



VicRoads
Investigation of Driver and
Motorcycle Rider
Attitudes toward Each Other
Q23-00002
Final report



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Executive summary

Overview

The current project was commissioned by VicRoads in 2009 to better understand the attitudes of drivers and motorcycle riders toward each other, and toward riding, and how these factors contribute to motorcyclist crash risk. The project sought to identify the key on-road issues facing motorcyclists, as well as perceptions and attitudes drivers and riders have about themselves and about other road users. The project involved determining the likeliness of encountering conditions that may lead to a motorcycle crash, the behaviours that riders and drivers exhibit on public roads, and number and type of motorcyclist crashes. The findings of this study help highlight the attitudinal differences between riders and drivers as well as attitudes which may lead to potentially dangerous riding or driving behaviours; this in turn will help guide the development of road safety initiatives and communication strategies, as well as future research to reduce the number and severity of motorcycle accidents.

Method and sample

A self-report survey instrument was developed in collaboration with VicRoads. The survey data was captured using an online methodology. At the conclusion of data collection, a total of 1251 respondents had been recorded. Respondents were sourced from:

- The VicRoads Motorcyclist Exposure on Victorian Roads project (n=283)
- Word of mouth (n=118)
- Facebook advertisement (n= 274)
- Various websites (n=96)
- Survey Sampling International (SSI) (n= 89)
- Other (unspecified) (n=287)

Key findings

A large number of insights were revealed in the data across a range of areas.

Attitudes and behaviours

- Attitudes toward motorcyclists, toward car drivers and toward road users generally differed significantly between riders and drivers.
- Respondents appear to think about car drivers, and NOT about motorcyclists, when thinking about road users generally.
- Riders almost always wear a full complement of protective gear when riding.
- Drivers tend to agree more strongly than current riders that drivers are generally unable to judge the speed and distance of a motorcyclist, and are generally unable to anticipate their behaviour.
- Stark differences were noted between drivers and riders in perceptions of motorcyclist crash risk, with riders tending to agree much more strongly than drivers that they will ride in a safe manner.
- Current riders generally have more positive attitudes toward motorcyclists than those who are former riders or who have never ridden.

Motorcyclist crash risk

- Most motorcyclists have not had a crash, but less than a quarter have never had a near miss.
- Male riders have three times the chance of having a crash than females.
- Riders who engage in more risky riding behaviours have 3 times the chance of having a crash than riders with less risky riding behaviours.
- Riders with negative attitudes toward road users generally are 1.5 times more likely to have a crash than riders with more positive attitudes toward road users.
- A greater number of crashes are associated with more years riding, more hours ridden each week, more negative attitudes toward road users generally and a greater perceived inevitability of a crash.
- Some professional rider training appears to have a protective effect on motorcyclist safety.

Implications

This project provides a cross-sectional view of motorcycle rider and car driver attitudes, behaviours and crash risk. The findings might be used for road safety communications that:

- Are tailored for specific social segments.
- Raise awareness of the links between road user behaviours and motorcyclist crash risk, and between motorcyclist crash history, attitudes, training and crash risk.
- Target specific attitudes or behaviours that are especially relevant to motorcyclist crash events.
- Address the disparity in perceptions between motorcyclists and other road users.

Section A: Introduction and Context

In Victoria, motorcyclists are involved in a disproportionate number of accidents resulting in death or serious injury. In 2007-2008, 14% of serious casualty accidents involved a motorcyclist, yet motorcycles comprise only 3% of registered vehicles in Victoria (Transport Accident Commission [TAC], 2009a).

In 2008, 45% of motorcycle accidents resulting in death or serious injury involved another vehicle (Transport Accident Commission [TAC], 2009b). The most commonly reported cause of such accidents is a motorist failing to give way to a motorcyclist, often because the motorcyclist is reportedly not seen, or seen too late for the motorist to react to avoid impact (Crundall, Bibby, Clarke, Ward, & Bartle, 2007; Horswill, Helman, Ardiles, & Wann, 2005). The comparatively smaller size of motorcycles make them less visible than larger vehicles; the smaller size may also result in drivers inaccurately estimating the speed, distance or arrival time of motorcycles, with drivers often expecting a motorcyclist to reach them later than they actually would (Horswill et al., 2005). Thus motorcyclists face a considerable risk to their safety on the roads, particularly from conflict with drivers of larger vehicles.

Potential conflict between motorcycle riders and drivers of other vehicles may be the consequence of, or result in, particular attitudes toward each other. Such attitudes may have a subsequent impact on motorcyclist crash risk. To date, research linking driver and rider attitudes toward each other, to driving and riding behaviour, and to crash risk has been limited. Some authors have suggested that drivers with no motorcycling experience tend to hold greater negative attitudes toward motorcycle riders and report more on-road violations (e.g. failing to make all appropriate checks) than those with some motorcycling experience (Crundall et al., 2007). Yet further investigation is warranted.

Accident statistics would suggest that motorcycling is a high risk activity, a view that may be shared by motorcyclists themselves. Yet motorcyclists often perceive accident risk as a product of the behaviours of other road users (Bellaby & Lawrenson, 2001). This perception may indicate that motorcyclists tend to see other road users as potential hazards to their own safety, and adjust their riding accordingly; this may in turn influence motorcyclist crash risk in terms of the perceived inevitability of being involved in a crash.

Better understanding of the factors that may increase motorcyclist crash risk has the potential to decrease the incidences of serious casualty or fatality accidents involving motorcyclists.

Project objectives

The primary objective of this project was to better understand the attitudes of drivers and motorcycle riders toward each other, and toward riding, and how these factors contribute to motorcyclist crash risk.

Literature review

Introduction and context

Riding a motorcycle inherently carries a greater risk of severe road trauma than other forms of on-road motorised transport. Two wheeled motorcycles are inherently less stable than vehicles with 3 or more wheels, thus factors such as poor road surfaces, debris, obstructions and sharp corners pose a greater threat to motorcyclists than other vehicles, and may be a causal factor in a motorcyclist slipping or crashing. In addition, motorcycle riders are protected by little more than their clothing, thus a rider who 'comes off' their motorcycle has a high risk of serious bodily damage.

Road accident statistics reflect this greater risk carried by motorcyclists. Of the 303 fatalities on Victorian roads in 2008, 43 were motorcycle riders or pillion passengers, representing 14% of the total road toll (TAC, 2009a). In the same time period, of the 6504 people seriously injured on Victorian roads, 1026 were motorcycle riders, representing 16% of serious injuries (TAC, 2009a). When considering that motorcycles comprise 3% of all registered vehicles in Victoria, and make up less than 1% of kilometres travelled by Victorian vehicles, motorcycle riders are overrepresented in those severely injured or killed on Victorian roads (Australian Bureau of Statistics [ABS], 2008a; 2008b).

Crash risk factors

Several Australian studies have investigated the risk factors of serious injury and fatality motorcycle crashes. A study by Haworth, Smith, Brumen and Pronk (1997) investigated the characteristics of 222 motorcycle accidents requiring hospitalisation or involving a fatality in a 14 month period on metropolitan Melbourne roads. The authors compared, where possible, the characteristics of the riders involved in the accidents to a group of control riders who passed the place of the crash at the same time of day and day of the week in which the crash occurred. The findings suggested that 6 key factors had the greatest contribution to crashes: young age (riders under 25 years); any alcohol in the rider's system (whether over the legal limit or not); riders that were unlicensed; riding an unregistered motorcycle or one that was not their own; and using a motorcycle for non-work-related riding.

In another Australian study, De Rome, Stanford and Wood (2002) surveyed 796 New South Wales motorcycle riders about their crash experiences. Two-thirds (67%) of respondents had had a crash of some kind and less than half (43%) of the respondents in the study had a crash involving injury to themselves or passenger at some point in their riding career. The most commonly reported reason for a crash was loss of traction with road surface (56%), avoiding a situation caused by another vehicle (27%) and excessive speed (14%). Other factors included running out of cornering clearance (9%), being impaired (7%) and unfamiliarity with the motorcycle (5%).

Crashes involving more than one vehicle

Accidents resulting in serious casualty or death of a motorcycle rider often involve more than one vehicle. In 2008, 45% of fatalities and serious injuries to motorcycle riders or pillion passengers on Victorian roads involved at least one other vehicle, with the majority of these crashes occurring at intersections (TAC, 2009a). Similarly, between 2003 and 2007, 1588 motorcycle riders were killed or seriously injured on Western Australian roads, with 64% of these in a multiple vehicle crash (N=1020) (Motorcycle and Scooter Safety Action Group, 2009).

The evidence of who is at fault in multi-vehicle accidents involving motorcycles is somewhat mixed. In the study by Haworth and colleagues (1997), 70% of Victorian riders involved in a multi-vehicle crash claimed that the other person was at fault, with the rider stating that they did not contribute to the crash (e.g. did not fail to respond or brake, was positioned correctly and had no mechanical fault). Yet a New South Wales study by de Rome and Brandon (2007) found that 44% of motorcyclists involved in multi-vehicle accidents (N=245) judged the other driver/rider at fault, while 37% indicated themselves (N=204) and 11% blamed the road surface (N=59). Lynam, Broughton, Minton and Tunbridge (2001), using road accident data from England and Wales between 1986 and 1995, noted that 60% of accidents involving a motorcyclist and one or more larger vehicles were considered to be the fault of the motorcyclist.

In multi-vehicle crashes involving motorcyclists, the majority occur at intersections, with failure to see the motorcyclist or failure to give way the most commonly cited causes. Clarke, Ward, Bartle, and Truman (2007) noted that between 1997 and 2002, 681 of 1790 motorcycle accidents (38%) in the United Kingdom involved failure to give way, mainly at intersections. Yet in only 19% of failure to give way accidents was the rider judged as either being fully or partly to blame for the accident. In over 65% of failure to give way accidents where the rider was not at fault, the driver reportedly failed to see the motorcyclist despite an apparently clear view (Clarke et al., 2007). In the study by Lynam and colleagues (2001), of fatal accidents where the driver was at fault, the most commonly reported causes were the driver failing to look for, or looking for but failing to see, the motorcyclist (41%), and from driver carelessness or inattention(36%). These factors led to the driver failing to give way or performing a poor turn/manoeuvre which resulted in the accident.

In another study, Horswill et al. (2005) used computer simulations to investigate the ability of car drivers to estimate the time of arrival of a motorcycle compared with other vehicles. Results indicated that drivers estimated the arrival time of motorcycles to be later than other, larger vehicles, despite the actual arrival time being the same. These findings suggest that an 'optical illusion' may be present when drivers perceive motorcyclists, resulting in misjudgements about approach time and drivers failing to leave a large enough gap when manoeuvring in front of motorcycles at intersections.

Magazzú, Comelli, and Marinoni (2005) looked at the differences between those drivers who had a car licence and those who had both a car and motorcycle licence in terms of who is responsible for accidents involving a motorcycle and a car. The study used data collected from MAIDS (Motorcycle Accident in Depth Study) on collisions between motorcycles and four wheeled vehicles which were either the riders' or the drivers' fault. The authors found that drivers who also held a motorcycle licence were in a higher proportion of crashes where the rider, not the driver was at fault, suggesting that experience riding a motorcycle may help a driver to see a motorcyclist and to anticipate their behaviour while driving a car.

In the studies reviewed on multi-vehicle crashes, between 44% and 70% of crashes were determined to be at fault of the other driver through either self-report by the rider or police crash report data. These types of crashes (multi-vehicle involving a motorcycle) mainly occurred at intersections. Two studies (Clarke et al., 2007; Lynam et al., 2001) gave failing to look for, or looking but failing to see, the motorcyclist as a key contributing factors, while there is some evidence that experience riding a motorcycle may help a driver see and anticipate the behaviour of a motorcyclist (Magazzú et al., 2005). These findings suggest investigation into possible causes of on-road behaviours of drivers and motorcyclists is warranted.

Attitudes and behaviour

The psychological literature is replete with discussion about the factors that influence behaviour. One key theory linking attitudes and behaviour is The Theory of Planned Behaviour (Ajzen, 1988, 1991). This theory postulates that behaviour is a function of intention and perceived control; intentions represent the effort that an individual is willing to expend to enact the behaviour, while perceived control is the degree of ease or difficulty an individual associates with a given behaviour. Attitudes toward, and the subjective norm associated with, the behaviour are said to influence intention, as well as perceived control.

Motorcyclist attitudes, behaviour and crash risk

Several studies have looked at the relationship between the attitudes and on-road behaviour of motorcyclists, but few have linked these factors to crash risk. In one study, Watson, Tunnicliff, White, Schonfeld and Wishart (2007) investigated the views of motorcyclists on risky and safe riding. The authors conducted six focus groups in which motorcycle riders were asked about what behaviours constituted safe and risky riding, and the factors that influenced their riding behaviours. Safe riding was typically viewed in terms of the ability to handle the motorcycle proficiently and skilfully, and to remain aware of the changing road environment, such as road conditions and other road users. Riders also typically viewed an association between unsafe riding and "poor attitude", such as lack of respect for themselves, for others, or for their motorcycle, or doing things that they can do rather than what they should be doing on a public road. According to the Theory of Planned Behaviour, such negative attitudes would influence intentions to ride in an unsafe manner and thus execution of unsafe riding behaviours.

The relationships between attitudes toward riding, riding behaviour and crash risk of motorcyclists in the UK were investigated by Sexton, Baughan, Elliott, & Maycock (2004). A total of 11360 riders completed a questionnaire about riding experience, accidents, blame, riding behaviours and attitudes. The aspects of rider behaviour measured were traffic errors, speed, stunt, safety and control errors and the rider attitudes measured were pleasure from riding, enjoying the dynamic aspects of performance of motorcycle (speed), the convenience of riding, and the economic advantages. The authors found that riding style, as well as gaining pleasure from riding and a preference for speed were predictors of behavioural errors and subsequent accidents.

Despite the empirical evidence, rider perceptions of dangerous or risky riding might in fact be life enhancing, and may facilitate learning to ride safely. Bellaby and Lawrenson (2001) formally interviewed ten riders who visited a bike dealer and repairer in Norfolk County, England, and conducted informal discussions with others from the area about motorcycling and risk. A common theme noted was the perception that motorcycling is enjoyable and life enhancing, increasing the range of available activities. In the study by Watson et al. (2007), riders often mentioned that pushing limits was important to develop better skills as a rider, even if that meant coming off the motorcycle.

Social Identity Theory and 'strength' of attitude

In another study investigating the relationship between attitudes and behaviours of drivers, Crundall et al. (2007) surveyed 1355 UK drivers, and categorised them into four groups: with under 2 years driving experience, with 2 to 10 years driving

experience, with over 10 years driving experience, and those with over 10 years experience of both driving a car and riding a motorcycle (dual rider/drivers). Respondents completed 26 general and motorcycle-related items and the 24 items of the reduced Driver Behaviour Questionnaire (Parker, Reason, Manstead, & Stradling, 1995). Results suggested that all driver groups had higher negative attitudes towards motorcyclists compared to dual rider/drivers, with drivers in the 2 to 10 year group showing the most negative attitudes and reporting the most violations (such as driving when over the legal blood alcohol limit). For female drivers with over 10 years driving experience, negative attitudes were slightly lower than females with less driving experience, yet males only showed a slight decrease in negative attitudes as their driving experience increased.

One theory that may help understand the differences between drivers and riders in attitudes towards motorcyclists is Tajfel and Turner's (1979, 1986) Social Identity Theory. This theory postulates that an individual's identity is developed through drawing attention to the positive characteristics they have in common with groups to which they are a member (in-group) and distinguishing themselves from the negative characteristics of groups they do not belong to (out-group). Thus motorcycle riders and car drivers may distinguish themselves from each other in terms of their likeliness with other 'in-group' members (riders and drivers, respectively), which in turn influences attitudes toward the 'other'. In the Crundall et al. (2007) study, drivers with 2 to 10 years driving experience may strongly identify with their 'in-group' (i.e. drivers) and thus hold particularly negative attitudes toward motorcyclists.

Another theory that may be tied in with Social Identity Theory is Attitude Accessibility Theory (Fazio, 1986). This theory proposes that an attitude must be readily accessible in order for it to influence behaviour; stronger attitudes are said to be more likely accessible. Perhaps riders that strongly identify with the in-group possess stronger attitudes toward riding and appropriate behaviours of riders, and thus their attitudes are more readily accessible and have a greater influence on their behaviour.

Perception of crash risk

There is evidence to suggest that drivers and riders perceive situations differently in terms of crash risk. In one French study (Banet & Bellet, 2008), 11 car drivers and 10 motorcyclists were shown 21 short videos of driving situations where risk of collision was evident. Respondents stopped the video when they felt the situation became critical, and later rated the situation's level of 'criticalness'. Interestingly, the results show that drivers rated on average the situations as more critical and stopped the video earlier than riders. However, when respondents were presented situations that may be more risky for drivers than riders (e.g. collisions with fixed objects that riders could easily manoeuvre around), riders tended to judge a situation more critical than drivers when the weather was unfavourable, when involving vulnerable objects (such as pedestrians or bicycles) or when crossing an intersection.

In another, UK-based study, Horswill and Helman (2003) looked at whether the differences between riders and drivers persisted when motorcyclists drove a car. One-hundred and six motorcyclists and 56 car drivers (with no motorcycling experience) completed paper- and video-based tests measuring hazard perception, closeness of following the vehicle in front, gap acceptance, overtaking and speed. Half the motorcyclists completed the tests as if they were driving a motorcycle, with half as if they were driving a car. Motorcyclists completing the tests as drivers tended to allow a larger gap for manoeuvring and had better hazard perception than car drivers. Conversely, those completing the tests as motorcycle riders preferred to go faster, pull

out into smaller gaps, and overtake more often than both 'car driver' groups. No differences between groups in attitudes to riding or driving were noted. The laboratory based methods were later replicated in field studies, with consistent results. The findings of this and the study by Banet and Bellet (2008) suggest that experience riding a motorcycle may alter hazard perception when driving a car.

Summary and conclusions

Riding a motorcycle inherently carries a greater risk of severe road trauma than other forms of on-road motorised transport. While factors such as age, alcohol and unfamiliarity with the motorcycle can increase motorcyclist crash risk, on-road behaviour is also an important determinant in whether or not a motorcyclist is involved in a crash. Conflict between motorcyclists and drivers of other vehicles poses a particularly high threat to motorcyclist safety.

The findings of this literature review suggest that a large proportion of motorcycle crashes involve more than one vehicle, with mixed results as to the attribution of blame. Where multi-vehicle crashes occur at an intersection, cause is often attributed to a motorist failing to see or appropriately react to the motorcyclist. This latter cause may be the result of a driver inaccurately perceiving the arrival time of the motorcyclist.

Investigations of the relationship between on-road attitudes, behaviour and motorcyclist crash risk have been limited, yet there is some evidence to suggest that attitudes toward motorcyclists and toward motorcycling may influence the likelihood of a motorcyclists' involvement in a crash. Riders with "poor attitudes" such as a lack of respect for others on the road and a preference for speed may have a greater likelihood of engaging in behavioural errors and subsequent crashes. Inexperienced drivers tend to show more negative attitudes toward motorcyclists, and the most driving violations, which may in turn increase their likelihood of being involved in a crash. Yet more research is warranted.

Finally, perception of crash risk appears to differ between riders and drivers. Generally speaking, drivers appear to perceive potentially dangerous situations as more risky than riders, with riders perceiving situations as more risky when the weather is poor or when crossing an intersection. Perhaps riders, understanding the greater acceleration and manoeuvrability of a motorcycle, believe they can avoid a potentially dangerous situation more easily, unless factors such as weather and particular road conditions are involved. It also appears that the skills acquired as a motorcyclist carry over to driving situations, with drivers who have riding experience better at perceiving and reacting to motorcyclists when driving.

Given that the Theory of Planned Behaviour (Ajzen, 1988, 1991) postulates that behaviour is a function of intention and perceived control, and attitudes toward and the subjective norm associated with the behaviour are said to influence the intention and perceived control, we would expect in this current study that attitudes would influence behaviour. Specifically the riders with "poor attitudes" towards other road users would more frequently exhibit behaviours on the road that are associated with crashes. Subsequently these riders would have recorded more crashes than those riders who have a more positive attitude. Similarly, we would expect to find those who drive a car only (don't ride) who have a negative attitude to motorcycle riders would also display behaviours on the road which negatively impact riders, and as a result would have had more crashes with motorcyclists than those with more positive attitudes.

Section B: Method

Method summary

Following a thorough review of existing literature and review of focus group data, a database of potential questions was developed and reviewed by staff at VicRoads. Questions were refined as required and piloted via an online survey. Further refinement of the questions using pilot feedback resulted in a final survey of 48 items in total.

An online survey methodology was used for data collection. Potential respondents from existing databases were invited to participate via email, with additional respondents sourced from a number of different websites, as well as from a professional respondent recruitment organisation.

Data were collected over a four week period, with real-time reports available online throughout the duration of the project.

Detailed methodology

Focus groups

Focus group discussion guides were developed following the literature review and the initial consultation process (The focus group discussion guide appears in Appendix A).

Two focus groups were conducted on two consecutive evenings at the UltraFeedback office in Eltham. Participants received \$50 each for their contribution. The first was held on Wednesday 2 September, and comprised motorcycle riders sourced from an existing database¹. The second focus group was held on Thursday 3 September, and comprised drivers sourced via word-of-mouth².

