Evaluation of Peritraumatic Dissociation as a Multidimensional Construct and its Contribution as a Predictor of PTSD Severity

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This thesis contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text.

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# Table of Contents

Structured Abstract........................................................................................................... 1
Literature Review .............................................................................................................. 4  
  Peritraumatic Dissociation......................................................................................... 4  
  Gender......................................................................................................................... 8  
  Neuroticism............................................................................................................... 9  
  Avoidant- and Emotion-oriented Coping Styles..................................................... 12  
  Trait Dissociation...................................................................................................... 15  
  Fear of Dying............................................................................................................. 17  
Aims and Hypotheses...................................................................................................... 20  
Journal Title Page......................................................................................................... 21  
Author contact information.......................................................................................... 22  
Abstract....................................................................................................................... 23  
Introduction.................................................................................................................. 24  
Method........................................................................................................................ 36  
Results.......................................................................................................................... 40  
  Table 1....................................................................................................................... 41  
  Table 2....................................................................................................................... 43  
  Table 3....................................................................................................................... 44  
  Table 4....................................................................................................................... 45  
Discussion..................................................................................................................... 48  
References.................................................................................................................... 54  
Appendix A Ethics Approval........................................................................................ 68  
Appendix B Survey....................................................................................................... 69  
Appendix C Journal Highlights.................................................................................... 73
Structured Abstract

Scope
Only a relatively small number of people who experience a traumatic event subsequently develop posttraumatic stress disorder (PTSD). As a result, research has focused on investigating prospective and reliable risk factors of PTSD such as pre-existing individual vulnerabilities like personality traits and coping styles, as well as individuals’ emotional responses to a traumatic event. A common everyday event that is frequently experienced as traumatic, with adverse consequences, is involvement in a motor vehicle accident (Norris, 1992).

Purpose
The aim of the present study was to examine a well-established risk factor of PTSD, peritraumatic dissociation (PD). One area of investigation was to determine whether PD is a multifactorial construct. The other area of investigation was, on the basis that PD is multidimensional, whether PD as a construct, or its specific components, uniquely predicted PTSD severity in a sample of motor vehicle accident (MVA) survivors. To assess this, PD was evaluated alongside other risk factors of PTSD that were either pre-traumatic (pre-existing) or peri-traumatic (occurred at the time of the trauma). Pre-traumatic variables included in this study were female gender, neuroticism, trait dissociation and coping style (avoidant or emotion) and one other peritraumatic variable, fear of dying. It was hypothesised that females and individuals with higher peritraumatic dissociation, trait dissociation, neuroticism traits, avoidant-oriented coping style, emotion-oriented coping style and fear of dying scores would result in greater PTSD severity subsequent to their MVA.
Methodology

Participants ranged in age from 18 to 88 years (M = 39.24) and had been involved in a MVA and attended hospital where they were treated and discharged immediately, or else admitted. There were two time points in the study. At both phases, the questions on the surveys related to the recent MVA for which they attended hospital. Time 1 included a survey that was mailed for completion one month after the MVA. The survey collected information including gender, response to a single Likert item question about fear of dying at the time of the MVA (where 1 = “not at all” and 5 = “certain I would die”) and a score of PD, measured by the ten items in The Peritraumatic Dissociation Experiences Questionnaire-Self-Report (PDEQ-SR; Marmar, Weiss & Metzler, 1998). Of 1460 surveys mailed, 337 were returned.

The second survey mailed for completion at Time 2, three months post-MVA, included the following measures: the Posttraumatic Stress Diagnostic Scale (PDS; Foa, Cashman, Jaycox, & Perry, 1997), the Trait Dissociation Questionnaire (TDQ; Murray, Ehlers, & Mayou, 2002), Eysenck Personality Inventory (EPI; Duncan-Jones, 1983) from which neuroticism was measured; and the Coping Inventory for Stressful Situations (CISS; Endler & Parker, 1990). Only avoidant- and emotion-oriented coping styles in the CISS were included in the present study as both are risk factors of PTSD. A total of 122 surveys were returned.

Results

SPSS Version 19 was used for all analyses: descriptive statistics, correlations, t-tests, factor analysis and multiple linear regressions (MLR). With the exception of avoidant coping, all other pre-traumatic and peritraumatic risk factors positively correlated with PTSD severity. Exploratory factor analysis of PD produced two factors that explained 61.1% of the variance. There were five items in each factor; the first factor nominated to
be altered awareness, and the second, depersonalisation/derealisation. Although both PD factors predicted PTSD severity, only altered awareness remained a significant predictor in the final MLR model. Two additional predictors of PTSD severity were trait dissociation and fear of dying. Collectively, these three predictors explained 40.6% of the total variance of PTSD severity and individually, each predictor uniquely contributed to the explanation of PTSD severity. In the final MLR model, gender, neuroticism and emotion-oriented coping style did not predict PTSD severity.

**Conclusions**

PD was shown to be multidimensional, comprising two constructs, altered awareness and depersonalisation/derealisation. There were three predictors of PTSD severity: PD Factor 1, altered awareness, trait dissociation and fear of dying, of which PD Factor 1, altered awareness, was the strongest predictor. Even though both PD factors were significant predictors of PTSD severity initially, only PD Factor 1, altered awareness, remained so in the final model. This indicated dissociative experiences concomitant with alterations in awareness, were the better predictor of PTSD severity in the current MVA sample. Results are limited to a self-selective MVA sample.

**Implications**

This study highlights the importance of dissociation and a subjective appraisal of trauma, such as fear of dying, as risk factors for PTSD severity after a MVA. Hence, for clinicians working with MVA survivors, assessing the presence of both state and trait dissociation, and negative appraisals such as fear of dying, is not only important in determining whether a person may be more susceptible to develop PTSD after a MVA, but also crucial for appropriate therapeutic intervention.
Literature Review

Unlike other psychiatric diagnoses, PTSD is unique in that it is preceded by exposure to an event perceived to be traumatic (DSM-IV-TR; Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text revision, American Psychiatric Association [APA], 2000). Prevalence rates of exposure to a traumatic event varied from 82.8% (NCS-R; National Comorbidity Study-Replication, Kessler, Berglund, Demler, Jin, & Walters, 2005) to 89.7%, in the Detroit Area Survey of Trauma (Breslau et al., 1998). This contrasts with the lifetime prevalence of PTSD in the United States of 6.8% (Kessler et al.) and similar findings in the Australian National Survey of Mental Health and Well-being (SMHWB; Australian Bureau of Statistics [ABS], 2008) of 6.4%. To understand why only some individuals develop PTSD, research has examined risk factors of PTSD, one of which is peritraumatic dissociation (PD).

Peritraumatic Dissociation

Peritraumatic dissociation (PD) is a transient, state dissociation, triggered by, and occurring at the time of, exposure to a traumatic event. PD involves alterations or distortions in notion of self, time (slower or rapidly accelerated), environment and meaning that can result in depersonalisation (unreality regarding one’s self), derealisation (sensation that one’s surroundings are unreal), detachment and disorientation (Cardena & Spiegel, 1993; Marmar, 1997; Steinberg, 1994). PD is considered important in the development of PTSD as it has been proposed that it disrupts the encoding of information of the traumatic event, and the subsequent inability to integrate memories may result in intrusive images and flashbacks such as those associated with PTSD (Ehlers & Clark, 2000). PD has been shown a significant predictor of PTSD in studies of emergency workers (Marmar et al., 2006); industrial disaster victims (Birmes et al., 2005); natural disaster victims (Koopman, Classen, & Spiegel, 1994);
physical assault victims (Birmes et al., 2003; Johansen, Wahl, Eilertsen, Hanestad, & Weisaeth, 2006); and sexual assault victims (Marshall & Garakani, 2002).

An everyday occurrence that can result in trauma and PTSD is involvement in a motor vehicle accident (MVA). Prevalence of PTSD subsequent to MVAs has ranged from 7.1% to 46% (Blanchard et al., 1996; Blanchard, Hickling, Taylor, Loos, & Geradi, 1994; Ehlers, Mayou, & Bryant, 1998; Ehrling, Ehlers, Cleare, & Glucksman, 2008; Irish et al., 2011). A small number of MVA samples have demonstrated PD as a risk factor for PTSD (Ehlers, Mayou, & Bryant, 1998; Irish et al., 2011; Shalev, Peri, Caneti, & Schreiber, 1996; Ursano et al., 1999b; Zatzick et al., 2002). Drawbacks exist in three of these studies, such as absence of a valid questionnaire measuring PD (Ehlers et al.), a small sample size (Shalev et al.), and substance use as a potential confounding variable (Zatzick et al.). Nonetheless, Ursano and colleagues not only established PD was a significant predictor of PTSD in an MVA sample, but also showed that individuals who experienced PD were 4.12 times more likely to develop PTSD. More recently, PD was shown as a highly significant predictor of PTSD at six weeks and at six months in a large sample (N=356) of MVA survivors admitted to hospital (Irish et al., 2011).

A significant association between PD and subsequent PTSD, or posttraumatic stress, was confirmed by meta-analyses of 59 studies reviewed by Lensvelt-Mulders et al. (2008), and of 68 studies examined by Ozer, Best, Lipsey and Weiss (2003). Furthermore, Ozer et al. found that PD was the strongest of seven reliable risk factors of PTSD. However, Breh and Seidler (2007) criticised the findings of Ozer et al. due to the retrospection in the studies examined and therefore set out to include studies they termed “quasi-prospective” (p. 55), where PD is assessed after the trauma but before development of PTSD. Regardless, Breh and Seidler found very little difference in effect size for the predictive ability of PD with PTSD severity in both prospective and retrospective studies, $r = .35$ and $r = .37$, respectively.
Two groups of researchers investigated the predictive ability of PD and investigated PD and persistent dissociation as predictors of PTSD, one in a general population study (Briere, Scott, & Weathers, 2005) and the other, a MVA sample (Murray, Ehlers, & Mayou, 2002). Briere and colleagues argued that as other studies had not established a temporal boundary for PD, persistent dissociation could be a stronger predictor of PTSD. Persistent dissociation was defined as dissociation that occurred at the time of, or shortly after, exposure to the traumatic event and persisted until time of assessment (Briere et al.) or as dissociation that ensued from the trauma that had continued for four weeks (Murray et al.). PD was a significant predictor of PTSD in both studies, yet ceased to be so in the presence of persistent dissociation (Briere et al.; Murray et al.). Despite these findings, the difference between PD and persistent dissociation is imprecise, illustrated by both groups of researchers providing two different definitions of persistent dissociation. Furthermore, though Murray and colleagues measured PTSD six months after MVA, the time interval between trauma and assessment in Briere et al.’s study is unknown, and if lengthy, may have occasioned biased results due to poor recall.

Reservations about the predictive ability of PD for PTSD exist. Gershuny, Cloitre and Otto (2003) suggested PD was mediated by other risk factors, namely, fear of dying and fear of losing control, and demonstrated that PD did not remain a significant predictor of PTSD in the presence of these two fears. However, the study was limited by retrospectivity of reports as the researchers included any lifetime traumatic event and the sample was restricted to females primarily aged 18-24 years. Van der Velden and Wittman (2008) also argued the predictive power of PD was confounded by the other variables and in a systematic review of 17 single traumatic event studies, established PD was an independent predictor of PTSD severity in only three of these studies. Findings are limited as eight studies had small sample sizes; four studies included children and teenagers; and studies were excluded if follow-up
was conducted earlier than three months or if pre-existing psychopathology had not been assessed. Despite criticisms of PD and its predictive ability, with the exception of Brewin, Andrews and Valentine’s (2000) meta-analysis that found an effect size ($r = .40$) for lack of social support, no other meta-analyses has found another risk factor to have greater predictive ability than PD.

Whilst PD has been considered a unifactorial construct, in recent years, questions have been raised as to whether it is a global, single underlying phenomenon, or whether peritraumatic responses are disparate and involve dissimilar processes that may differ in their predictive power of PTSD symptomatology (Briere, Weathers, & Runtz, 2005; McNally, 2003). To ascertain this, various researchers recommended PD be evaluated to determine its dimensionality and ascertain whether particular components were more predictive of PTSD (Bryant, 2007; Lensvelt-Mulders et al., 2008; McNally, 2003; van der Velden & Wittman, 2008). Bryant et al. (2009) conducted a factor analysis of PD and found two separate factors, termed altered awareness and depersonalisation/derealisation but rather than assessing the predictive ability of these factors for PTSD, Bryant and colleagues examined the predictive ability of PD factors for acute stress, anxiety and depression.

