Chapter ?

The Consistency of Crash Involvement Recall Across Time

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Introduction

It is estimated that throughout the world, 1.3 million traffic crashes result in fatalities every year (WHO, 2010). Currently, a wide variety of self-report measurement tools are employed with the intention of predicting which driver types have the greatest risk of crash involvement. Many of these tools, including the Manchester Driving Behaviour Questionnaire (DBQ) (Reason, Manstead, Stradling, Baxter & Campbell, 1990), were specifically developed to examine different types of aberrant driving behaviours and utilise self-reported crash history as a dependent variable. Through individual differences based methodology, researchers attempt to identify drivers (and types of driving) that are predictive of crash involvement.

Self-report data offers a number of advantages associated with economy and simplicity of use (af Wåhlberg, Dorn & Kline, 2010). It can also capture a range of information, including: driver behaviours, driver attitudes and personality characteristics (Sullman, & Taylor, 2010). However, the effectiveness of popular self-report driving scales to predict crash involvement has been mixed. For example, a recent meta-analysis of the DBQ, the most widely-used driving assessment tool, found uncorrected zero-order correlations between self-reported accidents and the DBQ subscales to be .10 (errors) and .13 (violations) (de Winter & Dodou, 2010). However, the small magnitude of the correlations

between these variables and crashes, calls into question the validity of these proxy items (such as the DBQ) to predict crashes given the degree to which road safety research draws on self-report data (af Wåhlberg, Dorn, de Winter, Dodou & Freeman, 2012).

Research has also indicated that exposure to the road (e.g., kilometres driven per year) is more effective at predicting crashes than measurement scales that assess a range of self-reported behavioural and attitudinal factors (Davey, Wishart, Freeman & Watson, 2007; Freeman, Wishart, Davey, Rowland & Williams, 2009; Wishart, Freeman, Davey & Rowland & Barraclough, under review). The usefulness of the DBQ as a predictive tool may be undermined by a number of factors, including social desirability, common method variance and issues of accurate memory recall (af Wåhlberg, 2009; af Wåhlberg et al., 2010; Lajunen & Summala, 2003; Lindeman & Verkasalo, 1995). Of particular interest in the current research is the extent to which self-reported recall of crashes is consistent across time and remains a reliable outcome variable.

The importance of the accurate recall of crashes is threefold. Firstly, self-reported crash history is the most common dependent variable (e.g., outcome variable) utilised within road safety research, with the characteristics of drivers with higher crash involvement histories generally used as a measure by which to identify the factors most predictive of aberrant driving outcomes. Secondly, researchers are beginning to explore whether examining the culpability of crash involvement subsequently improves predictive ability (af Wåhlberg, 2009). Not surprisingly, the DBQ may not prove to be an efficient predictor of crashes if many of these crashes were actually caused by a driver other than the one participating in the research programme (i.e., assessment scale in many instances would not capture the driving behaviours that contribute to a crash). Given these factors, it is particularly important to determine whether motorists can accurately recall crash history, including the circumstances surrounding the event.

Although relatively little research has been conducted within the road safety domain, a number of studies have pointed to the low reliability of recall within this area. One early study (Cash & Moss, 1972), compared self-reports of injuries sustained in motor vehicle crashes with related police records and found that the consistency of recall dropped from 87% at three months to 73% after 12 months. In a survey examining the crash recall of bus drivers, up to 44% of responses provided by study participants did not match official records, with both under-reporting and over-reporting observed (af Wåhlberg, 2002). In their test-retest study of self-reported road injuries, Alonso, Laguna and Seguí-Gomez (2006) found that while self-reporting was fairly reliable within the study sample, discrepancies did increase over time. However, in their study 14% of respondents who initially reported sustaining minor injuries as a result of a road accident did not indicate that this had occurred at time two (Alonso et al., 2006). Research has indicated that approximately 25% of all crashes are forgotten each year, and that drivers tend to more readily report crashes occurring in the periods closest to the time of the survey (Maycock, Lockwood & Lester, 1991; Maycock & Lester, 1995; af Wåhlberg, 2012). It has been argued that this contributes to many drivers under-reporting the number of crashes in which they have been involved (af Wåhlberg, 2012).