Key themes arising from the motorcycle riders' focus group included:

- a perceived deterioration of respect on the roads overall, including respect for motorcyclists;
- an excess of "visual clutter" including street signs;
- a perceived lack of awareness of motorcyclists generally;
- the perception that motorists generally are not aware of their surroundings, do not perform all appropriate checks before manoeuvring, and are too easily distracted by mobile phones and GPS systems;
- the perception that passing a driving licence test should encompass more detailed driver training, similar to what is undertaken in motorcycle licence testing;
- the view that motorcyclists tend to treat other road users as a potential hazard to their own safety, and that the behaviour or inattention of other road users largely contributes to an increased risk of a motorcyclist being in a crash;

1 Motorcycle riders were sourced from participants in the VicRoads Motorcyclist Exposure on Victorian Roads project conducted in 2007, who agreed to participate in future road safety research.

2 Drivers were recruited by UltraFeedback staff from their own networks of friends, family and colleagues.

- the perception that drivers of larger vehicles are unable to judge the speed or distance of a motorcycle;
- the view that motorcyclists lane-split through stationary traffic for safety reasons, to minimise the number of potential threats surrounding them, and to avoid breathing in excessive car exhaust fumes; and
- the perception that it is inevitable that a motorcyclist will be involved in a crash or near miss at some point during their riding career.

Perceptions of car drivers differed from those of motorcycle riders. Key themes arising from the drivers' focus group included:

- the perception that there is a considerable amount of aggression and lack of courtesy on Victorian roads, particularly in relation to other countries;
- the perception that motorcyclists are difficult to see;
- the perception that motorcyclists are frustrating and dangerous when they 'make their own rules' by weaving in and out of traffic then expecting drivers to allow them to merge back into a lane;
- acknowledgement that riders are more vulnerable than drivers and are likely to come off "second best" in an accident;
- the perception that drivers are not taught to be aware of motorcyclists, or how to judge their behaviour, speed or distance;
- the view that motorcyclists can react to a situation quicker than a car driver, and that motorcyclists can stop more quickly than a car driver;
- a perception that motorcyclists compensate for the behaviour of other drivers on the road, that they must ride in response to the behaviour of other motorists and ride predictably because motorists play a significant role in motorcycle crashes;
- the perception that great care and awareness is needed around motorcyclists without adequate protective gear (i.e. who ride in jeans and t-shirt); and
- a high perceived likelihood of a motorcyclist being involved an accident during their riding career.

Pilot instrument development

Data gathered from the literature review and focus groups guided the development of a body of potential questions. Literature and focus group data suggested that attitudes and behaviours may differ according to the type of vehicle driven; for example, truck drivers' perceptions of road users may differ if they spend more hours on the road, or have undergone different licence training or testing. As a result, questions were developed that targeted *car* drivers specifically.

Draft questions were reviewed by a number of VicRoads staff, and were refined as required.

The pilot study was conducted online between 28 September and 5 October 2009. Respondents were sourced from an existing database of motorcycle riders and UltraFeedback contacts. Feedback from pilot respondents prompted further refinement of the instrument, with the final survey version approved by VicRoads (Appendix B).

Sampling

At 31 March 2009, there were 147,600 motorcycles and 3,178,777 cars³ registered in Victoria (Australian Bureau of Statistics [ABS], 2009a). The populations of interest (motorcycle riders and car drivers) therefore approximate, and may exceed, 100,000. With a population of this size, a sample of 400 would allow generalisability of findings to the total (heterogeneous) population, while allowing for a sampling error of $\pm 5\%$ (Yamane, 1967). The total sample of 1147 respondents, comprising 558 riders and 559 drivers, exceeds minimum sample requirements; thus inferences about Victorian riders and drivers can be made with a high degree of confidence.

Sources of data

With no existing database of respondents from which a truly representative sample of Victorian motorcycle riders and car drivers could be drawn, UltraFeedback identified a number of different sources of respondents that would provide an overall sample to broadly represent the desired subpopulations. These sources are described below.

Motorcyclist Exposure Project

The VicRoads Motorcyclist Exposure on Victorian Roads project, conducted in 2007, provided an existing database of 710 motorcycle riders who had agreed to participate in future road safety research. Of these, 283 responded to the current survey. These individuals comprised 25% of the total sample; 47% of riders, and 1% of drivers⁴.

Word of Mouth

This group comprised respondents who reported hearing about the survey via a friend, colleague or family member. A total of 118 respondents (10% of the total sample) make up this group. These individuals comprised 9% of riders and 12% of drivers.

Facebook

The social networking website Facebook has more than 1.5 million users residing within 80km of Melbourne. An advertisement for the survey (Appendix C), targeting these 1.5 million users, was placed on Facebook between 9 and 15 November 2009. A total of 685 clicks were recorded, with 274 respondents (24% of the total sample) completing the survey. These individuals comprised 4% of riders and 45% of drivers.

³ The term 'cars' is used to describe 'passenger vehicles', classified as "Motor vehicles constructed primarily for the carriage of persons and containing up to nine seats (including the driver's seat). Included are cars, station wagons, four-wheel drive passenger vehicles and forward-control passenger vehicles. Excluded are campervans." (p. 26)

⁴ Eight riders who participated in the Motorcyclist Exposure Project no longer rode a motorcycle and thus completed the survey as a 'current driver only'.

Various websites

This group of 96 respondents (10% of the total sample) comprised those who heard about the survey via a number of different websites. A number of riders in the 'Motorcyclist Exposure Project' group described above posted a link to the survey on websites such as netrider (netrider.net.au), Bike Deadline (bikedeadline.com.au), Auto Deadline (autodeadline.com.au), and Motorcycling Australia (ma.org.au). A link to the survey was also posted on the 'Road Safety' page of the RACV website (racv.com.au). These individuals comprised 14% of riders and 3% of drivers.

Survey Sampling International (SSI)

SSI are an international respondent sampling organisation specialising in recruitment for survey research. In the final week of data collection, UltraFeedback approached SSI to provide a list of potential respondents with appropriate demographic characteristics to complete the representative sample of Victorian motorcycle riders and car drivers. A total of 89 respondents (8% of the total sample) were recruited by this means. These individuals comprised 1% of riders and 15% of drivers.

Other

This group of 287 respondents (23% of the total sample) comprised those who reported hearing about the survey via an 'other' (unspecified) source, or who did not answer the question asking where they heard about the survey. These individuals represented 26% of riders and 25% of drivers.

Incentives

A lottery type incentive was offered to respondents. Respondents who completed at least 32% of the survey questions (i.e. who provided opinions as well as demographic information) were entered into the draw to win one of two gift vouchers valued at \$250 each. Respondents sourced from SSI were not entered into the draw as their incentive took the form of points from SSI. UltraFeedback employees and their family members were also removed. The draw took place on 7 December 2009 at the UltraFeedback Sydney office, and winners were notified via email on 21 December 2009. Incentives were discussed with VicRoads during development of the project.

Selection bias

In order to minimise possible selection biases, respondents were sought from a range of sources. Basic demographic characteristics of respondents, such as age, gender, and residential location (i.e. metro/rural) were monitored throughout the recruitment process to ensure a final sample of respondents that represented the Victorian population.

While vehicle registration and licensing databases provide basic information about the number of registered vehicles and licence holders in Victoria, there is, to be best of our knowledge, no reliable source of detailed demographic information about motorcycle riders and car drivers who currently ride or drive on Victorian roads. As such, Australian Bureau of Statistics population data from the 2006 census (ABS, 2009b) were used to estimate the required demographic breakdown needed to make up a representative sample. ABS demographic characteristics of interest were gender (49% male), age group (38% aged 18 to 44; 32% aged 45 to 75), and region (73% resident in the Melbourne area). Further, the VicRoads Motorcyclist Exposure project indicated

that males comprise the vast majority of the Victorian motorcyclist population (total “unique” respondents: n=1186, male respondents: n=1045 [89%]). It was therefore anticipated that for the current project, a representative sample of Victorian motorcyclists would be comprised of approximately 90% males.

Methodological limitations

A key methodological limitation for this project is the difficulty in randomly selecting a sample of Victorian motorcycle riders and car drivers from the true, total population. The final sample size and the range of sources from which respondents were obtained do, however, increase confidence that a good range of respondents across motorcycle riders and car drivers have been included.

Another limitation to this project is the self-report nature of the data collected. The issues associated with self-reports are acknowledged across many types of research, as respondents may make mistakes, provide inaccurate data, or respond in a manner that makes them appear more ‘socially desirable’. Such inconsistencies are accounted for, to some degree, in analyses (e.g. removal of outlying and duplicate cases). Overall, however, UltraFeedback is confident that the potential risk of inaccurate data is relatively minimal for this project.

Data collection

All data were collected using an online methodology. Three different approaches were used.

Approach 1:

Where a database of existing respondents was available to UltraFeedback, potential respondents were invited to participate via email. The email briefly described the aims of the study, incentives offered, approximate completion time and contact details where questions could be directed. A brief outline of where their details were obtained from was also included.

Respondents accessed the survey homepage via a web link included in the emailed invitation. This link was personalised for each respondent, containing their own unique login details. Responses were entered by clicking the relevant options or typing in relevant information, and were automatically saved upon moving to the next page. Respondents were routed through the survey, only seeing questions specific to their situation (e.g. car drivers were not shown questions about motorcycling).

Respondents who participated in the Motorcyclist Exposure project were captured this way.

Approach 2:

Where a database of existing respondents was not available, another method of recruitment was required. Here, potential respondents accessed the survey homepage via a circulated or advertised link posted on online discussion boards, embedded in banner ads, or forwarded via email.

The survey homepage contained information about the survey, similar to that appearing in the email invitation outlined above. Once on this page, respondents clicked a button to generate their own unique login, and then logged into the survey.

The first question was mandatory, and asked for a valid email address which would be used for validation purposes only. The survey was then completed as per approach 1 above.

Respondents from the 'word of mouth', 'Facebook', 'various websites' and some of the 'other' groups were captured this way.

Approach 3:

Toward the end of the data collection period, the sample was 'topped up' with a purchased list of respondents from SSI to ensure an adequate representation of Victorian riders and drivers. Here, a list 5000 survey links containing unique login details for each potential respondent was emailed to SSI. SSI staff then located potential respondents from their databases who matched the sample requirements and emailed an invitation to participate. From here, participation was as per approach 2.

Sample overview

At the conclusion of data collection, a total of 1251 respondents had been recorded. Of these, 29 did not currently ride a motorcycle or drive a car on Victorian roads, while a further 75 provided minimal data (e.g. demographic information only) and were excluded from further analyses. Data from a total of 1147 respondents remained.

The final sample comprised 588 respondents (51%) who currently rode a motorcycle on Victorian roads. Of these, 560 (95% of riders, 49% of the total sample) reported that they also currently drive a car on Victorian roads, while 28 (5% of riders, 2% of the total sample) did not currently drive a car. Further, 559 respondents (49%) currently drove a car on Victorian roads but did not currently ride a motorcycle; of these, 86 (15% of drivers) reported that they had ridden a motorcycle on public roads 3 or more years ago, while 30 (5% of drivers) reported that they had ridden a motorcycle on public roads less than 3 years ago.

Riders:

- Gender: The majority (93%) of riders were male.
- Age: The average age of riders was 44.7 years, with age ranging from 19 years to 69 or older.
- Region: A total of 74% of riders reported living in a metropolitan area.

Drivers:

- Gender: Just under half (42%) of drivers were male.
- Age: The average age of drivers was 42 years, with the youngest driver 18 years and the oldest 69 years or older.
- Region: Most drivers (75%) live in a metropolitan area.

The age and regional characteristics of riders closely approximates those of the Victorian population generally, with gender closely approximating the anticipated proportion of 90% males. The demographic characteristics of drivers also closely approximate those of the Victorian population generally. Overall, the sample was considered sufficiently representative of the anticipated population of Victorian riders and drivers.

More detailed characteristics of both riders and drivers can be found in Section C, and in Appendix D.

Section C: Results

The results section comprises two parts: General and Advanced. The General section outlines basic summary statistics that give an overall snapshot of the findings. The Advanced section provides more sophisticated statistical analyses that reveal further insights into the data collected.

Respondents were shown questions that were appropriate to their individual characteristics and answers to previous questions. Thus few respondents completed all questions.

Part 1: General findings

The majority of respondents were current drivers (98%) with 49% being both a current driver and a current rider and 49% being a current driver only (*Figure 1*).

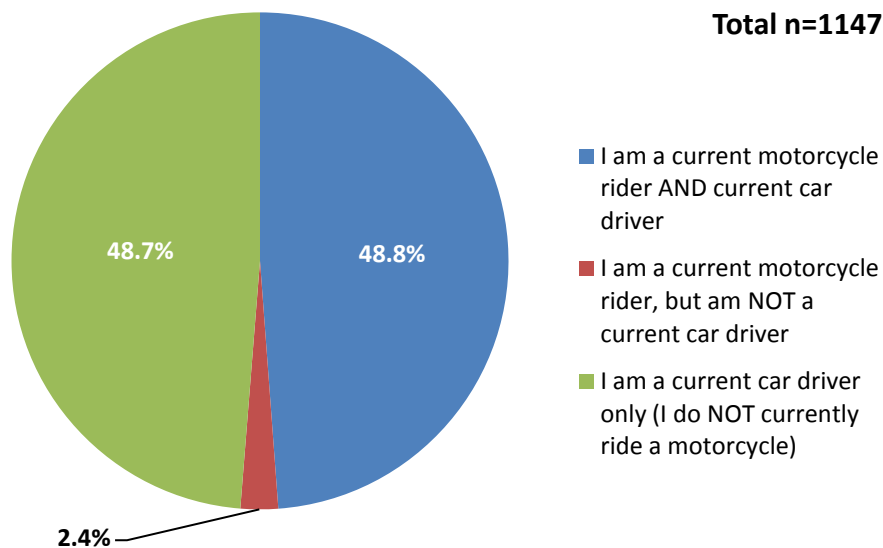


Figure 1: What is your current on-road status?

Characteristics of riders

Most riders (75%) were married or in a de facto relationship, with just under half (40%) having dependent children. The majority of riders (92%) had a full motorcycle licence, and almost two-thirds (64%) had at least 10 years riding experience.

Over a third (37%) of riders had taken a two day motorcycle learner permit/licence course and testing. Almost 18% had not undertaken professional or commercial riding training (*Figure 2*).

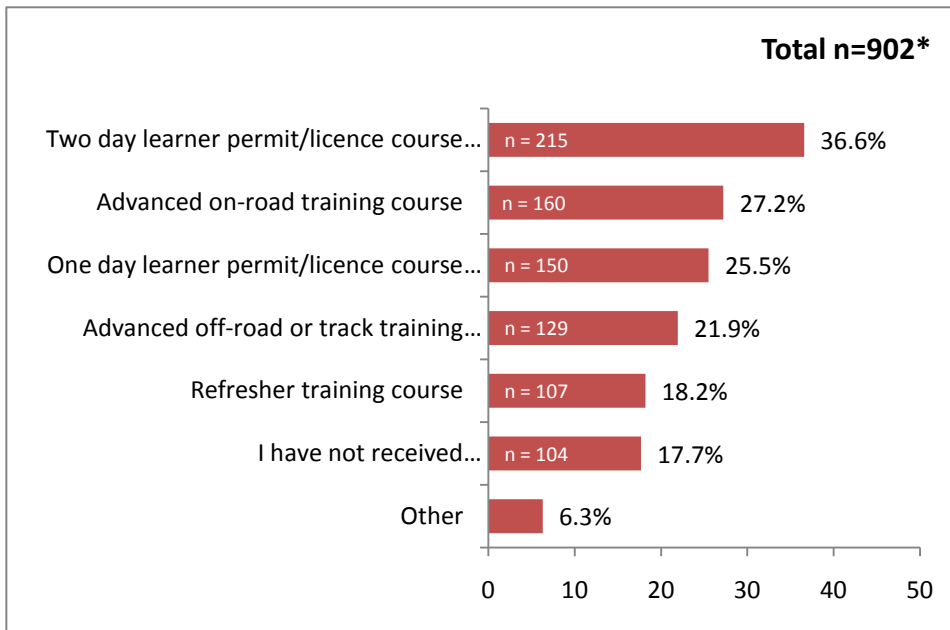


Figure 2: Motorcyclists: What professional (i.e. commercial) riding courses have you attended?

* Note: Respondents could select more than one response.

The main bike type ridden varied, with sports bikes and sports tourers the most popular. Together sports bikes and sports tourers were ridden by 45% of riders (Table 1).

What sort of machine is the PRIMARY or MAIN motorcycle that you ride?		
	N	Percent (%)
Scooter	23	3.9
Naked (Standard)	99	17.0
Sports Bike	142	24.3
Dual Sport	34	5.8
Tourer	42	7.2
Cruiser	72	12.3
Trail/Enduro	28	4.8
Other	18	3.1
Sports tourer	126	21.6
Total	584	100.0

Table 1: Motorcyclists: What sort of machine is the PRIMARY or MAIN motorcycle that you ride?

Most riders (75%) ride a motorcycle on public roads 10 hours per week or less

(Table 2).

On average, how many hours do you ride a motorcycle on public roads each week?

	N	Percent (%)
Less than 1	42	7.3
1-5	192	33.4
6-10	195	33.9
11-15	78	13.6
16-20	43	7.5
21-30	19	3.3
31-40	3	0.5
More than 40	3	0.5
Total	575	100.0

Table 2: Motorcyclists: On average, how many hours do you ride a motorcycle on public roads each week?

The rider sample showed a relatively even spread of those who ride most days and those who ride less frequently (Figure 3).

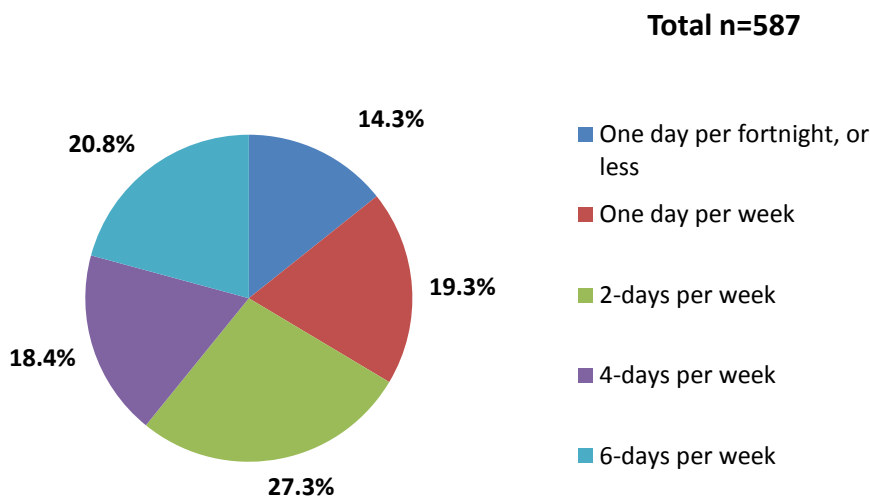


Figure 3: Motorcyclists: How often do you currently ride a motorcycle?

Just over 65% of riders reported 'rarely' or 'never' carrying a pillion.

The majority of riders generally ride on main or arterial regional/rural roads (63%), local metropolitan streets (62%) and freeways or highways (60%). Only 19% of riders generally ride on dirt roads (Figure 4).

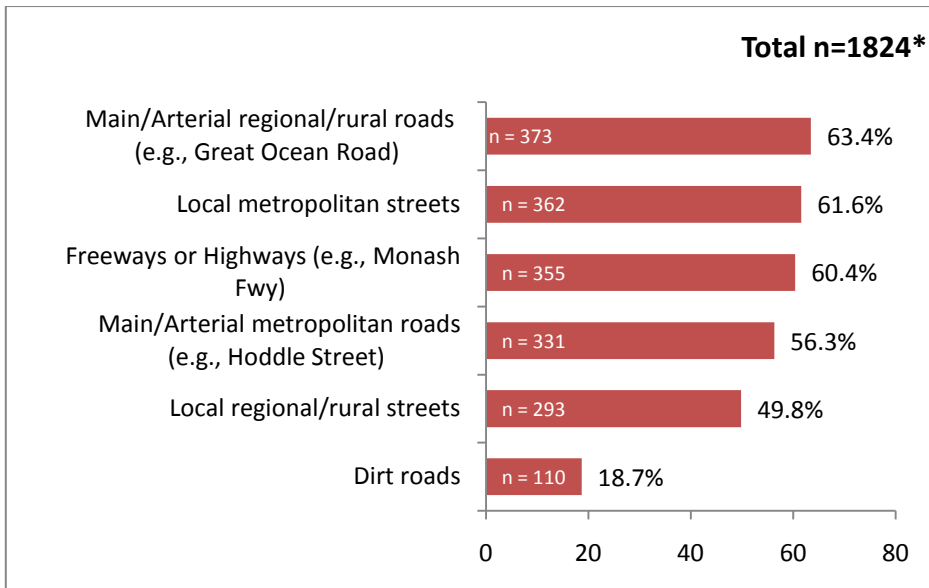


Figure 4: Motorcyclists: On what sort of roads do you generally ride on?

