

**This is the author-manuscript version of this work - accessed from  
<http://eprints.qut.edu.au>**

Freeman, James and Davey, Jeremy and Wishart, Darren (2007) A study examining the relationship between attitudes and aberrant driving behaviours within an Australian fleet setting. In *Proceedings 14th International Conference of Road Safety on Four Continents*, Bangkok, Thailand.

**Copyright 2007 (please consult author)**

# **A STUDY EXAMINING THE RELATIONSHIP BETWEEN ATTITUDES AND ABERRANT DRIVING BEHAVIOURS WITHIN AN AUSTRALIAN FLEET SETTING**

Freeman, J., Davey, J., & Wishart, D.

Centre for Accident Research & Road Safety – Queensland (CARRS-Q), Queensland University of Technology (QUT), Carseldine Campus, Beams Rd, Carseldine, 4034, Australia. Ph: +61 7 3138 4574, Fax +61 7 3138 4907, e-mail: je.freeman@qut.edu.au

## **ABSTRACT**

This study reports on the utilisation of the Driver Attitude Questionnaire (DAQ) to examine the self-reported behaviours of a sample of Australian fleet drivers ( $N = 416$ ). Surveys were posted to drivers who agreed to participate in the study. Univariate analyses of the four DAQ subscales revealed that respondents were least concerned about speeding, followed by risky overtaking manoeuvres. In contrast, attitudes regarding the seriousness of close following behaviours and drink driving were significantly higher. Additional analyses revealed the speeding factor was associated with self-reported traffic offences, and was predictive of demerit point loss at a multivariate level, even after controlling for driving exposure (i.e., kms driven each year). This paper will further highlight the major findings of the study as well as possible implications regarding the predictive utility of self-reported questionnaires to investigate driving behaviours.

## **1. PRESENT CONTEXT**

Work-related drivers are often defined as those who drive at least once a week for work purposes and research suggests that up to 30% of registered vehicles in Australia are work vehicles (Haworth, Tingvall & Kowadlo, 2000). Such vehicles usually travel considerable distances and have been estimated to comprise up to half the vehicle traffic stream at any one time (Haworth et al., 2000). Not surprisingly, fleet vehicles are often disproportionately represented in crash statistics, and as a result, work related motor vehicle incidents represent a substantial emotional and financial cost to the community. For example, research consistently demonstrates that traffic crashes are one of the largest contributors to work-related fatalities in Australia (Harrison, Mandryk & Frommer, 1993; National Occupational Health and Safety Commission, 1998). In addition, an early estimation of the total cost of work-related road incidents in Australia was in the vicinity of \$1.5 billion (Wheatley, 1997). More recently, the average total insurance cost of a fleet incident to organisations and society was estimated to be approximately \$28, 000 (Davey & Banks, 2005), estimates of the true cost of work related crashes suggest that hidden costs may be somewhere between 8-36 times vehicle repair/replacement costs (Murray et al, 2003). In regards to fatalities, road crash deaths have become the most common form of work-related injury (Haworth et al., 2000). Importantly, research has demonstrated that work-related drivers on average report a higher level of crash involvement compared to personal car drivers (Downs et al., 1999; Lynn & Lockwood, 1998). As a result, there is an obvious and growing need for industry, government and the community to allocate resources to further knowledge and expertise in this area.

Despite the economic and personal impact of fleet-related vehicle crashes, comparatively little research has endeavoured to identify the underlying factors associated with increased

risk of crash involvement. This appears a critical oversight as changes in industry/employer accountability, business processes, OH&S, workers compensation legislation, insurance costs, third party coverage and public liability are requiring industry to develop better benchmarking along with more comprehensive programs related to fleet safety.

