



Can organisational safety climate and occupational stress predict work-related driver fatigue?

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ABSTRACT

Road crashes are a significant cause of work-related injury and death. Driver fatigue is thought to cause 20–30% of fatal crashes. The current study utilised a survey to examine the relationship between safety climate, occupational stress and work-related driver fatigue. Drivers ($n = 219$) from two government organisations responded to items from the job-related tension scale [Kahn, R. L., Wolfe, D. M., Quinn, R. P., & Snoek, J. D. (1964). *Organisational stress: Studies in role conflict and ambiguity*. Malabar, FL: Krieger Publishing], safety climate questionnaire [Glendon, A., & Litherland, D. (2001). Safety climate factors, group differences and safety behaviour in road construction. *Safety Science*, 39, 157–188] and purpose-designed items on fatigue-related behaviour. Outcome measures were current self-reported, fatigue-related behaviour and self-reported 'near (crash) misses' during the previous 6 months. Together, occupational stress and safety climate predicted fatigue-related behaviour, accounting for 29% of the variance over and above that explained by control variables. Further, logistic regression revealed occupational stress and safety climate to be significant predictors of fatigue-related near misses. Safety climate emerged as a stronger predictor of both fatigue-related behaviour and near misses than occupational stress. Results suggest that organisations can play a part in improving the safety-related behaviours of their workforce through attention to safety climate and occupational stress.

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1. Introduction

Workplace safety attracts considerable attention from governments, organisations, employees and safety researchers because it carries with it far reaching implications both economically and socially. Work-related vehicle crashes have been reported as the leading cause of work-related injury and death in a number of countries, including the US (Pratt, 2003), France (Charbotel, Chiron, Martin, & Bergeret, 2001), UK (Health, 2001) and Australia (Haworth, Tingvall, & Kowald, 2000). In Australia reports suggest that crashes involving fleet vehicles account for 25% of overall road fatalities and 43% of work-related fatalities (Meers, 2002; Murray, Newnam, Watson, Davey, & Schonfeld, 2002). Total direct cost of crashes (from all causes) in Australia are estimated in the order of \$15 billion per annum (1996 data) (BTE, 2000), making these work-related crashes expensive to businesses, with indirect costs from physical, psychological and economic consequences having substantial impact on the community.

Difficulties in fatigue measurement and reporting methods make it problematic to determine precisely what proportion of road crashes are due to fatigue. However, it is generally accepted that driver fatigue accounts for around 20–30% of fatal

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road crashes (House of Representatives Standing Committee on Communications & the Arts, 2000). In addition, fatigue has been shown to be a particularly prevalent factor in work-related crashes (Harrison, Mandryk, & Frommer, 1993).

Though there is increasing awareness that driver fatigue plays a significant role in many work-related motor vehicle crashes, this area is under researched when compared to other road safety risks such as speeding and drink driving (Brown, 1994; Haworth et al., 2000; Philip et al., 2003).

Recognising the importance of work-related driving to injury has led to research investigating the impact of organisational factors on driver safety and to a lesser extent, driver fatigue. This trend reflects a fundamental shift in thinking regarding the roles that organisations play in influencing the safety behaviours of employees. Historically, driver safety research has focussed on individual characteristics, attempting to elucidate what makes one individual safer than another (Wills, Watson, & Biggs, 2007). At the organisational level, a number of researchers have begun to investigate factors such as roster designs and consecutive hours spent working and how they relate to driver fatigue (Arnold et al., 1997; Baas, Charlton, & Bastin, 2000). However, this research has generally concentrated on high-risk groups such as long distance truck drivers. The present study aimed to extend previous research by focusing specifically on organisational influences of work-related driver fatigue rather than individual influences and by utilising a mixed driver population.

1.1. *Driver fatigue*

For the purposes of description, fatigue is often referred to as a feeling of tiredness and reduced alertness that is associated with drowsiness, which impairs both capability and willingness to perform a task (Craig, Tran, Wijesuriya, & Boord, 2006; Lal & Craig, 2001). Fatigue contributes to crash risk by significantly increasing reaction times and degrading driving performance (Philip et al., 2003).

Typically fatigue research has focused on individual factors such as amount or quality of sleep, age, or physical health (Stutts, Wilkins, Osberg, & Vaughn, 2003). Such studies have shown that lack of sleep, low sleep quality or excessive daytime sleepiness are significant predictors of driver fatigue as well as fatigue-related crashes (Arnold et al., 1997; Gander, Marshall, James, & Le Quesne, 2006; Hartley, 2004; Van den Berg & Landstrom, 2006). Driving at times of the day that would normally be spent sleeping, or driving for prolonged periods are also associated with increased crash risk (Folkhard, 1997; Hartley, 2004). Other studies have examined personality-related (e.g. sensation seeking and extraversion) (Thiffault & Bergeron, 2003) and psychological characteristics such as depression and anxiety (Craig et al., 2006; Lal & Craig, 2001) showing an association between high levels of these factors and greater propensity towards driver fatigue.

Stress and its contribution to fatigue have also been extensively examined in the past and are well recognised in the literature (Macdonald, 2003; Mathews, 2002; Tepas & Price, 2001). Stress can be thought of as a result of a perceived imbalance between demands and resources (Lazarus & Folkman, 1984) such that the individual cannot mobilise sufficient resources to meet the current demands. This produces tension which may be experienced physically, emotionally or mentally. The impact of stress on fatigue is complex and person specific (Beehr, 2000), as individual factors such as coping style, personality traits and social support all play a role in moderating the extent to which stress is experienced (Legree, Heffner, Psocka, Martin, & Medsker, 2003).

1.2. *Occupational stress*

Occupational stress is a term used to describe stress that originates from the work environment (Cartwright, Cooper, & Barron, 1996). Occupational stress is different from other life stresses in that organisations play a role in moderating the extent of the stress experienced (Cartwright et al., 1996). For example, poor job/position design, poor job support and high workload are all likely to contribute to workers' experiences of occupational stress. Manifestations of occupational stress can include physical depletion, emotional drain, absenteeism and reduced efficiency and performance (Cushway, Tyler, & Nolan, 1996; Farber, 1990).

Though as highlighted above, there is considerable individual variation in the experience of stress, including occupational stress, research has provided strong support for a link between occupational stress and the safety behaviours and safety outcomes of workers (Sutherland & Cooper, 1991; Westerman & Haigney, 2000). Research has revealed that occupational stressors contribute to decreased driving performance and vigilance and therefore an increase in crash risk (Legree et al., 2003). Further, Cartwright et al. (1996) reported that occupational stress was predictive of road crashes in work-related drivers.

While occupational stress has been linked to fatigue and road safety behaviours and outcomes, the relationship between occupational stress and work-related driver fatigue is yet to be examined. This relationship warrants further investigation and empirical evaluation particularly when considering the implications for both organisational safety management and organisational liability in cases of highly stressed employees.

1.3. *Safety climate*

Safety climate represents another organisational influence on driver safety. A large body of research supports the role of organisational safety climate in predicting safety behaviours and safety outcomes (see Clarke, 2006). While it is noted that there is no consensus as to the specific definition of safety climate (see Griffin & Neal, 2000; Wills, Watson, & Biggs, 2006) it is apparent that there are some commonalities to the thinking behind the concept within the broader framework of organisational culture.

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