Thirdly, given that crashes are relatively rare events, researchers often expand the timeframe across which crashes are measured, in order to increase the overall frequency of crashes reported. However, concerns remain as to whether this extension produces a spurious decline in reported crashes due to memory effects (af Wåhlberg, 2009). Similarly, researchers are attempting to find proxies for crashes, such as demerit point loss and near misses. In order to identify such effective proxies, some level of comparison needs to be undertaken with an accurate recall of crash history.

Within the wider field of executive processing and memory, an increasing amount of research has centred on the reliability of memory functions (Rhodes & Kelley, 2005). Recall

accuracy has been shown to be quite low, with the potential to be influenced by many factors, which may result in: false memories, memory distortion, memory illusions and memory metaphors (Koriat, Goldsmith & Panksy, 2000). The act of memory recall is a complicated process, which is dependent upon a number of inferential and decisional processes that often reflect the subject's capacity to problem solve and make decisions (Koriat et al., 2000). In addition, the issue of memory recall is complicated by asking respondents to recall unpleasant memories, as there is evidence that humans have a capacity to repress or forget unpleasant events (Geraerts & McNally, 2008). Research has also demonstrated that executive functioning (including memory recall) can diminish with age (Kelly & Sahakyan, 2003), with obvious implications for older drivers participating in self-report studies.

It has previously been proposed that any reporting biases, including memory recall problems, may only affect dependent variables, at worst producing a random error effect, which may result in a reduction of real effects that can be identified (af Wåhlberg & Dorn, under review). However, such errors can still significantly influence the outcome of multivariate analyses by distorting the significance placed on variables that are hypothesised to affect negative driving outcomes. Given that research routinely requires participants to report crash histories over recent years, it may be suggested that researchers assume that data is reported consistently over time periods of at least a few months (af Wåhlberg & Dorn, under review). As a result, there is a need to determine if this hypothesis is in fact correct.

Earlier studies in this area found high correlation coefficients for repeated recall of self-reported crashes, although the recall period was set at only two or three days (Arthur, 1991; Arthur & Graziano, 1996). An earlier study by French, West, Elander and Wilding (1993) reported a correlation of .305 between crashes occurring over a three year period and crashes reported over one year. These authors were not aware of similar studies conducted in regard to the reliability of self-reported violations. Additionally, the issue of accurately reporting mileage is of considerable importance to road safety research, given that exposure

to the road is often entered into multivariate models of crash prediction, in order to control for the different amount of time on the road.

Overall, a central aim of psychometric analysis is to determine the reliability of measured variables, and this goal is undermined by the presence of unstable variables (af Wåhlberg & Dorn, under review), some which can be influenced by memory problems. In fact, low reliability may suggest that any results are artefactual. Furthermore, an unreliable measure may struggle to predict anything, unless some form of bias becomes a contributing factor (af Wåhlberg & Dorn, under review). As a result, the current study examines the stability of memory recall as it relates to self-reported crashes and violations. More specifically, this study seeks to:

1. Examine the consistency of crash recall across a two-month period;
2. Examine the consistency of infringement notices recall across a two-month period; and
3. Examine the driving and behavioural characteristics of those respondents who provided inconsistent crash history responses.

Method

Participants and Procedure

A total of 249 general Queensland motorists responded to an electronic promotion of the study. As such, there was no random assignment of participants to the sample group. Rather a convenience sampling approach was utilised, as participants were encouraged to forward the email to others, including family and friends. Data were collected over a six month period (Sept 2011 to Feb 2012) and participants voluntarily completed either an online or a hardcopy of the questionnaire. No between-group differences were found in responses between the different data collection methods. Participants completed an initial questionnaire

(Time 1) and then the same questionnaire two months later (Time 2). The responses given at the two time periods were compared for inconsistencies. On completion of each survey, participants received payment in the form of a gift voucher valued at $10 Australian.

Materials

A series of assessment scales were utilised in the larger research project, however this study focused primarily on data related to socio-demographic factors and crash history data (e.g., frequency of crashes in last three years, total number of crashes in driving history). Socio-demographic questions were included in the questionnaire to determine participants': age, gender, licence tenure and driving exposure. Categorical questions on average distance and hours driven per week over the past year provided indicators of driving exposure.