* Note: Respondents could select more than one response.

Riders as car drivers

Most riders (97%) reported having a full car licence, with 91% having at least 10 years driving experience. A total of 353 (61%) had received driving lessons with a professional instructor, while 147 (25%) reported having no professional driving training.

Sedans and four wheel drive vehicles are the most commonly driven cars among the rider subsample, comprising 31% and 20% respectively (*Table 3*).

What sort of machine is the PRIMARY or MAIN car that you drive?

	N	Percent (%)
Sedan	174	31.2
Four wheel drive (includes S.U.V.)	109	19.6
Hatchback	78	14.0
Station wagon	62	11.1
Ute	55	9.9
Sports car	46	8.3
Other	18	3.2
Minivan	12	2.2
City car (e.g. Smart)	3	0.5
Total	557	100.0

Table 3: Motorcyclists: What sort of machine is the PRIMARY or MAIN car that you drive?

More than half (61%) of riders reported driving a car on public roads for 10 hours per week or less. Just under half (44%) drove most days, or every day, of the week.

Characteristics of drivers

Of those respondents who reported driving a car only (i.e. who did NOT currently ride a motorcycle), 62% were in a married or de facto relationship, with 40% having dependent children. The majority (92%) of car drivers held a full car driving licence, and most (83%) reported 10 or more years driving experience.

Most drivers had attended at least one type of professional driver training or instruction. A total of 417 (75%) had had lessons with a professional instructor, with 111 (20%) reporting no professional driver training (*Figure 5*).

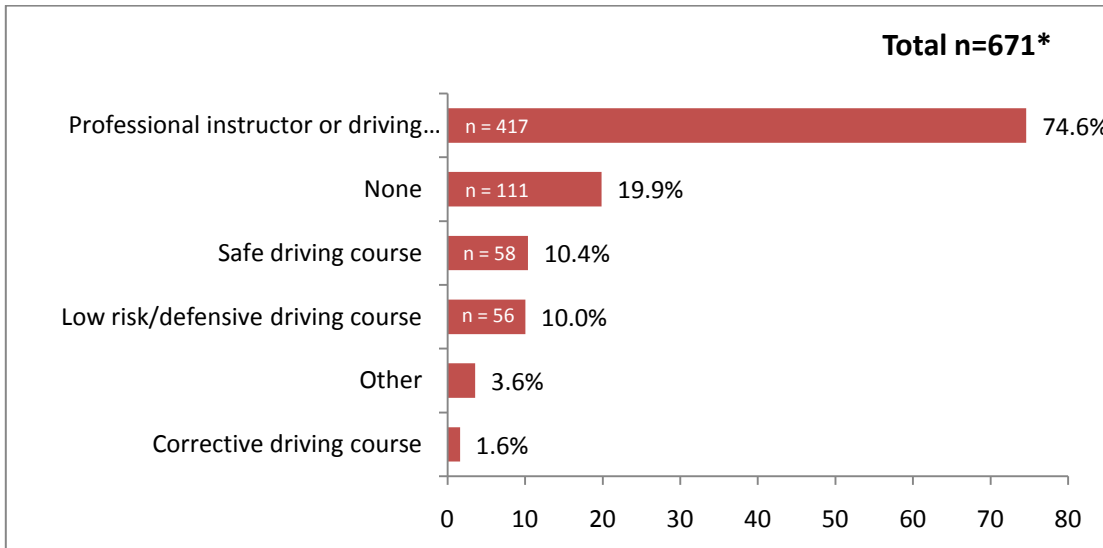


Figure 5: Car drivers: What professional (i.e. commercial) driving courses or lessons have you attended?

* Note: Respondents could select more than one response.

Most drivers drive a sedan (47%) or a hatchback (22%) (*Table 4*).

What sort of machine is the PRIMARY or MAIN car that you drive?

	N	Percent (%)
Sedan	263	47.0
Hatchback	123	22.0
Station wagon	64	11.4
Four wheel drive (inc. S.U.V.)	58	10.4
Sports car	30	5.4
Ute	12	2.1
Minivan	4	0.7
Other (please specify)	3	0.5
City car (e.g. Smart)	2	0.4
Total	559	100.0

Table 4: Car drivers: What sort of machine is the PRIMARY or MAIN car that you drive?

Most drivers drive a car on public roads less than 10 hours per week (52%) (Table 5).

On average, how many hours do you drive a car on public roads each week?

	N	Percent (%)
Less than 1	9	1.6
1-5	131	23.7
6-10	149	26.9
11-15	120	21.7
16-20	73	13.2
21-30	33	6.0
31-40	18	3.3
More than 40	20	3.6
Total	553	100.0

Table 5: Car drivers: On average, how many hours do you drive a car on public roads each week?

Most drivers reported driving a car 6 or 7 days per week (70%) (Figure 6).

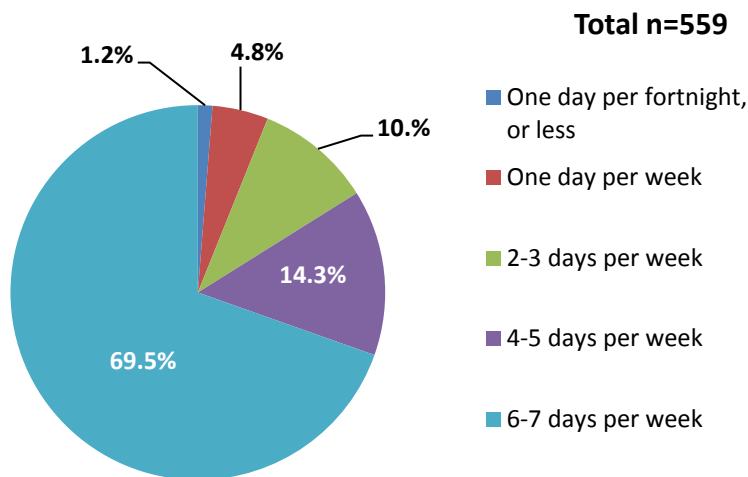


Figure 6: Car drivers: How often do you currently drive a car?

Of the 28 respondents (2%) who reported that they did not currently drive a car on Victorian roads, only three had not driven a car on public roads at all.

Of the 559 respondents who reported that they did not currently ride a motorcycle (i.e. the 'driver only' group), 116 (20%) reported having previously ridden a motorcycle on public roads, with just over half (51%) of these individuals riding a motorcycle on a public road within the last 10 years.

Attitudes toward road users, car drivers and motorcycle riders

A series of questions assessing attitudes toward road users, toward motorcyclists and toward car drivers were presented to all respondents. Questions were developed to assess attitudes that may be related to safe or unsafe on-road behaviours, and to crashes.

As the driver-only subsample contained 116 drivers (21%) who had previously ridden a motorcycle on public roads, it was questioned whether past riding experience may overly influence the overall pattern of attitudes – as well as driving behaviours, situation awareness and perceptions of motorcyclist crash risk – for drivers, and comparisons of same between the rider and driver subsamples. Analyses were therefore re-run with responses for these 116 car drivers excluded. The same pattern of findings were revealed – mean scores of the driver subsample for individual questions shifted by .1 at the most, while the pattern of (statistically) significant differences remained consistent with analyses conducted using the entire sample. These findings suggest that responses of the 116 car drivers who had previously ridden a motorcycle did not overly influence the pattern of responses of drivers generally. As such, analyses using the total sample were maintained to maximise statistical power, and are presented below.

Attitudes toward road users generally

All respondents were asked to provide their opinion about Victorian road users in general; road users were defined as car drivers, motorcyclists, taxi drivers, bus drivers, truck drivers, etc. Five questions were presented to respondents to tap their general attitude toward road users, with responses provided on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree).

On average, riders tended to moderately agree that “Most Victorian road users tend to travel over the speed limit” ($M=3.35$; $SD=1.11$). Riders tended to disagree that “Most Victorian road users are aware of what’s going on around them” ($M=2.34$; $SD=1.07$) (*Figure 7*).

Similarly, drivers also tended to agree that “Most Victorian road users tend to travel over the speed limit” ($M=3.58$; $SD=1.10$) however on average, tended to neither agree nor disagree that “Most Victorian road users are aware of what’s going on around them” ($M=2.99$; $SD=1.11$).

For all questions, the differences in mean scores for riders and drivers were statistically significant (at $\alpha=.05$).

Most Victorian road users:

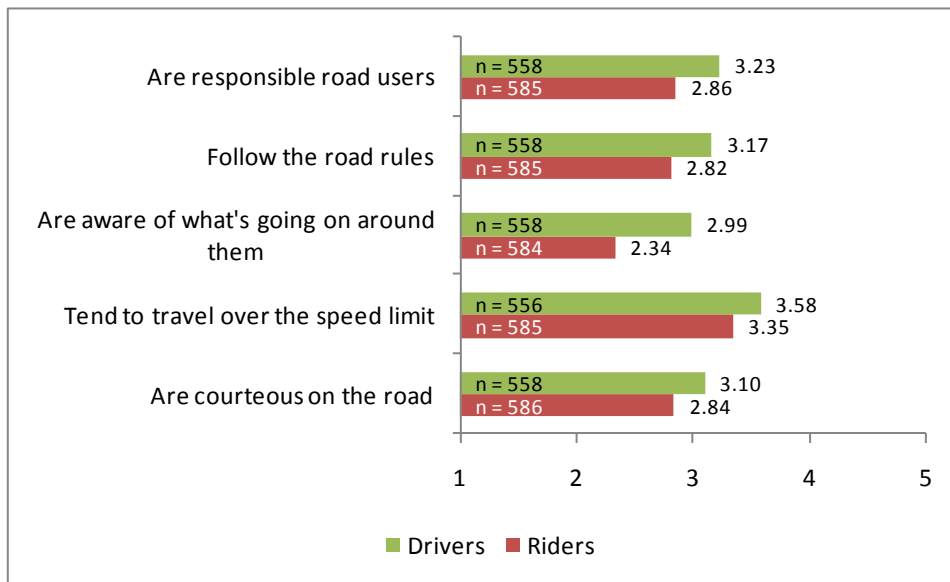


Figure 7: Comparison of driver and rider attitudes towards Victorian road users generally.

Attitudes toward motorcyclists

All respondents were asked to answer a number of questions about Victorian motorcyclists in general. Eleven questions tapped general attitudes toward motorcyclists, with responses on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). The following shows the average rating for each question; responses to the questions prefixed by "Most Victorian motorcyclists..." are presented first, followed by the questions which are preceded by the phrase "To what extent do you agree or disagree with the following statements".

Riders tended to agree strongly that "Most Victorian motorcyclists are aware of what's going on around them" (M=4.22; SD=0.92). Drivers, however, tended to agree less strongly (M=3.38; SD=0.99). Drivers tended to agree that "Most Victorian motorcyclists frequently change lanes unexpectedly" (M=3.76; SD=1.08), a sentiment not shared by riders (M=2.64; SD=1.01) (Figure 8).

For all questions, the differences in mean scores between riders and drivers were assessed using independent samples t-tests, and all differences were statistically significant (at alpha=.05).

Most Victorian motorcyclists:

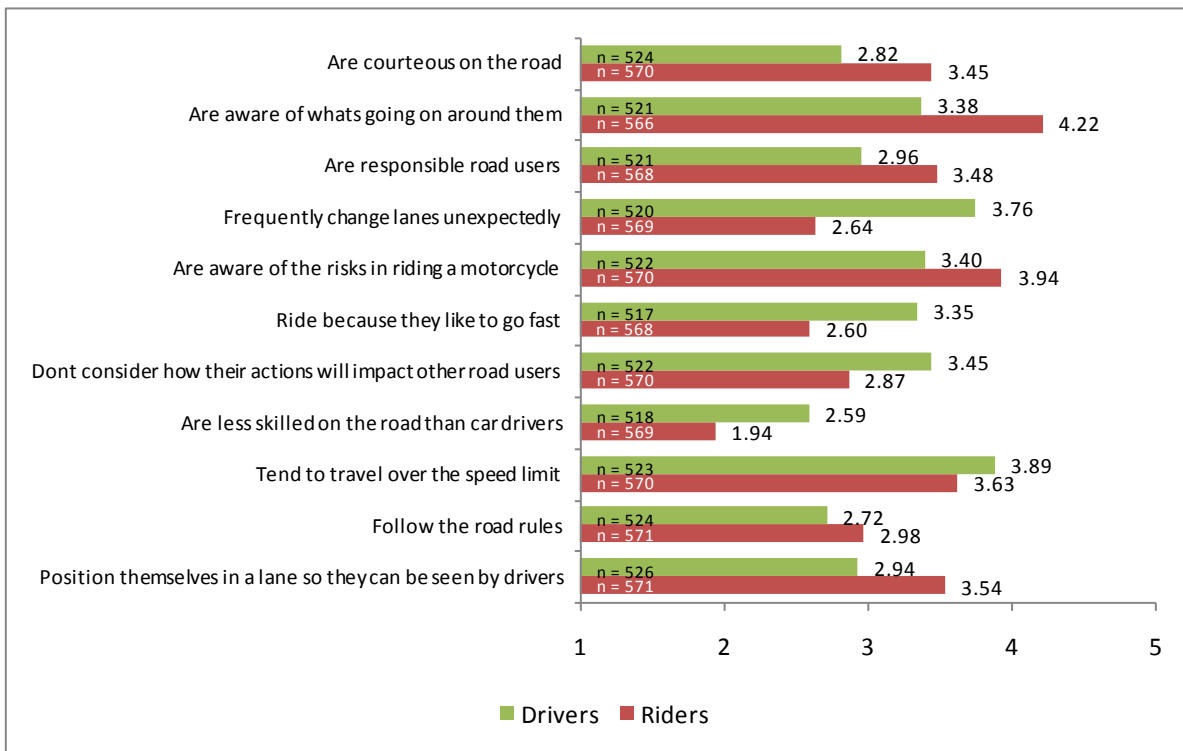


Figure 8: Comparison of driver and rider attitudes towards Victorian motorcyclists.

Drivers tended to strongly agree that “Motorcyclists who make their own lane (i.e. lane split between traffic) annoy other road users” (M=4.07; SD=1.09), yet riders tended to agree less strongly (M=3.30; SD=1.05).

Drivers tended to agree more strongly than riders that “It is inevitable that a motorcycle rider will have a crash at some point during their riding career” (drivers: M=3.51, SD=1.20; riders: M=3.12; SD=1.44). Drivers also tended to agree that “If a motorcyclist comes off their bike while turning a corner, it is most likely because they were going too fast” (M=3.23; SD=1.15) whereas riders tended to disagree (M=2.35; SD=1.29) (Figure 9).

For all questions, the differences in scores for riders and drivers were statistically significant (at alpha=.05).

To what extent do you agree or disagree with the following statements:

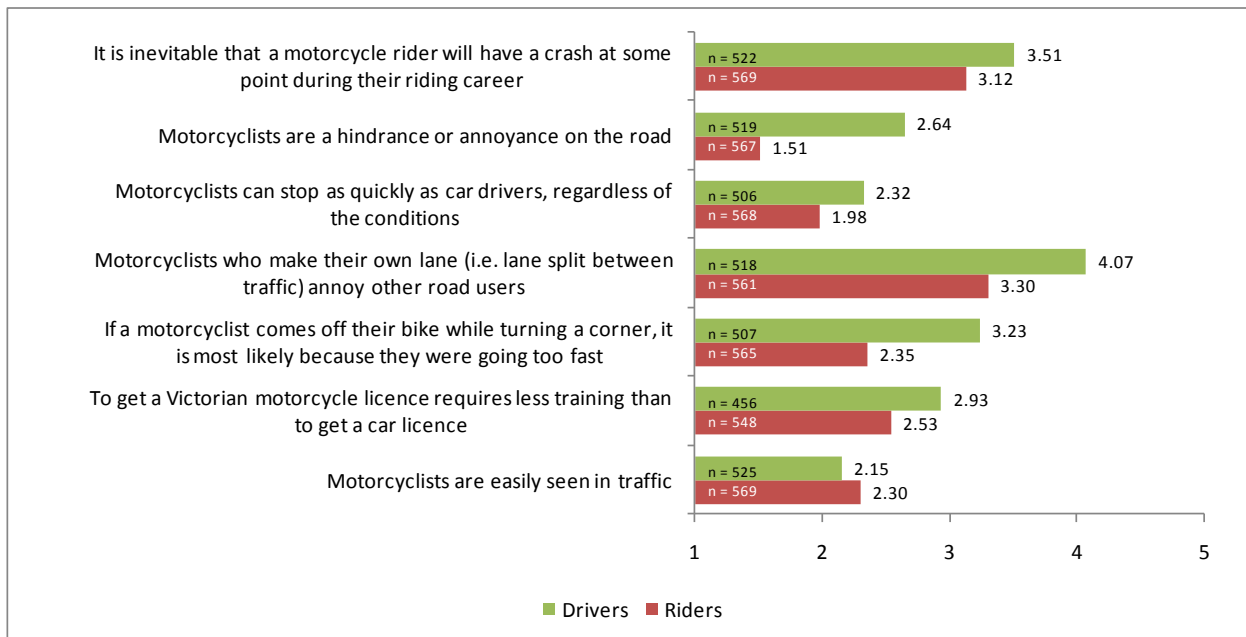


Figure 9: Comparison of driver and rider attitudes towards motorcyclists generally.

Attitudes toward car drivers

All respondents were asked about their general attitude toward car drivers in Victoria. Nine questions were presented, with responses provided on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). Responses of riders and drivers are presented below.

Riders tended to agree that “Most Victorian car drivers don’t consider how their actions will impact other road users” (M=3.68; SD=1.21); however they tended to disagree that “Most Victorian car drivers actively look for motorcyclists riding on the road” (M=1.80; SD=0.97).

Drivers tended to agree that “Most Victorian car drivers dislike motorcyclists who make their own lane (i.e. lane split between traffic)” (M=3.93; SD=1.10) and also tended to disagree that “Most Victorian car drivers actively look for motorcyclists riding on the road” (M=2.62; SD=1.04) (Figure 10).

Only one question, “Most Victorian car drivers don’t consider how their actions will impact other road users”, showed no statistically significantly different score between drivers and riders. For all other questions, the average score for drivers and riders was statistically significantly different (at alpha=0.05).

Most Victorian car drivers:

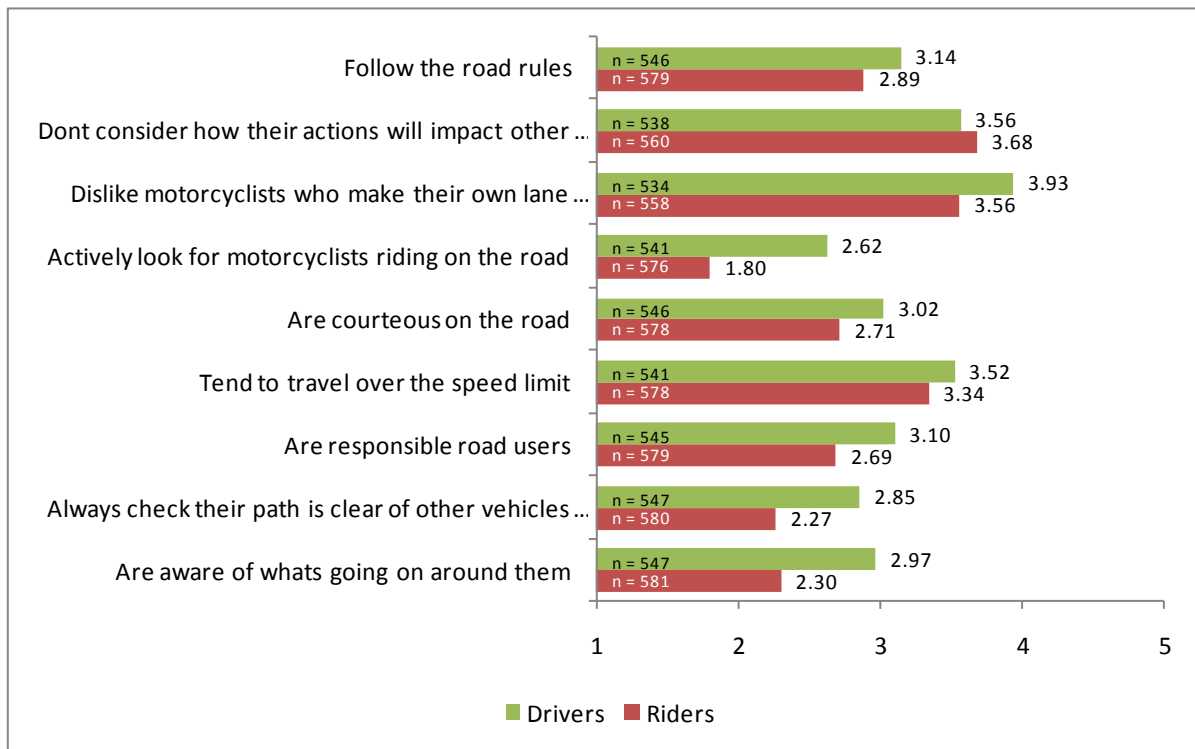


Figure 10: Comparison of driver and rider attitudes towards Victorian car drivers.