### 1.1 Driving Assessment Tools

As a result of the tremendous burden that road crashes have on the community, researchers are focusing an increasing amount of attention towards investigating the attitudes and behaviours of general motorists' in an attempt to predict to crash involvement. Such measurement tools include: the Driving Skill Inventory (Lajunen & Summala, 1997), Driver Anger Scale (Deffenbacher, Oetting & Lynch, 1994), the Manchester Driver Behaviour Questionnaire (DBQ) (Reason et al., 1990) and the Driver Attitude Questionnaire (DAQ) (Parker et al., 1996). The latter questionnaire has recently received increasing attention within the literature as researchers begin to identify driving attitudes associated with crash involvement (Anderson & Summala, 2004; Burgess & Webley, 2000; Davey et al., 2006; Meadows, 2002). The DAQ was originally developed by Parker et al. (1996), and focuses on four distinct factors that aim to measure respondents' attitudes towards major driving issues, which are: (a) drink driving (b) following closely to other vehicles (c) risky overtaking and (d) speeding. The drink driving factor consists of items such as the perceived seriousness of drinking more than the legal limit and then driving, while the close following factor focuses on attitudes towards the acceptability of driving very closely to vehicles in front. The overtaking factor concentrates on whether it is safe to overtake in risky situations and the speeding factor focuses on identifying whether respondents believe it is safe to drive above the speed limit.

A small but increasing body of research is accumulating which highlights the outcomes of utilising the DAQ within a number of different applied settings such as: driver training programs (Burgess & Webley, 2000), bicycle interventions (Anderson & Summala, 2004), speed awareness training (Meadows, 2002) and fleet programs (Davey et al., 2006). For example, Burgess and Webley (2000) used the DAQ as a measurement scale to assess the impact of a driver education program and reported that for the 1,439 participants, individuals were most likely to indicate the highest level of intolerance towards drink driving behaviours, followed by close following, and then dangerous overtaking. In contrast, participants were least concerned about speeding violations. Furthermore, Davey et al. (2006) utilised the DAQ in combination with a number of additional self-report driving assessment questionnaires (e.g., DBQ & Climate Safety Questionnaire) to investigate the driving behaviours of 4195 fleet motorists in a large telecommunication organisation. The researchers found that participants reported the highest level of acceptance for speeding above the limit, while close following and risky overtaking procedures were reported as less acceptable. Interestingly, risky overtaking procedures were reported as a significant predictor of incurring demerit point loss while driving for work purposes. In addition, Meadows (2002) found the DAQ to be a reliable measurement tool to examine the impact of a speed awareness program in the United Kingdom.

However, despite the considerable proportion of professional drivers on public roads and the need for occupational health and safety accountability, relatively little research has endeavoured to examine the self-reported driving behaviours of those who drive company vehicles (Newnam et al., 2002; Newnam et al., 2004; Sullman et al., 2002; Xie & Parker, 2002). Nevertheless, a small body of research is beginning to demonstrate that company car drivers are at a greater risk of accident involvement than general motorists (Newnam et al.,

2002; Sullman et al., 2002), and early research has indicated that self-reported data provided by fleet drivers can be utilised to predict demerit point loss i.e., committing a higher number of errors (Davey et al., 2006; Davey et al., 2007). Apart from these preliminary findings, very little research has endeavoured to examine the factors associated with crash involvement and general aberrant driving behaviours (e.g., incurring demerit point loss) within fleet settings. What remains evident is that considering the tremendous amount of kilometres driven by professional drivers within Australia each year, often under time pressures, there remains a need to investigate the usefulness of self-reported assessment tools, such as the DAQ, to assess motorist's attitudes towards the driving task, as well as determine the relationship such factors have with the likelihood of crash involvement and traffic offences. As a result, the current study aims to utilise the DAQ to investigate the attitudes and self-reported driving behaviours of a group of Australian drivers within a fleet setting. More specifically the study endeavoured to:

- (a) examine a group of fleet drivers' attitudes regarding the seriousness of drink driving, close following, risky overtaking and speeding;
- (b) identify whether attitudinal differences exist on key demographic factors (e.g., gender, urban vs rural driving); and
- (c) investigate the relationship the DAQ has with self-reported crash involvement and traffic offences.