To ascertain respondent's crash history, participants were asked the total number of crashes experienced within the last 3 years and the total number of crashes experienced over their lifetime. Participants also provided a short description of the most recent crash in which they were involved. A crash was deemed to be any incident involving a motor vehicle that resulted in damage to a vehicle, property or injury. Instances in which the crash details, as provided, changed or remained the same between the two time periods were coded. On occasion the descriptions of the most recent crash, as provided in the two surveys, differed somewhat, being too vague or brief to determine whether or not they referred to the same incident. In these instances responses were given the benefit of the doubt and coded as consistent, if they could feasibly be regarded as such. For example at Time 1 a crash description might read "Hit by car, other driver at fault" and at Time 2 be described as "hit in rear end collision". If respondents indicated no difference in the number of lifetime crashes at both times, the item was subsequently coded as representing a description of the same crash. Conversely if respondents indicated a change in the number of lifetime crashes over the two surveys, the two descriptions were coded as representing different incidents. Effectively this produced a conservative approach to identifying any discrepancies related to changes in

descriptions of the most recent crash. Offence history was obtained by recording the number of occasions participants had been fined or lost demerit points for traffic offences in the last three years, excluding parking offences.

Characteristics of the sample

A total of 249 motorists responded to the initial survey and 214 of these participants completed the second survey two months later, producing a retention rate of 85.94%. Of those who completed both surveys, 80 (37.4%) were males and 134 (62.6%) were females. The average age of respondents was 37.3 years old (range 18-65) and they had held their driving licences for an average of 18.9 years (range 1-48). Almost three quarters of participants (73.2%) reported driving between 51 and 500kms per week. A similar proportion (74.5%) reported driving for 10 hours or less per week. As would be expected, the total number of crashes experienced over a driving lifetime increased slightly at Time 2, being 440 crashes, up from 436.

Results

The first series of analyses focused on crash recall consistency across time. Over three quarters of respondents (78.1%) reported experiencing a crash at some point in their lifetime. Within this group, drivers reported an average of 2.61 crashes (range 1-10). A proportion of 32.7% reported losing demerit points in the past three years. Of the participants who had lost demerit points in the past three years, the average at Time 1 was 1.73 occasions and 1.65 at Time 2. Table 1 shows the involvement in crashes, as reported by respondents, occurring in the past three years and also the number of crashes experienced in a lifetime. At Time 1, 29.5% of respondents (31.3% at Time 2) reported having been involved in a crash in the last three years.

[insert Table 1 here]

Inconsistencies in self-reported crash histories

Secondly, an analysis was undertaken to examine the consistency of self-reported crashes across the two time periods. Table 2 shows a breakdown of the responses in relation to crash history as reported at Time 2 that were found to be inconsistent when compared with the information supplied two months earlier. The survey found that slightly over one fifth (22%) of the respondents reported never being involved in a crash, while 167 (78%) had been involved in a crash in their lifetime. Of the latter group, ten respondents did not provide descriptions of their most recent crash on either occasion, despite indicating on each survey that they had been involved in a crash. These were subsequently removed from the examination of consistent and inconsistent responses.

The analysis indicated there were considerable discrepancies, both in the number of lifetime crashes and in the descriptions of their most recent crash. More specifically, of the 157 participants who reported being involved in a crash during their lifetime and provided a description of their most recent crash in both surveys, 35 (22.3%) reported a lower number of lifetime crashes at Time 2, than at Time 1. Of the 88 drivers who reported no change in number of lifetime crashes, 10 (11.4%) described a different most recent crash at time two. In addition, of the 34 participants who reported an increase in the number of lifetime crashes, 29 (85.3%) provided the same description for their most recent crash. Within the cohort of the 167 drivers who had been involved in a crash, it was those whose lifetime crashes were unchanged at Time 2 that were the least likely to provide an inconsistent response. Assessed as a whole, almost half (47.1%) of participants made a confirmed mistake at Time 1 or Time 2, suggesting that self-reported crash data was inconsistently reported for up to half the sample across the two reporting periods.

[insert Table 2 here]

Socio-demographics and Driving Behaviours

An analysis of response inconsistency was undertaken to examine socio-demographic characteristics. No differences were found between the responses of the two groups (consistent versus inconsistent) as a function of age or years licensed (both *t*s(156) < 1.1, *ns*).

