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## The impact of motor vehicle injury on distress: Moderators and trajectories over time

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### ABSTRACT

Research reveals that motor vehicle injuries (MVIs) can result in severe and debilitating psychological distress. Yet, not every person who has sustained a MVI suffers psychologically. It appears that risk of distress varies by demographic and psychosocial characteristics. The present study aimed to explore the trajectories of post-MVI distress and the effect of pre-MVI psychological functioning on post-MVI distress. Hierarchical linear modeling was used to explore the longitudinal dataset from the Canadian National Population Health Survey. Participants were assessed up to nine years post-MVI. Post-MVI distress increased over time. Men experienced greater overall distress than women and a greater increase in distress over time. Pre-MVI distress predicted post-MVI distress. This relationship was strongest for those with greater pre-MVI alcohol consumption. At low levels of pre-MVI distress, greater pre-MVI alcohol consumption was related to lower post-MVI distress, but at high levels of pre-MVI distress, greater pre-MVI alcohol consumption predicted increased post-MVI distress. Those with partners experienced less distress than the unpartnered. This study supports the general findings of other post-MVI and post-trauma studies, although the current study's main and interaction effects reveal more complex and nuanced relationships among variables in their prediction of post-MVI psychological distress.

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## 1. Introduction

World-wide, 20–50 million people are injured in motor vehicle collisions each year (WHO, 2009). The WHO notes that only during this last decade has this issue “gained the prominence it deserves among the world’s most pressing international health and development concerns” (p. 2). Despite the high world-wide prevalence of motor vehicle injuries (MVIs) and recent research demonstrating that psychological distress is a key predictor of post-injury quality of life (Brasel, deRoon-Casini, & Bradley, 2010), research remains limited on the psychological sequelae of MVIs over time and on risk factors for post-MVI distress.

Previous clinical research reveals that MVIs can result in severe and debilitating psychological distress. The most commonly reported post-MVI distress reactions are mood disorders (e.g., depression) and anxiety disorders, including

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post-traumatic stress disorder (PTSD), acute stress disorder (ASD), and travel phobia (Blanchard et al., 1996; Ehlers, Hofmann, Herda, & Roth, 1994; Ehling, Ehlers, & Glucksman, 2008; Goldberg & Gara, 1990; Mayou, Bryant, & Duthie, 1993; Taylor, Deane, & Podd, 2002; Taylor & Koch, 1995; Vingilis, Larkin, Stoduto, Parkinson-Heyes, & McLellan, 1996). Primary research indicates that MVI survivors presenting for medical care are diagnosed with PTSD at rates approaching 46% (Blanchard, Hickling, Taylor, Loos, & Gerardi, 1994; Bryant & Harvey, 1995; Kupchik et al., 2007; Seethalakshmi, Dhavale, Gawande, & Dewan, 2006). Another 20–26% experience symptoms without meeting criteria for the full syndrome (Blanchard et al., 1994; Kupchik et al., 2007). A related disorder, ASD, is frequently diagnosed in individuals displaying PTSD-like symptoms prior to meeting the one-month symptom duration criterion necessary to diagnose PTSD. Within this one-month time-frame post-MVI, 14–16% of hospital patients could be diagnosed with ASD, and an additional 14% experienced subsyndromal symptoms (Harvey & Bryant, 1999). Depression is also common, with rates ranging between 21% and 67% (Beck & Coffey, 2007; Blanchard et al., 2004; Blaszczynski et al., 1998; Vingilis et al., 1996). Estimates of anxiety range between 4% and 87% (Blanchard et al., 1994; Blanchard et al., 2004; Blaszczynski et al., 1998; Kupchik et al., 2007; Vingilis et al., 1996), and up to 100% show some reluctance in driving (Blanchard et al., 1994). Mayou, Bryant, and Ehlers (2001) found that at one year post-MVI, 16% of individuals experienced phobic travel anxiety. Other research suggests phobias occur in anywhere from 2% to 47% of those injured (Blaszczynski et al., 1998). Psychosomatic complaints, adjustment concerns, and irritability are also common sequelae (Blaszczynski et al., 1998; Vingilis et al., 1996).