## 2. METHOD

### 2.1. Participants

A total of 416 individuals volunteered to participate in the study who were all employees of a large Australian company. There were 345 (78%) males and 98 (22%) females. The average age of the sample was 44 years (range 18-68yrs). Participants were located throughout Australia in both urban and rural areas. The largest proportion of vehicles driven by participants were reported to be for tool of trade (56%), although vehicles were also salary sacrificed (43%), and a small proportion were leased or participant's own vehicle (1%). Vehicles were reported to be sedans (85%), four wheel drives (12%) or other (3%). The majority of driving by participants was reported to be within the city (46%), or in the city and on country roads (40%). On average participants had held their licence for 26 years (range 5 – 48yrs), had been driving a work vehicle for approximately 5 years (range 1 – 33yrs), with the largest proportion driving between 11 and 20 hours per week (43%), and between 30,000 – 40,000kms per year. A total of 48 participants reported being involved in a crash while driving for work in the last year while 73 individuals reported incurring traffic infringements (i.e., demerit point loss) during the same time period.

### 2.2. Materials

### 2.3. Driver Attitude Questionnaire (DAQ)

The DAQ is a 20-item self-report questionnaire designed to measure attitudes regarding a range of driving behaviours which are collated to identify four factors: drink driving, close-following, dangerous overtaking and speeding. Respondents are required to indicate on a six point likert scale (0 = strongly disagree to 5 = strongly agree) their agreement with statements regarding the appropriateness of various driving behaviours.

## 2.4. Demographic Measures

A number of socio-demographic questions were included in the questionnaire to determine participants' age, gender, driving history (e.g., years experience, number of traffic offences and crashes) and their weekly driving exposure (e.g., type of car driven, driving hours).

## 2.5. Procedure

The participating organisation developed a list of individuals who expressed interest in participating in the research. A letter of introduction, the study questionnaire and a reply paid envelope were distributed through the company's internal mail system to the participants. In total 1440 were mailed out and 416 were returned indicating a 30% response rate.

## 3. RESULTS

### 3.1. Structure and Reliability of the Driver Attitude Questionnaire

Cronbach alpha reliability coefficients were utilised to calculate the internal consistency of the DAQ sub-factors, which are presented in Table 1. While there has been little research to determine the psychometric properties of the DAQ, the results are similar to one previous study (Meadows, 2002), which has indicated factors exhibit relative internal consistency. Examination of the scores reveals that the items traditionally associated with close following (.69) and overtaking (.65) had the highest reliability coefficients, while speeding had the lowest reliability (.53).

Table 1: Alpha Reliability Coefficients of the DAQ Scale

Close Following	(5 items)	.69
Overtaking	(5 items)	.65
Alcohol	(5 items)	.63
Speeding	(5 items)	.53

Table 2 highlights the overall mean scores for the factors, with higher means revealing a safer road safety attitude. Examination of the mean scores indicates that of the four aberrant driving behaviours, respondents were most likely to report that drink driving was the most unacceptable driving behaviour ( $M = 3.77$ ). The second highest factor was close following, followed by attitudes regarding risky overtaking. Interestingly in contrast, participants were most likely to report that speeding was an acceptable behaviour ( $M = 2.95$ ). Between group analyses revealed that participants' attitudes towards the unacceptability of drink driving were significantly higher than risky overtaking practices  $F(1, 416) = 79.63, p < .01$  as well as speeding  $F(1, 416) = 92.22, p < .01$ . The examination indicates that drink driving was perceived as the most serious offence in the current sample, and similar to previous research, speeding is often perceived as an acceptable behaviour in some circumstances (Burgess & Webley, 2000; Davey et al., 2006).

In addition to the sub-factors, Table 2 reports the mean and standard deviation scores for the four highest ranked items. While speeding was identified as the least serious driving offence (as highlighted above), it is noteworthy that the four highest ranked items related to less safe attitudes towards close following, overtaking and drink driving factors: *Some people can drive perfectly safely even when they only leave a small gap behind the vehicle in front* ( $M = 4.28, SD = .74$ ); *Close following is not really a serious road safety problem* ( $M = 4.21, SD = .89$ ); *I think it is OK to overtake in risky circumstances as long as you drive within your*

*own capabilities* ( $M = 4.11$ ,  $SD = .80$ ); *Some people can drive perfectly safely after drinking three or more pots of beer in an hour* ( $M = 4.09$ ,  $SD = .98$ ). In summary, the results indicate that respondents believed it was acceptable to engage in all four behaviours (in some circumstances), which may have contributed to the relatively low internal consistency reported in Table 1.