Like Bryant and colleagues (2009), the present study will evaluate whether PD is multidimensional and if so, determine whether a specific PD factor has greater explanatory value. Unlike Bryant et al., the present study will determine whether PD, or a PD factor, predicts PTSD severity at three months, in a sample of MVA victims. A further aim is to establish whether PD is a unique and independent predictor of PTSD severity by investigating its predictive ability relative to other reliable risk factors of PTSD: gender, neuroticism, avoidant and emotional coping, trait dissociation and fear of dying.
Gender

Findings of female gender as a risk factor for PTSD have been notable considering females’ lower propensity for exposure to trauma. The National Comorbidity Study (NCS; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995) revealed that whilst 60.7% of males compared to 51.2% of females had been exposed to trauma, lifetime prevalence of PTSD was 10.4% for females compared to 5% for males, indicative of a two-fold higher risk for females. This disparity has been replicated even with trauma type controlled (Breslau, Chilcoat, Kessler, Peterson, & Lucia, 1999). More recently, both international and Australian data showed the risk for females in developing PTSD had become two and a half fold (ABS, 2008; Kessler et al., 2005).

Robust findings for female gender as a risk factor of PTSD have also been confirmed in meta-analyses. Rubin, Berntsen and Johansen (2008) found females had a 2.6 higher risk for PTSD than males (excluding sexual assault), while Tolin and Foa (2006) found females to have a 1.85 higher risk of PTSD, independent of trauma type. Brewin, Andrews and Valentine (2000) also found similar gender disparity in a meta-analysis of 25 studies where female gender was a significant predictor of PTSD across various traumas with the exception of combat studies. However, although female gender was found a significant risk factor for PTSD in these meta-analyses, the weighted average effect size depicted in both Brewin et al.’s and Rubin et al.’s studies was small, r = .13.

Female gender has also been established as a risk factor for PTSD diagnosis and/or severity in numerous MVA studies. When PTSD was measured at one month (Dougall, Ursano, Posluszny, Fullerton, & Baum, 2001; Ursano et al., 1999a), three months (Ehlers, Mayou, & Bryant, 1998) and six months post MVA (Dougall et al., 2001), female gender remained a significant predictor in these MVA studies. In samples with mixed trauma
presentations, female gender predicted PTSD severity at both 1 and 4 months (Ruzek & Zatzick, 2000; Zatzick et al., 2002) in participants hospitalised for surgery, of which approximately two-thirds were MVA survivors; and again was predictive of PTSD in mixed samples, six weeks (Irish et al., 2011) and six months post MVA (Bryant & Harvey, 2003; Irish et al., 2011).

One possible reason for the finding of female gender as a risk factor may be attributed to a higher female ratio that may result in a bias toward female gender. For example, Jeavons (2000) found there was no greater risk for females in a MVA sample where there was an equal representation of males and females, though the sample was notably small. In a study with a very large sample of trauma victims who attended hospital, 85% MVAs, and an equal distribution of gender, female gender did not predict PTSD severity (Shalev, Freedman, Peri, Brandes, & Sahar, 1997). Yet, in a MVA study where approximately two thirds of the sample were males, female gender was again a risk factor for PTSD with 10.8% of males diagnosed with PTSD six months after the MVA, compared to 30.5% of females (Frommberger et al., 1998).

Because female gender has been established as a risk factor for PTSD in a majority of studies, including epidemiological studies, meta-analyses and MVA samples, it will be included as a prospective risk factor for PTSD severity in the current MVA study.

Neuroticism

Neuroticism, also termed ‘negative affectivity’ or ‘negative emotionality’, is a stable personality trait characterised by pervasive negative mood and emotion, and general dissatisfaction (Clark, Watson, & Mineka, 1994; Lahey, 2009). People high in neurotic traits are overly sensitive and have a tendency to appraise and respond to events in disproportionately negative ways (Suls & Martin, 2005; Watson & Clark, 1984). Individuals
with high neuroticism traits can be vulnerable to PTSD due to their greater arousal and negative interpretations of stimuli associated with exposure to trauma, persistent negative exaggeration of the threat, and maladaptive coping methods (Holeva & Tarrier, 2001). A review of the NCR data, demonstrated neuroticism was a significant risk factor for PTSD diagnosis irrespective of trauma type and pre-existing depressive and anxiety disorders and furthermore, neuroticism resulted in 3.13 higher likelihood of being diagnosed with PTSD (Cox, MacPherson, Enns, & McWilliams, 2004). However, Cox et al. did acknowledge higher neuroticism scores could have resulted from chronic PTSD.

The effect of neuroticism on PTSD has been studied in various trauma samples, with mixed results. Neuroticism was consistently established as a risk factor for PTSD in combat studies (Talbert, Braswell, Abrecht, Hyer, & Boudewyns, 1993); UN military peacekeepers (Bramsen, Dirkwzager, & van der Ploeg, 2000); and Dutch soldiers deployed to Afghanistan (Rademaker, van Zuiden, Vermetten, & Geuze, 2011). Conversely, Engelhard, van den Hout and Lommen (2009) found that while neuroticism was a significant predictor of subsequent PTSD, it did not remain significant when pre-deployment PTSD symptoms were included in the analysis. Although disaster studies validated neuroticism as a risk factor for PTSD in samples of fire fighters (McFarland, 1989), people exposed to flood and coal mining disasters (Strelau & Zawadzki, 2005) and residents exposed to plane and train crashes (Chung, Dennis, Easthope, Werrett, & Farmer, 2005), there are shortcomings. In McFarlane’s (1989) study, when participants completed the personality measure 29 months post trauma, they were requested to recall their personality type prior to trauma, which could have led to biased or inaccurate information. Likewise, in Strelau and Zawadski’s (2005) study, the interval between trauma and assessment ranged from three months to three years and moreover, the measure of PTSD developed by the authors, only assessed two PTSD constructs. Equally, Chung et al. (2005) assessed PTSD with a scale that only measured two subscales of PTSD
and there was a time lag of six to seven months between trauma and assessment, possibly confounding results.

No relationship between neuroticism and PTSD was found in a study of college students exposed to earthquake, flood, hurricane or tornado, but the sample was only 51 students (Borja, Callahan, & Rambo, 2009) and some natural disasters to which students were exposed may not have been uncommon in their region and thus less likely to result in an adverse effect. In contrast, another study of college students indicated a positive and strong interaction between trauma intensity and neuroticism across a broad range of traumas (Lauterbach & Vrana, 2001). Results indicated neuroticism significantly predicted PTSD severity though Lauterbach and Vrana observed that trauma may influence neuroticism or neuroticism may increase the probability of trauma, or the relationship may be reciprocal. A meta-analysis of studies of a range of traumas substantiated a high correlation between neuroticism and PTSD with a weighted average, $r = .43$, deemed higher than any other effect size for a predictor variable of PTSD studied by other meta-analyses (Rubin, Bernsten, & Johansen, 2008).

Neuroticism has been studied less often with MVA samples. Only one study, conducted by Holeva and Tarrier (2001), found neuroticism to be a significant and independent predictor of PTSD. Neuroticism was not a risk factor for PTSD in a study of 188 injured MVA survivors (Mayou, Bryant, & Duthie, 1993) and in another MVA study, was only a significant risk factor for PTSD prior to the addition of situation control and avoidance coping for analyses (Dorfel, Rabe, & Karl, 2008). Yet, Dorfel et al.’s findings were limited by a very small sample size and retrospective accounts beyond four years. The role of neuroticism in the development of PTSD in specific MVA samples is an under-investigated area. The present research will examine whether neuroticism is a risk factor for PTSD in a sample of MVA survivors.
Avoidant - and Emotion-Oriented Coping Style

Coping has been posited as a process of cognitive and behavioural efforts that are continually modified in response to stressful situations (Lazarus, 1993; Lazarus & Folkman, 1984), or a dispositional, characteristic coping style generally employed across different situations (Endler & Parker, 1990) but one that can adapt to situational demands (Endler, 1997). Irrespective of definitions, coping style or adopted coping strategies can be a negative response to stressful life events and consequently, psychological well-being and mental health can be adversely effected (Endler & Parker, 1990; 1994; McWilliams, Cox, & Enns, 2003).

The Coping Inventory of Stressful Situations (CISS; Endler & Parker, 1990) was developed to assess stable, trait coping strategies that individuals engage in across a variety of stressful situations. Coping was determined to comprise three distinct coping orientations: avoidant, emotion and task (Endler & Parker). Only avoidant and emotion are included in the current review as this study has focused on risk factors for PTSD severity and task-oriented coping, rather than being a risk factor for PTSD severity, is based on problem-solving strategies and thus does not increase vulnerability to PTSD.

In the CISS, avoidant-oriented coping was sub-divided into distraction and social diversion (also termed seeking social support), with the former regarded as a task oriented avoidance strategy and the latter, a person oriented avoidance strategy (Endler & Parker, 1990). Avoidant-oriented coping orients individuals away from the stress-provoking situation and their responses to the stressor (Krause, Kaltman, Goodman, & Dutton, 2008). An emotion-oriented coping style is person oriented only and has been described as involving self-oriented emotional responses, preoccupation with self, daydreaming and fantasising (Endler & Parker, 1990; Parker & Endler, 1992). One suggestion is that emotion oriented coping is more likely to result when individuals assess a situation and decide it is ineffective to take any action (Lazarus, 1993). Nevertheless, avoidant and emotion coping strategies are
employed to suppress negative effects (Endler, 1997), the practice of which is a risk factor for PTSD. Whilst situations, memories and undesirable emotions are deliberately avoided, normal processing of the trauma that leads to habituation of PTSD symptomatology is impeded (Pineles et al., 2011).

Avoidant-oriented coping has been investigated as a risk factor of PTSD, often in assault samples. Avoidance behaviours, such as distraction and avoidance of reminders, were examined in a sample of physical assault victims and found to be a significant and strong predictor of PTSD, six and nine months post assault, though avoidance behaviours were evaluated only in reference to the assault and therefore may have arisen from the assault (Dunmore, Clark, & Ehlers, 2001). Moreover, these avoidance behaviours may have related too closely to the hallmark avoidance symptoms of PTSD and thus limit the usefulness of these results. In a female sample of sexual (85%) and physical assault victims, avoidant coping, measured one-month post trauma, significantly predicted PTSD symptoms three months post assault (Pineles et al., 2011). One study coincidentally measured coping style prior to a traumatic event. High levels of trait avoidant coping style pre-existing to the trauma, as well as avoidant coping strategies measured after the trauma, were both predictive of PTSD in Israeli University students, six months after a suicide bombing on a bus (Gil, 2005). In victims of Hurricane Katrina, avoidant coping strategies were again predictive of PTSD (Glass, Flory, Hankin, Kloos, & Turecki, 2009).

Wishful thinking, has been considered both an emotion-focused style, as in the CISS (Endler & Parker, 1990), and has also been considered an avoidant coping strategy. Wishful thinking, behavioural distraction and denial were examined as avoidant coping strategies in a sample of female victims of domestic violence, and these avoidant coping strategies showed a significant increase in PTSD symptoms when assault history and assault severity were controlled (Krause, Kaltman, Goodman, & Dutton, 2008). When wishful thinking was
studied as an emotion coping strategy within a MVA sample, it also significantly predicted PTSD severity at six and twelve months (Dougall, Ursano, Poslusny, Fullerton, & Baum, 2001). Limitations of the study were that coping style was based on participants’ reported coping style after the MVA, rather than their general coping style, even though general coping style had been measured (Dougall et al.). Of interest, avoidant coping was also examined in this study and was not found to be a risk factor for PTSD (Dougall et al.).