Riders tended to agree that “Driving a car takes less skill than riding a motorcycle” (M=4.07; SD=1.20) whereas drivers tended to be generally neutral in their perceptions that “Driving a car takes less skill than riding a motorcycle” (M=2.92; SD=1.33). It is possible that drivers felt they were not able to accurately answer this question due to a lack of experience riding a motorcycle (Figure 11).

For both questions, the differences in scores for riders and drivers were statistically significant (at alpha=.05).

To what extent do you agree or disagree that:

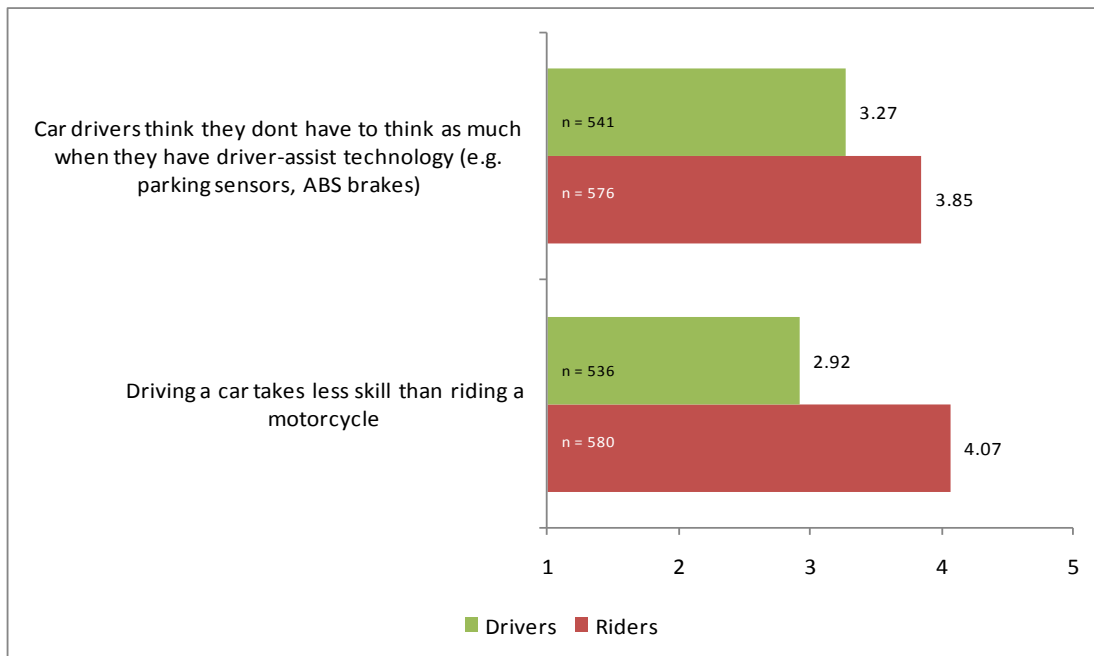


Figure 11: Comparison of driver and rider attitudes towards car drivers generally.

Comparison of rider and driver attitudes

Of the 'attitudes' questions presented above, five questions were common to each of the three road user type (i.e. "road users generally", "motorcyclists", and "car drivers"). Question prompts were:

- Most Victorian road users...
- Most Victorian motorcyclists...
- Most Victorian car drivers...

With the five questions:

- Are courteous on the road
- Are aware of what's going on around them
- Follow the road rules
- Are responsible road users
- Tend to travel over the speed limit

Each set of questions was entered into a correlation matrix to determine the degree of relationship between individual items. These correlations can be seen in Table 6.

Correlations suggested that when thinking about "road users", respondents tended to think about car drivers. In Table 6, red text highlights the correlations between corresponding "road users" questions and "car drivers" questions; all correlations are strong and statistically significant (at $\alpha < .01$). Correlations between corresponding "road users" questions and "motorcycle rider" questions are highlighted green text; all correlations are weak, suggesting that respondents tend NOT to think about motorcyclists when they think about "road users".

		Most Victorian road users...					Most Victorian car drivers...					Most Victorian motorcyclists...				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Most Victorian road users...	1	Are courteous on the road	-													
	2	Tend to travel over the speed limit	-.104**	-												
	3	Are aware of what's going on around them	.482**	-.050	-											
	4	Follow the road rules	.500**	-.179**	.615**	-										
	5	Are responsible road users	.597**	-.100**	.677**	.754**	-									
Most Victorian car drivers...	6	Are courteous on the road	.646**	.000	.393**	.443**	.505**	-								
	7	Tend to travel over the speed limit	-.024	.579**	.017	-.076*	-.013	.028	-							
	8	Are aware of what's going on around them	.416**	-.033	.642**	.519**	.560**	.564**	-.014	-						
	9	Follow the road rules	.387**	-.160**	.408**	.554**	.534**	.490**	-.147**	.518**	-					
	10	Are responsible road users	.474**	-.059*	.502**	.572**	.648**	.632**	-.032	.694**	.618**	-				
Most Victorian motorcyclists...	11	Are courteous on the road	.150**	-.041	.030	.101**	.130**	.089**	-.050	-.040	.108**	.062*	-			
	12	Tend to travel over the speed limit	.003	.284**	.031	-.044	-.039	.060*	.307**	.039	-.035	.006	-.170**	-		
	13	Are aware of what's going on around them	.060*	-.018	-.068*	.023	.029	.005	-.003	-.117**	.082**	.016	.549**	-.074*	-	
	14	Follow the road rules	.162**	-.055	.165**	.197**	.191**	.185**	-.063*	.161**	.226**	.246**	.475**	-.178**	.266**	-
	15	Are responsible road users	.117**	-.042	.006	.114**	.121**	.106**	-.032	.002	.121**	.114**	.643**	-.174**	.563**	.453**

Note: * $p < 0.05$ ** $p < 0.01$

Table 6. Correlations between attitudes questions for the total participant sample (n=1147). Strong and significant correlations between corresponding questions for "road users" and for "drivers" (red text) suggest that respondents tend to think about car drivers when they think about road users generally; weak correlations between corresponding questions for "road users" and "motorcyclists" (green text) suggest that respondents do NOT tend to think about motorcyclists when thinking about road users generally.

Motorcycle crashes and near misses

Current motorcycle riders, and drivers who had ridden a motorcycle on a public road in the past, were asked about their crash and "near miss" history while riding a motorcycle. Three question sets assessed different types of crashes or near misses, with riders reporting incidents in the past two years, as well as since they started riding.

Injury crashes

"Injury" crashes were defined as a crash where the rider or someone else had an injury requiring medical attention.

The majority of riders (both who currently ride and have ridden in the past) have not had an accident involving injury in the past 2 years (89%) (Figure 12).

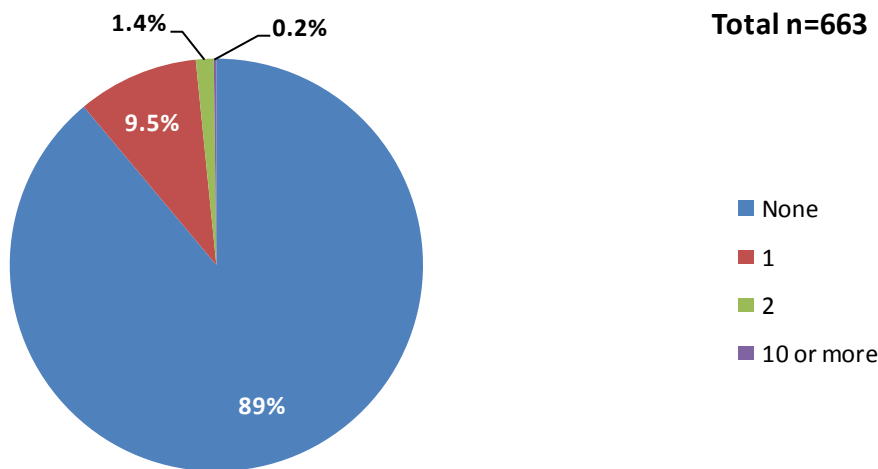


Figure 12: Number of "injury" crashes - ...in the past 2 years

Just over half of riders had not had a crash involving injury since they started riding (53%). About 10% of riders have had three or more crashes involving injury since they started riding (Figure 13).

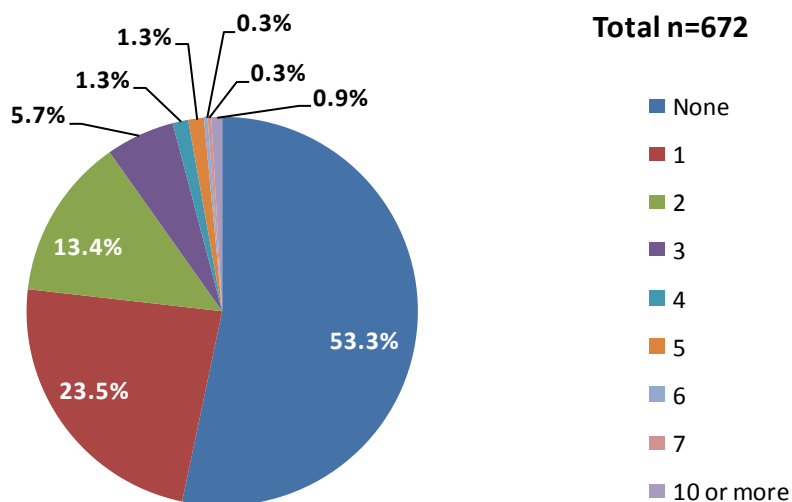


Figure 13: Number of "injury" crashes - ...since you started riding.

Damage crashes

"Damage" crashes were defined as a crash where no-one was injured (requiring medical attention) but there was serious damage to the motorcycle or another vehicle. "Serious damage" was defined as when the safety or operation of a vehicle is compromised.

The majority of riders (both who currently ride and have ridden in the past) have not had an accident involving serious damage in the past 2 years (90%) (Figure 14).

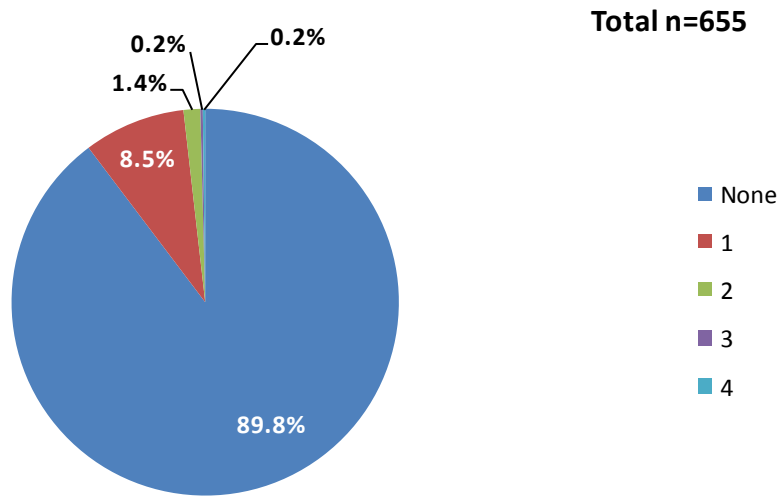


Figure 14: Number of "serious damage" crashes - ...in the past 2 years

More than half of riders have not had a crash involving serious damage since they started riding (59%). A little over 8% have had 3 or more serious crashes since they started riding (Figure 15).

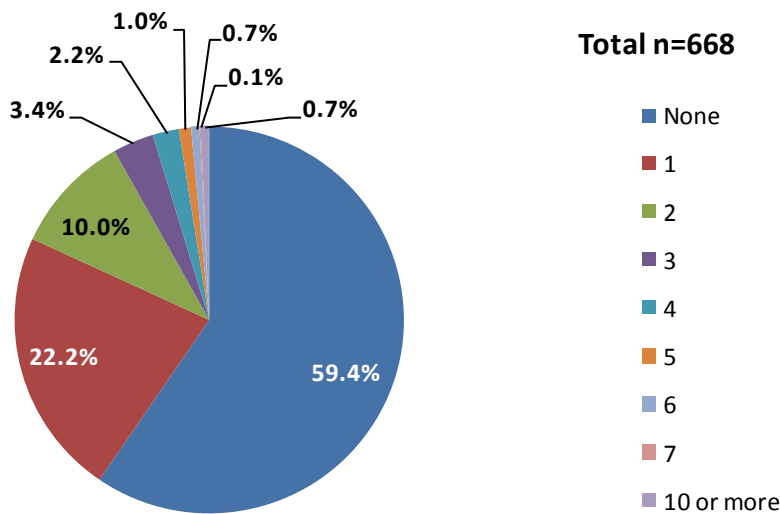


Figure 15: Number of "serious damage" crashes - ...since you started riding

Near misses

A "near miss" was defined as a situation where there were no injuries and no vehicle damage, but the rider stopped to catch their breath or check others were ok.

The majority of riders have had a near miss in the past 2 years (53%) with 5% of these having more than 10 near misses (Figure 16).

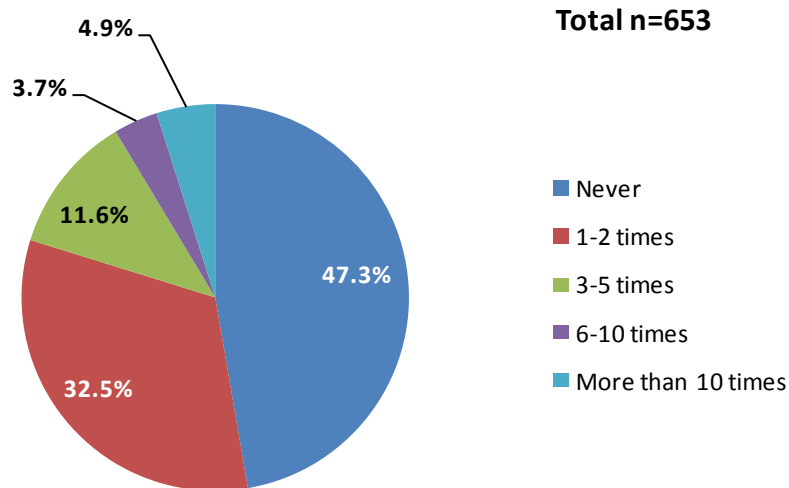


Figure 16: Number of "near misses" - ...in the past 2 years

Only 22% of riders have never had a near miss since they started riding; a similar number (22%) have had more than ten near misses since they started riding (Figure 17).

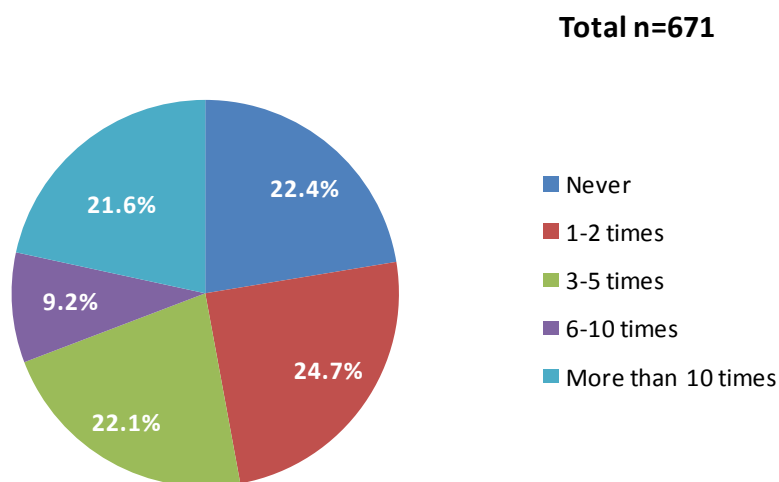


Figure 17: Number of "near misses" - ...since you started riding

Rider behaviour

Current riders and drivers who had previously ridden a motorcycle were asked a series of questions about behaviour while riding a motorcycle. Each question tapped a behaviour that may contribute to an increase in motorcyclist crash risk. Responses were provided on a 5-point scale (where 1=Never, 2=Rarely, 3=Sometimes, 4=Often, and 5=Always).

Riders indicated that in the past 12 months they have almost never ridden when they have had alcohol in their system ($M=1.31$; $SD=0.57$) or lost concentration and nearly had an accident ($M=1.48$; $SD=0.59$). Riders also indicated that in the past 12 months they almost always rode with a full complement of protective gear ($M=4.71$; $SD=0.55$) and with constant vigilance ($M=4.50$; $SD=0.90$) (*Figure 18*).

In the past 12 months as a motorcycle rider, how often have you:

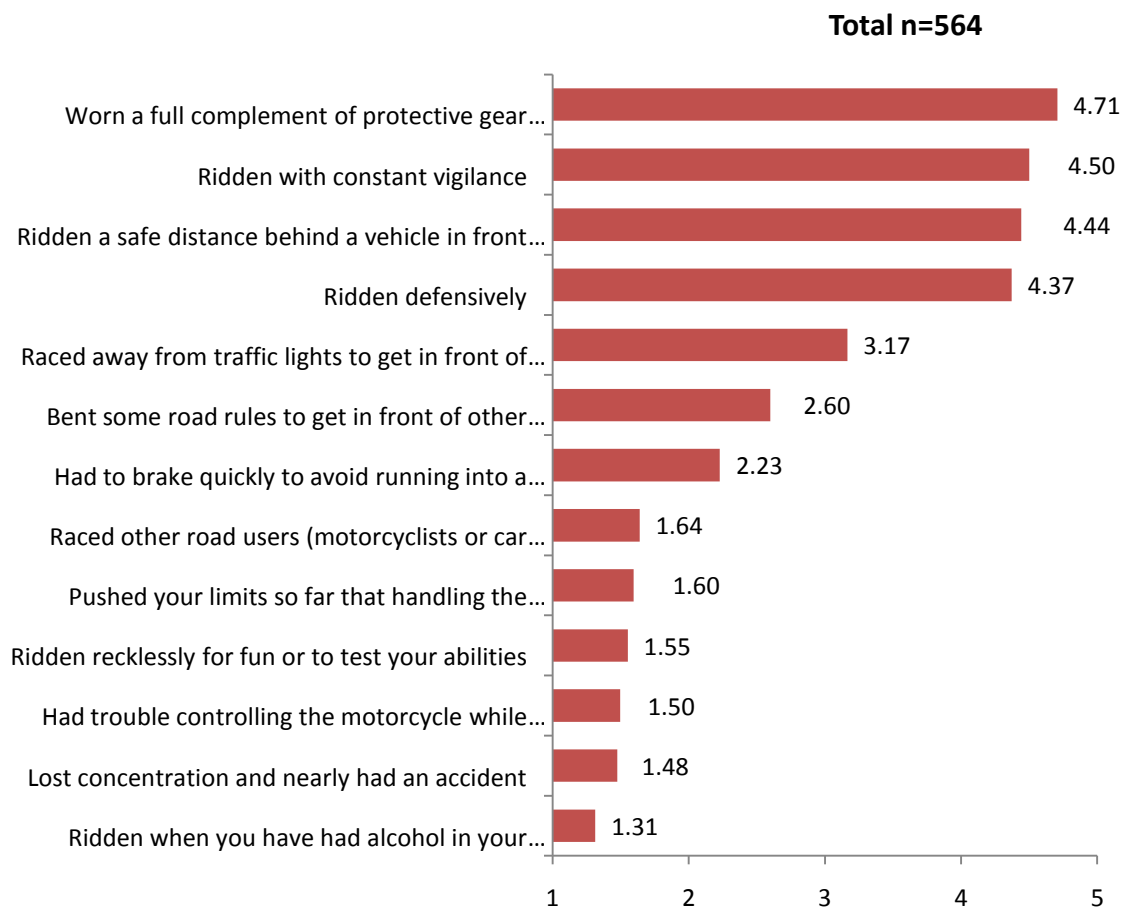


Figure 18: Mean scores of rider behaviours.

Driver behaviour

All respondents who were current drivers or had driven a car in the past were asked about their on-road behaviour while driving a car. Each question tapped a behaviour that may contribute to an increase in motorcyclist crash risk. Responses were provided on a 5-point scale (where 1=Never, 2=Rarely, 3=Sometimes, 4=Often, and 5=Always).

On average, both drivers and dual rider/drivers tended to disagree on all driver behaviour items. For most items, however, dual rider/drivers tended to disagree more strongly, with the exception of the item “paid more attention to the speedometer than what’s going on outside the car” (drivers: $M=2.29$, $SD=1.02$; dual rider/drivers: $M=2.57$, $SD=1.17$)” (Figure 19). Differences between the driver and riders groups were statistically significantly different (at $\alpha=.05$). Together these findings suggest that the self-reported driver behaviour of dual rider/drivers is safer than that of drivers (who are not current riders).