Table 2: Mean Scores for the DAQ factors

Factors	<i>M</i>	<i>SD</i>
Alcohol	3.77	.66
Close Following	3.68	.59
Overtaking	3.23	.56
Speeding	2.95	.65
Highest Ranked Items		
1. Some people can drive safe with only a small gap	4.28	.74
2. Close following is not really a serious road safety problem	4.21	.89
3. I think it is OK to overtake in risky circumstances	4.11	.80
4. Some people can drive safe after drinking three pots of beer	4.09	.98

### 3.2 Intercorrelations and Between-Group Comparisons

An examination was undertaken to determine the bi-variate relationship between the samples' attitudes regarding the four DAQ sub-factors and additional employment related variables. In regards to the association between the DAQ factors, the strongest relationship appeared to be between close following and overtaking ( $r = .36^{**}$ ), as participants who reported an unwillingness to engage in risky overtaking manoeuvres were also more likely to report following closely to other vehicles was another unacceptable behaviour. Similarly, beliefs that close following was unacceptable was also significantly associated with drink driving ( $r = .25^{**}$ ) and speeding ( $r = .20^{**}$ ). In regards to sample characteristics, the only notable bivariate relationship was found between age and overtaking ( $r = .12^*$ ) and close following ( $r = .21^{**}$ ), as older drivers were more likely to report a lower level of acceptance towards such aberrant driving behaviours.

A series of between group analyses revealed some significant differences on respondents' scale scores for different demographic groups. For example, males were more likely than females to report:

- a) speeding was an acceptable behaviour:  $t(1, 416) = -3.21, p = .001$ ; and
- b) drink driving was an acceptable behaviour:  $t(1, 416) = -4.62, p = .000$ .

No gender differences were found between the groups on attitudes towards close following or overtaking. Similarly, no differences were found on driving attitudes between: (a) those who drive trade vs. salary sacrifice vehicles, (b) type of vehicle (sedan vs. 4WD), (c) whether a company sign was on the car, nor between (d) urban vs rural driving.

### 3.3 Prediction of Offences

The third part of the study aimed to examine the relationship between participants' driving attitudes as measured by the DAQ and self-reported work crashes as well as demerit points. Due to the relatively small number of participants who reported a work-related crash in the last 12 months ( $N = 46$ ), it was not possible to implement regression analyses and thus the following analyses focus on predicting work-related driving infringements ( $N = 73$ ). A logistic regression analysis was performed to examine the contributions of the DAQ factors (e.g., overtaking, speeding, close following and alcohol), as well as exposure to the road (e.g., kilometres driven each year & hours driving per week) to the prediction of self-reported infringements in the past 12 months.

Table 3 shows the variables in each model, the regression coefficients, as well as the Wald and odds ratio values. Self-reported numbers of kilometres driven each year and hours of driving per week were entered in the first step to investigate, as well as control for, the influence of exposure to the driving task before the inclusion of the DAQ factors. As expected, the number of kilometres driven per year was predictive of incurring demerit point loss ( $p = .001$ ) as those who drive longer distances are at a greater risk.

Next, the four DAQ factors (alcohol, close following, overtaking and speeding) were entered in the model to assess whether the proposed attitudes towards driving improved the prediction of demerit point loss over and above exposure to driving (Step 2). The additional variables collectively were significant, with a chi-square statistic of  $X^2(4, N = 416) = 10.79, p = .03$ , as was the speeding variable. The model indicates that respondents' likelihood of incurring demerit point loss increases as their attitudes towards speeding becomes more lenient ( $p = .010$ ). Several additional regression models were estimated to determine the sensitivity of the results. A test of the full model with all six predictors entered together, as well as the two models entered separately, confirmed the same significant predictors (e.g., exposure and speeding). Forward and Backward Stepwise Regression identified the same predictors. Inclusion of gender, age and years driving experience did not increase the predictive value of the model.