When the total number of lifetime crashes was examined as a function of gender, no significant differences between males and females was found ($t(156) = 1.27$, *ns*). At Time 2 men reported having been involved in an average of 2.91 ($SD = 2.58$) crashes and women an average 2.50 ($SD = 1.68$) crashes in their lifetime. Returning briefly to the entire sample ($n = 214$), although men constituted only 37.4% of respondents and 41.9% of those who reported a crash ($n = 167$), they comprised 48.6% of those who were found to have provided inconsistent responses ($n = 74$).

In regard to general driving behaviour, participants who provided an inconsistent response at Time 2 also generally reported involvement in a greater number of crashes over their lifetime at Time 2 ($t(155) = 3.53$, $p = 0.001$). More specifically, at Time 2, those who provided inconsistent responses had a mean of 3.19 ($SD = 1.75$) crashes over their lifetime compared with a mean of 2.25 ($SD = 1.73$) crashes for those with consistent responses. Similar results were obtained when comparisons were made using responses provided at Time 1. Participants with an inconsistent response were involved in a crash on an average of 3.10 ($SD = 1.96$) occasions while those with a consistent response reported involvement in a crash on 2.31 ($SD = 1.60$) occasions with these differences also significant. Respondents who provided inconsistent answers at Time 2 were also more likely to have been involved in a crash in the previous three years ($t(155) = 2.44$, $p = 0.016$). These respondents had an average of 0.74 ($SD = 0.96$) crashes compared with .42 ($SD = 0.70$) crashes for drivers with a consistent response. This item was not found to be significant when using similar data from Time 1, although the average number of crashes was still greater for the inconsistent group (0.62 inconsistent vs. 0.45 consistent).

Exposure to the road was also associated with inconsistent crash reporting. An omnibus chi square test on the average kilometres driven per week, by inconsistent response style revealed significant differences ($\chi^2(4) = 12.341$, $p = 0.015$). Respondents who reported driving less than 50km per week ($n = 25$) were the group least likely to provide an inconsistent response (28%) while two thirds of drivers (66.7%) who reported driving over 500km per week ($n = 15$) provided an inconsistent response. Significant differences were also found in regard to time spent driving (hours per week) and reporting inconsistent lifetime crashes ($\chi^2(3) = 8.912$, $p = 0.030$). Of respondents who indicated that they drove less than five hours per week, an inconsistent response was provided by over a quarter 26.8% ($n = 41$). An inconsistent response was also given by 75% of those who drove 21 or more hours per week ($n = 6$), although care should be taken in interpreting this finding, given the small numbers present.

Minor Inconsistencies

Other examples of inconsistent memory recall were provided by respondents. Two respondents stated that they could not recall the details of their most recent crash, despite having provided a description two months earlier at Time 1. Another respondent recorded five lifetime crashes at Time 1 but ten lifetime crashes at Time 2. In this instance the response was coded as inconsistent as the description of the most recent crash remained unchanged. Seven respondents who reported an increase in crashes at Time 2 recorded no crashes in their lifetime at Time 1. While this is plausible, indeed it is to be expected, it is interesting to note that one of these respondents reported being involved in three crashes in this two-month period. While this entry was not coded as inconsistent, the unusually high number of crashes reported over such a short time suggests that the respondent possibly made an error in at least one of the surveys. Another respondent (coded inconsistent) who reported no lifetime crashes at Time 1 describes at Time 2 the most recent crash as occurring in 1975, well outside the two-month period between surveys.

Discrepancies other than crash-related responses were also noted in the current study. The reporting of distance driven remained relatively stable from Time 1 to Time 2, with the exception of the 51-100km and 101-200km groups which differed considerably. At Time 1, less than a fifth of respondents (19.7%) reported driving between 51 and 100km per week, while this proportion rose to 29.4% at Time 2. Conversely 30.0% of respondents reported driving between 101 and 200km per week at Time 1, while this figure dropped to 22.0% at Time 2. A chi square analysis confirmed that these distributions were significantly different ($\chi^2(5) = 17.54$, $p = 0.004$).