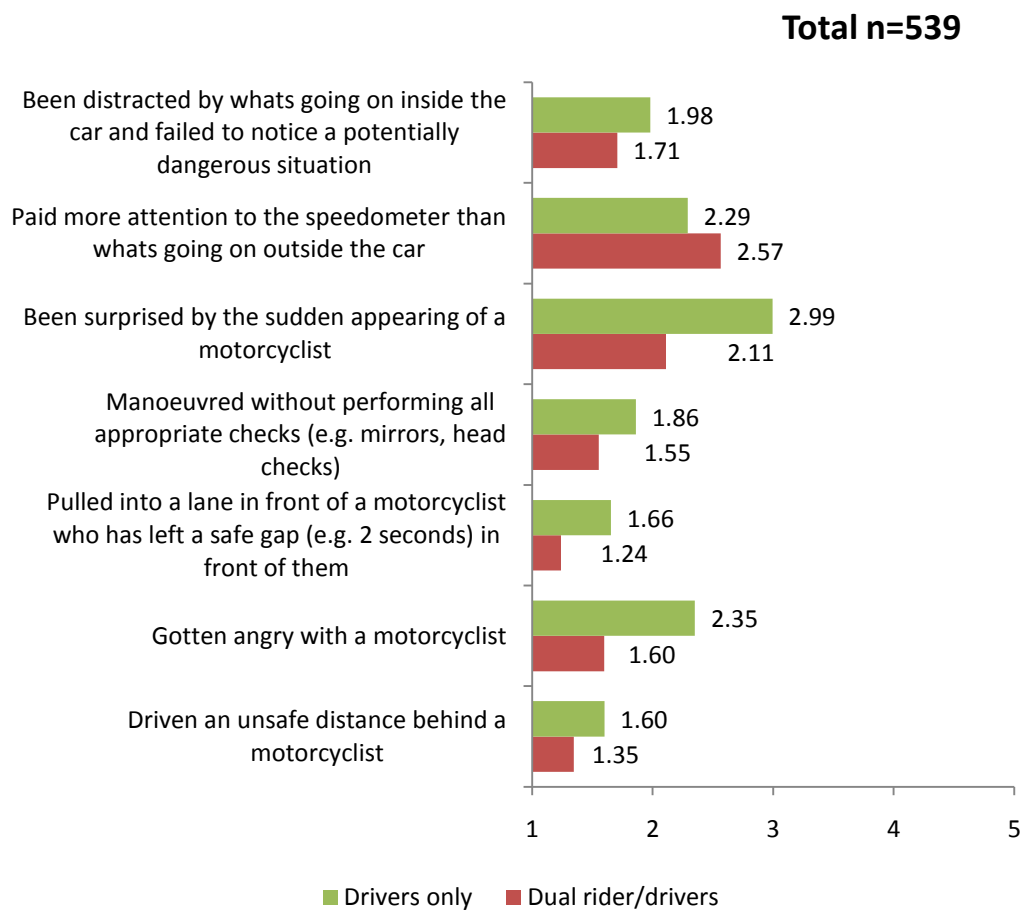


Figure 19: Driver behaviour of drivers and dual rider/drivers.

Situation awareness

Four questions, asked of both riders and drivers, assessed the extent of general awareness of motorcyclists on the road. Responses were provided on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree).

Both riders and drivers tended to agree that car drivers generally have a more obscured field of vision than motorcyclists, with riders tending to agree more strongly (riders: $M=3.73$, $SD=1.25$; drivers: $M=3.55$, $SD=1.04$). Both riders and drivers also tended to agree that drivers are unable to judge how far away a motorcyclist is (riders: $M=2.42$, $SD=1.08$; drivers: $M=2.93$, $SD=0.96$) and that drivers are unable to judge the speed of a motorcyclist (riders: $M=2.32$, $SD=1.07$; drivers: $M=2.64$, $SD=1.0$); for both questions, riders tended to agree more strongly than drivers (*Figure 20*).

For all four questions, the differences in average score for drivers and riders were statistically significant (at $\alpha=0.05$).

To what extent do you agree or disagree that car drivers generally...

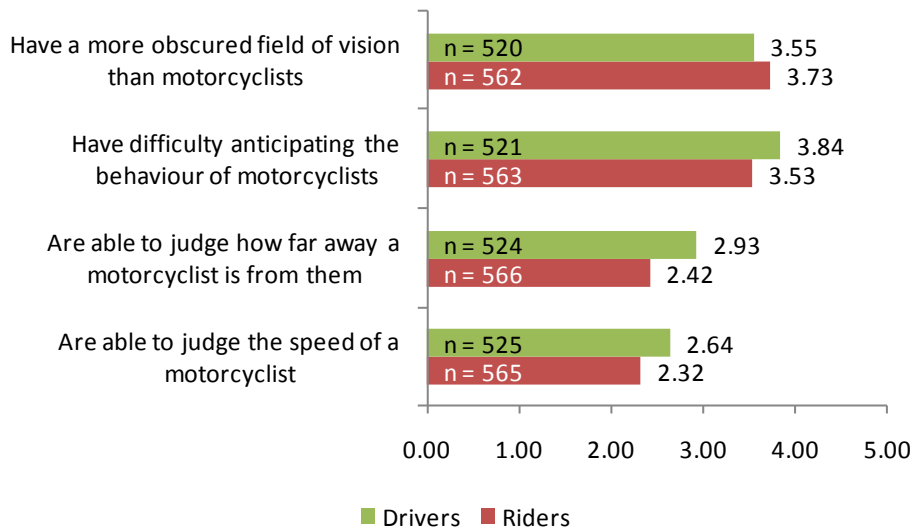


Figure 20: Comparison of perceived car driver situation awareness between riders and drivers.

Perception of crash risk

Current riders and drivers were asked a series of questions about perceived crash risk. Ten questions tapped situations that may result in a motorcyclist being involved in a crash, with riders asked to consider the likelihood that they would encounter each scenario during a typical week’s travel on their motorcycle, and drivers asked to consider the likelihood that a motorcyclist would encounter each during a typical week’s travel on a motorcycle. Responses were provided on a 5-point Likert scale from 1 (very low likelihood) to 5 (very high likelihood).

Some stark differences between riders’ perception of their own crash risk, and drivers’ perceptions of riders’ crash risk, can be noted. During a typical week’s travel, riders reported a low likelihood that they would fail to see a potentially dangerous situation (M=1.81; SD=0.88) or push their limits (M=1.82; SD=0.90). Drivers, however, report a comparatively high likelihood that a rider would fail to see a potentially dangerous situation (M=3.22; SD=0.89) and push their limits (M=3.84; SD=0.99)

Riders reported a very high likelihood that they would ride more carefully in poor weather (M=4.87; SD=0.44) and concentrate fully on the traffic and road environment around them (M=4.63; SD=0.70). Drivers, by comparison, reported a lower likelihood that riders would ride more carefully in poor weather (M=3.48; SD=1.04), and concentrate fully on their surrounding environment (M=3.56; SD=0.89). Drivers also tended to report a lower likelihood than riders that a motorcyclist would maintain correct lane positioning (M=2.69; SD=1.12 and M=4.25; SD=0.93, respectively) (Figure 21).

Differences between average scores for drivers and riders were statistically significant (at alpha=0.05) for all except 2 questions: *Encounter a driver who fails to give way*, and *Encounter poor road conditions (e.g. excessive visual clutter, poor road surfaces)*.

During a typical week's travel on your motorcycle, how likely is it that you will [that a motorcyclist will]:



Figure 21: Comparison of drivers and riders perceived motorcyclist crash risk.

Part 2: Advanced Analyses

Development of indices

To facilitate analyses and interpretation of data, summary index scores were created using combinations of relevant questions. These indices included:

- Perceived Crash Risk Index
- Riding Behaviour Index
- Attitudes toward Road Users Index
- Attitudes toward Drivers Index
- Attitudes toward Motorcyclists Index

Perceived Crash Risk Index

Step 1 involved reverse scoring relevant questions such that the scale for all related items followed the same direction (e.g. a higher score = “safer riding” or “less crash risk”). Step 2 saw corresponding items for drivers and riders combined to create new variables (refer Table 7). Thirdly, the new combined variables were entered into a principal components analysis with oblimin rotation to determine the extent to which they fit together. Items were removed and re-added in an iterative fashion until the combination of variables with the best fit and reliability (Cronbach’s alpha) resulted. Once the best mix of items was determined, the scores for each were summed and a pro-rata score between 20 and 100 determined.

A higher score on the Perceived Crash Risk Index indicates safer riding, and thus lower crash risk.

Original item shown to drivers	Reverse scored	Original item shown to riders (and combined with driver item)
<i>During a typical weeks travel, how likely do you think it is that a motorcyclist will:</i>		<i>During a typical week’s travel on your motorcycle, how likely do you think it is that you will:</i>
Abide by all road rules	No	Abide by all road rules
Concentrate fully on the traffic and road environment around them	No	Concentrate fully on the traffic and road environment around you
Fail to see a potentially dangerous situation	Yes	Fail to see a potentially dangerous situation
Maintain correct lane positioning	No	Maintain correct lane positioning
Push their limits	Yes	Push your limits
React appropriately to a dangerous situation	No	React appropriately to a dangerous situation
Ride more carefully in poor weather	No	Ride more carefully in poor weather

Table 7: Items in Perceived Crash Risk Index

Riding Behaviour Index

The Riding Behaviour Index was created using a slightly different method to that described above. As previously, step 1 involved reverse scoring relevant questions, with all riding behaviour questions entered into a principal components analysis with oblimin rotation at step 2. This analysis revealed that the items did not fit well together, that is, they were not tapping a similar construct. Variables were added and removed in an iterative fashion, but a suitable solution could not be found.

Step 3 involved determining correlations between each riding behaviour item and incidence of crashes. Correlations with all types of crashes (injury crashes in the past two years and since riding, damage crashes in the past two years and since riding) were low, likely because the vast majority of riders had experienced none or a small number of crashes. Riding behaviour items that were most highly correlated with each other were flagged as potential items to include in the index.

At step 4, all items were entered into a reliability analysis and Cronbach's alpha determined. Items were removed one at a time until 6 items remained and provided the greatest alpha (.607). Step 5 involved summing these items and determining a pro-rate score between 20 and 100. Items comprising this index are shown in Table 8.

A higher score on the Rider Behaviour Index indicates more risky, and therefore more dangerous, riding behaviour.

Original item	Reverse scored
<i>In the past 12 months as a motorcycle rider, how often have you:</i>	
Ridden a safe distance behind a vehicle in front of you	No
Raced other road users (motorcyclists or car drivers)	Yes
Had to brake quickly to avoid running into a vehicle in front of you	Yes
Ridden recklessly for fun or to test your abilities	Yes
Lost concentration and nearly had an accident	Yes
Had trouble controlling the motorcycle while cornering	Yes

Table 8: Items in Riding Behaviour Index

Attitudes Indices

Road Users Attitudes Index

Five "attitudes" questions tapped attitudes toward road users generally. One question (Tend to travel over the speed limit) was reverse scored. All five questions were entered into a correlation matrix at step 1, with all but one question showing moderate to strong significant correlations with each other ($r=.48$ to $r=.75$, all $p<.001$). One question, *Tend to travel over the speed limit*, was weakly correlated with the other four questions and was excluded from further analyses. Scores for the remaining four questions were summed and a pro-rata score out of 100 determined. Table 9 outlines the questions comprising this index.

A higher score on the Road Users Attitudes Index indicates a more positive attitude toward road users generally.

Riders and Drivers Attitudes Indices

To ensure consistency of comparison, the Riders and Drivers Attitudes Indices were created using the corresponding four attitudes questions that comprised the Road Users Index. As previously, the Riders Attitude Index and Drivers Attitude Index were created by summing scores from the relevant four questions and a pro-rata score between 20 and 100 determined. Questions comprising each index appear in Table 9.

A higher score on the Riders and Drivers Attitudes Indices correspond to more positive attitudes toward riders and drivers, respectively.

Index	Prompt	Question
Road Users Attitudes Index	Most Victorian road users:	Are courteous on the road
		Are aware of what's going on around them
		Follow the road rules
		Are responsible road users
Riders Attitudes Index	Most Victorian motorcycle riders:	Are courteous on the road
		Are aware of what's going on around them
		Follow the road rules
		Are responsible road users
Drivers Attitudes Index	Most Victorian car drivers:	Are courteous on the road
		Are aware of what's going on around them
		Follow the road rules
		Are responsible road users

Table 9: Items in Road Users, Riders & Drivers Indices

Correlations between attitudes, behaviours and crash risk

Individual question scores and indices scores assessing attitudes, behaviours and crash risk were entered into a series of correlations matrices (using Pearson product-moment correlations) to determine the degree of relationship between individual questions and constructs. Comparisons between drivers and riders (i.e. dual rider/drivers) are described in the following two sections.

A correlation of .15 or less is considered weak, with a correlation of .3 or more considered strong.

Attitudes and driving behaviour

The relationships between “attitudes toward motorcyclists” and driving behaviours differed between drivers and dual rider/drivers. Moderate to strong statistically significant correlations between “attitudes toward motorcyclists” questions and two driver behaviour questions – *Gotten angry with a motorcyclist* and *Been surprised by the sudden appearance of a motorcyclist* – were noted, and appear in Table 10. Correlations between “attitudes toward motorcyclists” questions and five other driver behaviour questions were small and/or non-significant, hence are not reported here.

Perhaps unsurprisingly, drivers who believe that riders are NOT courteous on the road also tend to report getting angry with a motorcyclist more often ($r=-.367$, $p<.01$). A similar, but much weaker, relationship exists for dual rider/drivers ($r=-.133$, $p<.01$). Likewise, drivers who believe that riders are an annoyance or hindrance on the road also report being surprised by the sudden appearance of a motorcyclist more often ($r=.314$, $p<.01$). For dual rider/drivers, a similar relationship is virtually non-existent ($r=.099$, $p<.05$).

<i>In the past 12 months as a car driver, how often have you: -</i>	<i>Gotten angry with a motorcyclist</i>		<i>Been surprised by the sudden appearance of a motorcyclist</i>	
	DRIVER ONLY	DUAL RIDER/ DRIVER	DRIVER ONLY	DUAL RIDER/ DRIVER
Most Victorian motorcyclists: - Position themselves in a lane so they can be seen by drivers	-.303**	-.119**	-.235**	-.079
Most Victorian motorcyclists: - Follow the road rules	-.295**	-.031	-.157**	-.019
Most Victorian motorcyclists: - Are less skilled on the road than car drivers	.257**	.068	.210**	.115**
Most Victorian motorcyclists: - Don't consider how their actions will impact other road users	.269**	.098*	.213**	.111*
Most Victorian motorcyclists: - Ride because they like to go fast	.231**	.106*	.242**	.129**
Most Victorian motorcyclists: - Are aware of the risks in riding a motorcycle	-.248**	-.082	-.123**	-.113**
Most Victorian motorcyclists: - Frequently change lanes unexpectedly	.278**	.126**	.258**	.279**
Most Victorian motorcyclists: - Are responsible road users	-.327**	-.072	-.228**	-.05

<i>In the past 12 months as a car driver, how often have you: -</i>	<i>Gotten angry with a motorcyclist</i>		<i>Been surprised by the sudden appearance of a motorcyclist</i>	
	DRIVER ONLY	DUAL RIDER/ DRIVER	DRIVER ONLY	DUAL RIDER/ DRIVER
Most Victorian motorcyclists: - Are aware of what's going on around them	-.308**	-.069	-.206**	-.057
Most Victorian motorcyclists: - Are courteous on the road	-.367**	-.133**	-.273**	-.055
Motorcyclists who make their own lane (i.e. lane split between traffic) annoy other road users	.245**	.142**	.141**	.206**
Motorcyclists are a hindrance or annoyance on the road	.413**	.152**	.314**	.099*

Note: * $p < 0.05$ ** $p < 0.01$

Table 10: Correlations between driving behaviours and attitudes toward motorcyclists, by drivers and dual rider/drivers.

Driving behaviour and crash risk

The correlations between perceived motorcyclist crash risk and driving behaviours also differed between drivers and dual rider/drivers. These are shown in Table 11.

<i>In the past 12 months as a car driver, how often have you: -</i>	<i>Gotten angry with a motorcyclist</i>	
	DRIVER ONLY	DUAL RIDER/ DRIVER
<i>During a typical week's travel on a motorcycle, how likely is it that a motorcyclist will [that you will]:</i>		
Concentrate fully on the traffic and road environment	-.270**	-.014
Maintain correct lane positioning	-.269**	.036
Abide by all road rules	-.314**	.021
React appropriately to a dangerous situation	-.309**	-.029
Ride more carefully in poor weather	-.305**	-.013
Fail to see a potentially dangerous situation	.282**	.095*
Push their [your] limits	.287**	.042

Note: * $p < 0.05$ ** $p < 0.01$

Table 11: Correlations between the driving behaviour "Gotten angry with a motorcyclist" and perceived motorcyclist crash risk, by drivers and dual rider/drivers.

Drivers who tend to get angry with a motorcyclist more often also tend to think that a motorcyclist is likely to push their limits, and to fail to see a potentially dangerous situation. Such drivers also tended to think riders were unlikely to concentrate fully on their environment, maintain correct lane positioning, abide by all road rules, react appropriately to a potentially dangerous situation or to ride more carefully in poor weather. For dual rider/drivers, no such relationships existed.

Crash risk and attitudes

Little or no relationship was found between the Road Users Attitudes Index and the number of “injury” crashes, the number of “damage” crashes, or the number of near misses. There was also little or no relationship between the Drivers Attitudes Index and the number of “injury” or “damage” crashes or near misses. Nor were there any notable relationships between the Riders Attitudes Index and crashes or near misses.

There was, however, an interesting relationship noted between the Riders Attitudes Index and the Perceived Crash Risk Index. For the riders group, there was a weak positive relationship between the Riders Attitudes Index and the Crash Perception Index ($r=.153$, $p<.01$). For the drivers group, the relationship was much stronger ($r=.599$, $p<.01$). This finding suggests that both riders and drivers who have a more positive attitude toward motorcyclists also tend to believe motorcyclists have a relatively low crash risk, with the relationship much stronger for drivers (who are not current riders).

Crash risk and riding behaviour

This section reports correlations between perceived crash risk and on-road rider behaviour. It contains data for current riders only.

Perceived crash risk and riding behaviour

Not all perceived crash risk items were correlated with rider behaviours items. Moderate to strong and statistically significant correlations are shown in Table 12.

<i>During a typical week's travel on your motorcycle, how likely is it that you will: -</i>	<i>Abide by all road rules</i>	<i>Push your limits</i>
<i>In the past 12 months as a motorcycle rider, how often have you: -</i>		
Ridden a safe distance behind a vehicle in front of you	.335**	-.211**
Raced other road users (motorcyclists or car drivers)	-.272**	.276**
Raced away from traffic lights to get in front of traffic	-.354**	.265**
Ridden recklessly for fun or to test your abilities	-.249**	.469**
Bent some road rules to get in front of other vehicles	-.479**	.309**

Note: * $p<0.05$ ** $p < 0.01$

Table 12: Correlations between perceived crash risk items “Abide by all road rules” and “Push your limits” and rider behaviours.

Riders who report abiding by all road rules also tend to ride a safe distance behind a vehicle in front; they are also less likely to race away from traffic lights to get in front of traffic and to bend road rules to get in front of other vehicles. In contrast, riders who push their limits are more likely to ride recklessly for fun or to test their abilities, and to race away from other road users.

Actual crashes and riding behaviour

Interestingly, there were only a small number of significant correlations between rider behaviour items and incidences of crashes, and these correlations were relatively weak. Riders who have had a “damage” crash in the past two years also had a slightly greater likelihood of racing other road users, pushing their limits so far that handling the motorcycle became difficult, racing away from traffic lights to get in front of traffic, having to brake quickly to avoid running into a vehicle in front, and having had trouble controlling the motorcycle while cornering ($r=.09$ to $r=.11$, all $p<.05$). There were no statistically significant correlations between rider behaviours and number of “injury” crashes.

Near misses and riding behaviour

A number of weak to moderate correlations were noted between some rider behaviour items and incidences of near misses. The statistically significant correlations are shown in Table 13.

Near misses: -	In the past 2 years	Since you started riding
<i>In the past 12 months as a motorcycle rider, how often have you: -</i>		
Raced other road users (motorcyclists or car drivers)	.117**	.114**
Had to brake quickly to avoid running into a vehicle stopping in front of you	.280**	.150**
Ridden recklessly for fun or to test your abilities	.112**	.126**
Ridden defensively	.115**	.159**
Bent some road rules to get in front of other vehicles	.123**	.098*
Lost concentration and nearly had an accident	.192**	.144**
Had trouble controlling the motorcycle while cornering	.132**	.005

Note: * $p<0.05$ ** $p < 0.01$

Table 13: Correlations between incidences of “near misses” and some riding behaviours.

Riders who have had a greater number of near misses are more likely to have had to stop quickly to avoid running into a vehicle in front, to have lost concentration and nearly had an accident, and to have ridden recklessly for fun or to test abilities. Interestingly, a greater number of near misses are also associated with a greater likelihood of riding defensively.

Predicting attitudes from demographic variables

A simple linear regression was performed to determine whether attitudes could be predicted by age, gender, marital status and dependent children. Results indicated that together, these demographic characteristics did not predict attitudes indices.

Predicting the likelihood of a crash

A step-wise logistic regression was performed to determine the likelihood of being in a crash (or not) from five different predictor variables. The two demographic predictors were gender and age group, with three additional predictors of Riding Behaviour Index, Road User Attitudes Index and hours ridden per week.

Logistic regression produces an “odds ratio” for each predictor variable. The odds ratio describes the probability, or chance, that an event will occur (i.e. a crash) relative to the probability that it will not (i.e. no crash), when the simultaneous effect of all other predictor variables has been taken into account.