Bryant and Harvey (1995) investigated posttraumatic stress (PTS) in a sample of MVA survivors and found avoidant coping style a significant predictor of intrusion, accounting for 31% of the variance. Drawbacks exist, as PTS rather than PTSD was assessed; evaluations were conducted retrospectively, a year after the MVA; and the sample was small. In a study without such shortcomings, both avoidant and emotion-oriented coping styles measured by the CISS were shown to be significant predictors of PTSD diagnosis three and six months post-MVA, with emotion-oriented coping style the stronger predictor (Jeavons, Horne, & Greenwood, 2000). Coping scores obtained after the MVA, remained constant at both three and six months, suggestive of a trait coping style or one that had developed and been maintained post MVA. In a further MVA study, an avoidant coping strategy, termed disengagement, was significantly correlated with, but not a predictor of, PTSD severity two months post MVA, but there was a trend toward significance (Mellman, David, Bustamante, Fins, & Esposito, 2001).

Although avoidant coping was again established as a significant risk factor for PTSD in a MVA study, the results were limited by an average interval of four years between MVA and assessment as well as a very small sample size (Dorfel, Rabe, & Karl, 2008). Participants with injuries (59% MVA survivors) were studied eight months after discharge from hospital and higher avoidant coping scores were present in those diagnosed with PTSD (Matthews, Harris, & Cumming, 2009). Although endorsement of avoidant coping and incidence of
PTSD were low, avoidant coping was a significant predictor of PTSD at six and twelve months in a MVA sample (Pacella et al., 2011). Overall, results indicate an avoidant-oriented coping style in MVA samples, more than an emotion-oriented style, is a risk factor for PTSD. On the other hand, emotion-oriented coping may not have been examined to the same extent. In the current study, both orientations will be investigated as risk factors of PTSD severity.

**Trait Dissociation**

Unlike PD, trait dissociation is perceived as a general tendency to dissociate that is a stable, pre-existing characteristic of individuals (Murray, Ehlers, & Mayou, 2002). Similar to PD, trait dissociation entails amnesia, depersonalisation, derealisation, identity alteration and identity confusion (Steinberg, 1994) that result in separation or fragmentation of thoughts, emotions and experiences (Spiegel & Cardena, 1991) that are then unable to be assimilated into memory (Ehlers & Clark, 2000; Nijenhuis & van der Hart, 2011). Proposed aetiology of trait dissociation includes childhood abuse and genetics. With findings of a positive relationship between dissociation and childhood abuse, it was proposed that trait dissociation evolved during developmental years as an escape mechanism (Chu & Dill, 1990; Spiegel & Cardena, 1991). In contrast, studies of adolescent and adult twins, as well as adopted siblings, demonstrated a genetic liability for both pathological and non-pathological dissociation (Becker-Please et al., 2004) and this was taken to be evidence of a dissociative trait (Jang, Paris, Zweig-Frank, & Livesley, 1998).

In their studies of dissociation of PTSD in a general population and a MVA sample, Briere, Scott and Weathers (2005) and Murray, Ehlers and Mayou (2002) evaluated three dissociations; PD, persistent dissociation and generalised dissociation, described as dissociation that had already resulted from exposure to a traumatic event prior to the event under study. As such, generalised dissociation could be interpreted as trait dissociation.
Although both groups of researchers resolved that persistent dissociation was the superior predictor of PTSD, it is unclear how they substantiated their definitions of either persistent or generalised dissociation, as both could have been interpreted as trait dissociation. Briere et al.’s (2005) study is limited by self-selection from a mail-out as well as a likely delay between trauma and assessment. Murray et al. (2002) developed the 38-item Trait Dissociation Questionnaire (TDQ) but chose to administer it only to the small inpatient sample (n=21) and administered a shortened version of a 10-item TDQ to the larger sample of 140 outpatients. In terms of convenience, this is understandable, yet a factor analysis they conducted had established seven dissimilar characteristics of dissociation in the TDQ (Murray et al.) thus the shortened version might not have fully encapsulated trait dissociation. Bedard-Gilligan and Zoellner (2012) provided a more specific definition of persistent dissociation as “dissociation in response to specific trauma-related cues” (p. 280), that differs from that described in either of the aforementioned studies.

The DES, a widely used measure of trait dissociation developed by Bernstein and Putnam (1986), was criticised for the inclusion of normal dissociative experiences of imagination, fantasy, absorption and automatic actions that were non-pathological everyday normal dissociative experiences (Kihlstrom, Glisky, & Angiulo, 1994; Waller & Ross, 1997). Furthermore, the DES was considered to under-represent pathological symptoms, such as identity confusion and identity alteration (Kruger & Mace, 2002) and neglected to assess emotional numbing and avoidance, symptoms strongly related to PTSD (Foa & Hearst-Ikeda, 1996; Murray, Ehlers, & Mayou, 2002). A recognised problem in analysing studies that have investigated trait dissociation and its relationship to PTSD relates to the different definitions and measurements of trait dissociation. As stated by Waller, Putnam and Carlson (1996), dissociation is a term that has been used “loosely” (p. 302) to denote hypnotisability and absorption, through to dissociative
disorders, making analysis problematic. In a similar vein, Holmes et al. (2005) noted that using the term dissociation to describe “a set of phenomena” has created “considerable confusion” (p. 4). Nijenhuis and van der Hart (2011) also stated that dissociation lacked definition in clinical studies.

PD and trait dissociation result in a failure to encode and store memories of traumatic events and this can result in not only the development of PTSD, but also the maintenance of PTSD, due to the inability to retrieve, process and integrate these traumatic memories (Bedard-Gilligan & Zoellner, 2012). It is important to differentiate between the mechanisms involved in trait dissociation, an underlying pre-disposition for dissociation and PD, a transient dissociation resulting from the trauma, and determine their respective association with, and predictive ability for, PTSD to assist with prevention, intervention and recovery at all stages. There is a dearth of studies that have investigated trait dissociation as a predictor of PTSD, let alone in MVA samples. The current study will examine PD and trait dissociation using validated measures of both forms of dissociation, in a MVA sample.

**Fear of dying**

Fear of dying, individuals’ subjective appraisal of a traumatic event, is a valid index of trauma severity (Dorfel, Rabe, & Karl, 2008; McNally, 2003). As noted by van der Kolk and McFarlane (1996) the assessment and meaning attached to the trauma signifying how threatened victims feel, is as crucial as the actual traumatic event. Ehlers and Clark (2000) developed a cognitive model of PTSD in which negative appraisals of the traumatic event, like a threat to life, can lead to PTSD as the evaluation of the trauma can be overgeneralised and other situations appraised to involve current threat. The activated perception of threat combined with re-experiencing symptoms can result in avoidance, intrusions and hyperarousal and PTSD symptomatology persists (Ehlers & Clark).
Fear of dying has been established as a risk factor for PTSD in assault samples. For example, Dunmore, Clark and Ehlers (1999) found fear of dying a significant predictor of PTSD but results may be limited as individuals diagnosed with PTSD were more likely to have been abused as a child, experienced previous trauma and to have depression. Another assault study indicated fear of dying a significant predictor of PTSD severity at six and nine months though this sample was notably small (Dunmore, Clark, & Ehlers, 2001). Researchers in Norway also studied assault but excluded domestic violence. Although fear of dying was significantly correlated with PTSD, some assessments were conducted four months post assault, possibly because of delay with police investigations or recovery from the high proportion (68%) of severe injuries (Johansen, Wahl, Eilertsen, Hanestad, & Weisaeth, 2006). In contrast, in another assault study fear of dying was not a risk factor for PTSD despite high reported rates (41%) of fear of dying (Johansen, Wahl, Eilertsen, & Weisaeth, 2007).

Although injuries were critical and life threatening in a study with 60% MVA, neither an objective measure of injury severity, nor a subjective measure of accident severity, was a risk factor for PTSD, and instead fear of dying was a significant risk factor of PTSD at twelve months (Schnyder, Moergeli, Klaghofer, & Buddegerg, 2001). Whilst an objective assessment of injury severity may be considered a better index of trauma severity, various studies found it has no bearing on the development of PTSD (Johansen, Wahl, Eilertsen, Hanestad, & Weisaeth, 2006; Voges & Romney, 2003). Such studies also include an epidemiological study (Holbrook, Hoyt, Stein, & Sieber, 2001) and MVA samples (Dorfel, Rabe, & Karl, 2008; Dougall, Ursano, Posluszny, Fullerton, & Baum, 2001; Fujita & Nishida, 2008; Irish, 2011; Mayou, 2002). Further evidence is provided in a study where injuries were significantly less and one-month post-MVA, fear of dying was a significant predictor of symptoms and diagnosis of PTSD (Delahanty, Raimonde, Spoonster, & Cullado, 2003).
Two MVA studies by Blanchard and colleagues (Blanchard et al., 1995; 1996) demonstrated fear of dying as a significant risk factor of PTSD. Of three subjective perceptions of risk (control, sense of danger and fear of dying), fear of dying was the only significant predictor of PTSD diagnosis and severity four months post MVA in a sample seeking medical attention (Blanchard et al. 1995). Additionally, fear of dying was the only risk factor that significantly differentiated between those with PTSD, or sub-syndromal PTSD or those without (Blanchard et al. 1995). With a very high rate of PTSD four months post-MVA (39%) in survivors who attended hospital with mild injuries, fear of dying significantly predicted PTSD diagnosis and severity (Blanchard et al., 1996). However, the twice-higher number of females in both studies could have resulted in the higher incidence of PTSD and greater perception of threat to life.

Nevertheless, fear of dying was demonstrated as a risk factor for PTSD in studies with an equal representation of gender or else an over-representation of males. An examination of various risk factors of PTSD in a very large sample of MVA survivors, with a range of injury severity and evaluation of consecutive attendees to hospital emergency, Ehlers, Mayou and Bryant (1998) established fear of dying was a significant predictor of both PTSD diagnosis and severity at three months. Measurement of perceived threat to life was a question that asked how frightening participants regarded the MVA, which may differ to threat to life appraisals. Jeavons (2000) also conducted a MVA study of consecutive hospital attendees of which the majority had minor injuries, and found fear of dying a significant predictor of PTSD diagnosis at three and six months, albeit in a small sample.

An epidemiological study conducted by Holbrook, Hoyt, Stein and Sieber (2001) not only indicated fear of dying as a significant predictor of PTSD at six months, but also established that fear of dying increased the odds of PTSD 1.6 times. Holbrook et al.’s study comprised severely injured participants, including MVA victims, who were admitted to hospital. A significant
positive relationship between fear of dying and PTSD was found in another MVA study of
hospital admissions though the sample was small (Delahanty, Raimonde, Spoonster, & Cullado,
2003). In a large MVA sample of hospital admissions, Irish et al. (2011) demonstrated fear of
dying was a significant predictor of PTSD at six months though, not at six weeks. Possibly, at six
weeks, it was too soon for some participants to tolerate revisiting the life threat. Alternatively,
chronic PTSD symptoms may bias recall of threat to life.

Fear of dying was evaluated as one of the predictors of PTSD diagnosis or severity in a
meta-analysis and established as a significant risk factor, irrespective of trauma type, with a
weighted effect size of $r = .24$ (Ozer, Best, Lipsey, & Weiss, 2003). Studies were conducted to
compare cognitive models as risk factors of PTSD with the risk factors established in Ozer et al.’s
meta-analysis. Fear of dying was not supported as a risk factor in two studies (Ehring, Ehlers, &
Glucksman, 2006; Ehring, Ehlers, Cleare, & Glucksman, 2008). In Ehlers et al.’s (2008) study,
such results may be attributed to the small sample size ($N=53$), and only five people diagnosed
with PTSD at six months. Yet, in contrast, fear of dying was demonstrated as a highly significant
risk factor for PTSD one and three months post MVA, and retained significance six months post
MVA, in another study by the same group of researchers (Ehring, Ehlers, & Glucksman, 2008).

Fear of dying has been demonstrated as a risk factor for PTSD in non-MVA and MVA
samples and will be evaluated as a prospective risk factor for PTSD severity, in a MVA sample,
in the present study.

