



Is workplace satisfaction associated with self-reported quad bike loss of control events among farm workers in New Zealand?



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ABSTRACT

This study investigated whether rural workers who have higher workplace satisfaction are less likely to report quad bike loss of control events (LCEs). Two independent samples of farmers completed a survey regarding LCEs and workplace satisfaction. In the first sample ($n = 130$) analysis revealed no relationship ($p = 0.74$) between workplace satisfaction and LCEs but lower rates of LCEs were reported by employees (IRR 0.52, 95%CI 0.31–0.86) compared to self-employed participants. In the second sample ($n = 112$), workplace satisfaction was weakly related to LCEs (IRR 1.04, 95%CI 1.00, to 1.09) with participants who found their job more psychologically demanding more likely to have had an LCE (IRR 1.14, 95%CI 1.05–1.23). Exploring the role of psychological demands on safety behaviour with respect to quad bike use, may help to address this important safety issue.

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1. Introduction

Quad bikes are used extensively on New Zealand (NZ) farms for stock work, transport, and towing farm implements (Milosavljevic et al., 2010; Moore, 2007) with an estimated 70 000 to 80 000 in current operation (Carman et al., 2010; Moore, 2007). Use of these vehicles, however, carries some risk of injury. Among NZ rural workers, quad bike incidents cause more than 850 injuries per year and claim an average of five lives (Department-of-Labour, 2010). The cost to the individual, their family, society and the economy as a whole is considerable. In 2009 NZ's nationalised no fault accident insurance scheme, the Accident Compensation Corporation (ACC), outlaid more than NZ\$7 million on medical, rehabilitation and workers compensation claims related to quad bike incidents (ACC, 2009).

Despite workplace educational interventions from national agencies (Farmsafe, ACC and Department of Labour) the number of reported quad bike injuries and fatalities on NZ farms has not reduced. Recent research identified a considerable number of farm quad bike incidents in NZ are unreported (Milosavljevic et al., 2011)

and the true working lifetime prevalence rates are in excess of 60% (Carman et al., 2010; Milosavljevic et al., 2010). Risk factors associated with quad bike fatality and injury in NZ include vehicle design (Milosavljevic et al., 2010; Moore, 2007), environmental conditions (Basham et al., 2006; Milosavljevic et al., 2010) and personal factors (Milosavljevic et al., 2011; Shulruf and Balemi, 2010). Risk factors fall into two categories; non-modifiable factors such as farm terrain, weather conditions, the rider's height and weight, and modifiable factors such as speed and route. Quad bikes are inherently unstable with a narrow wheel base and a high centre of gravity. There are on-going debates between farmers and manufacturers as to the ideal vehicle design with no progress to date. Safe use of quad bikes on farms, therefore, continues to rely to a large extent on rider behaviour. Neal and Griffin (2004) conceptualised workplace safety performance behaviours as being determined by safety knowledge and the motivation to adopt such behaviours, both of which were derived, in part, by an individual's attributes (attitude, personality etc). Farmer's workplace safety attitudes and behaviours are often posited as a cause of quad bike incidents (Basham et al., 2006; Cryer et al., 2009; Lovelock et al., 2008; Palmer et al., 2009). Organisations responsible for NZ farm health and safety have also hypothesised that personality and social traits in this population make it difficult to change safety behaviours (Lovelock et al., 2008; Research NZ, 2007). Research suggests workplace satisfaction can be an antecedent to safety motivation and knowledge (Probst and Brubaker, 2001). If satisfaction is high,

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workers are more motivated to comply with safety measures, lowering accident and injury outcomes (Probst and Brubaker, 2001).

Workplace satisfaction is the “overall affective orientation on the part of individuals work roles which they are presently occupying” (Kalleberg, 1977 p. 126). It is a complex construct that appears to be the composite of psychosocial aspects, specific job characteristics and an individual's personal factors that form a general like or dislike of the job (Cranny et al., 1992; Kalleberg, 1977; Locke, 1969; Warr, 2007). Global job satisfaction is related to occupational accidents and injury (Dembe et al., 2004; Harkness et al., 2004; Krause et al., 1998; Zontek et al., 2009). More specifically, a negative mood, high perceived physical demand, high perceived psychological demand and low co-worker support are associated with occupational accidents (Day et al., 2009; De Jonge et al., 2000; Harkness et al., 2004; Holmberg et al., 2004; Kaplan et al., 2009; Kirkcaldy et al., 1997; Krause et al., 1998; Lovelock et al., 2008; Rodgers and Adler, 2001; Swaen et al., 2004; Trimpop et al., 2000). It is psychometrically optimal to assess workplace satisfaction using multi-item questionnaires, which can be treated as a single factor or broken down to measure specific components of the job such as perceived physical or psychological demand, decision latitude, social support and task variety. There is limited existing knowledge of the role of workplace satisfaction in quad bike LCEs and broad models of occupational safety require further testing.