For example, the results presented below suggest that when rider age, Riding Behaviour Index score, Road User Attitudes Index score, and frequency of riding are taken into account (that is, when the effect of these variables is “held constant”), the probability that a male rider will have a crash is 3.13 times greater than the probability of a female rider having a crash.

Results of the logistic regression suggest that:

- male riders have 3.13 times the chance of having a crash than female riders;
- riders with higher scores on the Riding Behaviour Index (i.e. with more risky riding behaviour) have 3.20 times the chance of having a crash than riders with low Riding Behaviour Index scores;
- the crash risk for riders with lower scores on the Road User Attitudes Index (i.e. with more negative attitudes toward road users generally) is 1.5 times higher than for riders with higher scores on the Road User Attitudes Index;
- riders aged 25 to 34 have just over half the chance of a crash than riders from other age groups; and
- the crash risk for those who ride five hours or less per week is approximately half that of riders who ride for longer.

Two post hoc analyses were conducted to determine which items in the Riding Behaviour and Road User Attitudes Indices are related to crash risk.

For each item comprising the Riding Behaviour Index, a one-way analysis of variance (ANOVA) was used to compare the average score for riders who had NOT had a crash with those who had. Only one statistically significant difference was noted: riders who had had a crash were significantly more likely to have raced other road users than riders who had NOT had a crash ($F=4.15$, $p=.04$).

A similar analysis for items comprising the Road User Attitudes Index suggested that riders who had NOT had a crash were significantly more likely to perceive other Victorian road users as responsible on the road than riders who reported having a crash at some point during their riding career ($F=7.25$, $p<.01$).

While causation cannot necessarily be inferred from these analyses, these findings may suggest that motorcyclist crash risk is higher among those who race other road users, and those who perceive other road users as irresponsible on the road.

Predicting the number of crashes

A number of hierarchical multiple linear regressions were performed to determine which factors predict the number of motorcycle crashes. Data from current motorcyclists only were included in these analyses.

In the first analysis, riding experience, hours on the road, attitudes and perceived inevitability of a crash were used to predict damage crashes. The outcome being predicted was the number of damage crashes since commencement of riding, with the predictors being riding experience (number of years riding) and number of hours ridden each week (step 1), and Road Users Attitudes Index and perceived inevitability of a crash (step 2).

Results suggested that together, years riding and hours ridden each week significantly predicted the number of lifetime damage crashes; more years riding and more hours ridden each week were associated with more lifetime damage crashes. At step 2, the Road Users Attitudes Index and perceived inevitability of a crash significantly predicted lifetime damage crashes; more negative attitudes toward road users and greater perceived inevitability of a crash were associated with more lifetime damage crashes. The overall model accounted for 19% of the variance.

A further analysis was conducted to determine which of the items comprising the Road Users Attitudes Index uniquely contributed to the prediction of damage crashes. Results indicated that alone, none of the attitudes questions (Most Victorian road users: 1. are courteous, 2. are aware of what's going on around them, 3. follow the road rules, and 4. are responsible road users) significantly predicted damage crashes. This finding suggests that an overall attitude toward road users has a greater impact on crashes than specific attitudes.

The third analysis repeated the first with the same predictor variables, but predicting lifetime injury crashes. A similar result was found; more years riding and more hours ridden each week were associated with a greater number of lifetime injury crashes, while more negative attitudes toward road users and greater perceived inevitability of a crash were associated with a greater number of lifetime injury crashes. Overall, the model accounted for 21% of the variance.

A further analysis was then conducted to determine the unique contribution of items comprising the Road Users Attitude Index to injury crashes. Results suggested that none of the items alone contributed to lifetime injury crashes, indicating that an overall attitude toward road users is more strongly related to the number of injury crashes than specific attitudes.

Together, these analyses suggest that more years riding, the more hours ridden each week, the more negative attitude toward road users generally and a greater perceived inevitability of a crash are associated with a greater number of lifetime damage crashes and lifetime injury crashes. That 19% and 21% of the variance was accounted for (respectively) suggests that while these factors are important determinants of motorcyclist crash risk, other, unaccounted for, factors are also important.

Predicting perceived crash risk

A standard multiple linear regression was performed to predict perceived crash risk. The dependent variable (i.e. the outcome being predicted) was the Perceived Crash Risk Index, with the predictors being the Riding Behaviour Index and Riders Attitudes Index. Riding behaviour and rider attitudes were positively associated with perceived crash risk, with the model accounting for 21% of the variance.

A further analysis was conducted to determine the unique contribution of individual items in the Riding Behaviour and Riders Attitudes Indices in the prediction of the Perceived Crash Risk Index score. Results revealed that the attitude item “Most Victorian motorcyclists follow the road rules” and five rider behaviours – 1. riding a safe distance behind a vehicle in front; 2. not racing other road users; 3. not riding recklessly; 4. maintaining concentration to avoid an accident; and 5. riding such that the rider has control of the motorcycle while cornering – were positively associated with lower perceived crash risk. This model accounted for 26% of the variance.

These analyses suggest that the safer the rider behaviour and the more positive attitude toward motorcyclists, the lower the perceived crash risk. It is perhaps unsurprising that riding behaviour is associated with perceived crash risk. With respect to attitudes, it may be that attitudes towards other riders may in fact be a reflection of attitude toward the self as a rider, indicating that riders with a positive attitude toward other riders, or to the self as a rider, tend to believe they have a relatively low crash risk.

Interestingly, when riding experience and number of hours spend riding each week were entered into the equation, neither significantly predicted perceived crash risk.

Professional rider training, attitudes and crash risk

Relationships between professional rider training, attitudes (toward road users, toward car drivers and toward riders), and crash risk were assessed using a number of statistical techniques. These, and the findings, are described below.

Rider training and attitudes

The relationships between professional (i.e. commercial) riding training and attitudes were assessed using one-way ANOVAs. There were no statistically significant differences in The Road Users Attitudes, Drivers Attitudes or Riders Attitudes Indices between riders who have or have not attended a professional training course. This suggests that professional rider training has little impact on the overall attitude of riders toward road users, drivers or other riders.

Rider training and crashes

The relationships between professional rider training and crashes were investigated using a series of chi square analyses. The dichotomous “crash or no crash” variable was tested against each dichotomous “training or no training” variable (each type of training course was treated independently). Results suggested that riders are (statistically) significantly less likely to have had a crash if they have attended a two-day learner permit/licensing and testing course, a refresher training course, or an advanced on-road or advanced off-road training course. There was no statistically significant finding for those who had attended a one-day learner permit/licensing course or for those who had attended an “other” (unspecified) training course. Results of the chi square analyses appear in Table 14.

Training course type	Training completed	N "no crash"	N "crash"	Chi square statistic (χ ²)	Sig. (p)
One day learner permit/license course and testing	Yes	63	87	3.661	.061
	No	146	292		
Two day learner permit/license course and testing	Yes	106	109	28.002	<.001
	No	103	270		
Refresher training course	Yes	28	79	5.019	.026
	No	181	300		
Advanced on-road training course	Yes	44	116	6.209	.015
	No	165	263		
Advanced off-road or track training course	Yes	34	95	6.089	.016
	No	175	284		
Other training course	Yes	16	21	1.022	.375
	No	193	358		

Table 14. Chi square analyses for "crash or no crash" and different training course types

These findings suggest that some types of professional training – particularly two day learner permit licensing and testing – are associated with a lower likelihood of having a crash.

Crashes, attitudes and perceived crash risk

Differences in attitudes for riders who have had a crash compared to those who have not were tested using a series of one-way ANOVAs; analyses used the Road Users Attitudes, Drivers Attitudes and Rider Attitudes Indices. Riders who had had a crash tended to hold significantly more negative attitudes toward road users generally than riders who had not had a crash ($F=4.426$, $p=0.36$). No differences were found in attitudes toward car drivers or other riders.

Further analyses on individual attitudes items – including those comprising the indices as well as items not included in indices – revealed interesting findings. Riders who have had a crash tended to disagree more strongly (than riders who have not had a crash) that motorcyclists ride because they like to go fast, follow the road rules, and frequently change lanes unexpectedly ($F=.5186$, $p=.023$; $F=4.594$, $p=.033$; $F=5.769$, $p=.018$ respectively). These findings suggest that having a crash may alter some aspects of a rider's attitudes toward other riders.

Comparison of those who have had a crash with those who have not were performed using one-way ANOVAs for a number of other attitudes items, as well as perceived crash risk (using the Perceived Crash Risk Index). Perhaps unsurprisingly, riders who have had a crash tended to agree significantly more strongly than riders who have not had a crash to the item "it is inevitable that a rider will have a crash at some point in their riding career" ($F=51.064$, $p<.001$). Riders who have had a crash also tend to believe they have a greater likelihood of being in a crash than those who have never crashed ($F=73.160$, $p<.001$).

Crashes, attitudes and training

An analysis of covariance was used to determine the relationship between crashes ("crash" versus "no crash") and attitudes toward road users generally, while controlling for professional rider training. Results suggest that while riders who have experienced a crash have different attitudes toward road users generally than those who have not crashed, rider training is not a mitigating factor in this relationship.

Part 3: Further Analyses

This section comprises a number of additional analyses; including attitudes toward motorcyclists and motorcycling by social segment, and by different rider types (current riders, former riders and those who have never ridden).

Attitudes toward riders by social segment

Gender

Initial analyses by gender were conducted with the total sample, and a number of statistically significant differences were noted between males and females. The total sample did, however, contain a greater proportion of males (68%) than females (32%). Males comprised 93% of the motorcyclist subgroup, and 42% of the driver only subgroup, thus gender-based analyses were re-run using the more gender balanced driver only sub-sample (presented below).

The mean scores on all positive motorcycle attitudes questions did not differ (statistically) significantly between male and female drivers (*Table 15*).

Most Victorian motorcyclists:	Male (N=233) Mean	Female (N=326) Mean
Position themselves in a lane so they can be seen by drivers	2.87	2.98
Follow the road rules	2.63	2.78
Are aware of the risks in riding a motorcycle	3.41	3.39
Are responsible road users	2.90	3.00
Are aware of what's going on around them	3.34	3.40
Are courteous on the road	2.77	2.85

To what extent do you agree or disagree with the following statements:	Male (N=233) Mean	Female (N=326) Mean
Motorcyclists are easily seen in traffic	2.16	2.14
Motorcyclists can stop as quickly as car drivers, regardless of the conditions	2.36	2.29

Table 15: Comparison of mean scores of positive attitudes towards motorcyclists by gender

The mean scores on negative motorcycle attitudes were also similar for male and female drivers, with only statistically significant differences noted - female drivers tend to perceive that acquiring a motorcycle licence requires less skill than acquiring a car licence, whereas males tended to disagree (*Table 16*).

Most Victorian motorcyclists:	Male (N=233) Mean	Female (N=326) Mean
Tend to travel over the speed limit	3.98	3.82
Are less skilled on the road than car drivers	2.52	2.65
Don't consider how their actions will impact other road users	3.50	3.41
Ride because they like to go fast	3.42	3.30
Frequently change lanes unexpectedly	3.68	3.81
To what extent do you agree or disagree with the following statements:	Male (N=233) Mean	Female (N=326) Mean
To get a Victorian motorcycle licence requires less training than to get a car licence	2.66	3.26**
If a motorcyclist comes off their bike while turning a corner, it is most likely because they were going too fast	3.19	3.26
Motorcyclists who make their own lane (i.e. lane split between traffic) annoy other road users	4.02	4.10
Motorcyclists are a hindrance or annoyance on the road	2.60	2.67

Note: * $p < 0.05$ ** $p < 0.01$

Table 16: Comparison of mean scores of negative attitudes towards motorcyclists by gender

Together these findings suggest that attitudes toward motorcyclists and motorcycling are similar among male and female drivers.

Age group

Few differences in attitudes toward motorcyclists and motorcycling were noted between the different age groups.

Respondents aged 25-34 and 45-54 tended to agree more strongly that motorcyclists are aware of what’s going on around them than respondents aged 18-24 (Table 17).

Most Victorian motorcyclists:	Age: 18-24 (N=65)	Age: 25-34 (N=236)	Age: 35-44 (N=273)	Age: 45-54 (N=317)	Age: 55-64 (N=194)	Age: 65+ (N=52)
	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>
Position themselves in a lane so they can be seen by drivers	3.26	3.21	3.20	3.33	3.26	3.12
Follow the road rules	2.67	2.79	2.81	2.90	2.92	3.02
Are aware of the risks in riding a motorcycle	3.63	3.72	3.67	3.74	3.59	3.58
Are responsible road users	3.00	3.24	3.21	3.29	3.22	3.30
Are aware of what’s going on around them	3.47*	3.93	3.75	3.94	3.71	3.70
Are courteous on the road	2.84	3.20	3.16	3.17	3.12	3.18

To what extent do you agree or disagree with the following statements:	Age: 18-24 (N=65)	Age: 25-34 (N=236)	Age: 35-44 (N=273)	Age: 45-54 (N=317)	Age: 55-64 (N=194)	Age: 65+ (N=52)
	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>	<i>Mean</i>
Motorcyclists are easily seen in traffic	2.02	2.28	2.18	2.27	2.20	2.32
Motorcyclists can stop as quickly as car drivers, regardless of the conditions	1.96	2.06	2.12	2.08	2.32	2.38

Note: * $p < 0.05$ ** $p < 0.01$

Table 17: Comparison of mean scores of positive attitudes towards motorcyclists by age group.

Respondents aged 65 and over tended to agree more strongly than those aged 25 to 54 that motorcyclists ride because they like to go fast. Those aged 65+ also tend to agree more strongly than those aged 24-34, and those aged 45-54 that motorcyclists tend to travel over the speed limit. Finally, respondents aged 65+ tend to agree more strongly than those aged 55-64 that motorcyclists frequently change lanes unexpectedly (*Table 18*).

Most Victorian motorcyclists:	Age: 18-24 (N=65) Mean	Age: 25-34 (N=236) Mean	Age: 35-44 (N=273) Mean	Age: 45-54 (N=317) Mean	Age: 55-64 (N=194) Mean	Age: 65+ (N=52) Mean
Tend to travel over the speed limit	4.07	3.72	3.73	3.65	3.81	4.00*
Are less skilled on the road than car drivers	2.14	2.23	2.27	2.12	2.38	2.72
Don't consider how their actions will impact other road users	3.32	3.06	3.13	3.07	3.26	3.51
Ride because they like to go fast	3.15	2.89	2.79	2.89	3.16	3.62*
Frequently change lanes unexpectedly	3.42	3.22	3.08	3.03	3.27	3.57*

To what extent do you agree or disagree with the following statements:	Age: 18-24 (N=65) Mean	Age: 25-34 (N=236) Mean	Age: 35-44 (N=273) Mean	Age: 45-54 (N=317) Mean	Age: 55-64 (N=194) Mean	Age: 65+ (N=52) Mean
To get a Victorian motorcycle licence requires less training than to get a car licence	2.94	2.81	2.77	2.60	2.68	2.67
If a motorcyclist comes off their bike while turning a corner, it is most likely because they were going too fast	2.79	2.70	2.73	2.60	2.98	3.41*
Motorcyclists who make their own lane (i.e. lane split between traffic) annoy other road users	3.77	3.62	3.53	3.56	3.94	4.08
Motorcyclists are a hindrance or annoyance on the road	2.14	2.01	1.94	1.93	2.28	2.50

Note: * $p < 0.05$ ** $p < 0.01$

Table 18: Comparison of mean scores of negative attitudes towards motorcyclists by age group.

Region

Some statistically significant differences in attitudes toward motorcyclists and motorcycling were noted between individuals living in metropolitan versus rural/regional areas.

Rural/regional residents tended to agree more strongly than metropolitan residents that:

- Most Victorian motorcyclists are less skilled on the road than car drivers (rural: M=2.37, metro: M=2.21); and
- Motorcyclists who make their own lane (i.e. lane split between traffic) annoy other road users (rural: M=3.88, metro: M=3.59)

Marital status

For respondents of differing marital status, only one statistically significant difference in attitude toward motorcyclists or motorcycling were noted. Separated, divorced or widowed individuals tended to agree more strongly than those who were married or in a de facto relationship that most Victorian motorcyclists ride because they like to go fast (M=3.29, M=2.91 respectively).

Other analyses on motorcycle rider attitudes

Items assessing attitudes toward motorcyclists and motorcycling were examined using one-way ANOVA for each of the following:

- dependent children (yes/no);
- hours riding per week ("less than 1" to "more than 40");
- hours driving per week ("less than 1" to "more than 40");
- experience riding (in years);
- experience driving (in years);
- frequency of riding (number of times per week); and
- frequency of driving (number of times per week).

No differences, or very small and inconsistent differences, within each of these groups were noted.

Attitudes to road users, drivers and motorcyclists by current, former and never riders

The follow section compares the attitudes toward motorcyclists and motorcycling of current riders, former riders and those who have never ridden a motorcycle. A number of differences can be noted, highlighted below.

Attitudes toward motorcyclists

Former riders and those who have never ridden tend to *agree* significantly more strongly than current riders that most Victorian motorcyclists:

- tend to travel over the speed limit;
- are less skilled on the road than car drivers;
- don't consider how their actions will impact other road users;
- ride because they like to go fast; and
- frequently change lanes unexpectedly. Also:
- motorcyclists who make their own lane (i.e. lane split between traffic) annoy other road users.

Current riders tended to *disagree* significantly more strongly than former riders and those who have never ridden that:

- if a motorcyclist comes off their bike while turning a corner, it is most likely because they were going too fast; and
- motorcyclists are a hindrance or annoyance on the road.

Current riders tend to *agree* significantly more strongly than former riders and those who have never ridden that most Victorian motorcyclists:

- position themselves in a lane so they can be seen by drivers;
- are aware of the risks of riding a motorcycle;
- are responsible road users;
- are aware of what’s going on around them; and
- are courteous on the road.

These findings are shown in Table 19 below. Statistically significant differences (at $p < .01$) are indicated by superscript letters corresponding to each subgroup. Two examples are provided below:

1. For the item “position themselves in a lane so they can be seen by drivers”, the mean score for current riders [C] is statistically significantly higher than for former riders [F] and never riders [N].
2. For the item “follow the road rules”, the mean score for current riders [C] is statistically significantly higher than for never riders [N], while there is no statistically significant difference for current [C] or former [F] riders.

Most Victorian motorcyclists:	Current rider [C] (N=588) <i>Mean</i>	Former rider [F] (N=116) <i>Mean</i>	Never Rider [N] (N=443) <i>Mean</i>
Position themselves in a lane so they can be seen by drivers	3.54 ^{FN}	3.03	2.91
Follow the road rules	2.98 ^N	2.75	2.71
Are aware of the risks in riding a motorcycle	3.94 ^{FN}	3.41	3.40
Are responsible road users	3.48 ^{FN}	3.00	2.95
Are aware of what’s going on around them	4.22 ^{FN}	3.42	3.36
Are courteous on the road	3.45 ^{FN}	2.89	2.80
Tend to travel over the speed limit	3.63	3.95 ^C	3.87 ^C
Are less skilled on the road than car drivers	1.94	2.51 ^C	2.62 ^C
Don’t consider how their actions will impact other road users	2.87	3.45 ^C	3.45 ^C
Ride because they like to go fast	2.60	3.30 ^C	3.36 ^C
Frequently change lanes	2.64	3.54 ^C	3.80 ^C

Most Victorian motorcyclists:	Current rider [C] (N=588) <i>Mean</i>	Former rider [F] (N=116) <i>Mean</i>	Never Rider [N] (N=443) <i>Mean</i>
unexpectedly			
To what extent do you agree or disagree with the following statements:	Current rider [C] (N=588) <i>Mean</i>	Former rider [F] (N=116) <i>Mean</i>	Never rider [N] (N=443) <i>Mean</i>
Motorcyclists are easily seen in traffic	2.30	2.08	2.17
Motorcyclists can stop as quickly as car drivers, regardless of the conditions	1.98	2.15	2.37 ^C
To get a Victorian motorcycle licence requires less training than to get a car licence	2.53	2.54	3.04 ^{CF}
If a motorcyclist comes off their bike while turning a corner, it is most likely because they were going too fast	2.35	2.97 ^C	3.30 ^C
Motorcyclists who make their own lane (i.e. lane split between traffic) annoy other road users	3.30	3.85 ^C	4.13 ^C
Motorcyclists are a hindrance or annoyance on the road	1.51	2.22 ^C	2.76 ^{CF}

Note: * $p < 0.05$ ** $p < 0.01$

Table 19: Comparison of attitudes towards motorcyclists by current riders, former riders and those who have never ridden

Section D: Conclusions and Recommendations

Conclusions

Riding a motorcycle inherently carries a greater risk of severe road trauma than other forms of on-road motorised transport. Two wheeled motorcycles are less stable than four wheeled vehicles, and motorcyclists have little protection other than their clothing, thus errors or poor road surfaces have potentially more serious consequences for riders than for drivers.

A review of the literature revealed that factors such as age and rider behaviour influence the likelihood of a motorcyclist being involved in a crash. The present study also found these factors to influence crash risk. Males aged 25-34 are less likely to have a crash than younger or older individuals, while riders who engage in more risky riding behaviours have a much greater crash risk than riders whose on-road behaviour is safer. Previous studies have also found that for dual rider/drivers, skill acquired as a motorcyclist appears to carry over to situations of driving a car. The current study found evidence to support this notion, with dual rider/drivers less likely than drivers to be surprised by the sudden appearance of a motorcyclist, to pull out in front of a motorcyclist who has left a safe gap, and to get angry with a motorcyclist.