Aims and Hypotheses

The present study aimed to evaluate whether PD was multifactorial, and then determine
its contribution as a predictor of PTSD severity in a MVA sample. PD was evaluated in
conjunction with pre-existing risk factors of PTSD: female gender, neuroticism, trait dissociation
and coping style (avoidant or emotional) and fear of dying. It was hypothesised that females and
individuals with higher peritraumatic dissociation, trait dissociation, neuroticism, avoidant coping style, emotional coping style and fear of dying scores would have more severe PTSD.
Evaluation of Peritraumatic Dissociation as a Multidimensional Construct and its Contribution as a Predictor of PTSD Severity

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Abstract

It has been debated whether peritraumatic dissociation (PD) is a unidimensional construct and a unique predictor of Posttraumatic Stress Disorder (PTSD). Hence, the present study conducted an exploratory factor analysis (EFA) of PD to determine if it is multifactorial, and whether one factor, independently and uniquely predicted PTSD severity, in a sample of motor vehicle accident (MVA) victims. PD was evaluated in the presence of other reliable risk factors that were either pre-existing vulnerabilities: female gender, neuroticism, trait dissociation, coping styles or peritraumatic: fear of dying. It was hypothesised that females and individuals with higher peritraumatic dissociation, trait dissociation, neuroticism, avoidant- or emotion-oriented coping styles, or fear of dying scores would experience greater PTSD severity. Two PD factors, altered awareness and depersonalisation/derealisation were obtained by EFA. In the final model, only PD Factor 1, altered awareness, alongside trait dissociation and fear of dying predicted PTSD severity and collectively explained 40.6% of the total variance. In addition, each predictor uniquely contributed to the amount of variance explained. This study highlights the importance of assessment of PD, trait dissociation, and subjective appraisals of trauma, like fear of dying, to ascertain susceptibility to PTSD post-MVA and to provide appropriate clinical intervention for such symptomatology.

Key words: PTSD, Dissociation, Fear of Dying, Gender, Neuroticism, Coping style
The marked disparity between the number of people exposed to a traumatic event and the number who subsequently develop posttraumatic stress disorder (PTSD) has led to investigation of prospective risk factors for PTSD. Despite rates of exposure to traumatic events ranging between 80-90% (Breslau et al., 1998; Kessler, Berglund, Demler, Jin, & Walters, 2005), lifetime prevalence of PTSD in both Australia and the USA have occurred in only 6.4% and 6.8% of the population respectively. Whilst exposure to traumatic events can result from numerous avenues, an everyday occurrence that can be traumatic is a motor vehicle accident (MVA). MVAs were the fourth highest traumatic event of nineteen characteristic traumas examined (Breslau et al.), whilst accidents, primarily MVAs, were considered traumatic by 25% of males and 13% of females in the NCS-R (Kessler et al.). An epidemiological study reported MVAs a common precipitant of PTSD, in both occurrence and severity (Norris, 1992).

To facilitate understanding why some individuals develop PTSD and others do not, research has examined salient risk factors of PTSD associated with trauma, one of which is peritraumatic dissociation (PD). PD is a state dissociation, triggered by, and occurring at the time of, exposure to a traumatic event (Marmar, 1997). Distortions such as feeling like one is observing oneself or disconnected from oneself (depersonalisation); distortions of time (slowing or speeding up); distortions in meanings and of one’s environment that can lead to disorientation and intense unreality (derealisation); and feelings of confusion can be experienced (American Psychiatric Association [APA], 2000; Birmes et al., 2003; Marmar et al., 2007). In addition, Ehlers and Clark (2000) have posited a cognitive model for PTSD, from which it is proposed that PD disrupts encoding of information and assimilation of memories of the traumatic event and this can subsequently result in intrusive images and flashbacks associated with PTSD.
Meta-analyses have demonstrated a significant relationship between PD and subsequent PTSD or posttraumatic stress. PD has been shown to be the strongest predictor of PTSD of seven reliable predictors across sixteen studies, with an overall weighted effect size of $r = .35$ (Ozer, Best, Lipsey, & Weiss, 2003). Breh and Seidler (2007) criticised Ozer et al.’s results as more than 50% of the studies reviewed were retrospective and had assessed PD and PTSD concurrently. Breh and Seidler reviewed 35 studies where PD was assessed post trauma but prior to PTSD development, and found little difference in effect size for the predictive ability of PD for PTSD severity, $r = .35$ in prospective studies and $r = .37$ for retrospective studies. In a more recent meta-analysis, Lensvelt-Mulders et al. (2008) examined 59 studies and found a significant relationship between PD and the development of posttraumatic stress, with a weighted effect of $r = .40$. Overall the literature has demonstrated a robust relationship between PD and PTSD, albeit with a moderate effect size.

PD is a well-established predictor of PTSD in non-MVA samples, such as assault victims (Birmes et al., 2001, 2003; Johansen, Wahl, Eilertsen, Hanestad, & Weisaeth, 2006; Marshall & Schell, 2002); emergency workers (Marmar et al., 2006; Marmar, Weiss, Metzler, & Deluchi, 1996); disaster victims (Birmes et al., 2005; Cardena & Spiegel, 1993; Koopman, Classen, & Spiegel, 1994) and witnesses of mass shootings (Classen, Koopman, Hales, & Spiegel, 1998). However, only a small number of studies have investigated and established PD as a risk factor for PTSD in MVA samples (Ehlers, Mayou and Bryant, 1998; Shalev, Peri, Caneti, & Schreiber, 1996; Ursano et al., 1999b; Zatzick et al., 2002). Limitations of these studies included questionable validity of the measure of PD (Ehlers et al.), small sample size (Shalev et al.) and substance use as a potential confounding variable (Zatzick et al.). Nevertheless, Ursano and colleagues not only demonstrated PD a significant predictor of PTSD in a MVA study, but also showed that individuals who experienced PD were 4.12 times more likely to develop PTSD. In addition, PD was shown as a highly significant predictor of
PTSD at six weeks and six months in a large sample (N=356) of MVA survivors admitted to hospital (Irish et al., 2011).

Despite such positive findings, other researchers debated the predictive ability of PD in PTSD severity. Wittman, Moergeli and Schnyder (2006) proposed the relationship between PD and posttraumatic stress symptoms was “an artifact of confounding variables” (p. 640) and to test this, examined PD with Acute Stress Disorder (ASD) and PTSD symptomatology, in the presence of eight control variables. PD, measured with the Peritraumatic Dissociative Experiences Questionnaire (PDEQ-RV; Marmar, Weiss & Metzler, 1998) and three PTSD symptom cluster scores obtained from the German version of the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1998), were assessed as predictors of PTSD, six months post accident. Results showed PD was only predictive of PTSD if it was entered into the regression after the CAPS symptom clusters, at which point, it explained only 2.6% of the overall variance of 38.3% (Wittman et al.). If the order of entry was the opposite, PD was not a significant predictor. There are a number of drawbacks in this study, aside from the reported high number of significant predictors (14) explaining 38.3% of variance. Although the PDEQ comprises ten items rated on a 5-point Likert scale with a total score between 10-50, Wittman et al. allocated scores of zero if no PD was reported, 0.5 for responses regarded as sub-threshold, and a score of one for responses considered to be threshold. Moreover, Wittman et al. assessed ASD with items drawn from the CAPS as well as the PDEQ, the measurement they were using to assess PD and from which they chose to examine the relationship between PD and ASD.

Likewise, van der Velden and Wittman (2008) questioned the predictive ability of PD and suggested previous positive results might have been confounded by the presence of other variables. A systematic review of 17 studies of single traumatic events (i.e. assault, disaster, MVA or terrorism) showed only three studies supported PD as an independent predictor of
PTSD severity (van der Velden & Wittman). Findings are limited as four studies included children and teenagers; eight studies had small sample sizes (< 90); and studies were excluded if they had follow-up periods under three months or if pre-existing psychopathology had not been measured. Similarly, Gershuny, Cloitre and Otto (2003) suggested the relationship between PTSD severity and PD was mediated by fear of dying and fear of losing control. Although results showed PD did not remain significant in the presence of fear of dying and fear of losing control, the study was limited by retrospectivity of reports that assessed any lifetime traumatic event and a sample restricted to females primarily aged 18-24 years.

In the last decade, researchers began to question whether PD is unitary or multidimensional. Previously PD was regarded as unidimensional, however it has recently been suggested there could be different processes in PD that should be explored to determine which of these predict PTSD (Birmes et al., 2003; Bryant, 2007; McNally, 2003). It was proposed PD should be deconstructed and evaluated in terms of components, such as time distortion, reduced awareness, and derealisation and determined where the predictive value lies (Bryant, 2007; McNally, 2003). Additionally, van der Velden and Wittman (2008) suggested PD as a general construct could be compared to specific PD factors and then each evaluated as an independent predictor.

As a result, Bryant et al. (2009) performed confirmatory and exploratory factor analyses of PD in two studies, and then examined the predictive value of the two obtained PD factors, termed altered awareness and derealisation. Bryant et al. proposed that altered awareness resulted from attention being narrowly focused and reduced during the trauma whilst derealisation resulted from distortions of reality that led to distancing oneself from the trauma. The first study sample comprised 247 participants with trauma injuries, 58% MVA, admitted to hospitals for a minimum period of 24 hours. Rather than assessing PTSD, Bryant et al. chose to investigate the relationship between the PD factors and acute stress disorder,
anxiety and depression. PD (M = 7.43) was assessed by the PDEQ, acute stress disorder (ASD) by the CAPS-1 and anxiety and depression, assessed by the Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983). Logistic regression indicated that PD Factor 2, derealisation, was a significant predictor of ASD and linear regressions determined PD Factor 2 also predicted anxiety and depression. PD Factor 1, altered awareness, was not a predictor.

Bryant et al.’s second study was a cross-validation study to validate the two PD factors, altered awareness and derealisation, established in the first study, with a sample of 152 treatment-seeking participants following assault, MVA or fire-fighting who reported high acute stress, ASD, measured by The Acute Stress Disorder Scale (ASDS; Bryant, Moulds, & Guthrie, 2000) and high PD (M = 23.09). Despite the same two PD factors, each with the same four items, established by factor analysis, Bryant et al. concluded only partial support for the factors was obtained, due to higher cross loading. Bryant et al. acknowledged the different results might have occurred due to the disparity of the two samples as the first comprised hospital attendees seeking medical attention following injury whereas the second study comprised a clinical group post trauma exposure, with high reported ASD and PD.

There are a number of drawbacks in Bryant et al.’s studies. In the first study, despite reporting information about the sensitivity, specificity and reliability of the CAPS-1 in relation to PTSD diagnosis, Bryant et al. used the scale to measure ASD or diagnose “acute PTSD” (p. 70). Yet, had Bryant and colleagues wanted to measure ASD, it is unclear why they did not use the ASDS, as done in the second study. Diagnosis of PTSD presumably was not obtained as Bryant et al. administered the CAPS-1, 24 hours post hospital admission, and on average, seven days post injury, forfeiting the four-week duration of symptoms criteria. Furthermore, Bryant et al. examined PD as a predictor of ASD, which seems redundant, as
ASD requires three of five dissociative symptoms: numbing, detachment or absence of emotional responsiveness; reduction in awareness of surroundings; derealisation; dissociative amnesia and depersonalisation (DSM-IV-TR; APA, 2000) that overlap with PD symptoms. Lastly, the mean PD score in the first study was reported as 7.43, when scores normally range from 10-50. There was no explanation provided about how this score was derived. Additionally, there were no results provided for PD’s predictive ability in the second study as the results pertained solely to the factor analysis.

The current study aims to address the aforementioned concerns, by determining whether PD is multidimensional and if so, whether one factor is a unique and independent predictor of PTSD severity, in the presence of additional established risk factors of PTSD severity: female gender, neuroticism, avoidance and emotion-oriented coping styles, trait dissociation and fear of dying during the trauma.

