent with the trauma literature. It was hypothesised, based upon the literature (Seedat et al., 2005), that females would report higher levels of PTSS. One possible explanation for this finding is the self-selective nature of the sample. Unlike many studies (e.g. Freedman et al., 1999; Harvey & Bryant, 1998) in this area, which examined successive attendees at hospital emergency departments, this study relied primarily upon community volunteers. It may be that females with low levels of trauma symptoms choose to participate in the current study whilst males with low levels of trauma symptoms were more likely to not

participate, resulting in minimal differences between the genders in trauma symptoms experienced within the current sample.

The hypothesis that prior trauma would predict PTSS was rejected. Unlike previous studies which have used the victim's self-report of prior traumatic experiences (Ursano, Fullerton, Epstein, Crowley, Tzu-Cheg et al., 1999) the current study found no relationship between prior trauma and the development of PTSS. The non-significant result in the current sample may highlight the inadequacies of self-report of traumatic experiences. This result may also reflect the need for a clinician rating of prior trauma to ensure minimum levels of intrusive and avoidant symptoms are met as well as the time criteria specified in DSM-IV.

The hypotheses that a personal history of anxiety would predict PTSS and the hypothesis that a family history of anxiety would predict PTSS were not supported. In the current sample, neither a personal history of anxiety nor a family history of anxiety influenced subsequent PTSS. Whilst a personal history of depression was a significant predictor of PTSS, a personal history of anxiety did not appear to influence the victim. Although there is support within the literature for a family history of anxiety, other studies have found no relationship between this construct and predictions of PTSS (Ursano, Fullerton, Epstein, Crowley, Tzu-Cheg et al. 1999). Given the inconsistent findings of studies investigating the role of psychiatric history in the prediction of PTSS there appears to be a need for a more standardised way of measuring psychiatric history. It is often very difficult to ascertain how psychiatric history was measured and what aspects of psychiatric history were investigated in trauma studies involving MVA victims.

Collectively, the results pertaining to the first aim of the study indicate that when these six pre-accident risk factors are assessed in combination, it is only a personal history of

depression which significantly contributes to predictions of the development of PTSS.

Explaining between 9% and 13% of unique variance in PTSS depending on the PTSS

measure used, a personal history of depression would appear to be an important pre-accident

risk factor.

4.2   *Aim 2 – The variance in PTSS explained by the accident-related risk factors and the*

        relationship between accident-related risk factors and PTSS

        The group of accident-related risk factors made up of perceived injury severity,

recovery from physical injuries, perceived threat to life and PD explained 40% of the

variance in PTSS in PTSD-Q scores and 36% in IES scores. Three factors, namely perceived

injury severity, recovery from physical injuries and perceived threat to life, were not

significant when all accident-related risk factors were examined collectively. PD, however,

was shown to be a highly significant risk factor for the development of PTSS. PD explained

23% of unique variance in PTSD-Q scores and 19% in IES scores. This indicates that victims

who reported experiencing higher levels of PD symptoms were more likely to report

experiencing higher levels of PTSS.

        The finding that PD is a significant predictor of PTSS supports previous findings

which have indicated that PD is one of the most robust predictors of PTSD in the MVA

trauma literature as well as the broader trauma literature (Birmes et al., 2005; Jaycox et al.,

2003; Marx & Sloan, 2005; Ozer et al., 2003) and can predict the development of PTSS

independently of the level of trauma exposure and general dissociative tendencies (Marmar et

al., 1994). The alterations in mental state and detachment from on-going experience typical

of PD is believed to create a psychological context in which PTSS can and frequently does,

develop (Tampke & Irwin, 1999). There is evidence (Birmes et al., 2005; Marx & Sloan, 2005) to indicate that the level of dissociative symptoms experienced by victims during and after trauma may be related to the trauma severity, perceived threat to life and feelings of helplessness during the trauma. This may explain why perceived threat to life, recovery from physical injuries and perceived injury severity were not significant predictors in the current sample when examined in combination with PD. The current study may therefore provide further support for the notion that measuring PD in MVA survivors may negate the need to measure such variables as trauma severity and perceived threat to life, as they will be reflected within PD levels.

PD is believed to assist the victim in avoiding particular aspects of the trauma in an attempt to cope with the experience. It may be that dealing with a high level of perceived threat to life during the accident and on-going physical health problems may influence the use of PD (Foa & Hearst-Ikea, 1996; Wagner & Linehan, 1998).

Collectively, the results of Aim 2 indicate that when these four accident-related risk factors are assessed in combination it is only PD which significantly contributes to predictions of the development of PTSS. Explaining between 19% and 23% of unique variance in PTSS depending on the PTSS measure used, PD appears to be an important accident-related risk factor.

4.3   *Aim 3 – The variance in PTSS explained by maintaining risk factors and the*
        relationship between maintaining risk factors and PTSS

The maintaining risk factors, consisting of anxiety, depression, emotional support, informational support, instrumental support, social companionship, perceived social

constraints and sense of belonging accounted for 63% of the variance in PTSS in PTSD-Q

scores and 38% in IES scores. In PTSD-Q scores five of the eight maintaining risk factors

examined were shown to be significant in predicting PTSS development. These factors were;

anxiety, depression, emotional support, social companionship and perceived social

constraints. Anxiety explained 4%, depression 8%, emotional support 2%, social

companionship 2% and perceived social constraints 2% of unique variance in PTSD-Q

scores. In IES scores two of the eight maintaining risk factors examined were shown to be

significant in predicting PTSS development. These factors were anxiety and depression

which explained 3% and 5% of unique variance in IES scores respectively.

The hypothesis that higher levels of anxiety would be associated with higher levels of

PTSS was supported in both PTSD-Q and IES scores. There is a significant body of

empirical evidence indicating that anxiety is a common consequence of a MVA and is highly

correlated with PTSS (Maes et al., 2000; Manne et al., 2004).

The hypothesis that higher levels of depression would be associated with higher

levels of PTSS was supported in PTSD-Q and IES scores. In the current sample depression

explained the largest portion of unique variance in PTSS, reconfirming the importance of this

construct in the development of PTSS following a MVA. The current finding of the

importance of depression supports a number of similar studies involving MVA survivors

(Bleich et al., 1997; Galovski et al., 2003; Turton et al., 2001). As discussed earlier, it is

difficult to determine the reasons why higher levels of depression are associated with higher

levels of PTSS (Bleich et al., 1997). It appears necessary for further research to be conducted

to elucidate the relationship between PTSS and depressive symptoms, to determine whether

depressive symptoms are 'secondary' to PTSS in that their onset follows that of the PTSS, or

whether the onset of both disorders occurs simultaneously (Kessler et al., 1995).