Table 3: Logistic Regression Model Predicting Demerit Point Loss

Variables	B	SE	Wald	<i>p</i>	Odds ratio	95% C.I. Exp (B)	
						Lower	Upper
Step 1							
Hours per week	-.15	.17	.79	.373	.857	.76	1.11
Kms per year	.40**	.09	14.24	.000	1.41	1.19	1.92
Model Chi-Square 16.27** (df = 2)							
Step 2							
Hours per week	-.69	.18	.88	.348	.845	.91	1.10
Kms per year	.35**	.09	13.02	.000	1.42	1.21	1.85
Alcohol	-.35	.09	.14	.703	.87	.99	1.17
Close Following	-.50	.36	1.91	.167	.60	.77	1.01
Speeding	-.78*	.30	6.62	.010	2.19	.98	1.55
Overtaking	-.01	.30	.00	.959	.985	.78	1.09
Model Chi-Square 23.90** (df = 6)							

---

Note. \*  $p < .05$ , \*\*  $p < .01$ .

#### 4. DISCUSSION

The present research aimed to utilise the Driver Attitude Questionnaire to conduct one of the first investigations into the driving behaviours of a group of Australian fleet drivers. More specifically, the study aimed to examine the attitudes of a group of professional fleet drivers and determine whether such attitudes were predictive of aberrant driving behaviours. Currently, scant research has endeavoured to examine the self-reported driving behaviours of professional drivers (Davey et al., 2007; Newnam et al., 2004; Wills et al., 2004), or investigate the predictive utility of driving measurement tools to identify those at risk of crash involvement or demerit point loss (Davey et al., 2007; Sullman et al., 2002).

Firstly, analysis of the DAQ's internal reliability revealed coefficients that were moderately robust and were similar to previous research in the area (Meadows, 2002). However, given that the speeding factor's alpha coefficient was identified to be .51, further research appears necessary within fleet arenas to determine the DAQ's psychometric properties and thus the reliability of the measurement tool. However, the lower reliability may also indicate some level of ambivalence regarding participants' attitudes towards speed and thus the sample may have been prone to respond in an inconsistent manner.

Secondly, examination of the overall mean scores of the four factors revealed that participants believed drink driving was the most unacceptable behaviour of the four sub-factors. The findings are also similar to previous research that has demonstrated drivers are likely to indicate that drink driving is the most unacceptable behaviour of the four DAQ scales (Burgess & Webley, 2002; Davey et al., 2006). Encouragingly, the findings also support current initiatives (e.g., media campaigns & police operations) which aim to promote the message that drink driving is a serious road safety concern which should not be accepted. A similar finding was also noted for close following, which is again consistent with previous research (Davey et al., 2006; Meadows, 2002), indicating motorists believe this behaviour to be a serious safety risk. Concern towards overtaking was marginally lower than for close following. However, given the mean score for this factor was only (e.g.,  $M = 3.27$ ), it is noted that participants did not adamantly report overtaking in risky situations to be an unacceptable behaviour.

In contrast, participants in the current study reported the highest levels of acceptance for speeding behaviour(s). This finding is once again consistent with previous driving research (Adams-Guppy & Guppy, 1995; Dimmer & Parker, 1999; Lajunen et al., 2003; Parker et al., 1995), and in particular fleet safety research (Davey et al., 2007), which has indicated that speeding violations are the most common form of aberrant driving behaviour both exhibited as well as reported by motorists. In fact, one study reported some drivers believe it is more important to get to meetings on time than obey the speed limit (Adams-Guppy & Guppy, 1995). Furthermore, recent research has reported that fleet drivers hold a general belief that minor speeding violations are acceptable in some circumstances (Davey et al., 2007; Newnam et al., 2004), and given the considerable time pressures often placed on professional drivers in work settings, the present finding appears to confirm that this group of motorists are at risk of engaging in speeding-related driving infringements.