In addition, changes in the number of offences incurred over the last three years were reported at a greater level than expected. At Time 1, under a third of respondents (32.7%) reported incurring an offence or receiving demerit points in the past three years. At Time 2 this proportion increased to 36.9%. After allowing for any change that may be expected due to the slightly different timeframes (three years prior to each survey), figures representing the expected number of offences were calculated. A chi square goodness of fit was conducted to determine the extent to which the reported number of offences increased, remained constant or decreased over the two surveys and the differences were found to be significant ($\chi^2(2) = 52.77$, $p = 0.001$). After standardised figures were obtained (by dividing the difference between expected and observed figures by the square root of the expected figure), the number of respondents who indicated that their offences over the three years had not changed was lower than predicted ($p<.05$), drivers who recorded a reduction in the number of offences was greater than predicted ($p=.05$), and more drivers recorded an increase in offences incurred than would otherwise be expected ($p<.001$), providing further evidence of the unreliability of self-reported driving history.

Discussion

The present study aimed to examine a neglected issue within road safety, the reliability of self-reported crash information across time. To date, scant research has focused on this topic despite the tremendous amount of published research that continues to utilise self-reported crash history as the main dependent variable. The current study endeavoured to examine the consistency of crash recall across a two-month period and identify which socio-demographic characteristics (if any) were associated with reporting discrepancies.

Recall Inconsistency

The principle finding from this study is that almost half of the participants provided a response in relation to their crash history that was found to be inconsistent over the two waves of the survey. This result suggests that, regardless of whether the responses were more accurate at Time 1 or Time 2, self-reported responses in relation to crash history are unreliable. The finding is supportive of the small body of research that has identified discrepancies in self-reported data within road safety research (Maycock et al., 1991; af Wåhlberg, 2012). At best, the findings suggest that this issue warrants further investigation to determine the extent of the discrepancy between self-reported data and officially recorded crash histories (e.g., official crash databases). At worst, the findings provide support for the argument that researchers should treat self-reported data with extreme caution as the significance (or lack thereof) between independent variables and self-report crash history may be spurious. Given that self-reported crash history is commonly utilised as an outcome variable to predict aberrant driving outcomes, this issue has serious implications for road safety research.

Secondly, an examination of those respondents who did provide an inconsistent response found that exposure to the road appears to be a factor in this phenomenon. More specifically, general recall discrepancies were more likely to be found amongst drivers who drive for longer time periods or who drove greater distances weekly than for those who

reported driving less frequently. In addition, participants who provided an inconsistent response generally reported involvement in a greater number of crashes over their lifetime, suggesting that the greater number of incidents to recall, the greater scope to err when recalling and reporting crash history. The finding that drivers with inconsistent responses were also more likely to have been involved in a crash in the past three years is also supportive of this view. However, this raises the question of whether the figures for crashes occurring in the past three years are generally more accurate than those reported for lifetime crash involvement. While the design of the current study was not intended to determine the optimum time period over which self-reported road safety data should be examined, the findings highlight the need for considerable scientific effort to be directed towards clarifying this issue, in order to improve the accuracy (and meaningfulness) of the obtained data. In addition, discrepancies relating to self-reported mileage and the number of offences in the past three years were also observed, suggesting that the problem of unreliable self-report data extends beyond measuring crash outcomes.

Contrary to expectations, inconsistent responses were not associated with the age of participants despite an assumption that older respondents might be more likely to experience poor recall. However, this may reflect the relatively young age of the sample (M = 37 years) and the lack of older drivers within the sample (range 18 – 65). On a more pragmatic level, the issue of age and memory recall may not be a major issue for road safety research, as many older individuals (who experience clear memory problems) may not be licensed to drive. Additionally, while there was some evidence to suggest that men may be more likely to provide inconsistent responses in regard to their crash histories, the findings in the current study were not significant. With this in mind it would be most useful to replicate this study utilising a larger sample size.

Limitations

A number of limitations should be taken into account when interpreting the results of this study. While the sample included a wide variety of drivers (in terms of years licensed, kilometres driven and crash history), the findings of this research may not transfer to the general driving population. For example, it is not known to what extent the current sample contained individuals with an increased crash risk, such as professional drivers. In addition, the relatively small sample size limits, to some degree, the extent to which these findings may be reflected in the wider community. For example, the average number of crashes in the past three years in the current study was close to 30%, a figure much higher than the national average of 17.4%, as recorded over the period 1996 to 2011 (Petroulias, 2011). However, it is interesting to note that the latter figure is also derived from self-report data.