Understanding the nature of this relationship will in turn provide a stronger basis on which to

draw conclusions about the relationship between depression and other variables which have

been implicated in the maintenance of trauma symptoms (e.g., social support; Elal & Krespi,

1999).

The present study sought to build on the current road trauma literature by

investigating the unique variance explained by four aspects of social support; emotional

support, informational support, instrumental support and social companionship. Whilst social

support is recognised as a predictor of PTSS specific aspects of social support have not been

examined in combination to investigate the unique variance in PTSS they explain.

The hypothesis that lower levels of emotional support would be associated with

higher levels of PTSS was supported for PTSD-Q scores. This finding, with MVA victims,

supports studies with other trauma victims (Stephens & Long, 1999), which have found

emotional support to be implicated in the development and resolution of PTSS in various

trauma populations. Emotional support in the current study referred to the social support that

the victim received which allowed them to share important matters and feelings (Leinonen et

al., 2003). It is believed that victims who perceive emotional support being available to them,

specifically, the opportunity to talk about their traumatic experience and to express emotions

connected with the trauma, report less PTSS (Willebrand et al., 2001). When victims utilise

emotional supports around them it is believed that they are cognitively processing the trauma

which in turn is believed to lead to the facilitation of adjustment to the traumatic event

(Lepore & Helgeson, 1998).

The hypothesis that lower levels of social companionship would be associated with higher levels of PTSS was supported for PTSD-Q scores. Social companionship is a measure of the victim's shared interests and involvement with those around them including their partner, family, friends, colleagues and others (Timmerman et al., 2000). Those victims in the present study who reported experiencing low levels of social companionship were more likely than those reporting higher levels of social companionship to develop PTSS. The present study indicates that this form of social support may be of particular interest to clinicians attempting to predict the development of trauma symptoms. This is the first study to test and provide evidence of the important role of social companionship in the development of PTSS in MVA victims. Should this finding be replicated it may lead to much more efficient and effective assessment of a victim's current social supports as they relate to the prediction of the development of PTSS.

The hypothesis that higher levels of perceived social constraints would be associated with higher levels of PTSS was also supported for PTSD-Q scores. Whilst emotional support assesses the perceived availability of emotional support, the variable perceived social constraints measures the barriers to social support more generally. The present finding supports previous studies (Lepore & Helgeson, 1998; Manne et al., 2000; Turton et al., 2001) using non-MVA trauma populations which have found perceived social constraints play an important role in the development of PTSS. Perceived social constraints have been shown to be particularly important as a barrier to the resolution of PTSS. Whereas low levels of social companionship, for example, may be involved in allowing PTSS to develop, the victim's perceived social constraints may be primarily involved in preventing a resolution to PTSS. This may mean that perceived social constraints become a more important factor in resolving

PTSS as the time since the accident increases. The present study provides evidence to suggest that perceived social constraints are important for clinicians assessing and treating MVA survivors who have been involved in an accident in the past 12 months. When coupled with the earlier finding (Manne et al., 2000) which indicated that perceived social constraints can impede adjustment for seven years and beyond, this variable becomes extremely relevant to the assessment and treatment of PTSS.

The hypothesis that lower levels of informational support would be associated with higher levels of PTSS was not supported. Information support in this study measured the support that the victims received in the form of advice, suggestions, guidance and factual information. Similar to instrumental support, informational support was not correlated with either PTSD-Q scores or IES scores. This would indicate that victims who received advice, suggestions, guidance and factual information from family, friends, colleagues and others were not protected from PTSS.

The hypothesis that lower levels of instrumental support would be associated with higher levels of PTSS was not supported. Instrumental support in this study measured the practical help received with activities like child care, domestic chores and financial aid that was available to the victim. Instrumental support was not correlated with either PTSD or IES in the current sample. This indicates that it was not that instrumental support was not significant when measured in combination with the other human relatedness factors in the study, but simply had no relationship to PTSS in the current sample.

The hypothesis that lower levels of sense of belonging would be associated with higher levels of PTSS was not supported. Sense of belonging was highly correlated with both PTSD and IES, indicating that victims who reported lower levels of sense of belonging were

more likely to report higher levels of PTSS. However, when sense of belonging was assessed in combination with the other maintaining risk factors examined in the study, sense of belonging was no longer significant. This indicates that sense of belonging as a predictor of PTSS did not add to the model of predictor variables which included anxiety, depression, emotional support, companionship support and perceived social constraints.

Sense of belonging was tested on MVA survivors for the first time in the present study as a theoretically derived potential predictor following a study which indicated that sense of belonging was important in the development of depression following trauma exposure (Bay et al., 2002). There are number of reasons why, despite the findings of Bay and colleagues, that the present study found sense of belonging to not assist in predicting PTSS. The earlier study used a sample of brain injured trauma survivors, whereas brain injured survivors were eliminated from the present study. Only 70% of the participants in the earlier study were involved in a MVA compared with 100% in the current study. Also, 64% of the sample was unconscious at some time during or immediately after their accident whereas all such victims were eliminated from the current study. The earlier study also did not examine a range of human relatedness variables in combination with sense of belonging to predict outcome. Had more variables been included, particularly human relatedness variables such as specific aspects of social support and perceived social constraints, the role of sense of belonging may have been seen to be different. Finally, it is also important to note that the outcome variable was depression in the earlier study as opposed to PTSS in the current study.

Overall, the present findings indicating that certain aspects of social support, namely emotional support and social companionship, are significant predictors of PTSS whilst

instrumental support and informational support are predictors of PTSS. These findings

provide a significant advance on previous research examining social factors related to PTSS.

Whilst social support is recognised as an important risk factor, there was very little evidence

within the MVA trauma literature to indicate which aspects of social support are most

important. Similarly, the non significant result found for sense of belonging provides further

insight into the role of human relatedness factors in the development of PTSS in MVA

victims.

4.4   *Aim 4 – The variance in PTSS explained by the combination of all risk factors and the*

        relationship between all risk factors and PTSS

        When all risk factors were assessed in combination, only a small number of risk

factors were significant in predicting PTSS. In PTSD-Q scores all seventeen risk factors

collectively accounted for 65% of the variance in PTSS, but only four factors significantly

contributed to the model of predictive variables. Whilst PD, anxiety and depression are well

established predictor variables, the finding that social companionship remains a significant

predictor when assessed in combination with such a broad range of additional predictor

variables is important.