In regards to the association between the four DAQ factors, similar to previous research on general motorists (Meadows, 2002), positive correlations were evident between the drink driving, close following, overtaking and speeding factor. This result may suggest that while the four factors are conceptually distinct, at some level, they may reflect related attitudes towards driving behaviours. For example, the strongest relationship appeared to be between close following and overtaking, which may indicate those who are unwilling to take risks while overtaking are also more cautious about following too closely to other vehicles. That is, the factors may derive from a common theme regarding tolerance levels to engage in risky driving behaviours. However, it is also recognised that this finding may stem from common method variance and/or social report bias, as participants who report moderate attitudes towards one form of unsafe driving behaviour may also be more likely to report lenient attitudes towards other forms of aberrant driving (Davey et al., 2007). As a result, further research that incorporates a more refined examination of the possible relationships between the factors may prove fruitful in identifying if the association is affected by the purpose of the driving task e.g., personal vs work.

In regards to identifying whether attitudinal differences existed on key demographic factors, it is noteworthy that few differences were identified within the current sample. Apart from males being more likely to express higher levels of tolerance for speeding and drink driving behaviours, no differences were identified on driving attitudes between trade vs. salary sacrifice vehicles, sedan vs. 4WD drivers, whether a company sign was on the car (e.g., logo), nor between urban vs rural driving. The finding that males are more likely to speed and drink drive is consistent with research that has demonstrated males are more reckless and take greater risks when driving than females (Taubman-Ben-Ari, Mukilincer & Gillath, 2004). On the other hand, further research appears necessary to determine if few attitudinal differences are in fact evident between fleet drivers operating different vehicles in different environments, or if the current findings are only specific to the sample.

In regards to the prediction of self-reported driving offences and crashes, only a small proportion of the sample reported being involved in a crash within the last year, which negated the possibility of determining which attitudinal factors are associated with the event. While the time period to examine the incidence of crashes in the current study may have been relatively short (i.e., 1 year), accidents remain a moderately rare event and the current findings support research that suggests an aggregate of different driving behaviours/offences may be required to obtain an accurate measure of driving performance (Davey et al., 2007; Ulleberg & Rundmo, 2003).

As a result, an examination of self-reported demerit point loss (e.g., infringement notices) revealed a larger proportion of the fleet drivers had incurred demerit point loss while driving for work purposes compared to crash involvement. A step wise logistic regression analysis indicated that both exposure to the road and lenient attitudes towards speeding were predictive of reporting driving violations. Firstly, exposure to the road was expected to be a significant predictor given that increasing driving distances is likely to impact upon driving safety (Collingwood, 1997; Griffith, 1997). Secondly, speeding was also identified as a predictor of demerit point loss, even after controlling for exposure to the road. Not only did the majority of the sample report that speeding was a generally acceptable driving behaviour in some circumstances, but this factor also predicted demerit point loss, over and above, exposure to the road. Given that speeding may be considered one of the most likely methods to incur infringement notices, it may not be surprising that attitudes towards speeding are predictive of fines. However, future research that identifies the particular origins of

motorists' demerit point loss (e.g., speeding vs errors) may provide for a more refined analysis to determine the specific contribution of speeding to driving infringements and even crash involvement. Despite this, the current study provides support for a growing body of research which is demonstrating that individuals who spend longer periods on the road are at a greater risk of engaging in aberrant driving behaviours (Davey et al., 2007; Sullman et al., 2002), as well as highlighting the negative affect speeding can have on driving outcomes.

In regards to fleet safety practice, the above findings and further research into fleet drivers has the potential to assist in the development of targeted interventions and strategies aimed at addressing factors contributing to unsafe driving behaviours. For example, close-following and risky overtaking manoeuvres have direct implications for other road users (Burgess & Webley, 2000) and identifying individuals within fleet environments who engage in such behaviours has potential benefits in regards to early intervention. For example, utilising the DAQ and other driving measurement tools to gather self-reported information provides a proactive opportunity to gain an organisational perspective of the type of behaviours exhibited by fleet drivers (Davey et al., 2007). This process may lead to the development of targeted interventions aimed at reducing the likelihood of a work-related crash before the event occurs, rather than on the traditional post hoc basis (Davey et al., 2007). These interventions can take a number of forms, ranging from the production of safety flyers, emails through to specific programs for high risk individuals who continue to display inappropriate driving behaviours e.g., driving diaries.