The current study may also underestimate the number of drivers who provided an inconstant response. As noted earlier, the method by which differences in crash descriptions were recorded allowed many to be coded as consistent, despite a degree of vagueness in some of the responses. Of the respondents found to have provided consistent responses, most reported no change in lifetime crashes together with no change in their description of their most recent crash. By erring on the side of caution in this regard, it is possible that some inconsistent responses were not identified. Conversely, it is also possible that those who recorded an increase in lifetime crashes, but provided a description of their most recent crash that was the same as Time 1 (resulting in an inconsistent coding) may actually be describing two different crashes of a similar type (i.e., two different rear end collisions). However, it must be noted that the descriptions generally included sufficient detail to distinguish between different incidents, as well as incident types (e.g., *someone ran into the back of me in a car park* versus *rear ended while at traffic lights*). In addition, while offence history was not the central focus of this study, a change in offence rates could occur following a change in the road rules or a crackdown on particular driving behaviours. However, the authors were not aware of any changes to road rules or related legislation that might contribute to any change

in recorded offences. Nevertheless, the study was conducted between September 2011 and February 2012. For many respondents the two-month gap between surveys would have included the Christmas holiday period during which targeted law enforcement activities are often increased. Accordingly, any increase in offences, as reported by respondents who completed their second questionnaire in January or February, may reflect the fact that this survey period coincided with a period in which the likelihood of detection, for some offences, was possibly greater. It must be noted that as respondents were questioned about their offence history over a three-year period, this timeframe would automatically capture an equal number of periods of increased enforcement activity (i.e., three Easter and Christmas periods). Indeed, any increase in reported offences associated with a recent holiday period may be indicative of an inability to recall similar offences that occurred earlier in the three-year period.

Conclusion

Notwithstanding the aforementioned limitations, the main finding from this research reinforces the fact that further research is required to determine the accuracy of self-report data within the field of road safety. Ideally this study should be replicated with larger samples sizes, with scope to vary the recall time periods involved (i.e., both the duration over which the crashes were reported, as well as the time period between phases). Additionally, given other documented problems inherent in self-reported data (e.g., social desirability responding), it may be beneficial to consider other mechanisms to better elucidate the origins of crash involvement. Pathways to improve the usefulness of such information are likely to be found through comparisons of self-reported data and official crash databases, although it is also noted that a number of issues are also associated with using official data sources, such as obtaining access to such data and correctly ascertaining crash outcomes. Taken together, there are a number of outstanding research issues surrounding the usefulness and accuracy of self-report data within the arena of road safety. However, given the value of understanding

the origins of crashes (and the clear benefits of developing targeted effective interventions) further investigations into how best to utilise self-report data is warranted.

References

af Wåhlberg, A. (2002). On the validity of self-reported traffic accident data. *E140 Proceedings of Soric'02* (online). Available from www.psyk.uu.se/hemsidor/busdriver Accessed November 2012.

af Wåhlberg, A. (2009). *Driver Behaviour and Accident Research Methodology: Unresolved Problems*. Farnham, UK: Ashgate.

af Wåhlberg, A. (2012). Memory effects in self-reports of road traffic crashes. In L. Dorn (Ed.) *Driver Behaviour and Training (Vol. 5).* Farnham, UK: Ashgate.

af Wåhlberg, A., and Dorn, L. (under review). How reliable are self-report measures of mileage, violations and crashes? *Transportation Research Part F.*

af Wahlberg, A., Dorn, L., de Winter, J., Dodou, D., and Freeman, J. (2012). Commentaries and responses to "The Driver Behaviour Questionnaire as a Predictor of Accidents: A Meta-analysis". *Journal of Safety Research, 43*(1), 83-99.

af Wåhlberg, A., Dorn, L., & Kline, T (2010). The effect of social desirability on self-reported and recorded road traffic accidents. *Transportation Research Part F, 13,* 106-114.

Alonso, A., Laguna, S., and Seguí-Gomez, M. (2006). A comparison of information on motor vehicle crashes as reported by written or telephone interviews. *Injury Prevention, 12,* 117-120.

Arthur, W. (1991). *Individual differences in the prediction and training of complex perceptual-motor skill tasks: the development and validation of the computer-*

administered test of visual selective attention. Technical report. Texas A & M University.

Arthur, W., and Graziano, W.G. (1996). The five-factor model, conscientiousness, and driving accident involvement. *Journal of Personality, 64,* 593-618.