        This finding in PTSD scores would indicate that rather than needing to assess all

seventeen variables to predict PTSS, it may be possible to assess only PD, anxiety,

depression and social companionship to predict PTSS. It is also of interest that this finding

indicates that when variables are assessed in combination, pre-accident risk factors, such as

psychiatric history, are not significant. Only one variable relating to the time of the accident,

PD, is significant, whilst the remainder of the variables, namely anxiety, depression and social companionship are maintaining risk factors.

The current model, which collectively accounted for 65% of the variance in PTSD-Q scores, explained slightly more variance than other similar studies. A total of 43% of the variance in PTSS was accounted for in a model comprising PD, anxiety, age, education and trauma severity (Shalev et al., 1996) and a total of 61% of the variance in PTSS was accounted for in a model comprising, depression, history of psychiatric treatment, prior PTSD and prior MVA (Harvey & Bryant, 1999). Whereas 65% of the variance was accounted for in the current sample, there remains a significant portion of the variance in PTSS which remains unexplained. The most salient risk factors within the literature were selected for examination in the current study. Given these seventeen risk factors were only able to explain 65% of the variance in PTSS using PTSD scores as the dependent variable, it would indicate that a number of important factors are still to be elucidated which influence PTSS following exposure to a MVA.

The seventeen risk factors collectively accounted for 44% of the variance in IES scores. Only two of the seventeen risk factors, PD and depression, were significant. Results indicated that the risk factors accounted for considerably less variance in IES scores compared to PTSD scores. Also the number of significant variables reduces from four in PTSD scores to just two in IES scores.

Overall, it is significant that the present study using seventeen of the most salient risk factors acknowledged within the literature found that these risk factors when assessed in combination reduced to between two and four significant risk factors, depending on the dependent variable.

4.5   *Human Relatedness*

This study extended previous research by empirically testing sense of belonging as a predictor of PTSS in motor vehicle accident victims. Within the general population there is now clear evidence to suggest that sense of belonging is an important predictor of mental health (Bailey & McLaren, 2005; Hagerty et al., 1996; Kissane & McLaren, 2006). Feelings of belonging and connectedness to such things as school, work, family and the community are protective factors against depression and suicide (Bay et al., 2002). For the first time Bay and colleagues (2002) established that this relationship may extend to trauma exposed individuals, when they found that a high level of sense of belonging compensated for the adverse affects of trauma and served to reduce depressive symptoms following trauma.

The present study was not able to establish that sense of belonging acted in this manner for MVA victims. It would appear for MVA victims in the aftermath of trauma that rather than belongingness to wider groups protecting against psychopathology, it is social companionship which is critical. Acts of social companionship include visiting the victim, phoning them for a chat and inviting them shopping or to the movies. In the current research it was evident that emotional support such as cheering the person up, instrumental support such as providing advice and guidance and informational support such as supporting the victim's actions were not important in protecting against the development of PTSS.

It appears important to understand the MVA victim's social companionship supports in order to plan appropriate treatment. Social companionship support from family, friends and co-workers allows the victim to work though the trauma. Adequate social companionship support has also been linked with a reduction in dissociative tendencies (Wastell, 2005). According to Wastell, adequate social companionship support can assist the victim to use

treatment to incorporate the trauma into a revised self-schema. Placing the trauma within the larger perspective of the victim's life through a revised self-schema is believed to be critical to the dissipation of dissociative tendencies surrounding the trauma.

4.6   *Implications of the Present Research*

It is widely recognised within the literature that early identification of risk factors is needed to provide effective prevention and intervention for individuals who are at risk of developing PTSS (Gist & Devilly, 2002; Heinrichs et al., 2005; Yehuda, 1999). The present study was able to reduce seventeen risk factors, recognised and theoretically linked to the development of PTSS, to four key factors. This would indicate that rather than needing to examine large numbers of risk factors to predict trauma outcome, a small number of key risk factors could provide the same information as much more extensive testing. It appears that the literature is slowly moving towards this aim, which may facilitate psychological interventions that could potentially reduce chronic psychopathology (Kangas et al., 2005).

The current research would suggest that attempts to identify at risk individuals should focus upon PD, anxiety, depression and social companionship. Each of these variables will be discussed in relation to treatment of MVA victims.

The present study highlights the value of assessing PD symptoms in MVA trauma survivors. There is now substantial evidence in MVA (Fullerton et al., 2000) and non-MVA (Griffin, Resnick, & Mechanic, 1997) trauma populations that PD symptoms are implicated in the development of PTSS. An advantage of assessing PD specifically is that trauma exposed individuals who have high levels of dissociation are likely to exhibit a discrepancy between their self-reported levels of distress and objective physiological indicators of distress

in laboratory settings (Griffin et al., 1997). This indicates that assessing PD specifically through self-report measures may provide information about the trauma-exposed individual's likelihood of developing PTSS that may not arise from a face to face diagnostic interview which does not include specific questioning of PD symptoms (Griffin et al., 1997). Accident related anxiety, or anxiety phobia (Mayou et al., 1993), is believed to be more common in MVA victims than fully developed PTSD. In the present sample, higher levels of accident anxiety were associated with higher levels of PTSS. Anxiety in MVA victims tends to be particularly persistent (Kuch et al., 1995). Given the evidence in this study and the broader literature attesting to the importance of accident anxiety in predicting the development of PTSS, it may be valuable to assess accident anxiety in recently exposed MVA victims.

Assessing depression specifically in trauma exposed individuals can inform prediction and/or diagnosis of PTSS and PTSD (Shalev et al., 1998). Depressive symptoms following trauma exposure are associated with greater PTSS severity and lower levels of functioning. Diagnosing a victim with PTSD has different treatment implications to diagnosing a victim with PTSD and comorbid depression. Hence, assessing depression following trauma exposure can assist in predicting the development of PTSS. Depression can also guide treatment. It has been suggested that when depression and PTSS are present following trauma exposure, both need to be targeted by early treatment interventions (Shalev et al., 1998).