A number of limitations should be borne in mind when interpreting the findings of the current study. The response rate of participants was relatively low, and similar to research in this area, concerns remain regarding the reliability of the self-reported attitudes, such as the propensity for professional drivers to provide socially desirable responses. In addition, the current study focused on measuring attitudes, and a disparity may exist between such attitudes and the actual driving behaviours of participants. Questions also remain about the representativeness of the sample as participants were mainly corporate fleet drivers (e.g., involved in insurance sales) and such driving styles may not be easily transferable to other fleet driving populations. In summary, further research is required to establish the reliability and validity of the DAQ scale for the Australian setting and the usefulness of the tool to provide direction for fleet safety interventions.

Despite the above limitations, the results of the present research indicate that self-report measurement tools such as the DAQ have the potential to be utilised to investigate fleet drivers' attitudes towards road safety factors within the Australian context. However, further research appears necessary to not only determine the possible links between self-reported attitudes and subsequent fleet drivers' behaviours, but also the most effective methods to create attitudinal and behavioural change within such populations. While conducting research in applied settings such as fleet environments may prove costly in terms of both time and money, the collection of accurate data regarding fleet drivers' performance appears vital if effective interventions and countermeasures are to be developed that ultimately reduce the burden of work-related crashes.

## 5. REFERENCES

- Adams-Guppy, J.R., & Guppy, A. (1995). Speeding in relation to perceptions of risk, utility and driving style by British company car drivers. *Ergonomics*, Vol. 38(12), pp. 2525-2535.

- Anderson, A., & Summala, H. (2004). Commuter bicyclists' self image, attitudes, behaviour and accidents. *Paper presented at the Third International Conference on Traffic and Transport Psychology*, University of Helsinki.
- Burgess, C., & Webley, P. (2000). *Evaluating the effectiveness of the United Kingdom's National Driver Improvement Scheme*. School of Psychology, University of Exeter.
- Collingwood, V. (1997). Promoting the safe driving policy in NSW fleets of twenty or more vehicles. *Staysafe 36: Drivers as Workers, Vehicles as Workplaces: Issues in Fleet Management. Report No. 9/51*. Ninth report of the Joint Standing Committee on Road Safety of the 51<sup>st</sup> Parliament. Sydney: Parliament of New South Wales.
- Davey, J., Banks, T. (2005). Estimating the cost of work motor vehicle incidents in Australia. *Paper presented at Policing and Education Conference New Zealand*. [CD-ROM].
- Davey, J., Wishart, D., Freeman, J., Champness, P. (2006) *Telstra Fleet Safety Project Progress Report*. CARRS-Q: Brisbane.
- Davey, J., Wishart, D., Freeman, J., & Watson, B. (2007). An application of the Driver Behaviour Questionnaire in an Australian organisational fleet setting. *Transportation Research Part F*. Vol 10(1), pp.11-21.
- Deffenbacher, J.L., Oetting, E.R., & Lynch, R.S. (1994). Development of a driving anger scale. *Psychological Reports*, Vol. 74, pp. 83-91.
- Dimmer, A., R., & Parker, D. (1999). The accidents, attitudes and behaviour of company car drivers. In G.B. Grayson (Ed.), *Behavioural Research in Road Safety IX*, Transport Research Laboratory: Crowthorne.
- Downs, C. G., Keigan, M., Maycock, G., & Grayson, G. B. (1999). *The safety of fleet car drivers: A review* (No. 390). Transport Research Laboratory: Crowthorne.
- Griffiths, M. (1997). Selecting safe vehicles: Issues in vehicle crash safety. *Staysafe 36: Drivers as Workers, Vehicles as Workplaces: Issues in Fleet Management. Report No. 9/51. Ninth report of the Joint Standing Committee on Road Safety of the 51<sup>st</sup> Parliament*. Parliament of New South Wales: Sydney.
- Harrison, J.E., Mandryk, J.A., & Frommer, M.S. (1993). Work-related road fatalities in Australia, 1982-1984. *Accident Analysis and Prevention*, Vol. 25, pp. 443-451.
- Haworth, Tingvall, V., & Kowadlo, N. (2000). Review of best practice fleet safety initiatives in the corporate and/or business environment. *Report No. 166*. Monash University Accident Research Centre: Melbourne.
- Lajunen, T., Parker, D., & Summala, H. (2003). The Manchester Driver Behaviour Questionnaire: a cross-cultural study. *Accident Analysis and Prevention*, Vol 94, pp. 1-8.
- Lajunen, T., & Summala, H. (1997). Effects of driving experience, personality, and driver's skill and safety orientation on speed regulation and accidents. In T. Rothengatter &