Cash, W.S., and Moss, A.J., (1972). Optimum recall period for reporting persons injured in motor vehicle accidents. *Vital and Health Statistics, 2,* (50), 1–33.

Davey, J., Wishart, D., Freeman, J., and Watson, B. (2007). An application of the driver behaviour questionnaire in an Australian organisational fleet setting. *Transportation Research Part F, 10,* 11−21.

de Winter, J., and Dodou, D. (2010). The driver behaviour questionnaire as a predictor of accidents: A meta-analysis. *Journal of Safety Research, 41*, 463-470.

Freeman, J., Wishart, D., Davey, J., Rowland, B., and Williams, R. (2009). Utilising the driver behaviour questionnaire in an Australian organisational fleet setting: Can it identify risky drivers? *Journal of the Australasian College of Road Safety, 20*, 38−45.

French, D.J., West, R.J., Elander, J., and Wilding, J.M. (1993). Decision-making style, driving style, and self-reported involvement in road traffic accidents. *Ergonomics, 36,* 627-644.

Geraerts, E., and McNally, R.J. (2008). Forgetting unwanted memories: Directed forgetting and thought suppression methods. *Acta Psychologica, 127*, 614-622.

Kelly, C.M., and Sahakyan, L. (2003). Memory, monitoring, and control in the attainment of memory accuracy. *Journal of Memory and Language, 48,* 704-721.

Koriat, A., Goldsmith, M., and Pansky, A. (2000). Toward a psychology of memory accuracy. *Annual Review of Psychology, 51,* 481-537.

Lajunen, T., and Summala, H. (2003). Can we trust self-reports of driving? Effects of impression management on driver behaviour questionnaire responses. *Transportation Research Part F, 6*, 97–107.

Lindeman, M., and Verkasalo, M. (1995). Personality, situation, and positive–negative asymmetry in socially desirable responding. *European Journal of Personality, 9*, 125–134.

Maycock, G., and Lester, J. (1995). Accident liability of car drivers: follow up study. In G.B. Grayson (Ed.) *Behavioural Research in Road Safety V* (pp.106-120). Crowthorne, UK: Transport Research Laboratory.

Maycock, G., Lockwood, C., and Lester, J.F. (1991). *The Accident Liability of Car Drivers.* TRRL Research Report No.315. Crowthorne, UK: Transport and Road Research Laboratory.

Petroulias, T. (2011) *Attitudes to Road Safety – 2011 Survey Report, Road Safety Report 5.* The Social Research Centre Community: The Department of Infrastructure and Transport

Reason, J., Manstead, A., Stradling, S., Baxter, J., and Campbell, K. (1990). Errors and violations: A real distinction? *Ergonomics, 33*, 1315-1332.

Rhodes, M.G., and Kelley, C.M. (2005). Executive processes, memory accuracy, and memory monitoring: An aging and individual differences analysis. *Journal of Memory and Language, 52,* 578-594.

Sullman, M. J. M., and Taylor, J. E. (2010). Social desirability and self-reported driving behaviours: Should we be worried? *Transportation Research Part F, 13*, 215-221.

Wishart, D., Freeman, J., Davey, J., Rowland, B., and Barraclough, P. (under review). An application of the Driver behaviour Questionnaire in a large Australian organisational fleet setting: can it predict crashes and demerit loss?

World Health Organisation (2010). Global Plan for the Decade of Action for Road Safety 2011-2020. Retrieved from the world wide web 10/2/12. http://www.who.int/roadsafety/decade_of_action/plan/plan_en.pdf

Table 1. Frequency of self-reported crashes in previous three years and over entire lifetime at Time 1.

	Last 3 Years		Lifetime	
	Frequency	%	Frequency	%
None	151	70.6	47	22.0
One crash	48	22.4	54	25.2
Two crashes	10	4.7	44	20.6
Three or more crashes	5	2.4	69	32.3
Total	214	100	214	100

Table 2. Discrepancies in self-reported crash details at Time 2

Lifetime crash status		Inconsistent responses		
	n	Inconsistency type	n	Inconsistent response as % of relevant lifetime crash status
Experienced crash in a lifetime	157	Lifetime crashes decreased at T2	35	22.3
Lifetime crashes unchanged	88	Crash description changed at T2	10	11.4
Lifetime crashes increased	34	Crash description unchanged at T2	29	85.3
Total	157		74	47.1