The present study found that low levels of social companionship were associated with higher levels of PTSS. This would indicate that social companionship support, in the present sample, more so than informational support, instrumental support, emotional support and

perceived social constraints, influenced the development of PTSS. This would appear to indicate that specifically assessing social companionship support in MVA victims following their MVA may guide predictions of the likely development of PTSS. It has long been established that supportive interactions can protect the victim from the consequences of trauma and can facilitate coping (Laakso & Paunon-Ilmonen, 2002). The present finding may indicate the supportive interactions (i.e., social companionship), which are most important in guarding against the development of PTSS. At present there is no treatment protocol specifically targeted at treating low levels of social companionship. It may be valuable for future research to examine the effects of a treatment program aimed at boosting low levels of social companionship following MVA trauma exposure to protect against the development of PTSS.

The present study supports earlier findings (Fuglsang, Moergeli, & Schnyder, 2004) which indicate that dissatisfaction with the received social support in the aftermath of a MVA is significantly related to the subsequent development of PTSS. This highlights the importance of mobilising social support following an accident. This could be achieved by making sure that the victim has adequate levels of social companionship support. It may also be appropriate to provide information to close friends and relatives about how to provide appropriate support in the form of social companionship support to the MVA victim following their accident.

An important implication for those clinicians working in a hospital setting relates to the current findings concerning the accident-related risk factor group. The present study supports the earlier findings of Fuglsang and colleagues (2004) who suggest that in the acute aftermath of a traffic accident, the assessment of which victims need psychological support

or treatment should not be guided solely by the severity of physical injuries. Whilst there is support within the trauma literature for perceived threat to life, on-going physical injuries and perceived injury severity as predictors of trauma outcome, it would appear from the current findings that when assessed in combination with additional factors such as PD, anxiety, depression and social companionship, these variables do not play a significant role in predicting subsequent PTSS. It may be that whilst physical injuries are such a salient indicator for clinicians consulting victims in the acute aftermath of MVA exposure, the most critical factors to measure are PD, depression, anxiety and social companionship.

4.7   *Limitations of the Present Research*

Several limitations are evident in the present research which may have impacted upon the results, including the reliance upon self-report measures, psychological screening, sample composition and the generalisation of results. Each of these points will be discussed in turn.

The present study relied upon self-report measures which have several limitations (Birmes et al., 2005). Self-report measures involve an inherent risk that respondents can answer in a socially desirable manner (Shaughnessy & Zechmeister, 1994). More specifically to MVA victims, there is some evidence (Green et al., 1998) to suggest that self-report measures can overestimate diagnosis because there is no opportunity for the interviewer to assess the severity of a particular symptom or to determine whether the symptoms arose or worsened only after the MVA. Future studies would therefore benefit from using a diagnostic interview, where practical, to determine PTSS status. According to Mathews (2005), this would overcome the absence of baseline functioning measures with which to compare post-

trauma functioning so that it can be concluded whether or not current functioning is a result of the trauma.

The measurement of psychiatric difficulties within the family would have been measured more accurately by assessing family members face to face. This type of assessment was not practical in the present study. Consistent with some previous studies this variable was measured by the victims self-report of their family members psychiatric difficulties.

Countering some of these limitations of self-report measures are the positive aspects of using a self-report methodology. There is evidence to suggest that when highly personal and potentially embarrassing information is required from participants, self-report surveys, particularly when they are confidential as they were in the present study, are the most reliable method of collecting such data (Shaughnessy & Zechmeister, 1994).

The assessment of the victim's MVA was retrospective and hence may have been biased by current mood (Andrykowski, Cordova, Studts, & Miller, 1998). There is evidence (Andrykowski et al., 1998) to suggest that mood dependent memories may inflate reports of past traumatic events in individuals experiencing PTSS. The degree to which this may have occurred in the present study is unknown.

The use of cross-sectional data rather than prospective data is a limitation of the present study. As the study was cross-sectional the relationships between variables can not be inferred. Longitudinal research would have allowed the direction of relationships to be inferred and therefore provided additional information about the relationships between variables which can not be ascertained by cross-sectional research.

The use of a variable time frame (from one month to twelve months post trauma) is a limitation. The variable time frame was not assessed. When setting up the study it was

planned to assess victims according to the amount of time since their accident. It was a consequence of the difficulty in recruiting participants that the time since the accident was not able to be assessed.

The internal consistency of the perceived social constraints scale was a limitation of the study. As 51.2% of participants in the study did not have a partner, it was necessary to modify the scale. Unfortunately, the single scale measure of perceived social constraints in the present study had a Cronbach's alpha of .53 which indicates a low level of internal reliability. A use of a measure of perceived social constraints with a higher level of internal reliability in future research may provide further information about the role of perceived social constraints as a predictor of PTSS.

Despite significant effort being made to ensure that the sample was representative of the Australian road using public, the self-selective nature of the study may mean that the sample is not representative of Australian road accident victims. It is possible that some individuals declined participation because of avoidance symptoms of PTSD or because they were well adjusted and they perceived the study as irrelevant to them. Both of these potential scenarios would affect the representativeness of the sample and hence the prevalence of PTSS within the sample. Additionally, the use of a non-clinical population does not allow the current results to be generalised to clinically traumatised individuals. The use of a non-clinical population can result in low mean scores on PTSS and a floor effect. The small sample size also reduces the ability to make generalisations. The lack of participation from organisations with an interest in the mental and physical well-being of Australian motorists was disappointing. This research highlights the need for a more integrated approach to mental health research within the Australian public sector to better foster the interest of

Australian motorists. Due to this lack of participation, the sample was smaller than would have been ideal, but allowed for a greater range of organisations and allied health professionals to be involved than may be the case with other research. Due to the small sample size significant effort was made to gain participants from various sources which may have improved the representativeness of the sample, rather than relying upon one trauma clinic or hospital emergency department for participants as is frequently the case in MVA research. Finally, because of the small sample size it was not possible to analyse gender separately. Given the evidence within the literature (Seedat et al., 2005) indicating the significant differences in the ways in which males and females experience PTSS, the small sample size was a limitation.

4.8   *Recommendations for Future Research*

The present study indicates, in an Australian context, that MVA victims are at risk of developing pathological stress responses. At present these individuals are not receiving timely and specific interventions for their needs, but rather are often being treated after significant psychopathology has developed (Chan et al., 2003). Given the significant advances made in the treatment of PTSD over the past decade (Bryant, Moulds, Guthrie, & Nixon, 2005; Devilly, 2001), this situation needs to be the focus of future research. Whilst progress has been made in regards to understanding the specific risk factors affecting this population, much work is still needed to assess the roles of these risk factors collectively in the Australian context and to move towards specific and timely mental health interventions in the acute aftermath of MVA-related trauma exposure.