**Gender**

Findings of female gender as a risk factor for PTSD have been noteworthy due to the lower propensity of exposure to trauma for females. The National Comorbidity Study (NCS; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995) reported that whilst 60.7% of males compared to 51.2% of females had been exposed to trauma, lifetime prevalence of PTSD was 5% for males compared to 10.4% for females. The finding of a two-fold higher risk for females was replicated even with trauma type controlled (Breslau, Chilcoat, Kessler, Peterson, & Lucia, 1999; Tolin & Foa, 2006). A more recent epidemiological study, Australian census and a meta-analysis reported a two and a half fold risk for trauma exposure with female gender (Australian Bureau of Statistics, 2008; Kessler, Berglund, Demler, Jin, & Walters, 2005; Rubin, Berntsen, & Johansen, 2008).
Female gender has been established as a risk factor for PTSD diagnosis and/or severity post MVA at one month (Dougall, Ursano, Posluszny, Fullerton, & Baum, 2001; Ursano et al., 1999a), six weeks (Irish et al., 2011); three months (Ehlers, Mayou, & Bryant, 1998); and six months (Bryant & Harvey, 2003; Dougall et al., 2001; Irish et al.), irrespective of injury status. In contrast, Jeavons (2000) found there was no greater risk for females in a MVA sample with an equal representation of males and females, though the sample was notably small. Yet, in a study with a very large sample of trauma victims who attended hospital, 85% MVAs, with an equal distribution of gender, female gender was again not a risk factor for PTSD severity (Shalev, Freedman, Peri, Brandes, & Sahar, 1997).

Neuroticism

Neuroticism, also termed ‘negative affectivity’ or ‘negative emotionality’, is a stable personality trait characterised by pervasive negative mood and emotion, and general dissatisfaction (Clark, Watson & Mineka, 1994; Lahey, 2009). People high in neuroticism can appraise and respond to events in disproportionately negative ways (Suls & Martin, 2005; Watson & Clark, 1984) and thus can develop exaggerated negativity associated with the memory of a traumatic event (Rubin, Berntsen, & Johansen, 2008). Individuals with high neuroticism could be vulnerable to PTSD due to their high arousal and negative interpretations of stimuli associated with exposure to trauma, persistent negative exaggeration of the threat, and maladaptive coping methods (Holeva & Tarrier, 2001).

Neuroticism has been shown to be a significant predictor of PTSD in a meta-analysis of 14 mixed trauma studies with the highest effect size of all predictors examined (Rubin et al., 2008). In addition, Cox, MacPherson, Enns and McWilliams (2004) demonstrated that neuroticism was a consistent and significant risk factor for PTSD diagnosis, irrespective of trauma type and pre-existing depressive and anxiety disorders, but also, neuroticism resulted
in 3.13 higher likelihood of PTSD diagnosis. Cox et al. did acknowledge that higher neuroticism scores could have resulted from chronic PTSD.

Few studies have investigated neuroticism in MVA samples, of which only one found neuroticism a significant and independent predictor of PTSD (Holeva & Tarrier, 2001). Neuroticism was not supported as a risk factor for PTSD in Mayou, Bryant and Duthie’s (1993) study whilst in another MVA study, neuroticism did not remain significant in the presence of situation control and avoidance coping (Dorfel, Rabe, & Karl, 2008). Yet, Dorfel et al.’s findings were limited by a very small sample size and retrospective accounts beyond four years.

**Avoidant- and Emotion-Oriented Coping Styles**

Coping has been described as a process of cognitive and behavioural efforts continually modified in response to stressful situations (Lazarus, 1993; Lazarus & Folkman, 1984), as well as a dispositional, general coping style employed across different situations (Endler & Parker, 1990), which can adapt to meet situational demands (Endler, 1997). Trait coping strategies were categorised as ‘avoidant’ or ‘emotion’ oriented (Endler & Parker, 1990). Avoidance-oriented coping comprises distraction (task oriented) and social diversion (person oriented) avoidance strategies, whilst emotion-oriented coping style is only person oriented and involves self-oriented emotional responses, preoccupation with self, daydreaming and fantasising (Parker & Endler, 1992). If situations, memories and undesirable emotions are deliberately circumvented, normal processing of the trauma that promotes habituation to PTSD symptoms is impeded (Pineles et al., 2011).

In a MVA study, although an avoidant coping strategy, disengagement, did not predict PTSD severity two months post MVA, a trend toward significance was indicated (Mellman, David, Bustamante, Fins, & Esposito, 2001). Avoidance coping was demonstrated as a
significant risk factor for PTSD in Dorfel et al.’s (2008) MVA study but findings are limited by retrospective assessment and a small sample. In another study, higher avoidant coping scores were revealed with injured participants (59% MVA), diagnosed with PTSD eight months post discharge from hospital, (Matthews, Harris, & Cumming, 2009). A further MVA study found avoidant coping was a significant predictor of PTSD at six and twelve months (Pacella et al., 2011).

Wishful thinking, studied as an emotion coping strategy in a MVA sample, significantly predicted PTSD severity at six and twelve months (Dougall, Ursano, Posluszny, Fullerton, & Baum, 2001), though coping style was based on participants’ reported coping style after the MVA, rather than general coping style, even when general coping style had been measured. Avoidant coping failed to be a predictor of PTSD in this study (Dougall et al.). Both avoidant and emotion-oriented coping were significant predictors of PTSD diagnosis three and six months post-MVA, with emotion-oriented coping style the stronger predictor (Jeavons, Horne, & Greenwood, 2000) and as the coping style remained constant at both assessment periods, it was suggestive of a general style.

**Trait Dissociation**

Trait dissociation is a pre-existing, stable general tendency to dissociate (Murray, Ehlers, & Mayou, 2002). Research on dissociation is hindered by definitions that range from hypnotisability and absorption through to the level of dissociation present in dissociative disorders (Nijenhuis & van der Hart, 2011; Waller, Putnam, & Carlson, 1996). Similar to PD, trait dissociation comprises amnesia, depersonalisation, derealisation, identity alteration and identity confusion (Steinberg, 1994) that lead to separation or fragmentation of thoughts, emotions and experiences (Spiegel & Cardena, 1991) and the subsequent inability to assimilate these into memory (Ehlers & Clark, 2000; Nijenhuis & van der Hart, 2011). PD
and trait dissociation result in a failure to encode, store, and retrieve memories of traumatic events and this can result in both development and maintenance of PTSD (Bedard-Gilligan & Zoellner, 2012).

In two studies of dissociation and PTSD, one with a general population (Briere, Scott, & Weathers, 2005) and the other, a MVA sample (Murray, Ehlers, & Mayou, 2002), PD, persistent dissociation and generalised dissociation were evaluated as predictors of PTSD. Although both groups of researchers determined that persistent dissociation was the best predictor of PTSD, their definitions of persistent or and generalised dissociation were similar to PD and trait dissociation. Persistent dissociation, defined as dissociation that occurred around the time of exposure to a traumatic event that either persisted could be construed as PD. Generalised dissociation, described as dissociation that had already resulted from exposure to a traumatic event before the current traumatic event in study, could be construed as trait dissociation. Briere et al.’s and Murray et al.’s studies were further limited. There was an extensive time interval between trauma and assessment (Briere et al.) and Murray et al. only administered their 38-item Trait Dissociation Questionnaire (TDQ) to the small inpatient sample (n=21) and administered a 10-item TDQ to the 140 outpatients, even though they had established by factor analysis there were seven unrelated characteristics of dissociation in the TDQ. Therefore, the shortened version might not have fully encapsulated trait dissociation. Few studies have investigated trait dissociation as a predictor of PTSD in any trauma, let alone MVA samples.

**Fear of dying**

Fear of dying, an individual’s subjective appraisal of a traumatic event, is a valid index of trauma severity (Dorfel, Rabe, & Karl, 2008; McNally, 2003) as the evaluation of, and meaning attached to a trauma signifying how threatened victims feel, is as crucial as the actual traumatic
event (van der Kolk & McFarlane, 1996). Ehlers and Clark (2000) developed a cognitive model of PTSD, in which it was proposed that negative appraisals of a traumatic event could lead to PTSD, as the evaluation of threat can become overgeneralised and new situations assessed as a current threat.

In a meta-analysis, fear of dying was shown as a significant predictor of PTSD severity, irrespective of trauma type, with a weighted effect size of $r = .24$ (Ozer, Best, Lipsey, & Weiss, 2003). Yet, when other researchers compared cognitive models as risk factors of PTSD with the risk factors established in Ozer et al.’s meta-analysis, fear of dying did not predict PTSD in two MVA studies (Ehring, Ehlers, & Glucksman, 2006; Ehring, Ehlers, Cleare, & Glucksman, 2008). However, in Ehlers et al.’s (2008) study, the sample was small (N=53) with only five people diagnosed with PTSD at six months. Yet, the same group of researchers showed fear of dying was a highly significant risk factor for PTSD one, three and six months post MVA in another study (Ehring, Ehlers, & Glucksman, 2008).

Fear of dying has also been a significant predictor of PTSD with injured MVA participants. Neither an objective measure of injury severity nor a subjective measure of accident severity were risk factors of PTSD in a sample of participants with critical and life threatening injuries (60% MVA), and instead, fear of dying significantly predicted PTSD (Schnyder, Moergeli, Klaghofer, & Buddeberg, 2001). Equally, when compared with control and sense of danger as risk factors, fear of dying was the only significant predictor of PTSD severity, in a MVA sample of medical attention-seeking participants (Blanchard et al. 1995a). In another study by the Blanchard group of researchers, fear of dying significantly predicted PTSD severity four months after the MVA in a sample of MVA survivors who attended hospital for mild injuries (Blanchard et al., 1996).

Whilst the twice-higher number of females in both Blanchard studies could have been of influence in higher fear of dying, other MVA studies of participants attending hospital found fear
of dying a predictor of PTSD at six months (Delahanty, Raimonde, Spoonster, & Cullado, 2003; Irish et al., 2011; Jeavons, 2000), though the samples were small in Delahanty et al.’s and Jeavon’s studies. Furthermore, an epidemiological study of a sample of severely injured participants admitted to hospital, including MVA victims, not only indicated fear of dying was a significant predictor of PTSD at six months, but also established fear of dying increased the odds of PTSD 1.6 times (Holbrook, Hoyt, Stein, & Sieber, 2001).

**Aims of the study**

The present study aimed to establish whether PD was uni- or multidimensional, and if multifactorial, whether one factor had a higher predictive ability of PTSD, in a sample of MVA victims. If PD comprised more than one factor, each factor would be examined to ascertain whether one provides greater explanatory value in subsequent PTSD severity. PD was examined to assess its ability to uniquely contribute to the explanation of PTSD severity in the presence of additional established risk factors of PTSD: female gender, neuroticism, coping style (avoidance and emotion-oriented), trait dissociation and fear of dying, which were also examined as predictors of PTSD severity in this research.

**Hypotheses**

It was hypothesised that:

1. PD would be multidimensional and comprise two factors
2. PD would predict PTSD severity three months post MVA and uniquely contribute to the explanation of PTSD severity
3. Female gender and higher scores of neuroticism, trait dissociation, avoidance- and/or emotion-oriented coping styles and fear of dying would predict PTSD severity three months post MVA
Method

Participants

People who had been involved in a MVA during 2003-2005, and had attended a local hospital emergency department and were either treated and discharged (outpatient), or admitted and discharged later (in-patient), were invited to participate in the study. Exclusions included younger than 18 years of age, non-English speaking and loss of consciousness. There were two time points of assessment in the study, the first one month after the MVA and the second, three months after the MVA. The sample comprised 333 participants of whom 94% reported injuries, 179 (53.8%) were female and 154 (46.2%) male, with an age range of 18-88 years (M = 37.69, SD = 17.72)

Materials

Time 1

Pertinent information in the survey for the present study for Time 1 included gender, assessment of fear of dying and assessment of PD, role in accident (e.g. driver, passenger, motorcyclist, pedal cyclist or pedestrian), self-reported injury and whether participants were admitted to hospital. A single-item Likert scale question measured participants’ subjective appraisal of fear of dying (threat to life) at the time of the accident, where 1 = “not at all” and 5 = “certain I would die”. The ten items of The Peritraumatic Dissociation Experiences Questionnaire-Self-Report (PDEQ-SR; Marmar, Weiss, & Metzler, 1998) were embedded in the survey (see Appendix B).

The Peritraumatic Dissociation Experiences Questionnaire-Self-Report assesses PD. Each of the ten items is rated on a 5-point Likert scale with 1 = “not at all” and 5 = “extremely true”, hence the range of scores is 10-50 and higher scores indicate greater
peritraumatic dissociative symptomatology. High internal consistency ($\alpha = .80$) and good divergent and convergent validity have been reported (Marmar et al., 1998).