- E. Carbonell Vaya (Eds.), *Traffic and transport psychology: Theory and application* (pp. 283–294). Pergamon: Amsterdam.
- Lynn, P., & Lockwood, C.R. (1998). *The accident liability of company car drivers. Report No. 317*. Crowthorne, Transport Research Laboratory: Berkshire.
- Meadows, M. (2002). Speed Awareness Training. *Paper presented at the 67<sup>th</sup> Road Safety Congress, 4<sup>th</sup> – 6<sup>th</sup> March, Stratford, UK*.
- Murray, W., Newnam, S., Watson, B., Davey, J., & Schonfeld, C. (2003). *Evaluating and improving fleet safety in Australia*. Report for the Australian Transport Safety Bureau: Brisbane.
- National Occupational Health and Safety Commission. (1998). *Work-related traumatic fatalities in Australia, 1989-1992*. Sydney: National Occupational Health and Safety Commission.
- Newnam, S., Watson, B., & Murray, W. (2002). A comparison of the factors influencing the safety of work-related drivers in work and personal vehicles. *Proceedings of the Road Safety Research, Policing and Education Conference, Adelaide, [CD-ROM]*.
- Newnam, S., Watson, B., & Murray, W. (2004). Factors predicting intentions to speed in a work and personal vehicle. *Transportation Research Part F, Vol. 7*, pp. 287-300.
- Parker, D., Stradling, S.G., & Manstead, A. (1996). Modifying beliefs and attitudes to exceeding the speed limit: An intervention study based on the theory of planned behaviour. *Journal of Applied Social Psychology, Vol. 26*, pp. 1-19.
- Parker, D., West, R.J., Stradling, S.G., & Manstead, A. R. (1995). Behavioural characteristics and involvement in different types of traffic accident. *Accident Analysis and Prevention, Vol. 27(4)*, pp. 571-581.
- Reason, J., Manstead, A., Stradling, S., Baxter, J., & Campbell, K. (1990). Errors and violations: a real distinction? *Ergonomics, Vol. 33*, pp. 1315-1332.
- Sullman, M.J., Meadows, M., & Pajo, K.B. (2002). Aberrant driving behaviours amongst New Zealand truck drivers. *Transportation Research Part F, 5*, 217-232.
- Taubman-Ben-Ari, O., Mukilincer, M., & Gillath, O. (2004). The multi-dimensional driving style inventory- scale construction and validation. *Accident Analysis and Prevention, Vol. 36*, pp. 323-332.
- Ulleberg, P., & Rundmo, T. (2003). Personality, attitudes and risk perception as predictors of risky driving behaviour among young drivers. *Safety Science, Vol. 41*, pp. 427-443.
- Wheatley K. (1997) An overview of issues in work-related driving. In Staysafe 36: Drivers as workers, vehicles as workplaces: Issues in fleet management. (Report No. 9/51). *Ninth report of the Joint Standing Committee on Road Safety of the 51st Parliament*. Sydney: Parliament of New South Wales.

- Wills, A., Watson, B., & Biggs, B. (2004). The relative influence of fleet safety climate on work-related driver safety. *Proceedings of the Road Safety Research, Policing and Education Conference, Perth*, [CD-ROM].
- Xie, C., & Parker, D. (2002). A social psychological approach to driving violations in two Chinese cities. *Transportation Research Part F*, Vol. 5, pp. 293-308.