The small sample size was a limitation of the present study. It is necessary to examine the role of PD, depression, anxiety and social companionship as predictors of PTSS in MVA victims with a larger sample. In addition, the predictors need to be tested separately for males and females.

The current finding that pre-accident risk factors are not significant risk factors when examined in combination with accident risk factors such as PD and maintaining factors such as depression, anxiety and social companionship, are important. This study provides a foundation for further Australian research to not only replicate the findings but to further elucidate the relationship between these variables and particularly social companionship and PTSS.

Three findings of the present study should, in particular, be used as a basis to guide future research in the area. First, the present study indicates that social companionship may be of more interest to clinicians attempting to predict the development of trauma symptoms than more general measures of global social support. This is the first study to test and provide evidence of the important role of social companionship in the development of PTSS in MVA victims. Future research should attempt to replicate the relationship between social companionship and PTSS, as this finding may lead to more efficient and effective assessment of a victim's current social supports as they relate to the prediction of the development of PTSS.

The current finding that PD is a highly significant predictor of the development of PTSS supports the wider trauma literature and highlights the on-going need for further research into this construct. Almost a decade ago Ehlers and colleagues (1998) called for further investigation into PD which had, until that time, been infrequently examined. This

research effort needs to focus upon the relationship between PD and other variables implicated in the trauma experience such as perceived injury severity and perceived threat to life. There remains only a modest level of understanding within the literature regarding the role of PD in the development and resolution of PTSS following a MVA (Brown et al., 1998; McNally, 2005; Pope et al., 1999). The sheer amount of variance in PTSS accounted for by PD across studies, however, indicates that it is a variable of significant interest to our future progress in understanding the predictors of PTSS (Birmes et al., 2005; Jaycox et al., 2003; Marx & Sloan, 2005; Ozer et al., 2003).

The present study also indicates that once a variable is established as a risk factor for developing PTSS, it is valuable to understand what portion of variance this factor explains in the development of PTSS when assessed in combination with other predictor variables. It was less than a decade ago that Ehlers and colleagues (1998) observed that limited research has been conducted to examine the portion of variance in PTSS following a MVA that could be explained by groups of risk factors. Although this has changed somewhat there is still a need to move further towards large scale studies involving broader ranges of predictor variables.

CHAPTER 5: CONCLUSION

MVA trauma research has tended to focus upon individual risk factors and small groups of risk factors. MVA victims do not experience risk factors in isolation, however, but rather experience all risk factors collectively. The present research measured the combined portion of variance in trauma symptoms explained by seventeen risk factors involved in the psychological outcome of road trauma victims and provided a comprehensive understanding of the relationships between predictor variables and a more complete picture of the influence of a range of risk factors on the development of PTSS in MVA victims. It was found that when a large number of risk factors were examined collectively, between two and four were significant as predictors of PTSS. This finding is significant for the assessment and treatment of MVA-related PTSS. If only a small number of risk factors need to be assessed to make an accurate prediction of whether or not PTSS will develop, clinicians may be able to more efficiently identify victims at increased risk of developing PTSS and provide targeted interventions.

The present study expanded upon previous research to investigate a number of risk factors for PTSS which were yet to be investigated in MVA victims. Social support is recognised to be implicated in the development of trauma symptoms in MVA victims however, until now only global measures of social support were reported. The current study was able to identify specific aspects of social support which may be implicated in the development of PTSS and other aspects which may not be involved. The finding that low levels of companionship support can increase the likelihood of MVA victims developing PTSS provides a new lead for future research efforts.

These findings provide an understanding of the relationships between risk factors and the combined influence of a broad range of risk factors experienced by the MVA victim. The results of this study may assist clinicians to more efficiently identify MVA victims at increased risk of developing PTSS and to provide efficient and effective specifically targeted interventions.

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Appendix A. Advertisement for Participant Recruitment

Project on the Impact of Motor Vehicle Accidents

Involvement in a motor vehicle accident can affect people in different ways. The University of Ballarat is conducting an important project into the experiences of motor vehicle accident victims. This project shall improve our understanding of the experiences of motor vehicle accident victims, so that psychologists and other mental health professionals will be better able to assist motor accident victims who are experiencing problems adjusting to life after being involved in a road accident.

WHO IS REQUIRED?

If you are an adult 18 years and over and have been involved in a motor vehicle accident in the past 12 months, we wish to invite you to participate in this study. Please note, however, if you were **unconscious** during the accident you can not be involved in this study.

WHAT IS REQUIRED?

Those who wish to participate will have a questionnaire mailed out to them which will take approximately 20 to 25 minutes to complete along with a stamped self-addressed envelope to return the questionnaire. No information will be required which will identify you in any way.

WHAT DOES THE QUESTIONNAIRE INVOLVE?

The questionnaire covers areas such as the stress you have experienced since the accident, your mood, the social support you have available to help you cope following the accident and what effects the accident has had on your life. Returned questionnaires will form part of a database from which information will be gathered about how motor accident victims adjust after being involved in an accident.

RESULTS

A summary of results will be available upon request to volunteers in early 2006.

Additionally, it is anticipated that the findings will be reported in the media and on the

University of Ballarat website.

REGISTER YOUR INTEREST

If you would like to participate or would like further information please contact the principal

researcher by e-mail, phone or post:

Dr. Suzanne McLaren
University of Ballarat
University Drive
Mt Helen VIC 3350
email: s.mclaren@ballarat.edu.au
phone: (03) 53279628 (you are most welcome to reverse the telephone charges)

THANK-YOU
Your participation in this project will provide an invaluable contribution to our understanding
of the experiences of people involved in motor vehicle accidents in Australia.

Appendix B. Plain Language Statement

Invitation to Participate in a Project on the Impact of Motor Vehicle Accidents

Dear Potential Participant,

Dr. Suzanne McLaren and Mr. Brendan Meagher of the University of Ballarat are conducting a project on the impact of motor vehicle accidents. We would like to invite you to participate in this project, which will provide a better understanding of the psychological experiences of motor vehicle accident victims. This project will allow psychologists and other mental health professionals to provide better treatment for motor vehicle accident victims experiencing problems adjusting to life after being involved in a motor vehicle accident.

We are seeking those who are over the age of 18 years and have been involved in a motor vehicle accident in the past 12 months. Also you must have been conscious throughout your motor vehicle accident. If you were unconscious during or immediately after your accident, please disregard this questionnaire.

If you wish to participate in this project you are asked to respond to the questionnaire which is attached. We do not require any information which would identify you in any way.