**Time 2**

Time 2 of the study included four standardised measures to measure PTSD severity, neuroticism, coping style and trait dissociation. PTSD was measured by *The Posttraumatic Stress Diagnostic Scale* (PDS; Foa, Cashman, Jaycox, & Perry, 1997), a 49-item questionnaire that provides a single total score, ranging from 0-51, that provides a measure of symptom severity according to the criteria in the DSM-IV. Foa, Cashman, Jaycox and Perry showed the PDS has robust test-retest reliability ($\kappa = .83$) and internal consistency ($\alpha = .92$). In this study, participants answered the questions only in respect of the MVA for which they presented to hospital.

Neuroticism was measured by the eight items in *The short Eysenck Personality Inventory* (EPI; Duncan-Jones, 1983) that are ticked either Yes or No, dependent on whether the questions fit a description of the participants. The short version of the EPI correlates highly with the full version: $r = 0.90$ for the trait of neuroticism.

*The Coping Inventory for Stressful Situations* (CISS; Endler & Parker, 1990) measures three types of coping style that differ in orientation: task, emotion and avoidance. There are 48 items rated on a 5-point Likert scale of intensity, where 1 = “not at all” and 5 = “very much”. Participants respond in terms of their general coping style, how frequently they generally respond or engage in particular activities, when faced with a stressful or adverse situation. The internal consistency has been high, ranging from $\alpha = 0.87$ to $\alpha = 0.91$ (Endler & Parker, 1990, 1994). Only emotion-oriented and avoidance-oriented coping are assessed in the present study as prospective risk factors for PTSD, unlike task-oriented coping, which is a problem-solving coping style and not a risk factor for PTSD severity.
The Trait Dissociation Questionnaire (TDQ; Murray, Ehlers, & Mayou, 2002) comprises 38 items that measure trait dissociation tendencies such as detachment, emotional numbing, amnesia, confusion/ altered sense of time, a notion of split-self, labile mood and inattention. Self-ratings range from 0 = “never” to 5 = “always” and higher scores indicate higher levels of trait dissociation. Internal consistency, $\alpha = .92$, and test-retest reliability, $r = .82$, are robust (Murray, Ehlers, & Mayou).

Procedure

Approval for a broader study (reported elsewhere) had already been provided by the Research Ethics Committees from Hunter New England Area Health Service and University of Newcastle and so a variation was submitted and granted for the current study (Appendix A). A total of 1,460 MVA survivors with consecutive hospital emergency admissions were mailed information sheets, the four-page survey (Appendix B) and reply-paid addressed envelopes that were coded to indicate the hospital attended and whether treated as an in-patient or out-patient, to be completed one-month post-MVA. The mailings were completed by Clinical Nurse Consultants to maintain anonymity. At that time, an invitation to participate in Phase 2, three months post MVA, was also extended. Survey return implied consent. There were 367 responses, a 25% response rate, for Time 1 and a response rate of 12% for Time 2.

Data analysis

SPSS Version 19 was used for all the statistical analyses including descriptive statistics, factor analysis, t-tests, ANOVAs and multiple linear regressions. In the first instance, a correlation matrix was obtained for all ten items of the PDEQ and correlations and significance levels checked to determine if any items should be eliminated from factor analysis. Exploratory Factor Analysis (EFA) was performed to establish whether PD was a unitary phenomenon or multidimensional and factor scores calculated and stored. The EFA
entailed principal axis factoring (PAF) and promax rotation. These analyses methods were chosen, as PAF is the preferred method in SPSS with non-normal data, for which it gives the best results, and an oblique rotation such as promax is the preferred method when factors are correlated (Costello & Osborne, 2005). Following an oblique rotation, the pattern matrix was utilised to examine the item loadings, as recommended by Costello and Osborne. Factors were extracted based having an eigenvalue higher than one, as well as viewing the factor plot in rotated factor space.

Multiple linear regressions (MLR) were conducted to evaluate the predictive ability of the risk factors of PTSD severity included in the current study. In the first instance, predictors were screened for inclusion in the predictive model. Pearson correlations were conducted for risk factors that were continuous variables and a t-test was conducted for any risk factor that was dichotomous. Significant predictors were added to the MLR model that was built by three different methods: entering all significant variables together; Stepwise, and; Backwards Elimination methods. The reason for using three MLR methods was to confirm that all methods indicated the same set of significant variables in the model and thereby provide some protection against a system of variables that was unstable and produced different models depending on the order of entry of variables into the model. Univariate linear regressions were conducted to check for interactions between significant predictor variables in the final MLR model. In a final step, further MLR analysis was conducted to ascertain why predictors did not retain significance in the final MLR model. Assumptions of linearity, normality, homogeneity of variance were all checked.
Results

Demographics

In Time 1, as in the overall study, the age range for the 333 participants was 18 to 88 years (M = 37.69, SD = 17.72), slightly more than half the sample was female (53.8%) and comprised drivers (51.7%), passengers (22.7%), motor cyclists (15.2%), pedal cyclists (7.6%) and pedestrians (2.8%). A high number of MVA survivors reported an injury (93.4%), though only approximately a quarter of the sample (27%) was admitted to hospital.

Time 2 yielded 122 participants who differed in the following respects. There was a small reduction in age range, 18 to 81 years and a higher average age (M = 41.93, SD = 17.78) that was significant: \( t (331) = 2.098, p = .04 \) (two-tailed), equal variances assumed. More females participated in Phase 2 (63.1%), also a significant difference: \( \chi^2 (1) = 6.79, p = .009 \). The sample comprised more drivers (65.6%) yet fewer passengers (18%), motor cyclists (11.5%), pedal cyclists (3.3%) and pedestrians (1.6%). Although there were more participants who reported injuries (95.1%), the difference was not significant. Fewer hospital admissions (23%) resulted.

Measures

Time 1

Of the risk factors measured one month post MVA, PD was reported by 89.5% (n = 297) of 332 participants. There was little difference in reports of PD by phase: 88.6% (n = 187) in Phase 1 (M = 21.26, SD = 9.60) and 90.9% (n = 110) in Phase 2 (M = 21.84, SD = 9.50). There was a significant difference in PD by gender: \( t (330) = 2.34, p = .020 \) (two-tailed), equal variances assumed: females (M = 22.60, SD = 9.23) scoring 2.45 higher on average than males (M = 20.15, SD = 9.79). Fear of dying was reported by 74.5% (n = 248) of the total sample, 73.5% (n = 155) in Phase 1 and 76.2% (n = 93) in Phase 2. There were no significant differences by phase for either PD or fear of dying.


**Time 2**

Range of scores, means and SDs for the prospective risk factors of PTSD severity assessed in the second phase of the study, neuroticism, coping styles and trait dissociation, are displayed in Table 1. The mean PTSD score was comparatively low, indicating PTSD was not severe in this MVA sample. There was a significant difference in PTSD by gender: $t(112) = 2.43$, $p = .016$ (two-tailed), equal variances not assumed: females ($M = 14.10$, $SD = 11.99$) and males ($M = 9.42$, $SD = 9.44$) with females showing a higher score of 4.68 on average.

Table 1

*Range of Scores, Means and SDs for Phase 2 Measures*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Score range</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTSD</td>
<td>0 - 45</td>
<td>12.38 (11.19)</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>0 - 8</td>
<td>4.45 (2.32)</td>
</tr>
<tr>
<td>Avoidance-oriented coping style</td>
<td>19 - 69</td>
<td>44.27 (10.64)</td>
</tr>
<tr>
<td>Emotion-oriented coping style</td>
<td>16 - 75</td>
<td>42.36 (12.59)</td>
</tr>
<tr>
<td>Trait Dissociation</td>
<td>0 - 108</td>
<td>34.93 (24.46)</td>
</tr>
</tbody>
</table>

**Factor Analysis**

Exploratory Factor Analysis (EFA) and examination of the scree plot indicated the presence of two factors in PD. The Kaiser-Meyer-Olkin measure of sampling adequacy showed that the requisite value was over .6 (Tabachnick & Fidell, 2007). Results indicated the Items 1, 2, 8, 9 and 10 loaded on to Factor 1, which we labelled altered awareness, (AA) and Items 3, 4, 5, 6 and 7 loaded on to Factor 2, labelled depersonalisation/derealisation, (DD). Factor loadings are displayed in Table 2. The two factors explained 61.1% of the
variance, with Factor 1, explaining 48.8%. Cronbach’s coefficient alpha was calculated and it indicated high internal reliability, Factor 1, AA, $\alpha = .86$ and Factor 2, DD, $\alpha = .79$. The correlation between the two factors of $r = 0.82$ supported the use of the oblique rotation.
Table 2

*Response Frequencies and Factor Loadings from Exploratory Factor Analysis of Peritraumatic Dissociation using Principal Axis Factoring and Promax Rotation*

<table>
<thead>
<tr>
<th>Item</th>
<th>Item content</th>
<th>Factor</th>
<th>Relative frequencies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>I felt disoriented; that is, there were moments when I felt uncertain about where I was or what time it was</td>
<td>.882</td>
<td>-.112</td>
</tr>
<tr>
<td>9</td>
<td>I felt confused … there were moments when I had difficulty making sense of what was happening.</td>
<td>.825</td>
<td>-.024</td>
</tr>
<tr>
<td>1</td>
<td>I had moments of losing track of what was going on – I “blanked out” or “spaced out” …</td>
<td>.751</td>
<td>.057</td>
</tr>
<tr>
<td>8</td>
<td>I was surprised to find out afterward that a lot of things had happened at the time that I was not aware of.….</td>
<td>.693</td>
<td>.033</td>
</tr>
<tr>
<td>2</td>
<td>I found that I was on “automatic pilot” – I ended up doing things that I later realised I hadn’t actively decided to do</td>
<td>.566</td>
<td>.087</td>
</tr>
<tr>
<td>5</td>
<td>I felt as though I were a spectator watching what was happening to me….</td>
<td>-.141</td>
<td>.817</td>
</tr>
<tr>
<td>6</td>
<td>There were moments when my sense of my own body seemed distorted or changed. I felt disconnected ….</td>
<td>.055</td>
<td>.689</td>
</tr>
<tr>
<td>7</td>
<td>I felt as though things that were actually happening to others were happening to me ….</td>
<td>.014</td>
<td>.617</td>
</tr>
<tr>
<td>4</td>
<td>What was happening seemed unreal to me, like I was in a dream or watching a movie or play</td>
<td>.281</td>
<td>.479</td>
</tr>
<tr>
<td>3</td>
<td>My sense of time changed – things seemed to be happening in slow motion</td>
<td>.310</td>
<td>.383</td>
</tr>
</tbody>
</table>

*Note.* Bolding indicates highest factor loadings. Item Response Scale: 1 = *Not at all true*; 2 = *Slightly true*; 3 = *Somewhat true*; 4 = *Very true*; 5 = *“Extremely true”*

**Correlations**

Pearson correlation coefficients of the risk factors for PTSD severity were obtained for measures that were continuous (Table 3) to determine which predictors to include in the
regression model. With the exception of avoidance-oriented coping, all risk factors had a significant relationship with PTSD severity.