The present study found that attitudes toward road users generally, toward car drivers and toward motorcyclists differed significantly between drivers and riders. Drivers tended to have more positive attitudes toward road users generally, and toward drivers, than did riders; riders tended to have more positive attitudes toward motorcyclists than did drivers. For both riders and drivers, more positive attitudes toward motorcyclists were associated with lower perceived crash risk. Yet for motorcyclists, the number of actual crashes or near misses was not correlated with attitudes toward road users, car drivers or motorcyclists.

Motorcyclist crash risk was found to be related to a number of factors, both within and outside of the control of the rider. Crash risk is higher for male riders, for those who engage in risky riding behaviours, for riders with negative attitudes toward road users generally and for those who have not had professional rider training. A greater number of crashes was associated with more riding experience, more hours ridden each week, more negative attitudes toward road users generally and a greater perceived inevitability of a crash. Riders who have experienced a crash are also more likely to perceive road users generally as irresponsible.

For riders, perceived crash risk was related to attitudes toward riders, particularly the perception that riders follow the road rules. Riding behaviours related to lower perceived crash risk include riding a safe distance behind another vehicle, and not racing other road users, riding recklessly, losing concentration, or losing control on corners. And perhaps unsurprisingly, riders who have had a crash also tended to believe they have a greater likelihood of being in a crash than those who have not experienced a crash.

These findings have a number of implications for motorcyclist safety on Victorian roads, as well as for future road safety campaigns.

Implications

The establishment of particular education campaigns, or road safety strategies, based upon the attitudinal differences unearthed in this study, would be a substantial exercise in itself. However, the current project does imply some avenues for further exploration and development. The findings of this project suggest a range of options to consider regarding communicating safety messages to road users. Some possible message strategies include:

Evidence suggests that people think about car drivers, and NOT about motorcyclists, when thinking about road users generally. Strategies could emphasise that motorcyclists are road users too.

Drivers tend to agree more strongly than current riders that drivers are generally unable to judge the speed and distance of a motorcyclist, and are generally unable to anticipate their behaviour. Educating riders that their own behaviour impacts the extent to which drivers can perceive and react to them, and the importance of riding predictably, may help improve motorcyclist safety.

Perceived rider behaviours differ between drivers and riders, with drivers tending to perceive a lower likelihood that riders will engage in safe on-road behaviours. Drivers may benefit from experience as a rider, perhaps via a simulator, such that they are able to better understand the behaviour and experiences of motorcyclist. Incorporating such training into car driver licensing may be beneficial.

Riders who have had a crash tend to perceive road users generally as less responsible than riders who have not experienced a crash. This poses an interesting question: Are riders who have crashed more apt to recognise poor driving behaviour from other road users, or are motorcycle riders looking for external reasons (i.e. not taking as much personal responsibility) for crash events?

Those aged over 65 tended to hold more negative attitudes about motorcyclists than those in younger age groups. It is possible that road users aged over 65 hold a stereotypical view of motorcyclists. Addressing this view (e.g., that motorcyclists are actually a heterogeneous group) may reduce their negative attitudes. In other words, informing older drivers that "some of their own" ride motorcycles may stimulate them to reconsider their own attitudes, or at the very least "think more" about motorcyclists in a general sense. In essence, this strategy – as per Social Identity theory – suggests moving motorcyclists from an extreme out-group towards an in-group cognitive classification.

Familiarity with sharing the road with other motorcyclists may also be a key to reducing negative attitudes. Compared to their metropolitan counterparts, respondents from rural regions tended to agree more to the statement "motorcyclists who make their own lane (i.e. lane split between traffic) annoy other road users". Communication strategies based on specific behaviours – positive or negative – may be best targeted to regions where these behaviours are salient. Strategies oriented around "foreign" behaviours are unlikely to gain traction.

Riders who have had a crash also tend to believe they have a greater likelihood of being in a crash than those who have never crashed. Thus there may be no substitute for experience, even bad experience.

Recommendations for further research

The current project has collected a very large amount of data surrounding attitudes of, and towards, motorcyclist safety and behaviour. Some avenues for further research include the following.

- Continued data interrogation, including detailed analysis of qualitative data. The current report fully addresses the research brief's objectives, but there is considerable scope for further analysis. The breadth of data is such that additional hypothesis testing may also be possible.
- More detailed examination of the predictive attitudes. It may be difficult, but teasing out the different components of, for example, perceived responsibility of road users and motorcyclists may reveal additional insights into potential crash risk and behaviour.
- Development of a standardised attitudinal instrument for riders. The current study has laid some solid groundwork for this process.
- Examination of the relationship between communication (education) medium and the type/details of safety message, as they pertain to motorcyclists. For example, is the best way to change stereotypical attitudes towards motorcyclists via a conventional medium (e.g. TVC)?

Summary

The current project was commissioned to better understand the attitudes of drivers and motorcycle riders toward each other, towards riding more generally, and how these factors contribute to motorcyclist crash risk. These objectives have been met, with the project involved identifying key issues facing motorcyclists, key perceptions drivers have about riders and themselves, and attitudes and perceptions riders have about drivers and themselves.

The project also involved collecting data about the likelihood of encountering conditions that might lead to a motorcycle crash, the riders' and drivers' own behaviours that they exhibit on public roads, and number of crashes. The findings have helped highlight the attitudinal differences between riders and drivers, and to identify the attitudes which lead to potentially dangerous riding or driving behaviours. These insights will help guide future research and further understanding of the psychological mechanisms that govern rider and driver behaviours, and, ultimately, ways to reduce the number of motorcycle accidents on Victorian roads.

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Appendices

Appendix A: Focus group discussion guides

VicRoads: Driver/Rider Attitudes Project

Discussion Guide: Rider Focus Group

Welcome and introductions

- Remind to turn mobiles off
- Location of toilets and drinks
- Session duration
- Introduce Mel and Joe

Session "rules" and guidelines

- Discussion topic: what you think about motorcycling
- Attitudes
- Perceptions
- Road safety issues
- One person to talk at a time – NO talking over the top of others
- Notepad each – if someone is talking, write down what you want to say and raise the issue once the person talking has finished
- We want your opinions, but don't just criticise drivers
- Session will be recorded – 2 audio recorders on the table

Discussion topics and questions

Introduction

- How long have you been riding for?
- Who drives a car?
- What is the most difficult thing about riding or driving on the roads?
- What is the most difficult thing about being a motorcyclist?
- What you think about everyone else on the road
- Driver/rider courtesy, what do others think about you as a motorcyclist

Perceptions of other road users

- How do other road users treat you/react to you as a motorcyclist?
- How well are motorcyclists "seen" by other road users?
- How well do other road users:
 - Judge your speed
 - Judge your distance
 - Anticipate your behaviour
- How do other road users influence:
 - How you ride
 - How likely you are to have a crash

“Crashes” and “near misses”

How likely do you think it is that'll you have a crash/near miss when you ride (perception of crash risk)
How do you define a “crash”
Who has been in a crash while riding?
How do you define a “near miss”?
Who has had a “near miss” while riding?
Of the crashes or near misses you've had or seen, what have the circumstances been?
Anything common to them all?
(probe: who has been at fault?)
Who has had a crash or near miss with a motorcyclist when driving a car?

VicRoads: Driver/Rider Attitudes Project

Discussion Guide: Driver Focus Group

Welcome and introductions

Remind to turn mobiles off
Location of toilets and drinks
Session duration
Introduce Joe and Fiona

Session “rules” and guidelines

Discussion topic: motorcycling and driving
Attitudes
Behaviours
Perceptions
Road safety issues
One person to talk at a time – NO talking over the top of others
Notepad each – if someone is talking, write down what you want to say and raise the issue once the person talking has finished
We want your opinions, but don't just criticise motorcycle riders
Session will be recorded – 2 audio recorders on the table

Discussion topics and questions

Introduction

How long have you been driving for?
Anyone ride a motorcycle?
What is the most difficult thing about driving on the roads?
What you think about everyone else on the road
Driver/rider courtesy, what do others think about you as a car driver?

Perceptions of other road users

How do you treat or react to motorcyclists?
How well do you "see" motorcyclists?
How well do you:
Judge their speed
Judge their distance
Anticipate their behaviour
How do you think your behaviour on the road influences:
How motorcyclists ride
How likely motorcyclists are to have a crash

"Crashes" and "near misses"

How likely do you think it is motorcyclists will have a crash/near miss when they ride? (perception of crash risk)
How do you define a "crash" (e.g. making contact with another road user?)
Who has been in a crash?
Who has been in a crash with a motorcycle?
How do you define a "near miss"?
Who has had a "near miss"?
Who has had a "near miss" with a motorcycle?
When motorcyclists have a crash or near miss, what are circumstances (typically)?
Anything in common?
(Probe: who is typically at fault?)

Appendix B: Questionnaire

Current Victorian rider or car driver?

Do you currently drive a car or ride a motorcycle on Victorian roads? (an answer is required)

___ Yes ___ No

By "car" we mean a motor vehicle, other than a motorcycle, that: (a) is no heavier than 4.5 tonnes; and (b) is constructed or equipped to seat not more than 12 adults (including the driver).

By "motorcycle" we mean any two or three wheeled vehicle that may include a sidecar, forecar or trailer and includes a motor trike.

About you

Please enter your email address

The email address you enter here is for validation only.

Please indicate your gender:

___ Male ___ Female

In which year were you born?

(drop-down list, from "1940 or before" to "1993 or later")

What best describes your marital status?

___ Single: never married

___ Single: separated, divorced or widowed

___ Married or in a de facto relationship

Do you have any dependent children?

___ Yes ___ No

What is your current residential postcode?

What is your current on-road status? (an answer is required)

___ I am a current car driver only (I do NOT currently ride a motorcycle)

___ I am a current motorcycle rider AND current car driver

I am a current motorcycle rider, but am NOT a current car driver

I am neither a current motorcycle rider nor car driver

Do you currently drive a bus, truck or heavy vehicle (over 4.5 tonnes)?

Yes No

About your riding

Have you ever ridden a motorcycle on public roads? (an answer is required)

Yes No

About your driving

Have you ever driven a car on public roads? (an answer is required)

Yes No

Licensing and vehicles

What is your current motorcycle licence status?

Full motorcycle licence

Restricted motorcycle licence

Probationary motorcycle licence

Motorcycle learner permit

My motorcycle licence has expired or was surrendered

My motorcycle licence is suspended or disqualified

Don't currently have a motorcycle licence

Other (please specify) _____

What is your current car licence status?

- Full car licence
- Probationary car licence
- Car learner permit
- My car licence has expired or was surrendered
- My car licence is suspended or disqualified
- Don't currently have a car licence
- Other (please specify) _____

What sort of machine is the PRIMARY or MAIN motorcycle that you ride?

- Cruiser
- Dual Sport
- Naked (Standard)
- Scooter
- Sports Bike
- Sports tourer
- Tourer
- Trail/Enduro
- Trike
- Other (please specify) _____

What sort of machine is the PRIMARY or MAIN car that you drive?

- | | |
|--|---|
| <input type="checkbox"/> City car (e.g. Smart) | <input type="checkbox"/> Minivan |
| <input type="checkbox"/> Hatchback | <input type="checkbox"/> Four wheel drive (includes S.U.V.) |
| <input type="checkbox"/> Sedan | <input type="checkbox"/> Ute |
| <input type="checkbox"/> Sports car (including performance GT and coupe) | <input type="checkbox"/> Other (please specify) |

Experience as a motorcycle rider

Approximately how many years have you been riding motorcycles?
 (Please don't include breaks from riding; i.e. total years since commencing less total years away from riding)

- | | | |
|--------------------------------------|----------------------------|---------------------------------------|
| <input type="checkbox"/> Less than 1 | <input type="checkbox"/> 5 | <input type="checkbox"/> 10-15 |
| <input type="checkbox"/> 1 | <input type="checkbox"/> 6 | <input type="checkbox"/> 15-20 |
| <input type="checkbox"/> 2 | <input type="checkbox"/> 7 | <input type="checkbox"/> 20-30 |
| <input type="checkbox"/> 3 | <input type="checkbox"/> 8 | <input type="checkbox"/> 30-40 |
| <input type="checkbox"/> 4 | <input type="checkbox"/> 9 | <input type="checkbox"/> More than 40 |

What professional (i.e. commercial) riding courses have you attended?
 (mark as many options as appropriate)

- One day learner permit/licence course and testing
- Two day learner permit/licence course and testing
- Refresher training course
- Advanced on-road training course
- Advanced off-road or track training course
- Other (please specify) _____
- I have not received professional/commercial riding training

On average, how many hours do you ride a motorcycle on public roads each week?

- | | | |
|--------------------------------------|--------------------------------|---------------------------------------|
| <input type="checkbox"/> Less than 1 | <input type="checkbox"/> 11-15 | <input type="checkbox"/> 31-40 |
| <input type="checkbox"/> 1-5 | <input type="checkbox"/> 16-20 | <input type="checkbox"/> More than 40 |
| <input type="checkbox"/> 6-10 | <input type="checkbox"/> 21-30 | |

How often do you currently ride a motorcycle?

- | | |
|---|--|
| <input type="checkbox"/> One day per fortnight, or less | <input type="checkbox"/> 4-5 days per week |
| <input type="checkbox"/> One day per week | <input type="checkbox"/> 6-7 days per week |
| <input type="checkbox"/> 2-3 days per week | |

How often do you ride with a pillion passenger?

- Never Often
 Rarely Always
 Sometimes

On what sort of roads do you generally ride on? (mark as many options as appropriate)

- Freeways or Highways (e.g., Monash Fwy)
 Main/Arterial metropolitan roads (e.g., Hoddle Street)
 Main/Arterial regional/rural roads (e.g., Great Ocean Road)
 Local metropolitan streets
 Local regional/rural streets
 Dirt roads

How long has it been since you last rode a motorcycle on a public road?

- Less than 1 year 6-10 years
 1-2 years More than 10 years
 3-5 years

Experience as a car driver

Approximately how many years have you been driving cars? (Please don't include breaks from driving; i.e. total years since commencing less total years away from driving)

- | | | |
|--------------------------------------|----------------------------|---------------------------------------|
| <input type="checkbox"/> Less than 1 | <input type="checkbox"/> 5 | <input type="checkbox"/> 10-15 |
| <input type="checkbox"/> 1 | <input type="checkbox"/> 6 | <input type="checkbox"/> 15-20 |
| <input type="checkbox"/> 2 | <input type="checkbox"/> 7 | <input type="checkbox"/> 20-30 |
| <input type="checkbox"/> 3 | <input type="checkbox"/> 8 | <input type="checkbox"/> 30-40 |
| <input type="checkbox"/> 4 | <input type="checkbox"/> 9 | <input type="checkbox"/> More than 40 |

*What professional (i.e. commercial) driving courses or lessons have you attended?
(mark as many options as appropriate)*

Driving lessons through a professional instructor or driving school

Safe driving course

Corrective driving course

Low risk/defensive driving course

Other (please specify) _____

I have not received professional/commercial driving training

On average, how many hours do you drive a car on public roads each week?

Less than 1 16-20

1-5 21-30

6-10 31-40

11-15 More than 40

How often do you currently drive a car?

One day per fortnight, or less 4-5 days per week

One day per week 6-7 days per week

2-3 days per week

Attitudes to road users generally

The following questions ask for your opinion on some statements about Victorian road users IN GENERAL - this includes car drivers, motorcyclists, taxi drivers, bus drivers, truck drivers, etc.

If you strongly disagree with the statement, give a rating of 1. If you strongly agree with the statement, give a rating of 5.

Most Victorian road users:

	(1=Strongly disagree; 5=Strongly agree)					
	1	2	3	4	5	NA
Are courteous on the road	—	—	—	—	—	—
Tend to travel over the speed limit	—	—	—	—	—	—
Are aware of what's going on around them	—	—	—	—	—	—
Follow the road rules	—	—	—	—	—	—
Are responsible road users	—	—	—	—	—	—

Attitudes to car drivers

The following ask for your opinion on some statements about CAR DRIVERS in Victoria.

If you strongly disagree with the statement, give a rating of 1. If you strongly agree with the statement, give a rating of 5.

Most Victorian car drivers:

	(1=Strongly disagree; 5=Strongly agree)					
	1	2	3	4	5	NA
Are aware of what's going on around them	___	___	___	___	___	___
Always check their path is clear of other vehicles before changing lanes	___	___	___	___	___	___
Are responsible road users	___	___	___	___	___	___
Tend to travel over the speed limit	___	___	___	___	___	___
Are courteous on the road	___	___	___	___	___	___
Actively look for motorcyclists riding on the road	___	___	___	___	___	___
Dislike motorcyclists who make their own lane (i.e. lane split between traffic)	___	___	___	___	___	___
Don't consider how their actions will impact other road users	___	___	___	___	___	___
Follow the road rules	___	___	___	___	___	___

To what extent do you agree or disagree that:

	(1=Strongly disagree; 5=Strongly agree)					
	1	2	3	4	5	NA
Driving a car takes less skill than riding a motorcycle	___	___	___	___	___	___
Car drivers think they don't have to think as much when they have 'driver-assist' technology (e.g. parking sensors, ABS brakes)	___	___	___	___	___	___

Attitudes to motorcyclists

The following ask for your opinion on some statements about Victorian MOTORCYCLISTS.

If you strongly disagree with the statement, give a rating of 1. If you strongly agree with the statement, give a rating of 5.

Most Victorian motorcyclists:

	(1=Strongly disagree; 5=Strongly agree)					
	1	2	3	4	5	NA
Position themselves in a lane so they can be seen by drivers	___	___	___	___	___	___
Follow the road rules	___	___	___	___	___	___
Tend to travel over the speed limit	___	___	___	___	___	___
Are less skilled on the road than car drivers	___	___	___	___	___	___
Don't consider how their actions will impact other road users	___	___	___	___	___	___
Ride because they like to go fast	___	___	___	___	___	___
Are aware of the risks in riding a motorcycle	___	___	___	___	___	___
Frequently change lanes unexpectedly	___	___	___	___	___	___
Are responsible road users	___	___	___	___	___	___
Are aware of what's going on around them	___	___	___	___	___	___
Are courteous on the road	___	___	___	___	___	___

To what extent do you agree or disagree with the following statements:

	(1=Strongly disagree; 5=Strongly agree)					
	1	2	3	4	5	NA
Motorcyclists are easily seen in traffic	—	—	—	—	—	—
To get a Victorian motorcycle licence requires less training than to get a car licence	—	—	—	—	—	—
If a motorcyclist comes off their bike while turning a corner, it is most likely because they were going too fast	—	—	—	—	—	—
Motorcyclists who make their own lane (i.e. lane split between traffic) annoy other road users	—	—	—	—	—	—
Motorcyclists can stop as quickly as car drivers, regardless of the conditions	—	—	—	—	—	—
Motorcyclists are a hindrance or annoyance on the road	—	—	—	—	—	—

We define "crash" as when the rider "comes off" the motorcycle while on the road. A crash may or may not involve another road user.

To what extent do you agree or disagree that:

	(1=Strongly disagree; 5=Strongly agree)					
	1	2	3	4	5	NA
It is inevitable that a motorcycle rider will have a crash at some point during their riding career	—	—	—	—	—	—

Motorcycle crashes and near misses

We consider a "crash" as when the rider "comes off" the motorcycle while on the road. A crash may or may not involve another road user.

How many times have you been involved in a crash where you or someone else had an injury requiring medical attention...

	...in the past 2 years	...since you started riding
Number of "injury" crashes	_____	_____

How many times have you been involved in a crash where no-one was injured (requiring medical attention) but there was serious damage to your motorcycle or another vehicle...

	...in the past 2 years	...since you started riding
Number of "serious damage" crashes	_____	_____

How often have you had a "near miss" where there were no injuries and no vehicle damage, but you stopped to catch your breath or check others were ok...

	...in the past 2 years	...since you started riding
Number of "near misses"	_____	_____

Rider behaviour

In the past 12 months as a motorcycle rider, how often have you:
Options are:

Never; Rarely; Sometimes; Often; Always

	(1=Never; 2=Rarely; 3=Sometimes; 4=Often; 5=Always)					
	1	2	3	4	5	NA
Ridden a safe distance behind a vehicle in front of you	___	___	___	___	___	___
Raced other road users (motorcyclists or car drivers)	___	___	___	___	___	___
Pushed your limits so far that handling the motorcycle became difficult	___	___	___	___	___	___
Worn a full complement of protective gear while riding (helmet, jacket, pants, gloves and boots)	___	___	___	___	___	___
Ridden when you have had alcohol in your system	___	___	___	___	___	___
Raced away from traffic lights to get in front of traffic	___	___	___	___	___	___

In the past 12 months as a motorcycle rider, how often have you:

	(1=Never; 2=Rarely; 3=Sometimes; 4=Often; 5=Always)					
	1	2	3	4	5	NA
Had to brake quickly to avoid running into a vehicle stopping in front of you	___	___	___	___	___	___
Ridden recklessly for fun or to test your abilities	___	___	___	___	___	___
Ridden defensively	___	___	___	___	___	___
Bent some road rules to get in front of other vehicles	___	___	___	___	___	___
Lost concentration and nearly had an accident	___	___	___	___	___	___
Had trouble controlling the motorcycle while cornering	___	___	___	___	___	___
Ridden with constant vigilance	___	___	___	___	___	___

In the last two years AS A MOTORCYCLE RIDER, how many traffic infringement notices (in total) have you received?