Twenty percent of those injured still met criteria for diagnoses other than PTSD at six months post-MVI (Frommberger et al., 1998). Of those injured who presented to an Emergency Department, 33% maintained psychological complaints at one year post-MVI: 17% with PTSD, 16% with phobic travel anxiety, 19% with general anxiety, and 6% with depression (Mayou et al., 2001). Moreover, different groups show different trajectories of distress over time (Blanchard et al., 1996). One five-year MVI follow-up study found that 10% of participants had PTSD at five years, but there was notable variability in outcomes. Indeed, four of five participants diagnosed with PTSD at year one had improved by year five, whereas eight of nine diagnosed with PTSD at year five had not previously met criteria for the disorder (Mayou, Tyndel, & Bryant, 1997). Despite these intriguing findings, conclusions remain limited because this study had a small sample size and used non-parametric tests and logistic regression to examine group differences, and thus, the authors were not able to identify which variables were systematically predictive of different trajectories. In a different study, deRoon-Cassini, Mancini, Rusch, and Bonanno (2010) studied a sample experiencing a range of different trauma presenting to a level 1 trauma center and examined their trajectories of PTSD and depression at 1, 3 and 6 months follow-up, using latent growth curve modeling. Their findings confirmed different trajectories of distress over time. Similarly, other research with less specific patient populations (victims of any loss or trauma) has identified different trajectories of psychological sequelae (chronic, improved and delayed onset distress) (Bonanno, 2004; Bonanno, 2005), although very few studies have specifically examined post-MVI trajectories of psychological sequelae over the long term, or pre-MVI predictors of the post-MVI distress trajectories.

Despite the pervasiveness of psychological sequelae, not every person who has sustained a MVI suffers psychologically. Instead, it appears that risk of distress varies by pre-injury psychological and socio-demographic characteristics. Measures of pre-MVI psychological functioning and alcohol use and abuse consistently have been associated with post-MVI distress (Blanchard et al., 1994; Blanchard et al., 1996; Blanchard et al., 2004; Brewin, Andrews, & Valentine, 2000; Bromet, Sonnega, & Kessler, 1998; Bryant & Harvey, 1995; Ehlers, Mayou, & Bryant, 1998; Fullerton et al., 2001; Mayou et al., 2001; Ursano et al., 1999; Vingilis et al., 1996; Zatzick et al., 2002). Indeed, in their meta-analysis of risk for PTSD among adults facing any trauma, Brewin et al. (2000) stated that psychiatric problems/history had the most uniformity of effect, although they cautioned that effects varied by type of study and type of trauma.

Alcohol use and abuse also have been found to predict post-trauma distress, although few studies actually have examined pre-MVI alcohol use (Blanchard et al., 1994; Vingilis et al., 1996; Zatzick et al., 2002). Heavy alcohol consumption is thought to be both a marker for distress and a maladaptive coping strategy. Alcohol-related disorders are frequently co-morbid with other substance use disorders, depression, anxiety, and antisocial personality; these disorders may precede, coexist with, or follow alcohol difficulties (McCready, 1993). "Prolonged alcohol intoxication" can contribute to depressive-like symptoms (Schuckit, 1994, p. 46) and can increase depressive-like symptoms (Schuckit, 1994, p. 46), while interfering with an individual's ability to recover from a major depressive disorder (Mueller et al., 1994). In sum, despite the clear importance of examining the impact of pre-MVI alcohol consumption on post-MVI distress, very few studies actually have done so in a prospective manner.

Studies examining sociodemographic characteristics (i.e., sex, age, marital status, household income, education, and race) and post-MVI distress have found mixed results. Most suggest that women are at greater risk than men for post-MVI distress, especially PTSD (Blanchard et al., 2004; Ehlers et al., 1998; Frommberger et al., 1998; Tolin & Foa, 2006; Ursano et al., 1999; Wu & Cheung, 2006; Zatzick et al., 2002) – up to 4.7 times greater risk (Fullerton et al., 2001). Although women's injuries often are less severe than men's, they perceive collisions as more frightening and report greater distress (Blaszczynski et al., 1998; Ehlers et al., 1998). Yet other studies have found no sex differences in measures of post-trauma distress (Chiu, deRoon-Cassini, & Brasel, 2011; Cieslak, Benight, Luszczynska, & Laudenslager, 2011; Norris, 1992). Norris (1992) found no sex difference for post-MVI traumatic stress or PTSD, in her sample drawn from four southeastern American cities, although a race by sex interaction was found, such that post-traumatic stress following motor vehicle collisions was strongest for men from African-American backgrounds.

The impact of other demographic characteristics on distress also have been examined. Age has been shown to be negatively correlated with post-trauma distress (Brewin et al., 2000; Chiu et al., 2011; Norris, 1992), although some studies have

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