Table 3

*Correlation Matrix of Predictors of PTSD Severity*

<table>
<thead>
<tr>
<th>Predictors</th>
<th>PTSD Severity</th>
<th>Pearson Correlation</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PD Factor 1 Altered awareness (AA)</td>
<td></td>
<td>.534</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Trait Dissociation</td>
<td></td>
<td>.416</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Emotion-oriented coping style</td>
<td></td>
<td>.383</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>PD Factor 2 Derealisation/depersonalisation (DD)</td>
<td></td>
<td>.365</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Fear of dying</td>
<td></td>
<td>.348</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Neuroticism</td>
<td></td>
<td>.221</td>
<td>.020</td>
</tr>
<tr>
<td>Avoidance-oriented coping style</td>
<td></td>
<td>.077</td>
<td>.406</td>
</tr>
</tbody>
</table>

*Regressions*

Multiple linear regressions were performed to determine which risk factors predicted PTSD severity. All risk factors significantly correlated with PTSD severity were entered into regressions using the Enter, Stepwise and Backwards Elimination methods. The final model using the Enter method is reported as it involved the most complete data set. Stepwise and Backwards Elimination were affected by missing values due to variables with omitted values eventually not included in the final model, and therefore resulting in less information (observations) available. The final model shown in Table 4 specified three significant predictors of PTSD severity: PD Factor 1, altered awareness, trait dissociation and fear of dying: $F (3, 115) = 26.2, p < .001$, with 40.6% of the variance explained. The
residuals from the final model were examined and the normality, although a bit skewed to the right, was found to be satisfactory and the variability of the residuals was largely constant (a little less variability at lower predicted values), hence the final model was considered satisfactory. A log transformation was performed for the dependent variable PTSD, but with no change in overall results. In addition, the predictors were highly significant. Moreover, there was no indication of any multicollinearity with variance inflation values between 1-1.2.

Table 4

*Final Regression Model of PTSD Severity*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Beta</th>
<th>t</th>
<th>p value</th>
<th>Semi-partial correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PD Factor 1 Altered Awareness</td>
<td>.384</td>
<td>4.87</td>
<td>&lt; .001</td>
<td>.350</td>
</tr>
<tr>
<td>Trait Dissociation</td>
<td>.296</td>
<td>3.98</td>
<td>&lt; .001</td>
<td>.286</td>
</tr>
<tr>
<td>Fear of Dying</td>
<td>.217</td>
<td>2.85</td>
<td>.005</td>
<td>.205</td>
</tr>
</tbody>
</table>

A review of the Beta values showed that PD Factor 1, altered awareness, was the strongest predictor, followed by trait dissociation then fear of dying. As a means of comparing the relative impacts of the three significant variables, the beta coefficient for fear of dying was given the value of one, and then relative to that, the beta for trait dissociation was 1.4 and 1.8 for PD Factor 1, altered awareness. Variable importance was also assessed another way, considered superior, by evaluation of squared semi-partial correlations (Howell, 2013; Tabachnick & Fidell, 2007). Of the total variance (40.6%) of PTSD severity explained, each predictor also provided a unique contribution: fear of dying (4.2%), trait
dissociation (8.2%) and PD Factor 1, altered awareness, (12.3%). The difference in unique variance was almost two-fold for trait dissociation (1.9) and almost three-fold for PD Factor 1, altered awareness (2.9), highlighting the relative importance of dissociation as a predictor of PTSD severity in a MVA sample.

All pairwise interactions between the three predictors were tested with none found to be significant: PD Factor 1 x fear of dying: F (1, 114) = 0.01, p = .946; PD Factor 1 x trait dissociation: F (1, 114) = 1.12, p = .292; and trait dissociation x fear of dying: F (1, 114) = 2.98, p = .087.

Further analysis was conducted to determine why predictors shown to have a significant relationship with PTSD severity did not retain significance in the final MLR model, at a set cut-off point of .05. Regressions were conducted by entering each non-significant predictor separately into a regression model with PTSD severity and then adding each significant predictor from the final model one by one. The unstandardized coefficients, B, with significance values are reported below to show the corresponding difference in PTSD severity per unit change due to the addition of another predictor.

**PD Factor 2, derealisation/depersonalisation**

By itself, PD Factor 2, DD, was a significant predictor of PTSD severity: B = 4.413, p < .001. In the presence of trait dissociation and fear of dying in the model, PD Factor 2, DD, remained significant, with a reduction in B, but little change in p values: B = 3.735, p < .001 and B = 3.735, p = .002, respectively. PD Factor 2, DD, lost its significance, and markedly, in the presence of PD Factor 1, AA: B = -.275, p = .84. PD Factor 2 was not as strong a predictor as PD Factor 1. If Factor 1 was entered by itself into a regression model, 28% of the variance was explained compared to 13% of the variance that would be explained by entering Factor 2 by itself. Had Factor 2 been included in the final model instead of Factor 1 the results would have been Factor 1, (B = 4.697, B = .384, p = .002) and Factor 2,
(B = 2.673, B = .358, p = .008) with 8% overall less variance explained (32.6% versus 40.6%).

*Gender*

Gender alone was a significant predictor of PTSD severity, though it explained only 4% of the variance: B = 4.682, p = .025. When trait dissociation and fear of dying were added to the regression, gender remained significant with very little change to B and significance: B = 4.266, p = .027 and B = 4.310, p = .029, respectively, showing these two predictors had little influence on gender’s relationship with PTSD. In contrast, gender was effected by the presence of PD Factor 1: B = 1.859, p = .320, demonstrating a large reduction in B and significance level. As previously noted, there was a significant difference for gender in PTSD severity, with females having an average mean score 4.68 points higher than males. To elucidate this difference, a univariate ANOVA was conducted to see the effect on gender in PTSD severity in the presence of PD Factor 1. The estimated marginal means, adjusting for PD Factor 1, revealed the mean score change, with the difference now 1.86, females (M = 11.30) and males (M = 13.16), showing PD Factor 1 was part of the reason for the larger difference in means for gender in PTSD severity. PD item responses were checked to ascertain where females differed to males in their PD responses. Results showed significant differences in two Items in PD Factor 1: Item 1, $\chi^2(4) = 18.6, p = .001$ and Item 9, $\chi^2(4) = 11.4, p = .022$. Females tended to report higher levels of PD for Items 1 and 9, with 63.1% and 70.8% of females reporting symptoms for these two items, compared to 45.7% and 54% of males.

*Neuroticism*

As a single predictor of PTSD severity neuroticism was significant, although it also only explained 4% of the variance: B = 1.068, p = .020. Neuroticism remained significant in
the presence of fear of dying: $B = 1.078$, $p = .011$, but did not remain significant in the presence of either trait dissociation or PD Factor 1. In the presence of trait dissociation: $B = -.155$, $p = .769$, whilst in the presence of Factor 1: $B = .523$, $p = .203$. Thus both PD Factor 1 and trait dissociation over-rode any significance neuroticism had as a predictor of PTSD severity. To further ascertain where these effects occurred, correlations showed that neuroticism and trait dissociation were significantly correlated, $r = .593$, $p < .001$. Of interest, neuroticism was significantly correlated with only Item 1 from PD Factor 1: $r = .316$, $p = .001$.

**Emotion-oriented coping**

Alone, emotion-oriented coping style was a significant predictor of PTSD severity that explained 14% of the variance: $B = .341$, $p < .001$, more than that explained by PD Factor 2. In the presence of fear of dying and PD Factor 1, altered awareness, emotion-oriented coping remained significant: $B = .312$, $p < .001$, and: $B = .186$, $p = .016$, respectively. Emotion-oriented coping lost significance as a predictor of PTSD severity in the presence of trait dissociation: $B = .177$, $p = .074$, which can be explained by the significant correlation between the two variables, $r = .645$, $p < .001$, showing the overlap between the two constructs.

**Discussion**

The hypothesis that PD would predict PTSD severity was supported. Each of the two PD factors obtained by factor analysis was a significant predictor of PTSD severity, but Factor 1, AA, was superior, and retained significance in the final regression model. Furthermore, Factor 1, AA, contributed to PTSD severity beyond that contributed by the other two predictors of PTSD severity; trait dissociation and fear of dying, and this result
occurred irrespective of the order in which predictors were entered into the MLR. Even
though PD Factor 1, AA, trait dissociation and fear of dying were not independent predictors,
nevertheless, each uniquely contributed to the explanation of variance in PTSD severity, and
collectively explained 40.6%. Results of this study showed that individuals who experienced
dissociation as a pre-existing trait, or dissociated during or shortly after the MVA, and
individuals who feared dying during the MVA, experienced greater PTSD severity. The
hypotheses that females, individuals with higher neuroticism traits, and individuals who
employed more avoidance- and/or emotion-oriented coping styles would experience greater
PTSD severity were not supported.

These results differ to that found by Bryant et al. (2009), as the PD Factor, altered
awareness rather than derealisation, had the superior predictive ability. However, the current
research investigated PTSD severity, whereas Bryant et al. evaluated acute stress, anxiety
and depression. Altered awareness entailed losing of track of what is going on; being on
automatic pilot; being unaware of things as they happened; feeling confused about what is
happening; and feeling disoriented and these experiences were more predictive of PTSD
severity in the current study. Of note, had the EFA been conducted similarly to Bryant et al.
with items extracted, both Items 3 and 4 would have been removed and the remaining items
would have still loaded as they did, on the same two factors. Bryant et al. removed Items 2
and 7 as Item 2 cross-loaded and Item 7 did not appear to load on either factor. Of interest,
in the current study, 84.6% of the sample did not endorse Item 7, raising questions about its
usefulness as an item. In validation studies of the PDEQ, Marshall, Orlando, Jaycox, Foy
and Belzberg (2002) also discarded Item 7, stating it appeared redundant and noted it
previously may have been more applicable for combat samples or emergency workers.
Irrespective, the factor analyses from Bryant et al.’s and this study, demonstrated the same
two dimensions involved in PD, with little difference in item inclusion. With or without
items extracted, the final regression results would have been the same, with PD Factor 1, AA, trait dissociation and fear of dying, the three significant predictors of PTSD severity.

Results of the present research did not support arguments posited by Gershuny et al. (2003), namely, that PD was not a significant predictor of PTSD in the presence of fear of dying and control. In the current study, control was not evaluated, but PD Factor 1, AA, not only significantly predicted PTSD severity in the presence of fear of dying, but furthermore, uniquely explained three times the amount of variance in PTSD severity in comparison to fear of dying. Correspondingly, results from the present research dispute arguments proposed by Wittman, Moergeli and Schnyder (2006) and van der Velden and Wittman (2008) that PD is confounded by other variables. In the current study, PD Factor 1, AA, was the strongest predictor of the two PD factors and six other reliable and established risk factors of PTSD severity. The current results were unable to show that PD was an independent predictor of PTSD severity; an argument posited by van der Velden and Wittman (2008), as PD Factor 1, AA, trait dissociation and fear of dying were all significantly correlated with PTSD severity.

The current study could be conceptualised as an investigation under the rubric of a diathesis-stress model for PTSD. A diathesis-stress model suggests that exposure to a traumatic event can be a primary stressor that is more likely to be activated for individuals with pre-existing vulnerabilities, like neuroticism and negative coping strategies (psychological diatheses), and when also combined with peritraumatic responses, such as PD and fear of dying, potentiate PTSD symptomatology. Similarly, another vulnerability is engagement in negative cognitions that can be activated further by a stressful event and influence cognitive functioning and mental representation of the trauma as well as appraisal of any future stressors (Elwood, Hahn, Olatunji, & Williams, 2009). The current study combined a number of established risk factors of PTSD that are individual vulnerabilities, namely, female gender, neuroticism, avoidance and emotion-oriented coping styles, trait dissociation
and fear of dying and investigated these risk factors as potential predictors of PTSD severity in the presence of PD.

Evaluation of a number of vulnerability factors has been termed an integrative diathesis approach, considered important to establish unique contributions (Elwood et al.) Unique predictive ability was established for significant risk factors in this study and further analyses were undertaken to evaluate why the other risk factors did not remain significant as predictors of PTSD severity in the final model. Whereas other MVA studies found female gender as a risk factor for PTSD (Bryant & Harvey, 2003; Dougall et al., 2001; Ehlers, Mayou, & Bryant, 1998; Irish et al., 2011; Ursano et al., 1999a), the current research did not. Initially female gender did predict PTSD severity, but did not remain significant in the presence of PD, Factor 1, AA. Overall, females reported higher levels of PD than males, scoring, on average, 4.68 points more, with the most apparent differences in gender occurring in Items 1 and 4. Another consideration related to this non-significant result might be the PTSD measure itself, as Brewin et al. (2000) found that the effect size of gender did not remain significant when continuous measures of PTSD were used, as in the current research. Likewise, initially neuroticism also significantly predicted PTSD severity but did retain significance, in the presence of both PD Factor 1, AA, and trait dissociation. Neuroticism was significantly correlated with trait dissociation and similar to gender, was significantly correlated with Item 1 on the PDEQ. Few MVA studies have investigated neuroticism as a risk factor for PTSD.