This may include fines for speeding, running a red light, riding under the influence of drugs or alcohol, etc; but NOT including parking fines.

- | | |
|----------|------------------|
| ___ None | ___ 6 |
| ___ 1 | ___ 7 |
| ___ 2 | ___ 8 |
| ___ 3 | ___ 9 |
| ___ 4 | ___ 10 |
| ___ 5 | ___ More than 10 |

Driver behaviour

In the past 12 months as a car driver, how often have you:

	(1=Never; 2=Rarely; 3=Sometimes; 4=Often; 5=Always)					
	1	2	3	4	5	NA
Driven an unsafe distance behind a motorcyclist	___	___	___	___	___	___
Gotten angry with a motorcyclist	___	___	___	___	___	___
Pulled into a lane in front of a motorcyclist who has left a safe gap (e.g. 2 seconds) in front of them	___	___	___	___	___	___
Manoeuvred without performing all appropriate checks (e.g. mirrors, head checks)	___	___	___	___	___	___
Been surprised by the sudden appearing of a motorcyclist	___	___	___	___	___	___
Paid more attention to the speedometer than what's going on outside the car	___	___	___	___	___	___
Been distracted by what's going on inside the car and failed to notice a potentially dangerous situation	___	___	___	___	___	___

In the last two years AS A CAR DRIVER, how many traffic infringement notices (in total) have you received?

This may include fines for speeding, running a red light, using a mobile phone, driving under the influence of drugs or alcohol, etc; but NOT including parking fines.

- None 6
- 1 7
- 2 8
- 3 9
- 4 10
- 5 More than 10

Have you ever had a crash with a motorcyclist while you have been driving?

- Yes No

Situation awareness

The follow ask your opinion about car drivers in relation to motorcyclists.

If you disagree strongly with the statement, give a rating of 1. If you agree strongly with the statement, give a rating of 5.

To what extent do you agree or disagree that car drivers generally...

	(1=Strongly disagree; 5=Strongly agree)					
	1	2	3	4	5	NA
Are able to judge the speed of a motorcyclist	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are able to judge how far away a motorcyclist is from them	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have difficulty anticipating the behaviour of motorcyclists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Have a more obscured field of vision than motorcyclists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Perception of motorcycle rider crash risk

As you are not a current motorcycle rider, we would like your opinion on some statements about motorcyclists generally.

If you think the likelihood of the statement occurring is very low, give a rating of 1. If you think the likelihood is very high, give a rating of 5.

During a typical week's travel, how likely do you think it is that a motorcyclist will:

	Likelihood (1=Very low; 5=Very high)					
	1	2	3	4	5	NA
Encounter a driver who fails to give way	___	___	___	___	___	___
Concentrate fully on the traffic and road environment around them	___	___	___	___	___	___
Fail to see a potentially dangerous situation	___	___	___	___	___	___
Encounter a driver who does not appear to see them	___	___	___	___	___	___
Maintain correct lane positioning	___	___	___	___	___	___
Push their limits	___	___	___	___	___	___
Encounter poor road conditions (e.g. excessive visual clutter, poor road surfaces)	___	___	___	___	___	___
Abide by all road rules	___	___	___	___	___	___
React appropriately to a dangerous situation	___	___	___	___	___	___
Ride more carefully in poor weather	___	___	___	___	___	___

Perception of crash risk

We would like your opinion on some statements about when you ride your motorcycle.

If you think likelihood of the statement occurring is very low, give a rating of 1. If you think the likelihood is very high, give a rating of 5.

During a typical week's travel on your motorcycle, how likely is it that you will:

	Likelihood (1=Very low; 5=Very high)					
	1	2	3	4	5	NA
Encounter a driver who fails to give way	___	___	___	___	___	___
Concentrate fully on the traffic and road environment around you	___	___	___	___	___	___
Fail to see a potentially dangerous situation	___	___	___	___	___	___
Encounter a driver who does not appear to see you	___	___	___	___	___	___
Maintain correct lane positioning	___	___	___	___	___	___
Push your limits	___	___	___	___	___	___
Encounter poor road conditions (e.g. excessive visual clutter, poor road surfaces)	___	___	___	___	___	___
Abide by all road rules	___	___	___	___	___	___
React appropriately to a dangerous situation	___	___	___	___	___	___
Ride more carefully in poor weather	___	___	___	___	___	___

Thank you

Is there anything else you would like to tell us about your on-road experiences, or about this survey? If so, please detail below.

Where did you hear about this survey?

- A friend, colleague or family member forwarded the link
- www.bikedeadline.com.au
- www.autodeadline.com.au
- www.netrider.net.au
- www.ma.org.au
- Ad on Facebook
- RACV website
- OpinionWorld
- Other website (please specify) _____
- Other (please describe) _____

Would you be interested in participating in future research?

- Yes
- No

Thank you very much for completing this survey.

If you would like to be entered into the draw to win 1 of 2 gift vouchers valued at \$250 (each), please leave your contact details on the following page.

Please note that your contact details will not be linked to your answers. We will retain your details for the sole purpose of contacting you should you win a prize. Your details WILL NOT be given to any third party.

Thank you for completing this survey.

Appendix C: Facebook advertisement



Appendix D: Demographic characteristics of drivers and riders

Characteristics of riders

Basic demographic questions were asked of all respondents, the results of which appear below.

The majority of riders (75%) were married or in a de facto relationship (*Figure A1*).

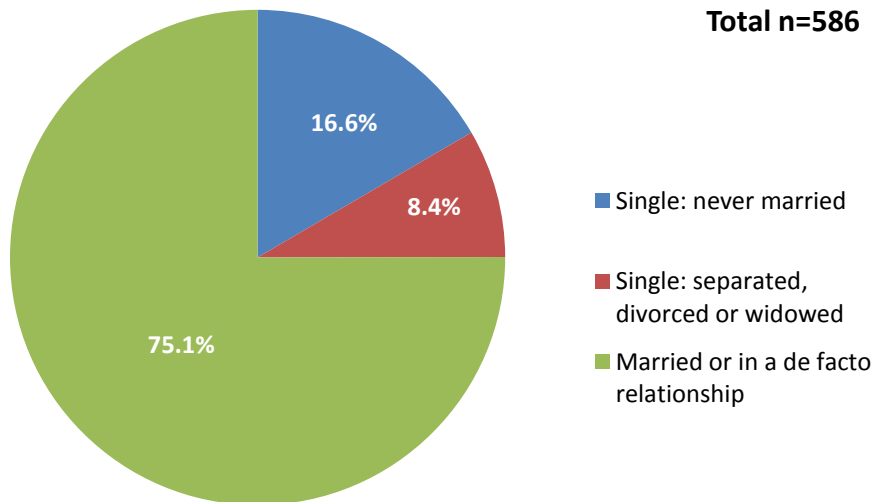


Figure A1: What best describes your marital status?

Just under half (40%) of motorcyclists reported having dependent children (*Figure A2*).

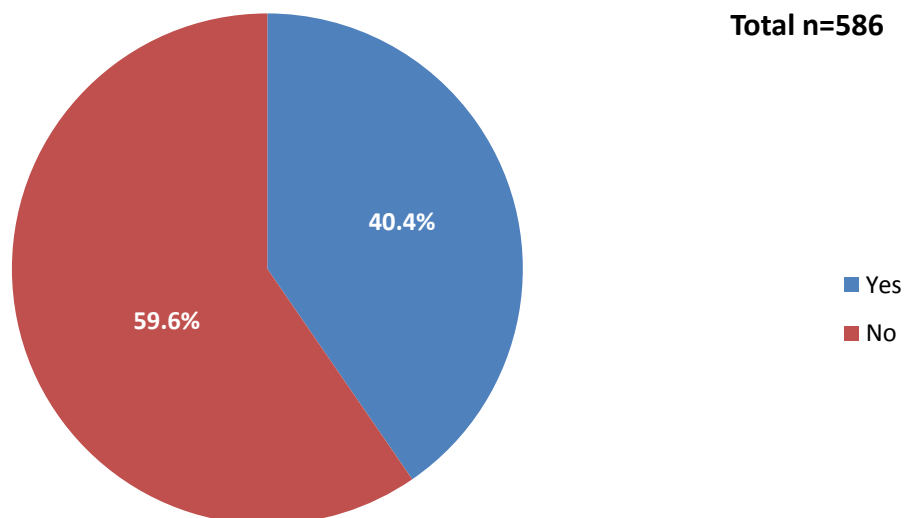


Figure A2: Do you have any dependent children?

Most riders do not currently drive a bus, truck or heavy vehicle (*Figure A3*).

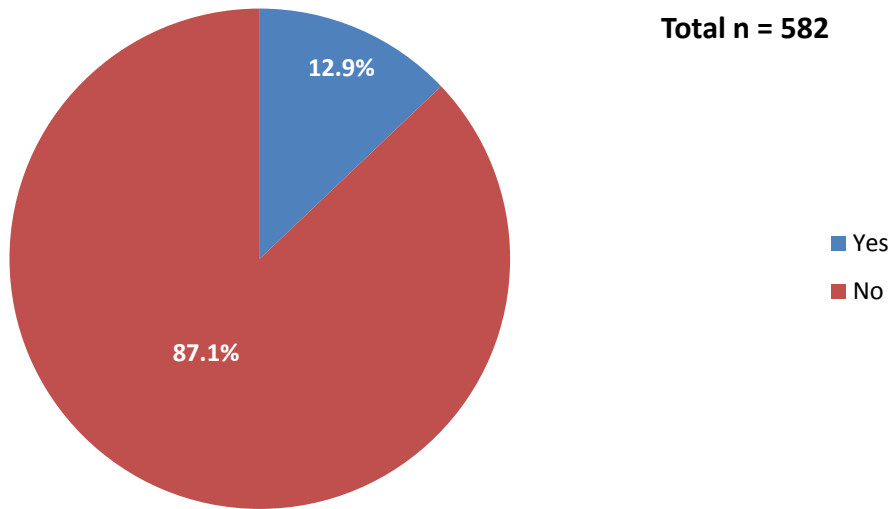


Figure A3: Do you currently drive a bus, truck or heavy vehicle (over 4.5 tonnes)?

Most riders (92%) have a full motorcycle licence (Figure A4).

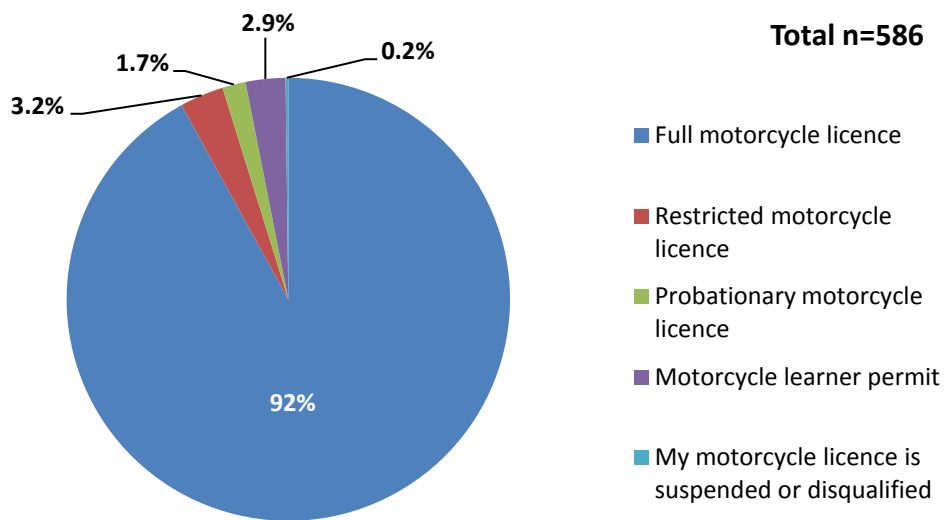


Figure A4: What is your current motorcycle licence status?

Just over half of riders report having 10 or more years riding experience (Table A1).

Approximately how many years have you been riding motorcycles?

	N	Percent (%)
1 or less	57	9.0
2-5	154	24.4
6-9	51	8.1
10-15	102	16.2
15-20	51	8.1
20-30	81	12.9
30-40	99	15.7
More than 40	35	5.6
Total	630	100.0

Table A1: Riding experience

Most riders (97%) also have a full car licence (Table A2).

What is your current car licence status?

	N	Percent (%)
Full car licence	565	96.9
Probationary car licence	4	0.7
Car learner permit	8	1.4
My car licence has expired or was surrendered	2	0.3
Don't currently have a car licence	1	0.2
Other	3	0.5
Total	583	100.0

Table A2: Car licence status for motorcycle riders

Just over 65% of riders reported 'rarely' or 'never' carrying a pillion (*Figure A5*).

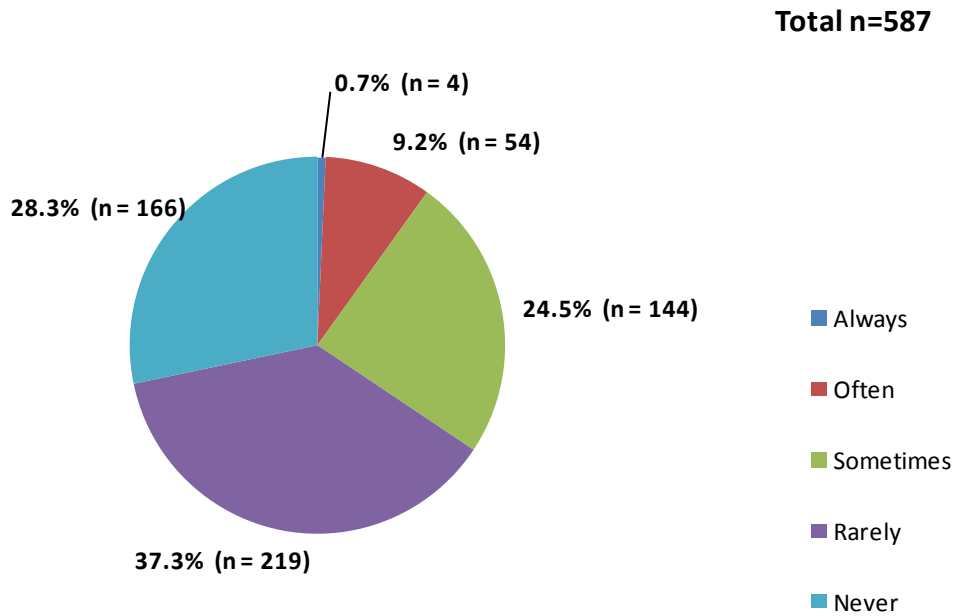


Figure A5: How often do you ride with a pillion passenger?

Characteristics of car drivers (only)

The majority of drivers hold a full car licence (92%) (*Figure A6*).

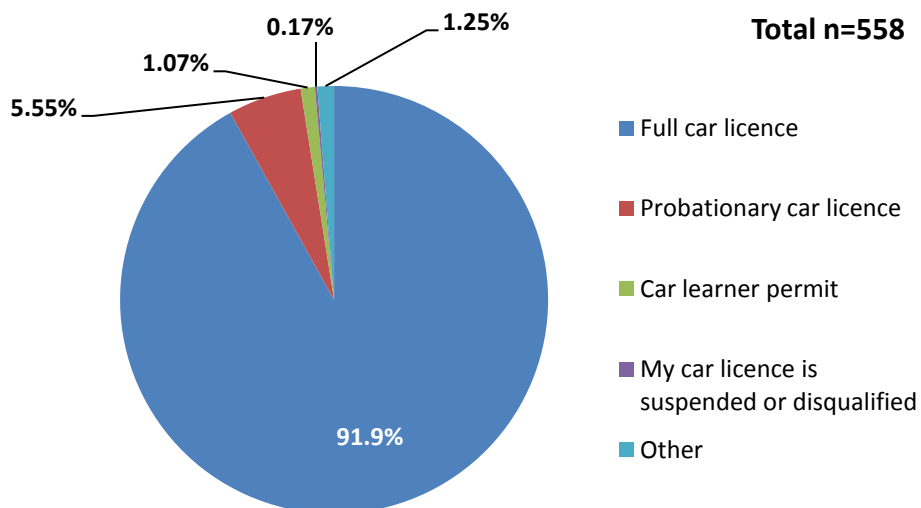


Figure A6: What is your current car licence status?

Just over half of drivers had 20 years or more driving experience (*Table A3*).

Approximately how many years have you been driving cars?

	N	Percent (%)
1 or less	8	1.5
2-5	40	7.4
6-9	42	7.8
10-15	81	15.0
15-20	64	11.9
20-30	133	24.7
30-40	108	20.0
More than 40	63	11.7
Total	539	100.0

Table A3: Participants driving experience

How long has it been since you last rode a motorcycle on a public road?

	N	Percent (%)
Less than 1 year	17	15.0
1-2 years	13	11.4
3-5 years	14	12.3
6-10 years	14	12.3
More than 10 years	56	49.1
Total	114	100.0

Table A4: Years since last ridden for drivers who had previously ridden motorcycle.

All respondents were asked about traffic infringements received in the past 2 years, either as a motorcycle rider or as a car driver. Responses were provided via a drop-down menu from "none" to "more than 10".

Traffic infringements - riders

Most riders have not received a traffic infringement notice in the past two years (77%) (Figure A7).

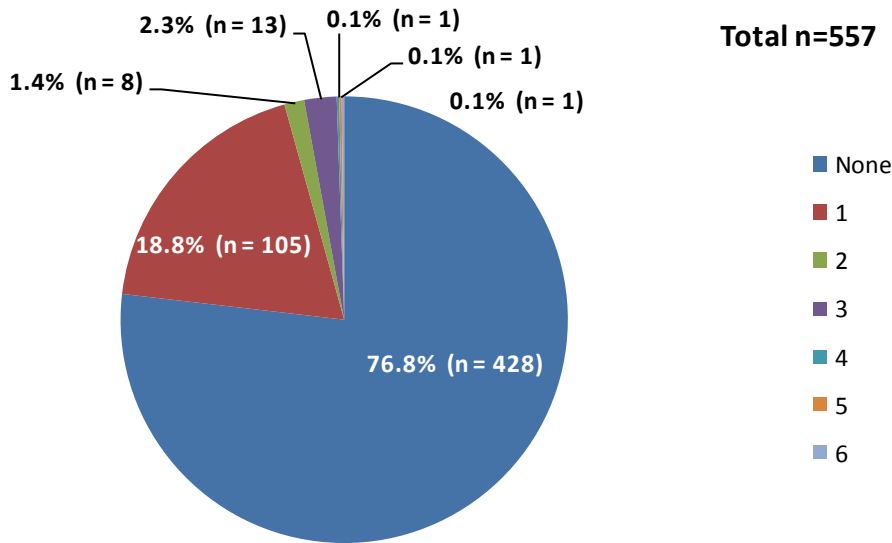


Figure A7: In the last two years AS A MOTORCYCLE RIDER, how many traffic infringement notices (in total) have you received?

Traffic infringements - drivers

Two-thirds of drivers have not received a traffic infringement notice in the past two years (66%). Just over 5% of drivers have received 3 or more fines in the past two years (Figure A8).

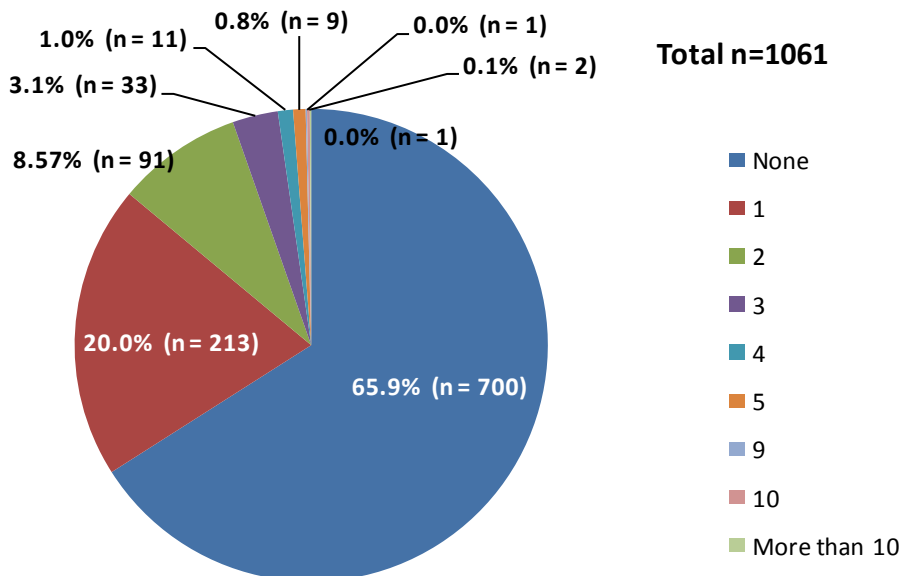


Figure A8: In the last two years AS A CAR DRIVER, how many traffic infringement notices (in total) have you received?