This questionnaire asks a series of questions about yourself and your motor vehicle accident experience. Area which are covered include, the stress you have experienced since the accident, your mood, the social support you have available to help you cope following the accident and what effects the accident has had on your life. If you decide to complete and return your anonymous questionnaire, it will form part of a database from which information will be gathered about how motor vehicle accident victims adjust to being involved in a motor vehicle accident.

The questionnaire should take approximately 20-30 minutes to complete. It is important that you remember to answer each question as honestly as possible for your questionnaire to be of significant value. Of course, you may withdraw your participation without repercussion at any stage prior to returning your questionnaire. Please understand that once you have returned the questionnaire, we will be unable to identify your anonymous

questionnaire within the larger pool of questionnaires, hence withdrawal at this stage will not be possible. Returning the completed questionnaire indicates that you understand the nature of the project and freely consent to participate in the project.

If you have any concerns during or after the completion of the questionnaire, you are encouraged to discuss these with your Doctor or the principal researcher, Dr. Suzanne McLaren. You are most welcome to reverse the telephone charges. Should you prefer to retain your anonymity, Lifeline is available 24-hours-a-day for the cost of a local call on 1300 651 251.

A summary of results from the project will be available in early 2006. Volunteers interested in receiving this information are asked to contact Dr McLaren and a summary will be posted to you. Additionally, it is anticipated that summaries of the research will appear in the media and on the University of Ballarat website.

Thank you for considering participating in this project. Your participation in this project will provide an invaluable contribution to our understanding of the experiences of people involved in motor vehicle accidents in Australia.

Dr Suzanne McLaren

Telephone 03 5327 9628

E-mail: **s.mclaren@ballarat.edu.au**

This invitation is to be retained by you. Please return only the questionnaire.

Note: should you have any concerns about the conduct of this research project, please contact the Executive Officer, Human Research Ethics Committee, Research and Graduate Studies Office, University of Ballarat, PO Box 663, Mt Helen, VIC 3353. Telephone: 03 5327 9765

Appendix C. Demographics and Psychiatric History Questionnaire

Thank you for volunteering to participate in this research. Please complete the following questions. Do __not__ give your name or any other specific information that might identify you.

Your Age: _____ years

Your gender: (Please circle only one)

Male   Female

What is your current relationship status?
(Please circle only one)

Single   Married   DeFacto   Separated   Divorced   Widowed

What is your highest attained educational level?
(Please circle only one)

| Primary School | Secondary School | TAFE | Trade certificate | Tertiary (undergrad) | Tertiary (postgrad) |

What is your current employment status?
(Please circle only one)

Employed (Full-time)   Employed (Part-time/Casual)   Home Duties

Workcover   Unemployed   Retired

Other   (please specify) _____

What is your current household income before tax per year?
(Please circle only one):

$5,000 - $10,000 $10,000 - $20,000 $20,000 - $30,000

$30,000 - $ 40,000 $40,000 - $50,000 $50,000+

How many months has it been since your accident? _____ months

For the following questions please circle the one response that best describes you.

Which of the following best describes you during the accident?

Car Driver   Car Passenger   Pedestrian   Truck Driver   Motor cyclist

Other (Please specify) _____

How many vehicles were involved in the accident?

          1 vehicle   2+ vehicles

How frightening was your accident?

1	2	3	4
not frightening	a little frightening	quite frightening	very frightening

How would you rate the degree of injury you sustained in the accident?

1	2	3	4
not at all injured	minor injury	quite major injury	severe injury

How well have you recovered physically from your injuries?

1	2	3
fully recovered	some problems	major problems

Did you attend hospital following your accident?

     Yes   No

Were you admitted to hospital following your accident?

     Yes   No

If you were admitted to hospital, how long did you remain in hospital?

_____weeks   _____days

What was your relationship status at the time of your accident?

Single   Married   DeFacto   Separated   Divorced   Widowed

Do you feel that you were responsible for the accident?

1_____2_____3_____4
not at all   totally
responsible   responsible

Had you ever been in a motor vehicle accident prior to your accident?

Yes   No

Had you ever experienced a trauma prior to your accident?

Yes   No

If so, how would you rate your trauma ? (Please circle only one)

1_____2_____3_____4
no   minor   quite major   severe
trauma   trauma   trauma   trauma

Had you sought counselling for a trauma prior to your accident?

Yes   No

Have you sought counselling since your accident?

Yes   No

Have you experienced post-traumatic stress disorder prior to your accident?

Yes   No

Has anybody in your family ever experienced post-traumatic stress disorder?

Yes   No

Had you experienced depression prior to your accident?

      Yes   No

If so, how would you rate your depression? (Please circle only one)

1	2	3	4
no depression	minor depression	quite major depression	severe depression

Had you sought counselling or medication for depression prior to your accident?

      Yes   No

Has anybody in your family ever experienced depression?

      Yes   No

If so, how would you rate their depression? (Please circle only one)

1	2	3	4
no depression	minor depression	quite major depression	severe depression

If they experienced depression, did they seek counselling or medication for their depression?

      Yes   No

Has anybody in your family ever experienced anxiety?

      Yes   No

If so, how would you rate their anxiety? (Please circle only one)

1	2	3	4
no anxiety	minor anxiety	quite major anxiety	severe anxiety

If they experienced anxiety, did they seek counselling or medication for their anxiety?

      Yes   No

Had you experienced anxiety prior to your accident?

       Yes   No

If so, how would you rate your anxiety? (Please circle only one)

1	2	3	4
no anxiety	minor anxiety	quite major anxiety	severe anxiety

If you experienced anxiety, did you sought counselling or medication for anxiety prior to your accident?

       Yes   No

Were you unconscious at any time during or after your accident?

       Yes   No

Do you have trouble remembering the accident?

       Yes   No

Have you experienced a trauma since your accident?

       Yes   No

Appendix D. Post-traumatic Stress Disorder Questionnaire

For each question, please pick the number from the scale below that best describes you. Then write the number on the line opposite the situation.