The primary aim of this study was to use existing data, from two independent samples, to explore the relationship between workplace satisfaction and prevalence of prior quad bike loss of control events (LCEs). It was predicted that farm workers with lower workplace satisfaction would report more LCEs than those with higher workplace satisfaction scores. The secondary aim was to determine the model of best fit, in each study population, to describe this relationship adjusting for confounding variables.

2. Methods

Sample A involved a secondary analysis of self-reported survey data collected in a cross-sectional study. Data were gathered during farm visits and face to face surveys in 2009 (Milosavljevic et al., 2010). The study explored how personal, physical and workplace characteristics influenced vibration and mechanical shock exposure, as well as LCE and injury prevalence (Milosavljevic et al., 2010). Sample B involved analysis of self-reported survey data collected face to face in 2011/2012 for a cross-sectional study exploring psychosocial risk factors for quad bike incidents on farms.

2.1. Participants

A convenience sample of 130 farmers and farm employees (Sample A) that regularly used quad bikes in their day-to-day work was recruited from the South Otago region of the South Island of NZ. The region is typified by rolling farmland with a variety of mixed stock and dairy farms. Sample B consisted of 112 farmers and farm employees initially selected at random from the Otago Farm Location Map 2005 and supplemented using a snowballing technique. All participants were recruited with approval from the University of Otago Human Ethics Committee. Written informed consent was obtained from each individual.

Although the samples showed similarities in the ratio of male to female participants and in occupational status there was significant disparity between them with respect to age, years of quad bike experience and the type of farming. The differences in methodology may have been responsible and it was for this reason that the samples were analysed separately. Sample A was a

convenience sample of farmers living within a one hour radius of the main service town in South Otago. One farm was visited per day. Sample B recruited participants within the wider Otago region from a publically available farm location directory, which provided a more robust sampling frame. Any farmers known personally by the researchers were excluded. For practical reasons participants were also asked to volunteer neighbours who could also be approached for participation. Several farms could be visited in any one day. Driving times varied between 30 min and 3.5 h from the main city.

2.2. Measures

The primary outcome variable was the number of quad bike LCEs per participant in a working lifetime. LCEs were defined as a driving experience where the worker lost control of the quad bike and had to either voluntarily or involuntarily dismount (e.g. ejected from or tipped off the vehicle). Injury or quad bike damage may or may not have occurred.

Workplace satisfaction was measured using a 15-item standalone instrument embedded within the Whole Body Vibration Health Surveillance Questionnaire (WBVHSQ) (Pope et al., 2002) used by Milosavljevic et al. (2010) in Sample A. Sample B used this instrument to allow for comparison. Each item is a work-related statement such as “I am happy with my job” and “My job is mentally demanding”. Responses are recorded using a 5-point Likert scale where 1 indicated strong disagreement with the statement and 5 indicated strong agreement. A Cronbach's alpha of 0.78 (Sample A) and 0.72 (Sample B) demonstrated reasonable internal consistency suggesting that the total or mean score could be used as a composite indicator of workplace satisfaction (Bland and Altman, 1997). Examination of the individual items, however, suggested that these addressed more than one construct related to workplace satisfaction and, since the psychometric properties of the scale are not reported, an exploratory principal components analysis (PCA) with varimax rotation was undertaken to investigate for the presence of variable clustering of items around meaningful constructs in each sample (Table 1).

For Sample A, results showed three independent factors with eigenvalues >1 explaining 59% of the variance in item response. The first factor contained seven items relating to how happy one was about their job and was termed ‘job satisfaction’. This factor had an eigenvalue of 6.35 and accounted for 30% of the variance with excellent internal consistency ($\alpha = 0.90$). The second factor had four items relating to how well one communicated with other farmers and was termed ‘colleague support’. This factor had an eigenvalue of 2.11 and accounted for 18% of the variance with acceptable internal consistency ($\alpha = 0.74$). The third factor contained four items which were related to psychological components of one's job. This factor was termed ‘job demands’, had an eigenvalue of 1.16 and accounted for 17% of the variance with acceptable internal consistency ($\alpha = 0.75$).

The same three independent factors with eigenvalues >1 were also found on PCA with varimax rotation in Sample B and explained 53% of the variance. Items within the job satisfaction and colleague support factors differed slightly from Sample A. The job satisfaction factor contained five items, had an eigenvalue of 3.83 and accounted for 26% of the variance with excellent internal consistency ($\alpha = 0.81$). The colleague support factor contained three items, had an eigenvalue of 2.41 and accounted for 16% of the variance with acceptable internal consistency ($\alpha = 0.74$). The third factor, job demands containing four items, had an eigenvalue of 1.74 and accounted for 11% of the variance with acceptable internal consistency ($\alpha = 0.62$). The remaining three items (5, 12 and 14) were disregarded as they loaded equally on two factors.

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