Whereas both gender and neuroticism only explained 4% of the variance in PTSD severity if entered into a regression model by themselves, emotion-oriented coping style in contrast, explained 14% of the variance in PTSD severity, which was a higher amount of variance than that explained by PD Factor 2, DD, when it was entered into the regression alone. Of further interest, emotion-oriented coping remained a significant predictor of PTSD
severity in the presence of PD Factor 1, AA, and fear of dying, yet lost significance in the presence of trait dissociation. This result was explained by the significant correlation between emotion-oriented coping and trait dissociation. Nonetheless, a trend toward significance occurred indicative that emotion-oriented coping style is a prospective risk factor for PTSD, in the current sample.

One possible explanation of the correlation between trait dissociation and emotion-oriented coping may be explained by a study of PD undertaken with university students whom had experienced either aversive or pleasant events in the previous year. Fantasy proneness was examined and a significant commonality shown between it and dissociation, with higher dissociation associated with aversive experiences (Candel & Merckelbach, 2004). As emotion-oriented coping entails daydreaming and fantasising, this overlap may explain the correlation between it and trait dissociation.

The non-significant relationship between PTSD severity and avoidance-oriented coping was unexpected considering the avoidance symptom cluster in PTSD. One possible explanation may be that whereas PTSD avoidance symptoms are very general, avoidance-coping strategies differ as they pertain to specific task-oriented (distraction) or person-oriented (social diversion) activities.

**Limitations**

The results of this research supported the findings of Bryant et al. (2009) that PD is a two-dimensional construct, and furthermore, established three significant and unique predictors of PTSD severity that collectively explained 40.6% of the variance: PD Factor 1, AA, trait dissociation and fear of dying, but there are limitations in the results. The present research was limited to a self-selected MVA sample, and one that had a low mean PTSD score. In their validation study of the PDS, Foa, Cashman, Jaycox and Perry (1997) found a mean of 33.59 for participants with PTSD and a mean of 12.54 for participants without
PTSD. Thus, the PTSD mean obtained in the current study was similar to the mean found for participants without PTSD. Nonetheless, PTSD scores greater than 33 and as high as 45 were found in the current study.

Further limitations include use of self-reports without clinician-verification of symptoms. Yet, all three predictors of PTSD severity are related to subjective experience, and diagnoses are often based on subjective interpretations and reports of experience. Single item questions, such as used in the assessment of fear of dying, have also been criticised for lack of stability and reliability (Bedard-Gilligan & Zoellner, 2012; Fujita, & Nishida, 2008). The present study did not account for history of prior trauma, pre-existing psychopathology or family history of psychopathology, all significant predictors of PTSD symptomatology in Ozer et al.’s (2003) meta-analysis. Current depressive symptoms were not assessed when it has not only been found that there is a high comorbidity between PTSD and depression (Frommberger et al., 1998) but that also, mood at the time of assessment can bias accounts of experiences like dissociation (Marshall & Schell, 2002).

Future research

There are a number of additional potential risk factors of PTSD severity that can be evaluated such as substance use, existing psychopathology and issues such as examination of responsibility for the MVA. Guilt or blame could be potential factors that may influence PTSD severity in MVA samples, as Lensvelt-Mulders et al. (2008) noted, victims’ perception and attribution of blame was a strong predictor of PTS. Future research might examine risk factors that may act as possible mediators of PTSD severity.

Implications

This study highlights the importance of dissociation and subjective appraisals of trauma, such as fear of dying, in predicting PTSD severity after a MVA. Hence, for clinicians working with MVA survivors, assessing the presence of both peritraumatic
and trait dissociation, and negative appraisals, is not only important in determining whether a person may be more susceptible to develop PTSD post-MVA, but also germane for therapeutic intervention.
References


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of posttraumatic stress disorder symptoms in severely injured accident victims.

trauma survivors: prospective evaluation of self-report and clinician-administered


Appendix A

HUMAN RESEARCH ETHICS COMMITTEE

Notification of Expedited Approval

To Chief Investigator or Project Supervisor: Doctor Rosemary Webster
Cc Co-investigators / Research Students: Mrs Rhonda Osborn
                                          Mr Robert Hodgson
                                          Mrs Maria Walker

Re Protocol: The impact of motor vehicle accidents upon psychological well-being

Date: 28-Oct-2010
Reference No: H-517-0203

Thank you for your Variation submission to the Human Research Ethics Committee (HREC) seeking approval in relation to a variation to the above protocol.

Variation to:

1. Re-activate the project for the purposes of analysis of de-identified data.

2. Add Mrs Rhonda Osborn and Mrs Maria Walker to the research team.

Your submission was considered under Expedited review by the Chair/Deputy Chair.

I am pleased to advise that the decision on your submission is Approved effective 27-Oct-2010.

The full Committee will be asked to ratify this decision at its next scheduled meeting. A formal Certificate of Approval will be available upon request.

Professor Alison Ferguson
Chair, Human Research Ethics Committee

For communications and enquiries:
Human Research Ethics Administration

Research Services
Research Office
The University of Newcastle
Callaghan NSW 2308
T +61 2 492 18999
F +61 2 492 17164
Human-Ethics@newcastle.edu.au
Appendix B

Accident Details and Background Survey

Dear Participant,

Thank you for volunteering to be in this study. This questionnaire will take approximately 10 minutes to complete. Your responses are strictly confidential. Please answer every question that applies to you by placing a TICK in the appropriate box or writing your response on the LINE provided, or by CIRCLING the most appropriate answer.

1. Today’s date _______/_____/_______
   Day     Month      Year

2. Date of the Accident _______/_____/_______
   Day     Month      Year

3. What time did the accident occur? ____________am/pm

4. When the Accident happened, were you a:
   Driver             Passenger
   Motorcyclist       Pillion Passenger
   on a Motorcycle    Pedal Cyclist
   Pedestrian

5. Please draw a circle around the number that best describes the overall Severity of the Accident.

   |   |   |   |   |   |
   | 1 | 2 | 3 | 4 | 5 |
   | Very Slight | Moderate | Serious | Severe | Very Severe |

6. Were you Physically Injured in the accident? Yes ☐ No ☐

7. Please draw a circle around the number that best describes the Severity of your injury/injuries.

   |   |   |   |   |   |
   | 1 | 2 | 3 | 4 | 5 |
   | None | Mild | Moderate | Serious | Life Threatening |

8. Please draw a circle around the number that best describes to what extent you feared for your life during the accident.

   |   |   |   |   |   |
   | 1 | 2 | 3 | 4 | 5 |
   | Not at all | A little | Somewhat | A lot | Certain I would Die |
9. **At the moment** how sad or depressed do you feel?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>A little</td>
<td>Somewhat</td>
<td>A lot</td>
<td>Extremely</td>
</tr>
</tbody>
</table>

10. **At the moment** how anxious or fearful are you?

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<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>A little</td>
<td>Somewhat</td>
<td>A lot</td>
<td>Extremely</td>
</tr>
</tbody>
</table>

11. Please draw a circle around the most appropriate answer to the following statement:

“During the 4 weeks **before the accident occurred** how much were you bothered by emotional problems (such as feeling depressed or anxious)?”

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>A little</td>
<td>Somewhat</td>
<td>A lot</td>
<td>Extremely</td>
</tr>
</tbody>
</table>

12. Have you had any other Motor Vehicle Accidents?

- [ ] No      (If no, go to Question 14)
- [ ] Yes →  How Many ________

13. How would rate this accident compared to the other accidents?

- [ ] Not as bad
- [ ] The same
- [ ] Worse

14. **Immediately prior to the accident** how would you describe your level of alertness?

- [ ] Felt active, wide-awake.
- [ ] Was functioning at a high level but not at peak.
- [ ] Felt relaxed, awake but not fully alert, responsive.
- [ ] Felt a little foggy headed.
- [ ] Felt foggy headed, had difficulty staying awake, beginning to lose track.
- [ ] Felt sleepy, would have preferred to lie down, woozy.
- [ ] Could not stay awake, sleep onset was imminent.
15. Please answer all the statements below by ticking the choice that best describes your experiences and reactions **during the accident and immediately afterward**. If a statement does not apply to your experience, please tick “Not at all true.”

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Not at all True</th>
<th>Slightly true</th>
<th>Somewhat true</th>
<th>Very true</th>
<th>Extremely true</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>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.</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>2</td>
<td></td>
<td>I found that I was on “automatic pilot” – I ended up doing things that I later realised I hadn’t actively decided to do.</td>
<td></td>
<td></td>
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<tr>
<td>3</td>
<td></td>
<td>My sense of time changed – things seemed to be happening in slow motion.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td></td>
<td>What was happening seemed unreal to me, like I was in a dream or watching a movie or play.</td>
<td></td>
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<tr>
<td>5</td>
<td></td>
<td>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.</td>
<td></td>
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<tr>
<td>6</td>
<td></td>
<td>There were moments when 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.</td>
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<tr>
<td>7</td>
<td></td>
<td>I felt as though things that were actually happening to others were happening to me – like I was trapped when I really wasn’t.</td>
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<td></td>
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<tr>
<td>8</td>
<td></td>
<td>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.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>I felt confused; that is, there were moments when I had difficulty making sense of what was happening.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>I felt disoriented; that is, there were moments when I felt uncertain about where I was or what time it was.</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
16. Briefly describe the accident
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

The following questions are about your background details.

17. Male □ Female □

18. Date of Birth _______/_______/________
Day       Month     Year

19. Please tick one of the Boxes below, which corresponds to your highest level of Education.

 Some Secondary Schooling □ Completed Year 12 (6th form) □ T.A.F.E or College □ University □

20. Please Tick One Box, which corresponds to your Average Yearly Income Before Tax.

 Less than $15,000 □ Between $15,000 and $30,000 □

 Between $30,000 and $50,000 □ More than $50,000 □

Thank you very much for your contribution.

Please fold the survey and return in the envelope provided.
If you have misplaced the envelope, please return the survey to Dr Rosemary Webster, School of Behavioural Sciences, Psychology, University of Newcastle, Callaghan, NSW, 2308.

If you want to be included in the follow-up study please complete the Contact Details Form and return it in the envelope provided.
Appendix C

Journal Highlights

- The present study examined peritraumatic dissociation (PD) in a sample of motor vehicle accident (MVA) victims to determine if (a) it was multifactorial and, (b) whether a specific PD factor uniquely predicted PTSD severity, in the presence of other established pre-traumatic and peritraumatic risk factors of PTSD severity. These risk factors were either pre-traumatic: female gender, neuroticism, trait dissociation, avoidance- or emotion-oriented coping styles or peritraumatic: fear of dying.

- It was hypothesised that females and individuals with higher PD, trait dissociation, neuroticism, avoidance- or emotion-oriented coping styles, or fear of dying scores would experience more severe PTSD. PTSD severity was predicted by one of the two PD factors obtained by exploratory factor analysis, altered awareness, and by trait dissociation and fear of dying. Collectively, these predictors explained 40.6% of the total variance and singularly, each uniquely contributed to the explanation of PTSD severity. Altered awareness was the strongest predictor and that with the highest unique contribution.

- This study highlights the importance of assessment of dissociation, both peritraumatic and trait, as well as subjective appraisals of the trauma, such as fear of dying, not only to ascertain susceptibility to PTSD post-MVA but to also adapt such symptomatology into therapeutic intervention.
Appendix D

Journal Scope

*Behaviour Research and Therapy* encompasses all of what is commonly referred to as cognitive behaviour therapy (CBT). The focus is on the following: theoretical and experimental analyses of psychopathological processes with direct implications for prevention and treatment; the development and evaluation of empirically-supported interventions; predictors, moderators and mechanisms of behaviour change; and dissemination and implementation of evidence-based treatments to general clinical practice. In addition to traditional clinical disorders, the scope of the journal also includes behavioural medicine. The journal will not consider manuscripts dealing primarily with measurement, psychometric analyses, and personality assessment.

The Editor and Associate Editors will make an initial determination of whether or not submissions fall within the scope of the journal and/or are of sufficient merit and importance to warrant full review.