1	2	3	4	5	6	7
No	Very little	A little	Somewhat	Quite a bit	Very much	Extremely
Never	Very rarely	Sometimes	Commonly	Often	Very often	Always

Have upsetting memories of the accident frequently pushed themselves into your mind at times?   ____

Have you had recurring unpleasant dreams about the accident?   ____

Have you ever suddenly acted or felt as if the accident were happening again? This includes flashbacks, illusions, hallucinations or other "re-livings" of the event, even if they occur when you are intoxicated or just waking up.   ____

Have things that reminded you of the accident sometimes upset you a great deal?   ____

Have you ever tried to avoid thinking about the accident or feelings you associate with it?   ____

Have you sometimes avoided activities or situations that remind you of the accident?   ____

Have you found you sometimes couldn't remember important things about the accident?   ____

Have you lost a lot of interest in things that were very important to you before the accident?   ____

Have you felt more cut off emotionally from other people at some period than you did before the accident?   ____

Have there been times when you felt that you did not express your emotions as much or as freely as you did before the accident?   ____

Have there been periods since the accident when you felt that you won't have much of a future – that you may not have a rewarding career, a happy family, or long, good life?   ____

Have you had more difficulty falling asleep or staying asleep at times than you did before the accident?   ____

Have you gotten irritated or lost your temper more at times than you did before the accident?   ____

Have there been periods since the accident when you had more trouble concentrating than you had before it?   ____

Have there been times when you were more overly alert, watchful, or super-aware of menacing noises or other stimuli than you were before the accident?   ____

Have you had these problems at least a few times a week for at least a month sometime since

the accident?   _____

Have you had these problems at least a few times each week over the past month?   _____

Appendix E. Impact of Events Scale

Below is a list of comments made by people after stressful life events. Thinking about your car accident, for each question, please pick the number from the scale below that best describes you DURING THE PAST SEVEN DAYS. Then write the number on the line opposite the situation.

1	2	3	4
not at all	rarely	sometimes	often

I thought about it when I didn't mean to   ____

I avoided letting myself get upset when I thought about it or was reminded of it   ____

I tried to remove it from memory   ____

I had trouble falling asleep or staying asleep because of pictures or thoughts
about it that came into my mind   ____

I had waves of strong feelings about it   ____

I had dreams about it   ____

I stayed away from reminders of it   ____

I felt as if it hadn't happened or wasn't real   ____

I tried not to talk about it   ____

Pictures about it popped into my mind   ____

Other things kept making me think about it   ____

I was aware that I still had a lot of feelings about it, but I didn't deal with them   ____

I tried not to think about it   ____

Any reminder brought back feelings about it   ____

My feelings about it were kind of numb   ____

Appendix F. Peri-traumatic Dissociative Experiences Questionnaire

For each question, please pick the number from the scale below that best describes your experiences and reactions during the car accident and immediately afterward. If an item does not apply to your experience, please write 1 for "not at all true".

1	2	3	4	5
Not at all true	Slightly true	Somewhat true	Very true	Extremely true

I had moments of losing track of what was going on – I "blanked out" or "spaced out" or in some way felt that I was not part of what was going on. ____

I found that I was on "automatic pilot" – I ended up doing things that I later realised I hadn't actively decided to do. ____

My sense of time changed – things seemed to be happening in slow motion. ____

What was happening seemed unreal to me, like I was in a dream or watching a movie or play. ____

I felt as though I were a spectator watching what was happening to me, as if I were floating above the scene or observing it as an outsider. ____

There were moments where my sense of my own body seemed distorted or changed. I felt disconnected from my own body, or that it was unusually large or small. ____

If felt as though things what were actually happening to others were happening to me like I was being trapped when I really wasn't. ____

I was surprised to find out afterward that a lot of things had happened at the time that I was not aware of, especially things I ordinarily would have noticed. ____

I felt confused; that is, there were moments when I had difficulty making sense of what was happening. ____

I felt disorientated; that is, there were moments when I felt uncertain about there I was or what time it was ____

Appendix G. Perceived Social Constraints Scale

Thinking of all people around you, please pick the number from the scale below that best describes you DURING THE PAST SEVEN DAYS. Then write the number on the line opposite the situation.

```
    1              2              3              4              5
Almost                                                    Almost
Never                                                     Always
```

How often did you feel as though you had to keep your feelings about your accident to yourself because they made other people uncomfortable?   ____

How often did you feel that you could discuss your feelings about your accident with other people when you wanted to?   ____

When you talked about the accident, how often did other people give you the idea they didn't want to hear about it?   ____

How often did you feel other people let you down by not showing you as much love and concern as you would have liked?   ____

How often have other people really got on your nerves?   ____

Appendix H. Social Support Inventory

For each question, please pick the number from the scale below that best describes you DURING THE PAST SEVEN DAYS. Then write the number on the line opposite the situation.

1	2	3	4
not at all	rarely	sometimes	often

People in my life:

Cheer me up ____

Support my actions ____

Pay me social visits ____

Lend me small things like effects or a little money ____

Says to me "That is the right way" ____

Hug me or cherishes me ____

Give me advice on all kinds of small domestic problems ____

Call me up just for a chat ____

Feel with me ____

Make constructive criticism about me ____

Take me somewhere ____

Show affection for me ____

Take care of diversion ____

Offer me help under special circumstances, like illness, moving, babysitting ____

Make me understand why I did something wrong ____

Go shopping, to the cinema, to a match or just a day out with me ____

Caress me ____

Offer me practical help with daily matters, like housekeeping or a small job ____

Emphasis my strong points ____

Invite me to a party or for dinner ____

Appendix I. Sense of Belonging Instrument

Think of the community in which you are currently living. Please circle the response that most clearly reflects your feelings in relation to that community, using the scale below.

1	2	3	4
strongly disagree	disagree	agree	strongly agree

I often wonder if there is any place where I really fit in	1	2	3	4
I am just not sure if I fit in with my friends	1	2	3	4
I would describe myself as a misfit in most social situations	1	2	3	4
I generally feel that people accept me	1	2	3	4
I feel like a piece of a jigsaw puzzle that doesn't fit into the puzzle	1	2	3	4
I would like to make a difference to people or things around me, but I don't feel that what I have to offer is valued	1	2	3	4
I feel like an outsider in most situations	1	2	3	4
I am troubled by feeling like I have no place in this world	1	2	3	4
I could disappear for days and it wouldn't matter to my family	1	2	3	4
In general, I don't feel a part of the mainstream of society	1	2	3	4
I feel like I observe life rather than participate in it	1	2	3	4
If I die tomorrow, very few people would come to my funeral	1	2	3	4
I feel like a square peg trying to fit into a round hole	1	2	3	4
I don't feel that there is any place where I really fit in this world	1	2	3	4
I am uncomfortable knowing that my background and experiences are so different from those who are usually around me	1	2	3	4
I could not see or call my friends for days and it wouldn't matter to them	1	2	3	4
I feel left out of things	1	2	3	4
I am not valued by or important to my friends	1	2	3	4
It is important to me that I am valued or accepted by others	1	2	3	4
In the past, I have felt valued and important to others	1	2	3	4
It is important to me that I fit in somewhere in this world	1	2	3	4
I have qualities that can be important to others	1	2	3	4
I am working on fitting in better with those around me	1	2	3	4

I want to be a part of things going on around me	1	2	3	4
It is important to me that my thoughts and opinions are valued	1	2	3	4
Generally, other people recognise my strengths and good points	1	2	3	4
I can make myself fit in anywhere	1	2	3	4
All of my life I have wanted to feel like I really belonged somewhere	1	2	3	4
I don't have the energy to work on being apart of things	1	2	3	4
Fitting in with people around me matters a great deal	1	2	3	4
I feel badly if others do not value or accept me	1	2	3	4
Relationships take too much energy for me	1	2	3	4
I just don't feel like getting involved with people	1	2	3	4

Appendix J. Accident Fear Questionnaire

These questions are about your accident and your reactions to it. Please circle yes or no for each question.

During the accident did you fear for your life?	**YES NO**
During the accident did you see anyone injured or killed?	**YES NO**
During the accident did you lose consciousness?	**YES NO**
Do you have nightmares about the accident?	**YES NO**
Are you nervous before trips?	**YES NO**
Do you easily get upset in the car?	**YES NO**
Do you tell the driver what to do?	**YES NO**
Do you drive less than you used to?	**YES NO**
Do you expect another accident soon?	**YES NO**
Would most people feel after an accident the way you do?	**YES NO**

How much do you avoid the situations listed below because of fear or distress? For each question, please pick a number from the scale below to show how much you avoid the situation. Then write the number on the line opposite the situation.

0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Would not								**Always**
avoid it								**avoid it**

Driving as a passenger	____
Driving yourself	____
Riding in a particular seat	____
Driving on certain roads	____
Riding with certain drivers	____
Driving in certain weather conditions	____
Hearing news of accidents	____
Seeing wounds and injuries	____
Crossing streets alone	____
Riding a bus or tram	____

Appendix K. Beck Depression Inventory-II

This questionnaire consists of 21 groups of statements. Please read each group of statements carefully and then pick out the one statement in each group that best describes the way you have been feeling during the past two weeks, including today. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group.

Sadness

0   I do not feel sad.

1   I feel sad much of the time.

2   I am sad all the time.

3   I am so sad or unhappy that I can't stand it.

Pessimism

0   I am not discouraged about my future.

1   I feel more discouraged about my future than I used to be.

2   I do not expect things to work out for me.

3   I feel my future is hopeless and will only get worse.

Past Failure

0   I do not feel like a failure.

1   I have failed more than I should have.

2   As I look back, I see a lot of failures.

3   I feel I am a total failure as a person.

Loss of Pleasure

0   I get as much pleasure as I ever did from the things I enjoy.

1   I don't enjoy things as much as I used to.

2   I get very little pleasure from the things I used to enjoy.

3   I can't get any pleasure from the things I used to enjoy.

Guilty Feelings

0   I don't feel particularly guilty.

1   I feel guilty over many things I have done or should have done.

2   I feel quite guilty most of the time.

3   I feel guilty all of the time.

Punishment Feelings

0   I don't feel I am being punished.

1   I feel I may be punished.

2   I expect to be punished.

3   I feel I am being punished.

Self-Dislike

0   I feel the same about myself as ever.

1   I have lost confidence in myself.

2   I am disappointed in myself.

3   I dislike myself.

Self-Criticalness

0   I don't criticize or blame myself more than usual.

1   I am more critical of myself than I used to be.

2   I criticize myself for all of my faults.

3   I blame myself for everything bad that happens.

Suicidal Thoughts or Wishes

0   I don't have any thoughts of killing myself.

1   I have thoughts of killing myself, but I would not carry them out.

2   I would like to kill myself.

3   I would kill myself if I had the chance.

Crying

0   I don't cry anymore than I used to.

1   I cry more than I used to.

2   I cry over every little thing.

3   I feel like crying but I can't.

Agitation

0   I am no more restless or wound up than usual.

1   I feel more restless or wound up than usual.

2   I am so restless or agitated that it's hard to stay still.

3   I am so restless or agitated that I have to keep moving or doing something.

Loss of Interest

0   I have not lost interest in other people or activities.

1   I am less interested in other people or things than before.

2   I have lost most of my interest in other people or things.

3   It's hard to get interested in anything.

Indecisiveness

0   I make decisions about as well as ever.

1   I find it more difficult to make decisions than usual.

2   I have much greater difficulty in making decisions than I used to.

3   I have trouble making any decisions.

Worthlessness

0   I do not feel I am worthless.

1   I don't consider myself as worthwhile and useful as I used to.

2   I feel more worthless as compared to other people.

3   I feel utterly worthless.

Loss of Energy

0   I have as much energy as ever.

1   I have less energy than I used to have.

2   I don't have enough energy to do very much.

3   I don't have enough energy to do anything.

Changes in Sleeping Pattern

0   I have not experienced any change in my sleeping pattern

1a   I sleep somewhat more than usual.

1b   I sleep somewhat less than usual.

2a   I sleep a lot more than usual.

2b   I sleep a lot less than usual.

3a   I sleep most of the day.

3b   I wake up 1-2 hours early and can't get back to sleep.

Irritability

0   I am no more irritable than usual.

1   I am more irritable than usual.

2   I am much more irritable than usual.

3   I am irritable all the time.

Changes in Appetite

0   I have not experienced any change in my appetite.

1a   My appetite is somewhat less than usual.

1b   My appetite is somewhat greater than usual.

2a   My appetite is much less than before.

2b   My appetite is much greater than usual.

3a   I have no appetite at all.

3b   I crave food all the time.

Concentration Difficulty

0   I can concentrate as well as ever.

1   I can't concentrate as well as usual.

2   It's hard to keep my mind on anything for very long.

3   I find I can't concentrate on anything.

Tiredness or Fatigue

0   I am no more tired or fatigued than usual.

1   I get more tired or fatigued more easily than usual.

2   I am too tired or fatigued to do a lot of the things I used to do.

3   I am too tired or fatigued to do most of the things I used to do.

Loss of Interest in Sex

0   I have not noticed any recent change in my interest in sex.

1   I am less interested in sex than I used to be.

2   I am much less interested in sex now.

3   I have lost interest in sex completely.